# SAF-RC-051
# 100 & 300 Area Component of the RCBRA - Incremental Soil Sampling FINAL DATA PACKAGE

**COMPLETE COPY OF DATA PACKAGE TO:**

| | | |
|---|---|---|
| Jill Thomson | H0-23 | ____NB 3/29/06<br>INITIAL/DATE |
| Jeanette Duncan | H9-02 | ___NB 3/29/06<br>INITIAL/DATE |

**COMMENTS:**

SDG _E2847____ SAF-RC-051

Rad only X Chem only Rad & Chem

X Complete Partial

## Waste Site: Upland Backfill Low-116-DR 1& 2

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APR 2 4 2006
EDMC

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MAR 2006

# BIOASSAY REPORT
## CHRONIC SCREENING BIOASSAYS
**Conducted January 25 through March 3, 2006**

Prepared for

ELR CONSULTING, INC.
WASHINGTON CLOSURE HANFORD

Prepared by

CH2M HILL
2300 NW Walnut Boulevard
Corvallis, Oregon 97330

March 28, 2006
Lab I.D. Nos. B1542-01 thru 09
SDG Number BG1542

SDG: E2847
SAF: RC-051

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## INTRODUCTION

CH2M HILL conducted chronic screening bioassay tests using the Sandberg bluegrass (*Poa sandbergii*) on soil samples provided by the ELR Consulting for Washington Closure Hanford, Richland, Washington. The tests were conducted from January 25 through March 3, 2006.

## METHODS AND MATERIALS

### TEST METHODS

The chronic test methods were performed according to: *Standard Guide for Conducting Terrestrial Plant Toxicity Tests*, ASTM E 1963-02 (2002).

### TEST ORGANISMS

The seeds used were obtained from Native Grass Seeds, Cornville, Arizona. All test conditions were maintained during planting, germination, and growth phases of the test as prescribed by the ASTM protocol.

### CONTROL SOIL

The control soil used in the tests was artificial soil comprised of 70 grade silica sand (70 percent by weight), kaolin clay (20 percent), and peat moss (10 percent). Calcium carbonate (0.4 percent of total weight) was added to adjust soil pH to 7.0 ± 0.5.

### HYDRATION WATER

The water used to initially hydrate the control and test soils was Milli-Q equivalent de-ionized water. After initial hydration, all test chambers were watered with half strength Hoagland's solution on an every other day basis. All hydration was accomplished via sub irrigation.

### TEST CONCENTRATIONS

The concentration tested in the bluegrass tests was 100 percent test soil with control soil alone for the lab control. For the bluegrass tests, 50 seeds per concentration were used with five replicate test chambers per concentration and 10 seeds planted per chamber. Following germination, test chambers were thinned to a maximum five seedlings per replicate.

## SAMPLE COLLECTION

Individual soil samples used during the testing were collected between October 31, 2005, and December 6, 2005. The samples were stored in the dark at 4°C until the initiation of the initiation of the tests. 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, Bluegrass test sample identification (SDG) numbers, and Analytical Lab SDG numbers.

**Table 1**
**Sample Cross-Reference**

| Client ID | Sample Date | Sample Location | Bluegrass test SDG | Analytical Lab SDG | |
|---|---|---|---|---|---|
| J10DW4 | 10/31/2005 | 600-131 | BG1542-01 | E2748 | -Rerun |
| J10DV4 | 11/08/2005 | PIT 23 | BG1542-02 | E2801 | -Rerun |
| J10DT8 | 11/14/2005 | Upland Backfill Elevated-100-F-2 | BG1542-03 | E2831 | -Rerun |
| J10DV2 | 11/15/2005 | Upland Native Reference-Central Plateau | BG1542-04 | E2846 | |
| J10DV1 | 11/15/2005 | Upland Backfill Low-116-DR-1&2 | BG1542-05 | E2847 | |
| J10DV3 | 11/16/2005 | Upland Native Elevated-JA Jones | BG1542-06 | E2857 | |
| J10DV0 | 11/21/2005 | Riparian Elevated-Site #3 Upriver 100-D | BG1542-07 | E2877 | |
| J10LJ5 | 11/28/2005 | Riparin Low-Site #10 Downriver 100-D | BG1542-08 | E2897 | -Rerun |
| J10DT9 | 12/06/2005 | Riparian Reference-Site #13 Vernita Bridge | BG1542-09 | E2953 | |

## SAMPLE PREPARATION

Test soils and control soil were dried and homogenized prior to use. For each replicate, 90 grams dry weight of soil was added to each test chamber. The soils were initially hydrated with Milli-Q equivalent de-ionized water via sub irrigation. In addition, a sub sample of the soil was added to a surrogate chamber and hydrated for pH measurements.

## TEST INITIATION

Tests were initiated by planting 10 seeds in each test chamber. Seeds were planted at a depth of 1 ½ times the seeds diameter (approximately 2 millimeters) and covered gently with soil. A small amount of hydration water (10 ml) was sprayed onto the soil surface to ensure seeds received moisture.

## TEST MONITORING

According to information provided by Native Grass Seed (seed supplier), germination should take place between 14 and 28 days. The number of seeds in each test chamber that had germinated was recorded on days 12, 14, 16, 21, and 23. Germination was determined to have occurred on day 23.

Observations of the shoot appearance were recorded 7 days after germination (30 days after planting). The number of germinated seeds in each test chamber was also recorded. Chambers that had more than five germinated seeds had shoots removed to prevent overcrowding. These test chambers were thinned to five seedlings each.

Soil pH was taken at test initiation and termination by placing a subsample of soil into a specimen cup, adding hydration water, and mixing prior to the pH measurement.

## TEST TERMINATION

Tests were terminated 14 days post germination. The number of seedlings, shoot appearance and height (tallest shoot of each plant), and root appearance and length (longest recovered root of each plant) was recorded.

For each test chamber, all of the above ground biomass (i.e. shoots) from all germinated plants were combined and placed into tarred aluminum tins. The shoots were weighed to determine the wet weight immediately following removal from the test chamber. The shoots were then dried in an oven at 60 °C for a minimum of 24 hours. The shoots were then placed into a desiccator for a minimum of 2 hours and weighed to determine dry weight.

The wet and dry weight for the roots were obtained following the same procedure as described above.

## DATA ANALYSIS

For each test chamber, the following endpoints were calculated:

- 14 Day Post-Germination Survival (%)
  (Calculated as the number of seedlings alive at 14 day post germination divided by 5)
- Average Above Ground Shoot Mass (Wet)
  (Calculated as the total wet weight of the shoots divided by the number of seedlings harvested)
- Average Above Ground Shoot Mass (Dry)
  (Calculated as the total dry weight of the shoots divided by the number of seedlings harvested)
- Average Root Mass (Wet)
  (Calculated as the total wet weight of the roots divided by the number of seedlings harvested)
- Average Root Mass (Dry)
  (Calculated as the total dry weight of the roots divided by the number of seedlings harvested)
- Average Total Mass (Wet)
  (Calculated as the total combined wet weights of the shoots and roots divided by the number of seedlings harvested)
- Average Total Mass (Dry)
  (Calculated as the total combined dry weights of the shoots and roots divided by the number of seedlings harvested)
- Average Shoot Height
  (Calculated as the total combined height of the tallest shoot of each seedling divided by the number of seedlings harvested)
- Average Root Length
  (Calculated as the total combined length of the longest root of each seedling divided by the number of seedlings harvested)

Note: Due to a laboratory error; the Shoot Height for samples J10DT8 and J10LJ5, was measured only for the single tallest shoot in each replicate. Similarly, the Root Length for samples J10DW4, J10DV4, J10DT8, and J10LJ5, was measured only for the single longest root from each replicate. As a result, statistical analysis for these endpoints on these samples was not performed.

Statistical analysis for each endpoint listed comprised of entering the data obtained from each replicate chamber of a test soil and comparing the results to the data from the replicate chambers of the laboratory control. Comparisons were made as a single tailed t-test, evaluating for statistically significant reductions from the control value, using CETIS version 1.1.2. The Equal Variance t Two-Sample test was used. When the assumptions of equality of variance or normality necessary for Equal Variance t Two-Sample test was not met, the Unequal Variance t Two-Sample test or Wilcoxon Rank Sum Two Sample test was used.

The endpoint data and the results statistical analysis are summarized in Table 2 below. The data represents the average value of the replicate chambers used in each test concentration.

## RESULTS AND DISCUSSION

Table 2 summarizes the results of the bluegrass tests.

The results for sample J10DW4 indicated a statistically significant reduction in germination, average above ground shoot mass (wet), average above ground shoot mass (dry), average root mass (dry), average total mass (shoots + roots wet), and average total mass (shoots + roots dry) when compared to the laboratory control.

The results for sample J10DV1 indicated a statistically significant reduction in germination, average above ground shoot mass (wet), average above ground shoot mass (dry), average root mass (wet), average root mass (dry), average total mass (shoots + roots wet), and average total mass (shoots + roots dry) when compared to the laboratory control.

The results for sample J10DT9 indicated a statistically significant reduction in germination when compared to the laboratory control.

**Table 2: Bluegrass Chronic Test Results for Washington Closure Hanford**

E, statistically significant difference from lab control by use of Equal Variance t Two-Sample Test

ns indicates a non statistically significant result; *, indicates statistically significant at alpha (α) = 0.05; --, indicates no statistical test performed.

| Lab ID: Sample Number: | Bluegrass 14 day Germination Endpoint (%) | Significantly different compared to Lab Control? | Bluegrass Average Stem Height (mm) | Significantly different compared to Lab Control? | Bluegrass Average Root Length (mm) | Significantly different compared to Lab Control? | Average Above Ground Shoot Mass (Wet) (mg) | Significantly different compared to Lab Control? | Average Above Ground Shoot Mass (Dry) (mg) | Significantly different compared to Lab Control? | Average Root Mass (Wet) (mg) | Significantly different compared to Lab Control? | Average Root Mass (Dry) (mg) | Significantly different compared to Lab Control? | Average Total Mass (Shoots + Roots) (Wet) (mg) | Significantly different compared to Lab Control? | Average Total Mass (Shoots + Roots) (Dry) (mg) | Significantly different compared to Lab Control? |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Tests initiated on Jan 25, 2006 | | | | | | | | | | | | | | | | | | |
| Laboratory Control | 88 | -- | 10.0 | -- | 36.5 | -- | 63.9 | -- | 12.35 | -- | 113.2 | -- | 7.87 | -- | 177.1 | -- | 20.22 | -- |
| BG1542-01 J10DW4 | 80 | E * | 14.0 | ns | -- | -- | 40.5 | E * | 7.30 | E * | 72.4 | ns | 3.27 | E * | 112.9 | E * | 10.57 | E * |
| BG1542-02 J10DV4 | 84 | ns | 20.3 | ns | -- | -- | 75.2 | ns | 14.85 | ns | 122.8 | ns | 5.98 | ns | 198.9 | ns | 21.83 | ns |
| BG1542-03 J10DT9 | 84 | ns | -- | -- | -- | -- | 80.9 | ns | 16.72 | ns | 172.1 | ns | 19.00 | ns | 253.0 | ns | 28.72 | ns |
| BG1542-04 J10DV2 | 72 | ns | 15.1 | ns | 39.8 | ns | 58.5 | ns | 10.67 | ns | 101.0 | ns | 6.59 | ns | 159.5 | ns | 17.26 | ns |
| BG1542-05 J10DV1 | 36 | E * | 22.4 | ns | 52.2 | ns | 25.0 | E * | 6.70 | E * | 41.0 | E * | 3.33 | E * | 71.8 | E * | 10.03 | E * |
| BG1542-06 J10DV3 | 64 | ns | 23.7 | ns | 54.1 | ns | 69.4 | ns | 5.13 | ns | 84.5 | ns | 14.85 | ns | 145.0 | ns | 14.05 | ns |
| BG1542-07 J10DV0 | 76 | ns | 11.7 | ns | 23.8 | ns | 76.0 | ns | 14.98 | ns | 123.0 | ns | 9.10 | ns | 200.8 | ns | 23.78 | ns |
| BG1542-08 J10LJ5 | 92 | ns | -- | -- | -- | -- | 79.3 | ns | 10.96 | ns | 127.5 | ns | 5.37 | ns | 205.8 | ns | 16.34 | ns |
| BG1542-09 J10DT8 | 48 | E * | 19.3 | ns | 38.9 | ns | 51.0 | ns | 8.66 | ns | 90.7 | ns | 8.06 | ns | 141.7 | ns | 13.72 | ns |

**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

## BLUEGRASS GROWTH TEST

Client: Hanford Project — Test Start Date: 01/25/2006 — ok 33-06

Initials: Day 0 Br Day 12 NJ Day 14 Br Day 16 Br Day 21 [illegible] Day 28 Br DH37 Br

| Sample ID: Lab Control (70% 70 grade silica sand, 20% clay, 10% peat) | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | # seeds germinated | | | #alive | | | | pH | |
| CONC. | REPLICATE | PRE-EMERGENCE (12 days after planting) | @ EMERGENCE (14 days after planting) | POST-EMERGENCE (16 days after planting) | 21 | 7-DAYS POST-EMERGENCE (21 days after planting) 23 | 28 30 | 14-DAYS POST-EMERGENCE (28 days after planting) 35 | INITIAL (@ planting) | FINAL (28 days after planting) |
| Control | A | 2 | 3 | 3 | 3 | 5 | 5 | 5 | 6.7 | 6.4 |
| | B | 1 | 3 | 6 | 7 | 7 | 7→5 | 5 | | |
| | C | 5 | 6 | 7 | 7 | 7 | 5 | 5 | | |
| | D | 0 | 2 | 2 | 4 | 4 | 3 | 3 | | |
| | E | 2 | 3 | 3 | 3 | 3 | 3 | 4 | | |

7-Days Post-Emergence: Selectively thin down to 5 Seedlings (leave the 5 tallest seedlings). Describe shoot appearance: Br 2.

Replicate A: 3 large plants w/ good color & multiple stems, 2 smaller
Replicate B: 7 medium plants, multiple stalks - pared down to 5 (removed smallest)
Replicate C: 1 large, 4 medium w/ good color - 2 dead & dried (1 medium has 1 brown stalk)
Replicate D: 1 medium, 2 small (1 w/ 1 brown stalk) + 1 small dead
Replicate E: 3 medium all good condition

14-Days Post-Emergence: Describe shoot appearance:

Replicate A: 3 med + 2 sm - good color - no brown
Replicate B: 5 med - good color - no brown
Replicate C: 1 lg + 4 med - good - 1 med w/ 1 brown shoot
Replicate D: 1 med + 2 sm - good
Replicate E: 3 medium + 1 small - good w/ 1 medium having 2 brown shoots

Measure Shoot Height: (above ground)

| | 1st Seedling | 2nd Seedling | 3rd Seedling | 4th Seedling | 5th Seedling | # shoots/Grades |
|---|---|---|---|---|---|---|
| Replicate A | 66 mm | 43 mm | 36 mm | 65 mm | 43 mm | 11, 13, 4, 15, 4 |
| Replicate B | 42 mm | 43 mm | 39 mm | 41 mm | 44 mm | 9, 13, 8, 11, 7 |
| Replicate C | 54 mm | 87 mm | 48 mm | 45 mm | 45 mm | 13, 18, 12, 11, 10 |
| Replicate D | 50 mm | 28 mm | 32 mm | mm | mm | 13, 5, 3 |
| Replicate E | 64 mm | 49 mm | 45 mm | 16 mm | mm | 12, 15, 11, 2 |

Measure Shoot Weight: (above ground)

| | Tin Tare Wt. (mg) | Wet Wt (mg) | Dry Wt. (mg) |
|---|---|---|---|
| Replicate A | 993.05 | 1329.5 | 1068.91 |
| Replicate B | 993.45 | 1269.4 | 1046.21 |
| Replicate C | 981.31 | 1393.0 | 1077.69 |
| Replicate D | 1004.53 | 1224.2 | 1031.01 |
| Replicate E | 977.10 | 1143.0 | 1008.81 |

Describe root appearance:

Replicate A
Replicate B
Replicate C
Replicate D
Replicate E

Measure Root Length: (longest root)

| | 1st Seedling | 2nd Seedling | 3rd Seedling | 4th Seedling | 5th Seedling |
|---|---|---|---|---|---|
| Replicate A | 148 mm | 139 mm | 74 mm | 118 mm | 215 mm |
| Replicate B | 138 mm | 143 mm | 144 mm | 135 mm | 150 mm |
| Replicate C | 153 mm | 158 mm | 135 mm | 164 mm | 156 mm |
| Replicate D | 157 mm | 71 mm | 70 mm | mm | mm |
| Replicate E | 78 mm | 47 mm | 76 mm | 158 mm | mm |

Measure Root Weight: (longest root)

| | Tin Tare Wt. (mg) | Wet Wt (mg) | Dry Wt. (mg) |
|---|---|---|---|
| Replicate A | 987.99 | 1704.8 | 1031.77 |
| Replicate B | 977.88 | 1681.0 | 1019.85 |
| Replicate C | 993.58 | 1786.2 | 1084.12 |
| Replicate D | 981.03 | 1197.1 | 992.37 |
| Replicate E | 976.75 | 1233.3 | 993.93 |

Comments: 60g dry wt./rep

## BLUEGRASS GROWTH TEST

Client: Hanford Project

Test Start Date: 01/25/2006

Initials: Day 0 Br Day 12 NJ Day 14 Br Day 16 NJ Day 21 [illegible] Day 30 NJ

Sample ID: E274801-SO12 B1542-01

| CONC. | REPLICATE | PRE-EMERGENCE (12 days after planting) | @ EMERGENCE (14 days after planting) | POST-EMERGENCE (16 days after planting) | | 7-DAYS POST-EMERGENCE (21 days after planting) | | 14-DAYS POST-EMERGENCE (28 days after planting) | pH INITIAL (@ planting) | pH FINAL (28 days after planting) |
|---|---|---|---|---|---|---|---|---|---|---|
| | | # seeds germinated | | | | | | | | |
| | | | | | 21 | 23 | 30 | | | |
| 100% | A | 0 | 3 | 3 | 3 | 3 | 3 | 3 | 6.9 | 6.8 |
| | B | 1 | 2 | 3 | 3 | 4 | 2 | 2 | | |
| | C | 0 | 1 | 1 | 3 | 3 | 2 | 2 | | |
| | D | 1 | 2 | 3 | 4 | 4 | 4 | 4 | | |
| | E | 0 | 2 | 4 | 4 | 4 | 4 | 4 | | |

7-Days Post-Emergence: Selectively thin down to 5 Seedlings (leave the 5 tallest seedlings). Describe shoot appearance:

Replicate A: 3 medium plants w/ multiple green shoots.

Replicate B: 1 medium in good shape + 1 medium w/ 3 green & 1 brown shoot, + 2 small dead plants

Replicate C: 2 medium in good shape + 1 small dead single shoot

Replicate D: 2 medium in good shape + 2 medium w/ browning tips on 1 shoot each.

Replicate E: 3 medium in good shape + 1 medium w/ 3 green & 1 brown shoot.

14-Days Post-Emergence: Describe shoot appearance:

Replicate A: 3 medium plants

Replicate B: 2 small plants / has a brown shoot

Replicate C: 2 small plants

Replicate D: 4 small/med plants / has brown shoot

Replicate E: 3 med / 1 small plant small plant has 4 brown shoots

Measure Shoot Height: (above ground)

| | 1st Seedling | 2nd Seedling | 3rd Seedling | 4th Seedling | 5th Seedling | # shoots |
|---|---|---|---|---|---|---|
| Replicate A | 41 mm | 40 mm | 50 mm | — mm | — mm | 7, 9, 10 |
| Replicate B | 45 mm | 34 mm | — mm | — mm | — mm | 5, 6 |
| Replicate C | 30 mm | 37 mm | — mm | — mm | — mm | 11, 4 |
| Replicate D | 61 mm | 40 mm | 35 mm | 40 mm | — mm | 14, 8, 7, 8 |
| Replicate E | 55 mm | 45 mm | 45 mm | 40 mm | — mm | 5, 6, 10, 9 |

Measure Shoot Weight: (above ground)

| | Tin Tare Wt. (mg) | Wet Wt (mg) | Dry Wt. (mg) |
|---|---|---|---|
| Replicate A | 1018.53 | 1184.9 | 1050.44 |
| Replicate B | 993.52 | 1032.6 | 1000.87 |
| Replicate C | 999.72 | 1076.3 | 1010.18 |
| Replicate D | 992.70 | 1154.4 | 1019.37 |
| Replicate E | 1036.15 | 1231.8 | 1077.30 |

Describe root appearance:

Replicate A

Replicate B

Replicate C

Replicate D

Replicate E

Measure Root Length: (longest root)

| | 1st Seedling | 2nd Seedling | 3rd Seedling | 4th Seedling | 5th Seedling |
|---|---|---|---|---|---|
| Replicate A | 115 mm | mm | mm | mm | mm |
| Replicate B | 100 mm | mm | mm | mm | mm |
| Replicate C | 119 mm | mm | mm | mm | mm |
| Replicate D | 87 mm | mm | mm | mm | mm |
| Replicate E | 130 mm | mm | mm | mm | mm |

Measure Root Weight: (longest root)

| | Tin Tare Wt. (mg) | Wet Wt (mg) | Dry Wt. (mg) |
|---|---|---|---|
| Replicate A | 1022.45 | 1367.6 | 1036.40 |
| Replicate B | 1012.46 | 1094.3 | 1017.15 |
| Replicate C | 1003.84 | 1092.6 | 1007.87 |
| Replicate D | 990.52 | 1324.7 | 1003.66 |
| Replicate E | 988.23 | 1313.1 | 1004.41 |

Comments: 90 g dry wt. / rep

# CETIS Test Summary

Report Date: 10 Mar-06 2:57 PM
Test Link: 19-6708-8127/B154201psc

**Plant Chronic test** — **CH2M Hill**

| | | | | | |
|---|---|---|---|---|---|
| Test No: | 03-9091-7145 | Test Type: | Plant Chronic test | Duration: | 37d 0h |
| Start Date: | 25 Jan-06 | Protocol: | ASTM E1963-02 (2002) | Species: | Poa sandbergii |
| Ending Date: | 03 Mar-06 | Dil Water: | | Source: | |
| Setup Date: | 25 Jan-06 12:00 AM | Brine: | | | |
| Comments: | E274801 | | | | |

| | | | | | |
|---|---|---|---|---|---|
| Sample No: | 18-1426-8954 | Code: | B1542-01 | Client: | |
| Sample Date: | 31 Oct-05 | Material: | Soil | Project: | |
| Receive Date: | | Source: | Hanford | | |
| Sample Age: | 86d 0h | Station: | | | |
| Comments: | J10DW4, E274801 | | | | |

**Comparison Summary**

| Analysis | Endpoint | NOEL | LOEL | ChV | PMSD | Method |
|---|---|---|---|---|---|---|
| 08-2631-8684 | % Germination | < 100 | 100 | N/A | 23.72% | Equal Variance t Two-Sample |
| 11-3105-6016 | AG Average Dry Wt. | < 100 | 100 | N/A | 38.24% | Equal Variance t Two-Sample |
| 16-3143-7290 | AG Average Height | 100 | > 100 | N/A | 31.73% | Equal Variance t Two-Sample |
| 10-9196-2081 | AG Average Wet Wt. | < 100 | 100 | N/A | 27.27% | Equal Variance t Two-Sample |
| 04-0460-7096 | Root Average Dry Wt. | < 100 | 100 | N/A | 45.60% | Equal Variance t Two-Sample |
| 07-1811-0773 | Root Average Wet Wt. | 100 | > 100 | N/A | 41.42% | Equal Variance t Two-Sample |
| 11-7102-7292 | Total Average Biomass Dry | < 100 | 100 | N/A | 40.05% | Equal Variance t Two-Sample |
| 02-3271-9163 | Total Average Biomass Wet | < 100 | 100 | N/A | 33.72% | Equal Variance t Two-Sample |

# CETIS Test Summary

Report Date: 10 Mar-06 2:57 PM
Test Link: 19-6708-8127/B154201psc

**% Germination Summary**

| Conc-% | Control Type | Reps | Mean | Minimum | Maximum | SE | SD | CV |
|---|---|---|---|---|---|---|---|---|
| 0 | Dilution Water | 5 | 0.88000 | 0.60000 | 1.00000 | 0.08000 | 0.17889 | 20.33% |
| 100 | | 5 | 0.60000 | 0.40000 | 0.80000 | 0.08944 | 0.20000 | 33.33% |

**AG Average Dry Wt. Summary**

| Conc-% | Control Type | Reps | Mean | Minimum | Maximum | SE | SD | CV |
|---|---|---|---|---|---|---|---|---|
| 0 | Dilution Water | 5 | 12.351 | 7.9275 | 19.276 | 2.1347 | 4.7733 | 38.65% |
| 100 | | 5 | 7.2993 | 3.675 | 10.637 | 1.3763 | 3.0775 | 42.16% |

**AG Average Height Summary**

| Conc-% | Control Type | Reps | Mean | Minimum | Maximum | SE | SD | CV |
|---|---|---|---|---|---|---|---|---|
| 0 | Dilution Water | 5 | 10.627 | 8.4 | 12.333 | 0.6527 | 1.4595 | 13.73% |
| 100 | | 5 | 14.833 | 11 | 20 | 1.6915 | 3.7823 | 25.50% |

**AG Average Wet Wt. Summary**

| Conc-% | Control Type | Reps | Mean | Minimum | Maximum | SE | SD | CV |
|---|---|---|---|---|---|---|---|---|
| 0 | Dilution Water | 5 | 63.903 | 41.475 | 82.338 | 7.1313 | 15.946 | 24.95% |
| 100 | | 5 | 40.525 | 19.54 | 55.457 | 6.0773 | 13.589 | 33.53% |

**Root Average Dry Wt. Summary**

| Conc-% | Control Type | Reps | Mean | Minimum | Maximum | SE | SD | CV |
|---|---|---|---|---|---|---|---|---|
| 0 | Dilution Water | 5 | 7.8666 | 3.78 | 14.108 | 1.8839 | 4.1678 | 52.98% |
| 100 | | 5 | 3.268 | 2.015 | 4.6500 | 0.4968 | 1.1108 | 33.99% |

**Root Average Wet Wt. Summary**

| Conc-% | Control Type | Reps | Mean | Minimum | Maximum | SE | SD | CV |
|---|---|---|---|---|---|---|---|---|
| 0 | Dilution Water | 5 | 113.23 | 51.638 | 158.52 | 21.449 | 47.962 | 42.36% |
| 100 | | 5 | 72.356 | 40.920 | 111.72 | 13.274 | 29.681 | 41.02% |

**Total Average Biomass Dry Wt. Summary**

| Conc-% | Control Type | Reps | Mean | Minimum | Maximum | SE | SD | CV |
|---|---|---|---|---|---|---|---|---|
| 0 | Dilution Water | 5 | 20.217 | 12.223 | 33.384 | 3.9407 | 8.8117 | 43.58% |
| 100 | | 5 | 10.567 | 6.02 | 15.287 | 1.8513 | 4.1395 | 39.17% |

**Total Average Biomass Wet Wt. Summary**

| Conc-% | Control Type | Reps | Mean | Minimum | Maximum | SE | SD | CV |
|---|---|---|---|---|---|---|---|---|
| 0 | Dilution Water | 5 | 177.14 | 93.113 | 240.86 | 26.086 | 58.331 | 32.93% |
| 100 | | 5 | 112.88 | 60.46 | 167.17 | 18.747 | 41.919 | 37.14% |

# CETIS Test Summary

Report Date: 10 Mar-06 2:57 PM
Test Link: 19-6708-8127/B154201psc

**% Germination Detail**

| Conc-% | Control Type | Rep 1 | Rep 2 | Rep 3 | Rep 4 | Rep 5 |
|---|---|---|---|---|---|---|
| 0 | Dilution Water | 1.00000 | 1.00000 | 1.00000 | 0.60000 | 0.80000 |
| 100 | | 0.60000 | 0.40000 | 0.40000 | 0.80000 | 0.80000 |

**AG Average Dry Wt. Detail**

| Conc-% | Control Type | Rep 1 | Rep 2 | Rep 3 | Rep 4 | Rep 5 |
|---|---|---|---|---|---|---|
| 0 | Dilution Water | 15.1720 | 10.552 | 19.276 | 8.82666 | 7.92751 |
| 100 | | 10.6366 | 3.67499 | 5.23001 | 6.6675 | 10.2875 |

**AG Average Height Detail**

| Conc-% | Control Type | Rep 1 | Rep 2 | Rep 3 | Rep 4 | Rep 5 |
|---|---|---|---|---|---|---|
| 0 | Dilution Water | 10.2 | 8.4 | 11.2 | 12.3333 | 11 |
| 100 | | 14.6667 | 20 | 17 | 11 | 11.5 |

**AG Average Wet Wt. Detail**

| Conc-% | Control Type | Rep 1 | Rep 2 | Rep 3 | Rep 4 | Rep 5 |
|---|---|---|---|---|---|---|
| 0 | Dilution Water | 67.2900 | 55.1900 | 82.338 | 73.2233 | 41.4750 |
| 100 | | 55.4567 | 19.54 | 38.2900 | 40.4250 | 48.9125 |

**Root Average Dry Wt. Detail**

| Conc-% | Control Type | Rep 1 | Rep 2 | Rep 3 | Rep 4 | Rep 5 |
|---|---|---|---|---|---|---|
| 0 | Dilution Water | 8.75601 | 8.39399 | 14.108 | 3.77999 | 4.295 |
| 100 | | 4.65000 | 2.34500 | 2.01498 | 3.28499 | 4.045 |

**Root Average Wet Wt. Detail**

| Conc-% | Control Type | Rep 1 | Rep 2 | Rep 3 | Rep 4 | Rep 5 |
|---|---|---|---|---|---|---|
| 0 | Dilution Water | 143.362 | 140.624 | 158.524 | 72.0233 | 51.6375 |
| 100 | | 111.717 | 40.9200 | 44.38 | 83.545 | 81.2175 |

**Total Average Biomass Dry Wt. Detail**

| Conc-% | Control Type | Rep 1 | Rep 2 | Rep 3 | Rep 4 | Rep 5 |
|---|---|---|---|---|---|---|
| 0 | Dilution Water | 23.9280 | 18.946 | 33.384 | 12.6066 | 12.2225 |
| 100 | | 15.2866 | 6.01999 | 7.245 | 9.95248 | 14.3325 |

**Total Average Biomass Wet Wt. Detail**

| Conc-% | Control Type | Rep 1 | Rep 2 | Rep 3 | Rep 4 | Rep 5 |
|---|---|---|---|---|---|---|
| 0 | Dilution Water | 210.652 | 195.814 | 240.862 | 145.247 | 93.1125 |
| 100 | | 167.173 | 60.46 | 82.6700 | 123.97 | 130.130 |

# CETIS Analysis Detail

| Plant Chronic test | CH2M Hill |
|---|---|

| Endpoint | Analysis Type | Sample Link | Control Link | Date Analyzed | Version |
|---|---|---|---|---|---|
| % Germination | Comparison | 19-6708-8127 | 19-6708-8127 | 10 Mar-06 2:56 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 | 23.72% |

**Group Comparisons**

| Control | vs | Conc-% | Statistic | Critical | P-Value | MSD | Decision(0.05) |
|---|---|---|---|---|---|---|---|
| Dilution Water | | 100 | 2.36128 | 1.85955 | 0.0229 | 0.24559 | Significant Effect |

**ANOVA Table**

| Source | Sum of Squares | Mean Square | DF | F Statistic | P-Value | Decision(0.05) |
|---|---|---|---|---|---|---|
| Between | 0.2431297 | 0.24313 | 1 | 5.58 | 0.04587 | Significant Effect |
| Error | 0.3488457 | 0.043606 | 8 | | | |
| Total | 0.59197535 | 0.2867354 | 9 | | | |

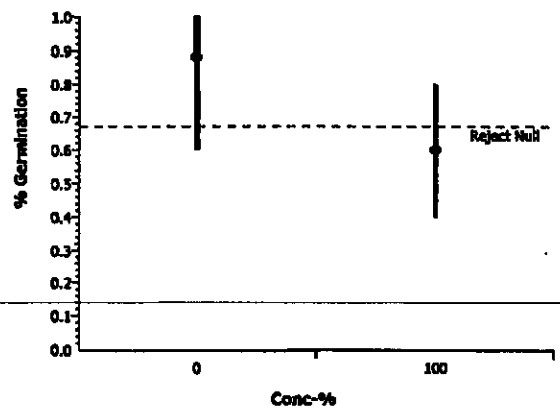
**ANOVA Assumptions**

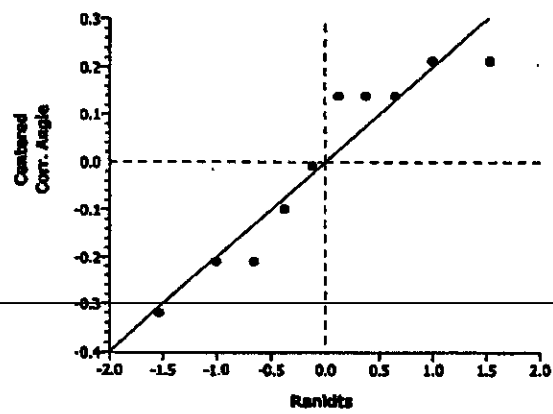
| Attribute | Test | Statistic | Critical | P-Value | Decision(0.01) |
|---|---|---|---|---|---|
| Variances | Variance Ratio F | 1.04816 | 23.15450 | 0.96473 | Equal Variances |
| Distribution | Shapiro-Wilk W | 0.88173 | | 0.13660 | Normal Distribution |

**Data Summary**

| | | | Original Data | | | | Transformed Data | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Conc-% | Control Type | Count | Mean | Minimum | Maximum | SD | Mean | Minimum | Maximum | SD |
| 0 | Dilution Water | 5 | 0.88000 | 0.60000 | 1.00000 | 0.17889 | 1.20581 | 0.88608 | 1.34528 | 0.20635 |
| 100 | | 5 | 0.60000 | 0.40000 | 0.80000 | 0.20000 | 0.89396 | 0.68472 | 1.10715 | 0.21126 |

**Graphics**



# CETIS Analysis Detail

**Plant Chronic test** — **CH2M Hill**

| Endpoint | Analysis Type | Sample Link | Control Link | Date Analyzed | Version |
|---|---|---|---|---|---|
| AG Average Dry Wt. | Comparison | 19-6708-8127 | 19-6708-8127 | 10 Mar-06 2:56 PM | CETISv1.1.2 |

| Method | Alt H | Data Transform | Zeta | NOEL | LOEL | Toxic Units | ChV | PMSD |
|---|---|---|---|---|---|---|---|---|
| Equal Variance t Two-Sample | C > T | Untransformed | | <100 | 100 | | N/A | 38.24% |

**Group Comparisons**

| Control | vs | Conc-% | Statistic | Critical | P-Value | MSD | Decision(0.05) |
|---|---|---|---|---|---|---|---|
| Dilution Water | | 100 | 1.98886 | 1.85955 | 0.0410 | 4.72307 | Significant Effect |

**ANOVA Table**

| Source | Sum of Squares | Mean Square | DF | F Statistic | P-Value | Decision(0.05) |
|---|---|---|---|---|---|---|
| Between | 63.79421 | 63.79421 | 1 | 3.96 | 0.08192 | Non-Significant Effect |
| Error | 129.0223 | 16.12778 | 8 | | | |
| Total | 192.816475 | 79.921995 | 9 | | | |

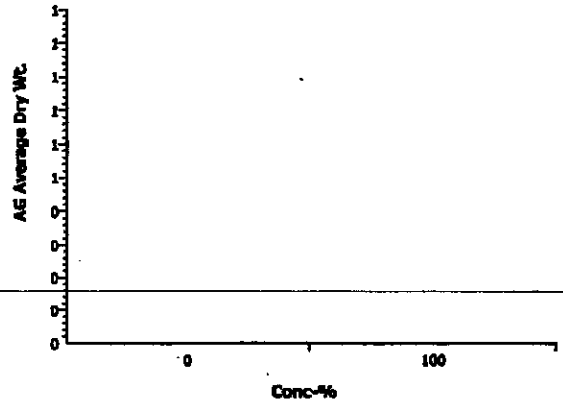
**ANOVA Assumptions**

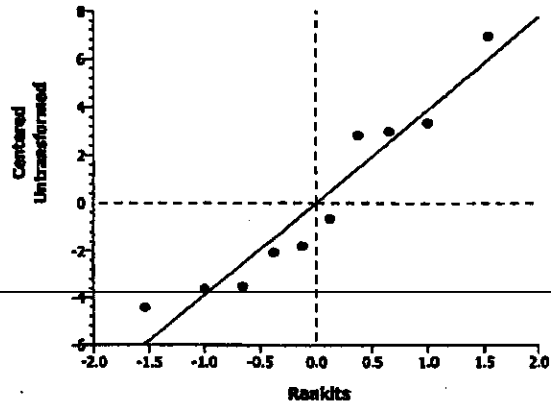
| Attribute | Test | Statistic | Critical | P-Value | Decision(0.01) |
|---|---|---|---|---|---|
| Variances | Variance Ratio F | 2.40572 | 23.15450 | 0.41603 | Equal Variances |
| Distribution | Shapiro-Wilk W | 0.91144 | | 0.29103 | Normal Distribution |

**Data Summary**

| | | | Original Data | | | | Transformed Data | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Conc-% | Control Type | Count | Mean | Minimum | Maximum | SD | Mean | Minimum | Maximum | SD |
| 0 | Dilution Water | 5 | 12.351 | 7.9275 | 19.276 | 4.7733 | | | | |
| 100 | | 5 | 7.2993 | 3.675 | 10.637 | 3.0775 | | | | |

**Graphics**



# CETIS Analysis Detail

**Plant Chronic test** — CH2M Hill

| Endpoint | Analysis Type | Sample Link | Control Link | Date Analyzed | Version |
|---|---|---|---|---|---|
| AG Average Height | Comparison | 19-6708-8127 | 19-6708-8127 | 10 Mar-06 2:57 PM | CETISv1.1.2 |

| Method | Alt H | Data Transform | Zeta | NOEL | LOEL | Toxic Units | ChV | PMSD |
|---|---|---|---|---|---|---|---|---|
| Equal Variance t Two-Sample | C > T | Untransformed | | 100 | >100 | 1 | N/A | 31.73% |

**Group Comparisons**

| Control | vs | Conc-% | Statistic | Critical | P-Value | MSD | Decision(0.05) |
|---|---|---|---|---|---|---|---|
| Dilution Water | | 100 | -2.3202 | 1.85955 | 0.9755 | 3.37146 | Non-Significant Effect |

**ANOVA Table**

| Source | Sum of Squares | Mean Square | DF | F Statistic | P-Value | Decision(0.05) |
|---|---|---|---|---|---|---|
| Between | 44.24011 | 44.24011 | 1 | 5.38 | 0.04890 | Significant Effect |
| Error | 65.74311 | 8.217889 | 8 | | | |
| Total | 109.983223 | 52.458001 | 9 | | | |

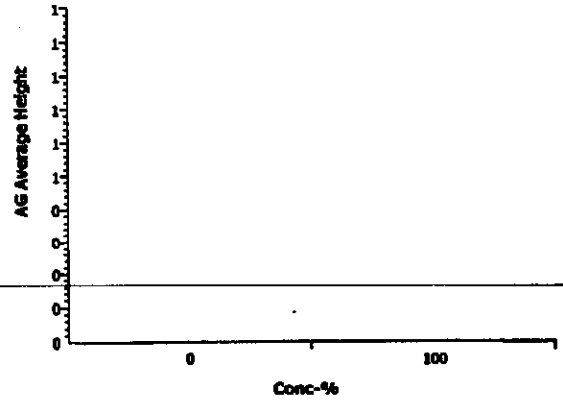
**ANOVA Assumptions**

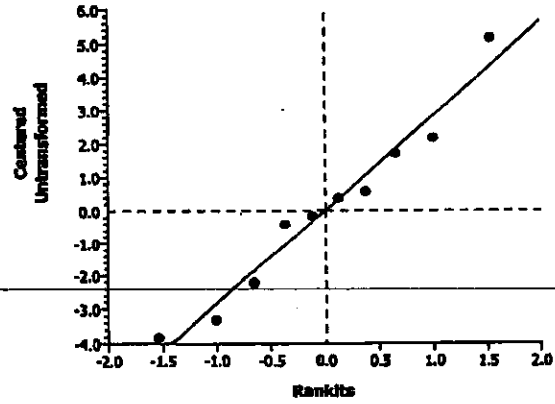
| Attribute | Test | Statistic | Critical | P-Value | Decision(0.01) |
|---|---|---|---|---|---|
| Variances | Variance Ratio F | 6.71552 | 23.15450 | 0.09208 | Equal Variances |
| Distribution | Shapiro-Wilk W | 0.96385 | | 0.82873 | Normal Distribution |

**Data Summary**

| | | | Original Data | | | | Transformed Data | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Conc-% | Control Type | Count | Mean | Minimum | Maximum | SD | Mean | Minimum | Maximum | SD |
| 0 | Dilution Water | 5 | 10.627 | 8.4 | 12.333 | 1.4595 | | | | |
| 100 | | 5 | 14.833 | 11 | 20 | 3.7823 | | | | |

**Graphics**



# CETIS Analysis Detail

| Plant Chronic test | | | | | | CH2M Hill |
|---|---|---|---|---|---|---|
| **Endpoint** | **Analysis Type** | **Sample Link** | **Control Link** | **Date Analyzed** | **Version** | |
| AG Average Wet Wt. | Comparison | 19-6708-8127 | 19-6708-8127 | 10 Mar-06 2:56 PM | CETISv1.1.2 | |

| Method | Alt H | Data Transform | Zeta | NOEL | LOEL | Toxic Units | ChV | PMSD |
|---|---|---|---|---|---|---|---|---|
| Equal Variance t Two-Sample | C > T | Untransformed | | <100 | 100 | | N/A | 27.27% |

**Group Comparisons**

| Control | vs | Conc-% | Statistic | Critical | P-Value | MSD | Decision(0.05) |
|---|---|---|---|---|---|---|---|
| Dilution Water | | 100 | 2.49513 | 1.85955 | 0.0186 | 17.4233 | Significant Effect |

**ANOVA Table**

| Source | Sum of Squares | Mean Square | DF | F Statistic | P-Value | Decision(0.05) |
|---|---|---|---|---|---|---|
| Between | 1366.377 | 1366.377 | 1 | 6.23 | 0.03722 | Significant Effect |
| Error | 1755.801 | 219.4752 | 8 | | | |
| Total | 3122.17810 | 1585.852 | 9 | | | |

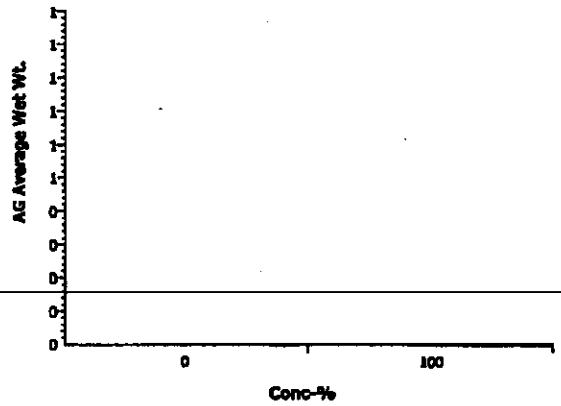
**ANOVA Assumptions**

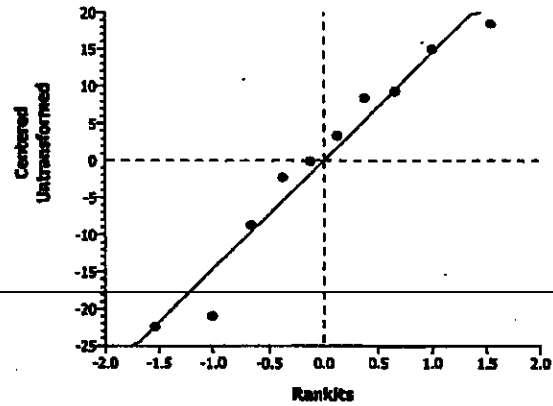
| Attribute | Test | Statistic | Critical | P-Value | Decision(0.01) |
|---|---|---|---|---|---|
| Variances | Variance Ratio F | 1.37694 | 23.15450 | 0.76412 | Equal Variances |
| Distribution | Shapiro-Wilk W | 0.93736 | | 0.52406 | Normal Distribution |

**Data Summary**

| | | | Original Data | | | | Transformed Data | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Conc-% | Control Type | Count | Mean | Minimum | Maximum | SD | Mean | Minimum | Maximum | SD |
| 0 | Dilution Water | 5 | 63.903 | 41.475 | 82.338 | 15.946 | | | | |
| 100 | | 5 | 40.525 | 19.54 | 55.457 | 13.589 | | | | |

**Graphics**



# CETIS Analysis Detail

| Plant Chronic test | | | | | | CH2M Hill |
|---|---|---|---|---|---|---|
| **Endpoint** | **Analysis Type** | **Sample Link** | **Control Link** | **Date Analyzed** | **Version** | |
| Root Average Dry Wt. | Comparison | 19-6708-8127 | 19-6708-8127 | 10 Mar-06 2:57 PM | CETISv1.1.2 | |

| Method | Alt H | Data Transform | Zeta | NOEL | LOEL | Toxic Units | ChV | PMSD |
|---|---|---|---|---|---|---|---|---|
| Equal Variance t Two-Sample | C > T | Untransformed | | <100 | 100 | | N/A | 45.60% |

**Group Comparisons**

| Control | vs | Conc-% | Statistic | Critical | P-Value | MSD | Decision(0.05) |
|---|---|---|---|---|---|---|---|
| Dilution Water | | 100 | 2.38399 | 1.85955 | 0.0221 | 3.58697 | Significant Effect |

**ANOVA Table**

| Source | Sum of Squares | Mean Square | DF | F Statistic | P-Value | Decision(0.05) |
|---|---|---|---|---|---|---|
| Between | 52.86784 | 52.86784 | 1 | 5.68 | 0.04427 | Significant Effect |
| Error | 74.41687 | 9.302109 | 8 | | | |
| Total | 127.28471 | 62.169949 | 9 | | | |

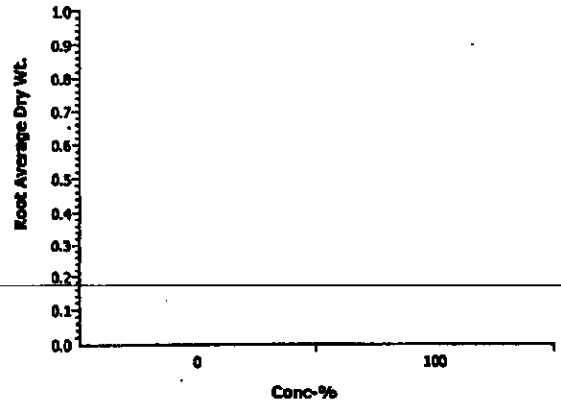
**ANOVA Assumptions**

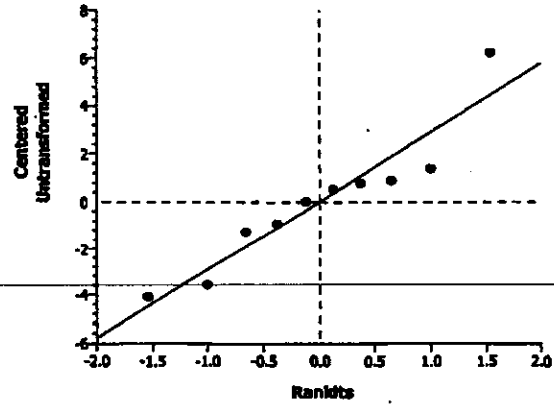
| Attribute | Test | Statistic | Critical | P-Value | Decision(0.01) |
|---|---|---|---|---|---|
| Variances | Variance Ratio F | 14.07658 | 23.15450 | 0.02523 | Equal Variances |
| Distribution | Shapiro-Wilk W | 0.91314 | | 0.30324 | Normal Distribution |

**Data Summary**

| | | | Original Data | | | | Transformed Data | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Conc-% | Control Type | Count | Mean | Minimum | Maximum | SD | Mean | Minimum | Maximum | SD |
| 0 | Dilution Water | 5 | 7.8666 | 3.78 | 14.108 | 4.1678 | | | | |
| 100 | | 5 | 3.268 | 2.015 | 4.6500 | 1.1108 | | | | |

**Graphics**



# CETIS Analysis Detail

| Plant Chronic test | CH2M Hill |
|---|---|

| Endpoint | Analysis Type | Sample Link | Control Link | Date Analyzed | Version |
|---|---|---|---|---|---|
| Root Average Wet Wt. | Comparison | 19-6708-8127 | 19-6708-8127 | 10 Mar-06 2:57 PM | CETISv1.1.2 |

| Method | Alt H | Data Transform | Zeta | NOEL | LOEL | Toxic Units | ChV | PMSD |
|---|---|---|---|---|---|---|---|---|
| Equal Variance t Two-Sample | C > T | Untransformed | | 100 | >100 | 1 | N/A | 41.42% |

**Group Comparisons**

| Control | vs | Conc-% | Statistic | Critical | P-Value | MSD | Decision(0.05) |
|---|---|---|---|---|---|---|---|
| Dilution Water | | 100 | 1.62059 | 1.85955 | 0.0719 | 46.908 | Non-Significant Effect |

**ANOVA Table**

| Source | Sum of Squares | Mean Square | DF | F Statistic | P-Value | Decision(0.05) |
|---|---|---|---|---|---|---|
| Between | 4177.597 | 4177.597 | 1 | 2.63 | 0.14376 | Non-Significant Effect |
| Error | 12725.4 | 1590.675 | 8 | | | |
| Total | 16902.9961 | 5768.2716 | 9 | | | |

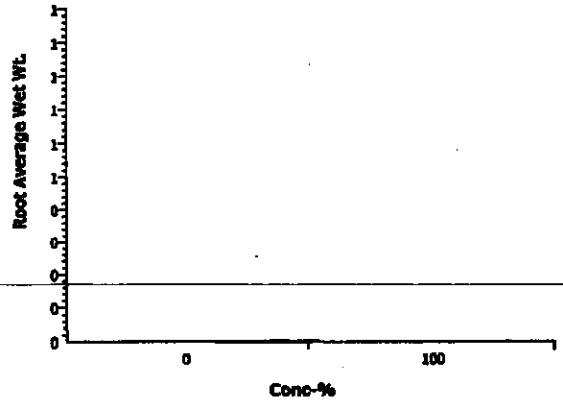
**ANOVA Assumptions**

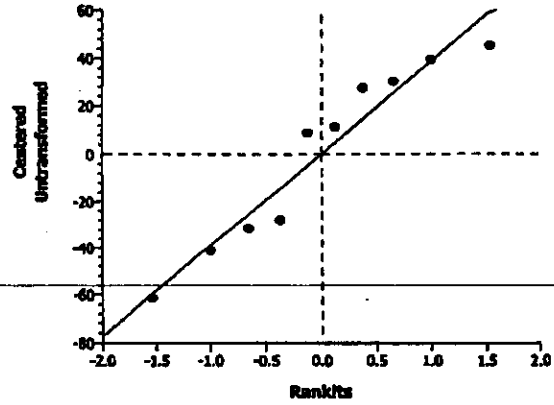
| Attribute | Test | Statistic | Critical | P-Value | Decision(0.01) |
|---|---|---|---|---|---|
| Variances | Variance Ratio F | 2.61121 | 23.15450 | 0.37516 | Equal Variances |
| Distribution | Shapiro-Wilk W | 0.91516 | | 0.31837 | Normal Distribution |

**Data Summary**

| | | | Original Data | | | | Transformed Data | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Conc-% | Control Type | Count | Mean | Minimum | Maximum | SD | Mean | Minimum | Maximum | SD |
| 0 | Dilution Water | 5 | 113.23 | 51.638 | 158.52 | 47.962 | | | | |
| 100 | | 5 | 72.356 | 40.920 | 111.72 | 29.681 | | | | |

**Graphics**



# CETIS Analysis Detail

**Plant Chronic test** — **CH2M Hill**

| Endpoint | Analysis Type | Sample Link | Control Link | Date Analyzed | Version |
|---|---|---|---|---|---|
| Total Average Biomass Dry Wt. | Comparison | 19-6708-8127 | 19-6708-8127 | 10 Mar-06 2:57 PM | CETISv1.1.2 |

| Method | Alt H | Data Transform | Zeta | NOEL | LOEL | Toxic Units | ChV | PMSD |
|---|---|---|---|---|---|---|---|---|
| Equal Variance t Two-Sample | C > T | Untransformed | | <100 | 100 | | N/A | 40.05% |

**Group Comparisons**

| Control | vs | Conc-% | Statistic | Critical | P-Value | MSD | Decision(0.05) |
|---|---|---|---|---|---|---|---|
| Dilution Water | | 100 | 2.21643 | 1.85955 | 0.0288 | 8.09629 | Significant Effect |

**ANOVA Table**

| Source | Sum of Squares | Mean Square | DF | F Statistic | P-Value | Decision(0.05) |
|---|---|---|---|---|---|---|
| Between | 232.8113 | 232.8113 | 1 | 4.91 | 0.05750 | Non-Significant Effect |
| Error | 379.1292 | 47.39115 | 8 | | | |
| Total | 611.940475 | 280.20242 | 9 | | | |

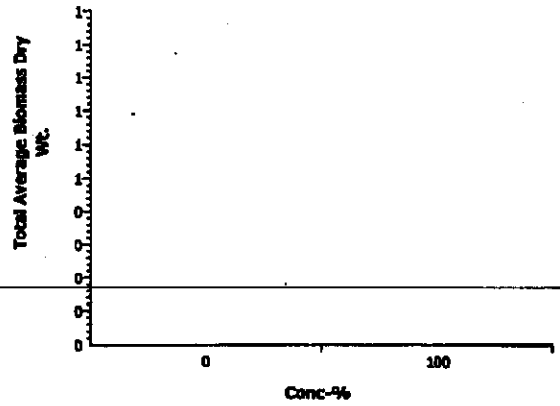
**ANOVA Assumptions**

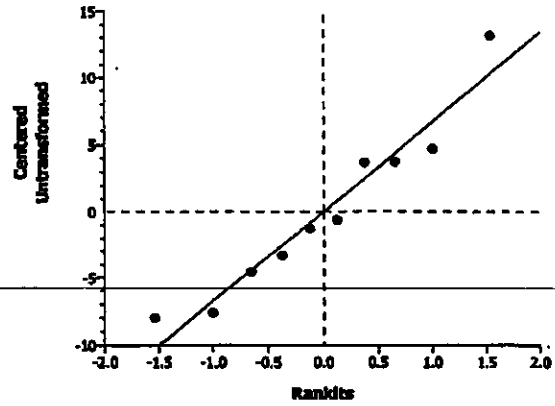
| Attribute | Test | Statistic | Critical | P-Value | Decision(0.01) |
|---|---|---|---|---|---|
| Variances | Variance Ratio F | 4.53128 | 23.15450 | 0.17247 | Equal Variances |
| Distribution | Shapiro-Wilk W | 0.93905 | | 0.54254 | Normal Distribution |

**Data Summary**

| | | | Original Data | | | | Transformed Data | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Conc-% | Control Type | Count | Mean | Minimum | Maximum | SD | Mean | Minimum | Maximum | SD |
| 0 | Dilution Water | 5 | 20.217 | 12.223 | 33.384 | 8.8117 | | | | |
| 100 | | 5 | 10.567 | 6.02 | 15.287 | 4.1395 | | | | |

**Graphics**



# CETIS Analysis Detail

**Plant Chronic test** — CH2M Hill

| Endpoint | Analysis Type | Sample Link | Control Link | Date Analyzed | Version |
|---|---|---|---|---|---|
| Total Average Biomass Wet Wt. | Comparison | 19-6708-8127 | 19-6708-8127 | 10 Mar-06 2:57 PM | CETISv1.1.2 |

| Method | Alt H | Data Transform | Zeta | NOEL | LOEL | Toxic Units | ChV | PMSD |
|---|---|---|---|---|---|---|---|---|
| Equal Variance t Two-Sample | C > T | Untransformed | | <100 | 100 | | N/A | 33.72% |

**Group Comparisons**

| Control | vs | Conc-% | Statistic | Critical | P-Value | MSD | Decision(0.05) |
|---|---|---|---|---|---|---|---|
| Dilution Water | | 100 | 2.00028 | 1.85955 | 0.0402 | 59.7359 | Significant Effect |

**ANOVA Table**

| Source | Sum of Squares | Mean Square | DF | F Statistic | P-Value | Decision(0.05) |
|---|---|---|---|---|---|---|
| Between | 10322.33 | 10322.33 | 1 | 4.00 | 0.08048 | Non-Significant Effect |
| Error | 20638.88 | 2579.86 | 8 | | | |
| Total | 30961.2119 | 12902.189 | 9 | | | |

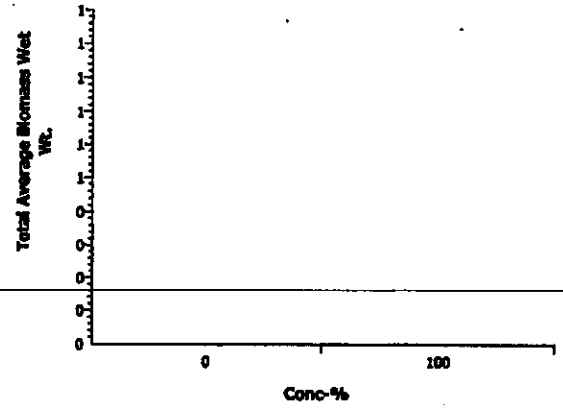
**ANOVA Assumptions**

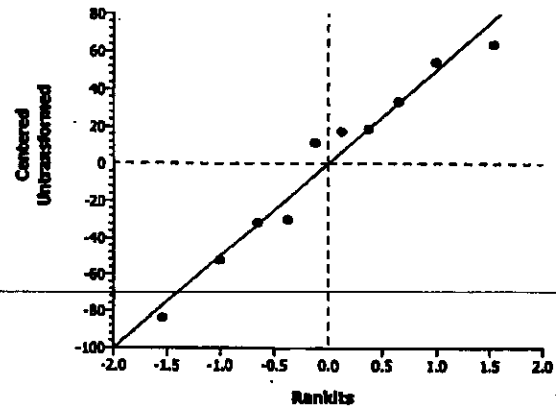
| Attribute | Test | Statistic | Critical | P-Value | Decision(0.01) |
|---|---|---|---|---|---|
| Variances | Variance Ratio F | 1.93632 | 23.15450 | 0.53790 | Equal Variances |
| Distribution | Shapiro-Wilk W | 0.95158 | | 0.68718 | Normal Distribution |

**Data Summary**

| | | | Original Data | | | | Transformed Data | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Conc-% | Control Type | Count | Mean | Minimum | Maximum | SD | Mean | Minimum | Maximum | SD |
| 0 | Dilution Water | 5 | 177.14 | 93.113 | 240.86 | 58.331 | | | | |
| 100 | | 5 | 112.88 | 60.46 | 167.17 | 41.919 | | | | |

**Graphics**



## BLUEGRASS GROWTH TEST

Client: Hanford Project

Test Start Date: 01/25/2008

Initials: Day 0 [illegible] Day 12 NT Day 14 [illegible] Day 16 NT Day 21 [illegible] Day 28 [illegible]

Sample ID: E280101-SOI2 B1542-02

| CONC. | REPLICATE | PRE-EMERGENCE (12 days after planting) | @ EMERGENCE (14 days after planting) | POST-EMERGENCE (16 days after planting) | 7-DAYS POST-EMERGENCE (21 days after planting) | | 14-DAYS POST-EMERGENCE (28 days after planting) | pH INITIAL (@ planting) | pH FINAL (28 days after planting) |
|---|---|---|---|---|---|---|---|---|---|
| | | # seeds germinated | | | # alive | | | | |
| 100% | A | 3 | 4 | 4 | 5 | 5 | 5 | 7.1 | 7.1 |
| | B | 2 | 3 | 3 | 3 | 3 | 3 | | |
| | C | 1 | 2 | 3 | 3 | 3 | 1 | | |
| | D | 4 | 6 | 6 | 7 | 7 | 7→5 | | |
| | E | 1 | 1 | 1 | 2 | 3 | 3 | | |

7-Days Post-Emergence: Selectively thin down to 5 Seedlings (leave the 5 tallest seedlings). Describe shoot appearance:

Replicate A: 1 large + 4 medium plants in good condition

Replicate B: 1 medium + 1 small in good condition + 1 small w/ 1 green + 1 browning shoot + 1 small dead

Replicate C: 1 medium in good shape + 2 single shoot small dead

Replicate D: 1 large + 4 medium in good shape - 1 medium + 1 small plants w/ brown edges removed

Replicate E: 2 medium in good shape + 1 small, single shoot plant dead.

14-Days Post-Emergence: Describe shoot appearance:

Replicate A: 1 large 4 medium all look good

Replicate B: 1 large 2 small 1 very small 1 brown shoot on smaller one

Replicate C: 1 medium looks good

Replicate D: 3 medium 1 small look good

Replicate E: 2 medium large plants look good

Measure Shoot Height: (above ground)

| | 1st Seedling | 2nd Seedling | 3rd Seedling | 4th Seedling | 5th Seedling | # of Shoots |
|---|---|---|---|---|---|---|
| Replicate A | 55 mm | 75 mm | 52 mm | 48 mm | 51 mm | 6, 8, 13, 15, 14 |
| Replicate B | 31 mm | 43 mm | 12 mm | — mm | — mm | 2, 4, 12 |
| Replicate C | 61 mm | — mm | — mm | — mm | — mm | 16 |
| Replicate D | 76 mm | 58 mm | 65 mm | 29 mm | 35 mm | 10, 9, 11, 12, 8 |
| Replicate E | 84 mm | 72 mm | — mm | — mm | — mm | 8, 14 |

Measure Shoot Weight: (above ground)

| | Tin Tare Wt. (mg) | Wet Wt (mg) | Dry Wt. (mg) |
|---|---|---|---|
| Replicate A | 989.24 | 1443.6 | 1073.98 |
| Replicate B | 1002.44 | 1073.4 | 1014.75 |
| Replicate C | 961.05 | 1076.1 | 985.85 |
| Replicate D | 1003.36 | 1312.7 | 1070.68 |
| Replicate E | 975.82 | 1154.5 | 1005.71 |

Describe root appearance:

Replicate A

Replicate B

Replicate C

Replicate D

Replicate E

Measure Root Length: (longest root)

| | 1st Seedling | 2nd Seedling | 3rd Seedling | 4th Seedling | 5th Seedling |
|---|---|---|---|---|---|
| Replicate A | 112 mm | mm | mm | mm | mm |
| Replicate B | 100 mm | mm | mm | mm | mm |
| Replicate C | 109 mm | mm | mm | mm | mm |
| Replicate D | 101 mm | mm | mm | mm | mm |
| Replicate E | 140 mm | mm | mm | mm | mm |

Measure Root Weight: (longest root)

| | Tin Tare Wt. (mg) | Wet Wt (mg) | Dry Wt. (mg) |
|---|---|---|---|
| Replicate A | 982.54 | 1685.7 | 1024.49 |
| Replicate B | 983.40 | 1122.6 | 990.50 |
| Replicate C | 1000.19 | 1202.5 | 1013.56 |
| Replicate D | 993.62 | 1455.7 | 1014.39 |
| Replicate E | 969.97 | 1254.1 | 981.99 |

Comments: 90 gl dry wt /rep

# CETIS Test Summary

Report Date: 10 Mar-06 2:29 PM
Test Link: 15-3014-2283/B154202psc

**Plant Chronic test** — **CH2M Hill**

| | | | | | |
|---|---|---|---|---|---|
| **Test No:** | 05-1469-8332 | **Test Type:** | Plant Chronic test | **Duration:** | 37d 0h |
| **Start Date:** | 25 Jan-06 | **Protocol:** | ASTM E1963-02 (2002) | **Species:** | Poa sandbergii |
| **Ending Date:** | 03 Mar-06 | **Dil Water:** | | **Source:** | |
| **Setup Date:** | 25 Jan-06 12:00 AM | **Brine:** | | | |
| **Comments:** | E280101 | | | | |

| | | | | | |
|---|---|---|---|---|---|
| **Sample No:** | 07-3307-9513 | **Code:** | B1542-02 | **Client:** | |
| **Sample Date:** | 08 Nov-05 | **Material:** | Soil | **Project:** | |
| **Receive Date:** | | **Source:** | Hanford | | |
| **Sample Age:** | 78d 0h | **Station:** | | | |
| **Comments:** | J10DV4, J10DV5, J10DV6, J10DV7, J10DV8. E280101 | | | | |

**Comparison Summary**

| Analysis | Endpoint | NOEL | LOEL | ChV | PMSD | Method |
|---|---|---|---|---|---|---|
| 04-6946-3761 | % Germination | 100 | > 100 | N/A | 37.51% | Equal Variance t Two-Sample |
| 11-1021-9867 | AG Average Dry Wt. | 100 | > 100 | N/A | 59.46% | Equal Variance t Two-Sample |
| 02-0499-7537 | AG Average Height | 100 | > 100 | N/A | 180.38% | Equal Variance t Two-Sample |
| 11-9140-3004 | AG Average Wet Wt. | 100 | > 100 | N/A | 49.90% | Equal Variance t Two-Sample |
| 00-9602-9003 | Root Average Dry Wt. | 100 | > 100 | N/A | 62.43% | Equal Variance t Two-Sample |
| 11-9362-4518 | Root Average Wet Wt. | 100 | > 100 | N/A | 55.35% | Equal Variance t Two-Sample |
| 07-4060-8488 | Total Average Biomass Dry | 100 | > 100 | N/A | 59.60% | Equal Variance t Two-Sample |
| 17-5778-7616 | Total Average Biomass Wet | 100 | > 100 | N/A | 51.32% | Equal Variance t Two-Sample |



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Analyst: BV Approval: _____

# CETIS Test Summary

Report Date: 10 Mar-06 2:29 PM
Test Link: 15-3014-2283/B154202psc

**% Germination Summary**

| Conc-% | Control Type | Reps | Mean | Minimum | Maximum | SE | SD | CV |
|---|---|---|---|---|---|---|---|---|
| 0 | Dilution Water | 5 | 0.88000 | 0.60000 | 1.00000 | 0.08000 | 0.17889 | 20.33% |
| 100 | | 5 | 0.64000 | 0.20000 | 1.00000 | 0.16000 | 0.35777 | 55.90% |

**AG Average Dry Wt. Summary**

| Conc-% | Control Type | Reps | Mean | Minimum | Maximum | SE | SD | CV |
|---|---|---|---|---|---|---|---|---|
| 0 | Dilution Water | 5 | 12.351 | 7.9275 | 19.276 | 2.1347 | 4.7733 | 38.65% |
| 100 | | 5 | 14.852 | 4.1033 | 24.8 | 3.3228 | 7.4301 | 50.03% |

**AG Average Height Summary**

| Conc-% | Control Type | Reps | Mean | Minimum | Maximum | SE | SD | CV |
|---|---|---|---|---|---|---|---|---|
| 0 | Dilution Water | 5 | 10.627 | 8.4 | 12.333 | 0.6527 | 1.4595 | 13.73% |
| 100 | | 5 | 26.293 | 9.6667 | 61 | 10.287 | 23.003 | 87.49% |

**AG Average Wet Wt. Summary**

| Conc-% | Control Type | Reps | Mean | Minimum | Maximum | SE | SD | CV |
|---|---|---|---|---|---|---|---|---|
| 0 | Dilution Water | 5 | 63.903 | 41.475 | 82.338 | 7.1313 | 15.946 | 24.95% |
| 100 | | 5 | 76.157 | 23.653 | 115.05 | 15.595 | 34.870 | 45.79% |

**Root Average Dry Wt. Summary**

| Conc-% | Control Type | Reps | Mean | Minimum | Maximum | SE | SD | CV |
|---|---|---|---|---|---|---|---|---|
| 0 | Dilution Water | 5 | 7.8666 | 3.78 | 14.108 | 1.8639 | 4.1678 | 52.98% |
| 100 | | 5 | 6.9781 | 2.3667 | 13.37 | 1.8708 | 4.1833 | 59.95% |

**Root Average Wet Wt. Summary**

| Conc-% | Control Type | Reps | Mean | Minimum | Maximum | SE | SD | CV |
|---|---|---|---|---|---|---|---|---|
| 0 | Dilution Water | 5 | 113.23 | 51.638 | 158.52 | 21.449 | 47.962 | 42.36% |
| 100 | | 5 | 122.76 | 46.4 | 202.31 | 25.995 | 58.126 | 47.35% |

**Total Average Biomass Dry Wt. Summary**

| Conc-% | Control Type | Reps | Mean | Minimum | Maximum | SE | SD | CV |
|---|---|---|---|---|---|---|---|---|
| 0 | Dilution Water | 5 | 20.217 | 12.223 | 33.384 | 3.9407 | 8.8117 | 43.58% |
| 100 | | 5 | 21.830 | 6.47 | 38.17 | 5.1432 | 11.500 | 52.68% |

**Total Average Biomass Wet Wt. Summary**

| Conc-% | Control Type | Reps | Mean | Minimum | Maximum | SE | SD | CV |
|---|---|---|---|---|---|---|---|---|
| 0 | Dilution Water | 5 | 177.14 | 93.113 | 240.86 | 26.086 | 58.331 | 32.93% |
| 100 | | 5 | 198.92 | 70.053 | 317.36 | 41.348 | 92.456 | 46.48% |



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Analyst: B Approval:

# CETIS Test Summary

Report Date: 10 Mar-06 2:29 PM
Test Link: 15-3014-2283/B154202psc

**% Germination Detail**

| Conc-% | Control Type | Rep 1 | Rep 2 | Rep 3 | Rep 4 | Rep 5 |
|---|---|---|---|---|---|---|
| 0 | Dilution Water | 1.00000 | 1.00000 | 1.00000 | 0.60000 | 0.80000 |
| 100 | | 1.00000 | 0.60000 | 0.20000 | 1.00000 | 0.40000 |

**AG Average Dry Wt. Detail**

| Conc-% | Control Type | Rep 1 | Rep 2 | Rep 3 | Rep 4 | Rep 5 |
|---|---|---|---|---|---|---|
| 0 | Dilution Water | 15.1720 | 10.552 | 19.276 | 8.82666 | 7.92751 |
| 100 | | 16.948 | 4.10333 | 24.8 | 13.4640 | 14.9450 |

**AG Average Height Detail**

| Conc-% | Control Type | Rep 1 | Rep 2 | Rep 3 | Rep 4 | Rep 5 |
|---|---|---|---|---|---|---|
| 0 | Dilution Water | 10.2 | 8.4 | 11.2 | 12.3333 | 11 |
| 100 | | 11.2 | 9.66667 | 61 | 10.6 | 39 |

**AG Average Wet Wt. Detail**

| Conc-% | Control Type | Rep 1 | Rep 2 | Rep 3 | Rep 4 | Rep 5 |
|---|---|---|---|---|---|---|
| 0 | Dilution Water | 67.2900 | 55.1900 | 82.338 | 73.2233 | 41.4750 |
| 100 | | 90.872 | 23.6533 | 115.05 | 61.868 | 89.34 |

**Root Average Dry Wt. Detail**

| Conc-% | Control Type | Rep 1 | Rep 2 | Rep 3 | Rep 4 | Rep 5 |
|---|---|---|---|---|---|---|
| 0 | Dilution Water | 8.75601 | 8.39399 | 14.108 | 3.77999 | 4.295 |
| 100 | | 8.39000 | 2.36666 | 13.37 | 4.75400 | 6.01001 |

**Root Average Wet Wt. Detail**

| Conc-% | Control Type | Rep 1 | Rep 2 | Rep 3 | Rep 4 | Rep 5 |
|---|---|---|---|---|---|---|
| 0 | Dilution Water | 143.362 | 140.624 | 158.524 | 72.0233 | 51.6375 |
| 100 | | 130.632 | 46.4 | 202.31 | 92.416 | 142.065 |

**Total Average Biomass Dry Wt. Detail**

| Conc-% | Control Type | Rep 1 | Rep 2 | Rep 3 | Rep 4 | Rep 5 |
|---|---|---|---|---|---|---|
| 0 | Dilution Water | 23.9280 | 18.946 | 33.384 | 12.6066 | 12.2225 |
| 100 | | 25.3380 | 6.46999 | 38.17 | 18.2180 | 20.9550 |

**Total Average Biomass Wet Wt. Detail**

| Conc-% | Control Type | Rep 1 | Rep 2 | Rep 3 | Rep 4 | Rep 5 |
|---|---|---|---|---|---|---|
| 0 | Dilution Water | 210.652 | 195.814 | 240.862 | 145.247 | 93.1125 |
| 100 | | 221.504 | 70.0533 | 317.360 | 154.284 | 231.405 |



CETIS™ v1.1.2revi

Analyst: BV Approval: _____

# CETIS Analysis Detail

**Plant Chronic test** — **CH2M Hill**

| Endpoint | Analysis Type | Sample Link | Control Link | Date Analyzed | Version |
|---|---|---|---|---|---|
| % Germination | Comparison | 15-3014-2283 | 15-3014-2283 | 10 Mar-06 2:26 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 | 37.51% |

**Group Comparisons**

| Control | vs | Conc-% | Statistic | Critical | P-Value | MSD | Decision(0.05) |
|---|---|---|---|---|---|---|---|
| Dilution Water | | 100 | 1.30924 | 1.85955 | 0.1134 | 0.37044 | Non-Significant Effect |

**ANOVA Table**

| Source | Sum of Squares | Mean Square | DF | F Statistic | P-Value | Decision(0.05) |
|---|---|---|---|---|---|---|
| Between | 0.1700585 | 0.170059 | 1 | 1.71 | 0.22680 | Non-Significant Effect |
| Error | 0.7936922 | 0.099212 | 8 | | | |
| Total | 0.96375073 | 0.2692700 | 9 | | | |

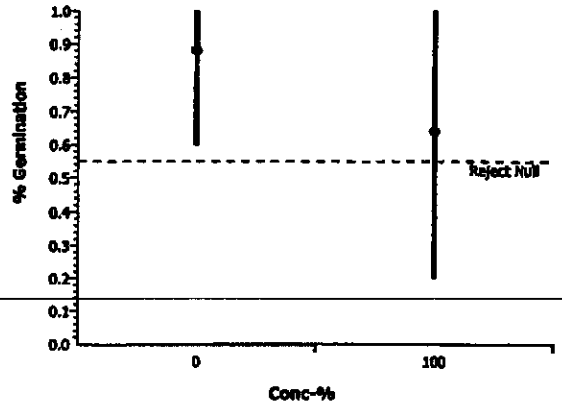
**ANOVA Assumptions**

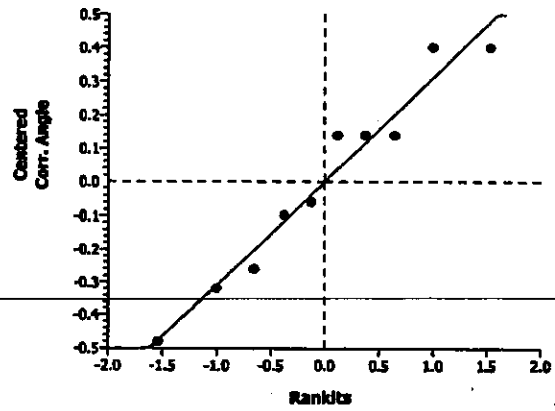
| Attribute | Test | Statistic | Critical | P-Value | Decision(0.01) |
|---|---|---|---|---|---|
| Variances | Variance Ratio F | 3.65997 | 23.15450 | 0.23677 | Equal Variances |
| Distribution | Shapiro-Wilk W | 0.94392 | | 0.59737 | Normal Distribution |

**Data Summary**

| | | | Original Data | | | | Transformed Data | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Conc-% | Control Type | Count | Mean | Minimum | Maximum | SD | Mean | Minimum | Maximum | SD |
| 0 | Dilution Water | 5 | 0.88000 | 0.60000 | 1.00000 | 0.17889 | 1.20581 | 0.88608 | 1.34528 | 0.20635 |
| 100 | | 5 | 0.64000 | 0.20000 | 1.00000 | 0.35777 | 0.94500 | 0.46365 | 1.34528 | 0.39477 |

**Graphics**



# CETIS Analysis Detail

**Plant Chronic test** — CH2M Hill

| Endpoint | Analysis Type | Sample Link | Control Link | Date Analyzed | Version |
|---|---|---|---|---|---|
| AG Average Dry Wt. | Comparison | 15-3014-2283 | 15-3014-2283 | 10 Mar-06 2:28 PM | CETISv1.1.2 |

| Method | Alt H | Data Transform | Zeta | NOEL | LOEL | Toxic Units | ChV | PMSD |
|---|---|---|---|---|---|---|---|---|
| Equal Variance t Two-Sample | C > T | Untransformed | | 100 | >100 | 1 | N/A | 59.46% |

**Group Comparisons**

| Control | vs | Conc-% | Statistic | Critical | P-Value | MSD | Decision(0.05) |
|---|---|---|---|---|---|---|---|
| Dilution Water | | 100 | -0.6333 | 1.85955 | 0.7279 | 7.34419 | Non-Significant Effect |

**ANOVA Table**

| Source | Sum of Squares | Mean Square | DF | F Statistic | P-Value | Decision(0.05) |
|---|---|---|---|---|---|---|
| Between | 15.64047 | 15.64047 | 1 | 0.40 | 0.54421 | Non-Significant Effect |
| Error | 311.963 | 38.99537 | 8 | | | |
| Total | 327.603419 | 54.635837 | 9 | | | |

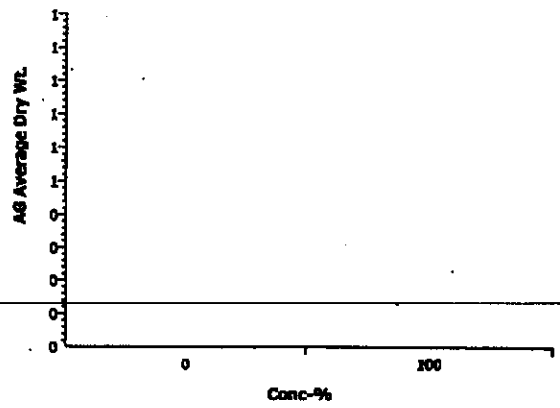
**ANOVA Assumptions**

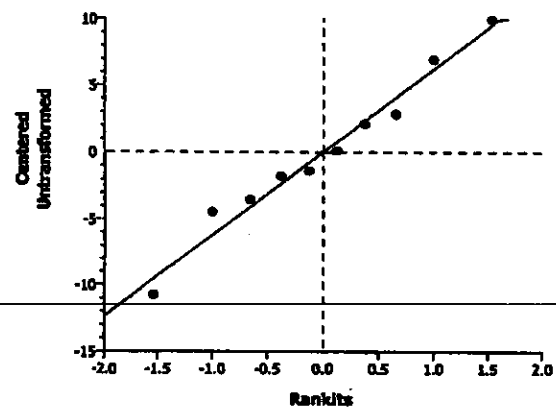
| Attribute | Test | Statistic | Critical | P-Value | Decision(0.01) |
|---|---|---|---|---|---|
| Variances | Variance Ratio F | 2.42296 | 23.15450 | 0.41235 | Equal Variances |
| Distribution | Shapiro-Wilk W | 0.98225 | | 0.97606 | Normal Distribution |

**Data Summary**

| | | | Original Data | | | | Transformed Data | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Conc-% | Control Type | Count | Mean | Minimum | Maximum | SD | Mean | Minimum | Maximum | SD |
| 0 | Dilution Water | 5 | 12.351 | 7.9275 | 19.276 | 4.7733 | | | | |
| 100 | | 5 | 14.852 | 4.1033 | 24.8 | 7.4301 | | | | |

**Graphics**



# CETIS Analysis Detail

**Plant Chronic test** — **CH2M Hill**

| Endpoint | Analysis Type | Sample Link | Control Link | Date Analyzed | Version |
|---|---|---|---|---|---|
| AG Average Height | Comparison | 15-3014-2283 | 15-3014-2283 | 10 Mar-06 2:29 PM | CETISv1.1.2 |

| Method | Alt H | Data Transform | Zeta | NOEL | LOEL | Toxic Units | ChV | PMSD |
|---|---|---|---|---|---|---|---|---|
| Equal Variance t Two-Sample | C > T | Untransformed | | 100 | >100 | 1 | N/A | 180.38% |

**Group Comparisons**

| Control | vs | Conc-% | Statistic | Critical | P-Value | MSD | Decision(0.05) |
|---|---|---|---|---|---|---|---|
| Dilution Water | | 100 | -1.5199 | 1.85955 | 0.9165 | 19.1681 | Non-Significant Effect |

**ANOVA Table**

| Source | Sum of Squares | Mean Square | DF | F Statistic | P-Value | Decision(0.05) |
|---|---|---|---|---|---|---|
| Between | 613.6111 | 613.6111 | 1 | 2.31 | 0.16703 | Non-Significant Effect |
| Error | 2125.068 | 265.6335 | 8 | | | |
| Total | 2738.67944 | 879.24463 | 9 | | | |

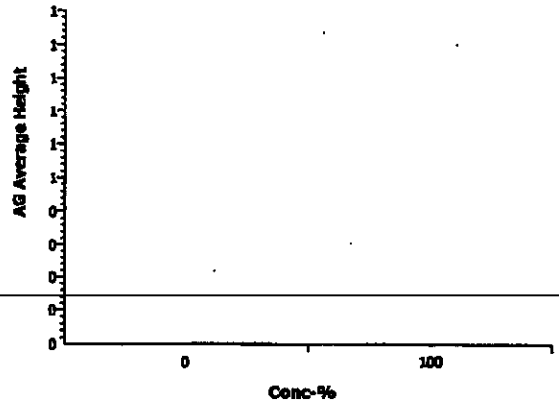
**ANOVA Assumptions**

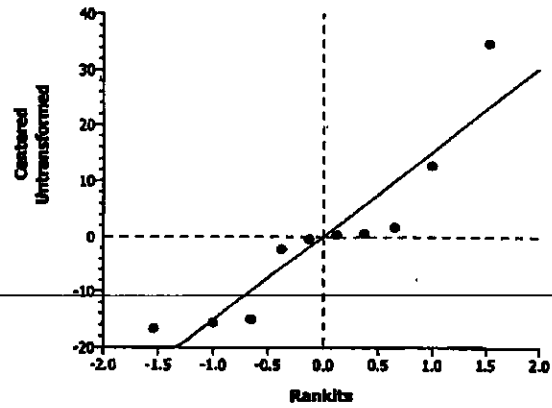
| Attribute | Test | Statistic | Critical | P-Value | Decision(0.01) |
|---|---|---|---|---|---|
| Variances | Variance Ratio F | 248.39520 | 23.15450 | 0.00010 | Unequal Variances |
| Distribution | Shapiro-Wilk W | 0.86082 | | 0.07803 | Normal Distribution |

**Data Summary**

| | | | Original Data | | | | Transformed Data | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Conc-% | Control Type | Count | Mean | Minimum | Maximum | SD | Mean | Minimum | Maximum | SD |
| 0 | Dilution Water | 5 | 10.627 | 8.4 | 12.333 | 1.4595 | | | | |
| 100 | | 5 | 26.293 | 9.6667 | 61 | 23.003 | | | | |

**Graphics**



# CETIS Analysis Detail

**Plant Chronic test** — **CH2M Hill**

| Endpoint | Analysis Type | Sample Link | Control Link | Date Analyzed | Version |
|---|---|---|---|---|---|
| AG Average Wet Wt. | Comparison | 15-3014-2283 | 15-3014-2283 | 10 Mar-06 2:28 PM | CETISv1.1.2 |

| Method | Alt H | Data Transform | Zeta | NOEL | LOEL | Toxic Units | ChV | PMSD |
|---|---|---|---|---|---|---|---|---|
| Equal Variance t Two-Sample | C > T | Untransformed | | 100 | >100 | 1 | N/A | 49.90% |

**Group Comparisons**

| Control | vs | Conc-% | Statistic | Critical | P-Value | MSD | Decision(0.05) |
|---|---|---|---|---|---|---|---|
| Dilution Water | | 100 | -0.7146 | 1.85955 | 0.7524 | 31.8871 | Non-Significant Effect |

**ANOVA Table**

| Source | Sum of Squares | Mean Square | DF | F Statistic | P-Value | Decision(0.05) |
|---|---|---|---|---|---|---|
| Between | 375.3645 | 375.3645 | 1 | 0.51 | 0.49519 | Non-Significant Effect |
| Error | 5880.917 | 735.1146 | 8 | | | |
| Total | 6256.28152 | 1110.4792 | 9 | | | |

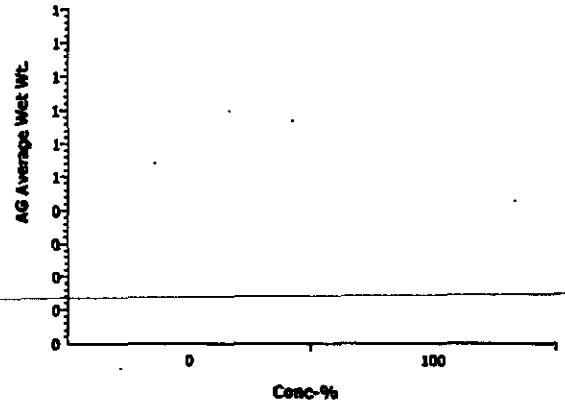
**ANOVA Assumptions**

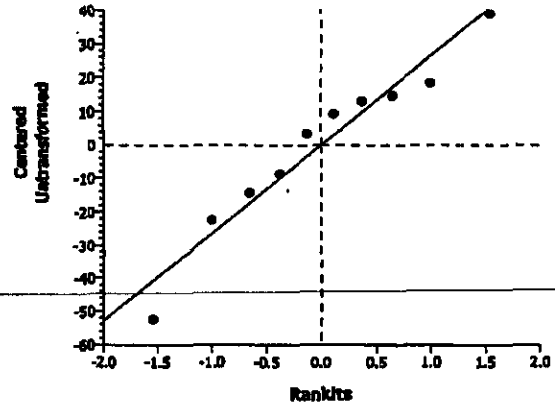
| Attribute | Test | Statistic | Critical | P-Value | Decision(0.01) |
|---|---|---|---|---|---|
| Variances | Variance Ratio F | 4.78193 | 23.15450 | 0.15878 | Equal Variances |
| Distribution | Shapiro-Wilk W | 0.95704 | | 0.75167 | Normal Distribution |

**Data Summary**

| | | | Original Data | | | | Transformed Data | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Conc-% | Control Type | Count | Mean | Minimum | Maximum | SD | Mean | Minimum | Maximum | SD |
| 0 | Dilution Water | 5 | 63.903 | 41.475 | 82.338 | 15.946 | | | | |
| 100 | | 5 | 76.157 | 23.653 | 115.05 | 34.870 | | | | |

**Graphics**



# CETIS Analysis Detail

**Plant Chronic test** — **CH2M Hill**

| Endpoint | Analysis Type | Sample Link | Control Link | Date Analyzed | Version |
|---|---|---|---|---|---|
| Root Average Dry Wt. | Comparison | 15-3014-2283 | 15-3014-2283 | 10 Mar-06 2:29 PM | CETISv1.1.2 |

| Method | Alt H | Data Transform | Zeta | NOEL | LOEL | Toxic Units | ChV | PMSD |
|---|---|---|---|---|---|---|---|---|
| Equal Variance t Two-Sample | C > T | Untransformed | | 100 | >100 | 1 | N/A | 62.43% |

**Group Comparisons**

| Control | vs | Conc-% | Statistic | Critical | P-Value | MSD | Decision(0.05) |
|---|---|---|---|---|---|---|---|
| Dilution Water | | 100 | 0.33643 | 1.85955 | 0.3726 | 4.91076 | Non-Significant Effect |

**ANOVA Table**

| Source | Sum of Squares | Mean Square | DF | F Statistic | P-Value | Decision(0.05) |
|---|---|---|---|---|---|---|
| Between | 1.973415 | 1.973415 | 1 | 0.11 | 0.74520 | Non-Significant Effect |
| Error | 139.4799 | 17.43499 | 8 | | | |
| Total | 141.45335 | 19.408407 | 9 | | | |

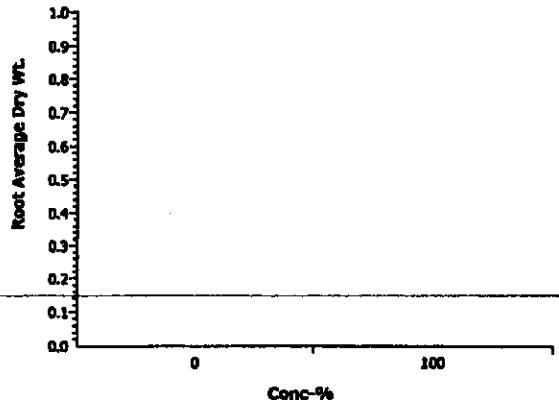
**ANOVA Assumptions**

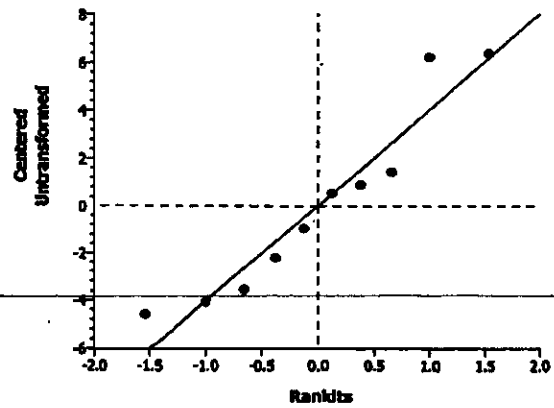
| Attribute | Test | Statistic | Critical | P-Value | Decision(0.01) |
|---|---|---|---|---|---|
| Variances | Variance Ratio F | 1.00746 | 23.15450 | 0.99443 | Equal Variances |
| Distribution | Shapiro-Wilk W | 0.90269 | | 0.23448 | Normal Distribution |

**Data Summary**

| | | | Original Data | | | | Transformed Data | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Conc-% | Control Type | Count | Mean | Minimum | Maximum | SD | Mean | Minimum | Maximum | SD |
| 0 | Dilution Water | 5 | 7.8666 | 3.78 | 14.108 | 4.1678 | | | | |
| 100 | | 5 | 6.9781 | 2.3667 | 13.37 | 4.1833 | | | | |

**Graphics**



# CETIS Analysis Detail

**Plant Chronic test** — CH2M Hill

| Endpoint | Analysis Type | Sample Link | Control Link | Date Analyzed | Version |
|---|---|---|---|---|---|
| Root Average Wet Wt. | Comparison | 15-3014-2283 | 15-3014-2283 | 10 Mar-06 2:29 PM | CETISv1.1.2 |

| Method | Alt H | Data Transform | Zeta | NOEL | LOEL | Toxic Units | ChV | PMSD |
|---|---|---|---|---|---|---|---|---|
| Equal Variance t Two-Sample | C > T | Untransformed | | .100 | >100 | 1 | N/A | 55.35% |

**Group Comparisons**

| Control | vs | Conc-% | Statistic | Critical | P-Value | MSD | Decision(0.05) |
|---|---|---|---|---|---|---|---|
| Dilution Water | | 100 | -0.2828 | 1.85955 | 0.6077 | 62.6698 | Non-Significant Effect |

**ANOVA Table**

| Source | Sum of Squares | Mean Square | DF | F Statistic | P-Value | Decision(0.05) |
|---|---|---|---|---|---|---|
| Between | 227.0727 | 227.0727 | 1 | 0.08 | 0.78452 | Non-Significant Effect |
| Error | 22716 | 2839.5 | 8 | | | |
| Total | 22943.0766 | 3066.5732 | 9 | | | |

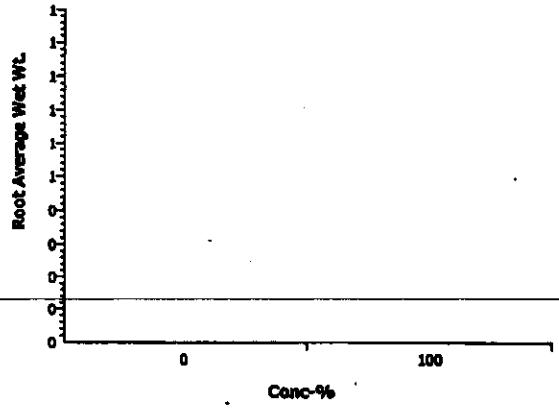
**ANOVA Assumptions**

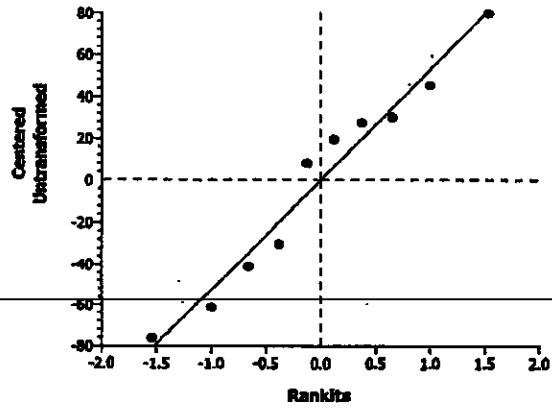
| Attribute | Test | Statistic | Critical | P-Value | Decision(0.01) |
|---|---|---|---|---|---|
| Variances | Variance Ratio F | 1.46872 | 23.15450 | 0.71863 | Equal Variances |
| Distribution | Shapiro-Wilk W | 0.95710 | | 0.75234 | Normal Distribution |

**Data Summary**

| | | | Original Data | | | | Transformed Data | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Conc-% | Control Type | Count | Mean | Minimum | Maximum | SD | Mean | Minimum | Maximum | SD |
| 0 | Dilution Water | 5 | 113.23 | 51.638 | 158.52 | 47.962 | | | | |
| 100 | | 5 | 122.76 | 46.4 | 202.31 | 58.126 | | | | |

**Graphics**



# CETIS Analysis Detail

| Plant Chronic test | | | | | CH2M Hill |
|---|---|---|---|---|---|
| **Endpoint** | **Analysis Type** | **Sample Link** | **Control Link** | **Date Analyzed** | **Version** |
| Total Average Biomass Dry Wt. | Comparison | 15-3014-2283 | 15-3014-2283 | 10 Mar-06 2:29 PM | CETISv1.1.2 |

| Method | Alt H | Data Transform | Zeta | NOEL | LOEL | Toxic Units | ChV | PMSD |
|---|---|---|---|---|---|---|---|---|
| Equal Variance t Two-Sample | C > T | Untransformed | | 100 | >100 | 1 | N/A | 59.60% |

**Group Comparisons**

| Control | vs | Conc-% | Statistic | Critical | P-Value | MSD | Decision(0.05) |
|---|---|---|---|---|---|---|---|
| Dilution Water | | 100 | -0.2489 | 1.85955 | 0.5951 | 12.0486 | Non-Significant Effect |

**ANOVA Table**

| Source | Sum of Squares | Mean Square | DF | F Statistic | P-Value | Decision(0.05) |
|---|---|---|---|---|---|---|
| Between | 6.502588 | 6.502588 | 1 | 0.06 | 0.80970 | Non-Significant Effect |
| Error | 839.6294 | 104.9537 | 8 | | | |
| Total | 846.131982 | 111.45626 | 9 | | | |

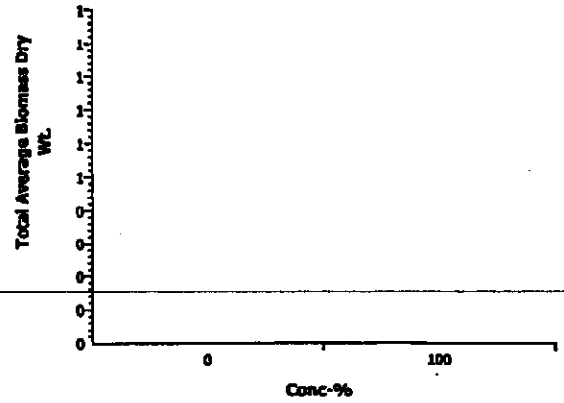
**ANOVA Assumptions**

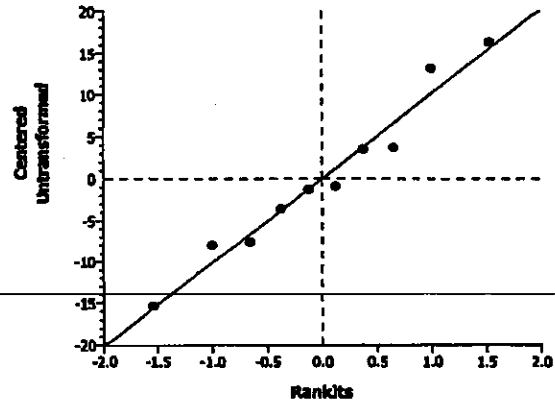
| Attribute | Test | Statistic | Critical | P-Value | Decision(0.01) |
|---|---|---|---|---|---|
| Variances | Variance Ratio F | 1.70337 | 23.15450 | 0.61853 | Equal Variances |
| Distribution | Shapiro-Wilk W | 0.96503 | | 0.84128 | Normal Distribution |

**Data Summary**

| | | | Original Data | | | | Transformed Data | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Conc-% | Control Type | Count | Mean | Minimum | Maximum | SD | Mean | Minimum | Maximum | SD |
| 0 | Dilution Water | 5 | 20.217 | 12.223 | 33.384 | 8.8117 | | | | |
| 100 | | 5 | 21.830 | 6.47 | 38.17 | 11.500 | | | | |

**Graphics**



# CETIS Analysis Detail

**Plant Chronic test** — CH2M Hill

| Endpoint | Analysis Type | Sample Link | Control Link | Date Analyzed | Version |
|---|---|---|---|---|---|
| Total Average Biomass Wet Wt. | Comparison | 15-3014-2283 | 15-3014-2283 | 10 Mar-06 2:29 PM | CETISv1.1.2 |

| Method | Alt H | Data Transform | Zeta | NOEL | LOEL | Toxic Units | ChV | PMSD |
|---|---|---|---|---|---|---|---|---|
| Equal Variance t Two-Sample | C > T | Untransformed | | 100 | >100 | 1 | N/A | 51.32% |

**Group Comparisons**

| Control | vs | Conc-% | Statistic | Critical | P-Value | MSD | Decision(0.05) |
|---|---|---|---|---|---|---|---|
| Dilution Water | | 100 | -0.4456 | 1.85955 | 0.6661 | 90.9112 | Non-Significant Effect |

**ANOVA Table**

| Source | Sum of Squares | Mean Square | DF | F Statistic | P-Value | Decision(0.05) |
|---|---|---|---|---|---|---|
| Between | 1186.341 | 1186.341 | 1 | 0.20 | 0.66771 | Non-Significant Effect |
| Error | 47802.41 | 5975.302 | 8 | | | |
| Total | 48988.7550 | 7161.6427 | 9 | | | |

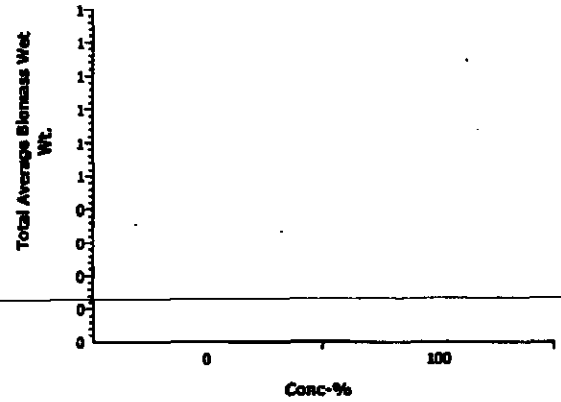
**ANOVA Assumptions**

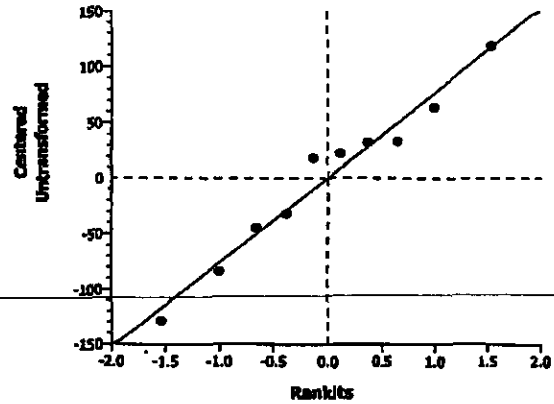
| Attribute | Test | Statistic | Critical | P-Value | Decision(0.01) |
|---|---|---|---|---|---|
| Variances | Variance Ratio F | 2.51228 | 23.15450 | 0.39406 | Equal Variances |
| Distribution | Shapiro-Wilk W | 0.96972 | | 0.88820 | Normal Distribution |

**Data Summary**

| | | | Original Data | | | | Transformed Data | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Conc-% | Control Type | Count | Mean | Minimum | Maximum | SD | Mean | Minimum | Maximum | SD |
| 0 | Dilution Water | 5 | 177.14 | 93.113 | 240.86 | 58.331 | | | | |
| 100 | | 5 | 198.92 | 70.053 | 317.36 | 92.456 | | | | |

**Graphics**



## BLUEGRASS GROWTH TEST

Client: Hanford Project

Test Start Date: 01/25/2006

Initials: Day 0 Br Day 12 NJ Day 14 Br Day 16 NJ Day 21 NJ Day 28 Br

Sample ID: E283101-SO12 B1542-03

| CONC. | REPLICATE | PRE-EMERGENCE (12 days after planting) | @ EMERGENCE (14 days after planting) | POST-EMERGENCE (18 days after planting) | 7-DAYS POST-EMERGENCE (21 days after planting) | | | 14-DAYS POST-EMERGENCE (28 days after planting) | pH INITIAL (@ planting) | pH FINAL (28 days after planting) |
|---|---|---|---|---|---|---|---|---|---|---|
| | | # seeds germinated | | | 21 | 23 | 30 | | | |
| 100% | A | 1 | 3 | 4 | 4 | 4 | 4 | 4 | 7.2 | 7.3 |
| | B | 4 | 5 | 5 | 6 | 6 | 6→5 | 5 | | |
| | C | 3 | 3 | 4 | 4 | 4 | 3 | 3 | | |
| | D | 2 | 2 | 3 | 4 | 4 | 4 | 4 | | |
| | E | 3 | 4 | 4 | 4 | 4 | 5 | 5 | | |

7-Days Post-Emergence: Selectively thin down to 5 Seedlings (leave the 5 tallest seedlings). Describe shoot appearance:

Replicate A 3 medium + 1 small plant in good shape

Replicate B 6 medium in good shape - smallest removed

Replicate C 1 large + 2 medium in good shape + 1 single shoot dead

Replicate D 3 medium + 1 small in good shape

Replicate E 4 medium in good shape + 1 small single shoot plant w/ browning tip.

14-Days Post-Emergence: Describe shoot appearance:

Replicate A 3 ~~4~~ NJ medium, all green & good shape, 1 small - good shape & green

Replicate B 4 medium - all green & good shape

Replicate C 1 large & 2 medium - all green & in good shape

Replicate D 4 medium - all green & in good shape

Replicate E 1 large, 3 medium - all green & in good shape. 1 small - w/ 1 brown shoot

Measure Shoot Height: (above ground)

| | 1st Seedling | 2nd Seedling | 3rd Seedling | 4th Seedling | 5th Seedling | # of shoots |
|---|---|---|---|---|---|---|
| Replicate A | 41 ~~68~~ NJ mm | mm | mm | mm | mm | 42 |
| Replicate B | 55 mm | mm | mm | mm | mm | 76 |
| Replicate C | 74 mm | mm | mm | mm | mm | 51 |
| Replicate D | 55 mm | mm | mm | mm | mm | 37 |
| Replicate E | 69 mm | mm | mm | mm | mm | |

Measure Shoot Weight: (above ground)

| | Tin Tare Wt. (mg) | Wet Wt (mg) | Dry Wt. (mg) |
|---|---|---|---|
| Replicate A | 1003.62 | 1245.0 | 1049.42 |
| Replicate B | 1020.47 | 1473.4 | 1103.86 |
| Replicate C | 1018.48 | 1473.6 | 1110.39 |
| Replicate D | 1002.17 | 1302.4 | 1046.68 |
| Replicate E | 994.12 | ~~1473.1~~ NJ 1377.3 | 1062.60 |

Describe root appearance:

Replicate A

Replicate B

Replicate C

Replicate D

Replicate E

Measure Root Length: (longest root)

| | 1st Seedling | 2nd Seedling | 3rd Seedling | 4th Seedling | 5th Seedling |
|---|---|---|---|---|---|
| Replicate A | 103 mm | mm | mm | mm | mm |
| Replicate B | 105 mm | mm | mm | mm | mm |
| Replicate C | 137 mm | mm | mm | mm | mm |
| Replicate D | 136 mm | mm | mm | mm | mm |
| Replicate E | 112 mm | mm | mm | mm | mm |

Measure Root Weight: (longest root)

| | Tin Tare Wt. (mg) | Wet Wt (mg) | Dry Wt. (mg) |
|---|---|---|---|
| Replicate A | ~~994.12~~ NJ | 1556.2 | 1046.86 |
| Replicate B | 965.79 | 1826.7 | 1021.39 |
| Replicate C | 1015.00 | 1826.5 | 1064.27 |
| Replicate D | 991.78 | 1479.4 | 1015.98 |
| Replicate E | 1000.25 | 1801.0 | 1045.22 |

Tin Tare Wt. (mg) 1017.14

Comments: 85 g dry wt/rep

# CETIS Test Summary

Report Date: 10 Mar-06 2:47 PM
Test Link: 11-6729-9100/B154203psc

**Plant Chronic test** — **CH2M Hill**

| | | | | | |
|---|---|---|---|---|---|
| **Test No:** | 08-7140-2504 | **Test Type:** | Plant Chronic test | **Duration:** | 37d 0h |
| **Start Date:** | 25 Jan-06 | **Protocol:** | ASTM E1963-02 (2002) | **Species:** | Poa sandbergii |
| **Ending Date:** | 03 Mar-06 | **Dil Water:** | | **Source:** | |
| **Setup Date:** | 25 Jan-06 12:00 AM | **Brine:** | | | |

**Comments:** E283101

| | | | | | |
|---|---|---|---|---|---|
| **Sample No:** | 15-5457-5144 | **Code:** | B1542-03 | **Client:** | |
| **Sample Date:** | 14 Nov-05 | **Material:** | Soil | **Project:** | |
| **Receive Date:** | | **Source:** | Hanford | | |
| **Sample Age:** | 72d 0h | **Station:** | | | |

**Comments:** J10DT8, E283101

**Comparison Summary**

| Analysis | Endpoint | NOEL | LOEL | ChV | PMSD | Method |
|---|---|---|---|---|---|---|
| 13-0598-5594 | % Germination | 100 | > 100 | N/A | 22.60% | Equal Variance t Two-Sample |
| 12-7925-4627 | AG Average Dry Wt. | 100 | > 100 | N/A | 63.25% | Equal Variance t Two-Sample |
| 05-9433-9153 | AG Average Wet Wt. | 100 | > 100 | N/A | 50.83% | Equal Variance t Two-Sample |
| 07-1842-1257 | Root Average Dry Wt. | 100 | > 100 | N/A | 61.46% | Equal Variance t Two-Sample |
| 12-8604-5268 | Root Average Wet Wt. | 100 | > 100 | N/A | 55.58% | Equal Variance t Two-Sample |
| 07-3498-2993 | Total Average Biomass Dry | 100 | > 100 | N/A | 61.50% | Equal Variance t Two-Sample |
| 03-3037-2496 | Total Average Biomass Wet | 100 | > 100 | N/A | 51.72% | Equal Variance t Two-Sample |

**% Germination Summary**

| Conc-% | Control Type | Reps | Mean | Minimum | Maximum | SE | SD | CV |
|---|---|---|---|---|---|---|---|---|
| 0 | Dilution Water | 5 | 0.88000 | 0.60000 | 1.00000 | 0.08000 | 0.17889 | 20.33% |
| 100 | | 5 | 0.84000 | 0.60000 | 1.00000 | 0.07483 | 0.16733 | 19.92% |

**AG Average Dry Wt. Summary**

| Conc-% | Control Type | Reps | Mean | Minimum | Maximum | SE | SD | CV |
|---|---|---|---|---|---|---|---|---|
| 0 | Dilution Water | 5 | 12.351 | 7.9275 | 19.276 | 2.1347 | 4.7733 | 38.65% |
| 100 | | 5 | 16.718 | 11.128 | 30.637 | 3.6185 | 8.0912 | 48.40% |

**AG Average Wet Wt. Summary**

| Conc-% | Control Type | Reps | Mean | Minimum | Maximum | SE | SD | CV |
|---|---|---|---|---|---|---|---|---|
| 0 | Dilution Water | 5 | 63.903 | 41.475 | 82.338 | 7.1313 | 15.946 | 24.95% |
| 100 | | 5 | 90.866 | 60.345 | 151.71 | 15.946 | 35.657 | 39.24% |

**Root Average Dry Wt. Summary**

| Conc-% | Control Type | Reps | Mean | Minimum | Maximum | SE | SD | CV |
|---|---|---|---|---|---|---|---|---|
| 0 | Dilution Water | 5 | 7.8666 | 3.78 | 14.108 | 1.8639 | 4.1678 | 52.98% |
| 100 | | 5 | 10.003 | 6.05 | 16.423 | 1.8129 | 4.0538 | 40.52% |

**Root Average Wet Wt. Summary**

| Conc-% | Control Type | Reps | Mean | Minimum | Maximum | SE | SD | CV |
|---|---|---|---|---|---|---|---|---|
| 0 | Dilution Water | 5 | 113.23 | 51.638 | 158.52 | 21.449 | 47.962 | 42.36% |
| 100 | | 5 | 172.14 | 121.90 | 270.5 | 26.184 | 58.548 | 34.01% |

**Total Average Biomass Dry Wt. Summary**

| Conc-% | Control Type | Reps | Mean | Minimum | Maximum | SE | SD | CV |
|---|---|---|---|---|---|---|---|---|
| 0 | Dilution Water | 5 | 20.217 | 12.223 | 33.384 | 3.9407 | 8.8117 | 43.58% |
| 100 | | 5 | 26.721 | 17.177 | 47.060 | 5.4021 | 12.079 | 45.21% |

**Total Average Biomass Wet Wt. Summary**

| Conc-% | Control Type | Reps | Mean | Minimum | Maximum | SE | SD | CV |
|---|---|---|---|---|---|---|---|---|
| 0 | Dilution Water | 5 | 177.14 | 93.113 | 240.86 | 26.086 | 58.331 | 32.93% |
| 100 | | 5 | 263.01 | 195.11 | 422.21 | 41.799 | 93.465 | 35.54% |

# CETIS Test Summary

Report Date: 10 Mar-06 2:47 PM
Test Link: 11-6729-9100/B154203psc

**% Germination Detail**

| Conc-% | Control Type | Rep 1 | Rep 2 | Rep 3 | Rep 4 | Rep 5 |
|---|---|---|---|---|---|---|
| 0 | Dilution Water | 1.00000 | 1.00000 | 1.00000 | 0.60000 | 0.80000 |
| 100 | | 0.80000 | 1.00000 | 0.60000 | 0.80000 | 1.00000 |

**AG Average Dry Wt. Detail**

| Conc-% | Control Type | Rep 1 | Rep 2 | Rep 3 | Rep 4 | Rep 5 |
|---|---|---|---|---|---|---|
| 0 | Dilution Water | 15.1720 | 10.552 | 19.276 | 8.82666 | 7.92751 |
| 100 | | 11.4500 | 16.6780 | 30.6367 | 11.1275 | 13.696 |

**AG Average Wet Wt. Detail**

| Conc-% | Control Type | Rep 1 | Rep 2 | Rep 3 | Rep 4 | Rep 5 |
|---|---|---|---|---|---|---|
| 0 | Dilution Water | 67.2900 | 55.1900 | 82.338 | 73.2233 | 41.4750 |
| 100 | | 60.3450 | 90.5860 | 151.707 | 75.0575 | 76.6360 |

**Root Average Dry Wt. Detail**

| Conc-% | Control Type | Rep 1 | Rep 2 | Rep 3 | Rep 4 | Rep 5 |
|---|---|---|---|---|---|---|
| 0 | Dilution Water | 8.75601 | 8.39399 | 14.108 | 3.77999 | 4.295 |
| 100 | | 7.42999 | 11.1200 | 16.4233 | 6.04999 | 8.99399 |

**Root Average Wet Wt. Detail**

| Conc-% | Control Type | Rep 1 | Rep 2 | Rep 3 | Rep 4 | Rep 5 |
|---|---|---|---|---|---|---|
| 0 | Dilution Water | 143.362 | 140.624 | 158.524 | 72.0233 | 51.6375 |
| 100 | | 134.765 | 172.182 | 270.5 | 121.905 | 161.350 |

**Total Average Biomass Dry Wt. Detail**

| Conc-% | Control Type | Rep 1 | Rep 2 | Rep 3 | Rep 4 | Rep 5 |
|---|---|---|---|---|---|---|
| 0 | Dilution Water | 23.9280 | 18.946 | 33.384 | 12.6068 | 12.2225 |
| 100 | | 18.8800 | 27.7980 | 47.0600 | 17.1775 | 22.69 |

**Total Average Biomass Wet Wt. Detail**

| Conc-% | Control Type | Rep 1 | Rep 2 | Rep 3 | Rep 4 | Rep 5 |
|---|---|---|---|---|---|---|
| 0 | Dilution Water | 210.652 | 195.814 | 240.862 | 145.247 | 93.1125 |
| 100 | | 195.11 | 262.768 | 422.207 | 196.963 | 237.986 |



CETIS™ v1.1.2revl

Analyst: Approval:

# CETIS Analysis Detail

**Plant Chronic test** — **CH2M Hill**

| Endpoint | Analysis Type | Sample Link | Control Link | Date Analyzed | Version |
|---|---|---|---|---|---|
| % Germination | Comparison | 11-6729-9100 | 11-6729-9100 | 10 Mar-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 | 1 | N/A | 22.60% |

**Group Comparisons**

| Control | vs | Conc-% | Statistic | Critical | P-Value | MSD | Decision(0.05) |
|---|---|---|---|---|---|---|---|
| Dilution Water | | 100 | 0.37677 | 1.85955 | 0.3581 | 0.23506 | Non-Significant Effect |

**ANOVA Table**

| Source | Sum of Squares | Mean Square | DF | F Statistic | P-Value | Decision(0.05) |
|---|---|---|---|---|---|---|
| Between | 0.0056708 | 0.005671 | 1 | 0.14 | 0.71614 | Non-Significant Effect |
| Error | 0.3195846 | 0.039948 | 8 | | | |
| Total | 0.3252554 | 0.0456189 | 9 | | | |

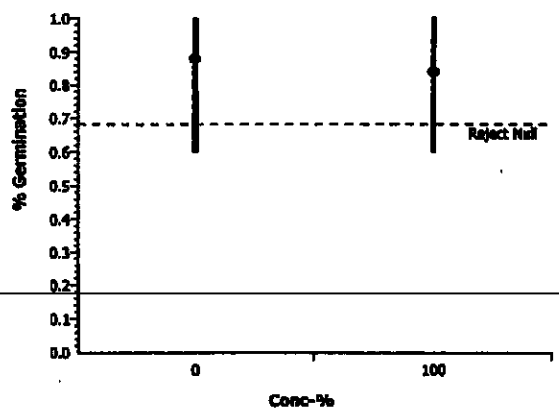
**ANOVA Assumptions**

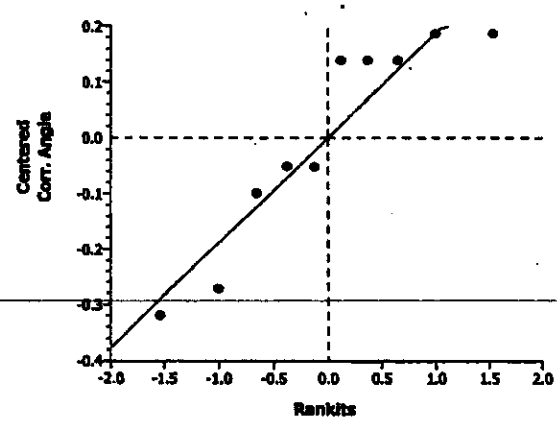
| Attribute | Test | Statistic | Critical | P-Value | Decision(0.01) |
|---|---|---|---|---|---|
| Variances | Variance Ratio F | 1.14108 | 23.15450 | 0.90131 | Equal Variances |
| Distribution | Shapiro-Wilk W | 0.85889 | | 0.07404 | Normal Distribution |

**Data Summary**

| | | | Original Data | | | | Transformed Data | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Conc-% | Control Type | Count | Mean | Minimum | Maximum | SD | Mean | Minimum | Maximum | SD |
| 0 | Dilution Water | 5 | 0.88000 | 0.60000 | 1.00000 | 0.17889 | 1.20581 | 0.88608 | 1.34528 | 0.20635 |
| 100 | | 5 | 0.84000 | 0.60000 | 1.00000 | 0.16733 | 1.15819 | 0.88608 | 1.34528 | 0.19317 |

**Graphics**



# CETIS Analysis Detail

**Plant Chronic test** — CH2M Hill

| Endpoint | Analysis Type | Sample Link | Control Link | Date Analyzed | Version |
|---|---|---|---|---|---|
| AG Average Dry Wt. | Comparison | 11-6729-9100 | 11-6729-9100 | 10 Mar-06 2:47 PM | CETISv1.1.2 |

| Method | Alt H | Data Transform | Zeta | NOEL | LOEL | Toxic Units | ChV | PMSD |
|---|---|---|---|---|---|---|---|---|
| Equal Variance t Two-Sample | C > T | Untransformed | | 100 | >100 | 1 | N/A | 63.25% |

**Group Comparisons**

| Control | vs | Conc-% | Statistic | Critical | P-Value | MSD | Decision(0.05) |
|---|---|---|---|---|---|---|---|
| Dilution Water | | 100 | -1.0394 | 1.85955 | 0.8355 | 7.8124 | Non-Significant Effect |

**ANOVA Table**

| Source | Sum of Squares | Mean Square | DF | F Statistic | P-Value | Decision(0.05) |
|---|---|---|---|---|---|---|
| Between | 47.67259 | 47.67259 | 1 | 1.08 | 0.32901 | Non-Significant Effect |
| Error | 353.0072 | 44.1259 | 8 | | | |
| Total | 400.679794 | 91.798492 | 9 | | | |

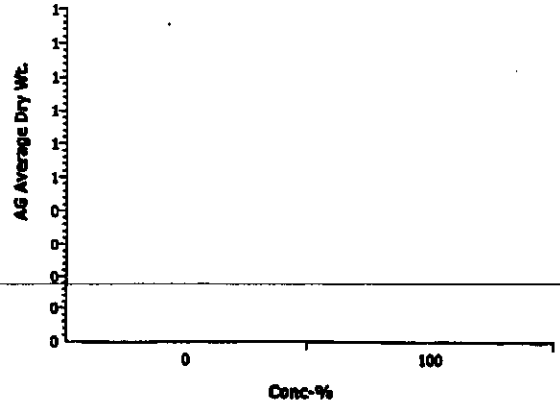
**ANOVA Assumptions**

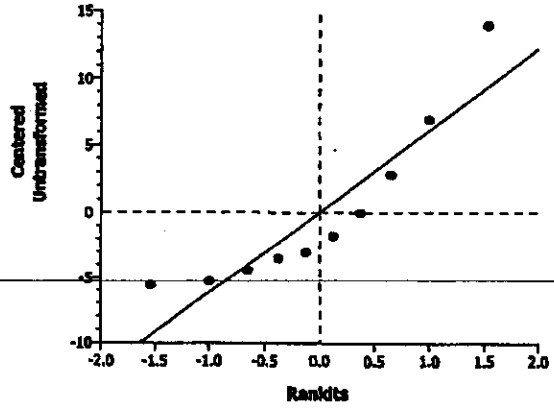
| Attribute | Test | Statistic | Critical | P-Value | Decision(0.01) |
|---|---|---|---|---|---|
| Variances | Variance Ratio F | 2.87331 | 23.15450 | 0.33110 | Equal Variances |
| Distribution | Shapiro-Wilk W | 0.84132 | | 0.04576 | Normal Distribution |

**Data Summary**

| | | | Original Data | | | | Transformed Data | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Conc-% | Control Type | Count | Mean | Minimum | Maximum | SD | Mean | Minimum | Maximum | SD |
| 0 | Dilution Water | 5 | 12.351 | 7.9275 | 19.276 | 4.7733 | | | | |
| 100 | | 5 | 16.718 | 11.128 | 30.637 | 8.0912 | | | | |

**Graphics**



# CETIS Analysis Detail

| Plant Chronic test | | | | | CH2M Hill |
|---|---|---|---|---|---|
| **Endpoint** | **Analysis Type** | **Sample Link** | **Control Link** | **Date Analyzed** | **Version** |
| AG Average Wet Wt. | Comparison | 11-6729-9100 | 11-6729-9100 | 10 Mar-06 2:47 PM | CETISv1.1.2 |

| Method | Alt H | Data Transform | Zeta | NOEL | LOEL | Toxic Units | ChV | PMSD |
|---|---|---|---|---|---|---|---|---|
| Equal Variance t Two-Sample | C > T | Untransformed | | 100 | >100 | 1 | N/A | 50.83% |

**Group Comparisons**

| Control | vs | Conc-% | Statistic | Critical | P-Value | MSD | Decision(0.05) |
|---|---|---|---|---|---|---|---|
| Dilution Water | | 100 | -1.5436 | 1.85955 | 0.9194 | 32.4828 | Non-Significant Effect |

**ANOVA Table**

| Source | Sum of Squares | Mean Square | DF | F Statistic | P-Value | Decision(0.05) |
|---|---|---|---|---|---|---|
| Between | 1817.505 | 1817.505 | 1 | 2.38 | 0.16127 | Non-Significant Effect |
| Error | 6102.717 | 762.8397 | 8 | | | |
| Total | 7920.22266 | 2580.3450 | 9 | | | |

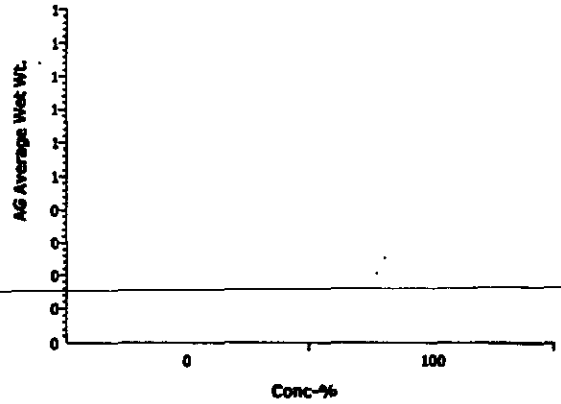
**ANOVA Assumptions**

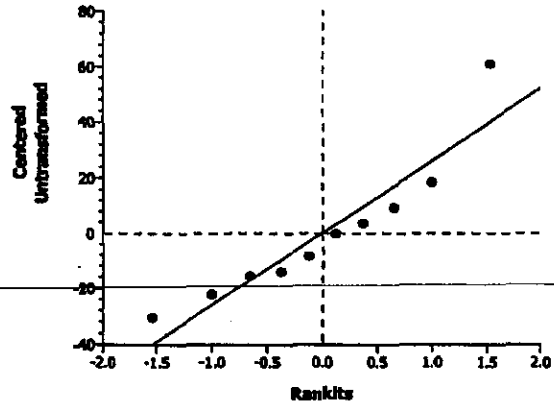
| Attribute | Test | Statistic | Critical | P-Value | Decision(0.01) |
|---|---|---|---|---|---|
| Variances | Variance Ratio F | 5.00000 | 23.15450 | 0.14815 | Equal Variances |
| Distribution | Shapiro-Wilk W | 0.89115 | | 0.17471 | Normal Distribution |

**Data Summary**

| | | | Original Data | | | | Transformed Data | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Conc-% | Control Type | Count | Mean | Minimum | Maximum | SD | Mean | Minimum | Maximum | SD |
| 0 | Dilution Water | 5 | 63.903 | 41.475 | 82.338 | 15.946 | | | | |
| 100 | | 5 | 90.866 | 60.345 | 151.71 | 35.657 | | | | |

**Graphics**



# CETIS Analysis Detail

**Plant Chronic test** — CH2M Hill

| Endpoint | Analysis Type | Sample Link | Control Link | Date Analyzed | Version |
|---|---|---|---|---|---|
| Root Average Dry Wt. | Comparison | 11-6729-9100 | 11-6729-9100 | 10 Mar-06 2:47 PM | CETISv1.1.2 |

| Method | Alt H | Data Transform | Zeta | NOEL | LOEL | Toxic Units | ChV | PMSD |
|---|---|---|---|---|---|---|---|---|
| Equal Variance t Two-Sample | C > T | Untransformed | | 100 | >100 | 1 | N/A | 61.46% |

**Group Comparisons**

| Control | vs | Conc-% | Statistic | Critical | P-Value | MSD | Decision(0.05) |
|---|---|---|---|---|---|---|---|
| Dilution Water | | 100 | -0.8218 | 1.85955 | 0.7825 | 4.83508 | Non-Significant Effect |

**ANOVA Table**

| Source | Sum of Squares | Mean Square | DF | F Statistic | P-Value | Decision(0.05) |
|---|---|---|---|---|---|---|
| Between | 11.41551 | 11.41551 | 1 | 0.68 | 0.43498 | Non-Significant Effect |
| Error | 135.2142 | 16.90177 | 8 | | | |
| Total | 146.629681 | 28.31728 | 9 | | | |

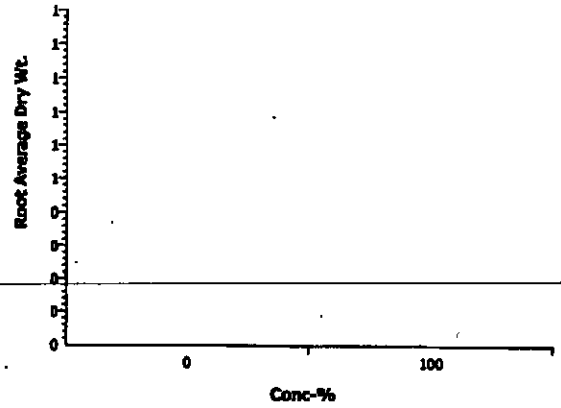
**ANOVA Assumptions**

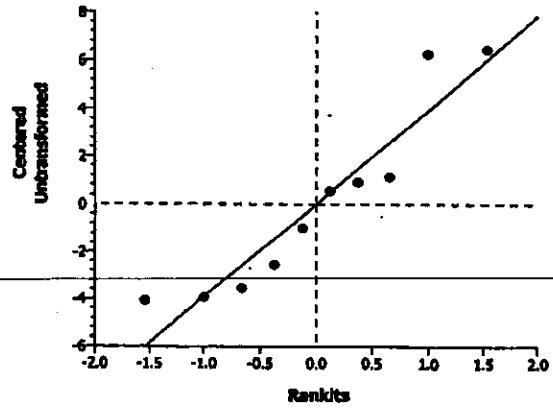
| Attribute | Test | Statistic | Critical | P-Value | Decision(0.01) |
|---|---|---|---|---|---|
| Variances | Variance Ratio F | 1.05701 | 23.15450 | 0.95844 | Equal Variances |
| Distribution | Shapiro-Wilk W | 0.87437 | | 0.11238 | Normal Distribution |

**Data Summary**

| | | | Original Data | | | | Transformed Data | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Conc-% | Control Type | Count | Mean | Minimum | Maximum | SD | Mean | Minimum | Maximum | SD |
| 0 | Dilution Water | 5 | 7.8666 | 3.78 | 14.108 | 4.1678 | | | | |
| 100 | | 5 | 10.003 | 6.05 | 16.423 | 4.0538 | | | | |

**Graphics**



# CETIS Analysis Detail

**Plant Chronic test** — CH2M Hill

| Endpoint | Analysis Type | Sample Link | Control Link | Date Analyzed | Version |
|---|---|---|---|---|---|
| Root Average Wet Wt. | Comparison | 11-6729-9100 | 11-6729-9100 | 10 Mar-06 2:47 PM | CETISv1.1.2 |

| Method | Alt H | Data Transform | Zeta | NOEL | LOEL | Toxic Units | ChV | PMSD |
|---|---|---|---|---|---|---|---|---|
| Equal Variance t Two-Sample | C > T | Untransformed | | 100 | >100 | 1 | N/A | 55.68% |

**Group Comparisons**

| Control | vs | Conc-% | Statistic | Critical | P-Value | MSD | Decision(0.05) |
|---|---|---|---|---|---|---|---|
| Dilution Water | | 100 | -1.7403 | 1.85955 | 0.9400 | 62.9411 | Non-Significant Effect |

**ANOVA Table**

| Source | Sum of Squares | Mean Square | DF | F Statistic | P-Value | Decision(0.05) |
|---|---|---|---|---|---|---|
| Between | 8674.86 | 8674.86 | 1 | 3.03 | 0.11998 | Non-Significant Effect |
| Error | 22913.1 | 2864.138 | 8 | | | |
| Total | 31587.9619 | 11538.998 | 9 | | | |

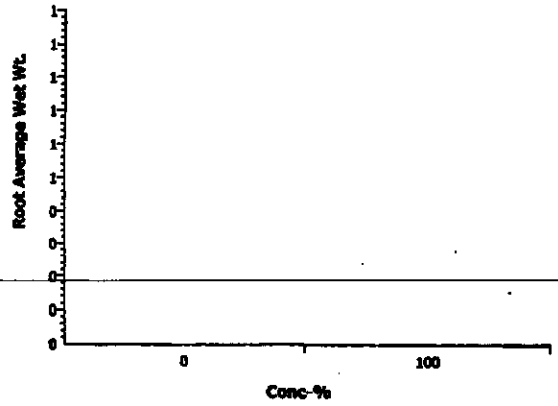
**ANOVA Assumptions**

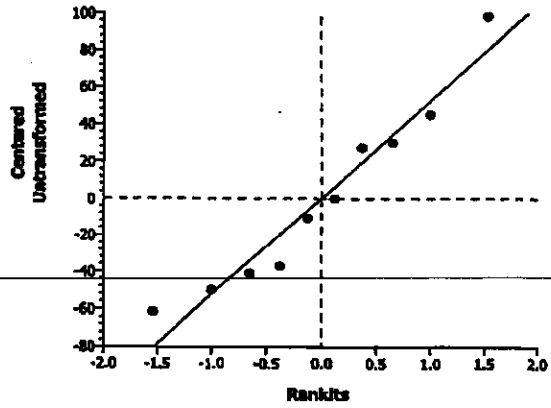
| Attribute | Test | Statistic | Critical | P-Value | Decision(0.01) |
|---|---|---|---|---|---|
| Variances | Variance Ratio F | 1.49014 | 23.15450 | 0.70857 | Equal Variances |
| Distribution | Shapiro-Wilk W | 0.94145 | | 0.56924 | Normal Distribution |

**Data Summary**

| | | | Original Data | | | | Transformed Data | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Conc-% | Control Type | Count | Mean | Minimum | Maximum | SD | Mean | Minimum | Maximum | SD |
| 0 | Dilution Water | 5 | 113.23 | 51.638 | 158.52 | 47.962 | | | | |
| 100 | | 5 | 172.14 | 121.91 | 270.5 | 58.548 | | | | |

**Graphics**



# CETIS Analysis Detail

**Plant Chronic test** — CH2M Hill

| Endpoint | Analysis Type | Sample Link | Control Link | Date Analyzed | Version |
|---|---|---|---|---|---|
| Total Average Biomass Dry Wt. | Comparison | 11-6729-9100 | 11-6729-9100 | 10 Mar-06 2:47 PM | CETISv1.1.2 |

| Method | Alt H | Data Transform | Zeta | NOEL | LOEL | Toxic Units | ChV | PMSD |
|---|---|---|---|---|---|---|---|---|
| Equal Variance t Two-Sample | C > T | Untransformed | | 100 | >100 | 1 | N/A | 61.50% |

**Group Comparisons**

| Control | vs | Conc-% | Statistic | Critical | P-Value | MSD | Decision(0.05) |
|---|---|---|---|---|---|---|---|
| Dilution Water | | 100 | -0.9726 | 1.85955 | 0.8204 | 12.4342 | Non-Significant Effect |

**ANOVA Table**

| Source | Sum of Squares | Mean Square | DF | F Statistic | P-Value | Decision(0.05) |
|---|---|---|---|---|---|---|
| Between | 105.7444 | 105.7444 | 1 | 0.95 | 0.35922 | Non-Significant Effect |
| Error | 894.2308 | 111.7788 | 8 | | | |
| Total | 999.975182 | 217.52325 | 9 | | | |

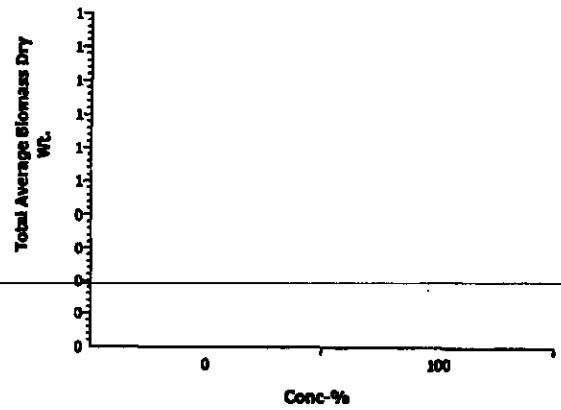
**ANOVA Assumptions**

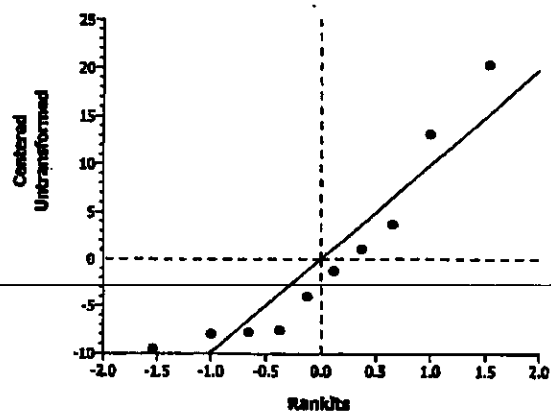
| Attribute | Test | Statistic | Critical | P-Value | Decision(0.01) |
|---|---|---|---|---|---|
| Variances | Variance Ratio F | 1.87917 | 23.15450 | 0.55620 | Equal Variances |
| Distribution | Shapiro-Wilk W | 0.86171 | | 0.07992 | Normal Distribution |

**Data Summary**

| | | | Original Data | | | | Transformed Data | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Conc-% | Control Type | Count | Mean | Minimum | Maximum | SD | Mean | Minimum | Maximum | SD |
| 0 | Dilution Water | 5 | 20.217 | 12.223 | 33.384 | 8.8117 | | | | |
| 100 | | 5 | 26.721 | 17.177 | 47.060 | 12.079 | | | | |

**Graphics**



# CETIS Analysis Detail

**Plant Chronic test** — CH2M Hill

| Endpoint | Analysis Type | Sample Link | Control Link | Date Analyzed | Version |
|---|---|---|---|---|---|
| Total Average Biomass Wet Wt. | Comparison | 11-6729-9100 | 11-6729-9100 | 10 Mar-06 2:47 PM | CETISv1.1.2 |

| Method | Alt H | Data Transform | Zeta | NOEL | LOEL | Toxic Units | ChV | PMSD |
|---|---|---|---|---|---|---|---|---|
| Equal Variance t Two-Sample | C > T | Untransformed | | 100 | >100 | 1 | N/A | 51.72% |

**Group Comparisons**

| Control | vs | Conc-% | Statistic | Critical | P-Value | MSD | Decision(0.05) |
|---|---|---|---|---|---|---|---|
| Dilution Water | | 100 | -1.7428 | 1.85955 | 0.9402 | 91.6218 | Non-Significant Effect |

**ANOVA Table**

| Source | Sum of Squares | Mean Square | DF | F Statistic | P-Value | Decision(0.05) |
|---|---|---|---|---|---|---|
| Between | 18433.81 | 18433.81 | 1 | 3.04 | 0.11954 | Non-Significant Effect |
| Error | 48552.59 | 6069.074 | 8 | | | |
| Total | 66986.4004 | 24502.881 | 9 | | | |

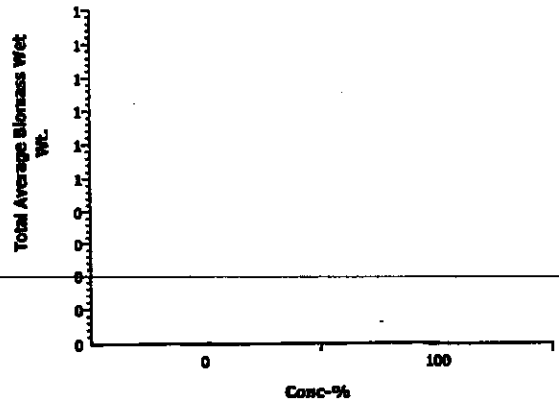
**ANOVA Assumptions**

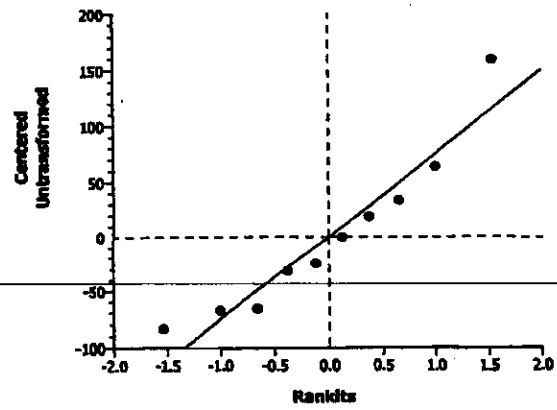
| Attribute | Test | Statistic | Critical | P-Value | Decision(0.01) |
|---|---|---|---|---|---|
| Variances | Variance Ratio F | 2.56740 | 23.15450 | 0.38336 | Equal Variances |
| Distribution | Shapiro-Wilk W | 0.92031 | | 0.35952 | Normal Distribution |

**Data Summary**

| | | | Original Data | | | | Transformed Data | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Conc-% | Control Type | Count | Mean | Minimum | Maximum | SD | Mean | Minimum | Maximum | SD |
| 0 | Dilution Water | 5 | 177.14 | 93.113 | 240.86 | 58.331 | | | | |
| 100 | | 5 | 263.01 | 195.11 | 422.21 | 93.465 | | | | |

**Graphics**



## BLUEGRASS GROWTH TEST

Client: Hanford Project

Test Start Date: 01/25/2006

Initials: Day 0 Bm Day 12 NS Day 14 Bm Day 18 NS Day 21 [illegible] Day 25 Bm

Sample ID: E284601-SOI2 31542-[illegible]04

| CONC. | REPLICATE | # seeds germinated: PRE-EMERGENCE (12 days after planting) | @ EMERGENCE (14 days after planting) | POST-EMERGENCE (18 days after planting) | 7-DAYS POST-EMERGENCE (21 days after planting) | 14-DAYS POST-EMERGENCE (28 days after planting) | pH: INITIAL (@ planting) | pH: FINAL (28 days after planting) |
|---|---|---|---|---|---|---|---|---|
| 100% | A | 2 | 2 | NO 2 3 | 5 5 3 | 3 | 6.5 | 7.1 |
| | B | 0 | 2 | 3 | 4 4 4 | 3 | | |
| | C | 0 | 1 | 2 | 2 2 2 | 2 | | |
| | D | 3 | 6 | 7 | 7 7 5 | 5 | | |
| | E | 0 | 1 | 2 | 6 7 7→5 | 5 | | |

7-Days Post-Emergence: Selectively thin down to 5 Seedlings (leave the 5 tallest seedlings). Describe shoot appearance:

Replicate A: 3 medium plants in good shape / color + 2 small brown plants (single shoot)

Replicate B: 1 medium + 1 small/medium w/ good color + 1 small/medium and 1 small w/ brown edges (still alive)

Replicate C: 2 medium plants in good shape w/ good color

Replicate D: 4 medium in good shape + 1 small w/ 1 green and 1 brown shoot, other small plants brown.

Replicate E: 1 large + 4 medium in good shape, 2 small single shoot plants in good shape removed

14-Days Post-Emergence: Describe shoot appearance:

Replicate A: 3 medium plants look good

Replicate B: 3 medium plants look good

Replicate C: 2 medium plants look good

Replicate D: 3-4 med / 1 large plant look good

Replicate E: 1 large plant 3-4 medium plants look good, 1 small plant

Measure Shoot Height: (above ground)

| | 1st Seedling | 2nd Seedling | 3rd Seedling | 4th Seedling | 5th Seedling | # Shoots |
|---|---|---|---|---|---|---|
| Replicate A | 40 mm | 49 mm | 44 mm | — mm | — mm | 6, 11, 11 |
| Replicate B | 40 mm | 40 mm | 51 mm | — mm | — mm | 4, 2, 4 |
| Replicate C | 60 mm | 40 mm | — mm | — mm | — mm | 9, 9 |
| Replicate D | 20 mm | 41 mm | 50 mm | 62 mm | 39 mm | 2, 13, 13, 12, 7 |
| Replicate E | 42 mm | 45 mm | 50 mm | 62 mm | 106 mm | 6, 4, 10, 8, 12 |

Measure Shoot Weight: (above ground)

| | Tin Tare Wt. (mg) | Wet Wt (mg) | Dry Wt. (mg) |
|---|---|---|---|
| Replicate A | 993.35 | 1180.7 | 1027.52 |
| Replicate B | 1015.99 | 1156.0 | 1043.63 |
| Replicate C | 995.41 | 1112.9 | 1015.98 |
| Replicate D | 996.70 | 1287.8 | 1051.81 |
| Replicate E | 999.42 | 1332.6 | 1056.72 |

Describe root appearance:

Replicate A

Replicate B

Replicate C

Replicate D

Replicate E

Measure Root Length: (longest root)

| | 1st Seedling | 2nd Seedling | 3rd Seedling | 4th Seedling | 5th Seedling |
|---|---|---|---|---|---|
| Replicate A | 137 mm | 125 mm | 126 mm | mm | mm |
| Replicate B | 144 mm | 96 mm | 107 mm | mm | mm |
| Replicate C | 157 mm | 136 mm | mm | mm | mm |
| Replicate D | 138 mm | 131 mm | 158 mm | 102 mm | 77 mm |
| Replicate E | 122 mm | 127 mm | 125 mm | 78 mm | 96 mm |

Measure Root Weight: (longest root)

| | Tin Tare Wt. (mg) | Wet Wt (mg) | Dry Wt. (mg) |
|---|---|---|---|
| Replicate A | 975.91 | 1323.6 | 995.69 |
| Replicate B | 992.17 | 1233.4 | 1010.81 |
| Replicate C | 998.33 | 1212.3 | 1012.18 |
| Replicate D | 991.57 | 1491.2 | 1024.03 |
| Replicate E | 1006.36 | 1515.1 | 1040.11 |

Comments: 90 g dry wt. / rep

# CETIS Test Summary

Report Date: 10 Mar-06 3:09 PM
Test Link: 08-5372-9401/B154204psc

**Plant Chronic test** — CH2M Hill

| | | | | | |
|---|---|---|---|---|---|
| **Test No:** | 09-9175-7411 | **Test Type:** | Plant Chronic test | **Duration:** | 37d 0h |
| **Start Date:** | 25 Jan-06 | **Protocol:** | ASTM E1963-02 (2002) | **Species:** | Poa sandbergii |
| **Ending Date:** | 03 Mar-06 | **Dil Water:** | | **Source:** | |
| **Setup Date:** | 25 Jan-06 12:00 AM | **Brine:** | | | |

| | | | | | |
|---|---|---|---|---|---|
| **Sample No:** | 09-5315-2344 | **Code:** | B1542-04 | **Client:** | |
| **Sample Date:** | 15 Nov-05 | **Material:** | Soil | **Project:** | |
| **Receive Date:** | | **Source:** | Hanford | | |
| **Sample Age:** | 71d 0h | **Station:** | | | |

**Comments:** J10DV2, E284601

**Comparison Summary**

| Analysis | Endpoint | NOEL | LOEL | ChV | PMSD | Method |
|---|---|---|---|---|---|---|
| 01-9254-1231 | % Germination | 100 | > 100 | N/A | 29.92% | Equal Variance t Two-Sample |
| 13-9253-1008 | AG Average Dry Wt. | 100 | > 100 | N/A | 32.76% | Equal Variance t Two-Sample |
| 16-7224-0566 | AG Average Height | 100 | > 100 | N/A | 49.51% | Equal Variance t Two-Sample |
| 13-7546-9439 | AG Average Wet Wt. | 100 | > 100 | N/A | 22.90% | Equal Variance t Two-Sample |
| 07-9665-2596 | Root Average Dry Wt. | 100 | > 100 | N/A | 44.15% | Equal Variance t Two-Sample |
| 02-2440-4958 | Root Average Length | 100 | > 100 | N/A | 62.01% | Equal Variance t Two-Sample |
| 05-2473-0552 | Root Average Wet Wt. | 100 | > 100 | N/A | 36.51% | Equal Variance t Two-Sample |
| 05-1227-1695 | Total Average Biomass Dry | 100 | > 100 | N/A | 36.53% | Equal Variance t Two-Sample |
| 06-6783-3595 | Total Average Biomass Wet | 100 | > 100 | N/A | 28.88% | Equal Variance t Two-Sample |

# CETIS Test Summary

Report Date: 10 Mar-06 3:09 PM
Test Link: 08-5372-9401/B154204psc

**% Germination Summary**

| Conc-% | Control Type | Reps | Mean | Minimum | Maximum | SE | SD | CV |
|---|---|---|---|---|---|---|---|---|
| 0 | Dilution Water | 5 | 0.88000 | 0.60000 | 1.00000 | 0.08000 | 0.17889 | 20.33% |
| 100 | | 5 | 0.72000 | 0.40000 | 1.00000 | 0.12000 | 0.26833 | 37.27% |

**AG Average Dry Wt. Summary**

| Conc-% | Control Type | Reps | Mean | Minimum | Maximum | SE | SD | CV |
|---|---|---|---|---|---|---|---|---|
| 0 | Dilution Water | 5 | 12.351 | 7.9275 | 19.276 | 2.1347 | 4.7733 | 38.65% |
| 100 | | 5 | 10.669 | 9.2133 | 11.46 | 0.4217 | 0.9429 | 8.84% |

**AG Average Height Summary**

| Conc-% | Control Type | Reps | Mean | Minimum | Maximum | SE | SD | CV |
|---|---|---|---|---|---|---|---|---|
| 0 | Dilution Water | 5 | 10.627 | 8.4 | 12.333 | 0.6527 | 1.4595 | 13.73% |
| 100 | | 5 | 15.12 | 8.4 | 25 | 2.7527 | 6.1553 | 40.71% |

**AG Average Wet Wt. Summary**

| Conc-% | Control Type | Reps | Mean | Minimum | Maximum | SE | SD | CV |
|---|---|---|---|---|---|---|---|---|
| 0 | Dilution Water | 5 | 63.903 | 41.475 | 82.338 | 7.1313 | 15.946 | 24.95% |
| 100 | | 5 | 58.544 | 46.670 | 66.636 | 3.3307 | 7.4477 | 12.72% |

**Root Average Dry Wt. Summary**

| Conc-% | Control Type | Reps | Mean | Minimum | Maximum | SE | SD | CV |
|---|---|---|---|---|---|---|---|---|
| 0 | Dilution Water | 5 | 7.8666 | 3.78 | 14.108 | 1.8639 | 4.1678 | 52.98% |
| 100 | | 5 | 6.5947 | 6.2133 | 6.925 | 0.1202 | 0.2689 | 4.08% |

**Root Average Length Summary**

| Conc-% | Control Type | Reps | Mean | Minimum | Maximum | SE | SD | CV |
|---|---|---|---|---|---|---|---|---|
| 0 | Dilution Water | 5 | 28.46 | 22.5 | 33 | 1.7486 | 3.91 | 13.74% |
| 100 | | 5 | 39.773 | 22 | 73 | 9.3283 | 20.859 | 52.44% |

**Root Average Wet Wt. Summary**

| Conc-% | Control Type | Reps | Mean | Minimum | Maximum | SE | SD | CV |
|---|---|---|---|---|---|---|---|---|
| 0 | Dilution Water | 5 | 113.23 | 51.638 | 158.52 | 21.449 | 47.962 | 42.36% |
| 100 | | 5 | 100.99 | 80.410 | 115.9 | 5.8455 | 13.071 | 12.94% |

**Total Average Biomass Dry Wt. Summary**

| Conc-% | Control Type | Reps | Mean | Minimum | Maximum | SE | SD | CV |
|---|---|---|---|---|---|---|---|---|
| 0 | Dilution Water | 5 | 20.217 | 12.223 | 33.384 | 3.9407 | 8.8117 | 43.58% |
| 100 | | 5 | 17.264 | 15.427 | 18.21 | 0.4928 | 1.1019 | 6.38% |

**Total Average Biomass Wet Wt. Summary**

| Conc-% | Control Type | Reps | Mean | Minimum | Maximum | SE | SD | CV |
|---|---|---|---|---|---|---|---|---|
| 0 | Dilution Water | 5 | 177.14 | 93.113 | 240.86 | 26.086 | 58.331 | 32.93% |
| 100 | | 5 | 159.54 | 127.08 | 178.35 | 8.7345 | 19.531 | 12.24% |

# CETIS Test Summary

Report Date: 10 Mar-06 3:09 PM
Test Link: 08-5372-9401/B154204psc

**% Germination Detail**

| Conc-% | Control Type | Rep 1 | Rep 2 | Rep 3 | Rep 4 | Rep 5 |
|---|---|---|---|---|---|---|
| 0 | Dilution Water | 1.00000 | 1.00000 | 1.00000 | 0.60000 | 0.80000 |
| 100 | | 0.60000 | 0.60000 | 0.40000 | 1.00000 | 1.00000 |

**AG Average Dry Wt. Detail**

| Conc-% | Control Type | Rep 1 | Rep 2 | Rep 3 | Rep 4 | Rep 5 |
|---|---|---|---|---|---|---|
| 0 | Dilution Water | 15.1720 | 10.552 | 19.276 | 8.82666 | 7.92751 |
| 100 | | 11.3900 | 9.21334 | 10.2600 | 11.0220 | 11.46 |

**AG Average Height Detail**

| Conc-% | Control Type | Rep 1 | Rep 2 | Rep 3 | Rep 4 | Rep 5 |
|---|---|---|---|---|---|---|
| 0 | Dilution Water | 10.2 | 8.4 | 11.2 | 12.3333 | 11 |
| 100 | | 15.3333 | 14.6667 | 25 | 8.4 | 12.2 |

**AG Average Wet Wt. Detail**

| Conc-% | Control Type | Rep 1 | Rep 2 | Rep 3 | Rep 4 | Rep 5 |
|---|---|---|---|---|---|---|
| 0 | Dilution Water | 67.2900 | 55.1900 | 82.338 | 73.2233 | 41.4750 |
| 100 | | 62.45 | 46.6700 | 58.7450 | 58.2200 | 66.6360 |

**Root Average Dry Wt. Detail**

| Conc-% | Control Type | Rep 1 | Rep 2 | Rep 3 | Rep 4 | Rep 5 |
|---|---|---|---|---|---|---|
| 0 | Dilution Water | 8.75601 | 8.39399 | 14.108 | 3.77999 | 4.295 |
| 100 | | 6.59334 | 6.21334 | 6.92499 | 6.49200 | 6.75 |

**Root Average Length Detail**

| Conc-% | Control Type | Rep 1 | Rep 2 | Rep 3 | Rep 4 | Rep 5 |
|---|---|---|---|---|---|---|
| 0 | Dilution Water | 27.8 | 28.4 | 30.6 | 33 | 22.5 |
| 100 | | 43 | 38.6667 | 73 | 22.2 | 22 |

**Root Average Wet Wt. Detail**

| Conc-% | Control Type | Rep 1 | Rep 2 | Rep 3 | Rep 4 | Rep 5 |
|---|---|---|---|---|---|---|
| 0 | Dilution Water | 143.362 | 140.624 | 158.524 | 72.0233 | 51.6375 |
| 100 | | 115.897 | 80.4100 | 106.985 | 99.926 | 101.748 |

**Total Average Biomass Dry Wt. Detail**

| Conc-% | Control Type | Rep 1 | Rep 2 | Rep 3 | Rep 4 | Rep 5 |
|---|---|---|---|---|---|---|
| 0 | Dilution Water | 23.9280 | 18.946 | 33.384 | 12.6066 | 12.2225 |
| 100 | | 17.9834 | 15.4267 | 17.185 | 17.5140 | 18.21 |

**Total Average Biomass Wet Wt. Detail**

| Conc-% | Control Type | Rep 1 | Rep 2 | Rep 3 | Rep 4 | Rep 5 |
|---|---|---|---|---|---|---|
| 0 | Dilution Water | 210.652 | 195.814 | 240.862 | 145.247 | 93.1125 |
| 100 | | 178.347 | 127.080 | 165.730 | 158.146 | 168.384 |



CETIS™ v1.1.2revl

Analyst: Approval:

# CETIS Analysis Detail

**Plant Chronic test** — **CH2M Hill**

| Endpoint | Analysis Type | Sample Link | Control Link | Date Analyzed | Version |
|---|---|---|---|---|---|
| % Germination | Comparison | 08-5372-9401 | 08-5372-9401 | 10 Mar-06 3:08 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 | 29.92% |

**Group Comparisons**

| Control | vs | Conc-% | Statistic | Critical | P-Value | MSD | Decision(0.05) |
|---|---|---|---|---|---|---|---|
| Dilution Water | | 100 | 1.08340 | 1.85955 | 0.1551 | 0.30265 | Non-Significant Effect |

**ANOVA Table**

| Source | Sum of Squares | Mean Square | DF | F Statistic | P-Value | Decision(0.05) |
|---|---|---|---|---|---|---|
| Between | 0.0777281 | 0.077728 | 1 | 1.17 | 0.31020 | Non-Significant Effect |
| Error | 0.529773 | 0.066222 | 8 | | | |
| Total | 0.60750108 | 0.1439497 | 9 | | | |

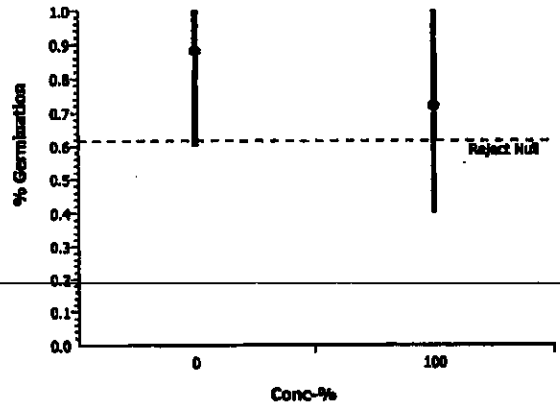
**ANOVA Assumptions**

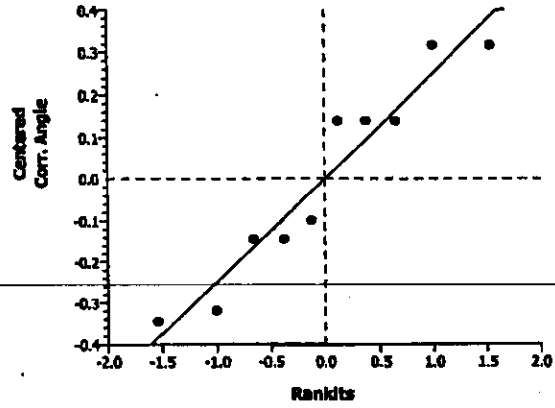
| Attribute | Test | Statistic | Critical | P-Value | Decision(0.01) |
|---|---|---|---|---|---|
| Variances | Variance Ratio F | 2.11043 | 23.15450 | 0.48725 | Equal Variances |
| Distribution | Shapiro-Wilk W | 0.90642 | | 0.25730 | Normal Distribution |

**Data Summary**

| | | | Original Data | | | | Transformed Data | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Conc-% | Control Type | Count | Mean | Minimum | Maximum | SD | Mean | Minimum | Maximum | SD |
| 0 | Dilution Water | 5 | 0.88000 | 0.60000 | 1.00000 | 0.17889 | 1.20581 | 0.88608 | 1.34528 | 0.20635 |
| 100 | | 5 | 0.72000 | 0.40000 | 1.00000 | 0.28833 | 1.02949 | 0.68472 | 1.34528 | 0.29977 |

**Graphics**



# CETIS Analysis Detail

**Plant Chronic test** — **CH2M Hill**

| Endpoint | Analysis Type | Sample Link | Control Link | Date Analyzed | Version |
|---|---|---|---|---|---|
| AG Average Dry Wt. | Comparison | 08-5372-9401 | 08-5372-9401 | 10 Mar-06 3:08 PM | CETISv1.1.2 |

| Method | Alt H | Data Transform | Zeta | NOEL | LOEL | Toxic Units | ChV | PMSD |
|---|---|---|---|---|---|---|---|---|
| Equal Variance t Two-Sample | C > T | Untransformed | | 100 | >100 | 1 | N/A | 32.76% |

**Group Comparisons**

| Control | vs | Conc-% | Statistic | Critical | P-Value | MSD | Decision(0.05) |
|---|---|---|---|---|---|---|---|
| Dilution Water | | 100 | 0.77289 | 1.85955 | 0.2309 | 4.04627 | Non-Significant Effect |

**ANOVA Table**

| Source | Sum of Squares | Mean Square | DF | F Statistic | P-Value | Decision(0.05) |
|---|---|---|---|---|---|---|
| Between | 7.070768 | 7.070768 | 1 | 0.60 | 0.46181 | Non-Significant Effect |
| Error | 94.69466 | 11.83683 | 8 | | | |
| Total | 101.765432 | 18.907601 | 9 | | | |

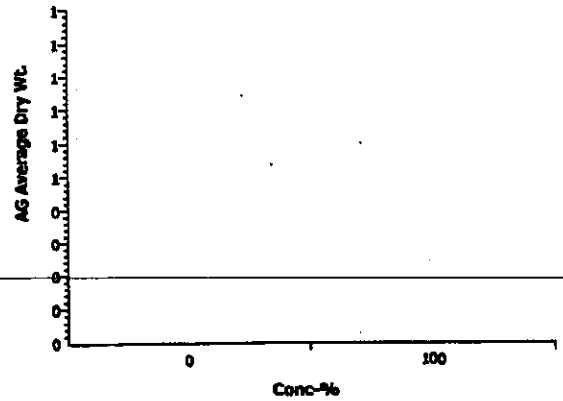
**ANOVA Assumptions**

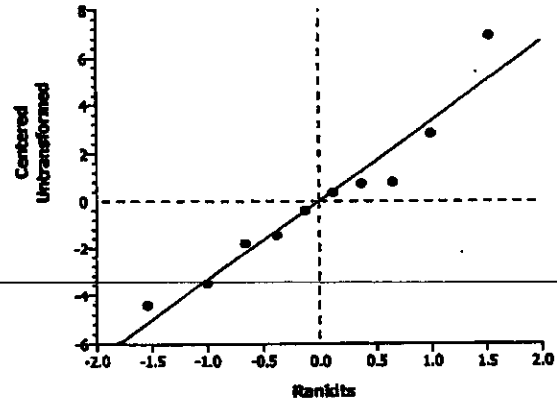
| Attribute | Test | Statistic | Critical | P-Value | Decision(0.01) |
|---|---|---|---|---|---|
| Variances | Variance Ratio F | 25.62671 | 23.15450 | 0.00825 | Unequal Variances |
| Distribution | Shapiro-Wilk W | 0.94329 | | 0.59015 | Normal Distribution |

**Data Summary**

| | | | Original Data | | | | Transformed Data | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Conc-% | Control Type | Count | Mean | Minimum | Maximum | SD | Mean | Minimum | Maximum | SD |
| 0 | Dilution Water | 5 | 12.351 | 7.9275 | 19.276 | 4.7733 | | | | |
| 100 | | 5 | 10.669 | 9.2133 | 11.46 | 0.9429 | | | | |

**Graphics**



# CETIS Analysis Detail

| Plant Chronic test | | | | | | CH2M Hill |
|---|---|---|---|---|---|---|
| **Endpoint** | **Analysis Type** | **Sample Link** | **Control Link** | **Date Analyzed** | **Version** | |
| AG Average Height | Comparison | 08-5372-9401 | 08-5372-9401 | 10 Mar-06 3:08 PM | CETISv1.1.2 | |

| Method | Alt H | Data Transform | Zeta | NOEL | LOEL | Toxic Units | ChV | PMSD |
|---|---|---|---|---|---|---|---|---|
| Equal Variance t Two-Sample | C > T | Untransformed | | 100 | >100 | 1 | N/A | 49.51% |

**Group Comparisons**

| Control | vs | Conc-% | Statistic | Critical | P-Value | MSD | Decision(0.05) |
|---|---|---|---|---|---|---|---|
| Dilution Water | | 100 | -1.5883 | 1.85955 | 0.9246 | 5.26077 | Non-Significant Effect |

**ANOVA Table**

| Source | Sum of Squares | Mean Square | DF | F Statistic | P-Value | Decision(0.05) |
|---|---|---|---|---|---|---|
| Between | 50.47511 | 50.47511 | 1 | 2.52 | 0.15089 | Non-Significant Effect |
| Error | 160.0711 | 20.00889 | 8 | | | |
| Total | 210.546219 | 70.484001 | 9 | | | |

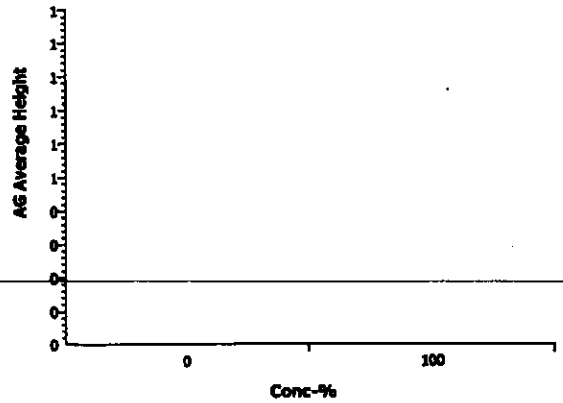
**ANOVA Assumptions**

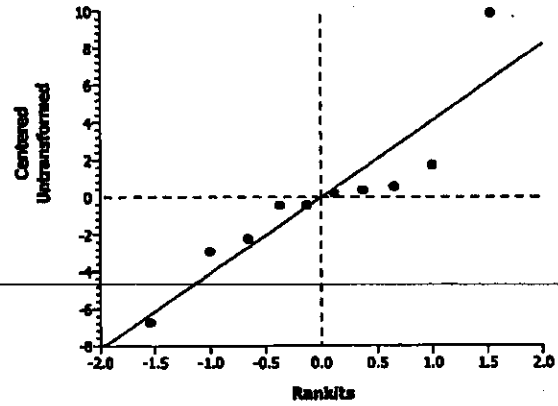
| Attribute | Test | Statistic | Critical | P-Value | Decision(0.01) |
|---|---|---|---|---|---|
| Variances | Variance Ratio F | 17.78573 | 23.15450 | 0.01640 | Equal Variances |
| Distribution | Shapiro-Wilk W | 0.86589 | | 0.08951 | Normal Distribution |

**Data Summary**

| | | | Original Data | | | | Transformed Data | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Conc-% | Control Type | Count | Mean | Minimum | Maximum | SD | Mean | Minimum | Maximum | SD |
| 0 | Dilution Water | 5 | 10.627 | 8.4 | 12.333 | 1.4595 | | | | |
| 100 | | 5 | 15.12 | 8.4 | 25 | 6.1553 | | | | |

**Graphics**



# CETIS Analysis Detail

**Plant Chronic test** — CH2M HILL

| Endpoint | Analysis Type | Sample Link | Control Link | Date Analyzed | Version |
|---|---|---|---|---|---|
| AG Average Wet Wt. | Comparison | 08-5372-9401 | 08-5372-9401 | 10 Mar-06 3:08 PM | CETISv1.1.2 |

| Method | Alt H | Data Transform | Zeta | NOEL | LOEL | Toxic Units | ChV | PMSD |
|---|---|---|---|---|---|---|---|---|
| Equal Variance t Two-Sample | C > T | Untransformed | | 100 | >100 | 1 | N/A | 22.90% |

**Group Comparisons**

| Control | vs | Conc-% | Statistic | Critical | P-Value | MSD | Decision(0.05) |
|---|---|---|---|---|---|---|---|
| Dilution Water | | 100 | 0.68088 | 1.85955 | 0.2576 | 14.6362 | Non-Significant Effect |

**ANOVA Table**

| Source | Sum of Squares | Mean Square | DF | F Statistic | P-Value | Decision(0.05) |
|---|---|---|---|---|---|---|
| Between | 71.79871 | 71.79871 | 1 | 0.46 | 0.51517 | Non-Significant Effect |
| Error | 1238.995 | 154.8743 | 8 | | | |
| Total | 1310.79346 | 226.67305 | 9 | | | |

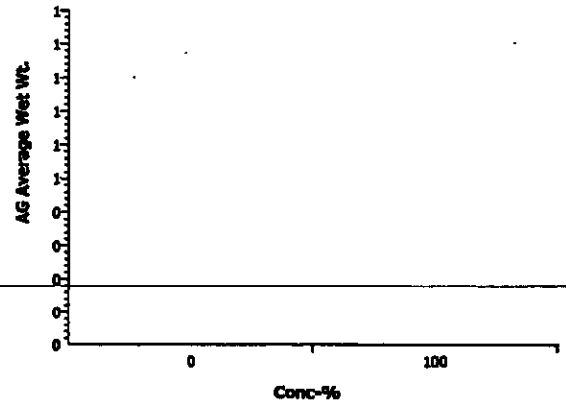
**ANOVA Assumptions**

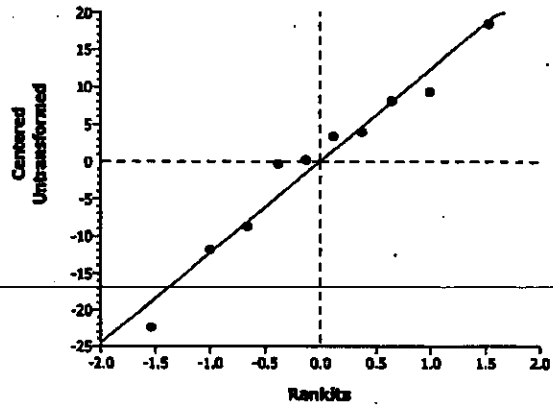
| Attribute | Test | Statistic | Critical | P-Value | Decision(0.01) |
|---|---|---|---|---|---|
| Variances | Variance Ratio F | 4.58421 | 23.15450 | 0.16944 | Equal Variances |
| Distribution | Shapiro-Wilk W | 0.96988 | | 0.88975 | Normal Distribution |

**Data Summary**

| | | | Original Data | | | | Transformed Data | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Conc-% | Control Type | Count | Mean | Minimum | Maximum | SD | Mean | Minimum | Maximum | SD |
| 0 | Dilution Water | 5 | 63.903 | 41.475 | 82.338 | 15.946 | | | | |
| 100 | | 5 | 58.544 | 46.67 | 66.636 | 7.4477 | | | | |

**Graphics**



# CETIS Analysis Detail

**Plant Chronic test** — CH2M Hill

| Endpoint | Analysis Type | Sample Link | Control Link | Date Analyzed | Version |
|---|---|---|---|---|---|
| Root Average Dry Wt. | Comparison | 08-5372-9401 | 08-5372-9401 | 10 Mar-06 3:08 PM | CETISv1.1.2 |

| Method | Alt H | Data Transform | Zeta | NOEL | LOEL | Toxic Units | ChV | PMSD |
|---|---|---|---|---|---|---|---|---|
| Equal Variance t Two-Sample | C > T | Untransformed | · | 100 | >100 | 1 | N/A | 44.15% |

**Group Comparisons**

| Control | vs | Conc-% | Statistic | Critical | P-Value | MSD | Decision(0.05) |
|---|---|---|---|---|---|---|---|
| Dilution Water | | 100 | 0.68096 | 1.85955 | 0.2576 | 3.47318 | Non-Significant Effect |

**ANOVA Table**

| Source | Sum of Squares | Mean Square | DF | F Statistic | P-Value | Decision(0.05) |
|---|---|---|---|---|---|---|
| Between | 4.044082 | 4.044082 | 1 | 0.46 | 0.51512 | Non-Significant Effect |
| Error | 69.77014 | 8.721268 | 8 | | | |
| Total | 73.8142233 | 12.765349 | 9 | | | |

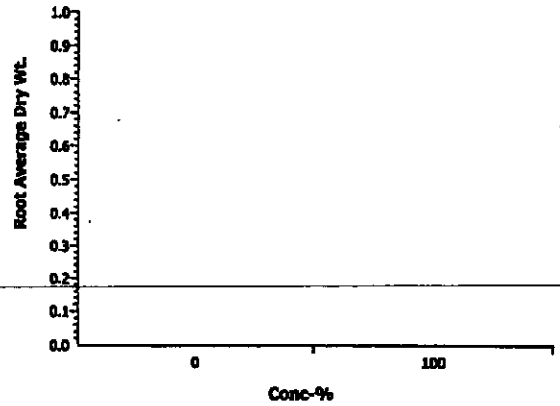
**ANOVA Assumptions**

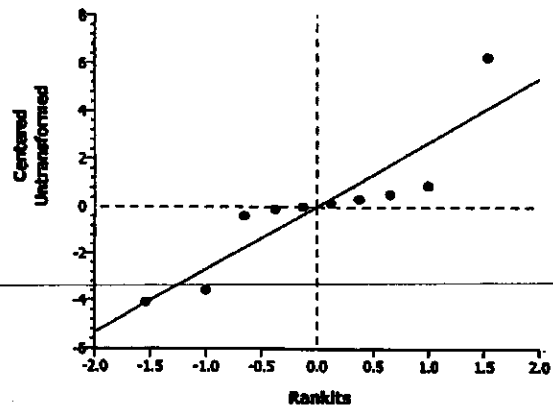
| Attribute | Test | Statistic | Critical | P-Value | Decision(0.01) |
|---|---|---|---|---|---|
| Variances | Variance Ratio F | 240.25800 | 23.15450 | 0.00010 | Unequal Variances |
| Distribution | Shapiro-Wilk W | 0.83816 | | 0.04194 | Normal Distribution |

**Data Summary**

| | | | Original Data | | | | Transformed Data | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Conc-% | Control Type | Count | Mean | Minimum | Maximum | SD | Mean | Minimum | Maximum | SD |
| 0 | Dilution Water | 5 | 7.8666 | 3.78 | 14.108 | 4.1678 | | | | |
| 100 | | 5 | 6.5947 | 6.2133 | 6.925 | 0.2689 | | | | |

**Graphics**



# CETIS Analysis Detail

**Plant Chronic test** — CH2M Hill

| Endpoint | Analysis Type | Sample Link | Control Link | Date Analyzed | Version |
|---|---|---|---|---|---|
| Root Average Length | Comparison | 08-5372-9401 | 08-5372-9401 | 10 Mar-06 3:08 PM | CETISv1.1.2 |

| Method | Alt H | Data Transform | Zeta | NOEL | LOEL | Toxic Units | ChV | PMSD |
|---|---|---|---|---|---|---|---|---|
| Equal Variance t.Two-Sample | C > T | Untransformed | | 100 | >100 | 1 | N/A | 62.01% |

**Group Comparisons**

| Control | vs | Conc-% | Statistic | Critical | P-Value | MSD | Decision(0.05) |
|---|---|---|---|---|---|---|---|
| Dilution Water | | 100 | -1.1920 | 1.85955 | 0.8663 | 17.6486 | Non-Significant Effect |

**ANOVA Table**

| Source | Sum of Squares | Mean Square | DF | F Statistic | P-Value | Decision(0.05) |
|---|---|---|---|---|---|---|
| Between | 319.9788 | 319.9788 | 1 | 1.42 | 0.26741 | Non-Significant Effect |
| Error | 1801.513 | 225.1891 | 8 | | | |
| Total | 2121.49173 | 545.16791 | 9 | | | |

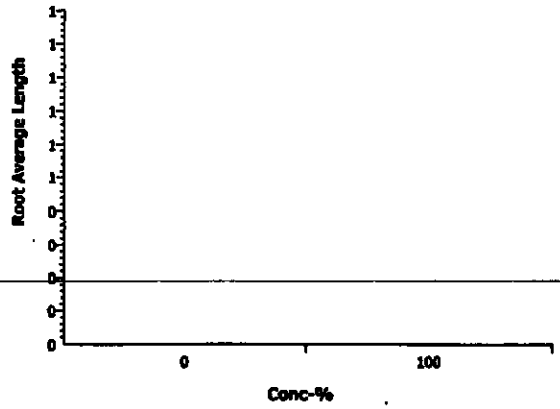
**ANOVA Assumptions**

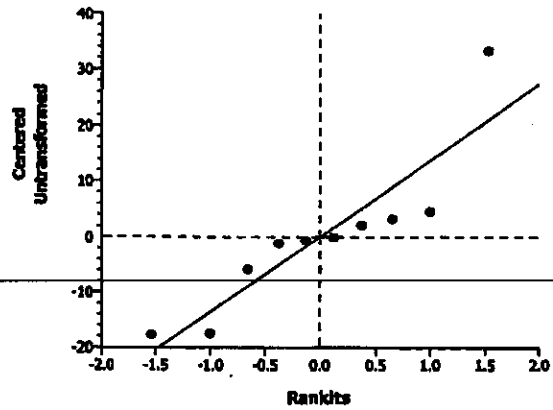
| Attribute | Test | Statistic | Critical | P-Value | Decision(0.01) |
|---|---|---|---|---|---|
| Variances | Variance Ratio F | 28.45959 | 23.15450 | 0.00676 | Unequal Variances |
| Distribution | Shapiro-Wilk W | 0.84109 | | 0.04547 | Normal Distribution |

**Data Summary**

| | | | Original Data | | | | Transformed Data | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Conc-% | Control Type | Count | Mean | Minimum | Maximum | SD | Mean | Minimum | Maximum | SD |
| 0 | Dilution Water | 5 | 28.46 | 22.5 | 33 | 3.91 | | | | |
| 100 | | 5 | 39.773 | 22 | 73 | 20.859 | | | | |

**Graphics**



# CETIS Analysis Detail

**Plant Chronic test** — **CH2M Hill**

| Endpoint | Analysis Type | Sample Link | Control Link | Date Analyzed | Version |
|---|---|---|---|---|---|
| Root Average Wet Wt. | Comparison | 08-5372-9401 | 08-5372-9401 | 10 Mar-06 3:08 PM | CETISv1.1.2 |

| Method | Alt H | Data Transform | Zeta | NOEL | LOEL | Toxic Units | ChV | PMSD |
|---|---|---|---|---|---|---|---|---|
| Equal Variance t Two-Sample | C > T | Untransformed | | 100 | >100 | 1 | N/A | 36.51% |

**Group Comparisons**

| Control | vs | Conc-% | Statistic | Critical | P-Value | MSD | Decision(0.05) |
|---|---|---|---|---|---|---|---|
| Dilution Water | | 100 | 0.55061 | 1.85955 | 0.2985 | 41.3408 | Non-Significant Effect |

**ANOVA Table**

| Source | Sum of Squares | Mean Square | DF | F Statistic | P-Value | Decision(0.05) |
|---|---|---|---|---|---|---|
| Between | 374.6069 | 374.6069 | 1 | 0.30 | 0.59693 | Non-Significant Effect |
| Error | 9884.932 | 1235.616 | 8 | | | |
| Total | 10259.5385 | 1610.2234 | 9 | | | |

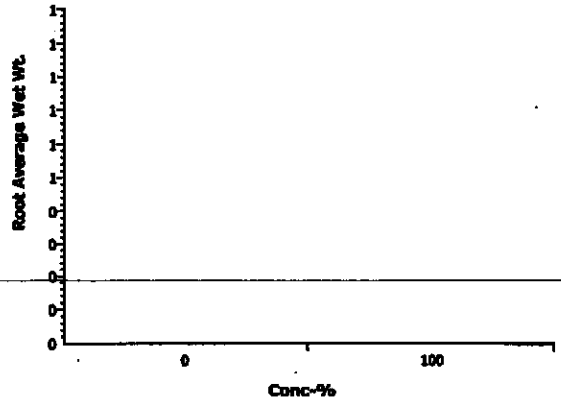
**ANOVA Assumptions**

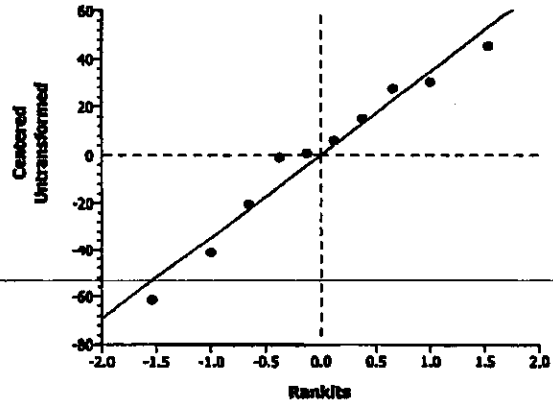
| Attribute | Test | Statistic | Critical | P-Value | Decision(0.01) |
|---|---|---|---|---|---|
| Variances | Variance Ratio F | 13.46452 | 23.15450 | 0.02736 | Equal Variances |
| Distribution | Shapiro-Wilk W | 0.95666 | | 0.74721 | Normal Distribution |

**Data Summary**

| | | | Original Data | | | | Transformed Data | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Conc-% | Control Type | Count | Mean | Minimum | Maximum | SD | Mean | Minimum | Maximum | SD |
| 0 | Dilution Water | 5 | 113.23 | 51.638 | 158.52 | 47.962 | | | | |
| 100 | | 5 | 100.99 | 80.410 | 115.9 | 13.071 | | | | |

**Graphics**



# CETIS Analysis Detail

**Plant Chronic test** — CH2M Hill

| Endpoint | Analysis Type | Sample Link | Control Link | Date Analyzed | Version |
|---|---|---|---|---|---|
| Total Average Biomass Dry Wt. | Comparison | 08-5372-9401 | 08-5372-9401 | 10 Mar-06 3:08 PM | CETISv1.1.2 |

| Method | Alt H | Data Transform | Zeta | NOEL | LOEL | Toxic Units | ChV | PMSD |
|---|---|---|---|---|---|---|---|---|
| Equal Variance t Two-Sample | C > T | Untransformed | | 100 | >100 | 1 | N/A | 36.53% |

**Group Comparisons**

| Control | vs | Conc-% | Statistic | Critical | P-Value | MSD | Decision(0.05) |
|---|---|---|---|---|---|---|---|
| Dilution Water | | 100 | 0.74372 | 1.85955 | 0.2392 | 7.38505 | Non-Significant Effect |

**ANOVA Table**

| Source | Sum of Squares | Mean Square | DF | F Statistic | P-Value | Decision(0.05) |
|---|---|---|---|---|---|---|
| Between | 21.80978 | 21.80978 | 1 | 0.55 | 0.47832 | Non-Significant Effect |
| Error | 315.4434 | 39.43043 | 8 | | | |
| Total | 337.253202 | 61.24021 | 9 | | | |

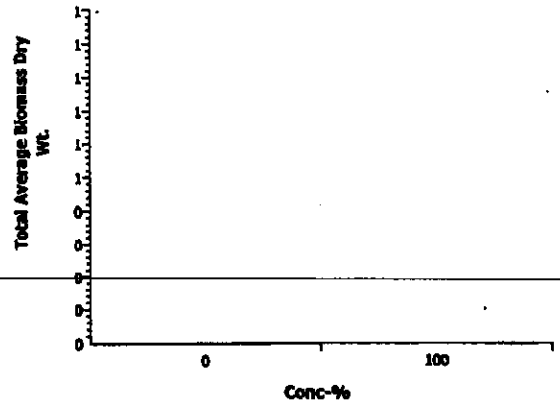
**ANOVA Assumptions**

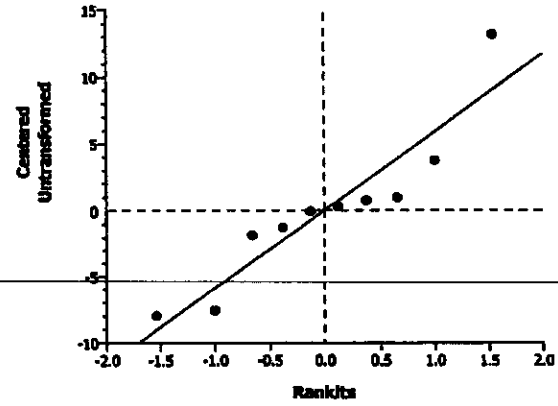
| Attribute | Test | Statistic | Critical | P-Value | Decision(0.01) |
|---|---|---|---|---|---|
| Variances | Variance Ratio F | 63.94633 | 23.15450 | 0.00141 | Unequal Variances |
| Distribution | Shapiro-Wilk W | 0.88617 | | 0.15347 | Normal Distribution |

**Data Summary**

| | | | Original Data | | | | Transformed Data | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Conc-% | Control Type | Count | Mean | Minimum | Maximum | SD | Mean | Minimum | Maximum | SD |
| 0 | Dilution Water | 5 | 20.217 | 12.223 | 33.384 | 8.6117 | | | | |
| 100 | | 5 | 17.264 | 15.427 | 18.21 | 1.1019 | | | | |

**Graphics**



# CETIS Analysis Detail

**Plant Chronic test** — **CH2M Hill**

| Endpoint | Analysis Type | Sample Link | Control Link | Date Analyzed | Version |
|---|---|---|---|---|---|
| Total Average Biomass Wet Wt. | Comparison | 08-5372-9401 | 08-5372-9401 | 10 Mar-06 3:08 PM | CETISv1.1.2 |

| Method | Alt H | Data Transform | Zeta | NOEL | LOEL | Toxic Units | ChV | PMSD |
|---|---|---|---|---|---|---|---|---|
| Equal Variance t Two-Sample | C > T | Untransformed | | 100 | >100 | 1 | N/A | 28.88% |

**Group Comparisons**

| Control | vs | Conc-% | Statistic | Critical | P-Value | MSD | Decision(0.05) |
|---|---|---|---|---|---|---|---|
| Dilution Water | | 100 | 0.63977 | 1.85955 | 0.2701 | 51.156 | Non-Significant Effect |

**ANOVA Table**

| Source | Sum of Squares | Mean Square | DF | F Statistic | P-Value | Decision(0.05) |
|---|---|---|---|---|---|---|
| Between | 774.4072 | 774.4072 | 1 | 0.41 | 0.54020 | Non-Significant Effect |
| Error | 15135.88 | 1891.985 | 8 | | | |
| Total | 15910.2910 | 2666.3927 | 9 | | | |

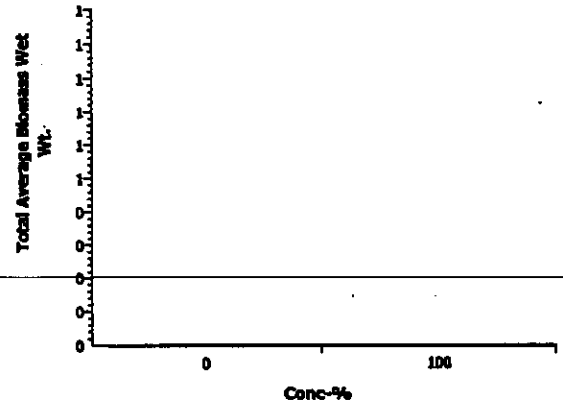
**ANOVA Assumptions**

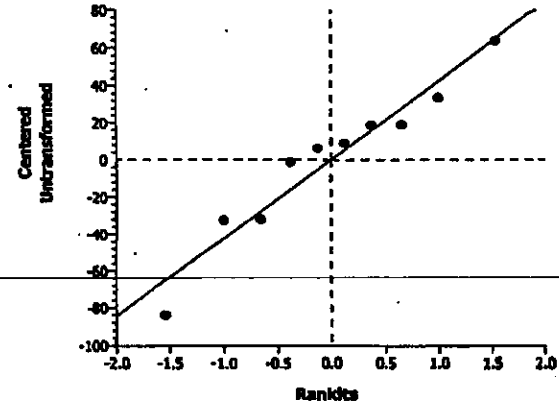
| Attribute | Test | Statistic | Critical | P-Value | Decision(0.01) |
|---|---|---|---|---|---|
| Variances | Variance Ratio F | 8.91986 | 23.15450 | 0.05688 | Equal Variances |
| Distribution | Shapiro-Wilk W | 0.94991 | | 0.66738 | Normal Distribution |

**Data Summary**

| | | | Original Data | | | | Transformed Data | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Conc-% | Control Type | Count | Mean | Minimum | Maximum | SD | Mean | Minimum | Maximum | SD |
| 0 | Dilution Water | 5 | 177.14 | 93.113 | 240.86 | 58.331 | | | | |
| 100 | | 5 | 159.54 | 127.08 | 178.35 | 19.531 | | | | |

**Graphics**



## BLUEGRASS GROWTH TEST

Client: Hanford Project

Test Start Date: 01/25/2006

Initials: Day 0 Br Day 12 NJ Day 14 Br Day 16 MS Day 21 SP Day 26 Br

Sample ID: E284701-SOI2 B1542-05

| CONC. | REPLICATE | PRE-EMERGENCE (12 days after planting) | @ EMERGENCE (14 days after planting) | POST-EMERGENCE (16 days after planting) | | 7-DAYS POST-EMERGENCE (21 days after planting) | | 14-DAYS POST-EMERGENCE (28 days after planting) | pH INITIAL (@ planting) | pH FINAL (28 days after planting) |
|---|---|---|---|---|---|---|---|---|---|---|
| | | # seeds germinated + alive | | | | | | | | |
| | | | | | 12 | 23 | 30 | | | |
| 100% | A | 0 | 1 | 4 | 4 | 4 | 1 | 1 | 6.8 | 7.2 |
| | B | 1 | 3 | 4 | 4 | 4 | 2 | 2 | | |
| | C | 0 | 2 | 4 | 5 | 5 | 5 | 4 | | |
| | D | 0 | 2 | 3 | 3 | 3 | 2 | 2 | | |
| | E | 0 | 0 | 0 | 1 | 1 | 0 | 0 | | |

7-Days Post-Emergence: Selectively thin down to 5 Seedlings (leave the 5 tallest seedlings). Describe shoot appearance:

Replicate A: 1 medium plant in good shape + 3 small, brown dead plants

Replicate B: 1 medium in good shape + 1 medium w/ 4 green and 1 brown shoots + 3 dead single shoot plants

Replicate C: 3 medium in good shape + 1 small w/ 2 green + 1 brown + 1 small single shoot turning brown

Replicate D: 2 medium w/ 1 brown and 3 green shoots + 1 brown, dead, small plant

Replicate E: 1 single shoot dead plant

14-Days Post-Emergence: Describe shoot appearance:

Replicate A: 1 small plant, 2 brown shoots - 5 good shoots 7 total shoots

Replicate B: 1 small & 1 medium plant med plant 3 brown shoots

Replicate C: 3 small 1 medium plant each plant has 1 brown shoot

Replicate D: 2 small plants 1 has only 1 green shoot, other has 1 brown shoot

Replicate E: no plants

Measure Shoot Height: (above ground)

| | 1st Seedling | 2nd Seedling | 3rd Seedling | 4th Seedling | 5th Seedling | # Shoots |
|---|---|---|---|---|---|---|
| Replicate A | 34 mm | ~~65~~ MS mm | MS 28 mm | — mm | — mm | 6 |
| Replicate B | 65 mm | 36 mm | MS 66 mm | — mm | — mm | 9 8 |
| Replicate C | 28 mm | 66 mm | MS 36 34 mm | 30 mm | — mm | 4, 6, 5, 7 |
| Replicate D | 55 mm | 25 mm | MS 40 mm | — mm | — mm | 4, 5 |
| Replicate E | — mm | — mm | — mm | — mm | — mm | |

Measure Shoot Weight: (above ground)

| | Tin Tare Wt. (mg) | Wet Wt (mg) | Dry Wt. (mg) |
|---|---|---|---|
| Replicate A | 1008.22 | 1039.2 | 1013.46 |
| Replicate B | 984.32 | 1060.0 | 1000.82 |
| Replicate C | 998.06 | 1116.6 | 1024.08 |
| Replicate D | 1006.64 | 1056.6 | 1020.26 |
| Replicate E | 1012.09 | — | — |

Describe root appearance:

Replicate A

Replicate B

Replicate C

Replicate D

Replicate E

Measure Root Length: (longest root)

| | 1st Seedling | 2nd Seedling | 3rd Seedling | 4th Seedling | 5th Seedling |
|---|---|---|---|---|---|
| Replicate A | 95 mm | mm | mm | mm | mm |
| Replicate B | 105 mm | 96 mm | mm | mm | mm |
| Replicate C | 97 mm | 120 mm | 43 mm | 73 mm | mm |
| Replicate D | 92 mm | 81 mm | mm | mm | mm |
| Replicate E | mm | mm | mm | mm | mm |

Measure Root Weight: (longest root)

| | Tin Tare Wt. (mg) | Wet Wt (mg) | Dry Wt. (mg) |
|---|---|---|---|
| Replicate A | 993.37 | 1035.6 | 995.94 |
| Replicate B | 1007.69 | 1145.2 | 1019.39 |
| Replicate C | 1039.63 | 1153.1 | 1047.71 |
| Replicate D | 988.21 | 1037.4 | 993.97 |
| Replicate E | 1005.00 | — | — |

Comments:

# CETIS Test Summary

Report Date: 10 Mar-06 3:15 PM
Test Link: 13-6207-2802/B154205psc

**Plant Chronic test** — CH2M Hill

| | | | | | |
|---|---|---|---|---|---|
| Test No: | 09-7340-6761 | Test Type: | Plant Chronic test | Duration: | 37d 0h |
| Start Date: | 25 Jan-06 | Protocol: | ASTM E1963-02 (2002) | Species: | Poa sandbergii |
| Ending Date: | 03 Mar-06 | Dil Water: | | Source: | |
| Setup Date: | 25 Jan-06 12:00 AM | Brine: | | | |

| | | | | | |
|---|---|---|---|---|---|
| Sample No: | 06-5742-9955 | Code: | B1542-05 | Client: | |
| Sample Date: | 15 Nov-05 | Material: | Soil | Project: | |
| Receive Date: | | Source: | Hanford | | |
| Sample Age: | 71d 0h | Station: | | | |

Comments: J10DV1, E284701

**Comparison Summary**

| Analysis | Endpoint | NOEL | LOEL | ChV | PMSD | Method |
|---|---|---|---|---|---|---|
| 16-4134-0539 | % Germination | < 100 | 100 | N/A | 31.94% | Equal Variance t Two-Sample |
| 04-0388-4068 | AG Average Dry Wt. | < 100 | 100 | N/A | 38.05% | Equal Variance t Two-Sample |
| 12-9304-8505 | AG Average Height | 100 | > 100 | N/A | 109.58% | Unequal Variance t Two-Sample |
| 15-3320-8767 | AG Average Wet Wt. | < 100 | 100 | N/A | 24.95% | Equal Variance t Two-Sample |
| 05-6551-5720 | Root Average Dry Wt. | < 100 | 100 | N/A | 54.04% | Equal Variance t Two-Sample |
| 16-8795-0081 | Root Average Length | 100 | > 100 | N/A | 129.59% | Unequal Variance t Two-Sample |
| 01-1714-1452 | Root Average Wet Wt. | < 100 | 100 | N/A | 43.27% | Equal Variance t Two-Sample |
| 07-9043-1977 | Total Average Biomass Dry | < 100 | 100 | N/A | 43.45% | Equal Variance t Two-Sample |
| 17-6925-3080 | Total Average Biomass Wet | < 100 | 100 | N/A | 33.77% | Equal Variance t Two-Sample |

# CETIS Analysis Detail

**Plant Chronic test** — **CH2M Hill**

| Endpoint | Analysis Type | Sample Link | Control Link | Date Analyzed | Version |
|---|---|---|---|---|---|
| % Germination | Comparison | 13-6207-2802 | 13-6207-2802 | 10 Mar-06 3:15 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 | 31.94% |

**Group Comparisons**

| Control | vs | Conc-% | Statistic | Critical | P-Value | MSD | Decision(0.05) |
|---|---|---|---|---|---|---|---|
| Dilution Water | | 100 | 3.31955 | 1.85955 | 0.0053 | 0.3208 | Significant Effect |

**ANOVA Table**

| Source | Sum of Squares | Mean Square | DF | F Statistic | P-Value | Decision(0.05) |
|---|---|---|---|---|---|---|
| Between | 0.8198639 | 0.819864 | 1 | 11.02 | 0.01055 | Significant Effect |
| Error | 0.5952135 | 0.074402 | 8 | | | |
| Total | 1.41507733 | 0.8942655 | 9 | | | |

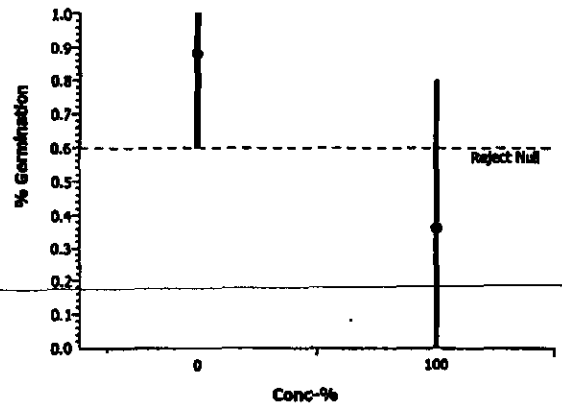
**ANOVA Assumptions**

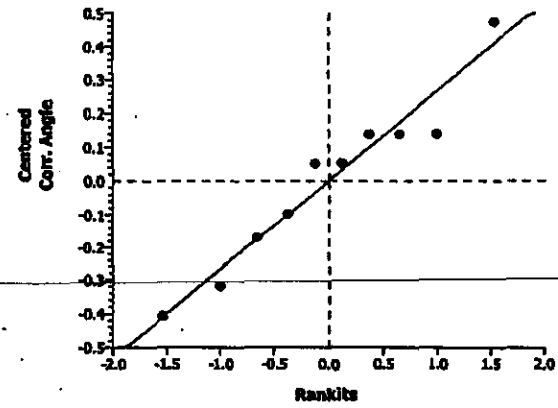
| Attribute | Test | Statistic | Critical | P-Value | Decision(0.01) |
|---|---|---|---|---|---|
| Variances | Variance Ratio F | 2.49465 | 23.15450 | 0.39757 | Equal Variances |
| Distribution | Shapiro-Wilk W | 0.95095 | | 0.67970 | Normal Distribution |

**Data Summary**

| | | | Original Data | | | | Transformed Data | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Conc-% | Control Type | Count | Mean | Minimum | Maximum | SD | Mean | Minimum | Maximum | SD |
| 0 | Dilution Water | 5 | 0.88000 | 0.60000 | 1.00000 | 0.17889 | 1.20581 | 0.88608 | 1.34528 | 0.20635 |
| 100 | | 5 | 0.36000 | 0.00000 | 0.80000 | 0.29665 | 0.63315 | 0.22551 | 1.10715 | 0.32592 |

**Graphics**



# CETIS Analysis Detail

**Plant Chronic test** — CH2M Hill

| Endpoint | Analysis Type | Sample Link | Control Link | Date Analyzed | Version |
|---|---|---|---|---|---|
| AG Average Dry Wt. | Comparison | 13-6207-2802 | 13-6207-2802 | 10 Mar-06 3:15 PM | CETISv1.1.2 |

| Method | Alt H | Data Transform | Zeta | NOEL | LOEL | Toxic Units | ChV | PMSD |
|---|---|---|---|---|---|---|---|---|
| Equal Variance t Two-Sample | C > T | Untransformed | | <100 | 100 | | N/A | 38.05% |

**Group Comparisons**

| Control | vs | Conc-% | Statistic | Critical | P-Value | MSD | Decision(0.05) |
|---|---|---|---|---|---|---|---|
| Dilution Water | | 100 | 2.27746 | 1.89458 | 0.0284 | 4.69977 | Significant Effect |

**ANOVA Table**

| Source | Sum of Squares | Mean Square | DF | F Statistic | P-Value | Decision(0.05) |
|---|---|---|---|---|---|---|
| Between | 70.92812 | 70.92812 | 1 | 5.19 | 0.05685 | Non-Significant Effect |
| Error | 95.72236 | 13.67462 | 7 | | | |
| Total | 166.650482 | 84.602746 | 8 | | | |

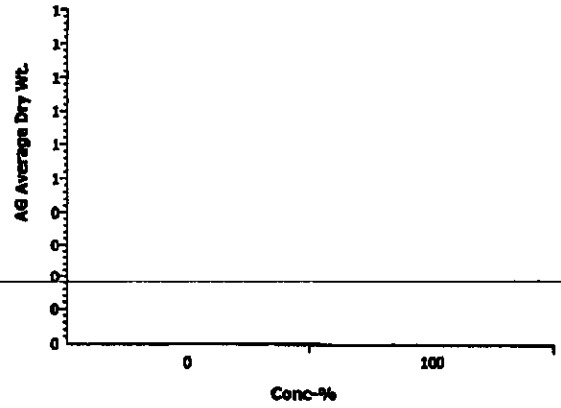
**ANOVA Assumptions**

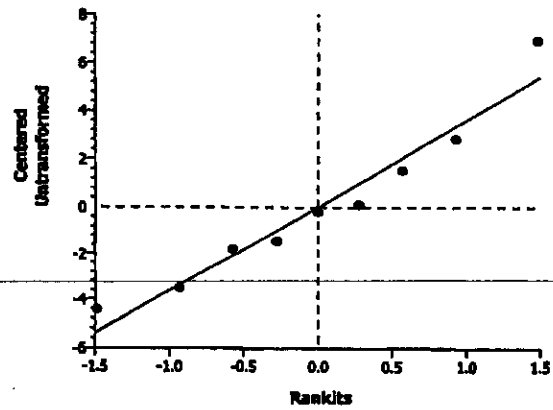
| Attribute | Test | Statistic | Critical | P-Value | Decision(0.01) |
|---|---|---|---|---|---|
| Variances | Variance Ratio F | 14.91113 | 46.19462 | 0.05089 | Equal Variances |
| Distribution | Shapiro-Wilk W | 0.95295 | | 0.72240 | Normal Distribution |

**Data Summary**

| | | | Original Data | | | | Transformed Data | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Conc-% | Control Type | Count | Mean | Minimum | Maximum | SD | Mean | Minimum | Maximum | SD |
| 0 | Dilution Water | 5 | 12.351 | 7.9275 | 19.276 | 4.7733 | | | | |
| 100 | | 4 | 6.7013 | 5.2401 | 8.25 | 1.2361 | | | | |

**Graphics**



# CETIS Analysis Detail

| Plant Chronic test | | | | | CH2M Hill |
|---|---|---|---|---|---|
| **Endpoint** | **Analysis Type** | **Sample Link** | **Control Link** | **Date Analyzed** | **Version** |
| AG Average Height | Comparison | 13-6207-2802 | 13-6207-2802 | 10 Mar-06 3:15 PM | CETISv1.1.2 |

| Method | Alt H | Data Transform | Zeta | NOEL | LOEL | Toxic Units | ChV | PMSD |
|---|---|---|---|---|---|---|---|---|
| Unequal Variance t Two-Sample | C > T | Untransformed | | 100 | >100 | 1 | N/A | 109.58% |

**Group Comparisons**

| Control | vs | Conc-% | Statistic | Critical | P-Value | MSD | Decision(0.05) |
|---|---|---|---|---|---|---|---|
| Dilution Water | | 100 | -2.3743 | 2.35336 | 0.9509 | 11.6446 | Non-Significant Effect |

**ANOVA Table**

| Source | Sum of Squares | Mean Square | DF | F Statistic | P-Value | Decision(0.05) |
|---|---|---|---|---|---|---|
| Between | 306.7185 | 306.7185 | 1 | 7.22 | 0.03119 | Significant Effect |
| Error | 297.2084 | 42.45834 | 7 | | | |
| Total | 603.926910 | 349.17688 | 8 | | | |

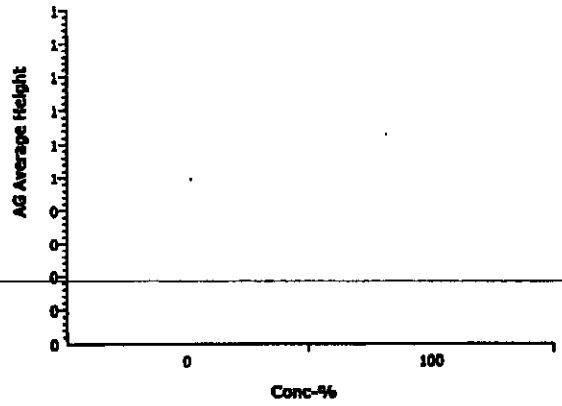
**ANOVA Assumptions**

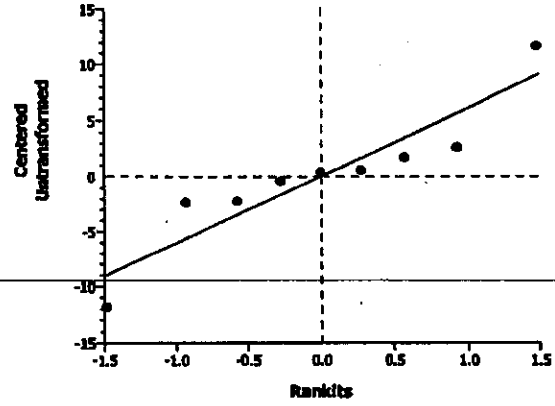
| Attribute | Test | Statistic | Critical | P-Value | Decision(0.01) |
|---|---|---|---|---|---|
| Variances | Variance Ratio F | 45.17330 | 24.25912 | 0.00305 | Unequal Variances |
| Distribution | Shapiro-Wilk W | 0.89720 | | 0.23620 | Normal Distribution |

**Data Summary**

| | | | Original Data | | | | Transformed Data | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Conc-% | Control Type | Count | Mean | Minimum | Maximum | SD | Mean | Minimum | Maximum | SD |
| 0 | Dilution Water | 5 | 10.627 | 8.4 | 12.333 | 1.4595 | | | | |
| 100 | | 4 | 22.375 | 10.5 | 34 | 9.8096 | | | | |

**Graphics**



# CETIS Analysis Detail

**Plant Chronic test** — **CH2M Hill**

| Endpoint | Analysis Type | Sample Link | Control Link | Date Analyzed | Version |
|---|---|---|---|---|---|
| AG Average Wet Wt. | Comparison | 13-6207-2802 | 13-6207-2802 | 10 Mar-06 3:15 PM | CETISv1.1.2 |

| Method | Alt H | Data Transform | Zeta | NOEL | LOEL | Toxic Units | ChV | PMSD |
|---|---|---|---|---|---|---|---|---|
| Equal Variance t Two-Sample | C > T | Untransformed | | <100 | 100 | | N/A | 24.95% |

**Group Comparisons**

| Control | vs | Conc-% | Statistic | Critical | P-Value | MSD | Decision(0.05) |
|---|---|---|---|---|---|---|---|
| Dilution Water | | 100 | 3.92614 | 1.89458 | 0.0029 | 15.9458 | Significant Effect |

**ANOVA Table**

| Source | Sum of Squares | Mean Square | DF | F Statistic | P-Value | Decision(0.05) |
|---|---|---|---|---|---|---|
| Between | 2426.535 | 2426.535 | 1 | 15.41 | 0.00570 | Significant Effect |
| Error | 1101.93 | 157.4186 | 7 | | | |
| Total | 3528.46484 | 2583.9533 | 8 | | | |

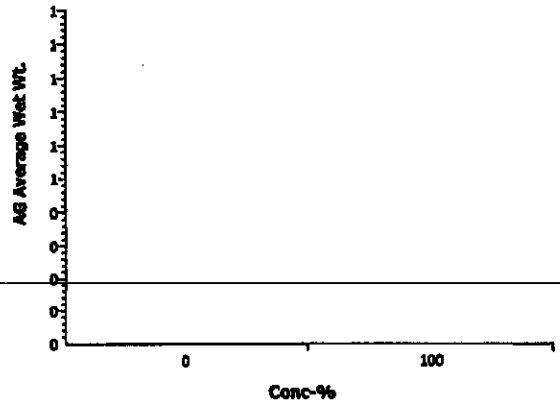
**ANOVA Assumptions**

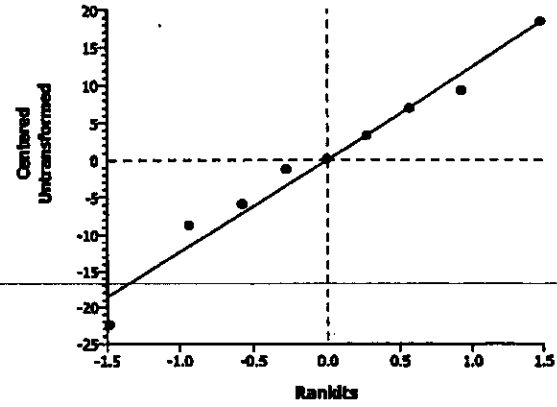
| Attribute | Test | Statistic | Critical | P-Value | Decision(0.01) |
|---|---|---|---|---|---|
| Variances | Variance Ratio F | 8.99470 | 46.19462 | 0.10183 | Equal Variances |
| Distribution | Shapiro-Wilk W | 0.98165 | | 0.97222 | Normal Distribution |

**Data Summary**

| | | | Original Data | | | | Transformed Data | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Conc-% | Control Type | Count | Mean | Minimum | Maximum | SD | Mean | Minimum | Maximum | SD |
| 0 | Dilution Water | 5 | 63.903 | 41.475 | 82.338 | 15.946 | | | | |
| 100 | | 4 | 30.659 | 24.98 | 37.84 | 5.317 | | | | |

**Graphics**



# CETIS Analysis Detail

**Plant Chronic test** — **CH2M Hill**

| Endpoint | Analysis Type | Sample Link | Control Link | Date Analyzed | Version |
|---|---|---|---|---|---|
| Root Average Dry Wt. | Comparison | 13-6207-2802 | 13-6207-2802 | 10 Mar-06 3:15 PM | CETISv1.1.2 |

| Method | Alt H | Data Transform | Zeta | NOEL | LOEL | Toxic Units | ChV | PMSD |
|---|---|---|---|---|---|---|---|---|
| Equal Variance t Two-Sample | C > T | Untransformed | | <100 | 100 | | N/A | 54.04% |

**Group Comparisons**

| Control | vs | Conc-% | Statistic | Critical | P-Value | MSD | Decision(0.05) |
|---|---|---|---|---|---|---|---|
| Dilution Water | | 100 | 2.0217 | 1.89458 | 0.0415 | 4.25136 | Significant Effect |

**ANOVA Table**

| Source | Sum of Squares | Mean Square | DF | F Statistic | P-Value | Decision(0.05) |
|---|---|---|---|---|---|---|
| Between | 45.73503 | 45.73503 | 1 | 4.09 | 0.08292 | Non-Significant Effect |
| Error | 78.32761 | 11.18966 | 7 | | | |
| Total | 124.062641 | 56.924686 | 8 | | | |

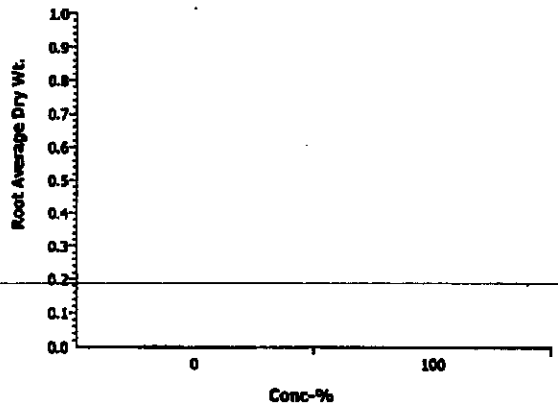
**ANOVA Assumptions**

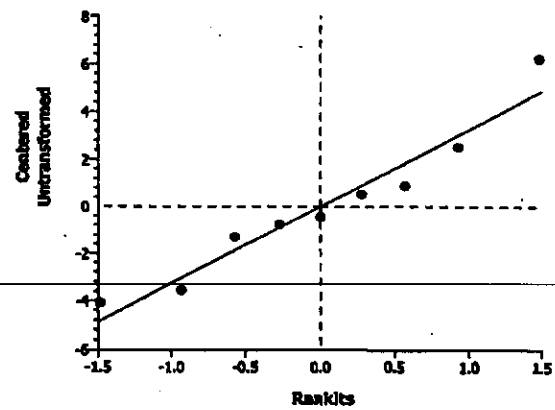
| Attribute | Test | Statistic | Critical | P-Value | Decision(0.01) |
|---|---|---|---|---|---|
| Variances | Variance Ratio F | 5.89043 | 46.19462 | 0.17693 | Equal Variances |
| Distribution | Shapiro-Wilk W | 0.94719 | | 0.65928 | Normal Distribution |

**Data Summary**

| | | | Original Data | | | | Transformed Data | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Conc-% | Control Type | Count | Mean | Minimum | Maximum | SD | Mean | Minimum | Maximum | SD |
| 0 | Dilution Water | 5 | 7.8666 | 3.78 | 14.108 | 4.1678 | | | | |
| 100 | | 4 | 3.33 | 2.02 | 5.8500 | 1.7172 | | | | |

**Graphics**



# CETIS Analysis Detail

**Plant Chronic test** — **CH2M Hill**

| Endpoint | Analysis Type | Sample Link | Control Link | Date Analyzed | Version |
|---|---|---|---|---|---|
| Root Average Length | Comparison | 13-6207-2802 | 13-6207-2802 | 10 Mar-06 3:15 PM | CETISv1.1.2 |

| Method | Alt H | Data Transform | Zeta | NOEL | LOEL | Toxic Units | ChV | PMSD |
|---|---|---|---|---|---|---|---|---|
| Unequal Variance t Two-Sample | C > T | Untransformed | | 100 | >100 | 1 | N/A | 129.59% |

**Group Comparisons**

| Control | vs | Conc-% | Statistic | Critical | P-Value | MSD | Decision(0.05) |
|---|---|---|---|---|---|---|---|
| Dilution Water | | 100 | -1.5141 | 2.35336 | 0.8864 | 36.8805 | Non-Significant Effect |

**ANOVA Table**

| Source | Sum of Squares | Mean Square | DF | F Statistic | P-Value | Decision(0.05) |
|---|---|---|---|---|---|---|
| Between | 1251.098 | 1251.098 | 1 | 2.95 | 0.12973 | Non-Significant Effect |
| Error | 2971.574 | 424.5106 | 7 | | | |
| Total | 4222.67236 | 1675.6089 | 8 | | | |

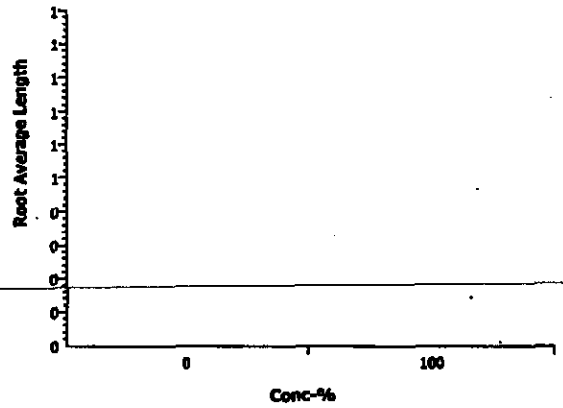
**ANOVA Assumptions**

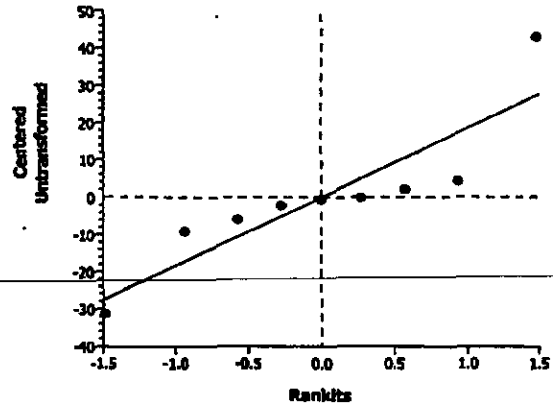
| Attribute | Test | Statistic | Critical | P-Value | Decision(0.01) |
|---|---|---|---|---|---|
| Variances | Variance Ratio F | 63.45765 | 24.25912 | 0.00158 | Unequal Variances |
| Distribution | Shapiro-Wilk W | 0.84021 | | 0.05806 | Normal Distribution |

**Data Summary**

| | | | Original Data | | | | Transformed Data | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Conc-% | Control Type | Count | Mean | Minimum | Maximum | SD | Mean | Minimum | Maximum | SD |
| 0 | Dilution Water | 5 | 28.46 | 22.5 | 33 | 3.91 | | | | |
| 100 | | 4 | 52.188 | 20.75 | 95 | 31.147 | | | | |

**Graphics**



# CETIS Analysis Detail

**Plant Chronic test** — CH2M Hill

| Endpoint | Analysis Type | Sample Link | Control Link | Date Analyzed | Version |
|---|---|---|---|---|---|
| Root Average Wet Wt. | Comparison | 13-6207-2802 | 13-6207-2802 | 10 Mar-06 3:15 PM | CETISv1.1.2 |

| Method | Alt H | Data Transform | Zeta | NOEL | LOEL | Toxic Units | ChV | PMSD |
|---|---|---|---|---|---|---|---|---|
| Equal Variance t Two-Sample | C > T | Untransformed | | <100 | 100 | | N/A | 43.27% |

**Group Comparisons**

| Control | vs | Conc-% | Statistic | Critical | P-Value | MSD | Decision(0.05) |
|---|---|---|---|---|---|---|---|
| Dilution Water | | 100 | 2.79386 | 1.89458 | 0.0134 | 48.9926 | Significant Effect |

**ANOVA Table**

| Source | Sum of Squares | Mean Square | DF | F Statistic | P-Value | Decision(0.05) |
|---|---|---|---|---|---|---|
| Between | 11599.27 | 11599.27 | 1 | 7.81 | 0.02676 | Significant Effect |
| Error | 10402.09 | 1486.014 | 7 | | | |
| Total | 22001.3672 | 13085.286 | 8 | | | |

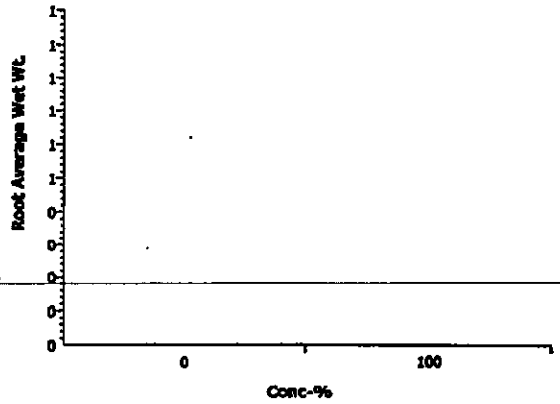
**ANOVA Assumptions**

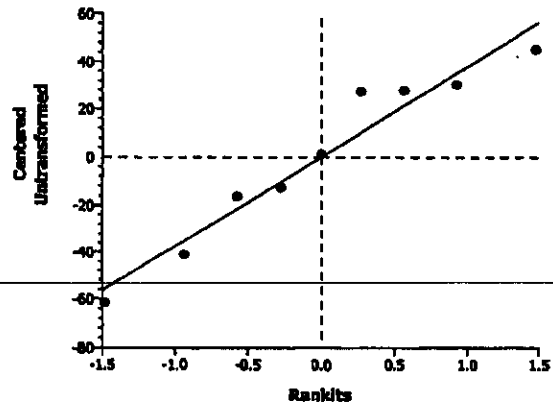
| Attribute | Test | Statistic | Critical | P-Value | Decision(0.01) |
|---|---|---|---|---|---|
| Variances | Variance Ratio F | 5.74830 | 46.19462 | 0.18247 | Equal Variances |
| Distribution | Shapiro-Wilk W | 0.93481 | | 0.52849 | Normal Distribution |

**Data Summary**

| | | | Original Data | | | | Transformed Data | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Conc-% | Control Type | Count | Mean | Minimum | Maximum | SD | Mean | Minimum | Maximum | SD |
| 0 | Dilution Water | 5 | 113.23 | 51.638 | 158.52 | 47.962 | | | | |
| 100 | | 4 | 40.987 | 24.595 | 68.755 | 20.005 | | | | |

**Graphics**



# CETIS Analysis Detail

**Plant Chronic test** — **CH2M Hill**

| Endpoint | Analysis Type | Sample Link | Control Link | Date Analyzed | Version |
|---|---|---|---|---|---|
| Total Average Biomass Dry Wt. | Comparison | 13-6207-2802 | 13-6207-2802 | 10 Mar-06 3:15 PM | CETISv1.1.2 |

| Method | Alt H | Data Transform | Zeta | NOEL | LOEL | Toxic Units | ChV | PMSD |
|---|---|---|---|---|---|---|---|---|
| Equal Variance t Two-Sample | C > T | Untransformed | | <100 | 100 | | N/A | 43.45% |

**Group Comparisons**

| Control | vs | Conc-% | Statistic | Critical | P-Value | MSD | Decision(0.05) |
|---|---|---|---|---|---|---|---|
| Dilution Water | | 100 | 2.19676 | 1.89458 | 0.0320 | 8.78501 | Significant Effect |

**ANOVA Table**

| Source | Sum of Squares | Mean Square | DF | F Statistic | P-Value | Decision(0.05) |
|---|---|---|---|---|---|---|
| Between | 230.5735 | 230.5735 | 1 | 4.83 | 0.06404 | Non-Significant Effect |
| Error | 334.4602 | 47.78003 | 7 | | | |
| Total | 565.033722 | 278.35357 | 8 | | | |

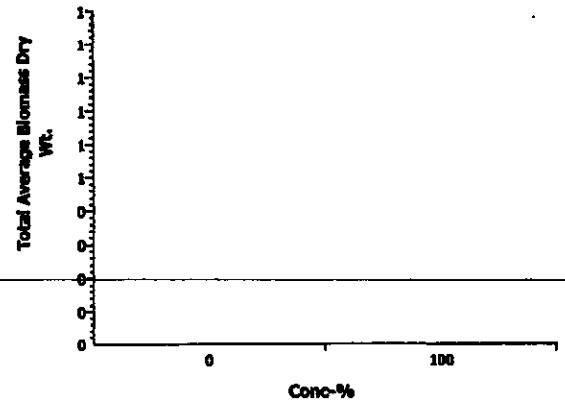
**ANOVA Assumptions**

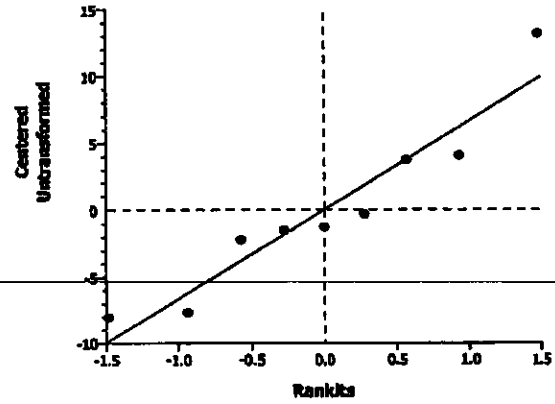
| Attribute | Test | Statistic | Critical | P-Value | Decision(0.01) |
|---|---|---|---|---|---|
| Variances | Variance Ratio F | 9.75715 | 46.19462 | 0.09127 | Equal Variances |
| Distribution | Shapiro-Wilk W | 0.91886 | | 0.38302 | Normal Distribution |

**Data Summary**

| | | | Original Data | | | | Transformed Data | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Conc-% | Control Type | Count | Mean | Minimum | Maximum | SD | Mean | Minimum | Maximum | SD |
| 0 | Dilution Water | 5 | 20.217 | 12.223 | 33.384 | 8.8117 | | | | |
| 100 | | 4 | 10.031 | 7.8101 | 14.100 | 2.821 | | | | |

**Graphics**



# CETIS Analysis Detail

**Plant Chronic test** — **CH2M Hill**

| Endpoint | Analysis Type | Sample Link | Control Link | Date Analyzed | Version |
|---|---|---|---|---|---|
| Total Average Biomass Wet Wt. | Comparison | 13-6207-2802 | 13-6207-2802 | 10 Mar-06 3:15 PM | CETISv1.1.2 |

| Method | Alt H | Data Transform | Zeta | NOEL | LOEL | Toxic Units | ChV | PMSD |
|---|---|---|---|---|---|---|---|---|
| Equal Variance t Two-Sample | C > T | Untransformed | | <100 | 100 | | N/A | 33.77% |

**Group Comparisons**

| Control | vs | Conc-% | Statistic | Critical | P-Value | MSD | Decision(0.05) |
|---|---|---|---|---|---|---|---|
| Dilution Water | | 100 | 3.33482 | 1.89458 | 0.0063 | 59.8184 | Significant Effect |

**ANOVA Table**

| Source | Sum of Squares | Mean Square | DF | F Statistic | P-Value | Decision(0.05) |
|---|---|---|---|---|---|---|
| Between | 24636.38 | 24636.38 | 1 | 11.12 | 0.01251 | Significant Effect |
| Error | 15507.06 | 2215.294 | 7 | | | |
| Total | 40143.4365 | 26851.673 | 8 | | | |

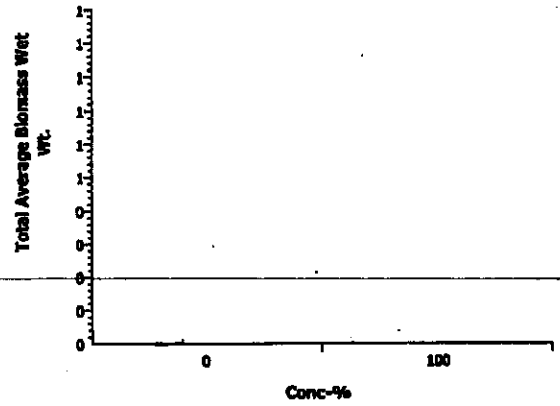
**ANOVA Assumptions**

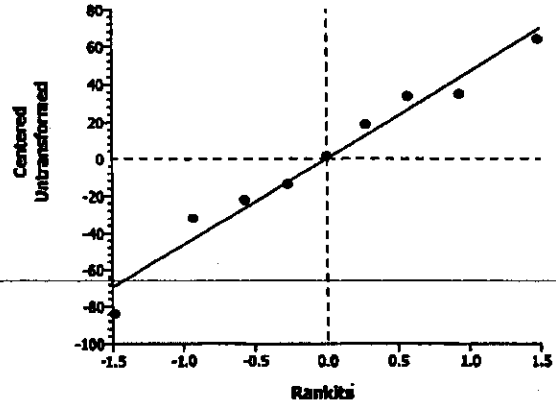
| Attribute | Test | Statistic | Critical | P-Value | Decision(0.01) |
|---|---|---|---|---|---|
| Variances | Variance Ratio F | 5.38092 | 46.19462 | 0.19823 | Equal Variances |
| Distribution | Shapiro-Wilk W | 0.97138 | | 0.90629 | Normal Distribution |

**Data Summary**

| | | | Original Data | | | | Transformed Data | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Conc-% | Control Type | Count | Mean | Minimum | Maximum | SD | Mean | Minimum | Maximum | SD |
| 0 | Dilution Water | 5 | 177.14 | 93.113 | 240.86 | 58.331 | | | | |
| 100 | | 4 | 71.846 | 49.575 | 106.59 | 25.146 | | | | |

**Graphics**



## BLUEGRASS GROWTH TEST

Client: Hanford Project

Test Start Date: 01/25/2008

Initials: Day 0 [illegible] Day 12 NJ Day 14 [illegible] Day 18 [illegible] Day 21 [illegible] Day 28 [illegible]

Sample ID: E285701-SOI2 D 0542-06

| CONC. | REPLICATE | # seeds germinated: PRE-EMERGENCE (12 days after planting) | @ EMERGENCE (14 days after planting) | POST-EMERGENCE (18 days after planting) | 21 | 23 | 7-DAYS POST-EMERGENCE (21 days after planting) | 30 | 14-DAYS POST-EMERGENCE (28 days after planting) | pH: INITIAL (@ planting) | FINAL (28 days after planting) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 100% | A | 1 | 2 | 3 | 5 | 5 | 1 | | 1 | 7.3 | 7.3 |
| | B | 0 | 5 | 5 | 5 | 6 | 5 | | 5 | | |
| | C | 5 | 5 | 5 | 6 | 6 | 6→5 | | 5 | | |
| | D | 2 | 4 | 5* | 5* | 5* | 4 | | 3 | | |
| | E | 0 | 1 | 2 | 3 | 4 | 2 | | 2 | | |

7-Days Post-Emergence: Selectively thin down to 5 Seedlings (leave the 5 tallest seedlings). Describe shoot appearance:

Replicate A: 1 medium plant in good shape + 4 single or double shoot plants turned brown.

Replicate B: 4 medium + 2 small in good shape (green color / multiple shoots) - 1 small removed

Replicate C: 4 medium in good shape + 1 medium w/ 3 green shoots + 2 brown shoots. 1 small brown removed

Replicate D: 3 medium in good shape + 1 small brown

Replicate E: 2 medium in good shape + 2/3 small brown

14-Days Post-Emergence: Describe shoot appearance:

Replicate A: 1 large - good color - no brown

Replicate B: 4 medium + 1 small - good color

Replicate C: 4 medium good color - no brown - (small w/ 4 brown shoots + 1 green

Replicate D: 3 medium - good color + 1 dead

Replicate E: 2 medium - both w/ browning tips on a couple of green shoots

Measure Shoot Height (above ground):

| | 1st Seedling | 2nd Seedling | 3rd Seedling | 4th Seedling | 5th Seedling | # shoots |
|---|---|---|---|---|---|---|
| Replicate A | 64 mm | mm | mm | mm | mm | 7 |
| Replicate B | 46 mm | 36 mm | 22 mm | 42 mm | 47 mm | 8, 12, 4, 5, 9 |
| Replicate C | 39 mm | 41 mm | 44 mm | 46 mm | 10 mm | 10, 10, 13, 10, 1 |
| Replicate D | 60 mm | 40 mm | 67 mm | mm | mm | 8, 11, 10 |
| Replicate E | 46 mm | 35 mm | mm | mm | mm | 10, 9 |

Measure Shoot Weight (above ground):

| | Tin Tare Wt. (mg) | Wet Wt (mg) | Dry Wt. (mg) |
|---|---|---|---|
| Replicate A | 1002.83 | 1113.5 | 1011.77 |
| Replicate B | 1008.30 | 1191.2 | 1043.83 |
| Replicate C | 998.00 | 1253.8 | 1046.67 |
| Replicate D | 1002.13 | 1201.0 | 1034.73 |
| Replicate E | 1005.79 | 1080.6 | 1021.71 |

Describe root appearance:

Replicate A

Replicate B

Replicate C

Replicate D

Replicate E

Measure Root Length (longest root):

| | 1st Seedling | 2nd Seedling | 3rd Seedling | 4th Seedling | 5th Seedling |
|---|---|---|---|---|---|
| Replicate A | 148 mm | mm | mm | mm | mm |
| Replicate B | 94 mm | 100 mm | 94 mm | 95 mm | 55 mm |
| Replicate C | 40 mm | 97 mm | 101 mm | 136 mm | 105 mm |
| Replicate D | 114 mm | 102 mm | 106 mm | mm | mm |
| Replicate E | 123 mm | 77 mm | mm | mm | mm |

Measure Root Weight (longest root):

| | Tin Tare Wt. (mg) | Wet Wt (mg) | Dry Wt. (mg) |
|---|---|---|---|
| Replicate A | 958.26 | 1056.2 | 964.56 |
| Replicate B | 966.35 | 1292.9 | 986.11 |
| Replicate C | 1000.09 | 1455.5 | 1030.67 |
| Replicate D | 992.46 | 1304.1 | 1006.98 |
| Replicate E | 1002.78 | 1131.3 | 1011.75 |

Comments: 90 grams dry wt / rep.

* Rep D day 30. 1 of the 5 counted as germinated on days 16, 21, 23 was identified as a separate species (20cm tall on day 30). Removed on day 30

# CETIS Test Summary

Report Date: 10 Mar-06 3:23 PM
Test Link: 07-9195-5290/B154206psc

**Plant Chronic test** — **CH2M Hill**

| | | | | | |
|---|---|---|---|---|---|
| **Test No:** | 07-6986-0052 | **Test Type:** | Plant Chronic test | **Duration:** | 37d 0h |
| **Start Date:** | 25 Jan-06 | **Protocol:** | ASTM E1963-02 (2002) | **Species:** | Poa sandbergii |
| **Ending Date:** | 03 Mar-06 | **Dil Water:** | | **Source:** | |
| **Setup Date:** | 25 Jan-06 12:00 AM | **Brine:** | | | |

| | | | | | |
|---|---|---|---|---|---|
| **Sample No:** | 09-1115-2498 | **Code:** | B1542-06 | **Client:** | |
| **Sample Date:** | 16 Nov-05 | **Material:** | Soil | **Project:** | |
| **Receive Date:** | | **Source:** | Hanford | | |
| **Sample Age:** | 70d 0h | **Station:** | | | |

**Comments:** J10DV3, E285701

**Comparison Summary**

| Analysis | Endpoint | NOEL | LOEL | ChV | PMSD | Method |
|---|---|---|---|---|---|---|
| 05-2321-5437 | % Germination | 100 | > 100 | N/A | 37.51% | Equal Variance t Two-Sample |
| 08-9561-0800 | AG Average Dry Wt. | 100 | > 100 | N/A | 33.63% | Equal Variance t Two-Sample |
| 04-9053-6328 | AG Average Height | 100 | > 100 | N/A | 183.12% | Wilcoxon Rank Sum Two-Sample |
| 06-0459-7695 | AG Average Wet Wt. | 100 | > 100 | N/A | 44.89% | Equal Variance t Two-Sample |
| 01-6453-5889 | Root Average Dry Wt. | 100 | > 100 | N/A | 45.34% | Equal Variance t Two-Sample |
| 10-1742-7543 | Root Average Length | 100 | > 100 | N/A | 158.61% | Wilcoxon Rank Sum Two-Sample |
| 06-1157-1082 | Root Average Wet Wt. | 100 | > 100 | N/A | 37.75% | Equal Variance t Two-Sample |
| 06-4473-5543 | Total Average Biomass Dry | 100 | > 100 | N/A | 37.33% | Equal Variance t Two-Sample |
| 10-6246-4792 | Total Average Biomass Wet | 100 | > 100 | N/A | 34.83% | Equal Variance t Two-Sample |

# CETIS Test Summary

Report Date: 10 Mar-06 3:23 PM
Test Link: 07-9195-5290/B154206psc

**% Germination Summary**

| Conc-% | Control Type | Reps | Mean | Minimum | Maximum | SE | SD | CV |
|---|---|---|---|---|---|---|---|---|
| 0 | Dilution Water | 5 | 0.88000 | 0.60000 | 1.00000 | 0.08000 | 0.17889 | 20.33% |
| 100 | | 5 | 0.64000 | 0.20000 | 1.00000 | 0.16000 | 0.35777 | 55.90% |

**AG Average Dry Wt. Summary**

| Conc-% | Control Type | Reps | Mean | Minimum | Maximum | SE | SD | CV |
|---|---|---|---|---|---|---|---|---|
| 0 | Dilution Water | 5 | 12.351 | 7.9275 | 19.276 | 2.1347 | 4.7733 | 38.65% |
| 100 | | 5 | 8.9213 | 7.106 | 10.867 | 0.6582 | 1.4718 | 16.50% |

**AG Average Height Summary**

| Conc-% | Control Type | Reps | Mean | Minimum | Maximum | SE | SD | CV |
|---|---|---|---|---|---|---|---|---|
| 0 | Dilution Water | 5 | 10.627 | 8.4 | 12.333 | 0.6527 | 1.4595 | 13.73% |
| 100 | | 5 | 23.733 | 7.2 | 64 | 10.445 | 23.355 | 98.40% |

**AG Average Wet Wt. Summary**

| Conc-% | Control Type | Reps | Mean | Minimum | Maximum | SE | SD | CV |
|---|---|---|---|---|---|---|---|---|
| 0 | Dilution Water | 5 | 63.903 | 41.475 | 82.338 | 7.1313 | 15.946 | 24.95% |
| 100 | | 5 | 60.421 | 36.58 | 110.67 | 13.681 | 30.591 | 50.63% |

**Root Average Dry Wt. Summary**

| Conc-% | Control Type | Reps | Mean | Minimum | Maximum | SE | SD | CV |
|---|---|---|---|---|---|---|---|---|
| 0 | Dilution Water | 5 | 7.8666 | 3.78 | 14.108 | 1.8639 | 4.1678 | 52.98% |
| 100 | | 5 | 5.1266 | 3.9520 | 6.24 | 0.4523 | 1.0114 | 19.73% |

**Root Average Length Summary**

| Conc-% | Control Type | Reps | Mean | Minimum | Maximum | SE | SD | CV |
|---|---|---|---|---|---|---|---|---|
| 0 | Dilution Water | 5 | 28.46 | 22.5 | 33 | 1.7486 | 3.91 | 13.74% |
| 100 | | 5 | 54.093 | 17.6 | 148 | 24.212 | 54.139 | 100.08 |

**Root Average Wet Wt. Summary**

| Conc-% | Control Type | Reps | Mean | Minimum | Maximum | SE | SD | CV |
|---|---|---|---|---|---|---|---|---|
| 0 | Dilution Water | 5 | 113.23 | 51.638 | 158.52 | 21.449 | 47.962 | 42.36% |
| 100 | | 5 | 84.544 | 64.510 | 103.88 | 8.2686 | 18.489 | 21.87% |

**Total Average Biomass Dry Wt. Summary**

| Conc-% | Control Type | Reps | Mean | Minimum | Maximum | SE | SD | CV |
|---|---|---|---|---|---|---|---|---|
| 0 | Dilution Water | 5 | 20.217 | 12.223 | 33.384 | 3.9407 | 8.8117 | 43.58% |
| 100 | | 5 | 14.048 | 11.058 | 15.850 | 0.9693 | 2.1673 | 15.43% |

**Total Average Biomass Wet Wt. Summary**

| Conc-% | Control Type | Reps | Mean | Minimum | Maximum | SE | SD | CV |
|---|---|---|---|---|---|---|---|---|
| 0 | Dilution Water | 5 | 177.14 | 93.113 | 240.86 | 26.086 | 58.331 | 32.93% |
| 100 | | 5 | 144.97 | 101.89 | 208.61 | 20.496 | 45.832 | 31.62% |

# CETIS Test Summary

Report Date: 10 Mar-06 3:23 PM
Test Link: 07-9195-5290/B154206psc

**% Germination Detail**

| Conc-% | Control Type | Rep 1 | Rep 2 | Rep 3 | Rep 4 | Rep 5 |
|---|---|---|---|---|---|---|
| 0 | Dilution Water | 1.00000 | 1.00000 | 1.00000 | 0.60000 | 0.80000 |
| 100 | | 0.20000 | 1.00000 | 1.00000 | 0.60000 | 0.40000 |

**AG Average Dry Wt. Detail**

| Conc-% | Control Type | Rep 1 | Rep 2 | Rep 3 | Rep 4 | Rep 5 |
|---|---|---|---|---|---|---|
| 0 | Dilution Water | 15.1720 | 10.552 | 19.276 | 8.82666 | 7.92751 |
| 100 | | 8.94000 | 7.10599 | 9.73401 | 10.8667 | 7.96002 |

**AG Average Height Detail**

| Conc-% | Control Type | Rep 1 | Rep 2 | Rep 3 | Rep 4 | Rep 5 |
|---|---|---|---|---|---|---|
| 0 | Dilution Water | 10.2 | 8.4 | 11.2 | 12.3333 | 11 |
| 100 | | 64 | 7.8 | 7.2 | 18.6667 | 21 |

**AG Average Wet Wt. Detail**

| Conc-% | Control Type | Rep 1 | Rep 2 | Rep 3 | Rep 4 | Rep 5 |
|---|---|---|---|---|---|---|
| 0 | Dilution Water | 67.2900 | 55.1900 | 82.338 | 73.2233 | 41.4750 |
| 100 | | 110.67 | 36.58 | 51.1600 | 66.2900 | 37.405 |

**Root Average Dry Wt. Detail**

| Conc-% | Control Type | Rep 1 | Rep 2 | Rep 3 | Rep 4 | Rep 5 |
|---|---|---|---|---|---|---|
| 0 | Dilution Water | 8.75601 | 8.39399 | 14.108 | 3.77999 | 4.295 |
| 100 | | 6.23999 | 3.95200 | 6.11600 | 4.83999 | 4.48499 |

**Root Average Length Detail**

| Conc-% | Control Type | Rep 1 | Rep 2 | Rep 3 | Rep 4 | Rep 5 |
|---|---|---|---|---|---|---|
| 0 | Dilution Water | 27.8 | 28.4 | 30.6 | 33 | 22.5 |
| 100 | | 148 | 17.6 | 19.2 | 35.6667 | 50 |

**Root Average Wet Wt. Detail**

| Conc-% | Control Type | Rep 1 | Rep 2 | Rep 3 | Rep 4 | Rep 5 |
|---|---|---|---|---|---|---|
| 0 | Dilution Water | 143.362 | 140.624 | 158.524 | 72.0233 | 51.6375 |
| 100 | | 97.9399 | 65.3100 | 91.082 | 103.88 | 64.5100 |

**Total Average Biomass Dry Wt. Detail**

| Conc-% | Control Type | Rep 1 | Rep 2 | Rep 3 | Rep 4 | Rep 5 |
|---|---|---|---|---|---|---|
| 0 | Dilution Water | 23.9280 | 18.946 | 33.384 | 12.6066 | 12.2225 |
| 100 | | 15.18 | 11.058 | 15.8500 | 15.7066 | 12.4450 |

**Total Average Biomass Wet Wt. Detail**

| Conc-% | Control Type | Rep 1 | Rep 2 | Rep 3 | Rep 4 | Rep 5 |
|---|---|---|---|---|---|---|
| 0 | Dilution Water | 210.652 | 195.814 | 240.862 | 145.247 | 93.1125 |
| 100 | | 208.61 | 101.890 | 142.242 | 170.17 | 101.915 |

# CETIS Analysis Detail

**Plant Chronic test** — **CH2M HILL**

| Endpoint | Analysis Type | Sample Link | Control Link | Date Analyzed | Version |
|---|---|---|---|---|---|
| % Germination | Comparison | 07-9195-5290 | 07-9195-5290 | 10 Mar-06 3:22 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 | 37.51% |

**Group Comparisons**

| Control | vs | Conc-% | Statistic | Critical | P-Value | MSD | Decision(0.05) |
|---|---|---|---|---|---|---|---|
| Dilution Water | | 100 | 1.30924 | 1.85955 | 0.1134 | 0.37044 | Non-Significant Effect |

**ANOVA Table**

| Source | Sum of Squares | Mean Square | DF | F Statistic | P-Value | Decision(0.05) |
|---|---|---|---|---|---|---|
| Between | 0.1700585 | 0.170059 | 1 | 1.71 | 0.22680 | Non-Significant Effect |
| Error | 0.7936922 | 0.099212 | 8 | | | |
| Total | 0.96375073 | 0.2692700 | 9 | | | |

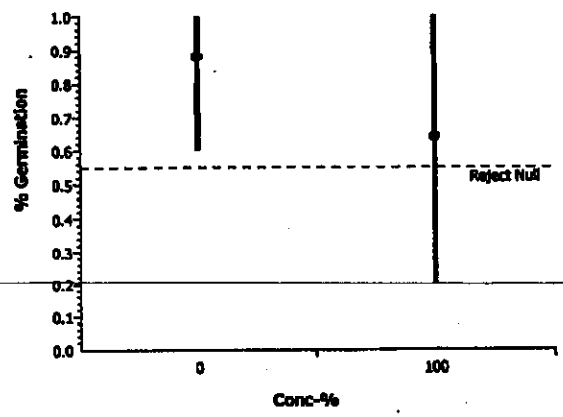
**ANOVA Assumptions**

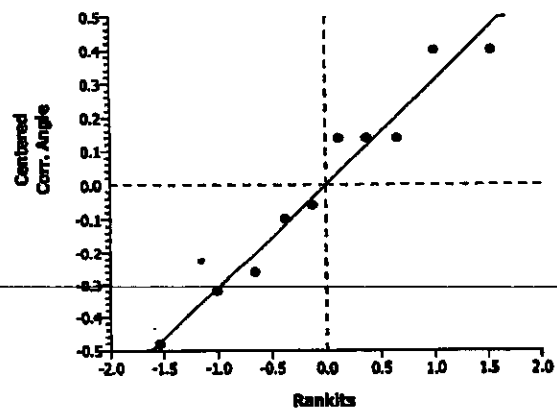
| Attribute | Test | Statistic | Critical | P-Value | Decision(0.01) |
|---|---|---|---|---|---|
| Variances | Variance Ratio F | 3.65997 | 23.15450 | 0.23677 | Equal Variances |
| Distribution | Shapiro-Wilk W | 0.94392 | | 0.59737 | Normal Distribution |

**Data Summary**

| | | | Original Data | | | | Transformed Data | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Conc-% | Control Type | Count | Mean | Minimum | Maximum | SD | Mean | Minimum | Maximum | SD |
| 0 | Dilution Water | 5 | 0.88000 | 0.60000 | 1.00000 | 0.17889 | 1.20581 | 0.88608 | 1.34528 | 0.20635 |
| 100 | | 5 | 0.64000 | 0.20000 | 1.00000 | 0.35777 | 0.94500 | 0.46365 | 1.34528 | 0.39477 |

**Graphics**



# CETIS Analysis Detail

**Plant Chronic test** — **CH2M Hill**

| Endpoint | Analysis Type | Sample Link | Control Link | Date Analyzed | Version |
|---|---|---|---|---|---|
| AG Average Dry Wt. | Comparison | 07-9195-5290 | 07-9195-5290 | 10 Mar-06 3:22 PM | CETISv1.1.2 |

| Method | Alt H | Data Transform | Zeta | NOEL | LOEL | Toxic Units | ChV | PMSD |
|---|---|---|---|---|---|---|---|---|
| Equal Variance t Two-Sample | C > T | Untransformed | | 100 | >100 | 1 | N/A | 33.63% |

**Group Comparisons**

| Control | vs | Conc-% | Statistic | Critical | P-Value | MSD | Decision(0.05) |
|---|---|---|---|---|---|---|---|
| Dilution Water | | 100 | 1.53523 | 1.85955 | 0.0816 | 4.15398 | Non-Significant Effect |

**ANOVA Table**

| Source | Sum of Squares | Mean Square | DF | F Statistic | P-Value | Decision(0.05) |
|---|---|---|---|---|---|---|
| Between | 29.40357 | 29.40357 | 1 | 2.36 | 0.16328 | Non-Significant Effect |
| Error | 99.80294 | 12.47537 | 8 | | | |
| Total | 129.206511 | 41.878938 | 9 | | | |

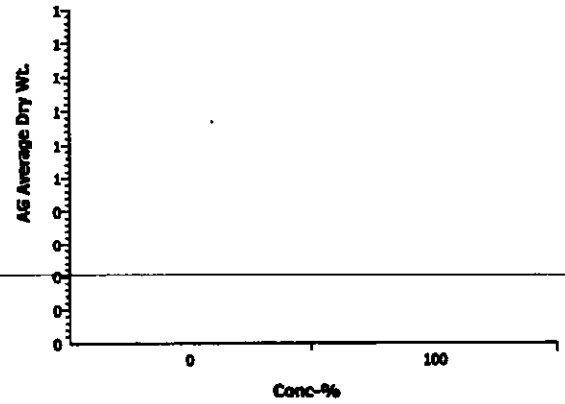
**ANOVA Assumptions**

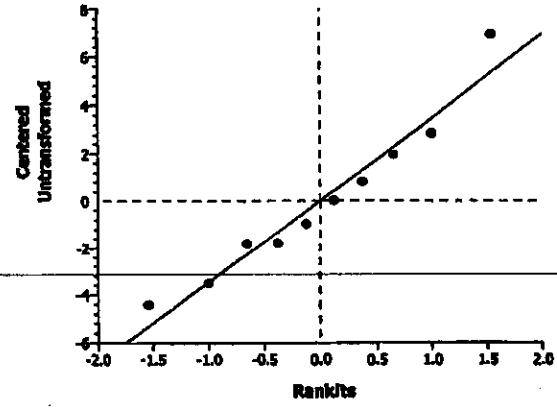
| Attribute | Test | Statistic | Critical | P-Value | Decision(0.01) |
|---|---|---|---|---|---|
| Variances | Variance Ratio F | 10.51840 | 23.15450 | 0.04261 | Equal Variances |
| Distribution | Shapiro-Wilk W | 0.95529 | | 0.73115 | Normal Distribution |

**Data Summary**

| | | | Original Data | | | | Transformed Data | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Conc-% | Control Type | Count | Mean | Minimum | Maximum | SD | Mean | Minimum | Maximum | SD |
| 0 | Dilution Water | 5 | 12.351 | 7.9275 | 19.276 | 4.7733 | | | | |
| 100 | | 5 | 8.9213 | 7.106 | 10.867 | 1.4718 | | | | |

**Graphics**



# CETIS Analysis Detail

**Plant Chronic test** — **CH2M Hill**

| Endpoint | Analysis Type | Sample Link | Control Link | Date Analyzed | Version |
|---|---|---|---|---|---|
| AG Average Height | Comparison | 07-9195-5290 | 07-9195-5290 | 10 Mar-06 3:22 PM | CETISv1.1.2 |

| Method | Alt. H | Data Transform | Zeta | NOEL | LOEL | Toxic Units | ChV | PMSD |
|---|---|---|---|---|---|---|---|---|
| Wilcoxon Rank Sum Two-Sample | C > T | Rank | | 100 | >100 | 1 | N/A | 183.12% |

**Group Comparisons**

| Control | vs | Conc-% | Statistic | Critical | P-Value | Ties | Decision(0.05) |
|---|---|---|---|---|---|---|---|
| Dilution Water | | 100 | 30 | | 0.6548 | 0 | Non-Significant Effect |

**ANOVA Table**

| Source | Sum of Squares | Mean Square | DF | F Statistic | P-Value | Decision(0.05) |
|---|---|---|---|---|---|---|
| Between | 429.4618 | 429.4618 | 1 | 1.57 | 0.24578 | Non-Significant Effect |
| Error | 2190.29 | 273.7862 | 8 | | | |
| Total | 2619.75159 | 703.24802 | 9 | | | |

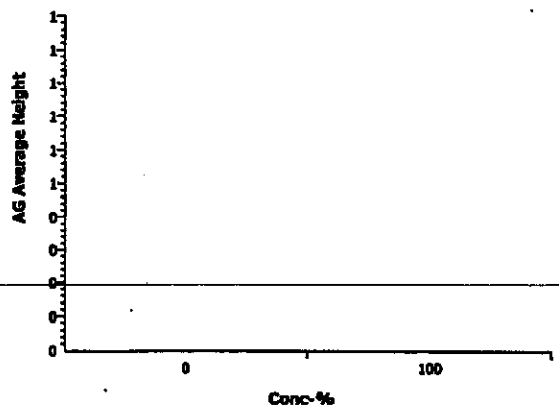
**ANOVA Assumptions**

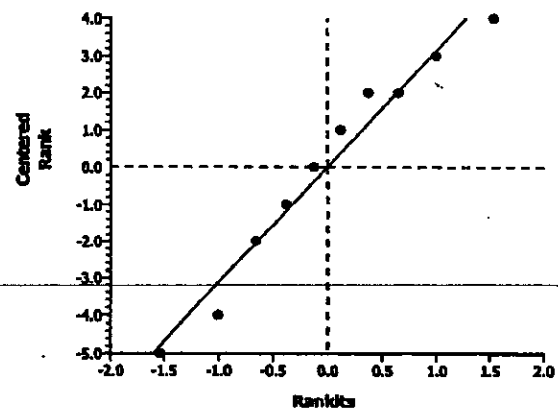
| Attribute | Test | Statistic | Critical | P-Value | Decision(0.01) |
|---|---|---|---|---|---|
| Variances | Variance Ratio F | 256.04940 | 23.15450 | 0.00009 | Unequal Variances |
| Distribution | Shapiro-Wilk W | 0.73242 | | 0.00218 | Non-normal Distribution |

**Data Summary**

| | | | Original Data | | | | Transformed Data | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Conc-% | Control Type | Count | Mean | Minimum | Maximum | SD | Mean | Minimum | Maximum | SD |
| 0 | Dilution Water | 5 | 10.627 | 8.4 | 12.333 | 1.4595 | 5.00000 | 3.00000 | 7.00000 | 1.58114 |
| 100 | | 5 | 23.733 | 7.2 | 64 | 23.355 | 6.00000 | 1.00000 | 10.0000 | 4.18330 |

**Graphics**



# CETIS Analysis Detail

**Plant Chronic test** — CH2M Hill

| Endpoint | Analysis Type | Sample Link | Control Link | Date Analyzed | Version |
|---|---|---|---|---|---|
| AG Average Wet Wt. | Comparison | 07-9195-5290 | 07-9195-5290 | 10 Mar-06 3:22 PM | CETISv1.1.2 |

| Method | Alt H | Data Transform | Zeta | NOEL | LOEL | Toxic Units | ChV | PMSD |
|---|---|---|---|---|---|---|---|---|
| Equal Variance t Two-Sample | C > T | Untransformed | | 100 | >100 | 1 | N/A | 44.89% |

**Group Comparisons**

| Control | vs | Conc-% | Statistic | Critical | P-Value | MSD | Decision(0.05) |
|---|---|---|---|---|---|---|---|
| Dilution Water | | 100 | 0.22571 | 1.85955 | 0.4135 | 28.689 | Non-Significant Effect |

**ANOVA Table**

| Source | Sum of Squares | Mean Square | DF | F Statistic | P-Value | Decision(0.05) |
|---|---|---|---|---|---|---|
| Between | 30.31542 | 30.31542 | 1 | 0.05 | 0.82709 | Non-Significant Effect |
| Error | 4760.421 | 595.0527 | 8 | | | |
| Total | 4790.73680 | 625.36809 | 9 | | | |

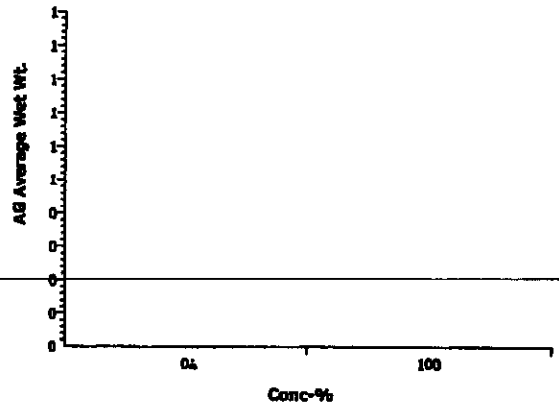
**ANOVA Assumptions**

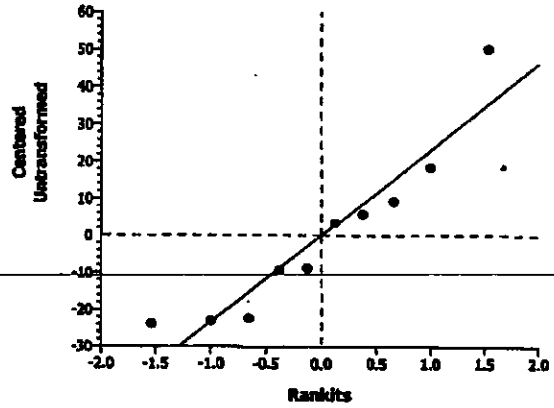
| Attribute | Test | Statistic | Critical | P-Value | Decision(0.01) |
|---|---|---|---|---|---|
| Variances | Variance Ratio F | 3.68029 | 23.15450 | 0.23489 | Equal Variances |
| Distribution | Shapiro-Wilk W | 0.89548 | | 0.19531 | Normal Distribution |

**Data Summary**

| | | | Original Data | | | | Transformed Data | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Conc-% | Control Type | Count | Mean | Minimum | Maximum | SD | Mean | Minimum | Maximum | SD |
| 0 | Dilution Water | 5 | 63.903 | 41.475 | 82.338 | 15.946 | | | | |
| 100 | | 5 | 60.421 | 36.58 | 110.67 | 30.591 | | | | |

**Graphics**



# CETIS Analysis Detail

**Plant Chronic test** — **CH2M Hill**

| Endpoint | Analysis Type | Sample Link | Control Link | Date Analyzed | Version |
|---|---|---|---|---|---|
| Root Average Dry Wt. | Comparison | 07-9195-5290 | 07-9195-5290 | 10 Mar-06 3:22 PM | CETISv1.1.2 |

| Method | Alt H | Data Transform | Zeta | NOEL | LOEL | Toxic Units | ChV | PMSD |
|---|---|---|---|---|---|---|---|---|
| Equal Variance t Two-Sample | C > T | Untransformed | | 100 | >100 | 1 | N/A | 45.34% |

**Group Comparisons**

| Control | vs | Conc-% | Statistic | Critical | P-Value | MSD | Decision(0.05) |
|---|---|---|---|---|---|---|---|
| Dilution Water | | 100 | 1.42859 | 1.85955 | 0.0955 | 3.56658 | Non-Significant Effect |

**ANOVA Table**

| Source | Sum of Squares | Mean Square | DF | F Statistic | P-Value | Decision(0.05) |
|---|---|---|---|---|---|---|
| Between | 18.76904 | 18.76904 | 1 | 2.04 | 0.19098 | Non-Significant Effect |
| Error | 73.573 | 9.196625 | 8 | | | |
| Total | 92.3420410 | 27.965668 | 9 | | | |

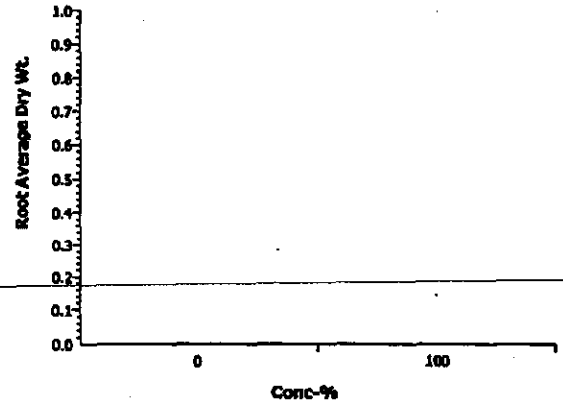
**ANOVA Assumptions**

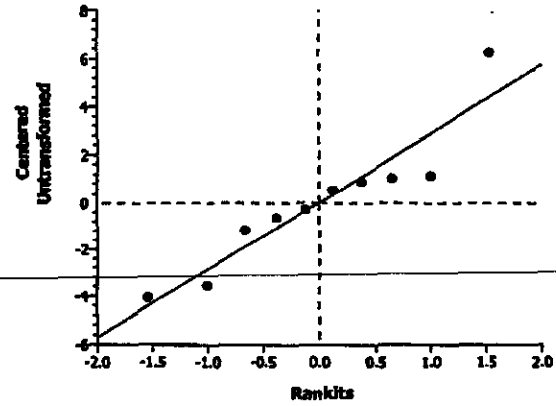
| Attribute | Test | Statistic | Critical | P-Value | Decision(0.01) |
|---|---|---|---|---|---|
| Variances | Variance Ratio F | 16.97948 | 23.15450 | 0.01787 | Equal Variances |
| Distribution | Shapiro-Wilk W | 0.90304 | | 0.23651 | Normal Distribution |

**Data Summary**

| | | | Original Data | | | | Transformed Data | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Conc-% | Control Type | Count | Mean | Minimum | Maximum | SD | Mean | Minimum | Maximum | SD |
| 0 | Dilution Water | 5 | 7.8666 | 3.78 | 14.108 | 4.1678 | | | | |
| 100 | | 5 | 5.1266 | 3.9520 | 6.24 | 1.0114 | | | | |

**Graphics**



# CETIS Analysis Detail

**Plant Chronic test** — **CH2M Hill**

| Endpoint | Analysis Type | Sample Link | Control Link | Date Analyzed | Version |
|---|---|---|---|---|---|
| Root Average Length | Comparison | 07-9195-5290 | 07-9195-5290 | 10 Mar-06 3:22 PM | CETISv1.1.2 |

| Method | Alt H | Data Transform | Zeta | NOEL | LOEL | Toxic Units | ChV | PMSD |
|---|---|---|---|---|---|---|---|---|
| Wilcoxon Rank Sum Two-Sample | C > T | Rank | | 100 | >100 | 1 | N/A | 158.61% |

**Group Comparisons**

| Control | vs | Conc-% | Statistic | Critical | P-Value | Ties | Decision(0.05) |
|---|---|---|---|---|---|---|---|
| Dilution Water | | 100 | 30 | | 0.6548 | 0 | Non-Significant Effect |

**ANOVA Table**

| Source | Sum of Squares | Mean Square | DF | F Statistic | P-Value | Decision(0.05) |
|---|---|---|---|---|---|---|
| Between | 1642.669 | 1642.669 | 1 | 1.12 | 0.32183 | Non-Significant Effect |
| Error | 11785.22 | 1473.152 | 8 | | | |
| Total | 13427.8892 | 3115.8219 | 9 | | | |

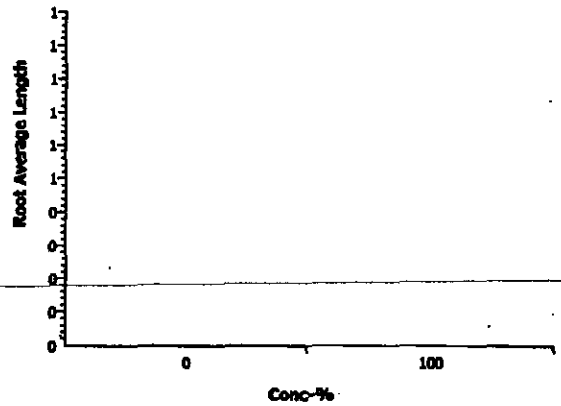
**ANOVA Assumptions**

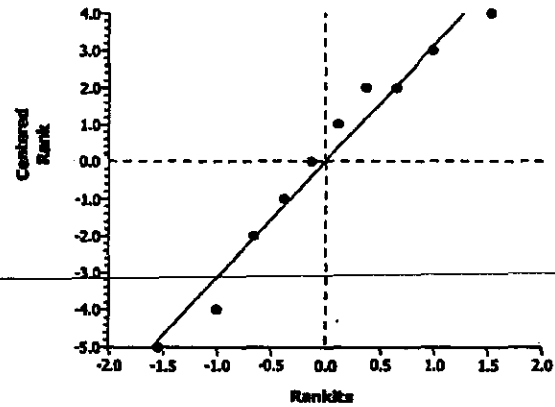
| Attribute | Test | Statistic | Critical | P-Value | Decision(0.01) |
|---|---|---|---|---|---|
| Variances | Variance Ratio F | 191.72010 | 23.15450 | 0.00016 | Unequal Variances |
| Distribution | Shapiro-Wilk W | 0.73476 | | 0.00233 | Non-normal Distribution |

**Data Summary**

| | | | Original Data | | | | Transformed Data | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Conc-% | Control Type | Count | Mean | Minimum | Maximum | SD | Mean | Minimum | Maximum | SD |
| 0 | Dilution Water | 5 | 28.46 | 22.5 | 33 | 3.91 | 5.00000 | 3.00000 | 7.00000 | 1.58114 |
| 100 | | 5 | 54.093 | 17.6 | 148 | 54.139 | 6.00000 | 1.00000 | 10.0000 | 4.18330 |

**Graphics**



# CETIS Analysis Detail

| Plant Chronic test | | | | | | CH2M Hill |
|---|---|---|---|---|---|---|
| **Endpoint** | **Analysis Type** | **Sample Link** | **Control Link** | **Date Analyzed** | **Version** | |
| Root Average Wet Wt. | Comparison | 07-9195-5290 | 07-9195-5290 | 10 Mar-06 3:23 PM | CETISv1.1.2 | |

| Method | Alt H | Data Transform | Zeta | NOEL | LOEL | Toxic Units | ChV | PMSD |
|---|---|---|---|---|---|---|---|---|
| Equal Variance t Two-Sample | C > T | Untransformed | | 100 | >100 | 1 | N/A | 37.75% |

**Group Comparisons**

| Control | vs | Conc-% | Statistic | Critical | P-Value | MSD | Decision(0.05) |
|---|---|---|---|---|---|---|---|
| Dilution Water | | 100 | 1.24804 | 1.85955 | 0.1237 | 42.7472 | Non-Significant Effect |

**ANOVA Table**

| Source | Sum of Squares | Mean Square | DF | F Statistic | P-Value | Decision(0.05) |
|---|---|---|---|---|---|---|
| Between | 2057.758 | 2057.758 | 1 | 1.56 | 0.24731 | Non-Significant Effect |
| Error | 10568.92 | 1321.115 | 8 | | | |
| Total | 12626.6821 | 3378.8738 | 9 | | | |

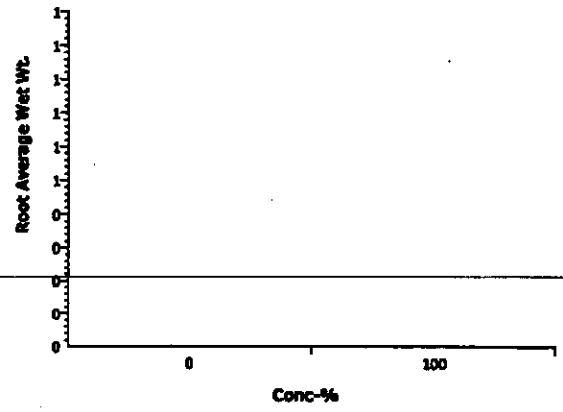
**ANOVA Assumptions**

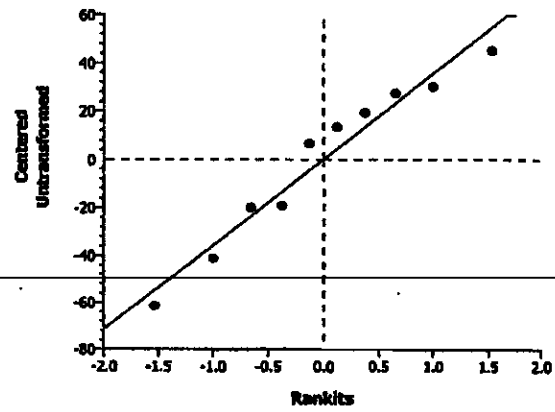
| Attribute | Test | Statistic | Critical | P-Value | Decision(0.01) |
|---|---|---|---|---|---|
| Variances | Variance Ratio F | 6.72930 | 23.15450 | 0.09177 | Equal Variances |
| Distribution | Shapiro-Wilk W | 0.94554 | | 0.61618 | Normal Distribution |

**Data Summary**

| | | | Original Data | | | | Transformed Data | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Conc-% | Control Type | Count | Mean | Minimum | Maximum | SD | Mean | Minimum | Maximum | SD |
| 0 | Dilution Water | 5 | 113.23 | 51.638 | 158.52 | 47.962 | | | | |
| 100 | | 5 | 84.544 | 64.510 | 103.88 | 18.489 | | | | |

**Graphics**



# CETIS Analysis Detail

| Plant Chronic test | | | | | | CH2M Hill |
|---|---|---|---|---|---|---|
| **Endpoint** | **Analysis Type** | **Sample Link** | **Control Link** | **Date Analyzed** | **Version** | |
| Total Average Biomass Dry Wt. | Comparison | 07-9195-5290 | 07-9195-5290 | 10 Mar-06 3:23 PM | CETISv1.1.2 | |

| Method | Alt H | Data Transform | Zeta | NOEL | LOEL | Toxic Units | ChV | PMSD |
|---|---|---|---|---|---|---|---|---|
| Equal Variance t Two-Sample | C > T | Untransformed | | 100 | >100 | 1 | N/A | 37.33% |

**Group Comparisons**

| Control | vs | Conc-% | Statistic | Critical | P-Value | MSD | Decision(0.05) |
|---|---|---|---|---|---|---|---|
| Dilution Water | | 100 | 1.52026 | 1.85955 | 0.0835 | 7.54637 | Non-Significant Effect |

**ANOVA Table**

| Source | Sum of Squares | Mean Square | DF | F Statistic | P-Value | Decision(0.05) |
|---|---|---|---|---|---|---|
| Between | 95.15679 | 95.15679 | 1 | 2.31 | 0.16693 | Non-Significant Effect |
| Error | 329.3759 | 41.17199 | 8 | | | |
| Total | 424.532677 | 136.32878 | 9 | | | |

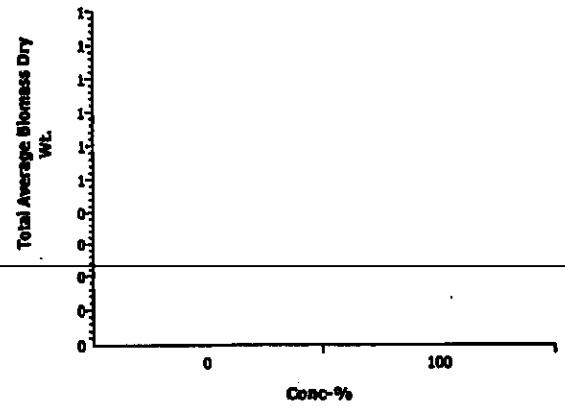
**ANOVA Assumptions**

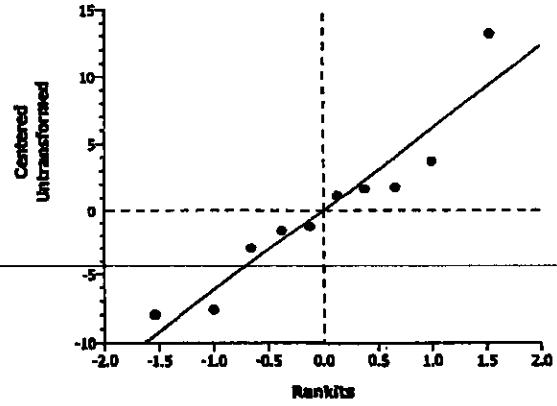
| Attribute | Test | Statistic | Critical | P-Value | Decision(0.01) |
|---|---|---|---|---|---|
| Variances | Variance Ratio F | 16.52981 | 23.15450 | 0.01878 | Equal Variances |
| Distribution | Shapiro-Wilk W | 0.91804 | | 0.34089 | Normal Distribution |

**Data Summary**

| | | | Original Data | | | | Transformed Data | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Conc-% | Control Type | Count | Mean | Minimum | Maximum | SD | Mean | Minimum | Maximum | SD |
| 0 | Dilution Water | 5 | 20.217 | 12.223 | 33.384 | 8.8117 | | | | |
| 100 | | 5 | 14.048 | 11.058 | 15.850 | 2.1673 | | | | |

**Graphics**



# CETIS Analysis Detail

| Plant Chronic test | | | | | | CH2M Hill |
|---|---|---|---|---|---|---|
| **Endpoint** | **Analysis Type** | | **Sample Link** | **Control Link** | **Date Analyzed** | **Version** |
| Total Average Biomass Wet Wt. | Comparison | | 07-9195-5290 | 07-9195-5290 | 10 Mar-06 3:23 PM | CETISv1.1.2 |

| Method | Alt H | Data Transform | Zeta | NOEL | LOEL | Toxic Units | ChV | PMSD |
|---|---|---|---|---|---|---|---|---|
| Equal Variance t Two-Sample | C > T | Untransformed | | 100 | >100 | 1 | N/A | 34.83% |

**Group Comparisons**

| Control | vs | Conc-% | Statistic | Critical | P-Value | MSD | Decision(0.05) |
|---|---|---|---|---|---|---|---|
| Dilution Water | | 100 | 0.96975 | 1.85955 | 0.1803 | 61.6913 | Non-Significant Effect |

**ANOVA Table**

| Source | Sum of Squares | Mean Square | DF | F Statistic | P-Value | Decision(0.05) |
|---|---|---|---|---|---|---|
| Between | 2587.601 | 2587.601 | 1 | 0.94 | 0.36057 | Non-Significant Effect |
| Error | 22012.2 | 2751.524 | 8 | | | |
| Total | 24599.7961 | 5339.1252 | 9 | | | |

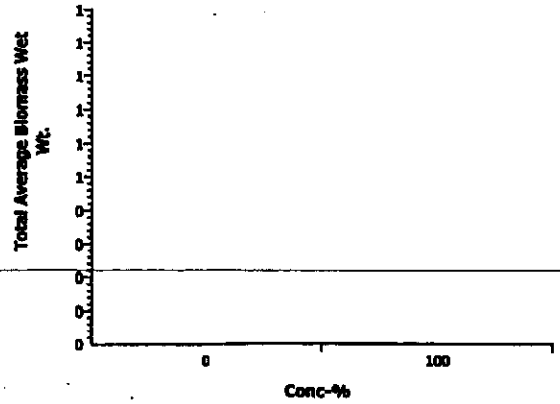
**ANOVA Assumptions**

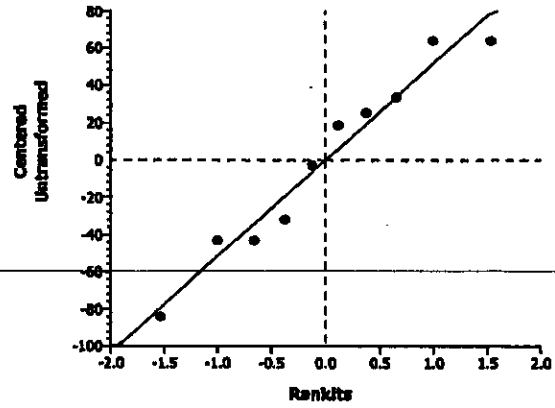
| Attribute | Test | Statistic | Critical | P-Value | Decision(0.01) |
|---|---|---|---|---|---|
| Variances | Variance Ratio F | 1.61984 | 23.15450 | 0.65173 | Equal Variances |
| Distribution | Shapiro-Wilk W | 0.94404 | | 0.59876 | Normal Distribution |

**Data Summary**

| | | | Original Data | | | | Transformed Data | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Conc-% | Control Type | Count | Mean | Minimum | Maximum | SD | Mean | Minimum | Maximum | SD |
| 0 | Dilution Water | 5 | 177.14 | 93.113 | 240.86 | 58.331 | | | | |
| 100 | | 5 | 144.97 | 101.89 | 208.61 | 45.832 | | | | |

**Graphics**



## BLUEGRASS GROWTH TEST

Client: Hanford Project

Test Start Date: 01/25/2006

Initials: Day 0 BW Day 12 NJ Day 14 BW Day 18 NJ Day 21 (A) Day 28 BW

Sample ID: E267701-SOI2 B 1547-07

| CONC. | REPLICATE | PRE-EMERGENCE (12 days after planting) | @ EMERGENCE (14 days after planting) | POST-EMERGENCE (16 days after planting) | | 7-DAYS POST-EMERGENCE (21 days after planting) | | 14-DAYS POST-EMERGENCE (28 days after planting) | pH INITIAL (@ planting) | pH FINAL (28 days after planting) |
|---|---|---|---|---|---|---|---|---|---|---|
| | | # seeds germinated | | | | A-live | | | | |
| | | | | | 21 | 25 | 30 | | | |
| 100% | A | 5 | 5 | 5 | 5 | 5 | 5 | 4 | 6.9 | 6.8 |
| | B | 3 | 5 | 6 | 6 | 6 | 6→5 | 5 | | |
| | C | 1 | 1 | 1 | 1 | 1 | 2 | 2 | | |
| | D | 4 | 4 | 6 | 7 | 7 | 6→5 | 5 | | |
| | E | 4 | 5 | 5 | 5 | 5 | 3 | 3 | | |

7-Days Post-Emergence: Selectively thin down to 5 Seedlings (leave the 5 tallest seedlings). Describe shoot appearance:

Replicate A: 3 medium in good shape + 1 small w/ 3 green + 1 brown + 1 small 2 shoots green

Replicate B: 5 medium in good shape + 1 small in good shape - small plant removed

Replicate C: 1 medium + 1 small in good shape

Replicate D: 4 medium + 2 small in good shape + 1 small dead - 1 small good shape removed

Replicate E: 3 medium in good shape + 3 small dead plants

14-Days Post-Emergence: Describe shoot appearance:

Replicate A: 3 medium & 1 small plant, all in good shape

Replicate B: 4 medium & 1 small plant, all in good shape

Replicate C: 2 small plants, 1 browning @ tips

Replicate D: 3 medium, 1 small plant all look good

Replicate E: 3 medium plants all look good

Measure Shoot Height: (above ground)

| | 1st Seedling | 2nd Seedling | 3rd Seedling | 4th Seedling | 5th Seedling | # of shoots |
|---|---|---|---|---|---|---|
| Replicate A | 44 mm | 55 mm | 45 mm | 29 mm | — mm | 11, 14, 19, 5 |
| Replicate B | 40 mm | 41 mm | 45 mm | 40 mm | 22 mm | 8, 11, 17, 19, 5 |
| Replicate C | 40 mm | 17 mm | — mm | — mm | — mm | 4, 17 9 ms |
| Replicate D | 58 mm | 39 mm | 22 mm | 56 mm | 45 mm | 15, 14, 4, 16, 15 |
| Replicate E | 60 mm | 57 mm | 45 mm | mm | mm | 10, 11, 11 |

Measure Shoot Weight: (above ground)

| | Tin Tare Wt. (mg) | Wet Wt (mg) | Dry Wt. (mg) |
|---|---|---|---|
| Replicate A | 1007.68 | 1502.0 | 1084.10 |
| Replicate B | 984.36 | 1298.9 | 1041.08 |
| Replicate C | 1004.73 | 1069.5 | 1025.72 |
| Replicate D | 1022.04 | 1428.1 | 1104.91 |
| Replicate E | 995.72 | 1247.3 | 1042.75 |

Describe root appearance:

Replicate A:

Replicate B:

Replicate C:

Replicate D: "bushy" many branches

Replicate E:

Measure Root Length: (longest root)

| | 1st Seedling | 2nd Seedling | 3rd Seedling | 4th Seedling | 5th Seedling |
|---|---|---|---|---|---|
| Replicate A | 110 mm | 95 mm | 87 mm | 45 mm | mm |
| Replicate B | 75 mm | 86 mm | 70 mm | 101 mm | 45 mm |
| Replicate C | 91 mm | 37 mm | mm | mm | mm |
| Replicate D | 89 mm | 97 mm | 98 mm | 65 mm | 45 mm |
| Replicate E | 103 mm | 95 mm | 110 mm | mm | mm |

Measure Root Weight: (longest root)

| | Tin Tare Wt. (mg) | Wet Wt. (mg) | Dry Wt. (mg) |
|---|---|---|---|
| Replicate A | 1013.67 | 1919.2 | 1069.22 |
| Replicate B | 968.36 | 1456.7 | 1001.77 |
| Replicate C | 1011.03 | 1087.0 | 1023.96 |
| Replicate D | 1006.99 | 1716.4 | 1061.36 |
| Replicate E | 999.37 | 1346.2 | 1022.16 |

Comments: 90 g dry wt. / rep. 2-14-06 removed all non sporting plants (brown leaves)

# CETIS Test Summary

Report Date: 10 Mar-06 3:32 PM
Test Link: 03-2429-7417/B154207psc

**Plant Chronic test** — **CH2M Hill**

| | | | | | |
|---|---|---|---|---|---|
| **Test No:** | 10-7437-4221 | **Test Type:** | Plant Chronic test | **Duration:** | 37d 0h |
| **Start Date:** | 25 Jan-06 | **Protocol:** | ASTM E1963-02 (2002) | **Species:** | Poa sandbergii |
| **Ending Date:** | 03 Mar-06 | **Dil Water:** | | **Source:** | |
| **Setup Date:** | 25 Jan-06 12:00 AM | **Brine:** | | | |
| **Comments:** | E2877.01 | | | | |

| | | | | | |
|---|---|---|---|---|---|
| **Sample No:** | 05-1608-3151 | **Code:** | B1542-07 | **Client:** | |
| **Sample Date:** | 21 Nov-05 | **Material:** | Soil | **Project:** | |
| **Receive Date:** | | **Source:** | Hanford | | |
| **Sample Age:** | 65d 0h | **Station:** | | | |
| **Comments:** | J10DV0, E287701 | | | | |

**Comparison Summary**

| Analysis | Endpoint | NOEL | LOEL | ChV | PMSD | Method |
|---|---|---|---|---|---|---|
| 11-0323-4244 | % Germination | 100 | > 100 | N/A | 29.15% | Equal Variance t Two-Sample |
| 06-9182-2401 | AG Average Dry Wt. | 100 | > 100 | N/A | 40.28% | Equal Variance t Two-Sample |
| 07-3152-3077 | AG Average Height | 100 | > 100 | N/A | 34.46% | Equal Variance t Two-Sample |
| 19-6612-9266 | AG Average Wet Wt. | 100 | > 100 | N/A | 48.02% | Equal Variance t Two-Sample |
| 10-8022-6215 | Root Average Dry Wt. | 100 | > 100 | N/A | 55.59% | Equal Variance t Two-Sample |
| 07-8510-5912 | Root Average Length | 100 | > 100 | N/A | 28.91% | Equal Variance t Two-Sample |
| 10-5296-9200 | Root Average Wet Wt. | 100 | > 100 | N/A | 61.63% | Equal Variance t Two-Sample |
| 00-2777-8528 | Total Average Biomass Dry | 100 | > 100 | N/A | 45.41% | Equal Variance t Two-Sample |
| 09-4056-4643 | Total Average Biomass Wet | 100 | > 100 | N/A | 55.04% | Equal Variance t Two-Sample |

# CETIS Test Summary

Report Date: 10 Mar-06 3:32 PM
Test Link: 03-2429-7417/B154207psc

**% Germination Summary**

| Conc-% | Control Type | Reps | Mean | Minimum | Maximum | SE | SD | CV |
|---|---|---|---|---|---|---|---|---|
| 0 | Dilution Water | 5 | 0.88000 | 0.60000 | 1.00000 | 0.08000 | 0.17889 | 20.33% |
| 100 | | 5 | 0.76000 | 0.40000 | 1.00000 | 0.11662 | 0.26077 | 34.31% |

**AG Average Dry Wt. Summary**

| Conc-% | Control Type | Reps | Mean | Minimum | Maximum | SE | SD | CV |
|---|---|---|---|---|---|---|---|---|
| 0 | Dilution Water | 5 | 12.351 | 7.9275 | 19.276 | 2.1347 | 4.7733 | 38.65% |
| 100 | | 5 | 14.659 | 10.595 | 19.105 | 1.6121 | 3.6047 | 24.59% |

**AG Average Height Summary**

| Conc-% | Control Type | Reps | Mean | Minimum | Maximum | SE | SD | CV |
|---|---|---|---|---|---|---|---|---|
| 0 | Dilution Water | 5 | 10.627 | 8.4 | 12.333 | 0.6527 | 1.4595 | 13.73% |
| 100 | | 5 | 11.73 | 7.6 | 18 | 1.8581 | 4.1548 | 35.42% |

**AG Average Wet Wt. Summary**

| Conc-% | Control Type | Reps | Mean | Minimum | Maximum | SE | SD | CV |
|---|---|---|---|---|---|---|---|---|
| 0 | Dilution Water | 5 | 63.903 | 41.475 | 82.338 | 7.1313 | 15.946 | 24.95% |
| 100 | | 5 | 76.856 | 32.385 | 123.58 | 14.88 | 33.272 | 43.29% |

**Root Average Dry Wt. Summary**

| Conc-% | Control Type | Reps | Mean | Minimum | Maximum | SE | SD | CV |
|---|---|---|---|---|---|---|---|---|
| 0 | Dilution Water | 5 | 7.8666 | 3.78 | 14.108 | 1.8639 | 4.1678 | 52.98% |
| 100 | | 5 | 9.1010 | 6.465 | 13.887 | 1.4338 | 3.2061 | 35.23% |

**Root Average Length Summary**

| Conc-% | Control Type | Reps | Mean | Minimum | Maximum | SE | SD | CV |
|---|---|---|---|---|---|---|---|---|
| 0 | Dilution Water | 5 | 28.46 | 22.5 | 33 | 1.7486 | 3.91 | 13.74% |
| 100 | | 5 | 23.587 | 15 | 34.333 | 4.065 | 9.0896 | 38.54% |

**Root Average Wet Wt. Summary**

| Conc-% | Control Type | Reps | Mean | Minimum | Maximum | SE | SD | CV |
|---|---|---|---|---|---|---|---|---|
| 0 | Dilution Water | 5 | 113.23 | 51.638 | 158.52 | 21.449 | 47.962 | 42.36% |
| 100 | | 5 | 123.91 | 37.985 | 226.38 | 30.793 | 68.855 | 55.57% |

**Total Average Biomass Dry Wt. Summary**

| Conc-% | Control Type | Reps | Mean | Minimum | Maximum | SE | SD | CV |
|---|---|---|---|---|---|---|---|---|
| 0 | Dilution Water | 5 | 20.217 | 12.223 | 33.384 | 3.9407 | 8.8117 | 43.58% |
| 100 | | 5 | 23.76 | 17.060 | 32.992 | 2.9736 | 6.6492 | 27.98% |

**Total Average Biomass Wet Wt. Summary**

| Conc-% | Control Type | Reps | Mean | Minimum | Maximum | SE | SD | CV |
|---|---|---|---|---|---|---|---|---|
| 0 | Dilution Water | 5 | 177.14 | 93.113 | 240.86 | 26.086 | 58.331 | 32.93% |
| 100 | | 5 | 200.76 | 70.37 | 349.96 | 45.485 | 101.71 | 50.66% |

# CETIS Test Summary

Report Date: 10 Mar-06 3:32 PM
Test Link: 03-2429-7417/B154207psc

**% Germination Detail**

| Conc-% | Control Type | Rep 1 | Rep 2 | Rep 3 | Rep 4 | Rep 5 |
|---|---|---|---|---|---|---|
| 0 | Dilution Water | 1.00000 | 1.00000 | 1.00000 | 0.60000 | 0.80000 |
| 100 | | 0.80000 | 1.00000 | 0.40000 | 1.00000 | 0.60000 |

**AG Average Dry Wt. Detail**

| Conc-% | Control Type | Rep 1 | Rep 2 | Rep 3 | Rep 4 | Rep 5 |
|---|---|---|---|---|---|---|
| 0 | Dilution Water | 15.1720 | 10.552 | 19.276 | 8.82666 | 7.92751 |
| 100 | | 19.105 | 11.344 | 10.5950 | 16.5740 | 15.6767 |

**AG Average Height Detail**

| Conc-% | Control Type | Rep 1 | Rep 2 | Rep 3 | Rep 4 | Rep 5 |
|---|---|---|---|---|---|---|
| 0 | Dilution Water | 10.2 | 8.4 | 11.2 | 12.3333 | 11 |
| 100 | | 10.75 | 7.6 | 13.5 | 8.8 | 18 |

**AG Average Wet Wt. Detail**

| Conc-% | Control Type | Rep 1 | Rep 2 | Rep 3 | Rep 4 | Rep 5 |
|---|---|---|---|---|---|---|
| 0 | Dilution Water | 67.2900 | 55.1900 | 62.338 | 73.2233 | 41.4750 |
| 100 | | 123.580 | 62.9080 | 32.3850 | 81.212 | 84.1934 |

**Root Average Dry Wt. Detail**

| Conc-% | Control Type | Rep 1 | Rep 2 | Rep 3 | Rep 4 | Rep 5 |
|---|---|---|---|---|---|---|
| 0 | Dilution Water | 8.75601 | 8.39399 | 14.108 | 3.77999 | 4.295 |
| 100 | | 13.8875 | 6.68201 | 6.465 | 10.874 | 7.59666 |

**Root Average Length Detail**

| Conc-% | Control Type | Rep 1 | Rep 2 | Rep 3 | Rep 4 | Rep 5 |
|---|---|---|---|---|---|---|
| 0 | Dilution Water | 27.8 | 28.4 | 30.6 | 33 | 22.5 |
| 100 | | 21 | 15 | 32 | 15.6 | 34.3333 |

**Root Average Wet Wt. Detail**

| Conc-% | Control Type | Rep 1 | Rep 2 | Rep 3 | Rep 4 | Rep 5 |
|---|---|---|---|---|---|---|
| 0 | Dilution Water | 143.362 | 140.624 | 158.524 | 72.0233 | 51.6375 |
| 100 | | 226.382 | 97.668 | 37.985 | 141.882 | 115.61 |

**Total Average Biomass Dry Wt. Detail**

| Conc-% | Control Type | Rep 1 | Rep 2 | Rep 3 | Rep 4 | Rep 5 |
|---|---|---|---|---|---|---|
| 0 | Dilution Water | 23.9280 | 18.946 | 33.384 | 12.6066 | 12.2225 |
| 100 | | 32.9925 | 18.0260 | 17.0601 | 27.448 | 23.2733 |

**Total Average Biomass Wet Wt. Detail**

| Conc-% | Control Type | Rep 1 | Rep 2 | Rep 3 | Rep 4 | Rep 5 |
|---|---|---|---|---|---|---|
| 0 | Dilution Water | 210.652 | 195.814 | 240.862 | 145.247 | 93.1125 |
| 100 | | 349.963 | 160.576 | 70.37 | 223.094 | 199.603 |

# CETIS Analysis Detail

**Plant Chronic test** — **CH2M Hill**

| Endpoint | Analysis Type | Sample Link | Control Link | Date Analyzed | Version |
|---|---|---|---|---|---|
| % Germination | Comparison | 03-2429-7417 | 03-2429-7417 | 10 Mar-06 3:32 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 | 29.15% |

**Group Comparisons**

| Control | vs | Conc-% | Statistic | Critical | P-Value | MSD | Decision(0.05) |
|---|---|---|---|---|---|---|---|
| Dilution Water | | 100 | 0.83103 | 1.85955 | 0.2150 | 0.29562 | Non-Significant Effect |

**ANOVA Table**

| Source | Sum of Squares | Mean Square | DF | F Statistic | P-Value | Decision(0.05) |
|---|---|---|---|---|---|---|
| Between | 0.0436344 | 0.043634 | 1 | 0.69 | 0.43006 | Non-Significant Effect |
| Error | 0.5054631 | 0.063183 | 8 | | | |
| Total | 0.54909750 | 0.1068173 | 9 | | | |

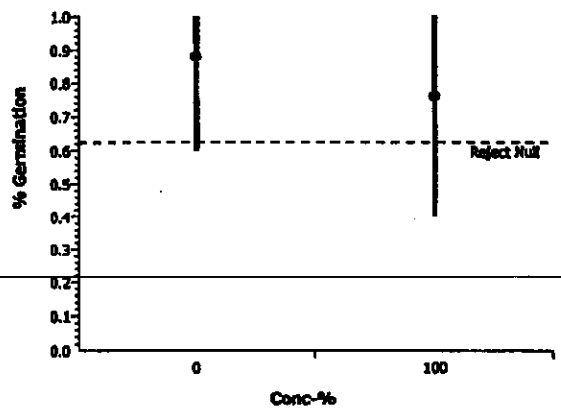
**ANOVA Assumptions**

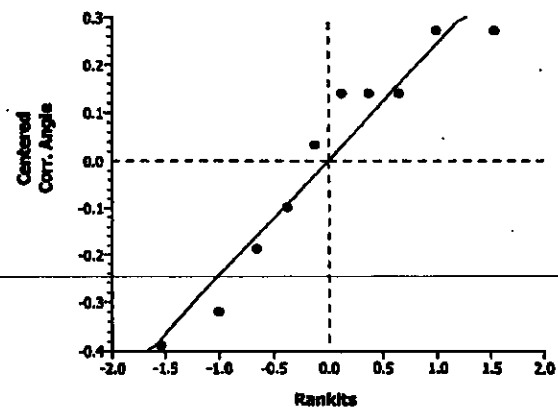
| Attribute | Test | Statistic | Critical | P-Value | Decision(0.01) |
|---|---|---|---|---|---|
| Variances | Variance Ratio F | 1.96770 | 23.15450 | 0.52822 | Equal Variances |
| Distribution | Shapiro-Wilk W | 0.90703 | | 0.26121 | Normal Distribution |

**Data Summary**

| | | | Original Data | | | | Transformed Data | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Conc-% | Control Type | Count | Mean | Minimum | Maximum | SD | Mean | Minimum | Maximum | SD |
| 0 | Dilution Water | 5 | 0.88000 | 0.60000 | 1.00000 | 0.17889 | 1.20581 | 0.88608 | 1.34528 | 0.20635 |
| 100 | | 5 | 0.76000 | 0.40000 | 1.00000 | 0.26077 | 1.07370 | 0.68472 | 1.34528 | 0.28946 |

**Graphics**



# CETIS Analysis Detail

| Plant Chronic test | | | | | | CH2M Hill |
|---|---|---|---|---|---|---|
| **Endpoint** | **Analysis Type** | **Sample Link** | **Control Link** | **Date Analyzed** | **Version** | |
| AG Average Dry Wt. | Comparison | 03-2429-7417 | 03-2429-7417 | 10 Mar-06 3:32 PM | CETISv1.1.2 | |

| Method | Alt H | Data Transform | Zeta | NOEL | LOEL | Toxic Units | ChV | PMSD |
|---|---|---|---|---|---|---|---|---|
| Equal Variance t Two-Sample | C > T | Untransformed | | 100 | >100 | 1 | N/A | 40.28% |

**Group Comparisons**

| Control | vs | Conc-% | Statistic | Critical | P-Value | MSD | Decision(0.05) |
|---|---|---|---|---|---|---|---|
| Dilution Water | | 100 | -0.8628 | 1.85955 | 0.7933 | 4.97430 | Non-Significant Effect |

**ANOVA Table**

| Source | Sum of Squares | Mean Square | DF | F Statistic | P-Value | Decision(0.05) |
|---|---|---|---|---|---|---|
| Between | 13.31844 | 13.31844 | 1 | 0.74 | 0.41334 | Non-Significant Effect |
| Error | 143.1132 | 17.88915 | 8 | | | |
| Total | 156.431646 | 31.207592 | 9 | | | |

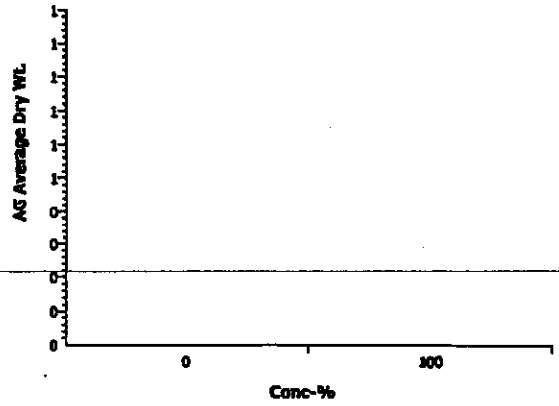
**ANOVA Assumptions**

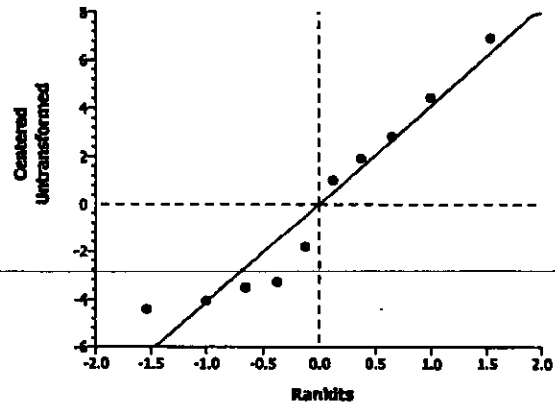
| Attribute | Test | Statistic | Critical | P-Value | Decision(0.01) |
|---|---|---|---|---|---|
| Variances | Variance Ratio F | 1.75351 | 23.15450 | 0.59977 | Equal Variances |
| Distribution | Shapiro-Wilk W | 0.91217 | | 0.29621 | Normal Distribution |

**Data Summary**

| | | | Original Data | | | | Transformed Data | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Conc-% | Control Type | Count | Mean | Minimum | Maximum | SD | Mean | Minimum | Maximum | SD |
| 0 | Dilution Water | 5 | 12.351 | 7.9275 | 19.276 | 4.7733 | | | | |
| 100 | | 5 | 14.659 | 10.595 | 19.105 | 3.6047 | | | | |

**Graphics**



# CETIS Analysis Detail

| Plant Chronic test | | | | | CH2M Hill |
|---|---|---|---|---|---|
| **Endpoint** | **Analysis Type** | **Sample Link** | **Control Link** | **Date Analyzed** | **Version** |
| AG Average Height | Comparison | 03-2429-7417 | 03-2429-7417 | 10 Mar-06 3:32 PM | CETISv1.1.2 |

| Method | Alt H | Data Transform | Zeta | NOEL | LOEL | Toxic Units | ChV | PMSD |
|---|---|---|---|---|---|---|---|---|
| Equal Variance t Two-Sample | C > T | Untransformed | | 100 | >100 | 1 | N/A | 34.46% |

**Group Comparisons**

| Control | vs | Conc-% | Statistic | Critical | P-Value | MSD | Decision(0.05) |
|---|---|---|---|---|---|---|---|
| Dilution Water | | 100 | -0.5602 | 1.85955 | 0.7047 | 3.66215 | Non-Significant Effect |

**ANOVA Table**

| Source | Sum of Squares | Mean Square | DF | F Statistic | P-Value | Decision(0.05) |
|---|---|---|---|---|---|---|
| Between | 3.043361 | 3.043361 | 1 | 0.31 | 0.59065 | Non-Significant Effect |
| Error | 77.56889 | 9.696111 | 8 | | | |
| Total | 80.612247 | 12.739472 | 9 | | | |

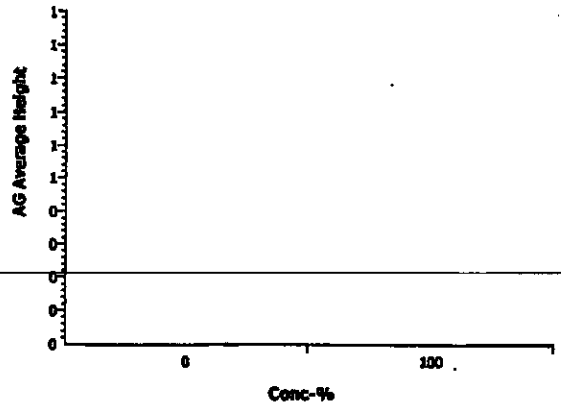
**ANOVA Assumptions**

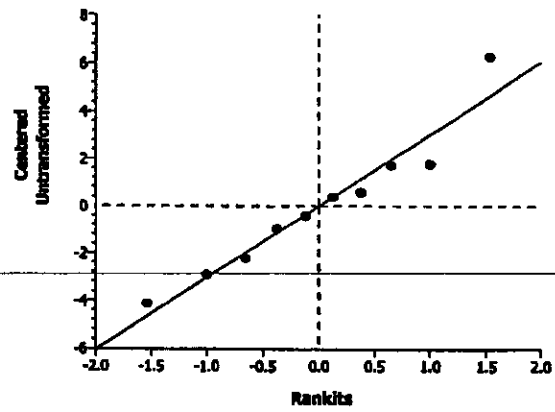
| Attribute | Test | Statistic | Critical | P-Value | Decision(0.01) |
|---|---|---|---|---|---|
| Variances | Variance Ratio F | 8.10338 | 23.15450 | 0.06710 | Equal Variances |
| Distribution | Shapiro-Wilk W | 0.94876 | | 0.65384 | Normal Distribution |

**Data Summary**

| | | | Original Data | | | | Transformed Data | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Conc-% | Control Type | Count | Mean | Minimum | Maximum | SD | Mean | Minimum | Maximum | SD |
| 0 | Dilution Water | 5 | 10.627 | 8.4 | 12.333 | 1.4595 | | | | |
| 100 | | 5 | 11.730 | 7.6 | 18 | 4.1548 | | | | |

**Graphics**



# CETIS Analysis Detail

| Plant Chronic test | | | | | CH2M Hill |
|---|---|---|---|---|---|
| **Endpoint** | **Analysis Type** | **Sample Link** | **Control Link** | **Date Analyzed** | **Version** |
| AG Average Wet Wt. | Comparison | 03-2429-7417 | 03-2429-7417 | 10 Mar-06 3:32 PM | CETISv1.1.2 |

| Method | Alt H | Data Transform | Zeta | NOEL | LOEL | Toxic Units | ChV | PMSD |
|---|---|---|---|---|---|---|---|---|
| Equal Variance t Two-Sample | C > T | Untransformed | | 100 | >100 | 1 | N/A | 48.02% |

**Group Comparisons**

| Control | vs | Conc-% | Statistic | Critical | P-Value | MSD | Decision(0.05) |
|---|---|---|---|---|---|---|---|
| Dilution Water | | 100 | -0.785 | 1.85955 | 0.7725 | 30.6833 | Non-Significant Effect |

**ANOVA Table**

| Source | Sum of Squares | Mean Square | DF | F Statistic | P-Value | Decision(0.05) |
|---|---|---|---|---|---|---|
| Between | 419.4125 | 419.4125 | 1 | 0.62 | 0.45508 | Non-Significant Effect |
| Error | 5445.28 | 680.66 | 8 | | | |
| Total | 5864.69229 | 1100.0725 | 9 | | | |

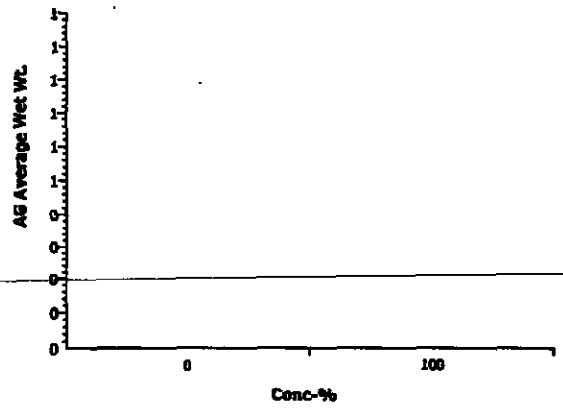
**ANOVA Assumptions**

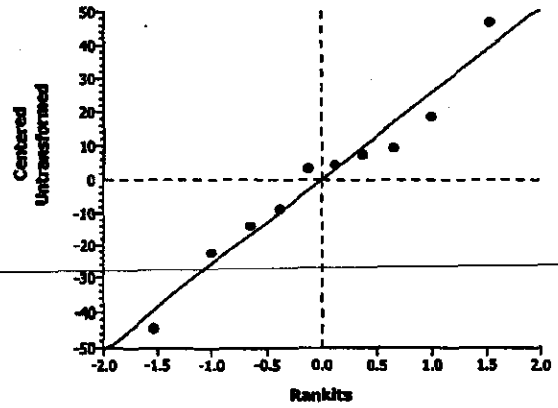
| Attribute | Test | Statistic | Critical | P-Value | Decision(0.01) |
|---|---|---|---|---|---|
| Variances | Variance Ratio F | 4.35362 | 23.15450 | 0.18327 | Equal Variances |
| Distribution | Shapiro-Wilk W | 0.97222 | | 0.91060 | Normal Distribution |

**Data Summary**

| | | | Original Data | | | | Transformed Data | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Conc-% | Control Type | Count | Mean | Minimum | Maximum | SD | Mean | Minimum | Maximum | SD |
| 0 | Dilution Water | 5 | 63.903 | 41.475 | 82.338 | 15.946 | | | | |
| 100 | | 5 | 76.856 | 32.385 | 123.58 | 33.272 | | | | |

**Graphics**



# CETIS Analysis Detail

| Plant Chronic test | | | | | CH2M Hill |
|---|---|---|---|---|---|
| **Endpoint** | **Analysis Type** | **Sample Link** | **Control Link** | **Date Analyzed** | **Version** |
| Root Average Dry Wt. | Comparison | 03-2429-7417 | 03-2429-7417 | 10 Mar-06 3:32 PM | CETISv1.1.2 |

| Method | Alt H | Data Transform | Zeta | NOEL | LOEL | Toxic Units | ChV | PMSD |
|---|---|---|---|---|---|---|---|---|
| Equal Variance t Two-Sample | C > T | Untransformed | | 100 | >100 | 1 | N/A | 55.59% |

**Group Comparisons**

| Control | vs | Conc-% | Statistic | Critical | P-Value | MSD | Decision(0.05) |
|---|---|---|---|---|---|---|---|
| Dilution Water | | 100 | -0.5249 | 1.85955 | 0.6931 | 4.37287 | Non-Significant Effect |

**ANOVA Table**

| Source | Sum of Squares | Mean Square | DF | F Statistic | P-Value | Decision(0.05) |
|---|---|---|---|---|---|---|
| Between | 3.809574 | 3.809574 | 1 | 0.28 | 0.61386 | Non-Significant Effect |
| Error | 110.5981 | 13.82476 | 8 | | | |
| Total | 114.407681 | 17.634337 | 9 | | | |

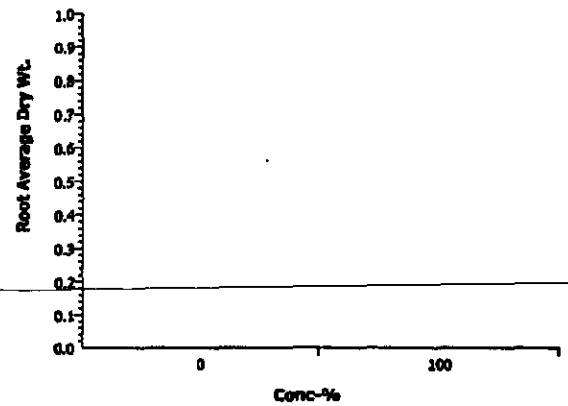
**ANOVA Assumptions**

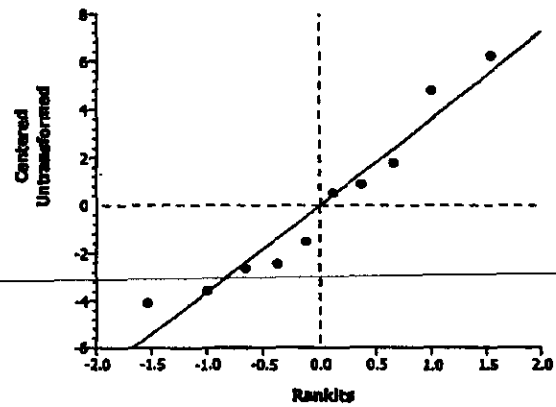
| Attribute | Test | Statistic | Critical | P-Value | Decision(0.01) |
|---|---|---|---|---|---|
| Variances | Variance Ratio F | 1.68983 | 23.15450 | 0.62375 | Equal Variances |
| Distribution | Shapiro-Wilk W | 0.92375 | | 0.38925 | Normal Distribution |

**Data Summary**

| | | | Original Data | | | | Transformed Data | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Conc-% | Control Type | Count | Mean | Minimum | Maximum | SD | Mean | Minimum | Maximum | SD |
| 0 | Dilution Water | 5 | 7.8666 | 3.78 | 14.108 | 4.1678 | | | | |
| 100 | | 5 | 9.1010 | 6.465 | 13.888 | 3.2061 | | | | |

**Graphics**



# CETIS Analysis Detail

**Plant Chronic test** — **CH2M Hill**

| Endpoint | Analysis Type | Sample Link | Control Link | Date Analyzed | Version |
|---|---|---|---|---|---|
| Root Average Length | Comparison | 03-2429-7417 | 03-2429-7417 | 10 Mar-06 3:32 PM | CETISv1.1.2 |

| Method | Alt H | Data Transform | Zeta | NOEL | LOEL | Toxic Units | ChV | PMSD |
|---|---|---|---|---|---|---|---|---|
| Equal Variance t Two-Sample | C > T | Untransformed | | 100 | >100 | 1 | N/A | 28.91% |

**Group Comparisons**

| Control | vs | Conc-% | Statistic | Critical | P-Value | MSD | Decision(0.05) |
|---|---|---|---|---|---|---|---|
| Dilution Water | | 100 | 1.10129 | 1.85955 | 0.1514 | 8.22874 | Non-Significant Effect |

**ANOVA Table**

| Source | Sum of Squares | Mean Square | DF | F Statistic | P-Value | Decision(0.05) |
|---|---|---|---|---|---|---|
| Between | 59.37344 | 59.37344 | 1 | 1.21 | 0.30280 | Non-Significant Effect |
| Error | 391.6356 | 48.95444 | 8 | | | |
| Total | 451.009003 | 108.32789 | 9 | | | |

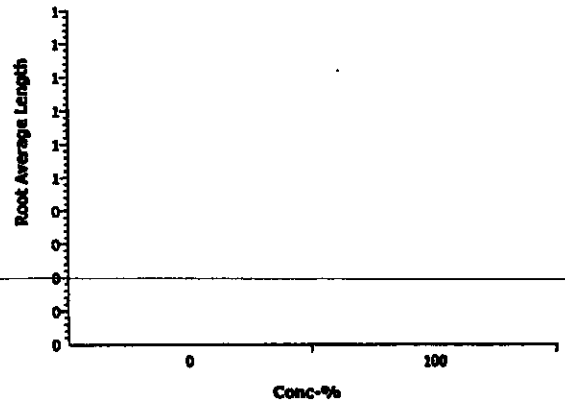
**ANOVA Assumptions**

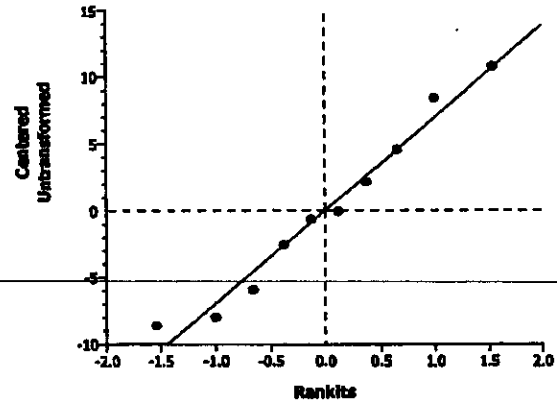
| Attribute | Test | Statistic | Critical | P-Value | Decision(0.01) |
|---|---|---|---|---|---|
| Variances | Variance Ratio F | 5.40430 | 23.15450 | 0.13106 | Equal Variances |
| Distribution | Shapiro-Wilk W | 0.95526 | | 0.73079 | Normal Distribution |

**Data Summary**

| | | | Original Data | | | | Transformed Data | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Conc-% | Control Type | Count | Mean | Minimum | Maximum | SD | Mean | Minimum | Maximum | SD |
| 0 | Dilution Water | 5 | 28.46 | 22.5 | 33 | 3.91 | | | | |
| 100 | | 5 | 23.587 | 15 | 34.333 | 9.0896 | | | | |

**Graphics**



# CETIS Analysis Detail

| Plant Chronic test | | | | | | CH2M Hill |
|---|---|---|---|---|---|---|
| **Endpoint** | **Analysis Type** | **Sample Link** | **Control Link** | **Date Analyzed** | **Version** | |
| Root Average Wet Wt. | Comparison | 03-2429-7417 | 03-2429-7417 | 10 Mar-06 3:32 PM | CETISv1.1.2 | |

| Method | Alt H | Data Transform | Zeta | NOEL | LOEL | Toxic Units | ChV | PMSD |
|---|---|---|---|---|---|---|---|---|
| Equal Variance t Two-Sample | C > T | Untransformed | | 100 | >100 | 1 | N/A | 61.63% |

**Group Comparisons**

| Control | vs | Conc-% | Statistic | Critical | P-Value | MSD | Decision(0.05) |
|---|---|---|---|---|---|---|---|
| Dilution Water | | 100 | -0.2844 | 1.85955 | 0.6083 | 69.7836 | Non-Significant Effect |

**ANOVA Table**

| Source | Sum of Squares | Mean Square | DF | F Statistic | P-Value | Decision(0.05) |
|---|---|---|---|---|---|---|
| Between | 284.6931 | 284.6931 | 1 | 0.08 | 0.78335 | Non-Significant Effect |
| Error | 28165.79 | 3520.723 | 8 | | | |
| Total | 28450.4782 | 3805.4162 | 9 | | | |

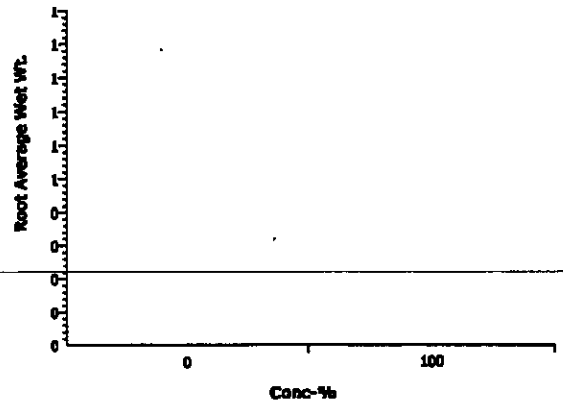
**ANOVA Assumptions**

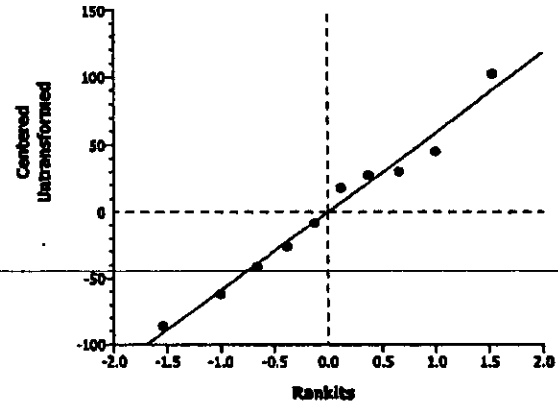
| Attribute | Test | Statistic | Critical | P-Value | Decision(0.01) |
|---|---|---|---|---|---|
| Variances | Variance Ratio F | 2.06099 | 23.15450 | 0.50090 | Equal Variances |
| Distribution | Shapiro-Wilk W | 0.98045 | | 0.96755 | Normal Distribution |

**Data Summary**

| | | | Original Data | | | | Transformed Data | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Conc-% | Control Type | Count | Mean | Minimum | Maximum | SD | Mean | Minimum | Maximum | SD |
| 0 | Dilution Water | 5 | 113.23 | 51.638 | 158.52 | 47.962 | | | | |
| 100 | | 5 | 123.91 | 37.985 | 226.38 | 68.855 | | | | |

**Graphics**



# CETIS Analysis Detail

**Plant Chronic test** — CH2M Hill

| Endpoint | Analysis Type | Sample Link | Control Link | Date Analyzed | Version |
|---|---|---|---|---|---|
| Total Average Biomass Dry Wt. | Comparison | 03-2429-7417 | 03-2429-7417 | 10 Mar-06 3:32 PM | CETISv1.1.2 |

| Method | Alt H | Data Transform | Zeta | NOEL | LOEL | Toxic Units | ChV | PMSD |
|---|---|---|---|---|---|---|---|---|
| Equal Variance t Two-Sample | C > T | Untransformed | | 100 | >100 | 1 | N/A | 45.41% |

**Group Comparisons**

| Control | vs | Conc-% | Statistic | Critical | P-Value | MSD | Decision(0.05) |
|---|---|---|---|---|---|---|---|
| Dilution Water | | 100 | -0.7176 | 1.85955 | 0.7533 | 9.18014 | Non-Significant Effect |

**ANOVA Table**

| Source | Sum of Squares | Mean Square | DF | F Statistic | P-Value | Decision(0.05) |
|---|---|---|---|---|---|---|
| Between | 31.37398 | 31.37398 | 1 | 0.51 | 0.49343 | Non-Significant Effect |
| Error | 487.4312 | 60.9289 | 8 | | | |
| Total | 518.805197 | 92.302885 | 9 | | | |

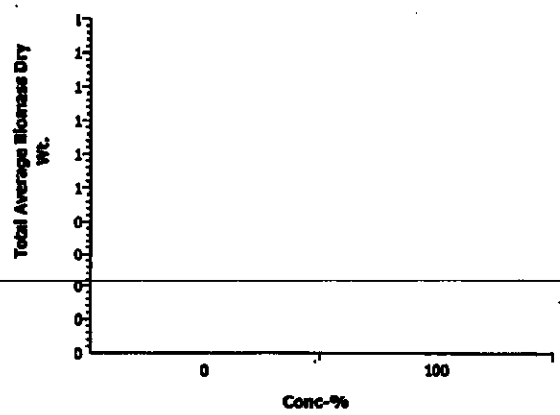
**ANOVA Assumptions**

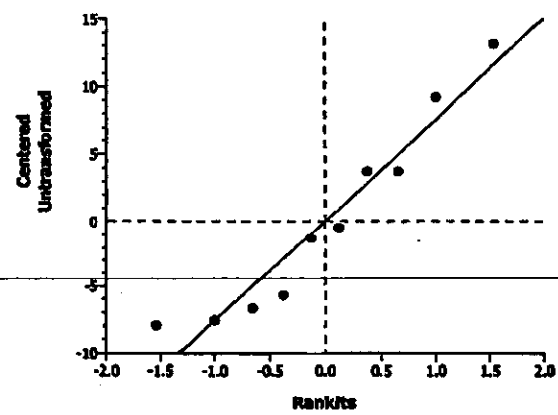
| Attribute | Test | Statistic | Critical | P-Value | Decision(0.01) |
|---|---|---|---|---|---|
| Variances | Variance Ratio F | 1.75627 | 23.15450 | 0.59876 | Equal Variances |
| Distribution | Shapiro-Wilk W | 0.91351 | | 0.30596 | Normal Distribution |

**Data Summary**

| | | | Original Data | | | | Transformed Data | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Conc-% | Control Type | Count | Mean | Minimum | Maximum | SD | Mean | Minimum | Maximum | SD |
| 0 | Dilution Water | 5 | 20.217 | 12.223 | 33.384 | 8.8117 | | | | |
| 100 | | 5 | 23.76 | 17.060 | 32.992 | 6.6491 | | | | |

**Graphics**



# CETIS Analysis Detail

**Plant Chronic test** — CH2M Hill

| Endpoint | Analysis Type | Sample Link | Control Link | Date Analyzed | Version |
|---|---|---|---|---|---|
| Total Average Biomass Wet Wt. | Comparison | 03-2429-7417 | 03-2429-7417 | 10 Mar-06 3:32 PM | CETISv1.1.2 |

| Method | Alt H | Data Transform | Zeta | NOEL | LOEL | Toxic Units | ChV | PMSD |
|---|---|---|---|---|---|---|---|---|
| Equal Variance t Two-Sample | C > T | Untransformed | | 100 | >100 | 1 | N/A | 55.04% |

**Group Comparisons**

| Control | vs | Conc-% | Statistic | Critical | P-Value | MSD | Decision(0.05) |
|---|---|---|---|---|---|---|---|
| Dilution Water | | 100 | -0.4505 | 1.85955 | 0.6679 | 97.5044 | Non-Significant Effect |

**ANOVA Table**

| Source | Sum of Squares | Mean Square | DF | F Statistic | P-Value | Decision(0.05) |
|---|---|---|---|---|---|---|
| Between | 1395.204 | 1395.204 | 1 | 0.20 | 0.66428 | Non-Significant Effect |
| Error | 54987.49 | 6873.436 | 8 | | | |
| Total | 56382.6920 | 8268.6398 | 9 | | | |

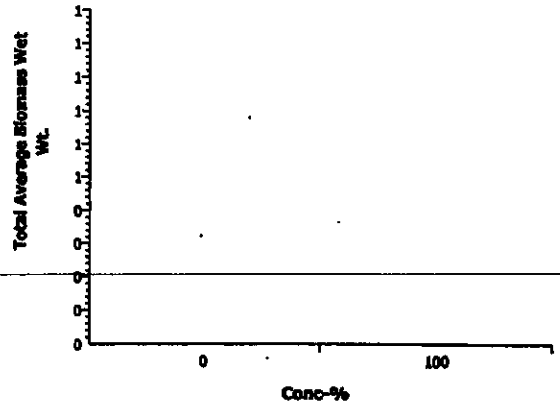
**ANOVA Assumptions**

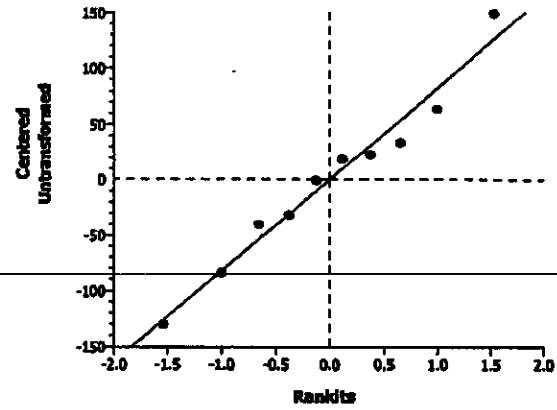
| Attribute | Test | Statistic | Critical | P-Value | Decision(0.01) |
|---|---|---|---|---|---|
| Variances | Variance Ratio F | 3.04021 | 23.15450 | 0.30692 | Equal Variances |
| Distribution | Shapiro-Wilk W | 0.98099 | | 0.97023 | Normal Distribution |

**Data Summary**

| | | | Original Data | | | | Transformed Data | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Conc-% | Control Type | Count | Mean | Minimum | Maximum | SD | Mean | Minimum | Maximum | SD |
| 0 | Dilution Water | 5 | 177.14 | 93.113 | 240.86 | 58.331 | | | | |
| 100 | | 5 | 200.76 | 70.37 | 349.96 | 101.71 | | | | |

**Graphics**



## BLUEGRASS GROWTH TEST

Client: Hanford Project

Test Start Date: 01/25/2006

Initials: Day 0 [illegible] Day 12 NJ Day 14 [illegible] Day 16 MT Day 21 [illegible] Day 28 [illegible]

Sample ID: E289701-SOI2 B1542-08

| CONC. | REPLICATE | PRE-EMERGENCE (12 days after planting) | @ EMERGENCE (14 days after planting) | POST-EMERGENCE (16 days after planting) | | 7-DAYS POST-EMERGENCE (21 days after planting) | | 14-DAYS POST-EMERGENCE (28 days after planting) | pH INITIAL (@ planting) | pH FINAL (28 days after planting) |
|---|---|---|---|---|---|---|---|---|---|---|
| | | # seeds germinated | | | # alive | | | | | |
| | | | | | 6 | 23 | 30 | | | |
| 100% | A | 2 | 3 | 4 | 4 | 4 | 5 | | 7.3 | 6.8 |
| | B | 2 | 3 | 5 | 5 | 5 | 5 | | | |
| | C | 3 | 5 | 7 | 7 | 7 | 7→5 | | | |
| | D | 1 | 1 | 2 | 4 | 4 | 3 | | | |
| | E | 4 | 4 | 4 | 6 | 7 | 7→5 | | | |

7-Days Post-Emergence: Selectively thin down to 5 Seedings (leave the 5 tallest seedings). Describe shoot appearance:

Replicate A: 3 medium in good shape + 2 small w/ browning edges.

Replicate B: 2 medium in good shape + 3 small brown plants - 1 brownleaf plant removed

Replicate C: 3 large + 2 medium in good shape - 2 small plants and 1 brownleaf plant removed

Replicate D: 1 medium in good shape, 1 small in good shape, 1 small turning brown, 3 brown leaf + 1 very long single stalk plant removed

Replicate E: 2 large + 3 medium in good shape, 2 small removed + 1 brownleaf plant removed

14-Days Post-Emergence: Describe shoot appearance:

Replicate A: 3 medium in good shape - all green + 1 small but green & 1 small brown

Replicate B: 1 small in good shape + 1 small w/ 2 browning shoots + 2 small brown

Replicate C: 3 large + 2 medium - all green and in good shape

Replicate D: 1 medium in good shape, 2 small; one with 2 brown tips on shoots, 1 small brown shoot

Replicate E: 1 large + ~~3~~ 3 medium - all green + in good shape

Measure Shoot Height: (above ground)

| | 1st Seedling | 2nd Seedling | 3rd Seedling | 4th Seedling | 5th Seedling | # of shoots |
|---|---|---|---|---|---|---|
| Replicate A | 557 mm | mm | mm | mm | mm | 46 |
| Replicate B | 240 mm | mm | mm | mm | mm | 26 |
| Replicate C | 800 mm | mm | mm | mm | mm | 68 |
| Replicate D | 570 mm | mm | mm | mm | mm | 22 |
| Replicate E | 980 mm | mm | mm | mm | mm | 84 |

Measure Shoot Weight: (above ground)

| | Tin Tare Wt. (mg) | Wet Wt (mg) | Dry Wt. (mg) |
|---|---|---|---|
| Replicate A | 986.95 | 1277.6 | 1058.96 |
| Replicate B | 978.08 | 1060.6 | 992.01 |
| Replicate C | 1013.99 | 1578.3 | 1095.87 |
| Replicate D | 976.55 | 1071.9 | 995.07 |
| Replicate E | 1012.66 | 1874.0 | 1108.04 |

Describe root appearance:

Replicate A

Replicate B

Replicate C

Replicate D

Replicate E

Measure Root Length: (longest root)

| | 1st Seedling | 2nd Seedling | 3rd Seedling | 4th Seedling | 5th Seedling |
|---|---|---|---|---|---|
| Replicate A | 175 mm | mm | mm | mm | mm |
| Replicate B | 150 mm | mm | mm | mm | mm |
| Replicate C | 178 mm | mm | mm | mm | mm |
| Replicate D | 122 mm | mm | mm | mm | mm |
| Replicate E | 270 mm | mm | mm | mm | mm |

Measure Root Weight: (longest root)

| | Tin Tare Wt. (mg) | Wet Wt (mg) | Dry Wt. (mg) |
|---|---|---|---|
| Replicate A | 967.35 | 1431.0 | 989.02 |
| Replicate B | 1024.31 | 1102.5 | 1031.92 |
| Replicate C | 964.73 | 1911.4 | 1003.88 |
| Replicate D | 1003.90 | ~~[illegible]~~ 2135.2 | 1019.33 |
| Replicate E | 997.67 | 2177.7 | 1037.86 |

Comments: 90% dry at replicate, brownleaf plants removed 2-14-06

# CETIS Test Summary

Report Date: 10 Mar-06 3:36 PM
Test Link: 08-6576-0477/B154208psc

**Plant Chronic test** — CH2M Hill

| | | | | | |
|---|---|---|---|---|---|
| Test No: | 20-1165-4941 | Test Type: | Plant Chronic test | Duration: | 37d 0h |
| Start Date: | 25 Jan-06 | Protocol: | ASTM E1963-02 (2002) | Species: | Poa sandbergii |
| Ending Date: | 03 Mar-06 | Dil Water: | | Source: | |
| Setup Date: | 25 Jan-06 12:00 AM | Brine: | | | |

| | | | | | |
|---|---|---|---|---|---|
| Sample No: | 15-5450-5055 | Code: | B1542-08 | Client: | |
| Sample Date: | 28 Nov-05 | Material: | Soil | Project: | |
| Receive Date: | | Source: | Hanford | | |
| Sample Age: | 58d 0h | Station: | | | |

Comments: J10LJ5, E289701

**Comparison Summary**

| Analysis | Endpoint | NOEL | LOEL | ChV | PMSD | Method |
|---|---|---|---|---|---|---|
| 15-9577-8021 | % Germination | 100 | > 100 | N/A | 23.35% | Wilcoxon Rank Sum Two-Sample |
| 13-0879-1029 | AG Average Dry Wt. | 100 | > 100 | N/A | 55.97% | Equal Variance t Two-Sample |
| 15-2658-0580 | AG Average Wet Wt. | 100 | > 100 | N/A | 85.91% | Equal Variance t Two-Sample |
| 06-9453-6105 | Root Average Dry Wt. | 100 | > 100 | N/A | 52.48% | Equal Variance t Two-Sample |
| 05-1384-9566 | Root Average Wet Wt. | 100 | > 100 | N/A | 72.60% | Equal Variance t Two-Sample |
| 05-3828-6637 | Total Average Biomass Dry | 100 | > 100 | N/A | 52.88% | Equal Variance t Two-Sample |
| 03-2729-5818 | Total Average Biomass Wet | 100 | > 100 | N/A | 74.97% | Equal Variance t Two-Sample |

**% Germination Summary**

| Conc-% | Control Type | Reps | Mean | Minimum | Maximum | SE | SD | CV |
|---|---|---|---|---|---|---|---|---|
| 0 | Dilution Water | 5 | 0.88000 | 0.60000 | 1.00000 | 0.08000 | 0.17889 | 20.33% |
| 100 | | 5 | 0.92000 | 0.60000 | 1.00000 | 0.08000 | 0.17889 | 19.44% |

**AG Average Dry Wt. Summary**

| Conc-% | Control Type | Reps | Mean | Minimum | Maximum | SE | SD | CV |
|---|---|---|---|---|---|---|---|---|
| 0 | Dilution Water | 5 | 12.351 | 7.9275 | 19.276 | 2.1347 | 4.7733 | 38.65% |
| 100 | | 5 | 10.963 | 2.766 | 19.076 | 3.0434 | 6.8052 | 62.08% |

**AG Average Wet Wt. Summary**

| Conc-% | Control Type | Reps | Mean | Minimum | Maximum | SE | SD | CV |
|---|---|---|---|---|---|---|---|---|
| 0 | Dilution Water | 5 | 63.903 | 41.475 | 82.338 | 7.1313 | 15.946 | 24.95% |
| 100 | | 5 | 78.309 | 16.504 | 172.27 | 28.648 | 64.058 | 81.80% |

**Root Average Dry Wt. Summary**

| Conc-% | Control Type | Reps | Mean | Minimum | Maximum | SE | SD | CV |
|---|---|---|---|---|---|---|---|---|
| 0 | Dilution Water | 5 | 7.8666 | 3.78 | 14.108 | 1.8639 | 4.1678 | 52.98% |
| 100 | | 5 | 5.3735 | 1.522 | 8.0380 | 1.2063 | 2.6973 | 50.20% |

**Root Average Wet Wt. Summary**

| Conc-% | Control Type | Reps | Mean | Minimum | Maximum | SE | SD | CV |
|---|---|---|---|---|---|---|---|---|
| 0 | Dilution Water | 5 | 113.23 | 51.638 | 158.52 | 21.449 | 47.962 | 42.36% |
| 100 | | 5 | 127.49 | 15.638 | 236.01 | 38.654 | 86.433 | 67.79% |

**Total Average Biomass Dry Wt. Summary**

| Conc-% | Control Type | Reps | Mean | Minimum | Maximum | SE | SD | CV |
|---|---|---|---|---|---|---|---|---|
| 0 | Dilution Water | 5 | 20.217 | 12.223 | 33.384 | 3.9407 | 8.8117 | 43.58% |
| 100 | | 5 | 16.336 | 4.3080 | 27.114 | 4.1865 | 9.3612 | 57.30% |

**Total Average Biomass Wet Wt. Summary**

| Conc-% | Control Type | Reps | Mean | Minimum | Maximum | SE | SD | CV |
|---|---|---|---|---|---|---|---|---|
| 0 | Dilution Water | 5 | 177.14 | 93.113 | 240.86 | 26.086 | 58.331 | 32.93% |
| 100 | | 5 | 205.80 | 32.142 | 408.27 | 66.483 | 148.66 | 72.23% |

# CETIS Test Summary

Report Date: 10 Mar-06 3:38 PM
Test Link: 08-6576-0477/B154208psc

**% Germination Detail**

| Conc-% | Control Type | Rep 1 | Rep 2 | Rep 3 | Rep 4 | Rep 5 |
|---|---|---|---|---|---|---|
| 0 | Dilution Water | 1.00000 | 1.00000 | 1.00000 | 0.60000 | 0.80000 |
| 100 | | 1.00000 | 1.00000 | 1.00000 | 0.60000 | 1.00000 |

**AG Average Dry Wt. Detail**

| Conc-% | Control Type | Rep 1 | Rep 2 | Rep 3 | Rep 4 | Rep 5 |
|---|---|---|---|---|---|---|
| 0 | Dilution Water | 15.1720 | 10.552 | 19.276 | 8.82666 | 7.92751 |
| 100 | | 10.402 | 2.786 | 16.3760 | 6.17334 | 19.0760 |

**AG Average Wet Wt. Detail**

| Conc-% | Control Type | Rep 1 | Rep 2 | Rep 3 | Rep 4 | Rep 5 |
|---|---|---|---|---|---|---|
| 0 | Dilution Water | 67.2900 | 55.1900 | 82.338 | 73.2233 | 41.4750 |
| 100 | | 58.13 | 16.504 | 112.862 | 31.7833 | 172.268 |

**Root Average Dry Wt. Detail**

| Conc-% | Control Type | Rep 1 | Rep 2 | Rep 3 | Rep 4 | Rep 5 |
|---|---|---|---|---|---|---|
| 0 | Dilution Water | 8.75601 | 8.39399 | 14.108 | 3.77999 | 4.295 |
| 100 | | 4.33401 | 1.522 | 7.83000 | 5.14333 | 8.03800 |

**Root Average Wet Wt. Detail**

| Conc-% | Control Type | Rep 1 | Rep 2 | Rep 3 | Rep 4 | Rep 5 |
|---|---|---|---|---|---|---|
| 0 | Dilution Water | 143.362 | 140.624 | 158.524 | 72.0233 | 51.6375 |
| 100 | | 92.7300 | 15.638 | 189.334 | 103.767 | 236.006 |

**Total Average Biomass Dry Wt. Detail**

| Conc-% | Control Type | Rep 1 | Rep 2 | Rep 3 | Rep 4 | Rep 5 |
|---|---|---|---|---|---|---|
| 0 | Dilution Water | 23.9280 | 18.946 | 33.384 | 12.6066 | 12.2225 |
| 100 | | 14.7360 | 4.30801 | 24.2060 | 11.3167 | 27.1140 |

**Total Average Biomass Wet Wt. Detail**

| Conc-% | Control Type | Rep 1 | Rep 2 | Rep 3 | Rep 4 | Rep 5 |
|---|---|---|---|---|---|---|
| 0 | Dilution Water | 210.652 | 195.814 | 240.862 | 145.247 | 93.1125 |
| 100 | | 150.86 | 32.142 | 302.196 | 135.550 | 408.274 |

# CETIS Analysis Detail

| Plant Chronic test | | | | | | CH2M Hill |
|---|---|---|---|---|---|---|
| **Endpoint** | **Analysis Type** | | **Sample Link** | **Control Link** | **Date Analyzed** | **Version** |
| % Germination | Comparison | | 08-6576-0477 | 08-6576-0477 | 10 Mar-06 3:37 PM | CETISv1.1.2 |

| Method | Alt H | Data Transform | Zeta | NOEL | LOEL | Toxic Units | ChV | PMSD |
|---|---|---|---|---|---|---|---|---|
| Wilcoxon Rank Sum Two-Sample | C > T | Rank | | 100 | >100 | 1 | N/A | 23.35% |

**Group Comparisons**

| Control | vs | Conc-% | Statistic | Critical | P-Value | Ties | Decision(0.05) |
|---|---|---|---|---|---|---|---|
| Dilution Water | | 100 | 29.5 | | 0.5794 | 3 | Non-Significant Effect |

**ANOVA Table**

| Source | Sum of Squares | Mean Square | DF | F Statistic | P-Value | Decision(0.05) |
|---|---|---|---|---|---|---|
| Between | 0.0056708 | 0.005671 | 1 | 0.13 | 0.72399 | Non-Significant Effect |
| Error | 0.3390172 | 0.042377 | 8 | | | |
| Total | 0.34468800 | 0.0480479 | 9 | | | |

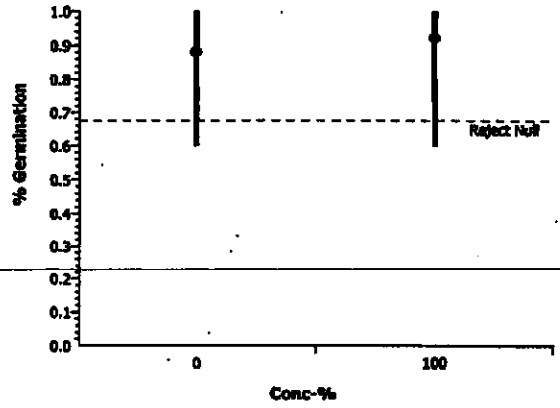
**ANOVA Assumptions**

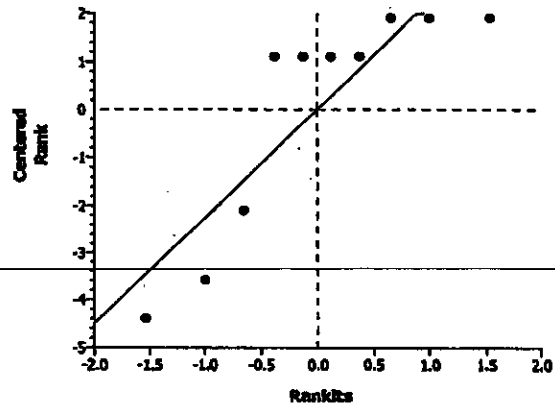
| Attribute | Test | Statistic | Critical | P-Value | Decision(0.01) |
|---|---|---|---|---|---|
| Variances | Variance Ratio F | 1.00963 | 23.15450 | 0.99281 | Equal Variances |
| Distribution | Shapiro-Wilk W | 0.71659 | | 0.00140 | Non-normal Distribution |

**Data Summary**

| | | | Original Data | | | | Transformed Data | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Conc-% | Control Type | Count | Mean | Minimum | Maximum | SD | Mean | Minimum | Maximum | SD |
| 0 | Dilution Water | 5 | 0.88000 | 0.60000 | 1.00000 | 0.17889 | 5.10000 | 1.50000 | 7.00000 | 2.65518 |
| 100 | | 5 | 0.92000 | 0.60000 | 1.00000 | 0.17889 | 5.90000 | 1.50000 | 7.00000 | 2.45967 |

**Graphics**



# CETIS Analysis Detail

**Plant Chronic test** — CH2M Hill

| Endpoint | Analysis Type | Sample Link | Control Link | Date Analyzed | Version |
|---|---|---|---|---|---|
| AG Average Dry Wt. | Comparison | 08-6576-0477 | 08-6576-0477 | 10 Mar-06 3:38 PM | CETISv1.1.2 |

| Method | Alt H | Data Transform | Zeta | NOEL | LOEL | Toxic Units | ChV | PMSD |
|---|---|---|---|---|---|---|---|---|
| Equal Variance t Two-Sample | C > T | Untransformed | | 100 | >100 | 1 | N/A | 55.97% |

**Group Comparisons**

| Control | vs | Conc-% | Statistic | Critical | P-Value | MSD | Decision(0.05) |
|---|---|---|---|---|---|---|---|
| Dilution Water | | 100 | 0.37342 | 1.85955 | 0.3593 | 6.91265 | Non-Significant Effect |

**ANOVA Table**

| Source | Sum of Squares | Mean Square | DF | F Statistic | P-Value | Decision(0.05) |
|---|---|---|---|---|---|---|
| Between | 4.817486 | 4.817486 | 1 | 0.14 | 0.71853 | Non-Significant Effect |
| Error | 276.3788 | 34.54735 | 8 | | | |
| Total | 281.19627 | 39.364834 | 9 | | | |

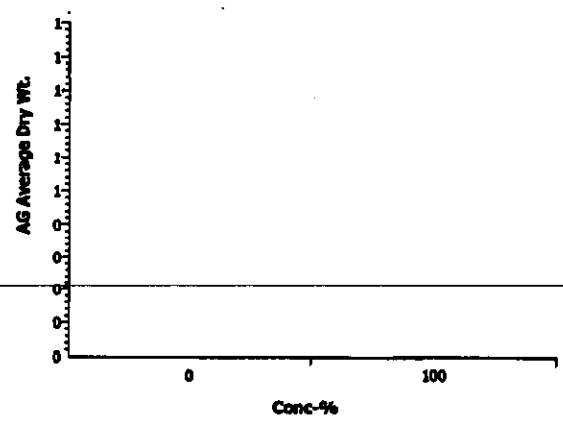
**ANOVA Assumptions**

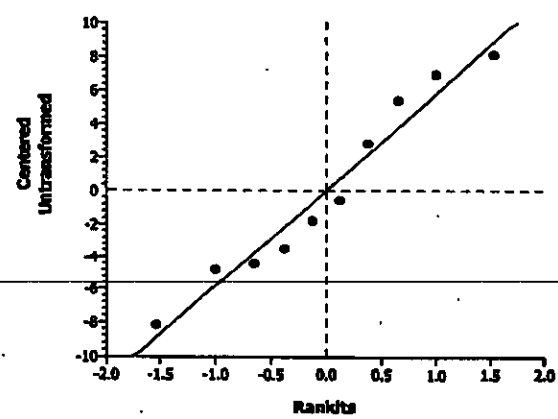
| Attribute | Test | Statistic | Critical | P-Value | Decision(0.01) |
|---|---|---|---|---|---|
| Variances | Variance Ratio F | 2.03252 | 23.15450 | 0.50901 | Equal Variances |
| Distribution | Shapiro-Wilk W | 0.94217 | | 0.57742 | Normal Distribution |

**Data Summary**

| | | | Original Data | | | | Transformed Data | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Conc-% | Control Type | Count | Mean | Minimum | Maximum | SD | Mean | Minimum | Maximum | SD |
| 0 | Dilution Water | 5 | 12.351 | 7.9275 | 19.276 | 4.7733 | | | | |
| 100 | | 5 | 10.963 | 2.786 | 19.076 | 6.8052 | | | | |

**Graphics**



# CETIS Analysis Detail

**Plant Chronic test** — CH2M Hill

| Endpoint | Analysis Type | Sample Link | Control Link | Date Analyzed | Version |
|---|---|---|---|---|---|
| AG Average Wet Wt. | Comparison | 08-6576-0477 | 08-6576-0477 | 10 Mar-06 3:38 PM | CETISv1.1.2 |

| Method | Alt H | Data Transform | Zeta | NOEL | LOEL | Toxic Units | ChV | PMSD |
|---|---|---|---|---|---|---|---|---|
| Equal Variance t Two-Sample | C > T | Untransformed | | 100 | >100 | 1 | N/A | 85.91% |

**Group Comparisons**

| Control | vs | Conc-% | Statistic | Critical | P-Value | MSD | Decision(0.05) |
|---|---|---|---|---|---|---|---|
| Dilution Water | | 100 | -0.488 | 1.85955 | 0.6807 | 54.8976 | Non-Significant Effect |

**ANOVA Table**

| Source | Sum of Squares | Mean Square | DF | F Statistic | P-Value | Decision(0.05) |
|---|---|---|---|---|---|---|
| Between | 518.847 | 518.847 | 1 | 0.24 | 0.63866 | Non-Significant Effect |
| Error | 17431.01 | 2178.877 | 8 | | | |
| Total | 17949.8607 | 2697.7238 | 9 | | | |

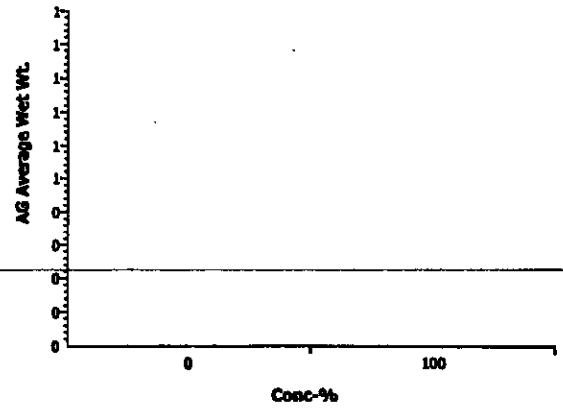
**ANOVA Assumptions**

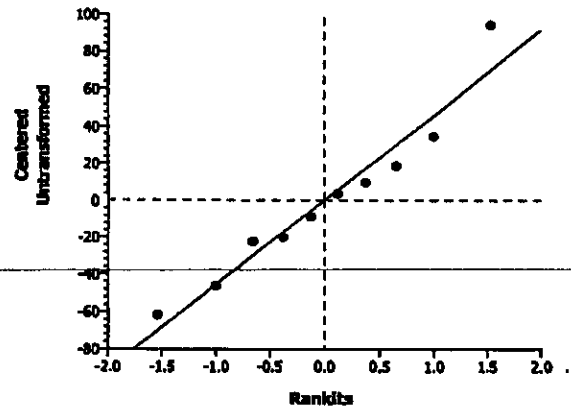
| Attribute | Test | Statistic | Critical | P-Value | Decision(0.01) |
|---|---|---|---|---|---|
| Variances | Variance Ratio F | 16.13761 | 23.15450 | 0.01963 | Equal Variances |
| Distribution | Shapiro-Wilk W | 0.95324 | | 0.70689 | Normal Distribution |

**Data Summary**

| | | | Original Data | | | | Transformed Data | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Conc-% | Control Type | Count | Mean | Minimum | Maximum | SD | Mean | Minimum | Maximum | SD |
| 0 | Dilution Water | 5 | 63.903 | 41.475 | 82.338 | 15.946 | | | | |
| 100 | | 5 | 78.309 | 16.504 | 172.27 | 64.058 | | | | |

**Graphics**



# CETIS Analysis Detail

**Plant Chronic test** — CH2M Hill

| Endpoint | Analysis Type | Sample Link | Control Link | Date Analyzed | Version |
|---|---|---|---|---|---|
| Root Average Dry Wt. | Comparison | 08-6576-0477 | 08-6576-0477 | 10 Mar-06 3:38 PM | CETISv1.1.2 |

| Method | Alt H | Data Transform | Zeta | NOEL | LOEL | Toxic Units | ChV | PMSD |
|---|---|---|---|---|---|---|---|---|
| Equal Variance t Two-Sample | C > T | Untransformed | | 100 | >100 | 1 | N/A | 52.48% |

**Group Comparisons**

| Control | vs | Conc-% | Statistic | Critical | P-Value | MSD | Decision(0.05) |
|---|---|---|---|---|---|---|---|
| Dilution Water | | 100 | 1.12295 | 1.85955 | 0.1470 | 4.1285 | Non-Significant Effect |

**ANOVA Table**

| Source | Sum of Squares | Mean Square | DF | F Statistic | P-Value | Decision(0.05) |
|---|---|---|---|---|---|---|
| Between | 15.53922 | 15.53922 | 1 | 1.26 | 0.29403 | Non-Significant Effect |
| Error | 98.58252 | 12.32281 | 8 | | | |
| Total | 114.121741 | 27.862037 | 9 | | | |

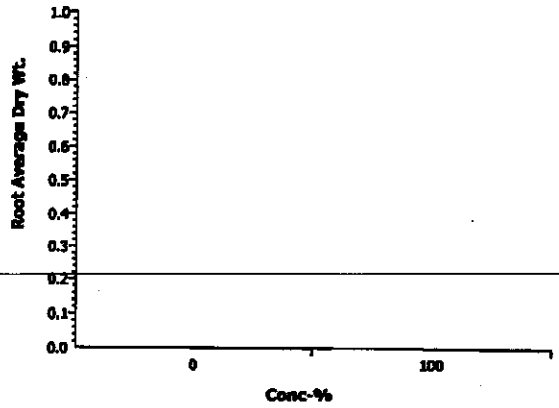
**ANOVA Assumptions**

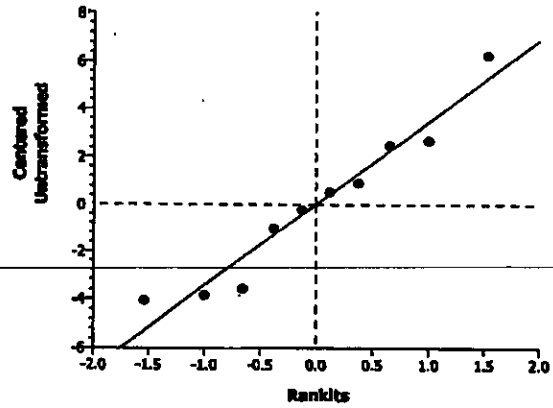
| Attribute | Test | Statistic | Critical | P-Value | Decision(0.01) |
|---|---|---|---|---|---|
| Variances | Variance Ratio F | 2.38753 | 23.15450 | 0.41996 | Equal Variances |
| Distribution | Shapiro-Wilk W | 0.94036 | | 0.55702 | Normal Distribution |

**Data Summary**

| | | | Original Data | | | | Transformed Data | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Conc-% | Control Type | Count | Mean | Minimum | Maximum | SD | Mean | Minimum | Maximum | SD |
| 0 | Dilution Water | 5 | 7.8666 | 3.78 | 14.108 | 4.1678 | | | | |
| 100 | | 5 | 5.3735 | 1.522 | 8.038 | 2.6973 | | | | |

**Graphics**



# CETIS Analysis Detail

**Plant Chronic test** — CH2M Hill

| Endpoint | Analysis Type | Sample Link | Control Link | Date Analyzed | Version |
|---|---|---|---|---|---|
| Root Average Wet Wt. | Comparison | 08-6576-0477 | 08-6576-0477 | 10 Mar-06 3:38 PM | CETISv1.1.2 |

| Method | Alt H | Data Transform | Zeta | NOEL | LOEL | Toxic Units | ChV | PMSD |
|---|---|---|---|---|---|---|---|---|
| Equal Variance t Two-Sample | C > T | Untransformed | | 100 | >100 | 1 | N/A | 72.60% |

**Group Comparisons**

| Control | vs | Conc-% | Statistic | Critical | P-Value | MSD | Decision(0.05) |
|---|---|---|---|---|---|---|---|
| Dilution Water | | 100 | -0.3226 | 1.85955 | 0.6224 | 82.2037 | Non-Significant Effect |

**ANOVA Table**

| Source | Sum of Squares | Mean Square | DF | F Statistic | P-Value | Decision(0.05) |
|---|---|---|---|---|---|---|
| Between | 508.4237 | 508.4237 | 1 | 0.10 | 0.75527 | Non-Significant Effect |
| Error | 39083.88 | 4885.484 | 8 | | | |
| Total | 39592.2987 | 5393.9081 | 9 | | | |

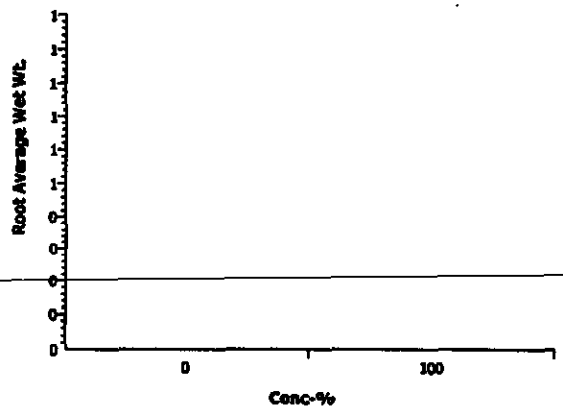
**ANOVA Assumptions**

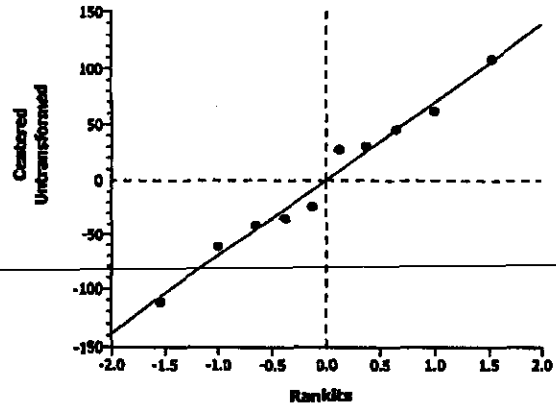
| Attribute | Test | Statistic | Critical | P-Value | Decision(0.01) |
|---|---|---|---|---|---|
| Variances | Variance Ratio F | 3.24754 | 23.15450 | 0.28037 | Equal Variances |
| Distribution | Shapiro-Wilk W | 0.97884 | | 0.95867 | Normal Distribution |

**Data Summary**

| | | | Original Data | | | | Transformed Data | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Conc-% | Control Type | Count | Mean | Minimum | Maximum | SD | Mean | Minimum | Maximum | SD |
| 0 | Dilution Water | 5 | 113.23 | 51.638 | 158.52 | 47.962 | | | | |
| 100 | | 5 | 127.49 | 15.638 | 236.01 | 86.433 | | | | |

**Graphics**



# CETIS Analysis Detail

**Plant Chronic test** — CH2M Hill

| Endpoint | Analysis Type | Sample Link | Control Link | Date Analyzed | Version |
|---|---|---|---|---|---|
| Total Average Biomass Dry Wt. | Comparison | 08-6576-0477 | 08-6576-0477 | 10 Mar-06 3:38 PM | CETISv1.1.2 |

| Method | Alt H | Data Transform | Zeta | NOEL | LOEL | Toxic Units | ChV | PMSD |
|---|---|---|---|---|---|---|---|---|
| Equal Variance t Two-Sample | C > T | Untransformed | | 100 | >100 | 1 | N/A | 52.88% |

**Group Comparisons**

| Control | vs | Conc-% | Statistic | Critical | P-Value | MSD | Decision(0.05) |
|---|---|---|---|---|---|---|---|
| Dilution Water | | 100 | 0.67508 | 1.85955 | 0.2593 | 10.6913 | Non-Significant Effect |

**ANOVA Table**

| Source | Sum of Squares | Mean Square | DF | F Statistic | P-Value | Decision(0.05) |
|---|---|---|---|---|---|---|
| Between | 37.66095 | 37.66095 | 1 | 0.46 | 0.51866 | Non-Significant Effect |
| Error | 661.1147 | 82.63934 | 8 | | | |
| Total | 698.7757 | 120.3003 | 9 | | | |

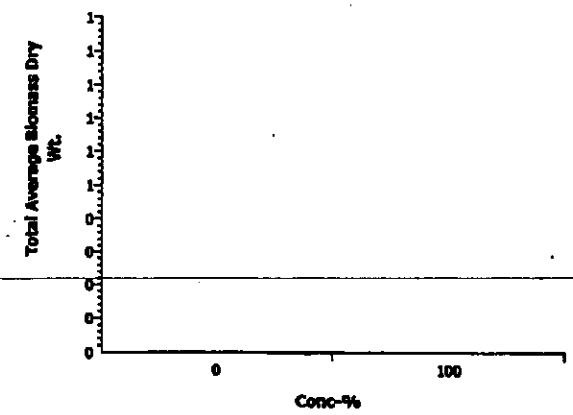
**ANOVA Assumptions**

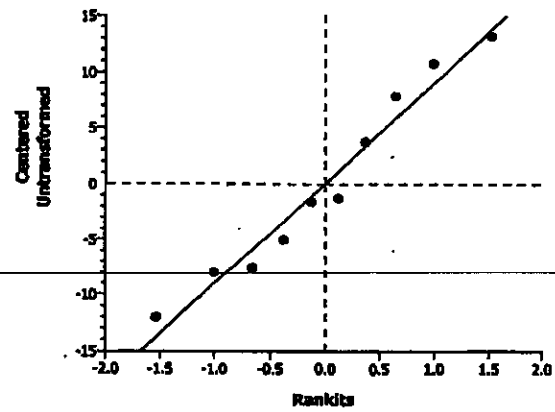
| Attribute | Test | Statistic | Critical | P-Value | Decision(0.01) |
|---|---|---|---|---|---|
| Variances | Variance Ratio F | 1.12860 | 23.15450 | 0.90949 | Equal Variances |
| Distribution | Shapiro-Wilk W | 0.94792 | | 0.64396 | Normal Distribution |

**Data Summary**

| | | | Original Data | | | | Transformed Data | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Conc-% | Control Type | Count | Mean | Minimum | Maximum | SD | Mean | Minimum | Maximum | SD |
| 0 | Dilution Water | 5 | 20.217 | 12.223 | 33.384 | 8.8117 | | | | |
| 100 | | 5 | 16.336 | 4.3080 | 27.114 | 9.3612 | | | | |

**Graphics**



# CETIS Analysis Detail

**Plant Chronic test** — CH2M Hill

| Endpoint | Analysis Type | Sample Link | Control Link | Date Analyzed | Version |
|---|---|---|---|---|---|
| Total Average Biomass Wet Wt. | Comparison | 08-6576-0477 | 08-6576-0477 | 10 Mar-06 3:38 PM | CETISv1.1.2 |

| Method | Alt. H | Data Transform | Zeta | NOEL | LOEL | Toxic Units | ChV | PMSD |
|---|---|---|---|---|---|---|---|---|
| Equal Variance t Two-Sample | C > T | Untransformed | | 100 | >100 | 1 | N/A | 74.97% |

**Group Comparisons**

| Control | vs | Conc-% | Statistic | Critical | P-Value | MSD | Decision(0.05) |
|---|---|---|---|---|---|---|---|
| Dilution Water | | 100 | -0.4014 | 1.85955 | 0.6507 | 132.804 | Non-Significant Effect |

**ANOVA Table**

| Source | Sum of Squares | Mean Square | DF | F Statistic | P-Value | Decision(0.05) |
|---|---|---|---|---|---|---|
| Between | 2054.488 | 2054.488 | 1 | 0.16 | 0.69863 | Non-Significant Effect |
| Error | 102008.6 | 12751.07 | 8 | | | |
| Total | 104063.043 | 14805.558 | 9 | | | |

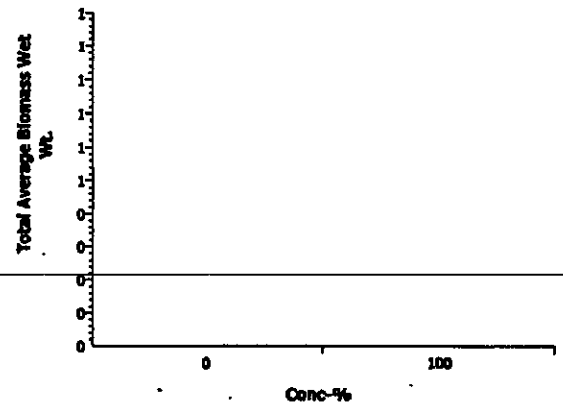
**ANOVA Assumptions**

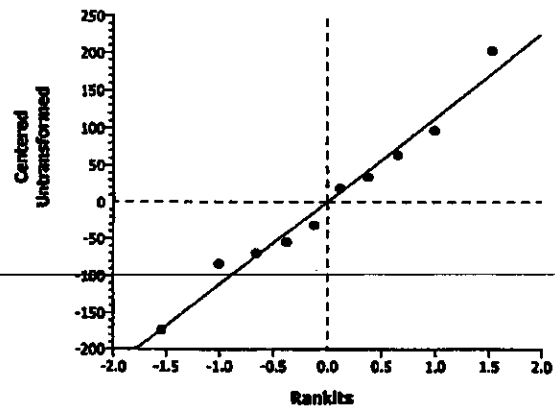
| Attribute | Test | Statistic | Critical | P-Value | Decision(0.01) |
|---|---|---|---|---|---|
| Variances | Variance Ratio F | 6.49508 | 23.15450 | 0.09731 | Equal Variances |
| Distribution | Shapiro-Wilk W | 0.98356 | | 0.98135 | Normal Distribution |

**Data Summary**

| | | | Original Data | | | | Transformed Data | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Conc-% | Control Type | Count | Mean | Minimum | Maximum | SD | Mean | Minimum | Maximum | SD |
| 0 | Dilution Water | 5 | 177.14 | 93.113 | 240.86 | 58.331 | | | | |
| 100 | | 5 | 205.80 | 32.142 | 408.27 | 148.66 | | | | |

**Graphics**



## BLUEGRASS GROWTH TEST

Client: Hanford Project

Test Start Date: 01/25/2006

Initials: Day 0 BV Day 12 NJ Day 14 BV Day 18 NT Day 21 (Day 28) Day 30 BV

Sample ID: E295301-SOI2 B542-09

| CONC. | REPLICATE | PRE-EMERGENCE (12 days after planting) | @ EMERGENCE (14 days after planting) | POST-EMERGENCE (16 days after planting) | | 7-DAYS POST-EMERGENCE (18 days after planting) | | 14-DAYS POST-EMERGENCE (28 days after planting) | pH INITIAL (@ planting) | pH FINAL (28 days after planting) |
|---|---|---|---|---|---|---|---|---|---|---|
| | | # seeds germinated | | | | | | | | |
| | | | | | 21 | | 30 | | | |
| 100% | A | 1 | 1 | 1 | 1 | 1 | 2 | 2 | 7.4 | 7.2 |
| | B | 1 | 1 | 3 | 3 | 3 | 3 | 3 | | |
| | C | 0 | 8 1/2 | 2 | 2 | 3 | 3 | 3 | | |
| | D | 0 | 1 | 1 | 2 | 2 | 3 | 2 | | |
| | E | 0 | 2 | 3 | 3 | 3 | 2 | 2 | | |

DA/21

7-Days Post-Emergence: Selectively thin down to 5 Seedlings (leave the 5 tallest seedlings). Describe shoot appearance:

Replicate A: 1 medium + 1 small (only 2 shoots) w/ good color - 1 broadleaf plant removed

Replicate B: 1 large + 2 small - all w/ good color

Replicate C: 2 medium + 1 small - good color

Replicate D: 2 medium plants w/ good color + 1 seedling just emerging

Replicate E: 1 medium + 1 small w/ good shape + 1 small brown single shoot.

14-Days Post-Emergence: Describe shoot appearance:

Replicate A: 2 small plants / looks poor only 3 shoots / brown

Replicate B: 2 small / large - small look poor / large looks good

Replicate C: 2 medium / small look good

Replicate D: 2 medium / look good

Replicate E: 2 plants / small / medium

Measure Shoot Height: (above ground)

| | 1st Seedling | 2nd Seedling | 3rd Seedling | 4th Seedling | 5th Seedling | # Shoots/Blades |
|---|---|---|---|---|---|---|
| Replicate A | 40 mm | 27 mm | — mm | — mm | — mm | 2, 10 |
| Replicate B | 30 mm | 21 mm | 68 mm | — mm | — mm | 2, 2, 19 |
| Replicate C | 46 mm | 50 mm | 15 mm | — mm | — mm | 12, 17, 3 |
| Replicate D | 55 mm | 45 mm | mm | mm | mm | 8, 14 |
| Replicate E | 36 mm | 29 mm | mm | mm | mm | 10, 4, 5 ms |

Measure Shoot Weight: (above ground)

| | Tin Tare Wt. (mg) | Wet Wt (mg) | Dry Wt. (mg) |
|---|---|---|---|
| Replicate A | 974.32 | 1014.3 | 981.89 |
| Replicate B | 982.82 | 1204.1 | 1019.02 |
| Replicate C | 989.34 | 1196.2 | 1022.48 |
| Replicate D | 986.00 | 1127.6 | 1009.69 |
| Replicate E | 983.66 | 1031.8 | 992.79 |

Describe root appearance:

Replicate A:

Replicate B: 1 large root system - paler in color than normal, 2 small ok.

Replicate C:

Replicate D:

Replicate E:

Measure Root Length: (longest root)

| | 1st Seedling | 2nd Seedling | 3rd Seedling | 4th Seedling | 5th Seedling |
|---|---|---|---|---|---|
| Replicate A | 55 mm | 122 mm | mm | mm | mm |
| Replicate B | 209 mm | 35 mm | 32 mm | mm | mm |
| Replicate C | 100 mm | 27 mm | 110 mm | mm | mm |
| Replicate D | 92 mm | ~~[illegible]~~ mm | 104 mm | mm | mm |
| Replicate E | 80 mm | 60 mm | mm | mm | mm |

Measure Root Weight: (longest root)

| | Tin Tare Wt. (mg) | Wet Wt (mg) | Dry Wt. (mg) |
|---|---|---|---|
| Replicate A | 1018.20 | 1130.0 | 1025.72 |
| Replicate B | 1016.76 | 1310.8 | 1030.89 |
| Replicate C | 1028.37 | 1338.6 | 1044.29 |
| Replicate D | 1008.21 | 1248.4 | 1024.74 |
| Replicate E | 1017.37 | 1119.6 | 1023.91 |

Comments: 85 g dry wt. / rep, broad leaved seedlings removed 2-14-06

# CETIS Test Summary

Report Date: 10 Mar-06 3:44 PM
Test Link: 01-8369-8444/B154209psc

**Plant Chronic test** — CH2M Hill

| | | | | | |
|---|---|---|---|---|---|
| Test No: | 15-8481-0577 | Test Type: | Plant Chronic test | Duration: | 37d 0h |
| Start Date: | 25 Jan-06 | Protocol: | ASTM E1963-02 (2002) | Species: | Poa sandbergii |
| Ending Date: | 03 Mar-06 | Dil Water: | | Source: | |
| Setup Date: | 25 Jan-06 12:00 AM | Brine: | | | |

| | | | | | |
|---|---|---|---|---|---|
| Sample No: | 07-3184-0122 | Code: | B1542-09 | Client: | |
| Sample Date: | 06 Dec-05 | Material: | Soil | Project: | |
| Receive Date: | | Source: | Hanford | | |
| Sample Age: | 50d 0h | Station: | | | |

Comments: J10DT9, E295301

**Comparison Summary**

| Analysis | Endpoint | NOEL | LOEL | ChV | PMSD | Method |
|---|---|---|---|---|---|---|
| 09-8687-3352 | % Germination | < 100 | 100 | N/A | 18.38% | Equal Variance t Two-Sample |
| 04-6596-1272 | AG Average Dry Wt. | 100 | > 100 | N/A | 42.47% | Equal Variance t Two-Sample |
| 07-9120-2062 | AG Average Height | 100 | > 100 | N/A | 42.66% | Equal Variance t Two-Sample |
| 16-4154-3147 | AG Average Wet Wt. | 100 | > 100 | N/A | 40.33% | Equal Variance t Two-Sample |
| 09-6233-5934 | Root Average Dry Wt. | 100 | > 100 | N/A | 48.68% | Equal Variance t Two-Sample |
| 08-1097-6197 | Root Average Length | 100 | > 100 | N/A | 29.97% | Equal Variance t Two-Sample |
| 12-8307-1390 | Root Average Wet Wt. | 100 | > 100 | N/A | 45.20% | Equal Variance t Two-Sample |
| 08-5176-9503 | Total Average Biomass Dry | 100 | > 100 | N/A | 43.16% | Equal Variance t Two-Sample |
| 17-0304-2643 | Total Average Biomass Wet | 100 | > 100 | N/A | 40.21% | Equal Variance t Two-Sample |

# CETIS Test Summary

Report Date: 10 Mar-06 3:44 PM
Test Link: 01-8369-8444/B154209psc

**% Germination Summary**

| Conc-% | Control Type | Reps | Mean | Minimum | Maximum | SE | SD | CV |
|---|---|---|---|---|---|---|---|---|
| 0 | Dilution Water | 5 | 0.88000 | 0.60000 | 1.00000 | 0.08000 | 0.17889 | 20.33% |
| 100 | | 5 | 0.48000 | 0.40000 | 0.60000 | 0.04899 | 0.10954 | 22.82% |

**AG Average Dry Wt. Summary**

| Conc-% | Control Type | Reps | Mean | Minimum | Maximum | SE | SD | CV |
|---|---|---|---|---|---|---|---|---|
| 0 | Dilution Water | 5 | 12.351 | 7.9275 | 19.276 | 2.1347 | 4.7733 | 38.65% |
| 100 | | 5 | 8.6617 | 3.7850 | 12.067 | 1.8436 | 4.1225 | 47.59% |

**AG Average Height Summary**

| Conc-% | Control Type | Reps | Mean | Minimum | Maximum | SE | SD | CV |
|---|---|---|---|---|---|---|---|---|
| 0 | Dilution Water | 5 | 10.627 | 8.4 | 12.333 | 0.6527 | 1.4595 | 13.73% |
| 100 | | 5 | 16.467 | 12 | 25 | 2.349 | 5.2525 | 31.90% |

**AG Average Wet Wt. Summary**

| Conc-% | Control Type | Reps | Mean | Minimum | Maximum | SE | SD | CV |
|---|---|---|---|---|---|---|---|---|
| 0 | Dilution Water | 5 | 63.903 | 41.475 | 82.338 | 7.1313 | 15.946 | 24.95% |
| 100 | | 5 | 51.001 | 19.99 | 73.76 | 11.883 | 26.571 | 52.10% |

**Root Average Dry Wt. Summary**

| Conc-% | Control Type | Reps | Mean | Minimum | Maximum | SE | SD | CV |
|---|---|---|---|---|---|---|---|---|
| 0 | Dilution Water | 5 | 7.8666 | 3.78 | 14.108 | 1.8639 | 4.1678 | 52.98% |
| 100 | | 5 | 5.059 | 3.27 | 8.265 | 0.8758 | 1.9584 | 38.71% |

**Root Average Length Summary**

| Conc-% | Control Type | Reps | Mean | Minimum | Maximum | SE | SD | CV |
|---|---|---|---|---|---|---|---|---|
| 0 | Dilution Water | 5 | 28.46 | 22.5 | 33 | 1.7486 | 3.91 | 13.74% |
| 100 | | 5 | 36.867 | 26.333 | 49 | 4.2408 | 9.4827 | 25.72% |

**Root Average Wet Wt. Summary**

| Conc-% | Control Type | Reps | Mean | Minimum | Maximum | SE | SD | CV |
|---|---|---|---|---|---|---|---|---|
| 0 | Dilution Water | 5 | 113.23 | 51.638 | 158.52 | 21.449 | 47.962 | 42.36% |
| 100 | | 5 | 90.707 | 51.115 | 145.1 | 17.251 | 38.574 | 42.53% |

**Total Average Biomass Dry Wt. Summary**

| Conc-% | Control Type | Reps | Mean | Minimum | Maximum | SE | SD | CV |
|---|---|---|---|---|---|---|---|---|
| 0 | Dilution Water | 5 | 20.217 | 12.223 | 33.384 | 3.9407 | 8.8117 | 43.58% |
| 100 | | 5 | 13.721 | 7.5450 | 20.11 | 2.5474 | 5.6962 | 41.52% |

**Total Average Biomass Wet Wt. Summary**

| Conc-% | Control Type | Reps | Mean | Minimum | Maximum | SE | SD | CV |
|---|---|---|---|---|---|---|---|---|
| 0 | Dilution Water | 5 | 177.14 | 93.113 | 240.86 | 26.086 | 58.331 | 32.93% |
| 100 | | 5 | 141.71 | 75.185 | 213.39 | 28.05 | 62.721 | 44.26% |

# CETIS Test Summary

Report Date: 10 Mar-06 3:44 PM
Test Link: 01-8369-8444/B154209psc

**% Germination Detail**

| Conc-% | Control Type | Rep 1 | Rep 2 | Rep 3 | Rep 4 | Rep 5 |
|---|---|---|---|---|---|---|
| 0 | Dilution Water | 1.00000 | 1.00000 | 1.00000 | 0.60000 | 0.80000 |
| 100 | | 0.40000 | 0.60000 | 0.60000 | 0.40000 | 0.40000 |

**AG Average Dry Wt. Detail**

| Conc-% | Control Type | Rep 1 | Rep 2 | Rep 3 | Rep 4 | Rep 5 |
|---|---|---|---|---|---|---|
| 0 | Dilution Water | 15.1720 | 10.552 | 19.276 | 8.82666 | 7.92751 |
| 100 | | 3.78500 | 12.0667 | 11.0467 | 11.8450 | 4.58500 |

**AG Average Height Detail**

| Conc-% | Control Type | Rep 1 | Rep 2 | Rep 3 | Rep 4 | Rep 5 |
|---|---|---|---|---|---|---|
| 0 | Dilution Water | 10.2 | 8.4 | 11.2 | 12.3333 | 11 |
| 100 | | 17 | 12 | 12.3333 | 25 | 16 |

**AG Average Wet Wt. Detail**

| Conc-% | Control Type | Rep 1 | Rep 2 | Rep 3 | Rep 4 | Rep 5 |
|---|---|---|---|---|---|---|
| 0 | Dilution Water | 67.2900 | 55.1900 | 82.338 | 73.2233 | 41.4750 |
| 100 | | 19.99 | 73.76 | 68.8867 | 68.3 | 24.0700 |

**Root Average Dry Wt. Detail**

| Conc-% | Control Type | Rep 1 | Rep 2 | Rep 3 | Rep 4 | Rep 5 |
|---|---|---|---|---|---|---|
| 0 | Dilution Water | 8.75601 | 8.39399 | 14.108 | 3.77999 | 4.295 |
| 100 | | 3.75998 | 4.71000 | 5.29 | 8.26498 | 3.26999 |

**Root Average Length Detail**

| Conc-% | Control Type | Rep 1 | Rep 2 | Rep 3 | Rep 4 | Rep 5 |
|---|---|---|---|---|---|---|
| 0 | Dilution Water | 27.6 | 28.4 | 30.6 | 33 | 22.5 |
| 100 | | 44 | 30 | 26.3333 | 49 | 35 |

**Root Average Wet Wt. Detail**

| Conc-% | Control Type | Rep 1 | Rep 2 | Rep 3 | Rep 4 | Rep 5 |
|---|---|---|---|---|---|---|
| 0 | Dilution Water | 143.362 | 140.624 | 158.524 | 72.0233 | 51.6375 |
| 100 | | 55.9 | 98.0133 | 103.41 | 145.095 | 51.115 |

**Total Average Biomass Dry Wt. Detail**

| Conc-% | Control Type | Rep 1 | Rep 2 | Rep 3 | Rep 4 | Rep 5 |
|---|---|---|---|---|---|---|
| 0 | Dilution Water | 23.9280 | 18.946 | 33.384 | 12.6066 | 12.2225 |
| 100 | | 7.54501 | 16.7767 | 16.3366 | 20.11 | 7.83502 |

**Total Average Biomass Wet Wt. Detail**

| Conc-% | Control Type | Rep 1 | Rep 2 | Rep 3 | Rep 4 | Rep 5 |
|---|---|---|---|---|---|---|
| 0 | Dilution Water | 210.652 | 195.814 | 240.862 | 145.247 | 93.1125 |
| 100 | | 75.89 | 171.773 | 172.297 | 213.395 | 75.185 |

# CETIS Analysis Detail

**Plant Chronic test** — CH2M Hill

| Endpoint | Analysis Type | Sample Link | Control Link | Date Analyzed | Version |
|---|---|---|---|---|---|
| % Germination | Comparison | 01-8369-8444 | 01-8369-8444 | 10 Mar-06 3:43 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 | 18.38% |

**Group Comparisons**

| Control | vs | Conc-% | Statistic | Critical | P-Value | MSD | Decision(0.05) |
|---|---|---|---|---|---|---|---|
| Dilution Water | | 100 | 4.21032 | 1.85955 | 0.0015 | 0.19458 | Significant Effect |

**ANOVA Table**

| Source | Sum of Squares | Mean Square | DF | F Statistic | P-Value | Decision(0.05) |
|---|---|---|---|---|---|---|
| Between | 0.4852164 | 0.485216 | 1 | 17.73 | 0.00295 | Significant Effect |
| Error | 0.2189753 | 0.027372 | 8 | | | |
| Total | 0.70419164 | 0.5125883 | 9 | | | |

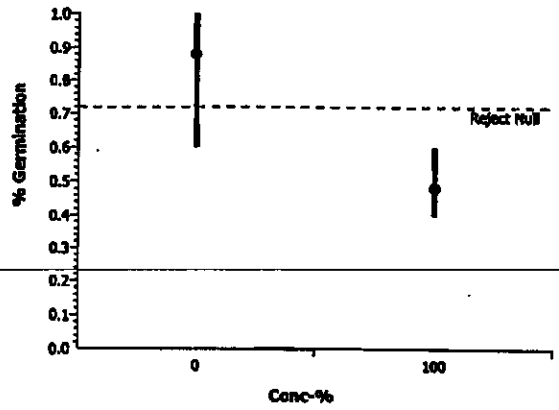
**ANOVA Assumptions**

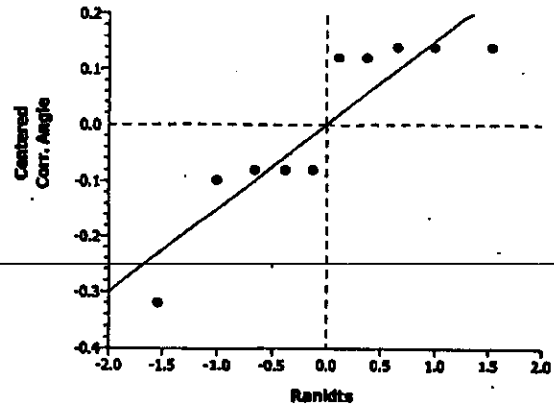
| Attribute | Test | Statistic | Critical | P-Value | Decision(0.01) |
|---|---|---|---|---|---|
| Variances | Variance Ratio F | 3.50088 | 23.15450 | 0.25233 | Equal Variances |
| Distribution | Shapiro-Wilk W | 0.81229 | | 0.02044 | Normal Distribution |

**Data Summary**

| | | | Original Data | | | | Transformed Data | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Conc-% | Control Type | Count | Mean | Minimum | Maximum | SD | Mean | Minimum | Maximum | SD |
| 0 | Dilution Water | 5 | 0.88000 | 0.60000 | 1.00000 | 0.17889 | 1.20581 | 0.88608 | 1.34528 | 0.20635 |
| 100 | | 5 | 0.48000 | 0.40000 | 0.60000 | 0.10954 | 0.76526 | 0.68472 | 0.88608 | 0.11029 |

**Graphics**



# CETIS Analysis Detail

**Plant Chronic test** — CH2M Hill

| Endpoint | Analysis Type | Sample Link | Control Link | Date Analyzed | Version |
|---|---|---|---|---|---|
| AG Average Dry Wt. | Comparison | 01-8369-8444 | 01-8369-8444 | 10 Mar-06 3:43 PM | CETISv1.1.2 |

| Method | Alt H | Data Transform | Zeta | NOEL | LOEL | Toxic Units | ChV | PMSD |
|---|---|---|---|---|---|---|---|---|
| Equal Variance t Two-Sample | C > T | Untransformed | | 100 | >100 | 1 | N/A | 42.47% |

**Group Comparisons**

| Control | vs | Conc-% | Statistic | Critical | P-Value | MSD | Decision(0.05) |
|---|---|---|---|---|---|---|---|
| Dilution Water | | 100 | 1.30792 | 1.85955 | 0.1136 | 5.24509 | Non-Significant Effect |

**ANOVA Table**

| Source | Sum of Squares | Mean Square | DF | F Statistic | P-Value | Decision(0.05) |
|---|---|---|---|---|---|---|
| Between | 34.02485 | 34.02485 | 1 | 1.71 | 0.22723 | Non-Significant Effect |
| Error | 159.1186 | 19.88983 | 8 | | | |
| Total | 193.143456 | 53.914675 | 9 | | | |

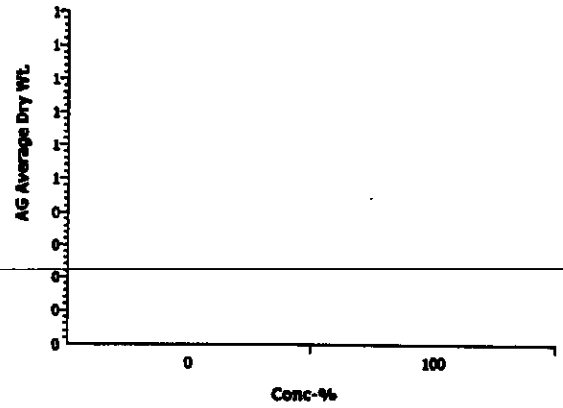
**ANOVA Assumptions**

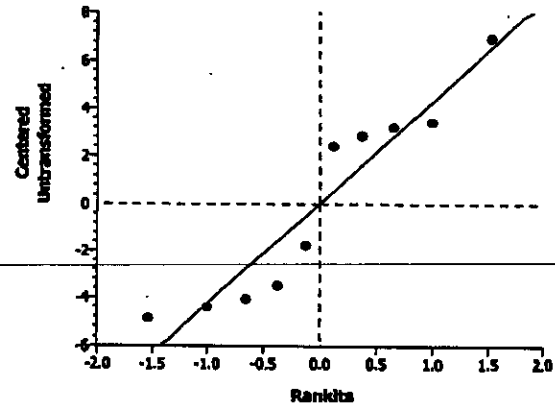
| Attribute | Test | Statistic | Critical | P-Value | Decision(0.01) |
|---|---|---|---|---|---|
| Variances | Variance Ratio F | 1.34066 | 23.15450 | 0.78323 | Equal Variances |
| Distribution | Shapiro-Wilk W | 0.88302 | | 0.14132 | Normal Distribution |

**Data Summary**

| | | | Original Data | | | | Transformed Data | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Conc-% | Control Type | Count | Mean | Minimum | Maximum | SD | Mean | Minimum | Maximum | SD |
| 0 | Dilution Water | 5 | 12.351 | 7.9275 | 19.276 | 4.7733 | | | | |
| 100 | | 5 | 8.6617 | 3.7850 | 12.067 | 4.1225 | | | | |

**Graphics**



# CETIS Analysis Detail

| Plant Chronic test | | | | | | CH2M Hill |
|---|---|---|---|---|---|---|
| **Endpoint** | **Analysis Type** | **Sample Link** | **Control Link** | **Date Analyzed** | **Version** | |
| AG Average Height | Comparison | 01-8369-8444 | 01-8369-8444 | 10 Mar-06 3:43 PM | CETISv1.1.2 | |

| Method | Alt H | Data Transform | Zeta | NOEL | LOEL | Toxic Units | ChV | PMSD |
|---|---|---|---|---|---|---|---|---|
| Equal Variance t Two-Sample | C > T | Untransformed | | 100 | >100 | 1 | N/A | 42.66% |

**Group Comparisons**

| Control | vs | Conc-% | Statistic | Critical | P-Value | MSD | Decision(0.05) |
|---|---|---|---|---|---|---|---|
| Dilution Water | | 100 | -2.3954 | 1.85955 | 0.9783 | 4.53357 | Non-Significant Effect |

**ANOVA Table**

| Source | Sum of Squares | Mean Square | DF | F Statistic | P-Value | Decision(0.05) |
|---|---|---|---|---|---|---|
| Between | 85.264 | 85.264 | 1 | 5.74 | 0.04349 | Significant Effect |
| Error | 118.8764 | 14.85956 | 8 | | | |
| Total | 204.140442 | 100.12356 | 9 | | | |

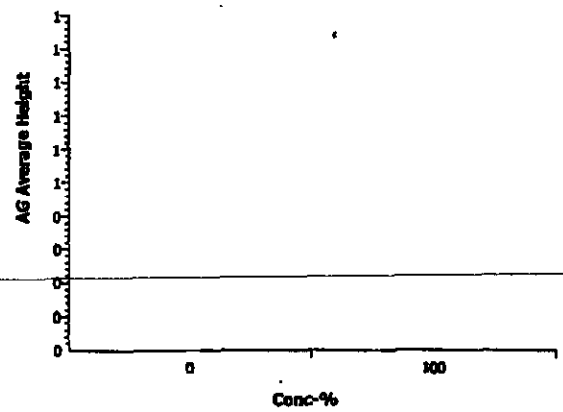
**ANOVA Assumptions**

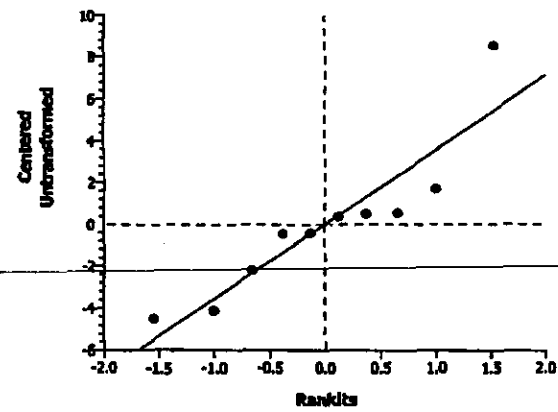
| Attribute | Test | Statistic | Critical | P-Value | Decision(0.01) |
|---|---|---|---|---|---|
| Variances | Variance Ratio F | 12.95118 | 23.15450 | 0.02935 | Equal Variances |
| Distribution | Shapiro-Wilk W | 0.86399 | | 0.08503 | Normal Distribution |

**Data Summary**

| | | | Original Data | | | | Transformed Data | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Conc-% | Control Type | Count | Mean | Minimum | Maximum | SD | Mean | Minimum | Maximum | SD |
| 0 | Dilution Water | 5 | 10.627 | 8.4 | 12.333 | 1.4585 | | | | |
| 100 | | 5 | 16.467 | 12 | 25 | 5.2525 | | | | |

**Graphics**



# CETIS Analysis Detail

| Plant Chronic test | | | | | CH2M Hill |
|---|---|---|---|---|---|
| **Endpoint** | **Analysis Type** | **Sample Link** | **Control Link** | **Date Analyzed** | **Version** |
| AG Average Wet Wt. | Comparison | 01-8369-8444 | 01-8369-8444 | 10 Mar-06 3:43 PM | CETISv1.1.2 |

| Method | Alt H | Data Transform | Zeta | NOEL | LOEL | Toxic Units | ChV | PMSD |
|---|---|---|---|---|---|---|---|---|
| Equal Variance t Two-Sample | C > T | Untransformed | | 100 | >100 | 1 | N/A | 40.33% |

**Group Comparisons**

| Control | vs | Conc-% | Statistic | Critical | P-Value | MSD | Decision(0.05) |
|---|---|---|---|---|---|---|---|
| Dilution Water | | 100 | 0.93097 | 1.85955 | 0.1896 | 25.7707 | Non-Significant Effect |

**ANOVA Table**

| Source | Sum of Squares | Mean Square | DF | F Statistic | P-Value | Decision(0.05) |
|---|---|---|---|---|---|---|
| Between | 416.1495 | 416.1495 | 1 | 0.87 | 0.37911 | Non-Significant Effect |
| Error | 3841.203 | 480.1504 | 8 | | | |
| Total | 4257.35239 | 896.29987 | 9 | | | |

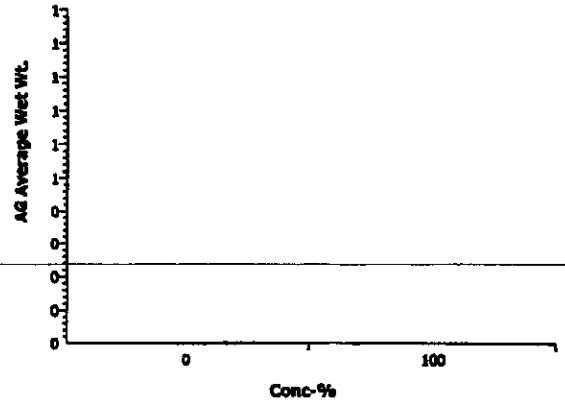
**ANOVA Assumptions**

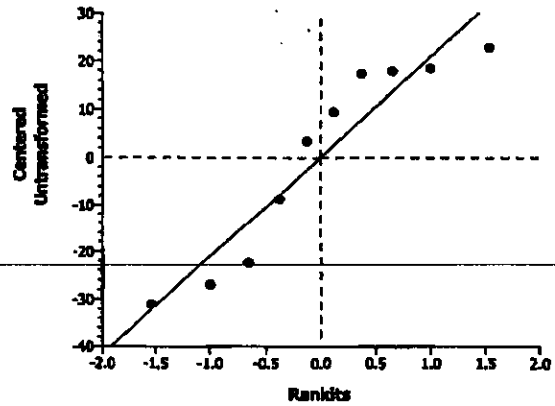
| Attribute | Test | Statistic | Critical | P-Value | Decision(0.01) |
|---|---|---|---|---|---|
| Variances | Variance Ratio F | 2.77655 | 23.15450 | 0.34643 | Equal Variances |
| Distribution | Shapiro-Wilk W | 0.87112 | | 0.10300 | Normal Distribution |

**Data Summary**

| | | | Original Data | | | | Transformed Data | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Conc-% | Control Type | Count | Mean | Minimum | Maximum | SD | Mean | Minimum | Maximum | SD |
| 0 | Dilution Water | 5 | 63.903 | 41.475 | 82.338 | 15.946 | | | | |
| 100 | | 5 | 51.001 | 19.99 | 73.76 | 26.571 | | | | |

**Graphics**



# CETIS Analysis Detail

**Plant Chronic test** — CH2M Hill

| Endpoint | Analysis Type | Sample Link | Control Link | Date Analyzed | Version |
|---|---|---|---|---|---|
| Root Average Dry Wt. | Comparison | 01-8369-8444 | 01-8369-8444 | 10 Mar-06 3:43 PM | CETISv1.1.2 |

| Method | Alt H | Data Transform | Zeta | NOEL | LOEL | Toxic Units | ChV | PMSD |
|---|---|---|---|---|---|---|---|---|
| Equal Variance t Two-Sample | C > T | Untransformed | | 100 | >100 | 1 | N/A | 48.68% |

**Group Comparisons**

| Control | vs | Conc-% | Statistic | Critical | P-Value | MSD | Decision(0.05) |
|---|---|---|---|---|---|---|---|
| Dilution Water | | 100 | 1.36331 | 1.85955 | 0.1050 | 3.82955 | Non-Significant Effect |

**ANOVA Table**

| Source | Sum of Squares | Mean Square | DF | F Statistic | P-Value | Decision(0.05) |
|---|---|---|---|---|---|---|
| Between | 19.70663 | 19.70663 | 1 | 1.86 | 0.20991 | Non-Significant Effect |
| Error | 84.82246 | 10.60281 | 8 | | | |
| Total | 104.529087 | 30.309438 | 9 | | | |

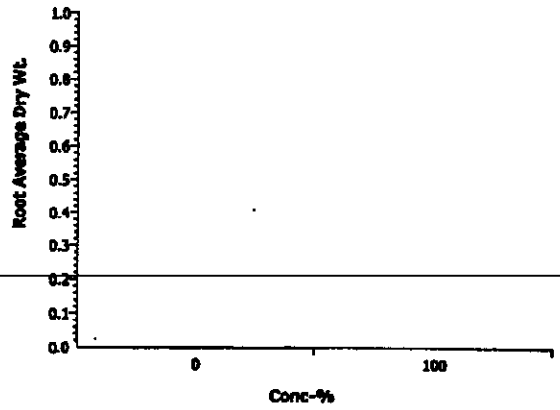
**ANOVA Assumptions**

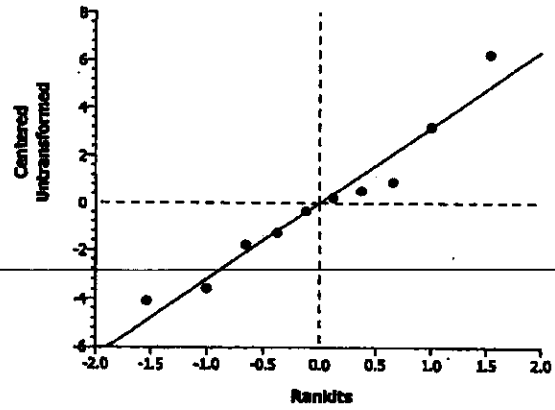
| Attribute | Test | Statistic | Critical | P-Value | Decision(0.01) |
|---|---|---|---|---|---|
| Variances | Variance Ratio F | 4.52895 | 23.15450 | 0.17261 | Equal Variances |
| Distribution | Shapiro-Wilk W | 0.94997 | | 0.66819 | Normal Distribution |

**Data Summary**

| | | | Original Data | | | | Transformed Data | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Conc-% | Control Type | Count | Mean | Minimum | Maximum | SD | Mean | Minimum | Maximum | SD |
| 0 | Dilution Water | 5 | 7.8666 | 3.78 | 14.108 | 4.1678 | | | | |
| 100 | | 5 | 5.059 | 3.27 | 8.265 | 1.9584 | | | | |

**Graphics**



# CETIS Analysis Detail

**Plant Chronic test** — CH2M Hill

| Endpoint | Analysis Type | Sample Link | Control Link | Date Analyzed | Version |
|---|---|---|---|---|---|
| Root Average Length | Comparison | 01-8369-8444 | 01-8369-8444 | 10 Mar-06 3:43 PM | CETISv1.1.2 |

| Method | Alt H | Data Transform | Zeta | NOEL | LOEL | Toxic Units | ChV | PMSD |
|---|---|---|---|---|---|---|---|---|
| Equal Variance t Two-Sample | C > T | Untransformed | | 100 | >100 | 1 | N/A | 29.97% |

**Group Comparisons**

| Control | vs | Conc-% | Statistic | Critical | P-Value | MSD | Decision(0.05) |
|---|---|---|---|---|---|---|---|
| Dilution Water | | 100 | -1.8327 | 1.85955 | 0.9479 | 8.53005 | Non-Significant Effect |

**ANOVA Table**

| Source | Sum of Squares | Mean Square | DF | F Statistic | P-Value | Decision(0.05) |
|---|---|---|---|---|---|---|
| Between | 176.6801 | 176.6801 | 1 | 3.36 | 0.10421 | Non-Significant Effect |
| Error | 420.8409 | 52.60511 | 8 | | | |
| Total | 597.520996 | 229.28522 | 9 | | | |

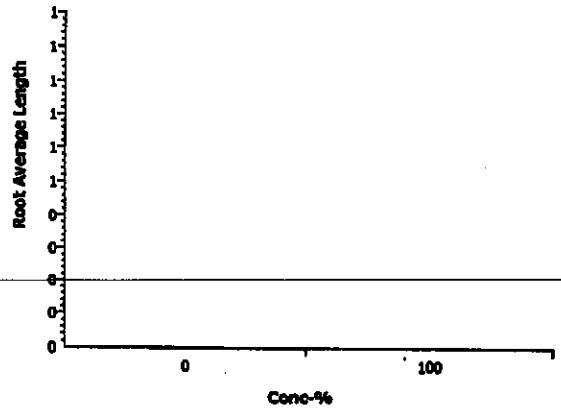
**ANOVA Assumptions**

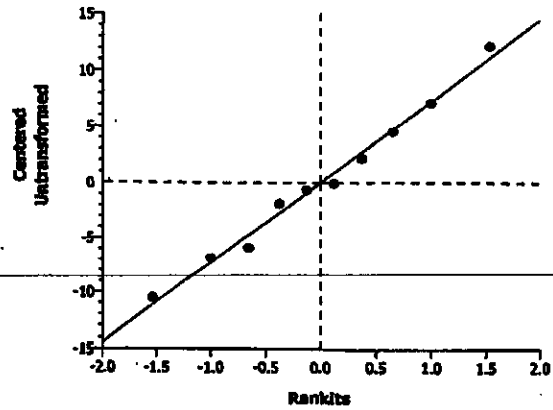
| Attribute | Test | Statistic | Critical | P-Value | Decision(0.01) |
|---|---|---|---|---|---|
| Variances | Variance Ratio F | 5.88188 | 23.15450 | 0.11442 | Equal Variances |
| Distribution | Shapiro-Wilk W | 0.98660 | | 0.99071 | Normal Distribution |

**Data Summary**

| | | | Original Data | | | | Transformed Data | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Conc-% | Control Type | Count | Mean | Minimum | Maximum | SD | Mean | Minimum | Maximum | SD |
| 0 | Dilution Water | 5 | 28.46 | 22.5 | 33 | 3.91 | | | | |
| 100 | | 5 | 36.867 | 26.333 | 49 | 9.4827 | | | | |

**Graphics**



# CETIS Analysis Detail

**Plant Chronic test** — CH2M Hill

| Endpoint | Analysis Type | Sample Link | Control Link | Date Analyzed | Version |
|---|---|---|---|---|---|
| Root Average Wet Wt. | Comparison | 01-8369-8444 | 01-8369-8444 | 10 Mar-06 3:43 PM | CETISv1.1.2 |

| Method | Alt H | Data Transform | Zeta | NOEL | LOEL | Toxic Units | ChV | PMSD |
|---|---|---|---|---|---|---|---|---|
| Equal Variance t Two-Sample | C > T | Untransformed | | 100 | >100 | 1 | N/A | 45.20% |

**Group Comparisons**

| Control | vs | Conc-% | Statistic | Critical | P-Value | MSD | Decision(0.05) |
|---|---|---|---|---|---|---|---|
| Dilution Water | | 100 | 0.81841 | 1.85955 | 0.2184 | 51.1856 | Non-Significant Effect |

**ANOVA Table**

| Source | Sum of Squares | Mean Square | DF | F Statistic | P-Value | Decision(0.05) |
|---|---|---|---|---|---|---|
| Between | 1268.721 | 1268.721 | 1 | 0.67 | 0.43682 | Non-Significant Effect |
| Error | 15153.4 | 1894.175 | 8 | | | |
| Total | 16422.1190 | 3162.8954 | 9 | | | |

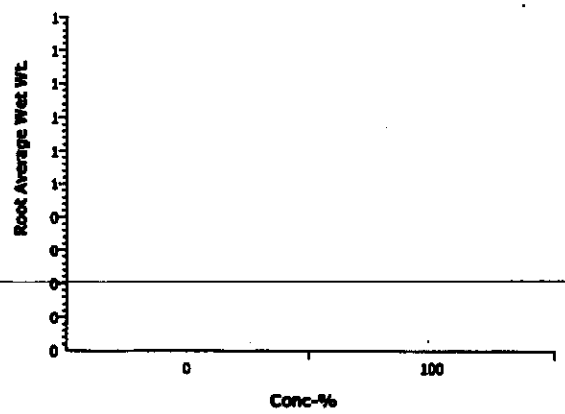
**ANOVA Assumptions**

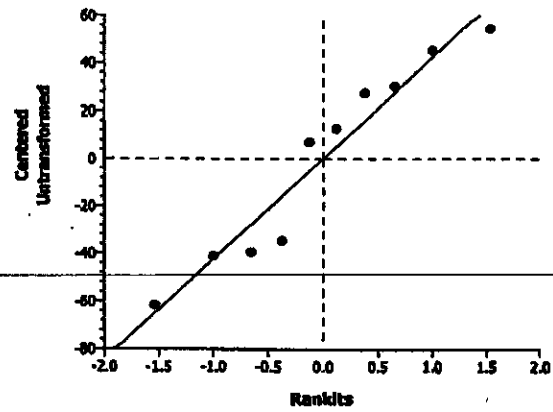
| Attribute | Test | Statistic | Critical | P-Value | Decision(0.01) |
|---|---|---|---|---|---|
| Variances | Variance Ratio F | 1.54599 | 23.15450 | 0.68325 | Equal Variances |
| Distribution | Shapiro-Wilk W | 0.91570 | | 0.32247 | Normal Distribution |

**Data Summary**

| | | | Original Data | | | | Transformed Data | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Conc-% | Control Type | Count | Mean | Minimum | Maximum | SD | Mean | Minimum | Maximum | SD |
| 0 | Dilution Water | 5 | 113.23 | 51.638 | 158.52 | 47.962 | | | | |
| 100 | | 5 | 90.707 | 51.115 | 145.1 | 38.574 | | | | |

**Graphics**



# CETIS Analysis Detail

**Plant Chronic test** — CH2M Hill

| Endpoint | Analysis Type | Sample Link | Control Link | Date Analyzed | Version |
|---|---|---|---|---|---|
| Total Average Biomass Dry Wt. | Comparison | 01-8369-8444 | 01-8369-8444 | 10 Mar-06 3:43 PM | CETISv1.1.2 |

| Method | Alt H | Data Transform | Zeta | NOEL | LOEL | Toxic Units | ChV | PMSD |
|---|---|---|---|---|---|---|---|---|
| Equal Variance t Two-Sample | C > T | Untransformed | | 100 | >100 | 1 | N/A | 43.16% |

**Group Comparisons**

| Control | vs | Conc-% | Statistic | Critical | P-Value | MSD | Decision(0.05) |
|---|---|---|---|---|---|---|---|
| Dilution Water | | 100 | 1.38453 | 1.85955 | 0.1018 | 8.72574 | Non-Significant Effect |

**ANOVA Table**

| Source | Sum of Squares | Mean Square | DF | F Statistic | P-Value | Decision(0.05) |
|---|---|---|---|---|---|---|
| Between | 105.52 | 105.52 | 1 | 1.92 | 0.20359 | Non-Significant Effect |
| Error | 440.3715 | 55.04644 | 8 | | | |
| Total | 545.891441 | 160.56639 | 9 | | | |

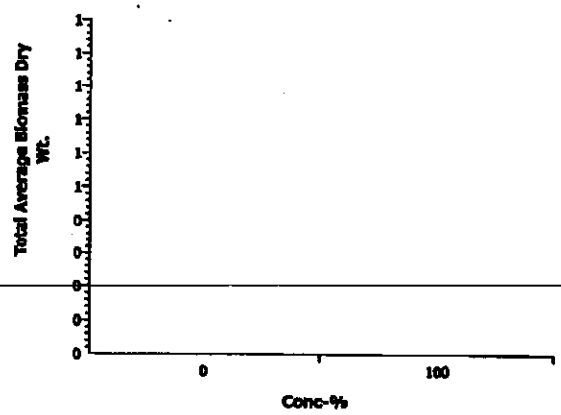
**ANOVA Assumptions**

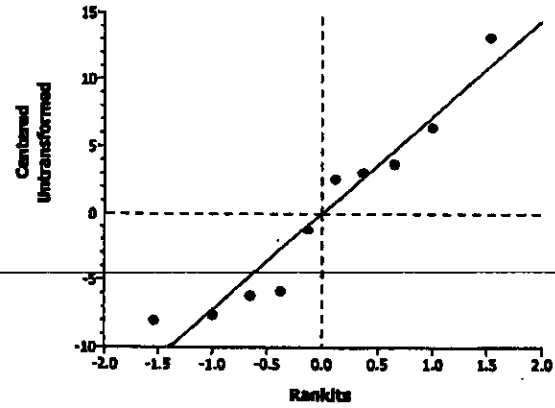
| Attribute | Test | Statistic | Critical | P-Value | Decision(0.01) |
|---|---|---|---|---|---|
| Variances | Variance Ratio F | 2.39308 | 23.15450 | 0.41876 | Equal Variances |
| Distribution | Shapiro-Wilk W | 0.91918 | | 0.35017 | Normal Distribution |

**Data Summary**

| | | | Original Data | | | | Transformed Data | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Conc-% | Control Type | Count | Mean | Minimum | Maximum | SD | Mean | Minimum | Maximum | SD |
| 0 | Dilution Water | 5 | 20.217 | 12.223 | 33.384 | 8.8117 | | | | |
| 100 | | 5 | 13.721 | 7.5450 | 20.11 | 5.6962 | | | | |

**Graphics**



# CETIS Analysis Detail

**Plant Chronic test** — **CH2M Hill**

| Endpoint | Analysis Type | Sample Link | Control Link | Date Analyzed | Version |
|---|---|---|---|---|---|
| Total Average Biomass Wet Wt. | Comparison | 01-8369-8444 | 01-8369-8444 | 10 Mar-06 3:43 PM | CETISv1.1.2 |

| Method | Alt H | Data Transform | Zeta | NOEL | LOEL | Toxic Units | ChV | PMSD |
|---|---|---|---|---|---|---|---|---|
| Equal Variance t Two-Sample | C > T | Untransformed | | 100 | >100 | 1 | N/A | 40.21% |

**Group Comparisons**

| Control | vs | Conc-% | Statistic | Critical | P-Value | MSD | Decision(0.05) |
|---|---|---|---|---|---|---|---|
| Dilution Water | | 100 | 0.92492 | 1.85955 | 0.1910 | 71.2307 | Non-Significant Effect |

**ANOVA Table**

| Source | Sum of Squares | Mean Square | DF | F Statistic | P-Value | Decision(0.05) |
|---|---|---|---|---|---|---|
| Between | 3138.11 | 3138.11 | 1 | 0.86 | 0.38206 | Non-Significant Effect |
| Error | 29346.01 | 3668.251 | 8 | | | |
| Total | 32484.1157 | 6806.3606 | 9 | | | |

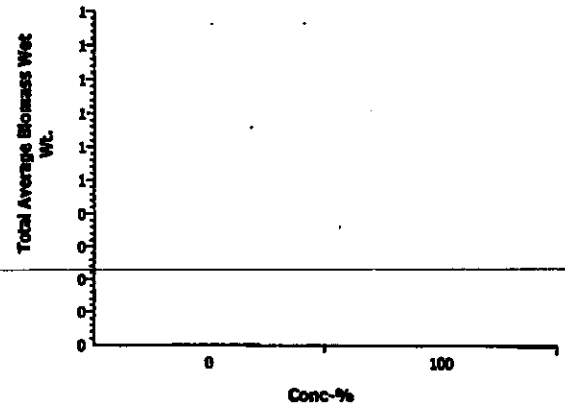
**ANOVA Assumptions**

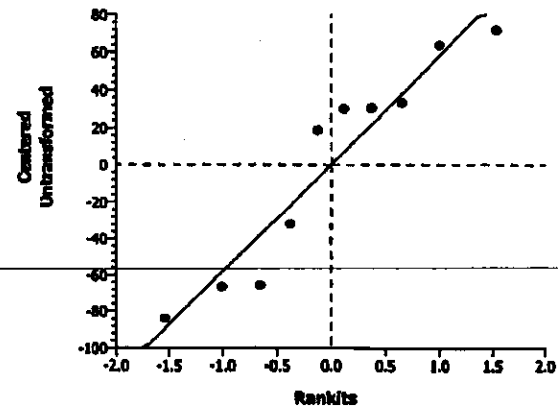
| Attribute | Test | Statistic | Critical | P-Value | Decision(0.01) |
|---|---|---|---|---|---|
| Variances | Variance Ratio F | 1.15620 | 23.15450 | 0.89153 | Equal Variances |
| Distribution | Shapiro-Wilk W | 0.88991 | | 0.16917 | Normal Distribution |

**Data Summary**

| | | | Original Data | | | | Transformed Data | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Conc-% | Control Type | Count | Mean | Minimum | Maximum | SD | Mean | Minimum | Maximum | SD |
| 0 | Dilution Water | 5 | 177.14 | 93.113 | 240.86 | 58.331 | | | | |
| 100 | | 5 | 141.71 | 75.185 | 213.4 | 62.721 | | | | |

**Graphics**



# APPENDIX B
# CHAIN OF CUSTODY

E 2748

| Washington Closure Hanford | CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST | RC-051-3 | Page 1 of 1 |
|---|---|---|---|

| | | | |
|---|---|---|---|
| Collector<br>L. COLLOM | 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>600-131 | | SAF No.<br>RC-051 |
| Ice Chest No. | Field Logbook No.<br>EL-1596 | COA<br>BESRAS6520 | Method of Shipment |
| Shipped To<br>CH2MHILL | Offsite Property No.<br>A060151 | | Bill of Lading/Air Bill No. |

Price Code 8L

Air Quality [ ]

Data Turnaround 45 Days

POSSIBLE SAMPLE HAZARDS/REMARKS

*NONE*

Special Handling and/or Storage

*NONE*

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Preservation | None | None | | | | | | | | | |
| Type of Container | G/P | P/G | | | | | | | | | |
| No. of Container(s) | 1 | 1 | | | | | | | | | |
| Volume | 1000g | ~~2000g~~ 4000g | | | | | | | | | |

SAMPLE ANALYSIS

11-1-05 LRC

| Sample No. | Matrix * | Sample Date | Sample Time | See item (1) in Special Instructions | Soil Plant Toxicity ASTM E1963; Soil Nematode Toxicity ASTM E2172 | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ~~J10DV0~~ J10DW4 | SOIL | 10-31-05 | 1530 | X | X | | | | | | | | |
| ~~J10DW0~~ | SOIL | | | | | | | | | | | | |
| ~~J10DW1~~ | SOIL | | | | | | | | | | | | |
| ~~J10DW2~~ | SOIL | | | | | | | | | | | | |
| ~~J10DW3~~ | SOIL | | | | | | | | | | | | |

| CHAIN OF POSSESSION | | Sign/Print Names | |
|---|---|---|---|
| Relinquished By/Removed From | Date/Time 11-1-05 0900 | Received By/Stored In | Date/Time 11-1-05 10:35 |
| 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

(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

Bioassay ID = B1542-01

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)

E 2801

| Washington Closure Hanford | CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST | RC-051-4 | Page 1 of 1 |
|---|---|---|---|

| | | | |
|---|---|---|---|
| Collector<br>L. COLLOM | 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>PIT 23 | | SAF No.<br>RC-051 |
| Ice Chest No. | Field Logbook No.<br>EL-1596 | COA<br>BESRAS6520 | Method of Shipment |
| Shipped To<br>CH2MHILL | Offsite Property No.<br>A060151 | | Bill of Lading/Air Bill No. |

Price Code 8L

Air Quality [ ]

Data Turnaround 45 Days

POSSIBLE SAMPLE HAZARDS/REMARKS

*NONE*

Special Handling and/or Storage

*NONE*

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Preservation | None | None | | | | | | | | | |
| Type of Container | G/P | P/G | | | | | | | | | |
| No. of Container(s) | 1 | 1 | | | | | | | | | |
| Volume | 1000g | ~~3000g~~ 1000g ST 11-8-5 | | | | | | | | | |
| 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 | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| J10DV4 | SOIL | 11-8-05 | 16:00 | 1 | 1 | | | | | | | | -1 |
| J10DV5 | SOIL | | | | | | | | | | | | |
| J10DV6 | SOIL | | | | | | | | | | | | |
| J10DV7 | SOIL | | | | | | | | | | | | |
| J10DV8 | SOIL | | | | | | | | | | | | |

| CHAIN OF POSSESSION | Sign/Print Names | | |
|---|---|---|---|
| Relinquished By/Removed From | Date/Time | Received By/Stored In | Date/Time |
| Elizabeth M Tolfs | 11-9-05 12:00 | [illegible] | 11-9-05 12:35 |
| 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

This chain of custody form documents the transfer of bulk field collected soils to the CH2M Hill Corvallis laboratory for incremental preparation and aliquoting.

(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

-1 ST 11/10/05 As per Rich Weisz

Bioassay ID = B1542-02

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)

E2P31

| Washington Closure Hanford | CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST | | RC-051-9 | Page 1 of 1 |
|---|---|---|---|---|
| Collector<br>L. COLLOM | 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>Upland Backfill Elevated-100-F-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 | |
| Shipped To<br>CH2MHILL | Offsite Property No.<br>A060151 | | Bill of Lading/Air Bill No. | |

POSSIBLE SAMPLE HAZARDS/REMARKS

*Potentially Radioactive.*

Special Handling and/or Storage

*NONE*

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 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 | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| H10DT8 | SOIL | 11/14/05 | 17:21 | 1 | 1 | | | | | | | |
| | | | | | | | | | | | | |
| | | | | | | | | | | | | |
| | | | | | | | | | | | | |
| | | | | | | | | | | | | |

| CHAIN OF POSSESSION | | Sign/Print Names | |
|---|---|---|---|
| Relinquished By/Removed From<br>Elizabeth Tepper | Date/Time 11/15/05 11:30 | Received By/Stored In<br>Davina Kaumann | Date/Time 11/15/05 11:01 |
| Relinquished By/Removed From<br>Elizabeth Tepper | 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

(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

Bioassay ID = B1542-03

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

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

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

E 2846

| Washington Closure Hanford | CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST | RC-051-15 | Page 1 of 1 |
|---|---|---|---|
| Collector: L.ICOLLOM | Company Contact: JOAN KESSNER; Telephone No.: 375-4688 | Project Coordinator: KESSNER, JH | Price Code: 8L; Data Turnaround: 45 Days |
| Project Designation: 100 & 300 Area Component of the RCBRA - Incremental So | Sampling Location: Upland Native Reference-Central Plateau | SAF No.: RC-051 | Air Quality: |
| Ice Chest No. | Field Logbook No.: EL-1596; COA: BESRAS6520 | Method of Shipment | |
| Shipped To: CH2MHILL | Offsite Property No.: A060153 | Bill of Lading/Air Bill No. | |

POSSIBLE SAMPLE HAZARDS/REMARKS
*NONE*

Special Handling and/or Storage
*NONE*

| SAMPLE ANALYSIS | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Preservation | None | None | | | | | | | | |
| | | | Type of Container | G/P | P/G | | | | | | | | |
| | | | No. of Container(s) | 1 | 1 | | | | | | | | |
| | | | Volume | 1000g | 4000g | | | | | | | | |
| | | | See item (1) in Special Instructions. | | Soil Plant Toxicity ASTM E1963; Soil Nematode Toxicity ASTM E2172 | | | | | | | | |
| Sample No. | Matrix * | Sample Date | Sample Time | | | | | | | | | | |
| J10DV2 | SOIL | 11-15-05 | 20:00 | 1 | 1 | | | | | | | | -1 |

| CHAIN OF POSSESSION | Date/Time | Sign/Print Names. Received By/Stored In | Date/Time |
|---|---|---|---|
| Relinquished By/Removed From: Elizabeth Teppler | CH2MHill 14:30 | Received By/Stored In: NA | |
| Relinquished By/Removed From: Elizabeth Teppler | 11-16-05 | Received By/Stored In: [illegible] CH2MHill | 11/16/05 14:31 |
| 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
This chain of custody form documents the transfer of bulk field collected soils to the CH2M Hill Corvallis laboratory for incremental preparation and aliquoting.

(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

Bioassay ID = B1542-04

Matrix *
S=Soil
SB=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 |

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

E 2847

| Washington Closure Hanford | CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST | | RC-051-12 | Page 1 of 1 |
|---|---|---|---|---|
| Collector: L. COLLOM | Company Contact: JOAN KESSNER | Telephone No.: 375-4688 | Project Coordinator: KESSNER, JH | Price Code: 8L — Data Turnaround: 45 Days |
| Project Designation: 100 & 300 Area Component of the RCBRA - Incremental So | Sampling Location: Upland Backfill Low-116-DR-1&2 | | SAF No.: RC-051 | Air Quality |
| Ice Chest No. | Field Logbook No.: EL-1596 | COA: BESRAS6520 | Method of Shipment | |
| Shipped To: CH2MHILL | Offsite Property No.: A060151 | | Bill of Lading/Air Bill No. | |

POSSIBLE SAMPLE HAZARDS/REMARKS

*NONE*

Special Handling and/or Storage

*NONE*

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 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 | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| J10DV1 | SOIL | 11-15-05 | 2015 | 1 | 1 | | | | | | | | -1 |
| | | | | | | | | | | | | | |
| | | | | | | | | | | | | | |
| | | | | | | | | | | | | | |
| | | | | | | | | | | | | | |

| CHAIN OF POSSESSION | Date/Time | Sign/Print Names: Received By/Stored In | Date/Time |
|---|---|---|---|
| Relinquished By/Removed From: CH2MHILL Elizabeth Tepper | 14:30 | NP | |
| Relinquished By/Removed From: Elizabeth Tepper | 11-16-05 | CH2MHILL | |
| Relinquished By/Removed From | Date/Time | Received By/Stored In | Date/Time 11/16/05 14:31 |
| 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

This chain of custody form documents the transfer of bulk field collected soils to the CH2M Hill Corvallis laboratory for incremental preparation and aliquoting.

(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

Bioassay ID = B1542-05

Matrix *

S=Soil
SE=Sediment
SO=Solid
SL=Sludge
W = Water
O=Oil
A=Air
DS=Dried Solids
DL=Dried 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 |

CHI-[illegible]011 (08/29/2005)

E2857

| Washington Closure Hanford | CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST | RC-051-16 | Page 1 of 1 |
|---|---|---|---|

| | | | |
|---|---|---|---|
| Collector<br>L. COLLOM | 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>Upland Native Elevated-JA Jones | | SAF No.<br>RC-051 |
| Ice Chest No. | Field Logbook No.<br>EL-1596 | COA<br>BESRAS6520 | Method of Shipment |
| Shipped To<br>CH2MHILL | Offsite Property No.<br>A060151 | | Bill of Lading/Air Bill No. |

Price Code 8L

Air Quality

Data Turnaround 45 Days

POSSIBLE SAMPLE HAZARDS/REMARKS

*NONE*

Special Handling and/or Storage

*NONE*

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 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 | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| J10DV3 | SOIL | 11/16/05 | 15:27 | 1 | 1 | | | | | | | | |
| | | | | | | | | | | | | | |
| | | | | | | | | | | | | | |
| | | | | | | | | | | | | | |
| | | | | | | | | | | | | | |

| CHAIN OF POSSESSION | Date/Time | Sign/Print Names | Date/Time |
|---|---|---|---|
| Relinquished By/Removed From<br>Elizabeth Tepper | 11/17/05 10:00 | Received By/Stored In<br>NA | |
| Relinquished By/Removed From<br>Elizabeth Tepper CH2MHill | | Received By/Stored In<br>Melody Becker | 11/17/05 10:15 |
| Relinquished By/Removed From | | Received By/Stored In | |
| Relinquished By/Removed From | | Received By/Stored In | |
| Relinquished By/Removed From | | Received By/Stored In | |
| Relinquished By/Removed From | | Received By/Stored In | |

SPECIAL INSTRUCTIONS

This chain of custody form documents the transfer of bulk field collected soils to the CH2M Hill Corvallis laboratory for incremental preparation and aliquoting.

(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

Bioassay ID = B1542-06

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)

E2877

| Washington Closure Hanford | CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST | RC-051-11 | Page 1 of 1 |
|---|---|---|---|

| | | | |
|---|---|---|---|
| Collector: L. COLLOM | Company Contact: JOAN KESSNER | Telephone No.: 375-4688 | Project Coordinator: KESSNER, JH |
| Price Code: 8L | Data Turnaround: 45 Days | Air Quality: | |
| Project Designation: 100 & 300 Area Component of the RCBRA - Incremental So | Sampling Location: Riparian Elevated-Site #3 Upriver 100-D | SAF No.: RC-051 | |
| Ice Chest No. | Field Logbook No.: EL-1596 | COA: BESRAS6520 | Method of Shipment |
| Shipped To: CH2MHILL | Offsite Property No.: A060151 | | Bill of Lading/Air Bill No. |

**POSSIBLE SAMPLE HAZARDS/REMARKS**

*NONE*

**Special Handling and/or Storage**

*NONE*

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Preservation | None | None | | | | | | | | | |
| Type of Container | G/P | P/G | | | | | | | | | |
| No. of Container(s) | 1 | 1 | | | | | | | | | |
| Volume | 1000g | ~~3000g~~ 4000g | ET 11-21-05 | | | | | | | | |
| 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 | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| J10DV0 | SOIL | 11-21-05 | 16:00 | 1 | 1 | | | | | | | | |
| | | | | | | | | | | | | | |
| | | | | | | | | | | | | | |
| | | | | | | | | | | | | | |
| | | | | | | | | | | | | | |

| CHAIN OF POSSESSION | Sign/Print Names | | |
|---|---|---|---|
| Relinquished By/Removed From | Date/Time | Received By/Stored In | Date/Time |
| Elizabeth Tepper CH2MHill | | | |
| Relinquished By/Removed From | Date/Time 9:00 | Received By/Stored In | Date/Time |
| Elizabeth M Tepper | 11/22/05 | | 11/22/05 |
| Relinquished By/Removed From | Date/Time | Received By/Stored In | Date/Time 9:01 |
| 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**

This chain of custody form documents the transfer of bulk field collected soils to the CH2M Hill Corvallis laboratory for incremental preparation and aliquoting.

(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

Bioassay ID = B1542-07

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-0 (9/29/2005)

E2897 E2897

| Washington Closure Hanford | CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST | RC-051-20 | Page 1 of 1 |
|---|---|---|---|

| | | | |
|---|---|---|---|
| Collector: L. COLLOM | Company Contact: JOAN KESSNER | Telephone No.: 375-4688 | Project Coordinator: KESSNER, JH |
| Project Designation: 100 & 300 Area Component of the RCBRA - Incremental So | Sampling Location: Riparian Low-Site#10 Downriver 100-D | | SAF No.: RC-051 |
| Ice Chest No. | Field Logbook No.: EL-1596 | COA: BESRAS6520 | Method of Shipment |
| Shipped To: CH2MHILL | Offsite Property No.: A060151 | | Bill of Lading/Air Bill No. |

Price Code: 8L — Data Turnaround: 45 Days — Air Quality:

**POSSIBLE SAMPLE HAZARDS/REMARKS**

*NONE*

**Special Handling and/or Storage**

*NONE*

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 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 | | | | | | | | | |

CT 11-28-05

| Sample No. | Matrix * | Sample Date | Sample Time | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| J10LJ5 | SOIL | 11-28-05 | ~~16:19~~ 16:19 | 1 | 1 | | | | | | | | -1 |
| | | | | | | | | | | | | | |
| | | | | | | | | | | | | | |
| | | | | | | | | | | | | | |
| | | | | | | | | | | | | | |

**CHAIN OF POSSESSION**

| Relinquished By/Removed From | Date/Time | Received By/Stored In | Date/Time |
|---|---|---|---|
| CH2MHill Elizabeth Tepper | 16:25 11-28-05 | Melody Buckles | 11-28-05 16:25 |
| 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**

This chain of custody form documents the transfer of bulk field collected soils to the CH2M Hill Corvallis laboratory for incremental preparation and aliquoting.

(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

Bioassay ID = B1542-08

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-0 3/29/2005)

E2953

| Washington Closure Hanford | CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST | RC-051-6 | Page 1 of 1 |
|---|---|---|---|

| | | | |
|---|---|---|---|
| Collector: L. COLLOM | Company Contact: JOAN KESSNER — Telephone No.: 375-4688 | Project Coordinator: KESSNER, JH | Price Code: 8L — Data Turnaround: 45 Days |
| Project Designation: 100 & 300 Area Component of the RCBRA - Incremental So | Sampling Location: Riparian Reference-Site #13 Vernita Bridge | SAF No.: RC-051 | Air Quality: ☐ |
| Ice Chest No. | Field Logbook No.: EL-1596 — COA: BESRAS6520 | Method of Shipment | |
| Shipped To: CH2MHILL | Offsite Property No.: A060151 | Bill of Lading/Air Bill No. | |

**POSSIBLE SAMPLE HAZARDS/REMARKS**

*NONE*

**Special Handling and/or Storage**

*NONE*

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Preservation | None | None | | | | | | | | | |
| Type of Container | G/P | P/G | | | | | | | | | |
| No. of Container(s) | 1 | 1 | ET 12 | | | | | | | | |
| Volume | 1000g | ~~5000g~~ 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 | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| J10DT9 | SOIL | 12-6-05 | 16:00 | X | X | | | | | | | | -1 |
| | | | | | | | | | | | | | |
| | | | | | | | | | | | | | |
| | | | | | | | | | | | | | |
| | | | | | | | | | | | | | |

| CHAIN OF POSSESSION | Sign/Print Names | | |
|---|---|---|---|
| Relinquished By/Removed From | Date/Time | Received By/Stored In | Date/Time |
| Elizabeth Tepper | | CH2M Hill | → |
| Relinquished By/Removed From | Date/Time | Received By/Stored In | Date/Time |
| Elizabeth M Tepper | 12/6/05 16:00 | [illegible] | 12-6-05 16:15 |
| 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**

This chain of custody form documents the transfer of bulk field collected soils to the CH2M Hill Corvallis laboratory for incremental preparation and aliquoting.

(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

Bioassay ID = B1542-09

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-0 9/29/2005)

RECEIVED
MAR 2006

# BIOASSAY REPORT
## ACUTE SCREENING BIOASSAYS
**Conducted February 2 through 3**
**and February 13 though 14, 2006**

Prepared for

ELR CONSULTING, INC.
WASHINGTON CLOSURE HANFORD

Prepared by

CH2M HILL
2300 NW Walnut Boulevard
Corvallis, Oregon 97330

March 3, 2006
Lab I.D. Nos. BN1542-01 thru 09
SDG Number BN1542



E2847

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## 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. The tests were conducted in two rounds from February 2 through 3, 2006, and February 13 through 14, 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 October 31, 2005, through December 6, 2005. 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 |
|---|---|---|---|---|
| J10DW4 | 10/31/2005 | 600-131 | BN1542-01 | E2748 |
| J10DV4 | 11/08/2005 | PIT 23 | BN1542-02 | E2801 |
| J10DT8 | 11/14/2005 | Upland Backfill Elevated-100-F-2 | BN1542-03 | E2831 |
| J10DV2 | 11/15/2005 | Upland Native Reference-Central Plateau | BN1542-04 | E2846 |
| J10DV1 | 11/15/2005 | Upland Backfill Low-116-DR-1&2 | BN1542-05 | E2847 |
| J10DV3 | 11/16/2005 | Upland Native Elevated-JA Jones | BN1542-06 | E2857 |
| J10DV0 | 11/21/2005 | Riparian Elevated-Site #3 Upriver 100-D | BN1542-07 | E2877 |
| J10LJ5 | 11/28/2005 | Riparin Low-Site #10 Downriver 100-D | BN1542-08 | E2897 |
| J10DT9 | 12/06/2005 | Riparian Reference-Site #13 Vernita Bridge | BN1542-09 | E2953 |

## 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 February 2, 2006.

**Table 2**
***Caenorhabditis elegans* Results**
**Test initiated on February 2, 2006**

| Client ID | Percent Survival | Percent Recovered |
|---|---|---|
| Control | 90.0 | 100 |
| J10DV1 | 63.3 [a] | 86.7 |
| J10DV3 | 90.0 | 97.7 |
| J10DV0 | 56.7 [a] | 90.0 |
| J10LJ5 | 80.0 | 96.7 |
| J10DT9 | 76.7 | 93.3 |

[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 J10DV3, J10LJ5, and J10DT9 samples and a statistically significant reduction in survival in the J10DV1 and J10DV0 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.

Table 3 summarizes the survival data for the nematode acute test initiated on February 13, 2006.

| Table 3<br>*Caenorhabditis elegans* Results<br>Test initiated on February 13, 2006 | | |
|---|---|---|
| **Client ID** | **Percent Survival** | **Percent Recovered** |
| Control | 90.0 | 96.7 |
| J10DW4 | 90.0 | 93.3 |
| J10DV4 | 83.3 | 86.7 |
| J10DT8 | 73.3 [a] | 83.3 |
| J10DV2 | 83.3 | 93.3 |

[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 J10DW4, J10DV4, and J10DV2 samples and a statistically significant reduction in survival in the J10DT8 sample 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 January 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) | 98.2 | 52.3 to 120.1 |

## 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. //TODE TOXICITY TEST SOIL QUALITY AND TEST CHAM..R ASSIGNMENT DATA

Client Hanford | Tech. 0 Hrs NJ 24 Hrs NJ | Beginning, Date 2-2-06 Time 0850
Sample Description see below | Time 0 Hrs 0850 24 Hrs 0835 | Ending, Date 2-3-06 Time 0835
Test Speci: *Caenorhabditis elegans* ID#: Nem007

| 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: |
|---|---|---|---|---|---|---|
| | | | | | | All test soils were dried during sampling process. |
| Lab Control | | | | 19.3 | 21.3 | Each test chamber has 2.33 g dry wt. soil + 0.93 ml Milli-Q water (40% of sry wt.). |
| E284701 | | | | 19.5 | 21.3 | Samples hydrated 7 days prior to test initiation. |
| E285701 | | | | 19.3 | 21.3 | * SAMPLES HAD ADDITIONAL 0.50 ml Milli-Q water on 1-31 / |
| E287701 | | | | 19.3 | 21.3 | covered edges w/ PARAFILM. Noted samples almost dry. |
| E289701 | | | | 19.3 | 21.3 | |
| E295301 | | | | 19.3 | 21.3 | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |

| Lab ID | Field ID | Replicate | Chamber # | Lab ID | Field ID | Replicate | Chamber # | Lab ID | Field ID | Replicate | Chamber # |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Lab Control | 70 grade Silica sand | A | 8 | E289701 | J10L55 | A | 11 | | | | 0 |
| Lab Control | 70 grade Silica sand | B | 18 | E289701 | 31542-09 | B | 13 | | | | 0 |
| Lab Control | 70 grade Silica sand | C | 3 | E289701 | | C | 4 | | | | 0 |
| E284701 | J10DV1 | A | 15 | E295301 | J10DT9 | A | 17 | | | | 0 |
| E284701 | 31542-05 | B | 14 | E295301 | 31542-09 | B | 9 | | | | 0 |
| E284701 | | C | 16 | E295301 | | C | 7 | | | | 0 |
| E285701 | J10DV3 | A | 2 | | | | 0 | | | | 0 |
| E285701 | 31542-06 | B | 5 | | | | 0 | | | | 0 |
| E285701 | | C | 6 | | | | 0 | | | | 0 |
| E287701 | J10DV0 | A | 1 | | | | 0 | | | | 0 |
| E287701 | 31542-07 | B | 12 | | | | 0 | | | | 0 |
| E287701 | | C | 10 | | | | 0 | | | | 0 |

CH2M HILL **NEMATODE TOXICITY TEST SURVIVAL DATA**

Client: Hanford
Sample Description: Lab ID#: see Assignment Data sheet
Test Species: *Caenorhabditis elegans* ID#: Nem 007

Beginning, Date 2-2-06 Time 0850
Ending, Date 2-3-06 Time 0835

Test Initiation: Tech: Tech: NJT Time: 0850

Test Termination: Tech: Tech: NJT Time: 0835

| Chamber Number | Start Count 0 | # alive found 24 hr | # dead found 24 hr | Comments: |
|---|---|---|---|---|
| 1 | 10 | 6 | 4 | long, thin nematode |
| 2 | 10 | 8 | 2 | found in both #1 and #2 |
| 3 | 10 | 9 | 1 | #4, #9, #11 - 9 foreign |
| 4 | 10 | 9 | 1 | nematodes found & not |
| 5 | 10 | 10 | 0 | included in final |
| 6 | 10 | 9 | 0 | counts of nematodes |
| 7 | 10 | 9 | 0 | if not |
| 8 | 10 | 9 | 1 | |
| 9 | 10 | 8 | 1 | |
| 10 | 10 | 7 | 1 | |
| 11 | 10 | 7 | 2 | |
| 12 | 10 | 4 | 5 | |
| 13 | 10 | 8 | 2 | |
| 14 | 10 | 7 | 3 | |
| 15 | 10 | 7 | 0 | |

| Chamber Number | Start Count 0 | # alive found 24 hr | # dead found 24 hr | Comments: |
|---|---|---|---|---|
| 16 | 10 | 5 | 4 | |
| 17 | 10 | 6 | 4 | |
| 18 | 10 | 9 | 1 | |
| 19 | 10 | | | |
| 20 | 10 | | | |
| 21 | 10 | | | |
| 22 | 10 | | | |
| 23 | 10 | | | |
| 24 | 10 | | | |
| 25 | 10 | | | |
| 26 | 10 | | | |
| 27 | 10 | | | |
| 28 | 10 | | | |
| 29 | 10 | | | |
| 30 | 10 | | | |

# CETIS Test Summary

Report Date: 16 Feb-06 3:05 PM
Test Link: 09-9781-8693/B154205cea

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

| | | | | | |
|---|---|---|---|---|---|
| **Test No:** | 17-4335-2950 | **Test Type:** | Nematode Survival | **Duration:** | 24h |
| **Start Date:** | 02 Feb-06 08:50 AM | **Protocol:** | ASTM E2172-01 (2001) | **Species:** | Caenorhabditis elegans |
| **Ending Date:** | 03 Feb-06 08:35 AM | **Dil Water:** | | **Source:** | In-House Culture |
| **Setup Date:** | 02 Feb-06 08:50 AM | **Brine:** | | | |

| | | | | | |
|---|---|---|---|---|---|
| **Sample No:** | 06-5742-9955 | **Code:** | B1542-05 | **Client:** | |
| **Sample Date:** | 15 Nov-05 | **Material:** | Soil | **Project:** | |
| **Receive Date:** | | **Source:** | Hanford | | |
| **Sample Age:** | 79d 8h | **Station:** | | | |

**Comments:** J10DV1, E284701

**Comparison Summary**

| Analysis | Endpoint | NOEL | LOEL | ChV | PMSD | Method |
|---|---|---|---|---|---|---|
| 04-1973-5798 | % Survival | < 100 | 100 | N/A | 11.50% | Equal Variance t Two-Sample |

**% Survival Summary**

| Conc-% | Control Type | Reps | Mean | Minimum | Maximum | SE | SD | CV |
|---|---|---|---|---|---|---|---|---|
| 0 | Control Sed | 3 | 0.90000 | 0.90000 | 0.90000 | 0.00000 | 0.00000 | 0.00% |
| 100 | | 3 | 0.63333 | 0.50000 | 0.70000 | 0.06667 | 0.11547 | 18.23% |

**% Survival Detail**

| Conc-% | Control Type | Rep 1 | Rep 2 | Rep 3 |
|---|---|---|---|---|
| 0 | Control Sed | 0.90000 | 0.90000 | 0.90000 |
| 100 | | 0.70000 | 0.70000 | 0.50000 |

✓ BM

# CETIS Analysis Detail

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

| Endpoint | Analysis Type | Sample Link | Control Link | Date Analyzed | Version |
|---|---|---|---|---|---|
| % Survival | Comparison | 09-9781-8693 | 09-9781-8693 | 16 Feb-06 3:05 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 | 11.50% |

**Group Comparisons**

| Control | vs | Conc-% | Statistic | Critical | P-Value | MSD | Decision(0.05) |
|---|---|---|---|---|---|---|---|
| Control Sed | | 100 | 4.76008 | 2.13185 | 0.0045 | 0.14622 | Significant Effect |

**ANOVA Table**

| Source | Sum of Squares | Mean Square | DF | F Statistic | P-Value | Decision(0.05) |
|---|---|---|---|---|---|---|
| Between | 0.1598792 | 0.159879 | 1 | 22.66 | 0.00890 | Significant Effect |
| Error | 0.0282244 | 0.007056 | 4 | | | |
| Total | 0.18810356 | 0.1669353 | 5 | | | |

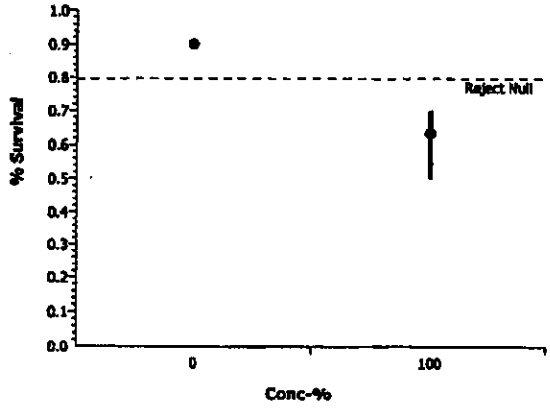
**ANOVA Assumptions**

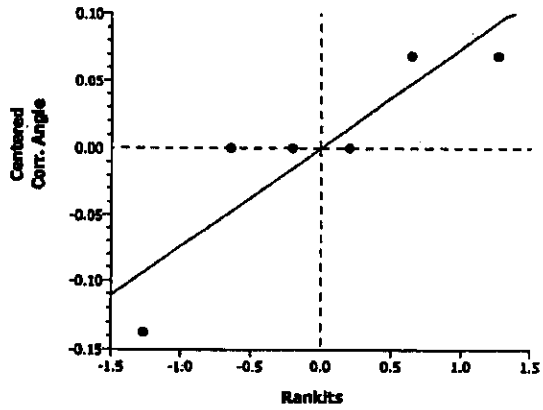
| Attribute | Test | Statistic | Critical | P-Value | Decision(0.01) |
|---|---|---|---|---|---|
| Variances | Variance Ratio F | 4767834000 | 199.00000 | 0.00000 | Unequal Variances |
| Distribution | Shapiro-Wilk W | 0.81374 | | 0.07784 | Normal Distribution |

**Data Summary**

| | | | Original Data | | | | Transformed Data | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Conc-% | Control Type | Count | Mean | Minimum | Maximum | SD | Mean | Minimum | Maximum | SD |
| 0 | Control Sed | 3 | 0.90000 | 0.90000 | 0.90000 | 0.00015 | 1.24905 | 1.24905 | 1.24905 | 0.00016 |
| 100 | | 3 | 0.63333 | 0.50000 | 0.70000 | 0.11547 | 0.92257 | 0.78540 | 0.99116 | 0.11879 |

**Graphics**



# CETIS Test Summary

Report Date: 16 Feb-06 3:25 PM
Test Link: 11-9227-7826/B154206cea

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

| | | | | | |
|---|---|---|---|---|---|
| **Test No:** | 09-5017-4566 | **Test Type:** | Nematode Survival | **Duration:** | 24h |
| **Start Date:** | 02 Feb-06 08:50 AM | **Protocol:** | ASTM E2172-01 (2001) | **Species:** | Caenorhabditis elegans |
| **Ending Date:** | 03 Feb-06 08:35 AM | **Dil Water:** | | **Source:** | In-House Culture |
| **Setup Date:** | 02 Feb-06 08:50 AM | **Brine:** | | | |

| | | | | | |
|---|---|---|---|---|---|
| **Sample No:** | 09-1115-2498 | **Code:** | B1542-06 | **Client:** | |
| **Sample Date:** | 16 Nov-05 | **Material:** | Soil | **Project:** | |
| **Receive Date:** | | **Source:** | Hanford | | |
| **Sample Age:** | 78d 8h | **Station:** | | | |

**Comments:** J10DV3, E285701

**Comparison Summary**

| Analysis | Endpoint | NOEL | LOEL | ChV | PMSD | Method |
|---|---|---|---|---|---|---|
| 10-3091-8870 | % Survival | 100 | > 100 | N/A | 15.32% | Equal Variance t Two-Sample |

**% Survival Summary**

| Conc-% | Control Type | Reps | Mean | Minimum | Maximum | SE | SD | CV |
|---|---|---|---|---|---|---|---|---|
| 0 | Control Sed | 3 | 0.90000 | 0.90000 | 0.90000 | 0.00000 | 0.00000 | 0.00% |
| 100 | | 3 | 0.90000 | 0.80000 | 1.00000 | 0.05774 | 0.10000 | 11.11% |

**% Survival Detail**

| Conc-% | Control Type | Rep 1 | Rep 2 | Rep 3 |
|---|---|---|---|---|
| 0 | Control Sed | 0.90000 | 0.90000 | 0.90000 |
| 100 | | 0.80000 | 1.00000 | 0.90000 |

✓ Bv

# CETIS Analysis Detail

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

| Endpoint | Analysis Type | Sample Link | Control Link | Date Analyzed | Version |
|---|---|---|---|---|---|
| % Survival | Comparison | 11-9227-7826 | 11-9227-7826 | 16 Feb-06 3:07 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 | 15.32% |

**Group Comparisons**

| Control | vs | Conc-% | Statistic | Critical | P-Value | MSD | Decision(0.05) |
|---|---|---|---|---|---|---|---|
| Control Sed | | 100 | -0.0798 | 2.13185 | 0.5299 | 0.18777 | Non-Significant Effect |

**ANOVA Table**

| Source | Sum of Squares | Mean Square | DF | F Statistic | P-Value | Decision(0.05) |
|---|---|---|---|---|---|---|
| Between | 7.401E-05 | 7.40E-05 | 1 | 0.01 | 0.94026 | Non-Significant Effect |
| Error | 0.0465461 | 0.011637 | 4 | | | |
| Total | 0.04662009 | 0.0117105 | 5 | | | |

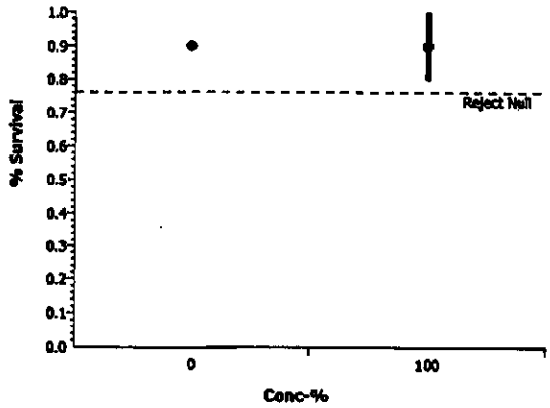
**ANOVA Assumptions**

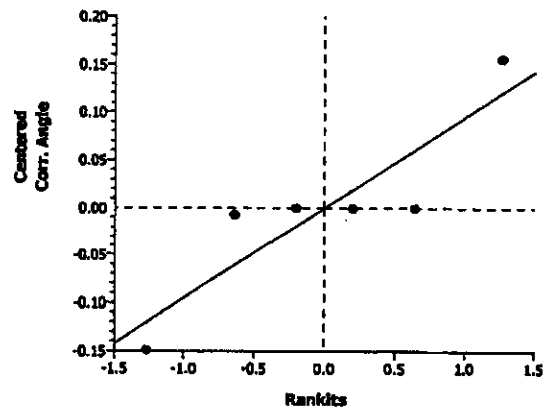
| Attribute | Test | Statistic | Critical | P-Value | Decision(0.01) |
|---|---|---|---|---|---|
| Variances | Variance Ratio F | 7862854000 | 199.00000 | 0.00000 | Unequal Variances |
| Distribution | Shapiro-Wilk W | 0.84220 | | 0.13594 | Normal Distribution |

**Data Summary**

| | | | Original Data | | | | Transformed Data | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Conc-% | Control Type | Count | Mean | Minimum | Maximum | SD | Mean | Minimum | Maximum | SD |
| 0 | Control Sed | 3 | 0.90000 | 0.90000 | 0.90000 | 0.00015 | 1.24905 | 1.24905 | 1.24905 | 0.00016 |
| 100 | | 3 | 0.90000 | 0.80000 | 1.00000 | 0.10000 | 1.25607 | 1.10715 | 1.41202 | 0.15256 |

**Graphics**



# CETIS Test Summary

Report Date: 16 Feb-06 3:08 PM
Test Link: 10-4312-1695/B154207cea

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

| | | | | | |
|---|---|---|---|---|---|
| **Test No:** | 10-7374-9443 | **Test Type:** | Nematode Survival | **Duration:** | 24h |
| **Start Date:** | 02 Feb-06 08:50 AM | **Protocol:** | ASTM E2172-01 (2001) | **Species:** | Caenorhabditis elegans |
| **Ending Date:** | 03 Feb-06 08:30 AM | **Dil Water:** | | **Source:** | In-House Culture |
| **Setup Date:** | 02 Feb-06 08:50 AM | **Brine:** | | | |

| | | | | | |
|---|---|---|---|---|---|
| **Sample No:** | 05-1608-3151 | **Code:** | B1542-07 | **Client:** | |
| **Sample Date:** | 21 Nov-05 | **Material:** | Soil | **Project:** | |
| **Receive Date:** | | **Source:** | Hanford | | |
| **Sample Age:** | 73d 8h | **Station:** | | | |

**Comments:** J10DV0, E287701

**Comparison Summary**

| Analysis | Endpoint | NOEL | LOEL | ChV | PMSD | Method |
|---|---|---|---|---|---|---|
| 02-6442-2122 | % Survival | < 100 | 100 | N/A | 15.69% | Equal Variance t Two-Sample |

**% Survival Summary**

| Conc-% | Control Type | Reps | Mean | Minimum | Maximum | SE | SD | CV |
|---|---|---|---|---|---|---|---|---|
| 0 | Control Sed | 3 | 0.90000 | 0.90000 | 0.90000 | 0.00000 | 0.00000 | 0.00% |
| 100 | | 3 | 0.56667 | 0.40000 | 0.70000 | 0.08819 | 0.15275 | 26.96% |

**% Survival Detail**

| Conc-% | Control Type | Rep 1 | Rep 2 | Rep 3 |
|---|---|---|---|---|
| 0 | Control Sed | 0.90000 | 0.90000 | 0.90000 |
| 100 | | 0.60000 | 0.40000 | 0.70000 |

# CETIS Analysis Detail

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

| Endpoint | Analysis Type | Sample Link | Control Link | Date Analyzed | Version |
|---|---|---|---|---|---|
| % Survival | Comparison | 10-4312-1695 | 10-4312-1695 | 16 Feb-06 3:08 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 | 15.69% |

**Group Comparisons**

| Control | vs | Conc-% | Statistic | Critical | P-Value | MSD | Decision(0.05) |
|---|---|---|---|---|---|---|---|
| Control Sed | | 100 | 4.39424 | 2.13185 | 0.0059 | 0.19166 | Significant Effect |

**ANOVA Table**

| Source | Sum of Squares | Mean Square | DF | F Statistic | P-Value | Decision(0.05) |
|---|---|---|---|---|---|---|
| Between | 0.2341103 | 0.234110 | 1 | 19.31 | 0.01174 | Significant Effect |
| Error | 0.0484969 | 0.012124 | 4 | | | |
| Total | 0.2826072 | 0.2462346 | 5 | | | |

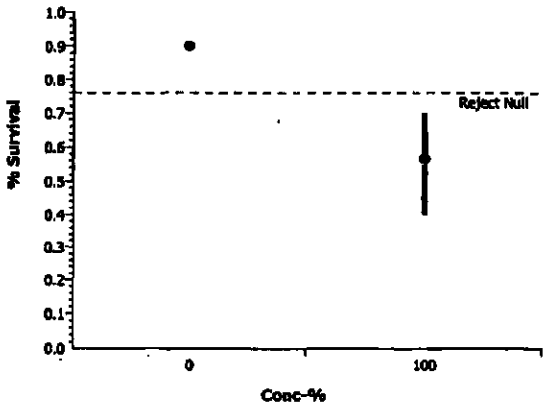
**ANOVA Assumptions**

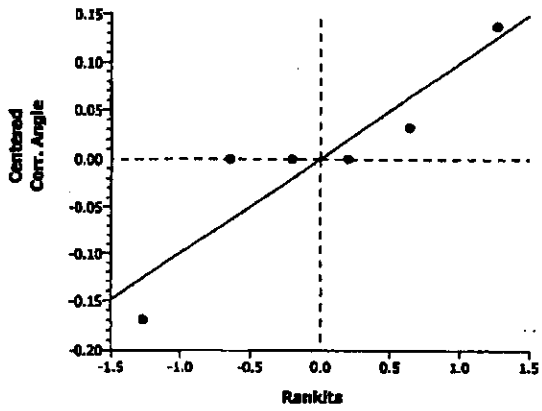
| Attribute | Test | Statistic | Critical | P-Value | Decision(0.01) |
|---|---|---|---|---|---|
| Variances | Variance Ratio F | 8192392000 | 199.00000 | 0.00000 | Unequal Variances |
| Distribution | Shapiro-Wilk W | 0.87536 | | 0.24842 | Normal Distribution |

**Data Summary**

| | | | Original Data | | | | Transformed Data | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Conc-% | Control Type | Count | Mean | Minimum | Maximum | SD | Mean | Minimum | Maximum | SD |
| 0 | Control Sed | 3 | 0.90000 | 0.90000 | 0.90000 | 0.00015 | 1.24905 | 1.24905 | 1.24905 | 0.00016 |
| 100 | | 3 | 0.56667 | 0.40000 | 0.70000 | 0.15275 | 0.85398 | 0.68472 | 0.99116 | 0.15572 |

**Graphics**



# CETIS Test Summary

Report Date: 16 Feb-06 3:09 PM
Test Link: 01-8258-7180/B154208cea

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

| | | | | | |
|---|---|---|---|---|---|
| **Test No:** | 18-5411-2771 | **Test Type:** | Nematode Survival | **Duration:** | 24h |
| **Start Date:** | 02 Feb-06 08:50 AM | **Protocol:** | ASTM E2172-01 (2001) | **Species:** | Caenorhabditis elegans |
| **Ending Date:** | 03 Feb-06 08:35 AM | **Dil Water:** | | **Source:** | In-House Culture |
| **Setup Date:** | 02 Feb-06 08:50 AM | **Brine:** | | | |

| | | | | | |
|---|---|---|---|---|---|
| **Sample No:** | 15-5450-5055 | **Code:** | B1542-08 | **Client:** | |
| **Sample Date:** | 28 Nov-05 | **Material:** | Soil | **Project:** | |
| **Receive Date:** | | **Source:** | Hanford | | |
| **Sample Age:** | 66d 8h | **Station:** | | | |

**Comments:** J10LJ5, E289701

**Comparison Summary**

| Analysis | Endpoint | NOEL | LOEL | ChV | PMSD | Method |
|---|---|---|---|---|---|---|
| 17-2393-1486 | % Survival | 100 | > 100 | N/A | 12.65% | Equal Variance t Two-Sample |

**% Survival Summary**

| Conc-% | Control Type | Reps | Mean | Minimum | Maximum | SE | SD | CV |
|---|---|---|---|---|---|---|---|---|
| 0 | Control Sed | 3 | 0.90000 | 0.90000 | 0.90000 | 0.00000 | 0.00000 | 0.00% |
| 100 | | 3 | 0.80000 | 0.70000 | 0.90000 | 0.05774 | 0.10000 | 12.50% |

**% Survival Detail**

| Conc-% | Control Type | Rep 1 | Rep 2 | Rep 3 |
|---|---|---|---|---|
| 0 | Control Sed | 0.90000 | 0.90000 | 0.90000 |
| 100 | | 0.70000 | 0.80000 | 0.90000 |

✓ Bm





Analyst: Bm Approval: _____

# CETIS Analysis Detail

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

| Endpoint | Analysis Type | Sample Link | Control Link | Date Analyzed | Version |
|---|---|---|---|---|---|
| % Survival | Comparison | 01-8258-7180 | 01-8258-7180 | 16 Feb-06 3:09 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 | 12.65% |

**Group Comparisons**

| Control | vs | Conc-% | Statistic | Critical | P-Value | MSD | Decision(0.05) |
|---|---|---|---|---|---|---|---|
| Control Sed | | 100 | 1.78704 | 2.13185 | 0.0742 | 0.15897 | Non-Significant Effect |

**ANOVA Table**

| Source | Sum of Squares | Mean Square | DF | F Statistic | P-Value | Decision(0.05) |
|---|---|---|---|---|---|---|
| Between | 0.0266382 | 0.026638 | 1 | 3.19 | 0.14846 | Non-Significant Effect |
| Error | 0.0333653 | 0.008341 | 4 | | | |
| Total | 0.06000343 | 0.0349795 | 5 | | | |

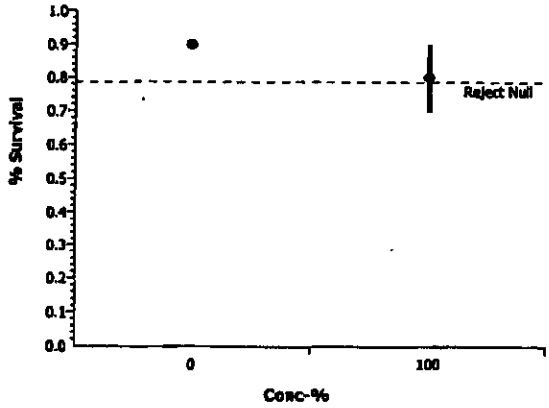
**ANOVA Assumptions**

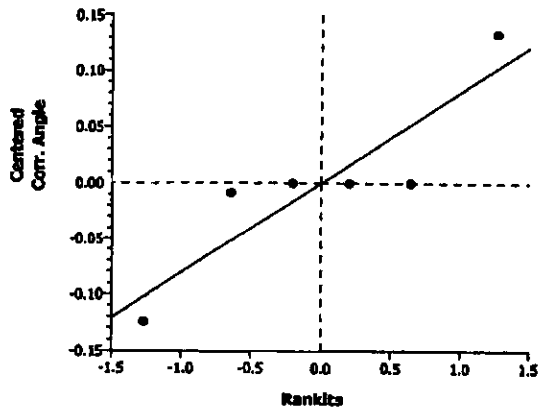
| Attribute | Test | Statistic | Critical | P-Value | Decision(0.01) |
|---|---|---|---|---|---|
| Variances | Variance Ratio F | 5636268000 | 199.00000 | 0.00000 | Unequal Variances |
| Distribution | Shapiro-Wilk W | 0.84832 | | 0.15255 | Normal Distribution |

**Data Summary**

| | | | Original Data | | | | Transformed Data | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Conc-% | Control Type | Count | Mean | Minimum | Maximum | SD | Mean | Minimum | Maximum | SD |
| 0 | Control Sed | 3 | 0.90000 | 0.90000 | 0.90000 | 0.00015 | 1.24905 | 1.24905 | 1.24905 | 0.00016 |
| 100 | | 3 | 0.80000 | 0.70000 | 0.90000 | 0.10000 | 1.11578 | 0.99116 | 1.24905 | 0.12916 |

**Graphics**



# CETIS Test Summary

Report Date: 16 Feb-06 3:11 PM
Test Link: 03-7488-5492/B154209cea

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

| | | | | | |
|---|---|---|---|---|---|
| **Test No:** | 16-2208-0421 | **Test Type:** | Nematode Survival | **Duration:** | 24h |
| **Start Date:** | 02 Feb-06 08:50 AM | **Protocol:** | ASTM E2172-01 (2001) | **Species:** | Caenorhabditis elegans |
| **Ending Date:** | 03 Feb-06 08:35 AM | **Dil Water:** | | **Source:** | In-House Culture |
| **Setup Date:** | 02 Feb-06 08:50 AM | **Brine:** | | | |

| | | | | | |
|---|---|---|---|---|---|
| **Sample No:** | 07-3184-0122 | **Code:** | B1542-09 | **Client:** | |
| **Sample Date:** | 06 Dec-05 | **Material:** | Soil | **Project:** | |
| **Receive Date:** | | **Source:** | Hanford | | |
| **Sample Age:** | 58d 8h | **Station:** | | | |

**Comments:** J10DT9, E295301

**Comparison Summary**

| Analysis | Endpoint | NOEL | LOEL | ChV | PMSD | Method |
|---|---|---|---|---|---|---|
| 04-5863-3854 | % Survival | 100 | > 100 | N/A | 18.94% | Equal Variance t Two-Sample |

**% Survival Summary**

| Conc-% | Control Type | Reps | Mean | Minimum | Maximum | SE | SD | CV |
|---|---|---|---|---|---|---|---|---|
| 0 | Control Sed | 3 | 0.90000 | 0.90000 | 0.90000 | 0.00000 | 0.00000 | 0.00% |
| 100 | | 3 | 0.76667 | 0.60000 | 0.90000 | 0.08819 | 0.15275 | 19.92% |

**% Survival Detail**

| Conc-% | Control Type | Rep 1 | Rep 2 | Rep 3 |
|---|---|---|---|---|
| 0 | Control Sed | 0.90000 | 0.90000 | 0.90000 |
| 100 | | 0.60000 | 0.80000 | 0.90000 |

# CETIS Analysis Detail

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

| Endpoint | Analysis Type | Sample Link | Control Link | Date Analyzed | Version |
|---|---|---|---|---|---|
| % Survival | Comparison | 03-7488-5492 | 03-7488-5492 | 16 Feb-06 3:11 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 | 18.94% |

**Group Comparisons**

| Control | vs | Conc-% | Statistic | Critical | P-Value | MSD | Decision(0.05) |
|---|---|---|---|---|---|---|---|
| Control Sed | | 100 | 1.59353 | 2.13185 | 0.0931 | 0.22514 | Non-Significant Effect |

**ANOVA Table**

| Source | Sum of Squares | Mean Square | DF | F Statistic | P-Value | Decision(0.05) |
|---|---|---|---|---|---|---|
| Between | 0.0424816 | 0.042482 | 1 | 2.54 | 0.18626 | Non-Significant Effect |
| Error | 0.0669179 | 0.016729 | 4 | | | |
| Total | 0.10939945 | 0.0592110 | 5 | | | |

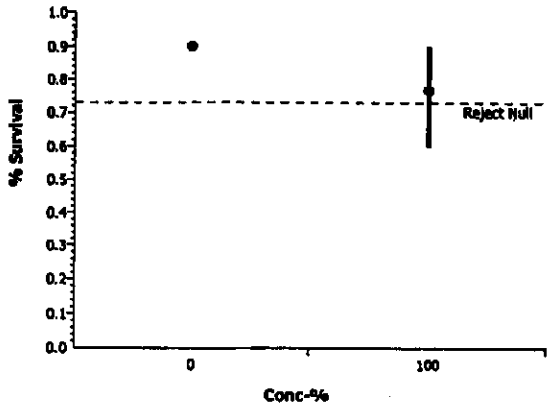
**ANOVA Assumptions**

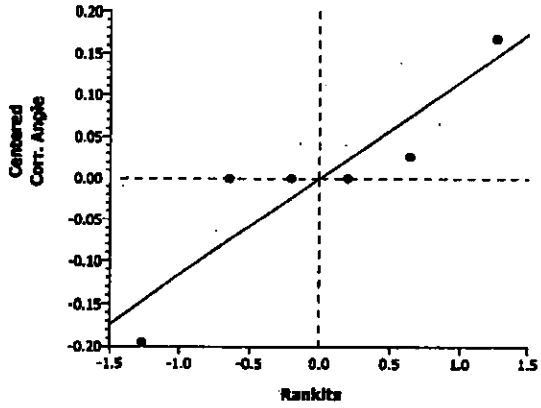
| Attribute | Test | Statistic | Critical | P-Value | Decision(0.01) |
|---|---|---|---|---|---|
| Variances | Variance Ratio F | 1130419000 | 199.00000 | 0.00000 | Unequal Variances |
| Distribution | Shapiro-Wilk W | 0.86641 | | 0.21226 | Normal Distribution |

**Data Summary**

| | | | Original Data | | | | Transformed Data | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Conc-% | Control Type | Count | Mean | Minimum | Maximum | SD | Mean | Minimum | Maximum | SD |
| 0 | Control Sed | 3 | 0.90000 | 0.90000 | 0.90000 | 0.00015 | 1.24905 | 1.24905 | 1.24905 | 0.00016 |
| 100 | | 3 | 0.76667 | 0.60000 | 0.90000 | 0.15275 | 1.08076 | 0.88608 | 1.24905 | 0.18292 |

**Graphics**



# CH2M ... //TODE TOXICITY TEST SOIL QUALITY AND TEST CHAMBER ASSIGNMENT DATA

Client: Hanford
Sample Description: see below
Test Specie: *Caenorhabditis elegans* ID#: Nem008

Tech. 0 Hrs NJ 24 Hrs NJ
Time 0 Hrs 0830 24 Hrs 0830

Beginning, Date 2-13-06 Time 0830
Ending, Date 2-14-06 Time 0830

| Lab ID | Soil pH 0 hr | Soil pH 24 hr | Soil % Moisture 0 hr | Soil Temperature (°C) 0 hr | Soil Temperature (°C) 24 hr |
|---|---|---|---|---|---|
| Lab Control | 7.1 | | | 21.4 | 20.8 |
| E274801 | 7.6 | | | 21.4 | 20.8 |
| E280101 | 7.5 | | | 21.4 | 20.8 |
| E283101 | 7.2 | | | 21.4 | 20.8 |
| E284601 | 6.5 | | | 21.4 | 20.8 |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |

Comments:
All test soils were dried during sampling process.
Each test chamber has 2.33 g dry wt. soil + 0.93 ml Milli-Q water (40% of sry wt.).
Samples hydrated 7 days prior to test initiation.

| Lab ID | Field ID | Replicate | Chamber # |
|---|---|---|---|
| Lab Control | 70 grade Silica sand | A | 1 |
| Lab Control | 70 grade Silica sand | B | 14 |
| Lab Control | 70 grade Silica sand | C | 4 |
| E274801 | J10DW4 | A | 11 |
| E274801 | B1542-01 | B | 15 |
| E274801 | | C | 3 |
| E280101 | J10DV4, J10DV5, J10DV6, | A | 2 |
| E280101 | J10DV7, J10DV8 | B | 5 |
| E280101 | B1542-02 | C | 6 |
| E283101 | J10DT8 | A | 12 |
| E283101 | B1542-03 | B | 7 |
| E283101 | | C | 9 |

| Lab ID | Field ID | Replicate | Chamber # |
|---|---|---|---|
| E284601 | J10DV2 | A | 13 |
| E284601 | B1542-04 | B | 8 |
| E284601 | | C | 10 |

| Lab ID | Field ID | Replicate | Chamber # |
|---|---|---|---|
| | | 0 | |

CH2M HILL **NEMATODE TOXICITY TEST SURVIVAL DATA**

Client Hanford

Sample Description Lab ID#: see Assignment Data sheet

Test Species: *Caenorhabditis elegans* ID#: Nem 008

Beginning, Date 2-13-06 Time 0830

Ending, Date 2-14-06 Time 0830

Test Initiation: Tech: Tech: NJ Time: 0830

Test Termination: Tech: Tech: NJ Time: 0830

| Chamber Number | Start Count 0 | # alive found 24 hr | # dead found 24 hr | Comments: |
|---|---|---|---|---|
| 1 | 10 | 9 | 1 | |
| 2 | 10 | 8 | 0 | |
| 3 | 10 | 9 | 1 | |
| 4 | 10 | 9 | 1 | |
| 5 | 10 | 9 | 1 | |
| 6 | 10 | 8 | 0 | |
| 7 | 10 | 8 | 0 | |
| 8 | 10 | 8 | 1 | |
| 9 | 10 | 7 | 1 | |
| 10 | 10 | 9 | 1 | |
| 11 | 10 | 9 | 0 | |
| 12 | 10 | 7 | 2 | |
| 13 | 10 | 8 | 1 | |
| 14 | 10 | 9 | 0 | |
| 15 | 10 | 9 | 0 | |

| Chamber Number | Start Count 0 | # alive found 24 hr | # dead found 24 hr | Comments: |
|---|---|---|---|---|
| 16 | 10 | | | |
| 17 | 10 | | | |
| 18 | 10 | | | |
| 19 | 10 | | | |
| 20 | 10 | | | |
| 21 | 10 | | | |
| 22 | 10 | | | |
| 23 | 10 | | | |
| 24 | 10 | | | |
| 25 | 10 | | | |
| 26 | 10 | | | |
| 27 | 10 | | | |
| 28 | 10 | | | |
| 29 | 10 | | | |
| 30 | 10 | | | |

# CETIS Test Summary

Report Date: 16 Feb-06 2:52 PM
Test Link: 04-9550-2436/B154201cea

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

| | | | | | |
|---|---|---|---|---|---|
| **Test No:** | 05-4016-1968 | **Test Type:** | Nematode Survival | **Duration:** | 24h |
| **Start Date:** | 13 Feb-06 08:30 AM | **Protocol:** | ASTM E2172-01 (2001) | **Species:** | Caenorhabditis elegans |
| **Ending Date:** | 14 Feb-06 08:30 AM | **Dil Water:** | | **Source:** | In-House Culture |
| **Setup Date:** | 30 Jan-06 10:30 AM | **Brine:** | | | |

| | | | | | |
|---|---|---|---|---|---|
| **Sample No:** | 18-1426-8954 | **Code:** | B1542-01 | **Client:** | |
| **Sample Date:** | 31 Oct-05 | **Material:** | Soil | **Project:** | |
| **Receive Date:** | | **Source:** | Hanford | | |
| **Sample Age:** | 91d 10h | **Station:** | | | |

**Comments:** J10DW4, E274801

**Comparison Summary**

| Analysis | Endpoint | NOEL | LOEL | ChV | PMSD | Method |
|---|---|---|---|---|---|---|
| 16-8964-2763 | % Survival | 100 | > 100 | N/A | 0.00% | Equal Variance t Two-Sample |

**% Survival Summary**

| Conc-% | Control Type | Reps | Mean | Minimum | Maximum | SE | SD | CV |
|---|---|---|---|---|---|---|---|---|
| 0 | Control Sed | 3 | 0.90000 | 0.90000 | 0.90000 | 0.00000 | 0.00000 | 0.00% |
| 100 | | 3 | 0.90000 | 0.90000 | 0.90000 | 0.00000 | 0.00000 | 0.00% |

**% Survival Detail**

| Conc-% | Control Type | Rep 1 | Rep 2 | Rep 3 |
|---|---|---|---|---|
| 0 | Control Sed | 0.90000 | 0.90000 | 0.90000 |
| 100 | | 0.90000 | 0.90000 | 0.90000 |





Analyst: D Approval:

# CETIS Analysis Detail

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

| Endpoint | Analysis Type | Sample Link | Control Link | Date Analyzed | Version |
|---|---|---|---|---|---|
| % Survival | Comparison | 04-9550-2436 | 04-9550-2436 | 16 Feb-06 2:52 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 | 0.00% |

**Group Comparisons**

| Control | vs | Conc-% | Statistic | Critical | P-Value | MSD | Decision(0.05) |
|---|---|---|---|---|---|---|---|
| Control Sed | | 100 | 0 | 2.13185 | 0.5000 | 3E-08 | Non-Significant Effect |

**ANOVA Table**

| Source | Sum of Squares | Mean Square | DF | F Statistic | P-Value | Decision(0.05) |
|---|---|---|---|---|---|---|
| Between | 0 | 0 | 1 | 0.00 | 1.00000 | Non-Significant Effect |
| Error | 1.776E-15 | 4.44E-16 | 4 | | | |
| Total | 1.7764E-15 | 4.441E-16 | 5 | | | |

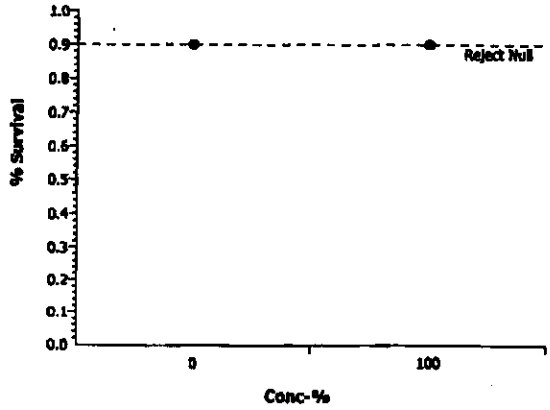
**ANOVA Assumptions**

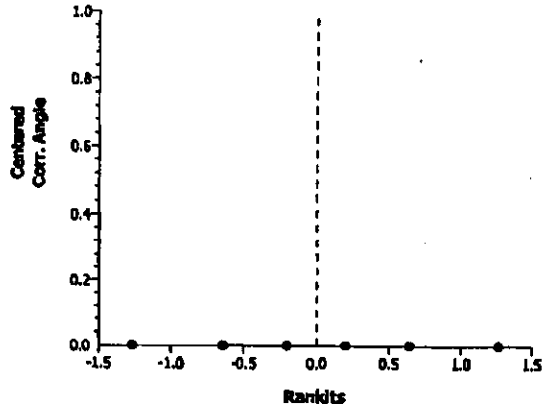
| Attribute | Test | Statistic | Critical | P-Value | Decision(0.01) |
|---|---|---|---|---|---|
| Variances | Variance Ratio F | 1.00000 | 199.00000 | 1.00000 | Equal Variances |

**Data Summary**

| | | | Original Data | | | | Transformed Data | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Conc-% | Control Type | Count | Mean | Minimum | Maximum | SD | Mean | Minimum | Maximum | SD |
| 0 | Control Sed | 3 | 0.90000 | 0.90000 | 0.90000 | 0.00015 | 1.24905 | 1.24905 | 1.24905 | 0.00016 |
| 100 | | 3 | 0.90000 | 0.90000 | 0.90000 | 0.00015 | 1.24905 | 1.24905 | 1.24905 | 0.00016 |

**Graphics**



# CETIS Test Summary

Report Date: 16 Feb-06 2:55 PM
Test Link: 07-1342-3910/B154202cea

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

| | | | | | |
|---|---|---|---|---|---|
| **Test No:** | 10-6949-0572 | **Test Type:** | Nematode Survival | **Duration:** | 24h |
| **Start Date:** | 13 Feb-06 08:30 AM | **Protocol:** | ASTM E2172-01 (2001) | **Species:** | Caenorhabditis elegans |
| **Ending Date:** | 14 Feb-06 08:30 AM | **Dil Water:** | | **Source:** | In-House Culture |
| **Setup Date:** | 13 Feb-06 08:30 AM | **Brine:** | | | |

| | | | | | |
|---|---|---|---|---|---|
| **Sample No:** | 07-3307-9513 | **Code:** | B1542-02 | **Client:** | |
| **Sample Date:** | 08 Nov-05 | **Material:** | Soil | **Project:** | |
| **Receive Date:** | | **Source:** | Hanford | | |
| **Sample Age:** | 97d 8h | **Station:** | | | |

**Comments:** J10DV4, J10DV5, J10DV6, J10DV7, J10DV8.
E280101

**Comparison Summary**

| Analysis | Endpoint | NOEL | LOEL | ChV | PMSD | Method |
|---|---|---|---|---|---|---|
| 01-5013-5976 | % Survival | 100 | > 100 | N/A | 7.58% | Equal Variance t Two-Sample |

**% Survival Summary**

| Conc-% | Control Type | Reps | Mean | Minimum | Maximum | SE | SD | CV |
|---|---|---|---|---|---|---|---|---|
| 0 | Control Sed | 3 | 0.90000 | 0.90000 | 0.90000 | 0.00000 | 0.00000 | 0.00% |
| 100 | | 3 | 0.83333 | 0.80000 | 0.90000 | 0.03333 | 0.05774 | 6.93% |

**% Survival Detail**

| Conc-% | Control Type | Rep 1 | Rep 2 | Rep 3 |
|---|---|---|---|---|
| 0 | Control Sed | 0.90000 | 0.90000 | 0.90000 |
| 100 | | 0.80000 | 0.90000 | 0.80000 |

✓ 8

# CETIS Analysis Detail

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

| Endpoint | Analysis Type | Sample Link | Control Link | Date Analyzed | Version |
|---|---|---|---|---|---|
| % Survival | Comparison | 07-1342-3910 | 07-1342-3910 | 16 Feb-06 2:55 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 | 7.58% |

**Group Comparisons**

| Control | vs | Conc-% | Statistic | Critical | P-Value | MSD | Decision(0.05) |
|---|---|---|---|---|---|---|---|
| Control Sed | | 100 | 2 | 2.13185 | 0.0581 | 0.10083 | Non-Significant Effect |

**ANOVA Table**

| Source | Sum of Squares | Mean Square | DF | F Statistic | P-Value | Decision(0.05) |
|---|---|---|---|---|---|---|
| Between | 0.0134232 | 0.013423 | 1 | 4.00 | 0.11612 | Non-Significant Effect |
| Error | 0.0134232 | 0.003356 | 4 | | | |
| Total | 0.02684637 | 0.016779 | 5 | | | |

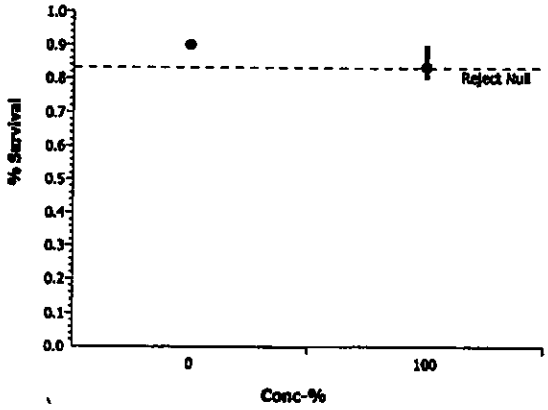
**ANOVA Assumptions**

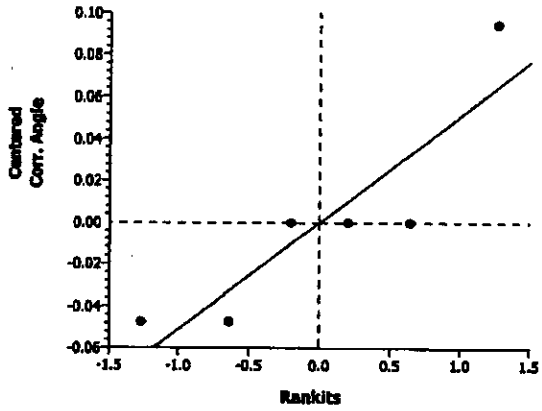
| Attribute | Test | Statistic | Critical | P-Value | Decision(0.01) |
|---|---|---|---|---|---|
| Variances | Variance Ratio F | 2267528000 | 199.00000 | 0.00000 | Unequal Variances |
| Distribution | Shapiro-Wilk W | 0.81374 | | 0.07784 | Normal Distribution |

**Data Summary**

| | | | Original Data | | | | Transformed Data | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Conc-% | Control Type | Count | Mean | Minimum | Maximum | SD | Mean | Minimum | Maximum | SD |
| 0 | Control Sed | 3 | 0.90000 | 0.90000 | 0.90000 | 0.00015 | 1.24905 | 1.24905 | 1.24905 | 0.00016 |
| 100 | | 3 | 0.83333 | 0.80000 | 0.90000 | 0.05774 | 1.15445 | 1.10715 | 1.24905 | 0.08192 |

**Graphics**



# CETIS Test Summary

Report Date: 16 Feb-06 3:00 PM
Test Link: 01-6976-7512/B154203cea

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

| | | | | | |
|---|---|---|---|---|---|
| **Test No:** | 13-3323-9275 | **Test Type:** | Nematode Survival | **Duration:** | 24h |
| **Start Date:** | 13 Feb-06 08:30 AM | **Protocol:** | ASTM E2172-01 (2001) | **Species:** | Caenorhabditis elegans |
| **Ending Date:** | 14 Feb-06 08:30 AM | **Dil Water:** | | **Source:** | In-House Culture |
| **Setup Date:** | 13 Feb-06 08:30 AM | **Brine:** | | | |

| | | | | | |
|---|---|---|---|---|---|
| **Sample No:** | 15-5457-5144 | **Code:** | B1542-03 | **Client:** | |
| **Sample Date:** | 14 Nov-05 | **Material:** | Soil | **Project:** | |
| **Receive Date:** | | **Source:** | Hanford | | |
| **Sample Age:** | 91d 8h | **Station:** | | | |

**Comments:** J10DT8, E283101

**Comparison Summary**

| Analysis | Endpoint | NOEL | LOEL | ChV | PMSD | Method |
|---|---|---|---|---|---|---|
| 05-2471-0884 | % Survival | < 100 | 100 | N/A | 6.07% | Equal Variance t Two-Sample |

**% Survival Summary**

| Conc-% | Control Type | Reps | Mean | Minimum | Maximum | SE | SD | CV |
|---|---|---|---|---|---|---|---|---|
| 0 | Control Sed | 3 | 0.90000 | 0.90000 | 0.90000 | 0.00000 | 0.00000 | 0.00% |
| 100 | | 3 | 0.73333 | 0.70000 | 0.80000 | 0.03333 | 0.05774 | 7.87% |

**% Survival Detail**

| Conc-% | Control Type | Rep 1 | Rep 2 | Rep 3 |
|---|---|---|---|---|
| 0 | Control Sed | 0.90000 | 0.90000 | 0.90000 |
| 100 | | 0.70000 | 0.80000 | 0.70000 |

✓ 5

# CETIS Analysis Detail

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

| Endpoint | Analysis Type | Sample Link | Control Link | Date Analyzed | Version |
|---|---|---|---|---|---|
| % Survival | Comparison | 01-6976-7512 | 01-6976-7512 | 16 Feb-06 3:00 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 | 6.07% |

**Group Comparisons**

| Control | vs | Conc-% | Statistic | Critical | P-Value | MSD | Decision(0.05) |
|---|---|---|---|---|---|---|---|
| Control Sed | | 100 | 5.67000 | 2.13185 | 0.0024 | 0.08243 | Significant Effect |

**ANOVA Table**

| Source | Sum of Squares | Mean Square | DF | F Statistic | P-Value | Decision(0.05) |
|---|---|---|---|---|---|---|
| Between | 0.0720895 | 0.072089 | 1 | 32.15 | 0.00477 | Significant Effect |
| Error | 0.0089694 | 0.002242 | 4 | | | |
| Total | 0.08105894 | 0.0743319 | 5 | | | |

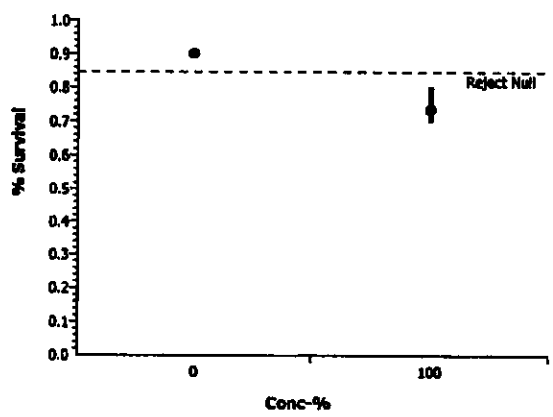
**ANOVA Assumptions**

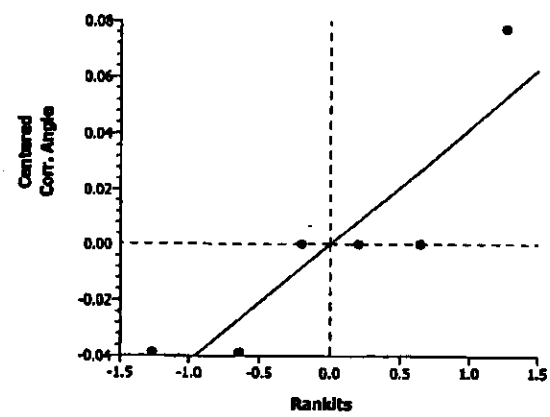
| Attribute | Test | Statistic | Critical | P-Value | Decision(0.01) |
|---|---|---|---|---|---|
| Variances | Variance Ratio F | 1515175000 | 199.00000 | 0.00000 | Unequal Variances |
| Distribution | Shapiro-Wilk W | 0.81374 | | 0.07784 | Normal Distribution |

**Data Summary**

| | | | Original Data | | | | Transformed Data | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Conc-% | Control Type | Count | Mean | Minimum | Maximum | SD | Mean | Minimum | Maximum | SD |
| 0 | Control Sed | 3 | 0.90000 | 0.90000 | 0.90000 | 0.00015 | 1.24905 | 1.24905 | 1.24905 | 0.00016 |
| 100 | | 3 | 0.73333 | 0.70000 | 0.80000 | 0.05774 | 1.02982 | 0.99116 | 1.10715 | 0.06697 |

**Graphics**



# CETIS Test Summary

Report Date: 16 Feb-06 3:02 PM
Test Link: 10-6481-1341/B154204cea

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

| | | | | | |
|---|---|---|---|---|---|
| **Test No:** | 04-3389-1423 | **Test Type:** | Nematode Survival | **Duration:** | 24h |
| **Start Date:** | 13 Feb-06 08:30 AM | **Protocol:** | ASTM E2172-01 (2001) | **Species:** | Caenorhabditis elegans |
| **Ending Date:** | 14 Feb-06 08:30 AM | **Dil Water:** | | **Source:** | In-House Culture |
| **Setup Date:** | 13 Feb-06 08:30 AM | **Brine:** | | | |

| | | | | | |
|---|---|---|---|---|---|
| **Sample No:** | 09-5315-2344 | **Code:** | B1542-04 | **Client:** | |
| **Sample Date:** | 15 Nov-05 | **Material:** | Soil | **Project:** | |
| **Receive Date:** | | **Source:** | Hanford | | |
| **Sample Age:** | 90d 8h | **Station:** | | | |

**Comments:** J10DV2, E284601

**Comparison Summary**

| Analysis | Endpoint | NOEL | LOEL | ChV | PMSD | Method |
|---|---|---|---|---|---|---|
| 09-5921-2719 | % Survival | 100 | > 100 | N/A | 7.58% | Equal Variance t Two-Sample |

**% Survival Summary**

| Conc-% | Control Type | Reps | Mean | Minimum | Maximum | SE | SD | CV |
|---|---|---|---|---|---|---|---|---|
| 0 | Control Sed | 3 | 0.90000 | 0.90000 | 0.90000 | 0.00000 | 0.00000 | 0.00% |
| 100 | | 3 | 0.83333 | 0.80000 | 0.90000 | 0.03333 | 0.05774 | 6.93% |

**% Survival Detail**

| Conc-% | Control Type | Rep 1 | Rep 2 | Rep 3 |
|---|---|---|---|---|
| 0 | Control Sed | 0.90000 | 0.90000 | 0.90000 |
| 100 | | 0.80000 | 0.80000 | 0.90000 |

✓ 3w

# CETIS Analysis Detail

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

| Endpoint | Analysis Type | Sample Link | Control Link | Date Analyzed | Version |
|---|---|---|---|---|---|
| % Survival | Comparison | 10-6481-1341 | 10-6481-1341 | 16 Feb-06 3:02 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 | 7.58% |

**Group Comparisons**

| Control | vs | Conc-% | Statistic | Critical | P-Value | MSD | Decision(0.05) |
|---|---|---|---|---|---|---|---|
| Control Sed | | 100 | 2 | 2.13185 | 0.0581 | 0.10083 | Non-Significant Effect |

**ANOVA Table**

| Source | Sum of Squares | Mean Square | DF | F Statistic | P-Value | Decision(0.05) |
|---|---|---|---|---|---|---|
| Between | 0.0134232 | 0.013423 | 1 | 4.00 | 0.11612 | Non-Significant Effect |
| Error | 0.0134232 | 0.003356 | 4 | | | |
| Total | 0.02684637 | 0.016779 | 5 | | | |

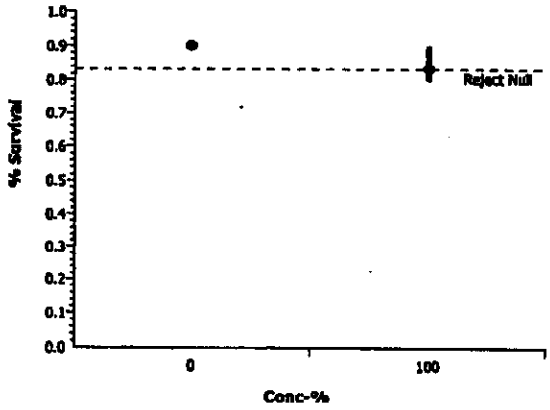
**ANOVA Assumptions**

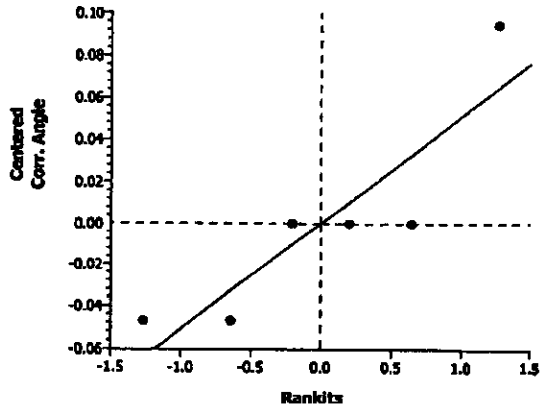
| Attribute | Test | Statistic | Critical | P-Value | Decision(0.01) |
|---|---|---|---|---|---|
| Variances | Variance Ratio F | 2267528000 | 199.00000 | 0.00000 | Unequal Variances |
| Distribution | Shapiro-Wilk W | 0.81374 | | 0.07784 | Normal Distribution |

**Data Summary**

| | | | Original Data | | | | Transformed Data | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Conc-% | Control Type | Count | Mean | Minimum | Maximum | SD | Mean | Minimum | Maximum | SD |
| 0 | Control Sed | 3 | 0.90000 | 0.90000 | 0.90000 | 0.00015 | 1.24905 | 1.24905 | 1.24905 | 0.00016 |
| 100 | | 3 | 0.83333 | 0.80000 | 0.90000 | 0.05774 | 1.15445 | 1.10715 | 1.24905 | 0.06192 |

**Graphics**



# WASHINGTON HANFORD CLOSURE CROSS REFERENCE

| DATE | SDG | CLIENT ID | SAMPLING LOCATION |
|---|---|---|---|
| 10/31/2005 | E2748 | J10DW4 | 600-131 |
| 11/08/2005 | E2801 | J10DV4 | PIT 23 |
| 11/14/2005 | E2831 | J10DT8 | Upland Backfill Elevated-100-F-2 |
| 11/15/2005 | E2846 | J10DV2 | Upland Native Reference-Central Plateau |
| 11/15/2005 | E2847 | J10DV1 | Upland Backfill Low-116-DR-1&2 |
| 11/16/2005 | E2857 | J10DV3 | Upland Native Elevated-JA Jones |
| 11/21/2005 | E2877 | J10DV0 | Riparian Elevated-Site # 3 Upriver 100-D |
| 11/28/2005 | E2897 | J10LJ5 | Riparian Low-Site # 10 Downriver 100-D |
| 12/06/2005 | E2953 | J10DT9 | Riparian Reference-Site # 13 Vernita Bridge |

# 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#: B 033-08
Species: *Caenorhabditis elegans* ID#: Nem 065

Beginning, Date 1-23-06 Time 1330
Ending, Date 1-24-06 Time 11:30

Test Initiation: Tech: Tech: NJ Time: 1330 Test Termination: Tech: Tech: NJ Time: 1130

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

Comments:

| Endpoint | LC50 | Cusum Chart Limits |
|---|---|---|
| Survival | 98.2 | 52.3 to 120.1 |

Task Manager Natisha Johnson

Project Manager

QA Officer

CH2M HILL

# ODE TOXICITY TEST SOIL QUALITY AND TEST CHAM ER ASSIGNMENT DATA

Client QA / QC

Sample Description sec below

Test Speci *Caenorhabditis elegans* ID#: Nem

Tech. 0 Hrs NJ 24 Hrs NJ

Time 0 Hrs 1330 24 Hrs 1130

Beginning, Date 1-23-06 Time 1530

Ending, Date 1-24-06 Time 1130

| Lab ID | K-Medium pH | | % Moisture | Temperature (°C) | | Comments: |
|---|---|---|---|---|---|---|
| | 0 hr | 24 hr | 0 hr | 0 hr | 24 hr | |
| Lab Control | 5.5 | 5.7 | NA | 19.9 | | |
| 10 mg/L Cu | 5.2 | 5.0 | NA | 19.9 | | |
| 50 mg/L Cu | 5.2 | 4.8 | NA | 20.0 | | |
| 100 mg/L Cu | 5.1 | 4.8 | NA | 20.1 | | |
| 250 mg/L Cu | 4.8 | 4.~~8~~ 4 | NA | 20.1 | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |

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

# CETIS Test Summary

Report Date: 26 Jan-06 2:57 PM
Test Link: 18-9490-9699/rcea005

Nematode 24 hour Acute test — CH2M Hill

| | | | | | |
|---|---|---|---|---|---|
| Test No: | 03-9544-7078 | Test Type: | Nematode Survival | Duration: | 22h |
| Start Date: | 23 Jan-06 01:30 PM | Protocol: | ASTM E2172-01 (2001) | Species: | Caenorhabditis elegans |
| Ending Date: | 24 Jan-06 11:30 AM | Dil Water: | | Source: | In-House Culture |
| Setup Date: | 23 Jan-06 01:30 PM | Brine: | | | |

| | | | | | |
|---|---|---|---|---|---|
| Sample No: | 13-1507-4495 | Material: | Copper | Client: | |
| Sample Date: | 23 Jan-06 | Code: | 1B033-08 | Project: | |
| Receive Date: | 26 Jan-06 02:55 PM | Source: | Reference Toxicant | | |
| Sample Age: | 14h | Station: | | | |

Comments: as CuSO4x5H2O

## Point Estimate Summary

| Analysis | Endpoint | % Effect | Conc-mg/L | 95% LCL | 95% UCL | Method |
|---|---|---|---|---|---|---|
| 07-3093-8444 | % Survival | 50 | 98.16186 | 67.39882 | 142.9662 | Trimmed Spearman-Karber |

## % Survival Summary

| Conc-mg/L | Control Type | Reps | Mean | Minimum | Maximum | SE | SD | CV |
|---|---|---|---|---|---|---|---|---|
| 0 | Dilution Water | 3 | 0.96667 | 0.90000 | 1.00000 | 0.03333 | 0.05774 | 5.97% |
| 10 | | 3 | 1.00000 | 1.00000 | 1.00000 | 0.00000 | 0.00000 | 0.00% |
| 50 | | 3 | 0.63333 | 0.60000 | 0.70000 | 0.03333 | 0.05774 | 9.12% |
| 100 | | 3 | 0.56667 | 0.50000 | 0.60000 | 0.03333 | 0.05774 | 10.19% |
| 250 | | 3 | 0.20000 | 0.00000 | 0.40000 | 0.11547 | 0.20000 | 100.00 |

## % Survival Detail

| Conc-mg/L | Control Type | Rep 1 | Rep 2 | Rep 3 |
|---|---|---|---|---|
| 0 | Dilution Water | 1.00000 | 0.90000 | 1.00000 |
| 0 | | 1.00000 | 1.00000 | 1.00000 |
| 50 | | 0.60000 | 0.60000 | 0.70000 |
| 100 | | 0.60000 | 0.60000 | 0.50000 |
| 250 | | 0.00000 | 0.40000 | 0.20000 |

# CETIS Analysis Detail

Nematode 24 hour Acute test — CH2M Hill

| Endpoint | Analysis Type | Sample Link | Control Link | Date Analyzed | Version |
|---|---|---|---|---|---|
| % Survival | Trimmed Spearman-Karber | 18-9490-9699 | 18-9490-9699 | 26 Jan-06 2:57 PM | CETISv1.1.1 |

**Spearman-Karber Options**

| Threshold Option | Lower Threshold | Trim | μ | σ |
|---|---|---|---|---|
| Control Threshold | 0.03333334 | 20.34% | 1.991943 | 0.08164523 |

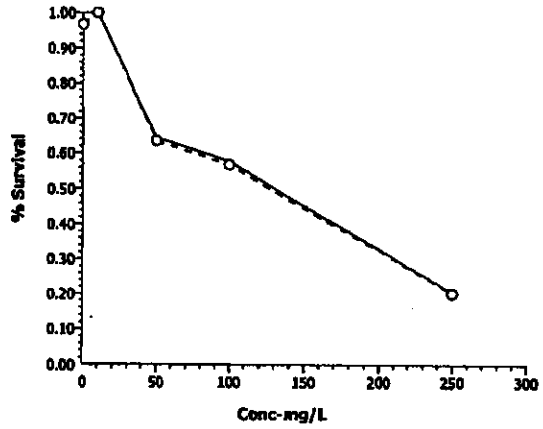
**Point Estimates**

| EC50/LC50 | 95% LCL | 95% UCL |
|---|---|---|
| 98.16186 | 67.39882 | 142.96620 |

**Data Summary**

| Conc-mg/ | Control Type | Count | Calculated Variate(A/B) Mean | Minimum | Maximum | SE | SD | A | B |
|---|---|---|---|---|---|---|---|---|---|
| 0 | Dilution Water | 3 | 0.96667 | 0.90000 | 1.00000 | 0.01179 | 0.05773 | 29 | 30 |
| 10 | | 3 | 1.00000 | 1.00000 | 1.00000 | 0.00000 | 0.00000 | 30 | 30 |
| 50 | | 3 | 0.63333 | 0.60000 | 0.70000 | 0.01179 | 0.05773 | 19 | 30 |
| 100 | | 3 | 0.56667 | 0.50000 | 0.60000 | 0.01179 | 0.05773 | 17 | 30 |
| 250 | | 3 | 0.20000 | 0.00000 | 0.40000 | 0.04082 | 0.20000 | 6 | 30 |

**Graphics**



# APPENDIX C
# CHAIN OF CUSTODY

E 2748

| Washington Closure Hanford | CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST | RC-051-3 | Page 1 of 1 |
|---|---|---|---|

| | | | |
|---|---|---|---|
| Collector<br>L. COLLOM | Company Contact<br>JOAN KESSNER | Telephone No.<br>375-4688 | Project Coordinator<br>KESSNER, JH | Price Code 8L | Data Turnaround<br>45 Days |
| Project Designation<br>100 & 300 Area Component of the RCBRA - Incremental So | Sampling Location<br>600-131 | | SAF No.<br>RC-051 | Air Quality [ ] | |
| Ice Chest No. | Field Logbook No.<br>EL-1596 | COA<br>BESRAS6520 | Method of Shipment | | |
| 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**

*NONE*

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Preservation | None | None | | | | | | | | | |
| Type of Container | G/P | P/G | | | | | | | | | |
| No. of Container(s) | 1 | 1 | | | | | | | | | |
| Volume | 1000g | ~~2000g~~ 4000g | | | | | | | | | |
| SAMPLE ANALYSIS | See item (1) in Special Instructions. | Soil Plant Toxicity ASTM E1963; Soil Nematode Toxicity ASTM E2172 | | | | | | | | | |

11-1-05 LRC

| Sample No. | Matrix * | Sample Date | Sample Time | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ~~J10DV0~~ J10DW4 | SOIL | 10-31-05 | 1530 | X | X | | | | | | | | |
| ~~J10DW0~~ | SOIL | | | | | | | | | | | | |
| ~~J10DW1~~ | SOIL | | | | | | | | | | | | |
| ~~J10DW2~~ | SOIL | | | | | | | | | | | | |
| ~~J10DW3~~ | SOIL | | | | | | | | | | | | |

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

| Relinquished By/Removed From | Date/Time | Received By/Stored In | Date/Time |
|---|---|---|---|
| [signature] | 11-1-05 0100 | [signature] | 11-1-05 10:30 |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |

**SPECIAL INSTRUCTIONS**

(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

Bioassay ID = B1542-01

Matrix *
S=Soil
SE=Sediment
SD=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)

E 2801

| Washington Closure Hanford | CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST | RC-051-4 | Page 1 of 1 |
|---|---|---|---|

| | | | |
|---|---|---|---|
| Collector<br>L. COLLOM | 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>PIT 23 | | SAF No.<br>RC-051 |
| Ice Chest No. | Field Logbook No.<br>EL-1596 | COA<br>BESRAS6520 | Method of Shipment |
| Shipped To<br>CH2MHILL | Offsite Property No.<br>A060151 | | Bill of Lading/Air Bill No. |

Price Code 8L

Air Quality ☐

Data Turnaround 45 Days

POSSIBLE SAMPLE HAZARDS/REMARKS

*NONE*

Special Handling and/or Storage

*NONE*

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Preservation | None | None | | | | | | | | | | |
| Type of Container | G/P | P/G | | | | | | | | | | |
| No. of Container(s) | 1 | 1 | | | | | | | | | | |
| Volume | 1000g | ~~3000g~~ 1000 g | ET 11-8-5 | | | | | | | | | |
| 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 | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| J10DV4 | SOIL | 11-8-05 | 11:00 | 1 | 1 | | | | | | | | ~1 |
| J10DV5 | SOIL | | | | | | | | | | | | |
| J10DV6 | SOIL | | | | | | | | | | | | |
| J10DV7 | SOIL | | | | | | | | | | | | |
| J10DV8 | SOIL | | | | | | | | | | | | |

| CHAIN OF POSSESSION | | Sign/Print Names | |
|---|---|---|---|
| Relinquished By/Removed From<br>Elizabeth M Toffs | Date/Time<br>11-9-05 12:00 | Received By/Stored In<br>[illegible] | Date/Time<br>11-9-05 12:30 |
| 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

This chain of custody form documents the transfer of bulk field collected soils to the CH2M Hill Corvallis laboratory for incremental preparation and aliquoting.

(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

ET 11/10/05 as per Rich Weiss

Bioassay ID = B1542-02

Matrix *

S=Soil
SD=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)

E2931

| Washington Closure Hanford | CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST | RC-051-9 | Page 1 of 1 |
|---|---|---|---|

| | | | |
|---|---|---|---|
| Collector<br>L. COLLOM | 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>Upland Backfill Elevated-100-F-2 | | SAF No.<br>RC-051 |
| Ice Chest No. | Field Logbook No.<br>EL-1596 | COA<br>BESRAS6520 | Method of Shipment |
| Shipped To<br>CH2MHILL | Offsite Property No.<br>A060151 | | Bill of Lading/Air Bill No. |

Price Code 8L — Air Quality

Data Turnaround — 45 Days

POSSIBLE SAMPLE HAZARDS/REMARKS

*Potentially Radioactive.*

Special Handling and/or Storage

*NONE*

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 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 | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| J10DT8 | SOIL | 11/14/05 | 17:21 | 1 | 1 | | | | | | | | |
| | | | | | | | | | | | | | |
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| | | | | | | | | | | | | | |
| | | | | | | | | | | | | | |

CHAIN OF POSSESSION — Sign/Print Names

| Relinquished By/Removed From | Date/Time | Received By/Stored In | Date/Time |
|---|---|---|---|
| Elizabeth Tepper | 11/15/05 11:20 | Dayna Kaumann | 11/15/05 11:01 |
| Elizabeth Tepper | | | |
| | | | |
| | | | |
| | | | |
| | | | |

SPECIAL INSTRUCTIONS

(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

Bioassay ID = B1542-03

Matrix *

S=Soil
SE=Sediment
SO=Solid
Sl=Sludge
W = Water
O=Oil
A=Air
OS=Drum Solids
OL=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)

E 2846

| Washington Closure Hanford | CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST | RC-051-15 | Page 1 of 1 |
|---|---|---|---|

| | | | |
|---|---|---|---|
| Collector<br>L. COLLOM | 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>Upland Native Reference-Central Plateau | | SAF No.<br>RC-051 |
| Ice Chest No. | Field Logbook No.<br>EL-1596 | COA<br>BESRAS6520 | Method of Shipment |
| Shipped To<br>CH2MHILL | Offsite Property No.<br>A060151 | | Bill of Lading/Air Bill No. |

Price Code 8L — Air Quality — Data Turnaround 45 Days

POSSIBLE SAMPLE HAZARDS/REMARKS

*NONE*

Special Handling and/or Storage

*NONE*

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 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 | | | | | | | | | | | | |
| J10DV2 / SOIL / 11-15-05 / 20:00 | 1 | 1 | | | | | | | | | | -1 |
| | | | | | | | | | | | | |
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CHAIN OF POSSESSION — Sign/Print Names

| Relinquished By/Removed From | Date/Time | Received By/Stored In | Date/Time |
|---|---|---|---|
| CH2M Hill Elizabeth Tepper | 14:30 | NA | |
| Elizabeth Tepper | 11-16-05 | Raymond Leonard CH2MHILL | 11/16/05 14:31 |
| | | | |
| | | | |
| | | | |
| | | | |

SPECIAL INSTRUCTIONS

This chain of custody form documents the transfer of bulk field collected soils to the CH2M Hill Corvallis laboratory for incremental preparation and aliquoting.

(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

Bioassay ID = B1542-04

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)

E 2847

| Washington Closure Hanford | CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST | RC-051-12 | Page 1 of 1 |
|---|---|---|---|

| | | | |
|---|---|---|---|
| Collector<br>L. COLLOM | Company Contact<br>JOAN KESSNER | Telephone No.<br>375-4688 | Project Coordinator<br>KESSNER, JH | Price Code 8L<br>Air Quality | Data Turnaround<br>45 Days |
| Project Designation<br>100 & 300 Area Component of the RCDRA - Incremental So | Sampling Location<br>Upland Backfill Low-116-DR-1&2 | | SAF No.<br>RC-051 | | |
| Ice Chest No. | Field Logbook No.<br>EL-1596 | COA<br>BESRAS6520 | Method of Shipment | | |
| 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

*NONE*

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 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 | | | | | | | | | | | |
| J10DV1 / SOIL / 11-15-05 / 2015 | 1 | 1 | | | | | | | | | -1 |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |

| CHAIN OF POSSESSION | Sign/Print Names | | |
|---|---|---|---|
| Relinquished By/Removed From<br>CH2MHill<br>Elizabeth Tepper | Date/Time<br>14:30 | Received By/Stored In<br>NP | Date/Time |
| Relinquished By/Removed From<br>Elizabeth Tepper | Date/Time<br>11-16-05 | Received By/Stored In<br>CH2MHill | Date/Time |
| Relinquished By/Removed From | Date/Time | Received By/Stored In | Date/Time 11/16/05 14:31 |
| 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

This chain of custody form documents the transfer of bulk field collected soils to the CH2M Hill Corvallis laboratory for incremental preparation and aliquoting.

(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

Bioassay ID = B1542-05

Matrix *

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

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

BHI-EE-7011 (08/29/2005)

E2851

| Washington Closure Hanford | CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST | RC-051-16 | Page 1 of 1 |
|---|---|---|---|

| | | | |
|---|---|---|---|
| Collector<br>L. COLLOM | Company Contact<br>JOAN KESSNER | Telephone No.<br>375-4688 | Project Coordinator<br>KESSNER, JH | Price Code 8L<br>Air Quality | Data Turnaround<br>45 Days |
| Project Designation<br>100 & 300 Area Component of the RCBRA - incremental So | Sampling Location<br>Upland Native Elevated-JA Jones | | SAF No.<br>RC-051 | | |
| Ice Chest No. | Field Logbook No.<br>EL-1596 | COA<br>BESRAS6520 | Method of Shipment | | |
| 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

*NONE*

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 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 | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| J10DV3 | SOIL | 11/16/05 | 15:27 | 1 | 1 | | | | | | | | |
| | | | | | | | | | | | | | |
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| | | | | | | | | | | | | | |
| | | | | | | | | | | | | | |

| CHAIN OF POSSESSION | Sign/Print Names | | |
|---|---|---|---|
| Relinquished By/Removed From<br>Elizabeth Tepper | Date/Time<br>10:00 11/17/05 | Received By/Stored In<br>NA | Date/Time |
| Relinquished By/Removed From<br>Elizabeth Tepper CH2MHill | Date/Time | Received By/Stored In<br>[illegible] | Date/Time<br>11/17/05 10:15 |
| 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

This chain of custody form documents the transfer of bulk field collected soils to the CH2M Hill Corvallis laboratory for incremental preparation and aliquoting.

(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

Bioassay ID = B1542-06

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)

E287

| Washington Closure Hanford | CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST | RC-051-11 | Page 1 of 1 |
|---|---|---|---|

| | | | |
|---|---|---|---|
| Collector<br>L. COLLOM | Company Contact<br>JOAN KESSNER | Telephone No.<br>375-4688 | Project Coordinator<br>KESSNER, JH | Price Code 8L<br>Air Quality | Data Turnaround<br>45 Days |
| Project Designation<br>100 & 300 Area Component of the RCBRA - Incremental So | Sampling Location<br>Riparian Elevated-Site #3 Upriver 100-D | | SAF No.<br>RC-051 | | |
| Ice Chest No. | Field Logbook No.<br>EL-1596 | COA<br>BESRAS6520 | Method of Shipment | | |
| 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**

*NONE*

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Preservation | None | None | | | | | | | | | |
| Type of Container | G/P | P/G | | | | | | | | | |
| No. of Container(s) | 1 | 1 | | | | | | | | | |
| Volume | 1000g | ~~3000g~~ 4000g | RT 11-21-05 | | | | | | | | |
| 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 | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| J10DV0 | SOIL | 11-21-05 | 16:00 | 1 | 1 | | | | | | | | |
| | | | | | | | | | | | | | |
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| | | | | | | | | | | | | | |

| CHAIN OF POSSESSION | | Sign/Print Names | |
|---|---|---|---|
| Relinquished By/Removed From<br>Elizabeth Tepper CH2MHill | Date/Time | Received By/Stored In | Date/Time |
| Relinquished By/Removed From<br>Elizabeth Tepper | Date/Time 11/22/05 9:00 | Received By/Stored In<br>[illegible] | Date/Time 11/22/05 9:01 |
| 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**

This chain of custody form documents the transfer of bulk field collected soils to the CH2M Hill Corvallis laboratory for incremental preparation and aliquoting.

(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

Bioassay ID = B1542-07

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-0 9/29/2005)

E2897 E 397

| Washington Closure Hanford | CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST | RC-051-20 | Page 1 of 1 |
|---|---|---|---|

| | | | |
|---|---|---|---|
| Collector<br>L. COLLOM | Company Contact<br>JOAN KESSNER | Telephone No.<br>375-4688 | Project Coordinator<br>KESSNER, JH | Price Code 8L<br>Data Turnaround 45 Days |
| Project Designation<br>100 & 300 Area Component of the RCBRA - Incremental So | Sampling Location<br>Riparian Low-Site#10 Downriver 100-D | | SAF No.<br>RC-051 | Air Quality ☐ |
| Ice Chest No. | Field Logbook No.<br>EL-1596 | COA<br>BESRAS6520 | Method of Shipment | |
| 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**

*NONE*

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 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 | | | | | | | | | |

CT 11-28-05

| Sample No. | Matrix * | Sample Date | Sample Time | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| J10LJ5 | SOIL | 11-28-05 | ~~16:19~~ 16:19 | 1 | 1 | | | | | | | | -1 |
| | | | | | | | | | | | | | |
| | | | | | | | | | | | | | |
| | | | | | | | | | | | | | |
| | | | | | | | | | | | | | |

| CHAIN OF POSSESSION | | Sign/Print Names | |
|---|---|---|---|
| Relinquished By/Removed From CH2MHILL | Date/Time 16:25 | Received By/Stored In | Date/Time |
| Elizabeth Tepper | 11-28-05 | Melody Buckelew | 11-28-05 16:25 |
| 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**

This chain of custody form documents the transfer of bulk field collected soils to the CH2M Hill Corvallis laboratory for incremental preparation and aliquoting.

(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

Bioassay ID = B1542-08

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-0 3/29/2005)

E2900 EZ 53

| Washington Closure Hanford | CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST | RC-051-6 | Page 1 of 1 |
|---|---|---|---|

| | | | |
|---|---|---|---|
| Collector<br>L. COLLOM | 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>Riparian Reference-Site #13 Vernita Bridge | | SAF No.<br>RC-051 |
| Ice Chest No. | Field Logbook No.<br>EL-1596 | COA<br>BESRAS6520 | Method of Shipment |
| Shipped To<br>CH2MHILL | Offsite Property No.<br>A060151 | | Bill of Lading/Air Bill No. |

Price Code 8L — Data Turnaround 45 Days — Air Quality [ ]

**POSSIBLE SAMPLE HAZARDS/REMARKS**

*NONE*

**Special Handling and/or Storage**

*NONE*

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Preservation | None | None | | | | | | | | | |
| Type of Container | G/P | P/G | | | | | | | | | |
| No. of Container(s) | 1 | 1 | ET 12/05 | | | | | | | | |
| Volume | 1000g | ~~3000g~~ 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 | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| J10DT9 | SOIL | 12-6-05 | 16:00 | X | X | | | | | | | | -1 |
| | | | | | | | | | | | | | |
| | | | | | | | | | | | | | |
| | | | | | | | | | | | | | |
| | | | | | | | | | | | | | |

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

| Relinquished By/Removed From | Date/Time | Received By/Stored In | Date/Time |
|---|---|---|---|
| Elizabeth Tepper | | CH2M Hill | → |
| Elizabeth M Tepper | 12/4/05 16:00 | M. Bailey Beckstrom | 12-6-05 16:15 |
| | | | |
| | | | |
| | | | |
| | | | |

**SPECIAL INSTRUCTIONS**

This chain of custody form documents the transfer of bulk field collected soils to the CH2M Hill Corvallis laboratory for incremental preparation and aliquoting.

(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

Bioassay ID = B1542-09

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-0 (9/29/2005)

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

CH2MHILL
Applied Sciences Laboratory

January 31, 2006

Washington Closure Hanford

334247.AO.ZZ

RE: Laboratory Report for Washington Closure Hanford
Applied Sciences Laboratory Reference No. E2847

Joan Kessner/WCH:

On November 16, 2005, 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 Elizabeth Tepper at (541) 758-0235, extension 3127.

Sincerely,

Elizabeth M Tepper

Elizabeth Tepper
Analytical Manager

Enclosures

RECEIVED
FEB 2006

SAF RC-051

## CLIENT SAMPLE CROSS-REFERENCE

## CH2M HILL Applied Sciences Laboratory Reference No. E2847

| Sample ID | Client Sample ID | Date Collected | Time Collected |
|---|---|---|---|
| E284701 | J10DV1 | 11/15/2005 | 20:05 |

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# 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.: E2847

Lab Name: CH2M HILL Applied Sciences Lab | Contract #.: 334247.AO.ZZ

Project Name: Washington Closure Hanford | 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 Tyree | Date: 1/19/06

Reviewed by: Amber Jayk | Date: 1/23/06

**SAMPLE DATA**
**SUMMARY**

1A-WC

GENERAL CHEMISTRY ANALYSIS DATA SHEET

Field Sample ID:

J10DV1

SDG No.: E2847

Matrix: SOIL

Lab Name: CH2M HILL/LAB/CVO

Lab Sample ID: E284701

Date Received: 11/16/05

| CAS No. | Analyte | MDL | PQL | Result | Q | Units | DF | Sample Amount | Analysis Method | Date Analyzed |
|---|---|---|---|---|---|---|---|---|---|---|
| 7664-41-7 | Ammonia-N | 0.552 | 2.07 | 0.777 | B | mg/kg | 1 | 1.0188 G | E350.3 | 11/29/05 |

1A-WC

GENERAL CHEMISTRY ANALYSIS DATA SHEET

Field Sample ID:

SB1-1129

SDG No.: E2847

Matrix: SOIL

Lab Name: CH2M HILL/LAB/CVO

Lab Sample ID: SB1-1129

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 | 1.09 | B | mg/kg | 1 | 1 G | E350.3 | 11/29/05 |

# QC DATA
# SUMMARY

GENERAL CHEMISTRY INITIAL CALIBRATION DATA

SDG No.: E2847

Lab Name: CH2M HILL/LAB/CVO

Analysis Method: E350.3

Initial Calibration Date: 11/29/05 11:30

Instrument Name: NONE

Concentration Units: mg/L

Initial Calibration ID: 112905NH3

| 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 | 149 | 1.0 | 95.1 | 10.0 | 39.9 | 100 | -13 | | | | | | |

# GENERAL CHEMISTRY INITIAL CALIBRATION DATA

SDG No.: E2847

Lab Name: CH2M HILL/LAB/CVO

Analysis Method: E350.3

Initial Calibration Date: 11/29/05 11:30

Instrument Name: NONE

Concentration Units: mg/L

Initial Calibration ID: 112905NH3

| Analyte | Curve Type | r | Q |
|---|---|---|---|
| Ammonia-N | LNR | 0.9999 | |

2B-WC

GENERAL CHEMISTRY SECOND SOURCE CALIBRATION VERIFICATION DATA

SDG No.: E2847

Lab Name: CH2M HILL/LAB/CVO

Analysis Method: E350.3

Instrument Name: NONE

Concentration Units: mg/L

Initial Calibration ID: 112905NH3

Second Source ID: ICV-1129

| Analyte | Expected | Found | %D | Q |
|---|---|---|---|---|
| Ammonia-N | 1 | 1.07 | 7.0 | |
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Comments:

2A-WC

GENERAL CHEMISTRY CALIBRATION VERIFICATION DATA

SDG No.: E2847

Lab Name: CH2M HILL/LAB/CVO

Analysis Method: E350.3

Instrument Name: NONE

Concentration Units: mg/L

Initial Calibration ID: 112905NH3

Analytical Lot ID: 112905NH3

CCV #1 ID: CV1-1129 CCV #2 ID: CV2-1129 CCV #3 ID: CV3-1129

| Analyte | Expected | Found | %D | Q | Expected | Found | %D | Q | Expected | Found | %D | Q |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ammonia-N | 0.1 | 0.0997 | -0.3 | | 1 | 0.989 | -1.1 | | 1 | 0.845 | -15.5 | |

COMMENTS:

GENERAL CHEMISTRY CALIBRATION VERIFICATION DATA

SDG No.: E2847

Lab Name: CH2M HILL/LAB/CVO

Analysis Method: E350.3

Instrument Name: NONE

Concentration Units: mg/L

Initial Calibration ID: 112905NH3

Analytical Lot ID: 112905NH3

CCV #4 ID: CV4-1129 CCV #5 ID: CCV #6 ID:

| Analyte | Expected | Found | %D | Q | Expected | Found | %D | Q | Expected | Found | %D | Q |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ammonia-N | 1 | 0.807 | -19.3 | | | | | | | | | |

COMMENTS:

3-WC

SOIL GENERAL CHEMISTRY METHOD BLANK SUMMARY

Field Sample ID:

SB1-1129

SDG No.: E2847

Analysis Method: E350.3

Initial Cal ID: 112905NH3

Matrix: (Soil/Water) SOIL

Instrument: NONE

Lab Name: CH2M HILL/LAB/CVO

Lab Sample ID: SB1-1129

Date Analyzed: 11/29/05

Time Analyzed: 1226

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

| | CLIENT SAMPLE ID | LAB SAMPLE ID | DATE ANALYZED | TIME ANALYZED |
|---|---|---|---|---|
| 04 | BS1S1129 | BS1S1129 | 11/29/05 | 1222 |
| 19 | J10DV1 | E284701 | 11/29/05 | 1345 |

COMMENTS:

7-WC

GENERAL CHEMISTRY LABORATORY CONTROL SAMPLE

SDG No.: E2847

Analysis Method: E350.3

Initial Cal ID: 112905NH3

Matrix: (Soil/Water) SOIL

Instrument: NONE

Lab Name: CH2M HILL/LAB/CVO

LCS ID: BS1S1129

Date Analyzed: 11/29/05

Time Analyzed: 1222

Concentration Units: mg/kg

| Analyte | Expected | Found | %R | QC Limits %R | Q |
|---|---|---|---|---|---|
| Ammonia-N | 20 | 21.4 | 107.2 | 80-120 | |

* Values outside of QC limits

Comments:

14-WC

GENERAL CHEMISTRY ANALYTICAL SEQUENCE

SDG No.: E2847

Lab Name: CH2M HILL/LAB/CVO

Analysis Method: E350.3

Lab Code: CVO

Instrument: NONE

Analytical Lot ID: 112905NH3

| | CLIENT SAMPLE ID | LAB SAMPLE ID | DATE ANALYZED | TIME ANALYZED |
|---|---|---|---|---|
| 01 | CV1-1129 | CV1-1129 | 11/29/05 | 1218 |
| 02 | CV2-1129 | CV2-1129 | 11/29/05 | 1218 |
| 04 | BS1S1129 | BS1S1129 | 11/29/05 | 1222 |
| 06 | SB1-1129 | SB1-1129 | 11/29/05 | 1226 |
| 17 | CV3-1129 | CV3-1129 | 11/29/05 | 1328 |
| 19 | J10DV1 | E284701 | 11/29/05 | 1345 |
| 24 | CV4-1129 | CV4-1129 | 11/29/05 | 1424 |
| 25 | ICV-1129 | ICV-1129 | 11/29/05 | 1130 |

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

01/19/06

# 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 |



ET060119-17:57-E2847-W

## ANIONS BY METHOD EPA300.0

## CASE NARRATIVE
## ANIONS

Analytical Method: EPA300.0 Batch No.: E2847

Lab Name: CH2M HILL Applied Sciences Lab Contract #.: 334247.AO.ZZ

Base/Command: Washington Closure 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: 1/26/06

Reviewed by: Date: 1/30/06

AFCEE FORM I-1

# SAMPLE DATA SUMMARY

1A-WC

GENERAL CHEMISTRY ANALYSIS DATA SHEET

Field Sample ID:

J10DV1

SDG No.: E2847

Matrix: SOIL

Lab Name: CH2M HILL/LAB/CVO

Lab Sample ID: E284701

Date Received: 11/16/05

| CAS No. | Analyte | MDL | PQL | Result | Q | Units | DF | Sample Amount | Analysis Method | Date Analyzed |
|---|---|---|---|---|---|---|---|---|---|---|
| 16887-00-6 | Chloride | 0.0316 | 0.651 | 5.02 | | mg/kg | 1 | 2.02 G | E300.0A | 11/23/05 |
| 16984-48-8 | Fluoride | 0.0283 | 0.651 | 0.117 | B | mg/kg | 1 | 2.02 G | E300.0A | 11/23/05 |
| 14797-55-8 | Nitrate-N | 0.0245 | 0.651 | 0.651 | U | mg/kg | 1 | 2.02 G | E300.0A | 11/23/05 |
| 14797-65-0 | Nitrite-N | 0.0234 | 0.651 | 0.442 | B | mg/kg | 1 | 2.02 G | E300.0A | 11/23/05 |
| 14808-79-8 | Sulfate | 0.0420 | 0.651 | 4.26 | | mg/kg | 1 | 2.02 G | E300.0A | 11/23/05 |

1A-WC

GENERAL CHEMISTRY ANALYSIS DATA SHEET

Field Sample ID:

SB1-1123

SDG No.: E2847

Matrix: SOIL

Lab Name: CH2M HILL/LAB/CVO

Lab Sample ID: SB1-1123

Date Received: / /

| CAS No. | Analyte | MDL | PQL | Result | Q | Units | DF | Sample Amount | Analysis Method | Date Analyzed |
|---|---|---|---|---|---|---|---|---|---|---|
| 16887-00-6 | Chloride | 0.0121 | 0.250 | 0.0350 | B | mg/kg | 1 | 5 G | E300.0A | 11/23/05 |
| 16984-48-8 | Fluoride | 0.0109 | 0.250 | 0.250 | U | mg/kg | 1 | 5 G | E300.0A | 11/23/05 |
| 14797-55-8 | Nitrate-N | 0.00939 | 0.250 | 0.250 | U | mg/kg | 1 | 5 G | E300.0A | 11/23/05 |
| 14797-65-0 | Nitrite-N | 0.00898 | 0.250 | 0.250 | U | mg/kg | 1 | 5 G | E300.0A | 11/23/05 |
| 14808-79-8 | Sulfate | 0.0161 | 0.250 | 0.250 | U | mg/kg | 1 | 5 G | E300.0A | 11/23/05 |

# QC DATA SUMMARY

2-WC

GENERAL CHEMISTRY INITIAL CALIBRATION DATA

SDG No.: E2847

Lab Name: CH2M HILL/LAB/CVO

Analysis Method: E300.0A

Initial Calibration Date: 07/08/05 11:53

Instrument Name: ICQ

Concentration Units: mg/L

Initial Calibration ID: 300A-070805

| 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 | 0.0061 | 0.10 | 0.015 | 0.50 | 0.083 | 1.0 | 0.14 | 5.0 | 0.78 | 10.0 | 1.8 | | |
| Fluoride | | | 0.10 | 0.0031 | 0.50 | 0.050 | 1.0 | 0.13 | 5.0 | 1.0 | 10.0 | 2.3 | | |
| Nitrate-N | 0.020 | 0.010 | 0.10 | 0.034 | 0.50 | 0.17 | 1.0 | 0.36 | 5.0 | 2.1 | 10.0 | 4.7 | | |
| Nitrite-N | 0.020 | 0.0031 | 0.10 | 0.018 | 0.50 | 0.10 | 1.0 | 0.22 | 5.0 | 1.3 | 10.0 | 2.7 | | |
| Sulfate | 0.060 | 0.0066 | 0.30 | 0.028 | 1.5 | 0.15 | 3.0 | 0.30 | 15.0 | 1.7 | 30.0 | 3.7 | | |

2-WC

GENERAL CHEMISTRY INITIAL CALIBRATION DATA

SDG No.: E2847

Lab Name: CH2M HILL/LAB/CVO

Analysis Method: E300.0A

Initial Calibration Date: 07/08/05 11:53

Instrument Name: ICQ

Concentration Units: mg/L

Initial Calibration ID: 300A-070805

| Analyte | Curve Type | r | Q |
|---|---|---|---|
| Chloride | LNR | 0.9985 | |
| Fluoride | LNR | 0.9976 | |
| Nitrate-N | LNR | 0.9985 | |
| Nitrite-N | LNR | 0.9997 | |
| Sulfate | LNR | 0.9990 | |

2B-WC

GENERAL CHEMISTRY SECOND SOURCE CALIBRATION VERIFICATION DATA

SDG No.: E2847

Lab Name: CH2M HILL/LAB/CVO

Analysis Method: E300.0A

Instrument Name: ICQ

Concentration Units: MG/L

Initial Calibration ID: 300A-070805

Second Source ID: ICV-0708

| Analyte | Expected | Found | %D | Q |
|---|---|---|---|---|
| Chloride | 5 | 4.78 | -4.4 | |
| Fluoride | 5 | 5.21 | 4.1 | |
| Nitrate-N | 32.9 | 31.3 | -5.0 | |
| Nitrite-N | 2.86 | 3.13 | 9.5 | |
| Sulfate | 5 | 4.96 | -0.9 | |
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Comments:

2A-WC

GENERAL CHEMISTRY CALIBRATION VERIFICATION DATA

SDG No.: E2847

Lab Name: CH2M HILL/LAB/CVO

Analysis Method: E300.0A

Instrument Name: ICQ

Concentration Units: MG/L

Initial Calibration ID: 300A-070805

Analytical Lot ID: 112305Q3

CCV #1 ID: CV1-1123 CCV #2 ID: CV2-1123 CCV #3 ID:

| Analyte | Expected | Found | %D | Q | Expected | Found | %D | Q | Expected | Found | %D | Q |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Chloride | 5 | 4.54 | -9.2 | | 5 | 4.55 | -9.1 | | | | | |
| Fluoride | 5 | 4.51 | -9.7 | | 5 | 4.53 | -9.4 | | | | | |
| Nitrate-N | 5 | 4.85 | -3.0 | | 5 | 4.87 | -2.6 | | | | | |
| Nitrite-N | 5 | 5.12 | 2.3 | | 5 | 5.13 | 2.5 | | | | | |
| Sulfate | 15 | 14.6 | -2.6 | | 15 | 14.4 | -4.1 | | | | | |

COMMENTS:

3-WC

SOIL GENERAL CHEMISTRY METHOD BLANK SUMMARY

Field Sample ID:

SB1-1123

SDG No.: E2847

Analysis Method: E300.0A

Initial Cal ID: 300A-070805

Matrix: (Soil/Water) SOIL

Instrument: ICQ

Lab Name: CH2M HILL/LAB/CVO

Lab Sample ID: SB1-1123

Date Analyzed: 11/23/05

Time Analyzed: 1546

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

| | CLIENT SAMPLE ID | LAB SAMPLE ID | DATE ANALYZED | TIME ANALYZED |
|---|---|---|---|---|
| 15 | BS1S1123 | BS1S1123 | 11/23/05 | 1514 |
| 16 | BS2S1123 | BS2S1123 | 11/23/05 | 1535 |
| 26 | J10DV1 | E284701 | 11/23/05 | 1701 |

COMMENTS:

7-WC

GENERAL CHEMISTRY LABORATORY CONTROL SAMPLE

SDG No.: E2847

Lab Name: CH2M HILL/LAB/CVO

Analysis Method: E300.0A

LCS ID: BS1S1123

Initial Cal ID: 300A-070805

Date Analyzed: 11/23/05

Matrix: (Soil/Water) SOIL

Time Analyzed: 1514

Instrument: ICQ

Concentration Units: MG/KG

| Analyte | Expected | Found | %R | QC Limits %R | Q |
|---|---|---|---|---|---|
| Chloride | 215 | 242 | 112.5 | 70-130 | |
| Fluoride | 306 | 269 | 87.9 | 70-130 | |
| Nitrate-N | 243 | 214 | 87.8 | 70-130 | |
| Sulfate | 314 | 223 | 71.1 | 70-130 | |

* Values outside of QC limits

Comments:

7-WC

GENERAL CHEMISTRY LABORATORY CONTROL SAMPLE

SDG No.: E2847

Analysis Method: E300.0A

Initial Cal ID: 300A-070805

Matrix: (Soil/Water) SOIL

Instrument: ICQ

Lab Name: CH2M HILL/LAB/CVO

LCS ID: BS2S1123

Date Analyzed: 11/23/05

Time Analyzed: 1535

Concentration Units: MG/KG

| Analyte | Expected | Found | %R | QC Limits %R | Q |
|---|---|---|---|---|---|
| Nitrite-N | 2.86 | 2.91 | 101.6 | 70-130 | |

* Values outside of QC limits

Comments:

GENERAL CHEMISTRY ANALYTICAL SEQUENCE

SDG No.: E2847

Lab Name: CH2M HILL/LAB/CVO

Analysis Method: E300.0A

Lab Code: CVO

Instrument: ICQ

Analytical Lot ID: 300A-070805

| | CLIENT SAMPLE ID | LAB SAMPLE ID | DATE ANALYZED | TIME ANALYZED |
|---|---|---|---|---|
| 02 | LEVEL1 | LEVEL1 | 07/08/05 | 1049 |
| 03 | LEVEL2 | LEVEL2 | 07/08/05 | 1102 |
| 04 | LEVEL3 | LEVEL3 | 07/08/05 | 1115 |
| 05 | LEVEL4 | LEVEL4 | 07/08/05 | 1127 |
| 06 | LEVEL5 | LEVEL5 | 07/08/05 | 1140 |
| 07 | LEVEL6 | LEVEL6 | 07/08/05 | 1153 |
| 09 | ICV-0708 | ICV-0708 | 07/08/05 | 1218 |
| 10 | ICV-0708 | ICV-0708 | 07/08/05 | 1231 |
| 12 | ICV-0708 | ICV-0708 | 07/08/05 | 1421 |

COMMENTS: _____

14-WC

GENERAL CHEMISTRY ANALYTICAL SEQUENCE

SDG No.: E2847

Lab Name: CH2M HILL/LAB/CVO

Analysis Method: E300.0A

Lab Code: CVO

Instrument: ICQ

Analytical Lot ID: 112305Q3

| | CLIENT SAMPLE ID | LAB SAMPLE ID | DATE ANALYZED | TIME ANALYZED |
|---|---|---|---|---|
| 14 | CV1-1123 | CV1-1123 | 11/23/05 | 1503 |
| 15 | BS1S1123 | BS1S1123 | 11/23/05 | 1514 |
| 16 | BS2S1123 | BS2S1123 | 11/23/05 | 1535 |
| 19 | SB1-1123 | SB1-1123 | 11/23/05 | 1546 |
| 26 | J10DV1 | E284701 | 11/23/05 | 1701 |
| 29 | CV2-1123 | CV2-1123 | 11/23/05 | 1805 |

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

01/27/06

# MDL Study Report

Analytical Method: E300.0A
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 |
| Nitrite-N | 11/01/05 | 0.25 | 0.230 | 0.270 | 0.270 | 0.260 | 0.270 | 0.260 | 0.265 | | 0.0143 | 0.0449 |
| Sulfate | 11/01/05 | 0.75 | 0.790 | 0.735 | 0.730 | 0.795 | 0.775 | 0.750 | 0.760 | | 0.0256 | 0.0806 |
| Chloride | 11/01/05 | 0.25 | 0.315 | 0.315 | 0.340 | 0.340 | 0.290 | 0.300 | 0.330 | | 0.0193 | 0.0607 |
| Fluoride | 11/02/05 | 0.5 | 0.505 | 0.480 | 0.500 | 0.470 | 0.490 | 0.485 | 0.455 | | 0.0173 | 0.0543 |



YL060127-16:02-E2847-W

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

1A-WC

GENERAL CHEMISTRY ANALYSIS DATA SHEET

Field Sample ID:

J10DV1

SDG No.: E2847

Matrix: SOIL

Lab Name: CH2M HILL/LAB/CVO

Lab Sample ID: E284701

Date Received: 11/16/05

| CAS No. | Analyte | MDL | PQL | Result | Q | Units | DF | Sample Amount | Analysis Method | Date Analyzed |
|---|---|---|---|---|---|---|---|---|---|---|
| MOISTURE | Moisture | 0.00 | 0.00 | 4.90 | | % | 1 | 32.1432 G | ASTM D2216 | 11/17/05 |

**PARTICLE SIZE**
**METHOD 422**

*Hanford*

**Particle Size**

500.0 g sample used

**Weight retained is the weight of material ON each sieve**

**ANALYST:** KH 11/17/2005

| Lab I.D. | Client I.D. | Sieve # | Sieve Size (um) | Sieve Size (mm) | Weight Retained (g) | Weight Retained (%) | Cumulative Coarser (%) | Cumulative Finer (%) |
|---|---|---|---|---|---|---|---|---|
| E284701 | J10DV1 | 8 | 2362 | 2.362 | 0.30 | 0.06 | 0.06 | 99.94 |
| | | 16 | 1180 | 1.180 | 47.30 | 9.50 | 9.56 | 90.44 |
| | | 30 | 600 | 0.600 | 114.40 | 22.98 | 32.54 | 67.46 |
| | | 50 | 500 | 0.500 | 106.10 | 21.31 | 53.86 | 46.14 |
| | | 100 | 147 | 0.147 | 65.60 | 13.18 | 67.03 | 32.97 |
| | | 200 | 75 | 0.075 | 149.00 | 29.93 | 96.97 | 3.03 |
| | | 325 | 45 | 0.045 | 10.70 | 2.15 | 99.12 | 0.88 |
| | | pan | | | 4.40 | 0.88 | 100.00 | 0.00 |
| | | total | | | 497.8 | | | |



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:

J10DV1

SDG No.: E2847

Matrix: SOIL

Lab Name: CH2M HILL/LAB/CVO

Lab Sample ID: E284701

Date Received: 11/16/05

| CAS No. | Analyte | MDL | PQL | Result | Q | Units | DF | Sample Amount | Analysis Method | Date Analyzed |
|---|---|---|---|---|---|---|---|---|---|---|
| pH | pH | 0.00 | 0.00 | 8.53 | | pH | 1 | 20 G | SW9045C | 11/17/05 |

1A-WC

GENERAL CHEMISTRY ANALYSIS DATA SHEET

Field Sample ID:

SB1-1117

SDG No.: E2847

Matrix: SOIL

Lab Name: CH2M HILL/LAB/CVO

Lab Sample ID: SB1-1117

Date Received: / /

| CAS No. | Analyte | MDL | PQL | Result | Q | Units | DF | Sample Amount | Analysis Method | Date Analyzed |
|---|---|---|---|---|---|---|---|---|---|---|
| pH | pH | 0.00 | 0.00 | 5.73 | | pH | 1 | 20 G | SW9045C | 11/17/05 |

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

**CASE NARRATIVE**
**TKN**

Analytical Method: EPA 351.4 Batch No.: E2847

Lab Name: CH2M HILL Applied Sciences Lab Contract #.: 334247.AO.ZZ

Project Name: Washington Closure Hanford 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 Tepps Date: 1/19/06

Reviewed by: Anita Taylor Date: 1/24/06

**SAMPLE DATA**
**SUMMARY**

1A-WC

GENERAL CHEMISTRY ANALYSIS DATA SHEET

Field Sample ID:

J10DV1

SDG No.: E2847

Matrix: SOIL

Lab Name: CH2M HILL/LAB/CVO

Lab Sample ID: E284701

Date Received: 11/16/05

| CAS No. | Analyte | MDL | PQL | Result | Q | Units | DF | Sample Amount | Analysis Method | Date Analyzed |
|---|---|---|---|---|---|---|---|---|---|---|
| 7727-37-9 | Total Kjeldahl Nitrogen as N | 21.7 | 104 | 179 | | mg/kg | 1 | 1.0163 G | E351.4 | 11/22/05 |

1A-WC

GENERAL CHEMISTRY ANALYSIS DATA SHEET

Field Sample ID:

SB1-1122

SDG No.: E2847

Matrix: SOIL

Lab Name: CH2M HILL/LAB/CVO

Lab Sample ID: SB1-1122

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 | 21.0 | 100 | 68.5 | B | mg/kg | 1 | 1 G | E351.4 | 11/22/05 |

# QC DATA SUMMARY

GENERAL CHEMISTRY INITIAL CALIBRATION DATA

SDG No.: E2847

Lab Name: CH2M HILL/LAB/CVO

Analysis Method: E351.4

Initial Calibration Date: 11/22/05 13:00

Instrument Name: NONE

Concentration Units: mg/L

Initial Calibration ID: 112205TKN

| 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 | 148 | 20.0 | 93.9 | 200 | 40.0 | 2000 | -17 | | | | | | |

GENERAL CHEMISTRY INITIAL CALIBRATION DATA

SDG No.: E2847

Lab Name: CH2M HILL/LAB/CVO

Analysis Method: E351.4

Initial Calibration Date: 11/22/05 13:00

Instrument Name: NONE

Concentration Units: mg/L

Initial Calibration ID: 112205TKN

| Analyte | Curve Type | r | Q |
|---|---|---|---|
| Total Kjeldahl Nitrogen as N | LNR | 0.9998 | |

2B-WC

GENERAL CHEMISTRY SECOND SOURCE CALIBRATION VERIFICATION DATA

SDG No.: E2847

Lab Name: CH2M HILL/LAB/CVO

Analysis Method: E351.4

Instrument Name: NONE

Concentration Units: mg/L

Initial Calibration ID: 112205TKN

Second Source ID: ICV-1122

| Analyte | Expected | Found | %D | Q |
|---|---|---|---|---|
| Total Kjeldahl Nitrogen as N | 13.6 | 13.7 | 0.7 | |
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Comments:

2A-WC

GENERAL CHEMISTRY CALIBRATION VERIFICATION DATA

SDG No.: E2847

Lab Name: CH2M HILL/LAB/CVO

Analysis Method: E351.4

Instrument Name: NONE

Concentration Units: mg/L

Initial Calibration ID: 112205TKN

Analytical Lot ID: 112205TKN

CCV #1 ID: CV1-1122 CCV #2 ID: CV2-1122 CCV #3 ID: CV3-1122

| Analyte | Expected | Found | %D | Q | Expected | Found | %D | Q | Expected | Found | %D | Q |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Total Kjeldahl Nitrogen as N | 2 | 2.05 | 2.7 | | 20 | 19.7 | -1.6 | | 200 | 182 | -8.9 | |

COMMENTS:

2A-WC

GENERAL CHEMISTRY CALIBRATION VERIFICATION DATA

SDG No.: E2847

Lab Name: CH2M HILL/LAB/CVO

Analysis Method: E351.4

Instrument Name: NONE

Concentration Units: mg/L

Initial Calibration ID: 112205TKN

Analytical Lot ID: 112205TKN

CCV #4 ID: CV4-1122 CCV #5 ID: CCV #6 ID:

| Analyte | Expected | Found | %D | Q | Expected | Found | %D | Q | Expected | Found | %D | Q |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Total Kjeldahl Nitrogen as N | 20 | 19.1 | -4.5 | | | | | | | | | |

COMMENTS:

3-WC

SOIL GENERAL CHEMISTRY METHOD BLANK SUMMARY

Field Sample ID:

SB1-1122

SDG No.: E2847

Analysis Method: E351.4

Initial Cal ID: 112205TKN

Matrix: (Soil/Water) SOIL

Instrument: NONE

Lab Name: CH2M HILL/LAB/CVO

Lab Sample ID: SB1-1122

Date Analyzed: 11/22/05

Time Analyzed: 1316

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

| | CLIENT SAMPLE ID | LAB SAMPLE ID | DATE ANALYZED | TIME ANALYZED |
|---|---|---|---|---|
| 05 | BS1S1122 | BS1S1122 | 11/22/05 | 1307 |
| 24 | J10DV1 | E284701 | 11/22/05 | 1438 |

COMMENTS:

7-WC

GENERAL CHEMISTRY LABORATORY CONTROL SAMPLE

SDG No.: E2847

Analysis Method: E351.4

Initial Cal ID: 112205TKN

Matrix: (Soil/Water) SOIL

Instrument: NONE

Lab Name: CH2M HILL/LAB/CVO

LCS ID: BS1S1122

Date Analyzed: 11/22/05

Time Analyzed: 1307

Concentration Units: mg/kg

| Analyte | Expected | Found | %R | QC Limits %R | Q |
|---|---|---|---|---|---|
| Total Kjeldahl Nitrogen as N | 680 | 685 | 100.6 | 75-125 | |

* Values outside of QC limits

Comments:

14-WC

GENERAL CHEMISTRY ANALYTICAL SEQUENCE

SDG No.: E2847

Lab Name: CH2M HILL/LAB/CVO

Analysis Method: E351.4

Lab Code: CVO

Instrument: NONE

Analytical Lot ID: 112205TKN

| | CLIENT SAMPLE ID | LAB SAMPLE ID | DATE ANALYZED | TIME ANALYZED |
|---|---|---|---|---|
| 01 | CV1-1122 | CV1-1122 | 11/22/05 | 1304 |
| 02 | CV1-1122 | CV2-1122 | 11/22/05 | 1304 |
| 03 | ICV-1122 | ICV-1122 | 11/22/05 | 1307 |
| 05 | BS1S1122 | BS1S1122 | 11/22/05 | 1307 |
| 07 | SB1-1122 | SB1-1122 | 11/22/05 | 1316 |
| 18 | CV3-1122 | CV3-1122 | 11/22/05 | 1358 |
| 24 | J10DV1 | E284701 | 11/22/05 | 1438 |
| 27 | CV4-1122 | CV4-1122 | 11/22/05 | 1447 |

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

01/19/06

# 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 | 03/17/05 | 100 | 100 | 109 | 113 | 103 | 101 | 116 | 99.8 | | 6.66 | 21.0 |



ET060119-18:04-E2847-W

**TOC SOIL**
**METHOD SW9060**

# CASE NARRATIVE
# TOC-SOIL

CLIENT/PROJECT: Washington Closure Hanford

LABORATORY: CH2M HILL Applied Sciences Laboratory PROJECT NO.: 334247.AO.ZZ

SDG NO: E2847

LAB CODE: CVO LAB BATCH NO: E2847

I. RECEIPT

A. Date Received:
November 16, 2005

B. Sample Information:

| LAB SAMPLE ID | CLIENT SAMPLE ID | SAMPLE MATRIX | DATE SAMPLED | DATE ANALYZED |
|---|---|---|---|---|
| E284701 | J10DV1 | Soil | 11/15/2005 | 12/12/2005 |

II. Holding Times:
All holding times were met.

III. Analysis:

A. Calibration:
All acceptance criteria were met.

B. Blanks:
All acceptance criteria were met.

C. Matrix Spike Sample(s):
Analysis performed in accordance with standard operating procedure.

D. Duplicate Sample(s):
Analysis performed in accordance with standard operating procedure.

E. Lab Control Sample(s):
All acceptance criteria were met.

F. Other:
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: 1-4-06

Reviewed By : _____ DATE: 01/04/06

## SAMPLE DATA SUMMARY

GENERAL CHEMISTRY ANALYSIS DATA SHEET

Field Sample ID:

J10DV1

SDG No.: E2847

Matrix: SOIL

Lab Name: CH2M HILL/LAB/CVO

Lab Sample ID: E284701

Date Received: 11/16/05

| CAS No. | Analyte | MDL | PQL | Result | Q | Units | DF | Sample Amount | Analysis Method | Date Analyzed |
|---|---|---|---|---|---|---|---|---|---|---|
| TOC | Total Organic Carbon | 106 | 106 | 1120 | | mg/kg | 1 | 0.3306 G | SW9060 | 12/12/05 |

GENERAL CHEMISTRY ANALYSIS DATA SHEET

Field Sample ID:

SB1-1212

SDG No.: E2847

Matrix: SOIL

Lab Name: CH2M HILL/LAB/CVO

Lab Sample ID: SB1-1212

Date Received: __/__/__

| CAS No. | Analyte | MDL | PQL | Result | Q | Units | DF | Sample Amount | Analysis Method | Date Analyzed |
|---|---|---|---|---|---|---|---|---|---|---|
| TOC | Total Organic Carbon | 35.0 | 35.0 | 35.0 | U | mg/kg | 1 | 1 G | SW9060 | 12/12/05 |

# QC SUMMARY

GENERAL CHEMISTRY INITIAL CALIBRATION DATA

SDG No.: E2847

Lab Name: CH2M HILL/LAB/CVO

Analysis Method: SW9060

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 | | | | |

2-WC

GENERAL CHEMISTRY INITIAL CALIBRATION DATA

SDG No.: E2847

Lab Name: CH2M HILL/LAB/CVO

Analysis Method: SW9060

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 | |

2B-WC

GENERAL CHEMISTRY SECOND SOURCE CALIBRATION VERIFICATION DATA

SDG No.: E2847

Lab Name: CH2M HILL/LAB/CVO

Analysis Method: SW9060

Instrument Name: TOC Skalar

Concentration Units: mg/kg

Initial Calibration ID: 101405S1

Second Source ID: ICV-1014

| Analyte | Expected | Found | %D | Q |
|---|---|---|---|---|
| Total Organic Carbon | 6430 | 6680 | 3.9 | |
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Comments:

2A-WC

GENERAL CHEMISTRY CALIBRATION VERIFICATION DATA

SDG No.: E2847

Lab Name: CH2M HILL/LAB/CVO

Analysis Method: SW9060

Instrument Name: TOC Skalar

Concentration Units: mg/kg

Initial Calibration ID: 101405S1

Analytical Lot ID: 121205TOCS2

CCV #1 ID: CV1-1212 CCV #2 ID: CV2-1212 CCV #3 ID:

| Analyte | Expected | Found | %D | Q | Expected | Found | %D | Q | Expected | Found | %D | Q |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Total Organic Carbon | 4000 | 3980 | -0.6 | | 4000 | 4200 | 5.1 | | | | | |

COMMENTS:

SOIL GENERAL CHEMISTRY METHOD BLANK SUMMARY

Field Sample ID:

SB1-1212

SDG No.: E2847

Analysis Method: SW9060

Initial Cal ID: 101405S1

Matrix: (Soil/Water) SOIL

Instrument: TOC Skalar

Lab Name: CH2M HILL/LAB/CVO

Lab Sample ID: SB1-1212

Date Analyzed: 12/12/05

Time Analyzed: 1005

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

| | CLIENT SAMPLE ID | LAB SAMPLE ID | DATE ANALYZED | TIME ANALYZED |
|---|---|---|---|---|
| 02 | BS1S1212 | BS1S1212 | 12/12/05 | 0953 |
| 05 | J10DV1 | E284701 | 12/12/05 | 1035 |

COMMENTS: _____

GENERAL CHEMISTRY LABORATORY CONTROL SAMPLE

SDG No.: E2847

Analysis Method: SW9060

Initial Cal ID: 101405S1

Matrix: (Soil/Water) SOIL

Instrument: TOC Skalar

Lab Name: CH2M HILL/LAB/CVO

LCS ID: BS1S1212

Date Analyzed: 12/12/05

Time Analyzed: 0953

Concentration Units: mg/kg

| Analyte | Expected | Found | %R | QC Limits %R | Q |
|---|---|---|---|---|---|
| Total Organic Carbon | 1000 | 877 | 87.6 | 80-120 | |

* Values outside of QC limits

Comments:

14-WC

GENERAL CHEMISTRY ANALYTICAL SEQUENCE

SDG No.: E2847

Lab Name: CH2M HILL/LAB/CVO

Analysis Method: SW9060

Lab Code: CVO

Instrument: TOC Skalar

Analytical Lot ID: 101405S1

| | CLIENT SAMPLE ID | LAB SAMPLE ID | DATE ANALYZED | TIME ANALYZED |
|---|---|---|---|---|
| 01 | ICB-1014 | ICB-1014 | 10/14/05 | 1046 |
| 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.: E2847

Lab Name: CH2M HILL/LAB/CVO

Analysis Method: SW9060

Lab Code: CVO

Instrument: TOC Skalar

Analytical Lot ID: 121205TOCS2

| | CLIENT SAMPLE ID | LAB SAMPLE ID | DATE ANALYZED | TIME ANALYZED |
|---|---|---|---|---|
| 01 | CV1-1212 | CV1-1212 | 12/12/05 | 0943 |
| 02 | BS1S1212 | BS1S1212 | 12/12/05 | 0953 |
| 03 | SB1-1212 | SB1-1212 | 12/12/05 | 1005 |
| 05 | J10DV1 | E284701 | 12/12/05 | 1035 |
| 13 | CV2-1212 | CV2-1212 | 12/12/05 | 1543 |

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

12/29/05

# MDL Study Report

Analytical Method: SW9060
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 |



AD031229-16:27-E2847-W

## CHAIN OF CUSTODY/SHIPPING DOCUMENTS

E 2847

| Washington Closure Hanford | CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST | RC-051-12 | Page 1 of 1 |
|---|---|---|---|

| | | | |
|---|---|---|---|
| Collector<br>L. COLLOM | Company Contact<br>JOAN KESSNER | Telephone No.<br>375-4688 | Project Coordinator<br>KESSNER, JH | Price Code 8L<br>Air Quality | Data Turnaround<br>45 Days |
| Project Designation<br>100 & 300 Area Component of the RCBRA - Incremental So | Sampling Location<br>Upland Backfill Low-116-DR-1&2 | | SAF No.<br>RC-051 | | |
| Ice Chest No. | Field Logbook No.<br>EL-1596 | COA<br>BESRAS6520 | Method of Shipment | | |
| 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

*NONE*

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 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 | | | | | | | | |
| J10DV1 | SOIL | 11-15-05 | 20:05 | 1 | 1 | | | | | | -1 |
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| CHAIN OF POSSESSION | Sign/Print Names | | |
|---|---|---|---|
| Relinquished By/Removed From CH2MHill Date/Time | Received By/Stored In | Date/Time | |
| Elizabeth Tepper 14:30 | NP | | |
| Relinquished By/Removed From Date/Time | Received By/Stored In | Date/Time | |
| Dakota Tepper 11-16-05 | [illegible] CH2MHill | | |
| Relinquished By/Removed From Date/Time | Received By/Stored In | Date/Time 11/16/05 14:31 | |
| 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

This chain of custody form documents the transfer of bulk field collected soils to the CH2M Hill Corvallis laboratory for incremental preparation and aliquoting.

(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
OS=Drum Solids
OL=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-EE011 (08/29/2005)

CH2MHILL
Analytical Services

# Sample Receipt Record

Batch Number: E2847 Date received: 11-16-05

Client/Project Washington Closure Hanford

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____ | HD | | |
| Type of packing material: Ice Blue Ice Bubble wrap | | | X |
| 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. 21.0 C | | | X |
| All VOCs free of air bubbles ? | N/A | | |

If the answer to any of the questions above is NO, a Sample Receipt Exceptions Report Must be written.

VERIFICATION OF SAMPLE PRESERVATION (verify all preserved samples except HAAs, HANs and CH)

| 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) |
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LOGIN AND pH VERIFICATIONS PERFORMED BY

Nicky Buchanan
Date/Time 11-16-05 14:35

Date/Time

Rev 11/05/2003-recptrcd.xls