0070592

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

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AUG 2 1 2006
EDMC

**COMPLETE COPY OF DATA PACKAGE TO:**

| | | |
|---|---|---|
| Jill Thomson | H0-23 | KW 7/31/06<br>INITIAL/DATE |
| Jackie Queen | H0-23 | KW 7/31/06<br>INITIAL/DATE |
| Jeanette Duncan | H9-02 | KW 7/31/06<br>INITIAL/DATE |

**COMMENTS:**

**SDG F1548 SAF-RC-051**

Rad only X Chem only Rad & Chem

X Complete Partial

**Corrected Bluegrass Report for Soil Plant Toxicity**

**Waste Site: 300-A Riparian #6**

ELR Consulting, Inc.
PROJECT MANAGEMENT, ENGINEERING, & TECHNICAL SERVICES

July 20, 2006

RECEIVED
JUL 2006
corrected

Ms. Joan Kessner
Subcontract Technical Representative
Washington Closure Hanford LLC
3070 George Washington Way
Richland, WA 99354

Dear Ms. Kessner:

ACUTE SCREENING BIOASSAYS – AMENDED BLUEGRASS REPORTS
CONTRACT NUMBER 0000X-SC-G0553

Enclosed are amended Bluegrass reports for the following Sample Delivery Groups:

- BG1542-01 thru 09 – Report amended July 18, 2006
- BG1542-01A, -02A, -03A and -08A and BG1566-01 thru 05 – Report amended July 19, 2006
- BG1575-01 thru 11 – Report amended July 19, 2006
- BG1589-01 thru 09 – Report amended July 19, 2006

An electronic copy of this information is provided for your convenience.

Should you have any questions, please feel free to call me at (509) 531-8774.

Sincerely yours,

Emmett L. Richards
President

Enclosures

RC-051
F1548

**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. ; W, statistically significant difference from lab control by use of Wilcoxon Rank Sum Two-Sample Test.

ns indicates a non statistically significant result; [5], indicates statistically significant at alpha (p) = 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 April 26, 2006 | | | | | | | | | | | | | | | | | | | |
| Laboratory Control | | 88 | -- | 88.6 | -- | 106.3 | -- | 34.2 | -- | 6.05 | -- | 36.2 | -- | 1.54 | -- | 70.4 | -- | 7.59 | -- |
| BG1575-01 | J11JB4 | 84 | ns | 69.5 | ns | 66.5 | E [5] | 27.0 | ns | 4.32 | ns | 29.2 | ns | 0.67 | ns | 56.2 | ns | 5.00 | E [5] |
| BG1575-02 | J11JB5 | 92 | ns | 76.3 | ns | 62.7 | E [5] | 30.4 | ns | 4.80 | ns | 29.2 | ns | 1.86 | ns | 59.6 | ns | 6.66 | ns |
| BG1575-03 | J11JH6 | 92 | ns | 75.2 | ns | 79.0 | E [5] | 27.2 | ns | 4.53 | ns | 38.3 | ns | 1.79 | ns | 65.5 | ns | 6.31 | ns |
| BG1575-04 | J11JJ0 | 96 | ns | 62.3 | E [5] | 71.7 | E [5] | 25.8 | ns | 3.55 | E [5] | 33.0 | ns | 1.92 | ns | 58.8 | ns | 5.47 | ns |
| BG1575-05 | J11JH9 | 76 | ns | 69.4 | ns | 69.5 | E [5] | 28.4 | ns | 4.72 | ns | 46.5 | ns | 2.15 | ns | 74.9 | ns | 6.86 | ns |
| BG1575-06 | J11JB6 | 80 | ns | 69.3 | ns | 60.2 | E [5] | 35.5 | ns | 5.04 | ns | 45.4 | ns | 1.81 | ns | 80.9 | ns | 6.85 | ns |
| BG1575-07 | J11K34 | 72 | ns | 66.5 | E [5] | 64.7 | E [5] | 16.8 | E [5] | 2.94 | E [5] | 14.4 | E [5] | 0.50 | E [5] | 31.2 | E [5] | 3.44 | E [5] |
| BG1575-08 | J11K28 | 44 | E [5] | 63.8 | E [5] | 58.8 | E [5] | 13.3 | E [5] | 2.63 | E [5] | 9.1 | E [5] | 0.70 | E [5] | 22.4 | E [5] | 3.33 | E [5] |
| BG1575-09 | J11K61 | 80 | ns | 93.3 | ns | 89.1 | E [5] | 34.4 | ns | 5.75 | ns | 39.1 | ns | 1.24 | ns | 73.5 | ns | 6.99 | ns |
| BG1575-10 | J11K40 | 80 | ns | 86.4 | ns | 80.3 | E [5] | 36.7 | ns | 5.31 | ns | 34.7 | ns | 1.67 | ns | 71.4 | ns | 6.98 | ns |
| BG1575-11 | J11JX6 | 68 | ns | 80.5 | ns | 89.1 | ns | 27.1 | ns | 4.64 | ns | 36.7 | ns | 1.80 | ns | 63.8 | ns | 6.44 | ns |

# BIOASSAY REPORT
## CHRONIC SCREENING BIOASSAYS
**Conducted April 26 through May 31, 2006**

**Report Amended July 19, 2006**

Prepared for

ELR CONSULTING, INC.
WASHINGTON CLOSURE HANFORD

Prepared by

CH2M HILL
2300 NW Walnut Boulevard
Corvallis, Oregon 97330

July 19, 2006
Lab I.D. Nos. BG1575-01 thru 11
SDG Number BG1575

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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 April 26 through May 31, 2006.

Following recommendations of an additional QA review, the statistical analysis for shoot height and root length presented in the original report (June 12, 2006) were recalculated. Subsequently, this document presents the amended results and serves as the final report.

## 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 subirrigation.

### TEST CONCENTRATIONS

The concentration tested in the bluegrass tests was 100 percent test sample with control soil alone for the 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 as needed to a maximum five seedlings per replicate.

## SAMPLE COLLECTION

The soil samples were collected from April 7 through 26, 2006. The samples were stored in the dark at 4°C until test solutions were prepared and tested. Chain of Custody for sample collection is provided in Appendix C.

## SAMPLE CROSS-REFERENCE TABLE

Table 1 provides a cross-reference of the Client ID numbers, sampling dates, sampling locations, 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 |
|---|---|---|---|---|
| J11JB4 | 04/05/2006 | 100-H RIPARIAN #1 | BG1575-01 | F1493 |
| J11JB5 | 04/09/2006 | 100-D RIPARIAN #2 | BG1575-02 | F1508 |
| J11JH6 | 04/10/2006 | 100-H RIAPRIAN #9 | BG1575-03 | F1514 |
| J11JJ0 | 04/11/2006 | UPPER RIPARIAN #16 | BG1575-04 | F1518 |
| J11JH9 | 04/12/2006 | UPPER RIPARIAN #14 | BG1575-05 | F1522 |
| J11JB6 | 04/17/2006 | 300-A RIPARIAN #6 | BG1575-06 | F1548 |
| J11K34 | 04/18/2006 | 600--139 | BG1575-07 | F1556 |
| J11K28 | 04/19/2006 | 600-132/600-190 | BG1575-08 | F1564 |
| J11K61 | 04/24/2006 | 628-1 | BG1575-09 | F1586 |
| J11K40 | 04/24/2006 | 600--204 | BG1575-10 | F1588 |
| J11JX6 | 04/25/2006 | 300-49 | BG1575-11 | F1600 |

## SAMPLE PREPARATION

Test soils and control soil were dried and homogenized prior to use. For each replicate, 90 g dry weight of soil was added to each test chamber. The soils were initially hydrated with Milli-Q equivalent de-ionized water via subirrigation. 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 the planting of 10 seeds in each test chamber. Seeds were planted 1 ½ times the seeds diameter (approx. 2 mm) 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 the seed supplier, germination should take place between 14 and 28 days. The number of seeds in each test chamber that germinated was recorded on days 14, 16, 19, 21, and 23. Germination was determined to have occurred on day 21.

Observations of the shoot appearance were recorded 7 days after post germination (day 28 after planting). The number of germinated seeds in each test chamber was also recorded. Chambers that had more than five germinated seeds had the smallest seedlings removed until the number of seedlings was reduced to five.

Soil pH was taken at initiation and termination by placing approximately 30 g of soil into a specimen cup, adding 100 ml of hydration water, and mixing.

## TEST TERMINATION

Tests were terminated 14 days post germination (day 35 after planting). 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 tared 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 dessicator for a minimum of 2 hours and weighed to determine dry weight.

The wet and dry weight for the roots were also obtained 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 germinated)
- Average Above Ground Shoot Mass (Dry)
  (Calculated as the total dry weight of the shoots divided by the number of seedlings germinated)
- Average Root Mass (Wet)
  (Calculated as the total wet weight of the roots divided by the number of seedlings germinated)
- Average Root Mass (Dry)
  (Calculated as the total dry weight of the roots divided by the number of seedlings germinated)
- Average Total Mass (Wet)
  (Calculated as the total combined wet weights of the shoots and roots divided by the number of seedlings germinated)
- Average Total Mass (Dry)
  (Calculated as the total combined dry weights of the shoots and roots divided by the number of seedlings germinated)
- Average Shoot Height
  (Calculated as the total combined height of the tallest shoot of each seedling divided by the number of seedlings germinated)
- Average Root Length
  (Calculated as the total combined length of the longest root of each seedling divided by the number of seedlings germinated)

Statistical analysis for each endpoint listed comprised of entering the data obtained from each replicate chamber of a test soil and comparing the result 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.

## RESULTS AND DISCUSSION

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

The results for sample J11JB4 indicated a statistically significant reduction in average root length and average total mass (shoots + roots, dry) when compared to the laboratory control.

The results for sample J11JB5 indicated a statistically significant reduction in average root length when compared to the laboratory control.

The results for sample J11JH6 indicated a statistically significant reduction in average root length when compared to the laboratory control.

The results for sample J11JJ0 indicated a statistically significant reduction in average stem (shoot) height, average root length, and average above ground shoot mass (dry) when compared to the laboratory control.

The results for sample J11JH9 indicated a statistically significant reduction in average root length when compared to the laboratory control.

The results for sample J11JB6 indicated a statistically significant reduction in average root length when compared to the laboratory control.

The results for sample J11JK34 indicated a statistically significant reduction in average shoot height, average root length, 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 J11JK28 indicated a statistically significant reduction in 14 day germination, average shoot height, average root length, 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 J11K61 indicated a statistically significant reduction in average root length when compared to the laboratory control.

The results for sample J11K40 indicated a statistically significant reduction in average root length when compared to the laboratory control.

The results for sample J11JX6 indicated no statistically significant reduction 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. : W, statistically significant difference from lab control by use of Wilcoxon Rank Sum Two-Sample Test.

ns indicates a non statistically significant result; $^{5}$, indicates statistically significant at alpha (p) = 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 April 28, 2008 | | | | | | | | | | | | | | | | | | | |
| Laboratory Control | | 88 | -- | 88.6 | -- | 106.3 | -- | 34.2 | -- | 6.05 | -- | 36.2 | -- | 1.54 | -- | 70.4 | -- | 7.59 | -- |
| BG1575-01 | J11JB4 | 84 | ns | 69.5 | ns | 66.5 | E$^{5}$ | 27.0 | ns | 4.32 | ns | 29.2 | ns | 0.67 | ns | 56.2 | ns | 5.00 | E$^{5}$ |
| BG1575-02 | J11JB5 | 92 | ns | 76.3 | ns | 62.7 | E$^{5}$ | 30.4 | ns | 4.80 | ns | 29.2 | ns | 1.86 | ns | 59.6 | ns | 6.66 | ns |
| BG1575-03 | J11JH6 | 92 | ns | 75.2 | ns | 79.0 | E$^{5}$ | 27.2 | ns | 4.53 | ns | 38.3 | ns | 1.79 | ns | 65.5 | ns | 6.31 | ns |
| BG1575-04 | J11JJ0 | 96 | ns | 62.3 | E$^{5}$ | 71.7 | E$^{5}$ | 25.8 | ns | 3.55 | E$^{5}$ | 33.0 | ns | 1.92 | ns | 58.8 | ns | 5.47 | ns |
| BG1575-05 | J11JH9 | 76 | ns | 69.4 | ns | 69.5 | E$^{5}$ | 28.4 | ns | 4.72 | ns | 46.5 | ns | 2.15 | ns | 74.9 | ns | 6.86 | ns |
| BG1575-06 | J11JB6 | 80 | ns | 69.3 | ns | 60.2 | E$^{5}$ | 35.5 | ns | 5.04 | ns | 45.4 | ns | 1.81 | ns | 80.9 | ns | 6.85 | ns |
| BG1575-07 | J11K34 | 72 | ns | 66.5 | E$^{5}$ | 64.7 | E$^{5}$ | 16.8 | E$^{5}$ | 2.94 | E$^{5}$ | 14.4 | E$^{5}$ | 0.50 | E$^{5}$ | 31.2 | E$^{5}$ | 3.44 | E$^{5}$ |
| BG1575-08 | J11K28 | 44 | E$^{5}$ | 63.8 | E$^{5}$ | 58.8 | E$^{5}$ | 13.3 | E$^{5}$ | 2.63 | E$^{5}$ | 9.1 | E$^{5}$ | 0.70 | E$^{5}$ | 22.4 | E$^{5}$ | 3.33 | E$^{5}$ |
| BG1575-09 | J11K61 | 80 | ns | 93.3 | ns | 89.1 | E$^{5}$ | 34.4 | ns | 5.75 | ns | 39.1 | ns | 1.24 | ns | 73.5 | ns | 6.99 | ns |
| BG1575-10 | J11K40 | 80 | ns | 86.4 | ns | 80.3 | E$^{5}$ | 36.7 | ns | 5.31 | ns | 34.7 | ns | 1.67 | ns | 71.4 | ns | 6.98 | ns |
| BG1575-11 | J11JX6 | 68 | ns | 80.5 | ns | 89.1 | ns | 27.1 | ns | 4.64 | ns | 36.7 | ns | 1.80 | ns | 63.8 | ns | 6.44 | 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: Washington Closure Hanford Project

Test Start Date: 4-26-06

Initials:
Day 0 DD/Bm Day 12 _____ Day 14 NJ Day 16 NJ Day 19 TP Day 21 NJ Day 23 NJ Day 28 TP Day 35 Bm

Sample ID: Lab Control (70% 70 grade silica sand, 20% clay, 10% peat)

| CONC. | REPLICATE | # seeds germinated: Emergence 12 days after planting | 14 days after planting | 16 days after planting | 19 days after planting | 21 days after planting | 23 days after planting | 7-DAYS POST-EMERGENCE (28 days after planting) | 14-DAYS POST-EMERGENCE (35 days after planting) | pH: INITIAL (@ planting) | FINAL (@ 14 days Post-Emergence) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Control | A | | 6 | 6 | 7 | 8 | 8 | 5 | 5 | 6.2 | 7.5 |
| | B | | 5 | 5 | 5 | 5 | 5 | 5 | 5 | | |
| | C | | 4 | 4 | 4 | 4 | 4 | 4 | 2L, 2 dead | | |
| | D | | 5 | 6 | 6 | 6 | 6 | 5 | 5 | | |
| | E | | 7 | 7 | 8 | 8 | 8 | 5 | 5 | | |

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

Replicate A 2lgG, 3smdG Removed 3smG - w/1B tip
Replicate B 4lgG, 1mdG
Replicate C 1lgG 1smG 2smB
Replicate D 3lgG, 2mdG Removed 1smB
Replicate E 5lgG Removed 2lgG + 1mdG

Appearance Code: Good (G) = deep green color with no brown, Brown (B) = brown color noted. # Lg = # of large plants (tallest, 6+ shoots), # Med = # of plants (smaller than large, fewer shoots), # Sm = # small plants (1-3 shoots)

14-Days Post-Emergence: Describe shoot appearance:

Replicate A 1 mdG 4 mdG w/ 1 B shoot.
Replicate B 1 Lg w/ 1 B shoot 2 mdG, 2 mdG w/ 1 B shoot.
Replicate C 1 Lg w/ 1 B shoot, 1 mdG 2 Sm dead - removed
Replicate D 2 mdG, 2 mdG w/ 1 B shoot.
Replicate E 2 LgG, 2 LgG w/ 1 B shoot each.

Measure Shoot Height:
Individual height of each seedling (above ground)

| | 1st Seedling | 2nd Seedling | 3rd Seedling | 4th Seedling | 5th Seedling |
|---|---|---|---|---|---|
| Replicate A | 31 mm | 70 mm | 70 mm | 100 mm | 72 mm |
| Replicate B | 120 mm | 75 mm | 75 mm | 85 mm | 90 mm |
| Replicate C | 45 mm | 89 mm | mm | mm | mm |
| Replicate D | 102 mm | 93 mm | 80 mm | 81 mm | 98 mm |
| Replicate E | 110 mm | 128 mm | 146 mm | 95 mm | 98 mm |

Measure Shoot Weight:
Total mass of all seedlings (above ground)

| | Tin Tare Wt. (mg) | Wet Wt (mg) | Dry Wt. (mg) |
|---|---|---|---|
| Replicate A | 995.35 | 1147.4 | 1018.02 |
| Replicate B | 1245.74 | 1411.6 | 1278.86 |
| Replicate C | 1257.58 | 1297.5 | 1265.85 |
| Replicate D | 1252.12 | 1423.3 | 1283.56 |
| Replicate E | 1237.76 | 1503.8 | ~~1283.56~~ 1281.17 |

Describe root appearance:

Replicate A
Replicate B
Replicate C
Replicate D
Replicate E

Measure Root Length:
Individual length of the longest root from each seedling

| | 1st Seedling | 2nd Seedling | 3rd Seedling | 4th Seedling | 5th Seedling |
|---|---|---|---|---|---|
| Replicate A | 136 mm | 97 mm | 121 mm | 82 mm | 78 mm |
| Replicate B | 153 mm | 76 mm | 120 mm | 110 mm | 113 mm |
| Replicate C | 134 mm | 31 mm | mm | mm | mm |
| Replicate D | 113 mm | 112 mm | 108 mm | 105 mm | 122 mm |
| Replicate E | 149 mm | 120 mm | 94 mm | 128 mm | 109 mm |

Measure Root Weight:
Total mass of all roots from all seedlings

| | Tin Tare Wt. (mg) | Wet Wt (mg) | Dry Wt. (mg) |
|---|---|---|---|
| Replicate A | 979.16 | 1145.8 | 985.50 |
| Replicate B | 1246.64 | 1451.3 | 1255.08 |
| Replicate C | 1246.62 | 1273.8 | 1248.49 |
| Replicate D | 1239.77 | 1381.3 | 1245.32 |
| Replicate E | 1250.43 | 1515.7 | 1263.82 |

Comments:

## BLUEGRASS GROWTH TEST

Client: Washington Closure Hanford Project

Test Start Date: 11-26-06

Initials: Day 0 (R) Day 12 ____ Day 14 NJ Day 16 NJ Day 19 (TP) Day 21 NJ Day 23 NJ Day 28 NJ Day 35 DW

Bioassay Lab ID: BG 1575-01 Sample No: J11JB4

| CONC. | REPLICATE | # seeds germinated: Emergence: 12 days after planting | 14 days after planting | 16 days after planting | 19 days after planting | 21 days after planting | 23 days after planting | 7-DAYS POST-EMERGENCE (28 days after planting) | 14-DAYS POST-EMERGENCE (35 days after planting) | pH: INITIAL (@ planting) | FINAL (@ 14 days Post-Emergence) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Control | A | | 3 | 3 | 4 | 4 | 4 | 4 | 4 | 6.2 | 7.3 |
| | B | | 2 | 2 | 3 | 3 | 3 | 3 | 3 | | |
| | C | | 2 | 3 | 4 | 6 | 6 | 5 | 5 | | |
| | D | | 1 | 2 | 3 | 4 | 4 | 4 | 4 | | |
| | E | | 2 | 3 | 4 | 4 | 5 | 5 | 5 | | |

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

Replicate A 3lg G, 1md G

Replicate B 1lg G, 1md G, 1sm G

Replicate C NTL 2lg G, 1md G, 2sm G Removed 1sm G

Replicate D 1lg G, 1med G, 2smG

Replicate E 2lg G, 3sm G

Appearance Code: Good (G) = deep green color with no brown, Brown (B) = brown color noted. # Lg = # of large plants (tallest, 6+ shoots), # Med = # of plants (smaller than large, fewer shoots), # Sm = # small plants (1-3 shoots)

14-Days Post-Emergence: Describe shoot appearance:

Replicate A 1 Md G, 3 Md w/ B tips

Replicate B 2 Lg G, 1 Sm G

Replicate C 2 Lg G, 1 Md G, 2 Sm G

Replicate D 2 Md G, 2 Sm G

Replicate E 1 Md G, 1 Md w/ 1 B shoot, 3 Sm G

Measure Shoot Height: Individual height of each seedling (above ground)

| | 1st Seedling | 2nd Seedling | 3rd Seedling | 4th Seedling | 5th Seedling |
|---|---|---|---|---|---|
| Replicate A | 32 mm | 94 mm | 61 mm | 97 mm | mm |
| Replicate B | 134 mm | 101 mm | 39 mm | mm | mm |
| Replicate C | 93 mm | 70 mm | 101 mm | 27 mm | 40 mm |
| Replicate D | 105 mm | 68 mm | 40 mm | 17 mm | mm |
| Replicate E | 91 mm | 96 mm | 28 mm | 6 mm | 23 mm |

Measure Shoot Weight: Total mass of all seedlings (above ground)

| | Tin Tare Wt. (mg) (992.17) | Wet Wt (mg) | Dry Wt. (mg) |
|---|---|---|---|
| Replicate A | ~~1001.15~~ | 1142.10 | 1022.45 |
| Replicate B | 1257.92 | 1357.10 | 1272.72 |
| Replicate C | 1255.06 | 1374.49 | 1273.56 |
| Replicate D | 1265.17 | 1318.15 | 1243.04 |
| Replicate E | 1248.72 | 1386.52 | 1265.96 |

Describe root appearance:

Replicate A

Replicate B

Replicate C

Replicate D

Replicate E

Measure Root Length: Individual length of the longest root from each seedling

| | 1st Seedling | 2nd Seedling | 3rd Seedling | 4th Seedling | 5th Seedling |
|---|---|---|---|---|---|
| Replicate A | 45 mm | 81 mm | 78 mm | 112 mm | mm |
| Replicate B | 76 mm | 133 mm | 41 mm | mm | mm |
| Replicate C | 26 mm | 39 mm | 98 mm | 93 mm | 92 mm |
| Replicate D | 67 mm | 22 mm | 36 mm | 70 mm | mm |
| Replicate E | 78 mm | 47 mm | 36 mm | 13 mm | 86 mm |

Measure Root Weight: Total mass of all roots from all seedlings

| | Tin Tare Wt. (mg) (1001.15) | Wet Wt (mg) | Dry Wt. (mg) |
|---|---|---|---|
| Replicate A | ~~992.17~~ | 1149.40 | 997.78 |
| Replicate B | 1246.57 | 1360.91 | 1251.37 |
| Replicate C | 1262.94 | 1424.60 | 1267.81 |
| Replicate D | 1245.56 | 1302.11 | 1248.15 |
| Replicate E | 1246.83 | 1368.20 | 1251.77 |

Comments:

# CETIS Test Summary

Report Date: 19 Jul-06 10:18 AM
Test Link: 11-8811-6060/B157501psB

**Plant Bioassay - Chronic** — **CH2M Hill**

| | | | | | |
|---|---|---|---|---|---|
| **Test No:** | 13-0819-5743 | **Test Type:** | Plant Chronic | **Duration:** | N/A |
| **Start Date:** | 26 Apr-06 | **Protocol:** | ASTM E1963-02 (2002) | **Species:** | Poa sandbergii |
| **Ending Date:** | | **Dil Water:** | | **Source:** | |
| **Setup Date:** | 26 Apr-06 | **Brine:** | | | |

**Comments:** recalculated Height and Length data July 19, 2006

| | | | | | |
|---|---|---|---|---|---|
| **Sample No:** | 16-5207-3918 | **Code:** | B1574-01 | **Client:** | |
| **Sample Date:** | 07 Apr-06 | **Material:** | Soil | **Project:** | |
| **Receive Date:** | | **Source:** | Hanford | | |
| **Sample Age:** | 19d 0h | **Station:** | | | |

**Comments:** J11JB4

**Comparison Summary**

| Analysis | Endpoint | NOEL | LOEL | ChV | PMSD | Method |
|---|---|---|---|---|---|---|
| 17-2113-9957 | % Germination | 100 | > 100 | N/A | 28.11% | Wilcoxon Rank Sum Two-Sample |
| 17-9030-4749 | Average Height (mm) | 100 | > 100 | N/A | 23.71% | Equal Variance t Two-Sample |
| 14-6232-4345 | Average Length (mm) | < 100 | 100 | N/A | 16.75% | Equal Variance t Two-Sample |
| 17-0075-6680 | Average AG Wt (Wet, mg) | 100 | > 100 | N/A | 36.98% | Equal Variance t Two-Sample |
| 16-2394-5043 | Average AG Wt (Dry, mg) | 100 | > 100 | N/A | 38.17% | Equal Variance t Two-Sample |
| 04-5932-8324 | Average Root Wt. (Wet, mg | 100 | > 100 | N/A | 49.20% | Equal Variance t Two-Sample |
| 10-1933-8355 | Average Root Wt. (Dry, mg) | 100 | > 100 | N/A | 62.26% | Equal Variance t Two-Sample |
| 13-8367-1787 | Average Total Wt (Wet, mg | 100 | > 100 | N/A | 42.48% | Equal Variance t Two-Sample |
| 06-1775-8595 | Average Total Wt (Dry, mg) | < 100 | 100 | N/A | 32.75% | Equal Variance t Two-Sample |

# CETIS Test Summary

Report Date: 19 Jul-06 10:18 AM
Test Link: 11-8811-6060/B157501psB

**% Germination Summary**

| Conc-% | Control Type | Reps | Mean | Minimum | Maximum | SE | SD | CV |
|---|---|---|---|---|---|---|---|---|
| 0 | Artificial Soil/S | 5 | 0.88000 | 0.40000 | 1.00000 | 0.12000 | 0.26833 | 30.49% |
| 100 | | 5 | 0.84000 | 0.60000 | 1.00000 | 0.07483 | 0.16733 | 19.92% |

**Average Height (mm) Summary**

| Conc-% | Control Type | Reps | Mean | Minimum | Maximum | SE | SD | CV |
|---|---|---|---|---|---|---|---|---|
| 0 | Artificial Soil/S | 5 | 88.560 | 67 | 115.40 | 8.048 | 17.996 | 20.32% |
| 100 | | 5 | 69.46 | 48.8 | 91.300 | 7.9203 | 17.710 | 25.50% |

**Average Length (mm) Summary**

| Conc-% | Control Type | Reps | Mean | Minimum | Maximum | SE | SD | CV |
|---|---|---|---|---|---|---|---|---|
| 0 | Artificial Soil/S | 5 | 106.34 | 82.5 | 120 | 6.5745 | 14.701 | 13.82% |
| 100 | | 5 | 66.540 | 48.8 | 83.300 | 6.9701 | 15.586 | 23.42% |

**Average AG Wt (Wet, mg) Summary**

| Conc-% | Control Type | Reps | Mean | Minimum | Maximum | SE | SD | CV |
|---|---|---|---|---|---|---|---|---|
| 0 | Artificial Soil/S | 5 | 34.197 | 19.960 | 53.208 | 5.3829 | 12.036 | 35.20% |
| 100 | | 5 | 27.049 | 13.257 | 37.482 | 4.156 | 9.2931 | 34.36% |

**Average AG Wt (Dry, mg) Summary**

| Conc-% | Control Type | Reps | Mean | Minimum | Maximum | SE | SD | CV |
|---|---|---|---|---|---|---|---|---|
| 0 | Artificial Soil/S | 5 | 6.05361 | 4.14001 | 8.68201 | 0.81424 | 1.82070 | 30.08% |
| 100 | | 5 | 4.32376 | 1.96750 | 7.57001 | 0.93855 | 2.09867 | 48.54% |

**Average Root Wt. (Wet, mg) Summary**

| Conc-% | Control Type | Reps | Mean | Minimum | Maximum | SE | SD | CV |
|---|---|---|---|---|---|---|---|---|
| 0 | Artificial Soil/S | 5 | 36.242 | 13.590 | 65.054 | 8.4756 | 18.952 | 52.29% |
| 100 | | 5 | 29.183 | 14.135 | 38.110 | 4.4846 | 10.028 | 34.36% |

**Average Root Wt. (Dry, mg) Summary**

| Conc-% | Control Type | Reps | Mean | Minimum | Maximum | SE | SD | CV |
|---|---|---|---|---|---|---|---|---|
| 0 | Artificial Soil/S | 5 | 1.53579 | 0.93500 | 2.67798 | 0.31159 | 0.69673 | 45.37% |
| 100 | | 5 | 0.67341 | -0.8425 | 1.60002 | 0.40906 | 0.91468 | 135.83 |

**Average Total Wt (Wet, mg) Summary**

| Conc-% | Control Type | Reps | Mean | Minimum | Maximum | SE | SD | CV |
|---|---|---|---|---|---|---|---|---|
| 0 | Artificial Soil/S | 5 | 70.439 | 33.550 | 118.26 | 13.727 | 30.694 | 43.58% |
| 100 | | 5 | 56.231 | 27.392 | 74.545 | 8.3953 | 18.772 | 33.38% |

**Average Total Wt (Dry, mg) Summary**

| Conc-% | Control Type | Reps | Mean | Minimum | Maximum | SE | SD | CV |
|---|---|---|---|---|---|---|---|---|
| 0 | Artificial Soil/S | 5 | 7.5894 | 5.0750 | 11.36 | 1.1021 | 2.4644 | 32.47% |
| 100 | | 5 | 4.9972 | 2.615 | 6.7275 | 0.7566 | 1.6917 | 33.85% |

# CETIS Test Summary

Report Date: 19 Jul-06 10:18 AM
Test Link: 11-8811-6060/B157501psB

**% Germination Detail**

| Conc-% | Control Type | Rep 1 | Rep 2 | Rep 3 | Rep 4 | Rep 5 |
|---|---|---|---|---|---|---|
| 0 | Artificial Soil/S | 1.00000 | 1.00000 | 0.40000 | 1.00000 | 1.00000 |
| 100 | | 0.80000 | 0.60000 | 1.00000 | 0.80000 | 1.00000 |

**Average Height (mm) Detail**

| Conc-% | Control Type | Rep 1 | Rep 2 | Rep 3 | Rep 4 | Rep 5 |
|---|---|---|---|---|---|---|
| 0 | Artificial Soil/S | 78.6 | 91 | 67 | 90.8000 | 115.400 |
| 100 | | 83.5 | 91.3000 | 66.2 | 57.5 | 48.8 |

**Average Length (mm) Detail**

| Conc-% | Control Type | Rep 1 | Rep 2 | Rep 3 | Rep 4 | Rep 5 |
|---|---|---|---|---|---|---|
| 0 | Artificial Soil/S | 102.800 | 114.400 | 82.5 | 112 | 120 |
| 100 | | 79 | 83.3000 | 69.6 | 48.8 | 52 |

**Average AG Wt (Wet, mg) Detail**

| Conc-% | Control Type | Rep 1 | Rep 2 | Rep 3 | Rep 4 | Rep 5 |
|---|---|---|---|---|---|---|
| 0 | Artificial Soil/S | 30.4100 | 33.172 | 19.9600 | 34.2360 | 53.2080 |
| 100 | | 37.4825 | 33.06 | 23.888 | 13.2575 | 27.5560 |

**Average AG Wt (Dry, mg) Detail**

| Conc-% | Control Type | Rep 1 | Rep 2 | Rep 3 | Rep 4 | Rep 5 |
|---|---|---|---|---|---|---|
| 0 | Artificial Soil/S | 4.53401 | 6.62400 | 4.14001 | 6.28801 | 8.68201 |
| 100 | | 7.57001 | 4.93331 | 3.70000 | 1.96750 | 3.44800 |

**Average Root Wt. (Wet, mg) Detail**

| Conc-% | Control Type | Rep 1 | Rep 2 | Rep 3 | Rep 4 | Rep 5 |
|---|---|---|---|---|---|---|
| 0 | Artificial Soil/S | 33.3280 | 40.9320 | 13.5900 | 28.3060 | 65.054 |
| 100 | | 37.0625 | 38.1100 | 32.3320 | 14.135 | 24.274 |

**Average Root Wt. (Dry, mg) Detail**

| Conc-% | Control Type | Rep 1 | Rep 2 | Rep 3 | Rep 4 | Rep 5 |
|---|---|---|---|---|---|---|
| 0 | Artificial Soil/S | 1.26801 | 1.68799 | 0.93500 | 1.10999 | 2.67798 |
| 100 | | -0.84250 | 1.60002 | 0.97402 | 0.64749 | 0.98801 |

**Average Total Wt (Wet, mg) Detail**

| Conc-% | Control Type | Rep 1 | Rep 2 | Rep 3 | Rep 4 | Rep 5 |
|---|---|---|---|---|---|---|
| 0 | Artificial Soil/S | 63.7380 | 74.1040 | 33.5500 | 62.5420 | 118.262 |
| 100 | | 74.5450 | 71.1700 | 56.22 | 27.3925 | 51.8300 |

**Average Total Wt (Dry, mg) Detail**

| Conc-% | Control Type | Rep 1 | Rep 2 | Rep 3 | Rep 4 | Rep 5 |
|---|---|---|---|---|---|---|
| 0 | Artificial Soil/S | 5.80201 | 8.31199 | 5.07501 | 7.398 | 11.36 |
| 100 | | 6.72751 | 6.53333 | 4.67402 | 2.61499 | 4.43601 |

# CETIS Analysis Detail

**Plant Bioassay - Chronic** — **CH2M Hill**

| Endpoint | Analysis Type | Sample Link | Control Link | Date Analyzed | Version |
|---|---|---|---|---|---|
| % Germination | Comparison | 11-8811-6060 | 11-8811-6060 | 19 Jul-06 10:18 AM | 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 | 28.11% |

**Group Comparisons**

| Control | vs | Conc-% | Statistic | Critical | P-Value | Ties | Decision(0.05) |
|---|---|---|---|---|---|---|---|
| Artificial Soil/Sedi | | 100 | 24 | | 0.2738 | 4 | Non-Significant Effect |

**ANOVA Table**

| Source | Sum of Squares | Mean Square | DF | F Statistic | P-Value | Decision(0.05) |
|---|---|---|---|---|---|---|
| Between | 0.0075576 | 0.007558 | 1 | 0.12 | 0.73659 | Non-Significant Effect |
| Error | 0.4983389 | 0.062292 | 8 | | | |
| Total | 0.50589649 | 0.0698499 | 9 | | | |

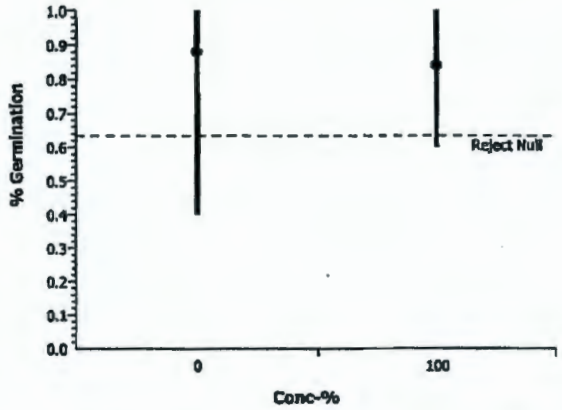
**ANOVA Assumptions**

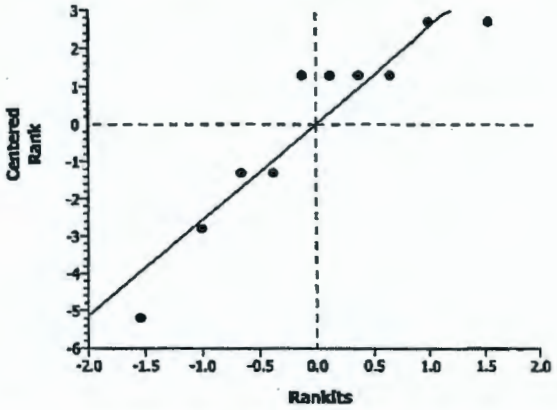
| Attribute | Test | Statistic | Critical | P-Value | Decision(0.01) |
|---|---|---|---|---|---|
| Variances | Variance Ratio F | 2.33866 | 23.15450 | 0.43080 | Equal Variances |
| Distribution | Shapiro-Wilk W | 0.77968 | | 0.00820 | Non-normal Distribution |

**Data Summary**

| | | | Original Data | | | | Transformed Data | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Conc-% | Control Type | Count | Mean | Minimum | Maximum | SD | Mean | Minimum | Maximum | SD |
| 0 | Artificial Soil/S | 5 | 0.88000 | 0.40000 | 1.00000 | 0.26833 | 6.20000 | 1.00000 | 7.50000 | 2.90689 |
| 100 | | 5 | 0.84000 | 0.60000 | 1.00000 | 0.16733 | 4.80000 | 2.00000 | 7.50000 | 2.53969 |

**Graphics**



# CETIS Analysis Detail

**Plant Bioassay - Chronic** — **CH2M Hill**

| Endpoint | Analysis Type | Sample Link | Control Link | Date Analyzed | Version |
|---|---|---|---|---|---|
| Average Height (mm) | Comparison | 11-8811-6060 | 11-8811-6060 | 19 Jul-06 10:18 AM | 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 | 23.71% |

**Group Comparisons**

| Control | vs | Conc-% | Statistic | Critical | P-Value | MSD | Decision(0.05) |
|---|---|---|---|---|---|---|---|
| Artificial Soil/Sedi | | 100 | 1.69152 | 1.85955 | 0.0646 | 20.9973 | Non-Significant Effect |

**ANOVA Table**

| Source | Sum of Squares | Mean Square | DF | F Statistic | P-Value | Decision(0.05) |
|---|---|---|---|---|---|---|
| Between | 912.0251 | 912.0251 | 1 | 2.86 | 0.12920 | Non-Significant Effect |
| Error | 2550.004 | 318.7505 | 8 | | | |
| Total | 3462.02948 | 1230.7756 | 9 | | | |

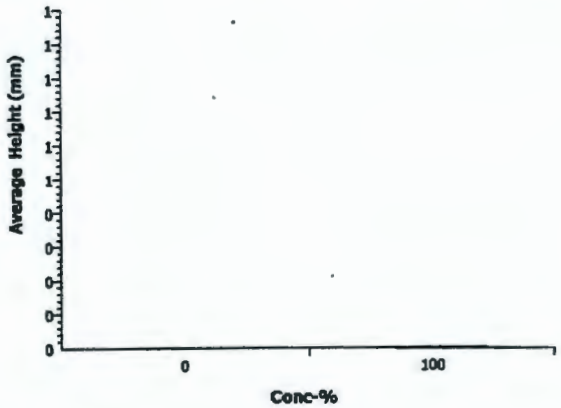
**ANOVA Assumptions**

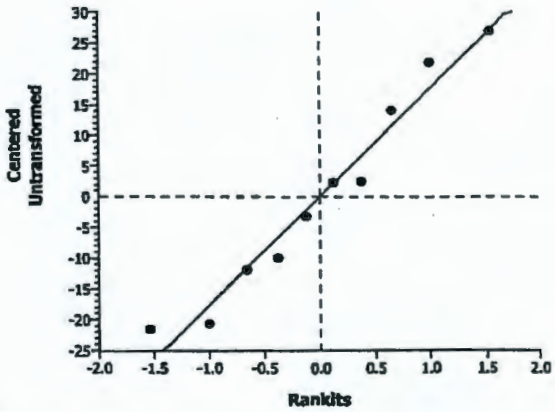
| Attribute | Test | Statistic | Critical | P-Value | Decision(0.01) |
|---|---|---|---|---|---|
| Variances | Variance Ratio F | 1.03250 | 23.15450 | 0.97601 | Equal Variances |
| Distribution | Shapiro-Wilk W | 0.94407 | | 0.59917 | Normal Distribution |

**Data Summary**

| | | | Original Data | | | | Transformed Data | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Conc-% | Control Type | Count | Mean | Minimum | Maximum | SD | Mean | Minimum | Maximum | SD |
| 0 | Artificial Soil/S | 5 | 88.560 | 67 | 115.4 | 17.996 | | | | |
| 100 | | 5 | 69.46 | 48.8 | 91.3 | 17.710 | | | | |

**Graphics**



# CETIS Analysis Detail

**Plant Bioassay - Chronic** — **CH2M Hill**

| Endpoint | Analysis Type | Sample Link | Control Link | Date Analyzed | Version |
|---|---|---|---|---|---|
| Average Length (mm) | Comparison | 11-8811-6060 | 11-8811-6060 | 19 Jul-06 10:18 AM | 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 | 16.75% |

**Group Comparisons**

| Control vs | Conc-% | Statistic | Critical | P-Value | MSD | Decision(0.05) |
|---|---|---|---|---|---|---|
| Artificial Soil/Sedi | 100 | 4.15384 | 1.85955 | 0.0016 | 17.8173 | Significant Effect |

**ANOVA Table**

| Source | Sum of Squares | Mean Square | DF | F Statistic | P-Value | Decision(0.05) |
|---|---|---|---|---|---|---|
| Between | 3960.1 | 3960.1 | 1 | 17.25 | 0.00319 | Significant Effect |
| Error | 1836.104 | 229.513 | 8 | | | |
| Total | 5796.20422 | 4189.6131 | 9 | | | |

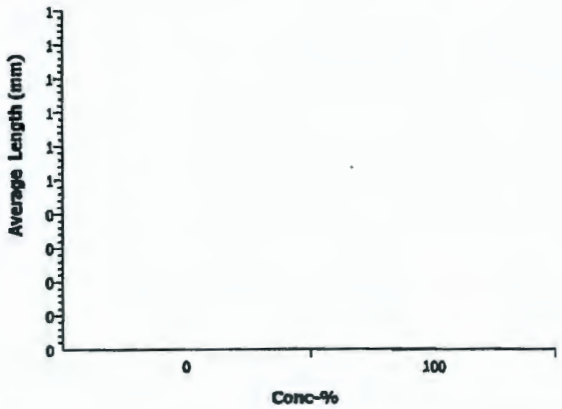
**ANOVA Assumptions**

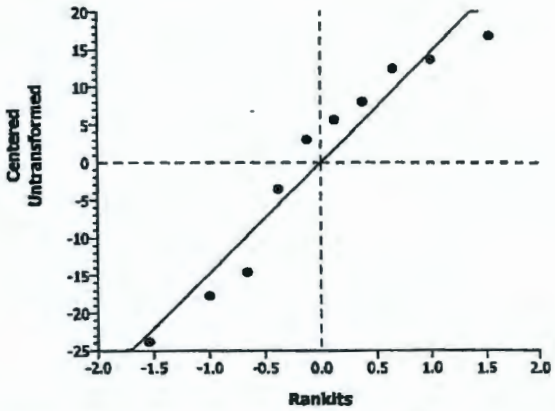
| Attribute | Test | Statistic | Critical | P-Value | Decision(0.01) |
|---|---|---|---|---|---|
| Variances | Variance Ratio F | 1.12396 | 23.15450 | 0.91256 | Equal Variances |
| Distribution | Shapiro-Wilk W | 0.91278 | | 0.30065 | Normal Distribution |

**Data Summary**

| | | | Original Data | | | | Transformed Data | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Conc-% | Control Type | Count | Mean | Minimum | Maximum | SD | Mean | Minimum | Maximum | SD |
| 0 | Artificial Soil/S | 5 | 106.34 | 82.5 | 120 | 14.701 | | | | |
| 100 | | 5 | 66.540 | 48.8 | 83.3 | 15.586 | | | | |

**Graphics**



# CETIS Analysis Detail

**Plant Bioassay - Chronic** — **CH2M Hill**

| Endpoint | Analysis Type | Sample Link | Control Link | Date Analyzed | Version |
|---|---|---|---|---|---|
| Average AG Wt (Wet, mg) | Comparison | 11-8811-6060 | 11-8811-6060 | 19 Jul-06 10:18 AM | 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 | 36.98% |

**Group Comparisons**

| Control | vs | Conc-% | Statistic | Critical | P-Value | MSD | Decision(0.05) |
|---|---|---|---|---|---|---|---|
| Artificial Soil/Sedi | | 100 | 1.05115 | 1.85955 | 0.1620 | 12.6459 | Non-Significant Effect |

**ANOVA Table**

| Source | Sum of Squares | Mean Square | DF | F Statistic | P-Value | Decision(0.05) |
|---|---|---|---|---|---|---|
| Between | 127.7498 | 127.7498 | 1 | 1.10 | 0.32390 | Non-Significant Effect |
| Error | 924.9483 | 115.6185 | 8 | | | |
| Total | 1052.69807 | 243.36831 | 9 | | | |

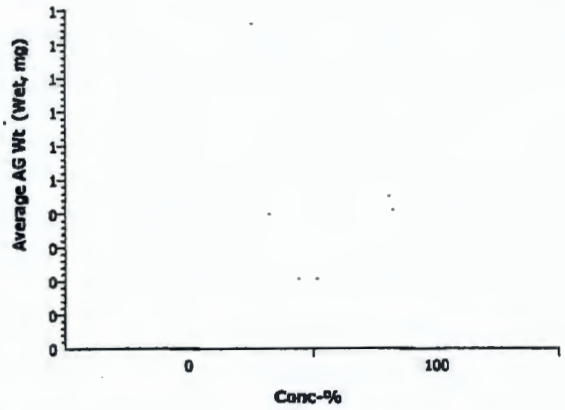
**ANOVA Assumptions**

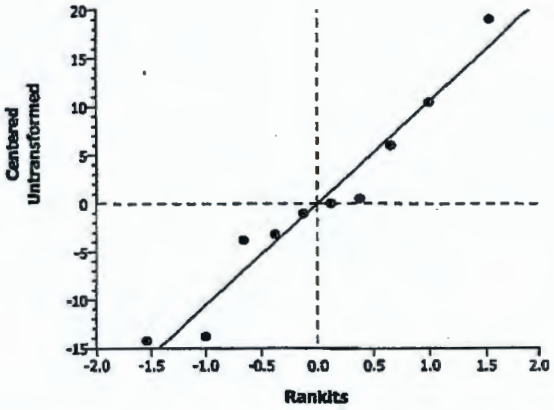
| Attribute | Test | Statistic | Critical | P-Value | Decision(0.01) |
|---|---|---|---|---|---|
| Variances | Variance Ratio F | 1.67756 | 23.15450 | 0.62853 | Equal Variances |
| Distribution | Shapiro-Wilk W | 0.94965 | | 0.66441 | Normal Distribution |

**Data Summary**

| | | | Original Data | | | | Transformed Data | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Conc-% | Control Type | Count | Mean | Minimum | Maximum | SD | Mean | Minimum | Maximum | SD |
| 0 | Artificial Soil/S | 5 | 34.197 | 19.960 | 53.208 | 12.036 | | | | |
| 100 | | 5 | 27.049 | 13.257 | 37.483 | 9.2931 | | | | |

**Graphics**



# CETIS Analysis Detail

**Plant Bioassay - Chronic** — CH2M Hill

| Endpoint | Analysis Type | Sample Link | Control Link | Date Analyzed | Version |
|---|---|---|---|---|---|
| Average AG Wt (Dry, mg) | Comparison | 11-8811-6060 | 11-8811-6060 | 19 Jul-06 10:18 AM | 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 | 38.17% |

**Group Comparisons**

| Control | vs | Conc-% | Statistic | Critical | P-Value | MSD | Decision(0.05) |
|---|---|---|---|---|---|---|---|
| Artificial Soil/Sedi | | 100 | 1.3922 | 1.85955 | 0.1007 | 2.31054 | Non-Significant Effect |

**ANOVA Table**

| Source | Sum of Squares | Mean Square | DF | F Statistic | P-Value | Decision(0.05) |
|---|---|---|---|---|---|---|
| Between | 7.480916 | 7.480916 | 1 | 1.94 | 0.20134 | Non-Significant Effect |
| Error | 30.87747 | 3.859683 | 8 | | | |
| Total | 38.3583822 | 11.340599 | 9 | | | |

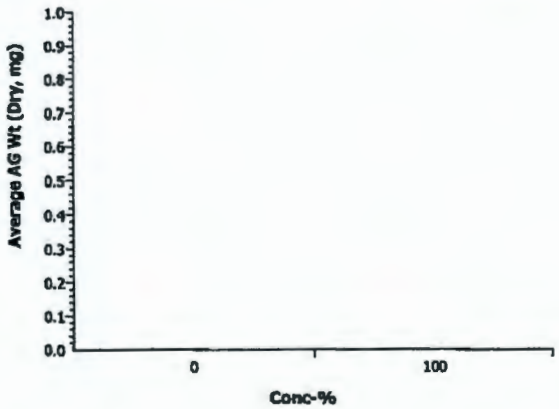
**ANOVA Assumptions**

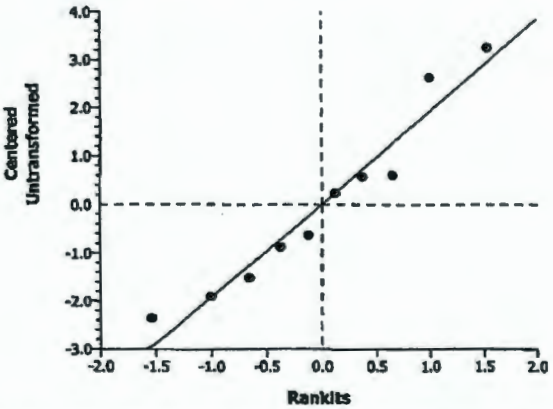
| Attribute | Test | Statistic | Critical | P-Value | Decision(0.01) |
|---|---|---|---|---|---|
| Variances | Variance Ratio F | 1.32865 | 23.15450 | 0.78970 | Equal Variances |
| Distribution | Shapiro-Wilk W | 0.93627 | | 0.51234 | Normal Distribution |

**Data Summary**

| | | | Original Data | | | | Transformed Data | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Conc-% | Control Type | Count | Mean | Minimum | Maximum | SD | Mean | Minimum | Maximum | SD |
| 0 | Artificial Soil/S | 5 | 6.05361 | 4.14001 | 8.68201 | 1.82070 | | | | |
| 100 | | 5 | 4.32376 | 1.96750 | 7.57001 | 2.09867 | | | | |

**Graphics**



# CETIS Analysis Detail

**Plant Bioassay - Chronic** — **CH2M Hill**

| Endpoint | Analysis Type | Sample Link | Control Link | Date Analyzed | Version |
|---|---|---|---|---|---|
| Average Root Wt. (Wet, mg) | Comparison | 11-8811-6060 | 11-8811-6060 | 19 Jul-06 10:18 AM | 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 | 49.20% |

**Group Comparisons**

| Control | vs | Conc-% | Statistic | Critical | P-Value | MSD | Decision(0.05) |
|---|---|---|---|---|---|---|---|
| Artificial Soil/Sedi | | 100 | 0.73619 | 1.85955 | 0.2413 | 17.8311 | Non-Significant Effect |

**ANOVA Table**

| Source | Sum of Squares | Mean Square | DF | F Statistic | P-Value | Decision(0.05) |
|---|---|---|---|---|---|---|
| Between | 124.5844 | 124.5844 | 1 | 0.54 | 0.48264 | Non-Significant Effect |
| Error | 1838.945 | 229.8682 | 8 | | | |
| Total | 1963.52973 | 354.45258 | 9 | | | |

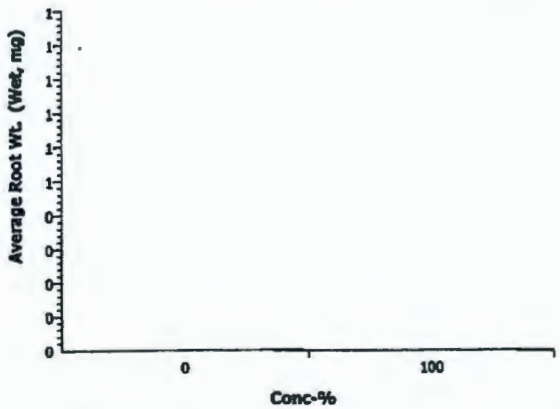
**ANOVA Assumptions**

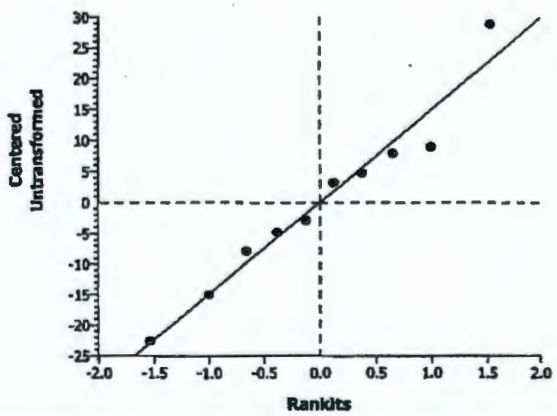
| Attribute | Test | Statistic | Critical | P-Value | Decision(0.01) |
|---|---|---|---|---|---|
| Variances | Variance Ratio F | 3.57181 | 23.15450 | 0.24520 | Equal Variances |
| Distribution | Shapiro-Wilk W | 0.96953 | | 0.88643 | Normal Distribution |

**Data Summary**

| | | | Original Data | | | | Transformed Data | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Conc-% | Control Type | Count | Mean | Minimum | Maximum | SD | Mean | Minimum | Maximum | SD |
| 0 | Artificial Soil/S | 5 | 36.242 | 13.590 | 65.054 | 18.952 | | | | |
| 100 | | 5 | 29.183 | 14.135 | 38.110 | 10.028 | | | | |

**Graphics**



# CETIS Analysis Detail

**Plant Bioassay - Chronic** — **CH2M Hill**

| Endpoint | Analysis Type | Sample Link | Control Link | Date Analyzed | Version |
|---|---|---|---|---|---|
| Average Root Wt. (Dry, mg) | Comparison | 11-8811-6060 | 11-8811-6060 | 19 Jul-06 10:18 AM | 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 | 62.26% |

**Group Comparisons**

| Control | vs | Conc-% | Statistic | Critical | P-Value | MSD | Decision(0.05) |
|---|---|---|---|---|---|---|---|
| Artificial Soil/Sedi | | 100 | 1.67709 | 1.85955 | 0.0660 | 0.95621 | Non-Significant Effect |

**ANOVA Table**

| Source | Sum of Squares | Mean Square | DF | F Statistic | P-Value | Decision(0.05) |
|---|---|---|---|---|---|---|
| Between | 1.859257 | 1.859257 | 1 | 2.81 | 0.13205 | Non-Significant Effect |
| Error | 5.288322 | 0.661040 | 8 | | | |
| Total | 7.14757931 | 2.5202972 | 9 | | | |

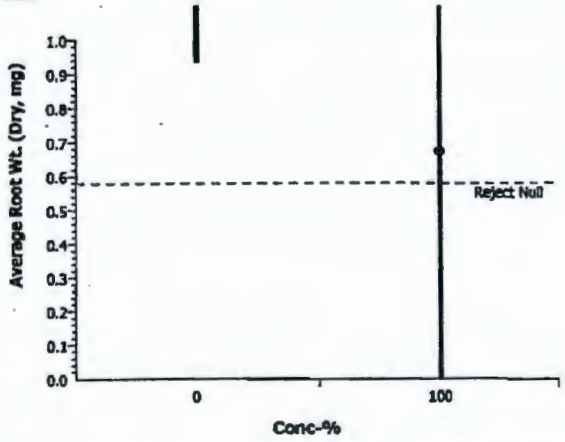
**ANOVA Assumptions**

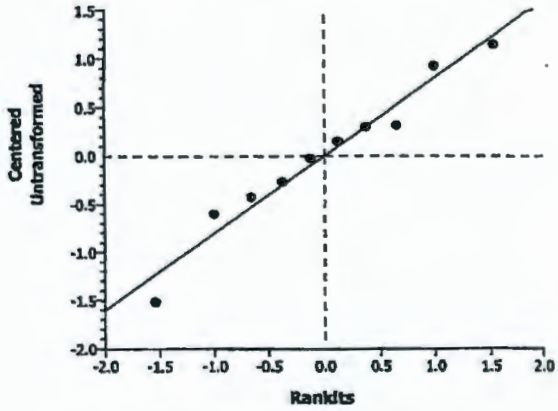
| Attribute | Test | Statistic | Critical | P-Value | Decision(0.01) |
|---|---|---|---|---|---|
| Variances | Variance Ratio F | 1.72351 | 23.15450 | 0.61089 | Equal Variances |
| Distribution | Shapiro-Wilk W | 0.96848 | | 0.87637 | Normal Distribution |

**Data Summary**

| | | | Original Data | | | | Transformed Data | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Conc-% | Control Type | Count | Mean | Minimum | Maximum | SD | Mean | Minimum | Maximum | SD |
| 0 | Artificial Soil/S | 5 | 1.53579 | 0.93500 | 2.67798 | 0.69673 | | | | |
| 100 | | 5 | 0.67341 | -0.8425 | 1.60002 | 0.91468 | | | | |

**Graphics**



# CETIS Analysis Detail

**Plant Bioassay - Chronic** — **CH2M Hill**

| Endpoint | Analysis Type | Sample Link | Control Link | Date Analyzed | Version |
|---|---|---|---|---|---|
| Average Total Wt (Wet, mg) | Comparison | 11-8811-6060 | 11-8811-6060 | 19 Jul-06 10:18 AM | 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 | 42.48% |

**Group Comparisons**

| Control | vs | Conc-% | Statistic | Critical | P-Value | MSD | Decision(0.05) |
|---|---|---|---|---|---|---|---|
| Artificial Soil/Sedi | | 100 | 0.88298 | 1.85955 | 0.2015 | 29.9212 | Non-Significant Effect |

**ANOVA Table**

| Source | Sum of Squares | Mean Square | DF | F Statistic | P-Value | Decision(0.05) |
|---|---|---|---|---|---|---|
| Between | 504.6483 | 504.6483 | 1 | 0.78 | 0.40300 | Non-Significant Effect |
| Error | 5178.138 | 647.2672 | 8 | | | |
| Total | 5682.78604 | 1151.9156 | 9 | | | |

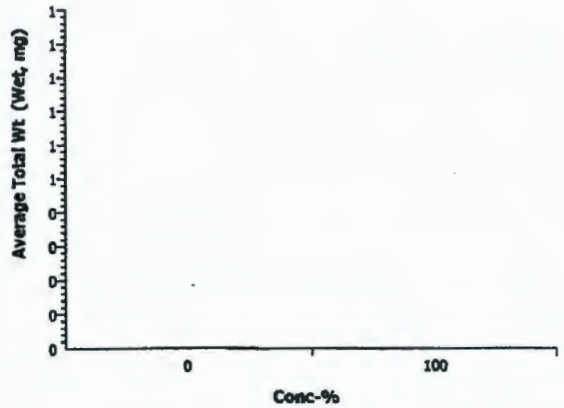
**ANOVA Assumptions**

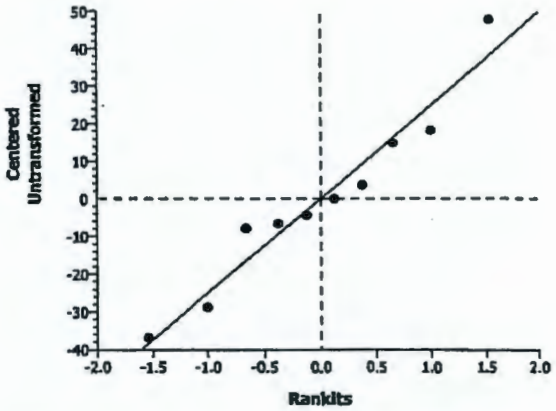
| Attribute | Test | Statistic | Critical | P-Value | Decision(0.01) |
|---|---|---|---|---|---|
| Variances | Variance Ratio F | 2.67346 | 23.15450 | 0.36394 | Equal Variances |
| Distribution | Shapiro-Wilk W | 0.95865 | | 0.77041 | Normal Distribution |

**Data Summary**

| | | | Original Data | | | | Transformed Data | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Conc-% | Control Type | Count | Mean | Minimum | Maximum | SD | Mean | Minimum | Maximum | SD |
| 0 | Artificial Soil/S | 5 | 70.439 | 33.550 | 118.26 | 30.694 | | | | |
| 100 | | 5 | 56.231 | 27.392 | 74.545 | 18.772 | | | | |

**Graphics**



# CETIS Analysis Detail

**Plant Bioassay - Chronic** — **CH2M Hill**

| Endpoint | Analysis Type | Sample Link | Control Link | Date Analyzed | Version |
|---|---|---|---|---|---|
| Average Total Wt (Dry, mg) | Comparison | 11-8811-6060 | 11-8811-6060 | 19 Jul-06 10:18 AM | 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 | 32.75% |

**Group Comparisons**

| Control | vs | Conc-% | Statistic | Critical | P-Value | MSD | Decision(0.05) |
|---|---|---|---|---|---|---|---|
| Artificial Soil/Sedi | | 100 | 1.93912 | 1.85955 | 0.0442 | 2.48585 | Significant Effect |

**ANOVA Table**

| Source | Sum of Squares | Mean Square | DF | F Statistic | P-Value | Decision(0.05) |
|---|---|---|---|---|---|---|
| Between | 16.79911 | 16.79911 | 1 | 3.76 | 0.08847 | Non-Significant Effect |
| Error | 35.74092 | 4.467615 | 8 | | | |
| Total | 52.5400314 | 21.266726 | 9 | | | |

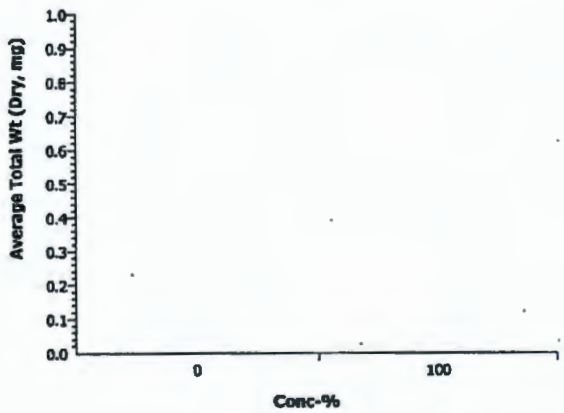
**ANOVA Assumptions**

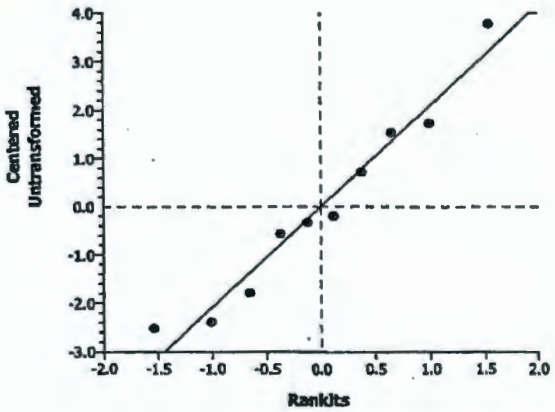
| Attribute | Test | Statistic | Critical | P-Value | Decision(0.01) |
|---|---|---|---|---|---|
| Variances | Variance Ratio F | 2.12204 | 23.15450 | 0.48412 | Equal Variances |
| Distribution | Shapiro-Wilk W | 0.95228 | | 0.69553 | Normal Distribution |

**Data Summary**

| | | | Original Data | | | | Transformed Data | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Conc-% | Control Type | Count | Mean | Minimum | Maximum | SD | Mean | Minimum | Maximum | SD |
| 0 | Artificial Soil/S | 5 | 7.5894 | 5.0750 | 11.36 | 2.4644 | | | | |
| 100 | | 5 | 4.9972 | 2.615 | 6.7275 | 1.6917 | | | | |

**Graphics**



# BLUEGRASS GROWTH TEST

Client: Washington Closure Hanford Project

Test Start Date: 4-26-06

Initials: Day 0 KG Day 12 ____ Day 14 NJ Day 16 NJ Day 19 TP Day 21 NJ Day 23 NJ Day 28 TP Day 35 DM

Bioassay Lab ID: BG 1575-02 Sample No: J11JB5

| CONC. | REPLICATE | # seeds germinated: Emergence: 12 days after planting | 14 days after planting | 16 days after planting | 19 days after planting | 21 days after planting | 23 days after planting | 7-DAYS POST-EMERGENCE (28 days after planting) | 14-DAYS POST-EMERGENCE (35 days after planting) | pH: INITIAL (@ planting) | FINAL (@ 14 days Post-Emergence) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Control | A | | 6 | 7 | 6 7 | 7 | 7 | 7 → 5 | 5 | 6.4 | 7.2 |
| | B | | 2 | 3 | 5 | 5 | 5 | 5 → 5 | 5 | | |
| | C | | 1 | 1 | 2 | 2 | 4 | 4 → 4 | 4 | | |
| | D | | 3 | 4 | 4 | 5 | 6 | 6 → 5 | 5 | | |
| | E | | NJ 3 | 3 | 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: 4 Lg (G), 1 med (G) w/ (TP); removed: 1 med (G) w/ 1 B shoot, 1 Small (G)

Replicate B: 2 Lg (G) w/ B tips, 3 med (G)

Replicate C: 3 Lg (G) 2w/ B tips, 1 med (G) (TP); 3 Sm. (G), 1 med (G) w/ B tips

Replicate D: 1 Lg (G), 4 Sm. 1 w/ B shoot; removed: 1 Sm (G)

Replicate E: 3 Lg (G) 2w/ B tips, 1 med (G)

Appearance Code: Good (G) = deep green color with no brown, Brown (B) = brown color noted, # Lg = # of large plants (tallest, 6+ shoots), # Med = # of plants (smaller than large, fewer shoots), # Sm = # small plants (1-3 shoots)

14-Days Post-Emergence: Describe shoot appearance:

Replicate A: 5 Lg G

Replicate B: 2 Lg G, 3 med G

Replicate C: 1 Med G, 1 Med w/ 1 B tip, 2 Sm G

Replicate D: ~~1 Lg G~~, 4 Med G 1 Sm G — 1 Large plant (non-bluegrass, removed)

Replicate E: 3 Lg w/ B tips, 1 Med G

Measure Shoot Height: Individual height of each seedling (above ground)

| | 1st Seedling | 2nd Seedling | 3rd Seedling | 4th Seedling | 5th Seedling |
|---|---|---|---|---|---|
| Replicate A | 79 mm | 107 mm | 93 mm | 105 mm | 89 mm |
| Replicate B | 79 mm | 63 mm | 78 mm | 91 mm | 125 mm |
| Replicate C | 38 mm | 34 mm | 54 mm | 84 mm | mm |
| Replicate D | 51 mm | 57 mm | 39 mm | 44 mm | 12 mm |
| Replicate E | 103 mm | 92 mm | 119 mm | 109 mm | mm |

Measure Shoot Weight: Total mass of all seedlings (above ground)

| | Tin Tare Wt. (mg) | Wet Wt (mg) | Dry Wt. (mg) |
|---|---|---|---|
| Replicate A | 1002.78 | 1242.2 | 1042.12 |
| Replicate B | 1243.18 | 1405.9 | 1269.41 |
| Replicate C | 1250.91 | 1303.8 | 1260.26 |
| Replicate D | 1254.41 | 1296.8 | 1258.58 |
| Replicate E | 1247.05 | 1449.9 | 1277.97 |

Describe root appearance:

Replicate A

Replicate B

Replicate C

Replicate D

Replicate E

Measure Root Length: Individual length of the longest root from each seedling

| | 1st Seedling | 2nd Seedling | 3rd Seedling | 4th Seedling | 5th Seedling |
|---|---|---|---|---|---|
| Replicate A | 93 mm | 84 mm | 63 mm | 70 mm | 73 mm |
| Replicate B | 114 mm | 44 mm | 96 mm | 55 mm | 67 mm |
| Replicate C | 39 mm | 47 mm | 36 mm | 71 mm | mm |
| Replicate D | 30 mm | 38 mm | 31 mm | 46 mm | 34 mm |
| Replicate E | 95 mm | 56 mm | 66 mm | 94 mm | mm |

Measure Root Weight: Total mass of all roots from all seedlings

| | Tin Tare Wt. (mg) | Wet Wt (mg) | Dry Wt. (mg) |
|---|---|---|---|
| Replicate A | 999.21 | 1244.1 | 1016.41 |
| Replicate B | 1244.66 | 1385.4 | 1256.35 |
| Replicate C | 1260.50 | 1317.0 | 1264.27 |
| Replicate D | NJ 18 1255.49 | 1287.0 | 1257.40 |
| Replicate E | 1254.57 | 1448.3 | 1264.16 |

Comments:

# CETIS Test Summary

Report Date: 19 Jul-06 10:24 AM
Test Link: 08-1256-9051/B157502psB

**Plant Bioassay - Chronic** — **CH2M Hill**

| | | | | | |
|---|---|---|---|---|---|
| **Test No:** | 10-6241-3668 | **Test Type:** | Plant Chronic | **Duration:** | N/A |
| **Start Date:** | 26 Apr-06 | **Protocol:** | ASTM E1963-02 (2002) | **Species:** | Poa sandbergii |
| **Ending Date:** | | **DII Water:** | | **Source:** | |
| **Setup Date:** | 26 Apr-06 | **Brine:** | | | |

**Comments:** recalculated Height and Length data July 19, 2006

| | | | | | |
|---|---|---|---|---|---|
| **Sample No:** | 04-4665-3490 | **Code:** | B1574-02 | **Client:** | |
| **Sample Date:** | 10 Apr-06 | **Material:** | Soil | **Project:** | |
| **Receive Date:** | | **Source:** | Hanford | | |
| **Sample Age:** | 16d 0h | **Station:** | | | |

**Comments:** J11JB5

**Comparison Summary**

| Analysis | Endpoint | NOEL | LOEL | ChV | PMSD | Method |
|---|---|---|---|---|---|---|
| 13-1608-0433 | % Germination | 100 | > 100 | N/A | 25.39% | Wilcoxon Rank Sum Two-Sample |
| 12-1277-2741 | Average Height (mm) | 100 | > 100 | N/A | 31.66% | Equal Variance t Two-Sample |
| 20-0606-3665 | Average Length (mm) | < 100 | 100 | N/A | 19.05% | Equal Variance t Two-Sample |
| 01-3471-5172 | Average AG Wt (Wet, mg) | 100 | > 100 | N/A | 56.09% | Equal Variance t Two-Sample |
| 08-2983-7307 | Average AG Wt (Dry, mg) | 100 | > 100 | N/A | 50.12% | Equal Variance t Two-Sample |
| 13-0827-0380 | Average Root Wt. (Wet, mg | 100 | > 100 | N/A | 62.32% | Equal Variance t Two-Sample |
| 02-7142-7008 | Average Root Wt. (Dry, mg) | 100 | > 100 | N/A | 75.69% | Equal Variance t Two-Sample |
| 15-8565-0097 | Average Total Wt (Wet, mg | 100 | > 100 | N/A | 58.66% | Equal Variance t Two-Sample |
| 12-4136-3872 | Average Total Wt (Dry, mg) | 100 | > 100 | N/A | 54.62% | Equal Variance t Two-Sample |

# CETIS Test Summary

Report Date: 19 Jul-06 10:24 AM
Test Link: 08-1256-9051/B157502psB

**% Germination Summary**

| Conc-% | Control Type | Reps | Mean | Minimum | Maximum | SE | SD | CV |
|---|---|---|---|---|---|---|---|---|
| 0 | Artificial Soil/S | 5 | 0.88000 | 0.40000 | 1.00000 | 0.12000 | 0.26833 | 30.49% |
| 100 | | 5 | 0.92000 | 0.80000 | 1.00000 | 0.04899 | 0.10954 | 11.91% |

**Average Height (mm) Summary**

| Conc-% | Control Type | Reps | Mean | Minimum | Maximum | SE | SD | CV |
|---|---|---|---|---|---|---|---|---|
| 0 | Artificial Soil/S | 5 | 88.560 | 67 | 115.40 | 8.048 | 17.996 | 20.32% |
| 100 | | 5 | 76.34 | 40.400 | 107 | 12.750 | 28.511 | 37.35% |

**Average Length (mm) Summary**

| Conc-% | Control Type | Reps | Mean | Minimum | Maximum | SE | SD | CV |
|---|---|---|---|---|---|---|---|---|
| 0 | Artificial Soil/S | 5 | 106.34 | 82.5 | 120 | 6.5745 | 14.701 | 13.82% |
| 100 | | 5 | 62.74 | 35.8 | 77.800 | 8.6846 | 19.419 | 30.95% |

**Average AG Wt (Wet, mg) Summary**

| Conc-% | Control Type | Reps | Mean | Minimum | Maximum | SE | SD | CV |
|---|---|---|---|---|---|---|---|---|
| 0 | Artificial Soil/S | 5 | 34.197 | 19.960 | 53.208 | 5.3829 | 12.036 | 35.20% |
| 100 | | 5 | 30.418 | 6.4780 | 50.712 | 8.8001 | 19.678 | 64.69% |

**Average AG Wt (Dry, mg) Summary**

| Conc-% | Control Type | Reps | Mean | Minimum | Maximum | SE | SD | CV |
|---|---|---|---|---|---|---|---|---|
| 0 | Artificial Soil/S | 5 | 6.05361 | 4.14001 | 8.68201 | 0.81424 | 1.82070 | 30.08% |
| 100 | | 5 | 4.80309 | 0.83398 | 7.86799 | 1.41403 | 3.16186 | 65.83% |

**Average Root Wt. (Wet, mg) Summary**

| Conc-% | Control Type | Reps | Mean | Minimum | Maximum | SE | SD | CV |
|---|---|---|---|---|---|---|---|---|
| 0 | Artificial Soil/S | 5 | 36.242 | 13.590 | 65.054 | 8.4756 | 18.952 | 52.29% |
| 100 | | 5 | 29.197 | 6.3020 | 48.978 | 8.6998 | 19.453 | 66.63% |

**Average Root Wt. (Dry, mg) Summary**

| Conc-% | Control Type | Reps | Mean | Minimum | Maximum | SE | SD | CV |
|---|---|---|---|---|---|---|---|---|
| 0 | Artificial Soil/S | 5 | 1.53579 | 0.93500 | 2.67798 | 0.31159 | 0.69673 | 45.37% |
| 100 | | 5 | 1.85700 | 0.38201 | 3.43999 | 0.54189 | 1.21170 | 65.25% |

**Average Total Wt (Wet, mg) Summary**

| Conc-% | Control Type | Reps | Mean | Minimum | Maximum | SE | SD | CV |
|---|---|---|---|---|---|---|---|---|
| 0 | Artificial Soil/S | 5 | 70.439 | 33.550 | 118.26 | 13.727 | 30.694 | 43.58% |
| 100 | | 5 | 59.615 | 12.780 | 99.145 | 17.474 | 39.073 | 65.54% |

**Average Total Wt (Dry, mg) Summary**

| Conc-% | Control Type | Reps | Mean | Minimum | Maximum | SE | SD | CV |
|---|---|---|---|---|---|---|---|---|
| 0 | Artificial Soil/S | 5 | 7.5894 | 5.0750 | 11.36 | 1.1021 | 2.4644 | 32.47% |
| 100 | | 5 | 6.6601 | 1.216 | 11.308 | 1.9379 | 4.3333 | 65.06% |

# CETIS Test Summary

Report Date: 19 Jul-06 10:24 AM
Test Link: 08-1256-9051/B157502psB

**% Germination Detail**

| Conc-% | Control Type | Rep 1 | Rep 2 | Rep 3 | Rep 4 | Rep 5 |
|---|---|---|---|---|---|---|
| 0 | Artificial Soil/S | 1.00000 | 1.00000 | 0.40000 | 1.00000 | 1.00000 |
| 100 | | 1.00000 | 1.00000 | 0.80000 | 1.00000 | 0.80000 |

**Average Height (mm) Detail**

| Conc-% | Control Type | Rep 1 | Rep 2 | Rep 3 | Rep 4 | Rep 5 |
|---|---|---|---|---|---|---|
| 0 | Artificial Soil/S | 78.6 | 91 | 67 | 90.8000 | 115.400 |
| 100 | | 94.6 | 87.2 | 52.5 | 40.4000 | 107 |

**Average Length (mm) Detail**

| Conc-% | Control Type | Rep 1 | Rep 2 | Rep 3 | Rep 4 | Rep 5 |
|---|---|---|---|---|---|---|
| 0 | Artificial Soil/S | 102.800 | 114.400 | 82.5 | 112 | 120 |
| 100 | | 76.6 | 75.2 | 48.3 | 35.8 | 77.8000 |

**Average AG Wt (Wet, mg) Detail**

| Conc-% | Control Type | Rep 1 | Rep 2 | Rep 3 | Rep 4 | Rep 5 |
|---|---|---|---|---|---|---|
| 0 | Artificial Soil/S | 30.4100 | 33.172 | 19.9600 | 34.2360 | 53.2080 |
| 100 | | 47.884 | 32.544 | 14.4725 | 6.47800 | 50.7125 |

**Average AG Wt (Dry, mg) Detail**

| Conc-% | Control Type | Rep 1 | Rep 2 | Rep 3 | Rep 4 | Rep 5 |
|---|---|---|---|---|---|---|
| 0 | Artificial Soil/S | 4.53401 | 6.62400 | 4.14001 | 6.28801 | 8.68201 |
| 100 | | 7.86799 | 5.24600 | 2.33749 | 0.83398 | 7.72998 |

**Average Root Wt. (Wet, mg) Detail**

| Conc-% | Control Type | Rep 1 | Rep 2 | Rep 3 | Rep 4 | Rep 5 |
|---|---|---|---|---|---|---|
| 0 | Artificial Soil/S | 33.3280 | 40.9320 | 13.5900 | 28.3060 | 65.054 |
| 100 | | 48.978 | 28.148 | 14.125 | 6.30200 | 48.4325 |

**Average Root Wt. (Dry, mg) Detail**

| Conc-% | Control Type | Rep 1 | Rep 2 | Rep 3 | Rep 4 | Rep 5 |
|---|---|---|---|---|---|---|
| 0 | Artificial Soil/S | 1.26801 | 1.68799 | 0.93500 | 1.10999 | 2.67798 |
| 100 | | 3.43999 | 2.13799 | 0.94250 | 0.38201 | 2.38251 |

**Average Total Wt (Wet, mg) Detail**

| Conc-% | Control Type | Rep 1 | Rep 2 | Rep 3 | Rep 4 | Rep 5 |
|---|---|---|---|---|---|---|
| 0 | Artificial Soil/S | 63.7380 | 74.1040 | 33.5500 | 62.5420 | 118.262 |
| 100 | | 96.862 | 60.692 | 28.5975 | 12.7800 | 99.1450 |

**Average Total Wt (Dry, mg) Detail**

| Conc-% | Control Type | Rep 1 | Rep 2 | Rep 3 | Rep 4 | Rep 5 |
|---|---|---|---|---|---|---|
| 0 | Artificial Soil/S | 5.80201 | 8.31199 | 5.07501 | 7.398 | 11.36 |
| 100 | | 11.308 | 7.38398 | 3.28 | 1.21599 | 10.1125 |

# CETIS Analysis Detail

**Plant Bioassay - Chronic** — **CH2M Hill**

| Endpoint | Analysis Type | Sample Link | Control Link | Date Analyzed | Version |
|---|---|---|---|---|---|
| % Germination | Comparison | 08-1256-9051 | 08-1256-9051 | 19 Jul-06 10:24 AM | 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 | 25.39% |

**Group Comparisons**

| Control | vs | Conc-% | Statistic | Critical | P-Value | Ties | Decision(0.05) |
|---|---|---|---|---|---|---|---|
| Artificial Soil/Sedi | | 100 | 26 | | 0.4206 | 4 | Non-Significant Effect |

**ANOVA Table**

| Source | Sum of Squares | Mean Square | DF | F Statistic | P-Value | Decision(0.05) |
|---|---|---|---|---|---|---|
| Between | 0.0033965 | 0.003396 | 1 | 0.07 | 0.80499 | Non-Significant Effect |
| Error | 0.417125 | 0.052141 | 8 | | | |
| Total | 0.42052149 | 0.0555371 | 9 | | | |

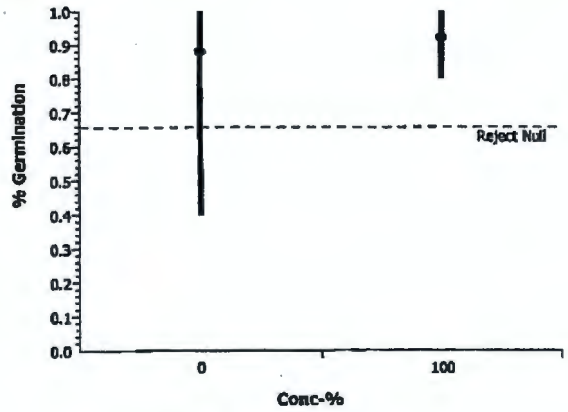
**ANOVA Assumptions**

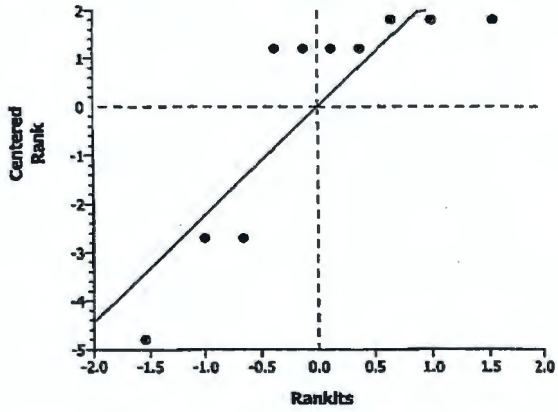
| Attribute | Test | Statistic | Critical | P-Value | Decision(0.01) |
|---|---|---|---|---|---|
| Variances | Variance Ratio F | 5.12973 | 23.15450 | 0.14232 | Equal Variances |
| Distribution | Shapiro-Wilk W | 0.68083 | | 0.00052 | Non-normal Distribution |

**Data Summary**

| | | | Original Data | | | | Transformed Data | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Conc-% | Control Type | Count | Mean | Minimum | Maximum | SD | Mean | Minimum | Maximum | SD |
| 0 | Artificial Soil/S | 5 | 0.88000 | 0.40000 | 1.00000 | 0.26833 | 5.80000 | 1.00000 | 7.00000 | 2.68328 |
| 100 | | 5 | 0.92000 | 0.80000 | 1.00000 | 0.10954 | 5.20000 | 2.50000 | 7.00000 | 2.46475 |

**Graphics**



# CETIS Analysis Detail

**Plant Bioassay - Chronic** — CH2M Hill

| Endpoint | Analysis Type | Sample Link | Control Link | Date Analyzed | Version |
|---|---|---|---|---|---|
| Average Height (mm) | Comparison | 08-1256-9051 | 08-1256-9051 | 19 Jul-06 10:24 AM | 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 | 31.66% |

**Group Comparisons**

| Control | vs | Conc-% | Statistic | Critical | P-Value | MSD | Decision(0.05) |
|---|---|---|---|---|---|---|---|
| Artificial Soil/Sedi | | 100 | 0.81046 | 1.85955 | 0.2206 | 28.038 | Non-Significant Effect |

**ANOVA Table**

| Source | Sum of Squares | Mean Square | DF | F Statistic | P-Value | Decision(0.05) |
|---|---|---|---|---|---|---|
| Between | 373.3211 | 373.3211 | 1 | 0.66 | 0.44112 | Non-Significant Effect |
| Error | 4546.824 | 568.353 | 8 | | | |
| Total | 4920.14481 | 941.67404 | 9 | | | |

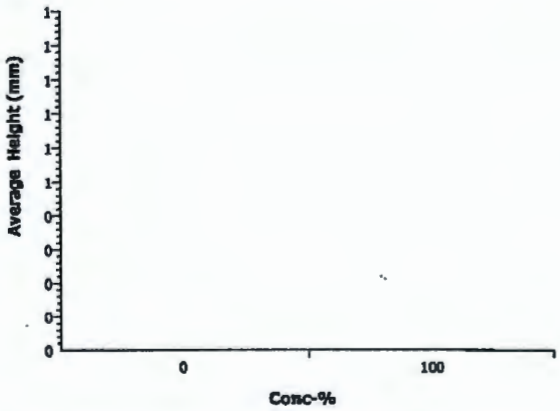
**ANOVA Assumptions**

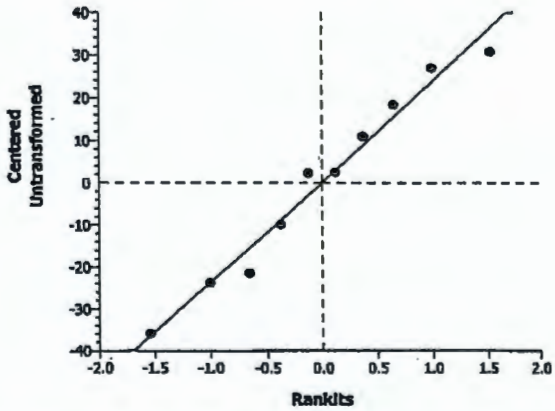
| Attribute | Test | Statistic | Critical | P-Value | Decision(0.01) |
|---|---|---|---|---|---|
| Variances | Variance Ratio F | 2.51000 | 23.15450 | 0.39451 | Equal Variances |
| Distribution | Shapiro-Wilk W | 0.95749 | | 0.75697 | Normal Distribution |

**Data Summary**

| | | | Original Data | | | | Transformed Data | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Conc-% | Control Type | Count | Mean | Minimum | Maximum | SD | Mean | Minimum | Maximum | SD |
| 0 | Artificial Soil/S | 5 | 88.560 | 67 | 115.4 | 17.996 | | | | |
| 100 | | 5 | 76.34 | 40.4 | 107 | 28.511 | | | | |

**Graphics**



# CETIS Analysis Detail

**Plant Bioassay - Chronic** — **CH2M Hill**

| Endpoint | Analysis Type | Sample Link | Control Link | Date Analyzed | Version |
|---|---|---|---|---|---|
| Average Length (mm) | Comparison | 08-1256-9051 | 08-1256-9051 | 19 Jul-06 10:24 AM | 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 | 19.05% |

**Group Comparisons**

| Control | vs | Conc-% | Statistic | Critical | P-Value | MSD | Decision(0.05) |
|---|---|---|---|---|---|---|---|
| Artificial Soil/Sedi | | 100 | 4.00278 | 1.85955 | 0.0020 | 20.2550 | Significant Effect |

**ANOVA Table**

| Source | Sum of Squares | Mean Square | DF | F Statistic | P-Value | Decision(0.05) |
|---|---|---|---|---|---|---|
| Between | 4752.4 | 4752.4 | 1 | 16.02 | 0.00393 | Significant Effect |
| Error | 2372.904 | 296.613 | 8 | | | |
| Total | 7125.30444 | 5049.0134 | 9 | | | |

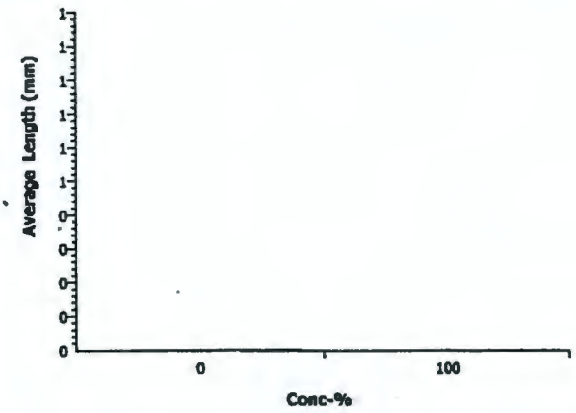
**ANOVA Assumptions**

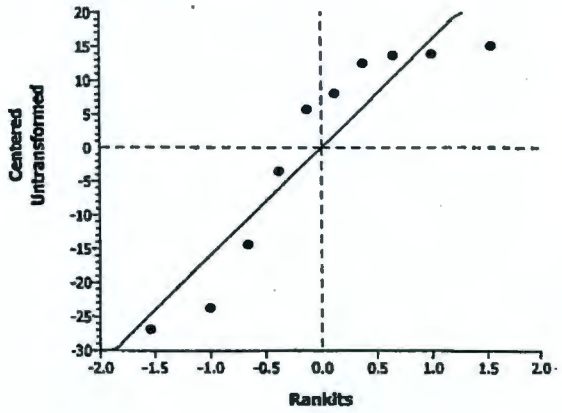
| Attribute | Test | Statistic | Critical | P-Value | Decision(0.01) |
|---|---|---|---|---|---|
| Variances | Variance Ratio F | 1.74492 | 23.15450 | 0.60292 | Equal Variances |
| Distribution | Shapiro-Wilk W | 0.83761 | | 0.04131 | Normal Distribution |

**Data Summary**

| | | | Original Data | | | | Transformed Data | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Conc-% | Control Type | Count | Mean | Minimum | Maximum | SD | Mean | Minimum | Maximum | SD |
| 0 | Artificial Soil/S | 5 | 106.34 | 82.5 | 120 | 14.701 | | | | |
| 100 | | 5 | 62.74 | 35.8 | 77.8 | 19.419 | | | | |

**Graphics**



# CETIS Analysis Detail

**Plant Bioassay - Chronic** — **CH2M Hill**

| Endpoint | Analysis Type | Sample Link | Control Link | Date Analyzed | Version |
|---|---|---|---|---|---|
| Average AG Wt (Wet, mg) | Comparison | 08-1256-9051 | 08-1256-9051 | 19 Jul-06 10:24 AM | 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 | 56.09% |

**Group Comparisons**

| Control vs | Conc-% | Statistic | Critical | P-Value | MSD | Decision(0.05) |
|---|---|---|---|---|---|---|
| Artificial Soil/Sedi | 100 | 0.36633 | 1.85955 | 0.3618 | 19.1828 | Non-Significant Effect |

**ANOVA Table**

| Source | Sum of Squares | Mean Square | DF | F Statistic | P-Value | Decision(0.05) |
|---|---|---|---|---|---|---|
| Between | 35.70236 | 35.70236 | 1 | 0.13 | 0.72362 | Non-Significant Effect |
| Error | 2128.333 | 266.0416 | 8 | | | |
| Total | 2164.03488 | 301.74393 | 9 | | | |

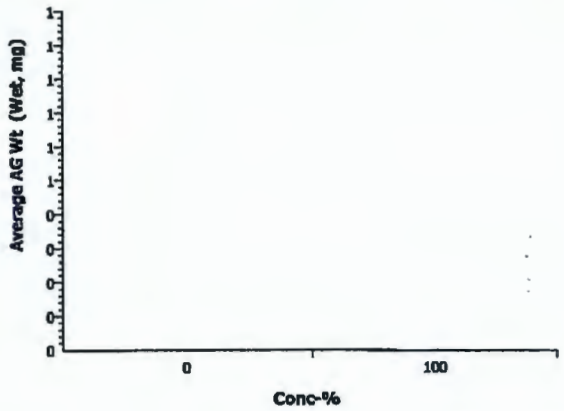
**ANOVA Assumptions**

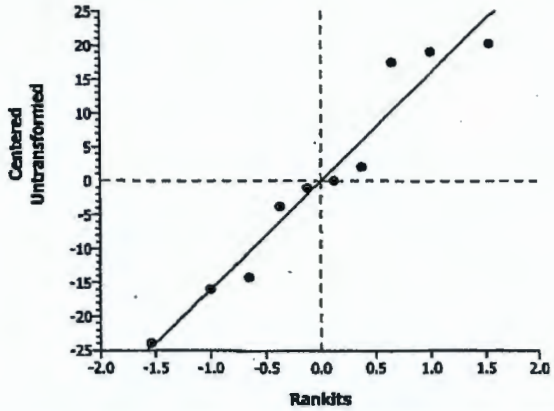
| Attribute | Test | Statistic | Critical | P-Value | Decision(0.01) |
|---|---|---|---|---|---|
| Variances | Variance Ratio F | 2.67268 | 23.15450 | 0.36408 | Equal Variances |
| Distribution | Shapiro-Wilk W | 0.92799 | | 0.42844 | Normal Distribution |

**Data Summary**

| | | | Original Data | | | | Transformed Data | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Conc-% | Control Type | Count | Mean | Minimum | Maximum | SD | Mean | Minimum | Maximum | SD |
| 0 | Artificial Soil/S | 5 | 34.197 | 19.960 | 53.208 | 12.036 | | | | |
| 100 | | 5 | 30.418 | 6.4780 | 50.712 | 19.678 | | | | |

**Graphics**



# CETIS Analysis Detail

**Plant Bioassay - Chronic** — **CH2M Hill**

| Endpoint | Analysis Type | Sample Link | Control Link | Date Analyzed | Version |
|---|---|---|---|---|---|
| Average AG Wt (Dry, mg) | Comparison | 08-1256-9051 | 08-1256-9051 | 19 Jul-06 10:24 AM | 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 | 50.12% |

**Group Comparisons**

| Control | vs | Conc-% | Statistic | Critical | P-Value | MSD | Decision(0.05) |
|---|---|---|---|---|---|---|---|
| Artificial Soil/Sedi | | 100 | 0.76639 | 1.85955 | 0.2327 | 3.03423 | Non-Significant Effect |

**ANOVA Table**

| Source | Sum of Squares | Mean Square | DF | F Statistic | P-Value | Decision(0.05) |
|---|---|---|---|---|---|---|
| Between | 3.909493 | 3.909493 | 1 | 0.59 | 0.46546 | Non-Significant Effect |
| Error | 53.24924 | 6.656155 | 8 | | | |
| Total | 57.1587341 | 10.565648 | 9 | | | |

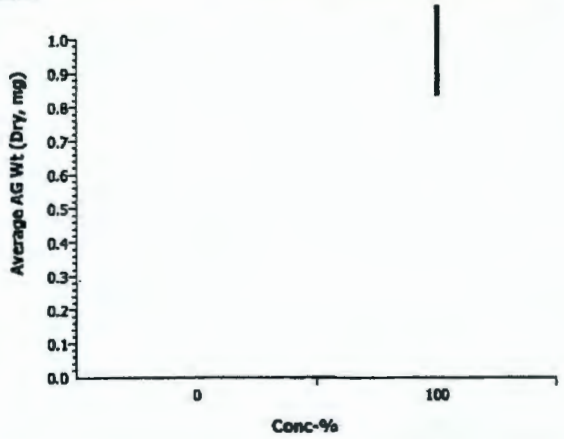
**ANOVA Assumptions**

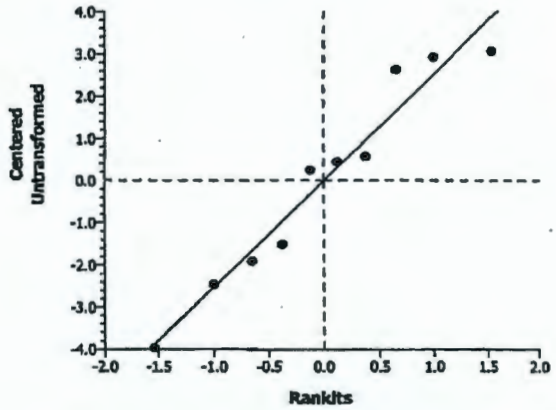
| Attribute | Test | Statistic | Critical | P-Value | Decision(0.01) |
|---|---|---|---|---|---|
| Variances | Variance Ratio F | 3.01584 | 23.15450 | 0.31028 | Equal Variances |
| Distribution | Shapiro-Wilk W | 0.93288 | | 0.47676 | Normal Distribution |

**Data Summary**

| | | | Original Data | | | | Transformed Data | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Conc-% | Control Type | Count | Mean | Minimum | Maximum | SD | Mean | Minimum | Maximum | SD |
| 0 | Artificial Soil/S | 5 | 6.05361 | 4.14001 | 8.68201 | 1.82070 | | | | |
| 100 | | 5 | 4.80309 | 0.83398 | 7.86799 | 3.16186 | | | | |

**Graphics**



# CETIS Analysis Detail

**Plant Bioassay - Chronic** — **CH2M Hill**

| Endpoint | Analysis Type | Sample Link | Control Link | Date Analyzed | Version |
|---|---|---|---|---|---|
| Average Root Wt. (Wet, mg) | Comparison | 08-1256-9051 | 08-1256-9051 | 19 Jul-06 10:24 AM | 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 | 62.32% |

**Group Comparisons**

| Control | vs | Conc-% | Statistic | Critical | P-Value | MSD | Decision(0.05) |
|---|---|---|---|---|---|---|---|
| Artificial Soil/Sedi | | 100 | 0.58002 | 1.85955 | 0.2889 | 22.5859 | Non-Significant Effect |

**ANOVA Table**

| Source | Sum of Squares | Mean Square | DF | F Statistic | P-Value | Decision(0.05) |
|---|---|---|---|---|---|---|
| Between | 124.0767 | 124.0767 | 1 | 0.34 | 0.57786 | Non-Significant Effect |
| Error | 2950.449 | 368.8061 | 8 | | | |
| Total | 3074.52563 | 492.88277 | 9 | | | |

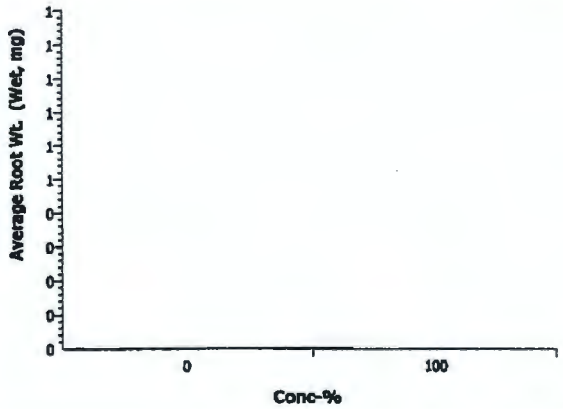
**ANOVA Assumptions**

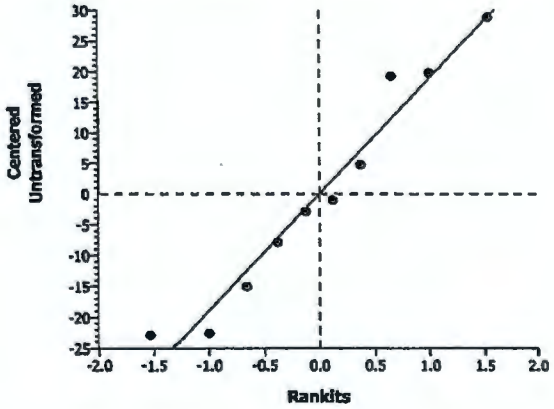
| Attribute | Test | Statistic | Critical | P-Value | Decision(0.01) |
|---|---|---|---|---|---|
| Variances | Variance Ratio F | 1.05362 | 23.15450 | 0.96085 | Equal Variances |
| Distribution | Shapiro-Wilk W | 0.93785 | | 0.52939 | Normal Distribution |

**Data Summary**

| | | | Original Data | | | | Transformed Data | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Conc-% | Control Type | Count | Mean | Minimum | Maximum | SD | Mean | Minimum | Maximum | SD |
| 0 | Artificial Soil/S | 5 | 36.242 | 13.590 | 65.054 | 18.952 | | | | |
| 100 | | 5 | 29.197 | 6.3020 | 48.978 | 19.453 | | | | |

**Graphics**



# CETIS Analysis Detail

**Plant Bioassay - Chronic** — **CH2M Hill**

| Endpoint | Analysis Type | Sample Link | Control Link | Date Analyzed | Version |
|---|---|---|---|---|---|
| Average Root Wt. (Dry, mg) | Comparison | 08-1256-9051 | 08-1256-9051 | 19 Jul-06 10:24 AM | 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 | 75.69% |

**Group Comparisons**

| Control | vs | Conc-% | Statistic | Critical | P-Value | MSD | Decision(0.05) |
|---|---|---|---|---|---|---|---|
| Artificial Soil/Sedi | | 100 | -0.5139 | 1.85955 | 0.6894 | 1.16237 | Non-Significant Effect |

**ANOVA Table**

| Source | Sum of Squares | Mean Square | DF | F Statistic | P-Value | Decision(0.05) |
|---|---|---|---|---|---|---|
| Between | 0.2579373 | 0.257937 | 1 | 0.26 | 0.62124 | Non-Significant Effect |
| Error | 7.814606 | 0.976826 | 8 | | | |
| Total | 8.072543 | 1.234763 | 9 | | | |

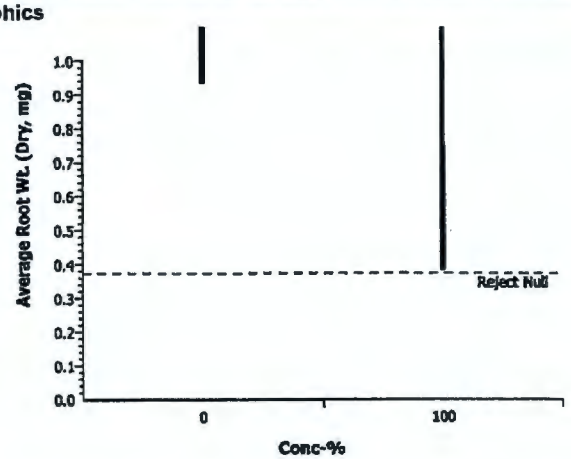
**ANOVA Assumptions**

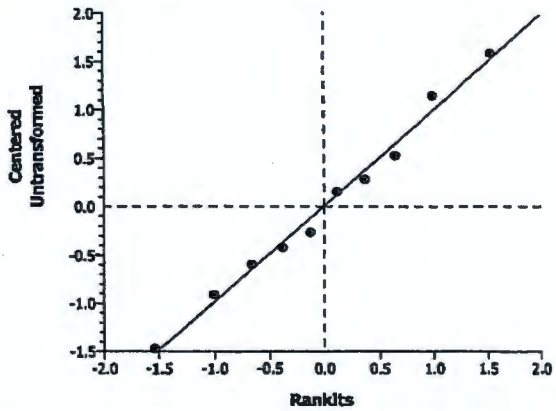
| Attribute | Test | Statistic | Critical | P-Value | Decision(0.01) |
|---|---|---|---|---|---|
| Variances | Variance Ratio F | 3.02456 | 23.15450 | 0.30907 | Equal Variances |
| Distribution | Shapiro-Wilk W | 0.98616 | | 0.98959 | Normal Distribution |

**Data Summary**

| | | | Original Data | | | | Transformed Data | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Conc-% | Control Type | Count | Mean | Minimum | Maximum | SD | Mean | Minimum | Maximum | SD |
| 0 | Artificial Soil/S | 5 | 1.53579 | 0.93500 | 2.67798 | 0.69673 | | | | |
| 100 | | 5 | 1.85700 | 0.38201 | 3.43999 | 1.21170 | | | | |

**Graphics**



# CETIS Analysis Detail

**Plant Bioassay - Chronic** — **CH2M Hill**

| Endpoint | Analysis Type | Sample Link | Control Link | Date Analyzed | Version |
|---|---|---|---|---|---|
| Average Total Wt (Wet, mg) | Comparison | 08-1256-9051 | 08-1256-9051 | 19 Jul-06 10:24 AM | 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 | 58.66% |

**Group Comparisons**

| Control | vs | Conc-% | Statistic | Critical | P-Value | MSD | Decision(0.05) |
|---|---|---|---|---|---|---|---|
| Artificial Soil/Sedi | | 100 | 0.48711 | 1.85955 | 0.3196 | 41.3206 | Non-Significant Effect |

**ANOVA Table**

| Source | Sum of Squares | Mean Square | DF | F Statistic | P-Value | Decision(0.05) |
|---|---|---|---|---|---|---|
| Between | 292.8929 | 292.8929 | 1 | 0.24 | 0.63925 | Non-Significant Effect |
| Error | 9875.252 | 1234.406 | 8 | | | |
| Total | 10168.1449 | 1527.2994 | 9 | | | |

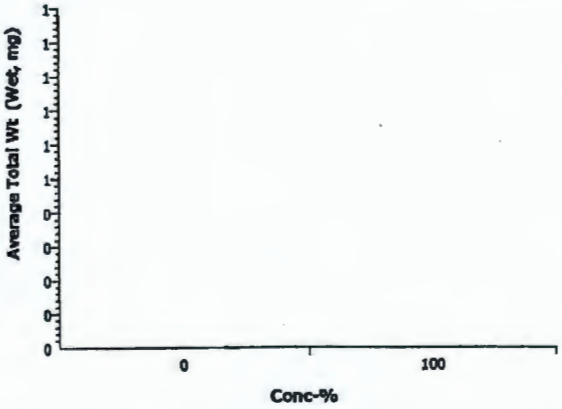
**ANOVA Assumptions**

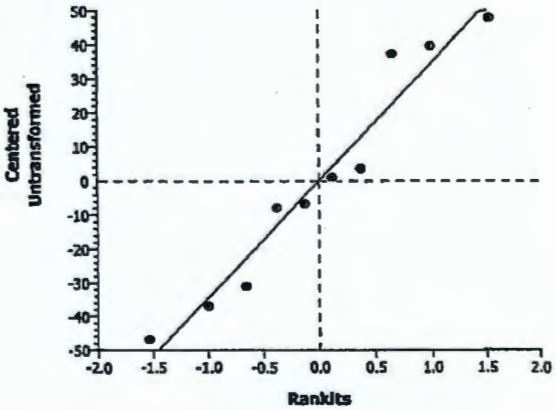
| Attribute | Test | Statistic | Critical | P-Value | Decision(0.01) |
|---|---|---|---|---|---|
| Variances | Variance Ratio F | 1.62045 | 23.15450 | 0.65148 | Equal Variances |
| Distribution | Shapiro-Wilk W | 0.92956 | | 0.44353 | Normal Distribution |

**Data Summary**

| | | | Original Data | | | | Transformed Data | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Conc-% | Control Type | Count | Mean | Minimum | Maximum | SD | Mean | Minimum | Maximum | SD |
| 0 | Artificial Soil/S | 5 | 70.439 | 33.550 | 118.26 | 30.694 | | | | |
| 100 | | 5 | 59.615 | 12.78 | 99.145 | 39.073 | | | | |

**Graphics**



# CETIS Analysis Detail

**Plant Bioassay - Chronic** — **CH2M Hill**

| Endpoint | Analysis Type | Sample Link | Control Link | Date Analyzed | Version |
|---|---|---|---|---|---|
| Average Total Wt (Dry, mg) | Comparison | 08-1256-9051 | 08-1256-9051 | 19 Jul-06 10:24 AM | 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 | 54.62% |

**Group Comparisons**

| Control | vs | Conc-% | Statistic | Critical | P-Value | MSD | Decision(0.05) |
|---|---|---|---|---|---|---|---|
| Artificial Soil/Sedi | | 100 | 0.41685 | 1.85955 | 0.3439 | 4.14563 | Non-Significant Effect |

**ANOVA Table**

| Source | Sum of Squares | Mean Square | DF | F Statistic | P-Value | Decision(0.05) |
|---|---|---|---|---|---|---|
| Between | 2.159032 | 2.159032 | 1 | 0.17 | 0.68775 | Non-Significant Effect |
| Error | 99.40231 | 12.42529 | 8 | | | |
| Total | 101.561338 | 14.584320 | 9 | | | |

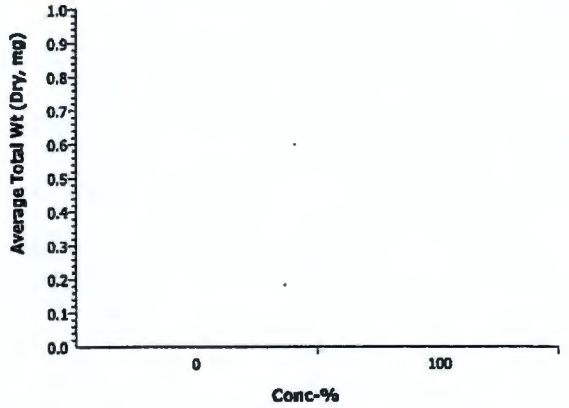
**ANOVA Assumptions**

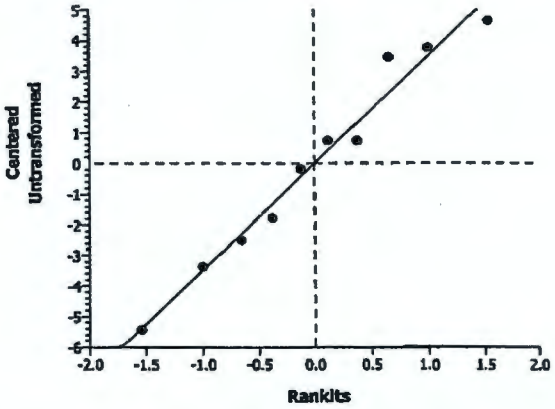
| Attribute | Test | Statistic | Critical | P-Value | Decision(0.01) |
|---|---|---|---|---|---|
| Variances | Variance Ratio F | 3.09181 | 23.15450 | 0.29997 | Equal Variances |
| Distribution | Shapiro-Wilk W | 0.95953 | | 0.78055 | Normal Distribution |

**Data Summary**

| | | | Original Data | | | | Transformed Data | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Conc-% | Control Type | Count | Mean | Minimum | Maximum | SD | Mean | Minimum | Maximum | SD |
| 0 | Artificial Soil/S | 5 | 7.5894 | 5.0750 | 11.36 | 2.4644 | | | | |
| 100 | | 5 | 6.6601 | 1.216 | 11.308 | 4.3333 | | | | |

**Graphics**



# BLUEGRASS GROWTH TEST

Client: Washington Closure Hanford Project

Test Start Date: 4-26-06

Initials: Day 0 (NJ) Day 12 ____ Day 14 NJ Day 16 NJ Day 19 (TP) Day 21 NJ Day 23 NJ Day 28 (TP) Day 35 B

Bioassay Lab ID: BG 1575- 03 Sample No: J11JH6

| CONC. | REPLICATE | # seeds germinated: Emergence: 12 days after planting | 14 days after planting | 16 days after planting | 19 days after planting | 21 days after planting | 23 days after planting | 7-DAYS POST-EMERGENCE (26 days after planting) | 14-DAYS POST-EMERGENCE (35 days after planting) | pH: INITIAL (@ planting) | FINAL (@ 14 days Post-Emergence) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Control | A | | 2 | 3 | 4 | 4 | 4 | 5 -> 5 | 4 live, 1 ded | 6.4 | 7.2 |
| | B | | 4 | 6 | 7 | 7 | 7 | 7 -> 5 | 5 | | |
| | C | | 4 | 4 | 5 | 6 | 6 | 6 -> 5 | 5 | | |
| | D | | 5 | 6 | 6 | 7 | 10 | 10 -> 5 | 4* | | |
| | E | | 4 | 5 | 4 | 4 | 4 | 7 -> 5 | 5 | | |

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

Replicate A: 2 Lg (G) one w/ B tip, 2 med. (G) 1 sm (G)

Replicate B: 3 Lg (G), 1 med w/ 1 B shoot, 1 sm (G) removed: 2 sm (G)

Replicate C: 2 Lg (G) one w/ B tips, 3 med one w/ B tip removed: 1 sm (G)

Replicate D: 3 Lg (G), 1 med (G), 1 sm (G) removed: 5 sm (G)

Replicate E: 1 Lg (G), 3 med (G) 2 w/ B tip, 1 sm. (G) removed 2 sm (G)

Appearance Code: Good (G) = deep green color with no brown, Brown (B) = brown color noted, # Lg = # of large plants (tallest, 6+ shoots), # Med = # of plants (smaller than large, fewer shoots), # Sm = # small plants (1-3 shoots)

14-Days Post-Emergence: Describe shoot appearance:

Replicate A: 2 med G, 2 med w/ 1 B shoot each, ded plant removed - 1 broad leaf removed

Replicate B: 3 Lg G, 1 Md G, 1 Md w/ 1 B shoot. - 1 broad leaf removed

Replicate C: 3 Md G, 2 Sm G - 1 broad leaf removed

Replicate D: 2 Lg G, 1 Lg w/ B tip 1 Med G - 1 Lg non bluegrass grass removed

Replicate E: 2 Lg G, 1 Med G, 1 Med w/ 1 B shoot 1 Sm G

Measure Shoot Height: Individual height of each seedling (above ground)

| | 1st Seedling | 2nd Seedling | 3rd Seedling | 4th Seedling | 5th Seedling |
|---|---|---|---|---|---|
| Replicate A | 80 mm | 83 mm | 97 mm | 52 mm | mm |
| Replicate B | 102 mm | 75 mm | 55 mm | 89 mm | 100 mm |
| Replicate C | 63 mm | 70 mm | 64 mm | 37 mm | 34 mm |
| Replicate D | 81 mm | 100 mm | 121 mm | 34 mm | mm |
| Replicate E | 94 mm | 42 mm | 76 mm | 134 mm | 34 mm |

Measure Shoot Weight: Total mass of all seedlings (above ground)

| | Tin Tare Wt. (mg) | Wet Wt (mg) | Dry Wt. (mg) |
|---|---|---|---|
| Replicate A | 998.59 | 1105.4 | 1015.30 |
| Replicate B | 1246.32 | 1400.3 | 1272.13 |
| Replicate C | 1248.99 | 1322.1 | 1265.16 |
| Replicate D | 1248.60 | 1418.8 | 1275.82 |
| Replicate E | 1245.70 | 1352.6 | 1262.01 |

Describe root appearance:

Replicate A

Replicate B

Replicate C

Replicate D

Replicate E

Measure Root Length: Individual length of the longest root from each seedling

| | 1st Seedling | 2nd Seedling | 3rd Seedling | 4th Seedling | 5th Seedling |
|---|---|---|---|---|---|
| Replicate A | 48 mm | 47 mm | 59 mm | 105 mm | mm |
| Replicate B | 77 mm | 52 mm | 122 mm | 113 mm | 89 mm |
| Replicate C | 58 mm | 60 mm | 88 mm | 75 mm | 35 mm |
| Replicate D | 108 mm | 49 mm | 114 mm | 74 mm | mm |
| Replicate E | 84 mm | 130 mm | 81 mm | 53 mm | 40 mm |

Measure Root Weight: Total mass of all roots from all seedlings

| | Tin Tare Wt. (mg) | Wet Wt (mg) | Dry Wt. (mg) |
|---|---|---|---|
| Replicate A | 971.15 | 1133.9 | 977.71 |
| Replicate B | 1243.44 | 1447.3 | 1254.41 |
| Replicate C | 1243.10 | 1328.2 | 1249.44 |
| Replicate D | 1248.17 | 1482.0 | 1257.76 |
| Replicate E | 1247.31 | 1419.1 | 1254.46 |

Comments: replicate E on day 19 had a large broad leaf grass growing that was not bluegrass it was removed (TP)

MS

* Rep D C Day 35 had 4 bluegrass + 1 Lg non bluegrass, w/ 10 germinated, reduce "stand count" to 4/100% survival)

# CETIS Test Summary

Report Date: 19 Jul-06 10:27 AM
Test Link: 12-0913-8299/B157503psB

**Plant Bioassay - Chronic** — **CH2M Hill**

| | | | | | |
|---|---|---|---|---|---|
| **Test No:** | 11-7687-4905 | **Test Type:** | Plant Chronic | **Duration:** | N/A |
| **Start Date:** | 26 Apr-06 | **Protocol:** | ASTM E1963-02 (2002) | **Species:** | Poa sandbergii |
| **Ending Date:** | | **Dil Water:** | | **Source:** | |
| **Setup Date:** | 26 Apr-06 | **Brine:** | | | |

**Comments:** recalculated Height and Length data July 19, 2006

| | | | | | |
|---|---|---|---|---|---|
| **Sample No:** | 07-1539-2463 | **Code:** | B1574-03 | **Client:** | |
| **Sample Date:** | 11 Apr-06 | **Material:** | Soil | **Project:** | |
| **Receive Date:** | | **Source:** | Hanford | | |
| **Sample Age:** | 15d 0h | **Station:** | | | |

**Comments:** J11JH6

**Comparison Summary**

| Analysis | Endpoint | NOEL | LOEL | ChV | PMSD | Method |
|---|---|---|---|---|---|---|
| 01-7352-2374 | % Germination | 100 | > 100 | N/A | 25.39% | Wilcoxon Rank Sum Two-Sample |
| 03-6485-4811 | Average Height (mm) | 100 | > 100 | N/A | 20.62% | Equal Variance t Two-Sample |
| 09-2861-3832 | Average Length (mm) | < 100 | 100 | N/A | 14.14% | Equal Variance t Two-Sample |
| 04-1373-8415 | Average AG Wt (Wet, mg) | 100 | > 100 | N/A | 38.84% | Equal Variance t Two-Sample |
| 08-1399-0241 | Average AG Wt (Dry, mg) | 100 | > 100 | N/A | 32.40% | Equal Variance t Two-Sample |
| 11-5190-0443 | Average Root Wt. (Wet, mg | 100 | > 100 | N/A | 55.30% | Equal Variance t Two-Sample |
| 05-6327-9902 | Average Root Wt. (Dry, mg) | 100 | > 100 | N/A | 46.09% | Equal Variance t Two-Sample |
| 05-1038-8670 | Average Total Wt (Wet, mg | 100 | > 100 | N/A | 46.90% | Equal Variance t Two-Sample |
| 15-8056-4476 | Average Total Wt (Dry, mg) | 100 | > 100 | N/A | 34.60% | Equal Variance t Two-Sample |

# CETIS Test Summary

Report Date: 19 Jul-06 10:27 AM
Test Link: 12-0913-8299/B157503psB

**% Germination Summary**

| Conc-% | Control Type | Reps | Mean | Minimum | Maximum | SE | SD | CV |
|---|---|---|---|---|---|---|---|---|
| 0 | Artificial Soil/S | 5 | 0.88000 | 0.40000 | 1.00000 | 0.12000 | 0.26833 | 30.49% |
| 100 | | 5 | 0.92000 | 0.80000 | 1.00000 | 0.04899 | 0.10954 | 11.91% |

**Average Height (mm) Summary**

| Conc-% | Control Type | Reps | Mean | Minimum | Maximum | SE | SD | CV |
|---|---|---|---|---|---|---|---|---|
| 0 | Artificial Soil/S | 5 | 88.560 | 67 | 115.40 | 8.048 | 17.996 | 20.32% |
| 100 | | 5 | 75.16 | 53.6 | 84.2 | 5.6279 | 12.584 | 16.74% |

**Average Length (mm) Summary**

| Conc-% | Control Type | Reps | Mean | Minimum | Maximum | SE | SD | CV |
|---|---|---|---|---|---|---|---|---|
| 0 | Artificial Soil/S | 5 | 106.34 | 82.5 | 120 | 6.5745 | 14.701 | 13.82% |
| 100 | | 5 | 78.960 | 63.200 | 90.6 | 4.7060 | 10.523 | 13.33% |

**Average AG Wt (Wet, mg) Summary**

| Conc-% | Control Type | Reps | Mean | Minimum | Maximum | SE | SD | CV |
|---|---|---|---|---|---|---|---|---|
| 0 | Artificial Soil/S | 5 | 34.197 | 19.960 | 53.208 | 5.3829 | 12.036 | 35.20% |
| 100 | | 5 | 27.210 | 14.622 | 42.550 | 4.6951 | 10.499 | 38.58% |

**Average AG Wt (Dry, mg) Summary**

| Conc-% | Control Type | Reps | Mean | Minimum | Maximum | SE | SD | CV |
|---|---|---|---|---|---|---|---|---|
| 0 | Artificial Soil/S | 5 | 6.05361 | 4.14001 | 8.68201 | 0.81424 | 1.82070 | 30.08% |
| 100 | | 5 | 4.52810 | 3.23401 | 6.80499 | 0.67032 | 1.49889 | 33.10% |

**Average Root Wt. (Wet, mg) Summary**

| Conc-% | Control Type | Reps | Mean | Minimum | Maximum | SE | SD | CV |
|---|---|---|---|---|---|---|---|---|
| 0 | Artificial Soil/S | 5 | 36.242 | 13.590 | 65.054 | 8.4756 | 18.952 | 52.29% |
| 100 | | 5 | 38.259 | 17.02 | 58.457 | 6.6577 | 14.887 | 38.91% |

**Average Root Wt. (Dry, mg) Summary**

| Conc-% | Control Type | Reps | Mean | Minimum | Maximum | SE | SD | CV |
|---|---|---|---|---|---|---|---|---|
| 0 | Artificial Soil/S | 5 | 1.53579 | 0.93500 | 2.67798 | 0.31159 | 0.69673 | 45.37% |
| 100 | | 5 | 1.78590 | 1.26799 | 2.39749 | 0.21872 | 0.48908 | 27.39% |

**Average Total Wt (Wet, mg) Summary**

| Conc-% | Control Type | Reps | Mean | Minimum | Maximum | SE | SD | CV |
|---|---|---|---|---|---|---|---|---|
| 0 | Artificial Soil/S | 5 | 70.439 | 33.550 | 118.26 | 13.727 | 30.694 | 43.58% |
| 100 | | 5 | 65.469 | 31.642 | 101.01 | 11.276 | 25.213 | 38.51% |

**Average Total Wt (Dry, mg) Summary**

| Conc-% | Control Type | Reps | Mean | Minimum | Maximum | SE | SD | CV |
|---|---|---|---|---|---|---|---|---|
| 0 | Artificial Soil/S | 5 | 7.5894 | 5.0750 | 11.36 | 1.1021 | 2.4644 | 32.47% |
| 100 | | 5 | 6.314 | 4.5020 | 9.2025 | 0.8829 | 1.9742 | 31.27% |

# CETIS Test Summary

Report Date: 19 Jul-06 10:27 AM
Test Link: 12-0913-8299/B157503psB

**% Germination Detail**

| Conc-% | Control Type | Rep 1 | Rep 2 | Rep 3 | Rep 4 | Rep 5 |
|---|---|---|---|---|---|---|
| 0 | Artificial Soil/S | 1.00000 | 1.00000 | 0.40000 | 1.00000 | 1.00000 |
| 100 | | 0.80000 | 1.00000 | 1.00000 | 0.80000 | 1.00000 |

**Average Height (mm) Detail**

| Conc-% | Control Type | Rep 1 | Rep 2 | Rep 3 | Rep 4 | Rep 5 |
|---|---|---|---|---|---|---|
| 0 | Artificial Soil/S | 78.6 | 91 | 67 | 90.8000 | 115.400 |
| 100 | | 78 | 84.2 | 53.6 | 84 | 76 |

**Average Length (mm) Detail**

| Conc-% | Control Type | Rep 1 | Rep 2 | Rep 3 | Rep 4 | Rep 5 |
|---|---|---|---|---|---|---|
| 0 | Artificial Soil/S | 102.800 | 114.400 | 82.5 | 112 | 120 |
| 100 | | 77.3000 | 90.6 | 63.2000 | 86.3000 | 77.4000 |

**Average AG Wt (Wet, mg) Detail**

| Conc-% | Control Type | Rep 1 | Rep 2 | Rep 3 | Rep 4 | Rep 5 |
|---|---|---|---|---|---|---|
| 0 | Artificial Soil/S | 30.4100 | 33.172 | 19.9600 | 34.2360 | 53.2080 |
| 100 | | 26.7025 | 30.7960 | 14.622 | 42.5500 | 21.3800 |

**Average AG Wt (Dry, mg) Detail**

| Conc-% | Control Type | Rep 1 | Rep 2 | Rep 3 | Rep 4 | Rep 5 |
|---|---|---|---|---|---|---|
| 0 | Artificial Soil/S | 4.53401 | 6.62400 | 4.14001 | 6.28801 | 8.68201 |
| 100 | | 4.17749 | 5.16201 | 3.23401 | 6.80499 | 3.26201 |

**Average Root Wt. (Wet, mg) Detail**

| Conc-% | Control Type | Rep 1 | Rep 2 | Rep 3 | Rep 4 | Rep 5 |
|---|---|---|---|---|---|---|
| 0 | Artificial Soil/S | 33.3280 | 40.9320 | 13.5900 | 28.3060 | 65.054 |
| 100 | | 40.6875 | 40.7720 | 17.02 | 58.4575 | 34.358 |

**Average Root Wt. (Dry, mg) Detail**

| Conc-% | Control Type | Rep 1 | Rep 2 | Rep 3 | Rep 4 | Rep 5 |
|---|---|---|---|---|---|---|
| 0 | Artificial Soil/S | 1.26801 | 1.68799 | 0.93500 | 1.10999 | 2.67798 |
| 100 | | 1.64000 | 2.19402 | 1.26799 | 2.39749 | 1.42998 |

**Average Total Wt (Wet, mg) Detail**

| Conc-% | Control Type | Rep 1 | Rep 2 | Rep 3 | Rep 4 | Rep 5 |
|---|---|---|---|---|---|---|
| 0 | Artificial Soil/S | 63.7380 | 74.1040 | 33.5500 | 62.5420 | 118.262 |
| 100 | | 67.39 | 71.5680 | 31.642 | 101.008 | 55.738 |

**Average Total Wt (Dry, mg) Detail**

| Conc-% | Control Type | Rep 1 | Rep 2 | Rep 3 | Rep 4 | Rep 5 |
|---|---|---|---|---|---|---|
| 0 | Artificial Soil/S | 5.80201 | 8.31199 | 5.07501 | 7.398 | 11.36 |
| 100 | | 5.81749 | 7.35603 | 4.50200 | 9.20248 | 4.69199 |

# CETIS Analysis Detail

**Plant Bioassay - Chronic** — **CH2M Hill**

| Endpoint | Analysis Type | Sample Link | Control Link | Date Analyzed | Version |
|---|---|---|---|---|---|
| % Germination | Comparison | 12-0913-8299 | 12-0913-8299 | 19 Jul-06 10:27 AM | 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 | 25.39% |

**Group Comparisons**

| Control | vs | Conc-% | Statistic | Critical | P-Value | Ties | Decision(0.05) |
|---|---|---|---|---|---|---|---|
| Artificial Soil/Sedi | | 100 | 26 | | 0.4206 | 4 | Non-Significant Effect |

**ANOVA Table**

| Source | Sum of Squares | Mean Square | DF | F Statistic | P-Value | Decision(0.05) |
|---|---|---|---|---|---|---|
| Between | 0.0033965 | 0.003396 | 1 | 0.07 | 0.80499 | Non-Significant Effect |
| Error | 0.417125 | 0.052141 | 8 | | | |
| Total | 0.42052149 | 0.0555371 | 9 | | | |

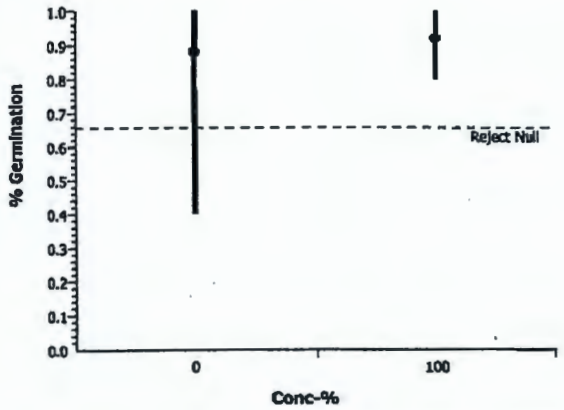
**ANOVA Assumptions**

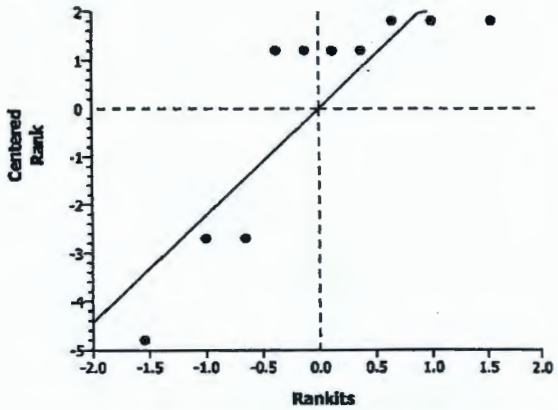
| Attribute | Test | Statistic | Critical | P-Value | Decision(0.01) |
|---|---|---|---|---|---|
| Variances | Variance Ratio F | 5.12973 | 23.15450 | 0.14232 | Equal Variances |
| Distribution | Shapiro-Wilk W | 0.68083 | | 0.00052 | Non-normal Distribution |

**Data Summary**

| | | | Original Data | | | | Transformed Data | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Conc-% | Control Type | Count | Mean | Minimum | Maximum | SD | Mean | Minimum | Maximum | SD |
| 0 | Artificial Soil/S | 5 | 0.88000 | 0.40000 | 1.00000 | 0.26833 | 5.80000 | 1.00000 | 7.00000 | 2.68328 |
| 100 | | 5 | 0.92000 | 0.80000 | 1.00000 | 0.10954 | 5.20000 | 2.50000 | 7.00000 | 2.46475 |

**Graphics**



# CETIS Analysis Detail

**Plant Bioassay - Chronic** — **CH2M Hill**

| Endpoint | Analysis Type | Sample Link | Control Link | Date Analyzed | Version |
|---|---|---|---|---|---|
| Average Height (mm) | Comparison | 12-0913-8299 | 12-0913-8299 | 19 Jul-06 10:27 AM | 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 | 20.62% |

**Group Comparisons**

| Control | vs | Conc-% | Statistic | Critical | P-Value | MSD | Decision(0.05) |
|---|---|---|---|---|---|---|---|
| Artificial Soil/Sedi | | 100 | 1.36449 | 1.85955 | 0.1048 | 18.2618 | Non-Significant Effect |

**ANOVA Table**

| Source | Sum of Squares | Mean Square | DF | F Statistic | P-Value | Decision(0.05) |
|---|---|---|---|---|---|---|
| Between | 448.9001 | 448.9001 | 1 | 1.86 | 0.20956 | Non-Significant Effect |
| Error | 1928.864 | 241.108 | 8 | | | |
| Total | 2377.76425 | 690.00813 | 9 | | | |

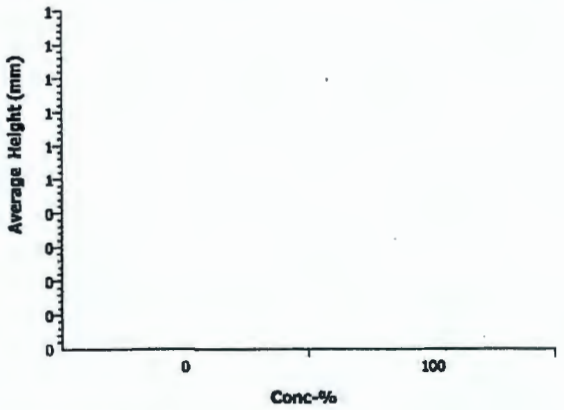
**ANOVA Assumptions**

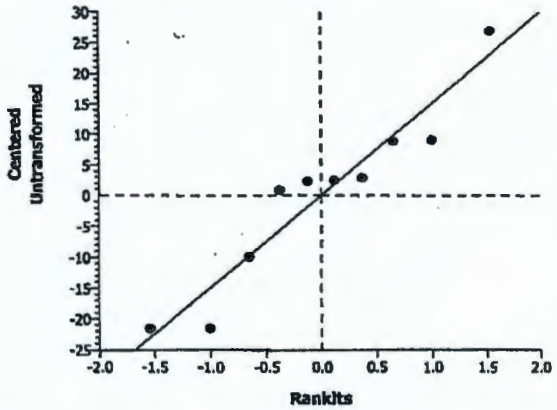
| Attribute | Test | Statistic | Critical | P-Value | Decision(0.01) |
|---|---|---|---|---|---|
| Variances | Variance Ratio F | 2.04491 | 23.15450 | 0.50546 | Equal Variances |
| Distribution | Shapiro-Wilk W | 0.91966 | | 0.35411 | Normal Distribution |

**Data Summary**

| | | | Original Data | | | | Transformed Data | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Conc-% | Control Type | Count | Mean | Minimum | Maximum | SD | Mean | Minimum | Maximum | SD |
| 0 | Artificial Soil/S | 5 | 88.560 | 67 | 115.4 | 17.996 | | | | |
| 100 | | 5 | 75.16 | 53.6 | 84.2 | 12.584 | | | | |

**Graphics**



# CETIS Analysis Detail

**Plant Bioassay - Chronic** — **CH2M Hill**

| Endpoint | Analysis Type | Sample Link | Control Link | Date Analyzed | Version |
|---|---|---|---|---|---|
| Average Length (mm) | Comparison | 12-0913-8299 | 12-0913-8299 | 19 Jul-06 10:27 AM | 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 | 14.14% |

**Group Comparisons**

| Control | vs | Conc-% | Statistic | Critical | P-Value | MSD | Decision(0.05) |
|---|---|---|---|---|---|---|---|
| Artificial Soil/Sedi | | 100 | 3.38644 | 1.85955 | 0.0048 | 15.0348 | Significant Effect |

**ANOVA Table**

| Source | Sum of Squares | Mean Square | DF | F Statistic | P-Value | Decision(0.05) |
|---|---|---|---|---|---|---|
| Between | 1874.161 | 1874.161 | 1 | 11.47 | 0.00955 | Significant Effect |
| Error | 1307.404 | 163.4255 | 8 | | | |
| Total | 3181.56482 | 2037.5864 | 9 | | | |

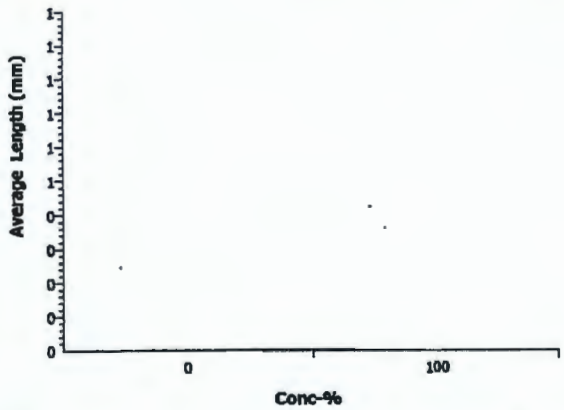
**ANOVA Assumptions**

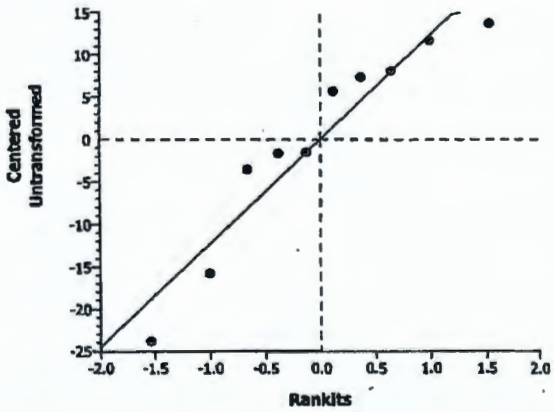
| Attribute | Test | Statistic | Critical | P-Value | Decision(0.01) |
|---|---|---|---|---|---|
| Variances | Variance Ratio F | 1.95170 | 23.15450 | 0.53312 | Equal Variances |
| Distribution | Shapiro-Wilk W | 0.90560 | | 0.25211 | Normal Distribution |

**Data Summary**

| | | | Original Data | | | | Transformed Data | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Conc-% | Control Type | Count | Mean | Minimum | Maximum | SD | Mean | Minimum | Maximum | SD |
| 0 | Artificial Soil/S | 5 | 106.34 | 82.5 | 120 | 14.701 | | | | |
| 100 | | 5 | 78.960 | 63.2 | 90.6 | 10.523 | | | | |

**Graphics**



# CETIS Analysis Detail

**Plant Bioassay - Chronic** — **CH2M Hill**

| Endpoint | Analysis Type | Sample Link | Control Link | Date Analyzed | Version |
|---|---|---|---|---|---|
| Average AG Wt (Wet, mg) | Comparison | 12-0913-8299 | 12-0913-8299 | 19 Jul-06 10:27 AM | 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 | 38.84% |

**Group Comparisons**

| Control | vs | Conc-% | Statistic | Critical | P-Value | MSD | Decision(0.05) |
|---|---|---|---|---|---|---|---|
| Artificial Soil/Sedi | | 100 | 0.97821 | 1.85955 | 0.1783 | 13.2823 | Non-Significant Effect |

**ANOVA Table**

| Source | Sum of Squares | Mean Square | DF | F Statistic | P-Value | Decision(0.05) |
|---|---|---|---|---|---|---|
| Between | 122.049 | 122.049 | 1 | 0.96 | 0.35662 | Non-Significant Effect |
| Error | 1020.383 | 127.5479 | 8 | | | |
| Total | 1142.43233 | 249.59689 | 9 | | | |

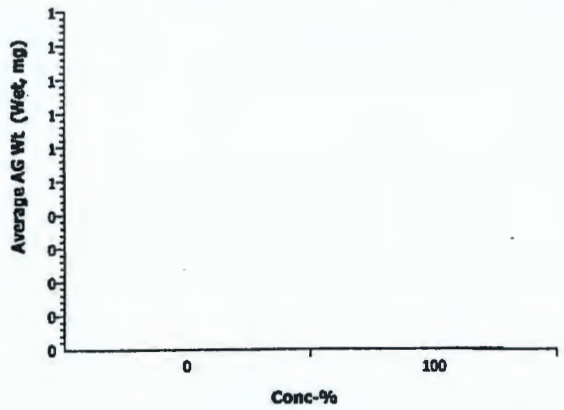
**ANOVA Assumptions**

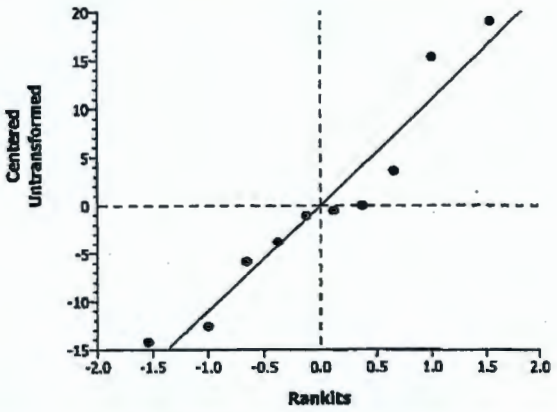
| Attribute | Test | Statistic | Critical | P-Value | Decision(0.01) |
|---|---|---|---|---|---|
| Variances | Variance Ratio F | 1.31442 | 23.15450 | 0.79747 | Equal Variances |
| Distribution | Shapiro-Wilk W | 0.92795 | | 0.42805 | Normal Distribution |

**Data Summary**

| | | | Original Data | | | | Transformed Data | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Conc-% | Control Type | Count | Mean | Minimum | Maximum | SD | Mean | Minimum | Maximum | SD |
| 0 | Artificial Soil/S | 5 | 34.197 | 19.960 | 53.208 | 12.036 | | | | |
| 100 | | 5 | 27.210 | 14.622 | 42.550 | 10.499 | | | | |

**Graphics**



# CETIS Analysis Detail

**Plant Bioassay - Chronic** — **CH2M Hill**

| Endpoint | Analysis Type | Sample Link | Control Link | Date Analyzed | Version |
|---|---|---|---|---|---|
| Average AG Wt (Dry, mg) | Comparison | 12-0913-8299 | 12-0913-8299 | 19 Jul-06 10:27 AM | 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 | 32.40% |

**Group Comparisons**

| Control | vs | Conc-% | Statistic | Critical | P-Value | MSD | Decision(0.05) |
|---|---|---|---|---|---|---|---|
| Artificial Soil/Sedi | | 100 | 1.44643 | 1.85955 | 0.0930 | 1.96120 | Non-Significant Effect |

**ANOVA Table**

| Source | Sum of Squares | Mean Square | DF | F Statistic | P-Value | Decision(0.05) |
|---|---|---|---|---|---|---|
| Between | 5.817917 | 5.817917 | 1 | 2.09 | 0.18607 | Non-Significant Effect |
| Error | 22.24646 | 2.780807 | 8 | | | |
| Total | 28.0643730 | 8.5987239 | 9 | | | |

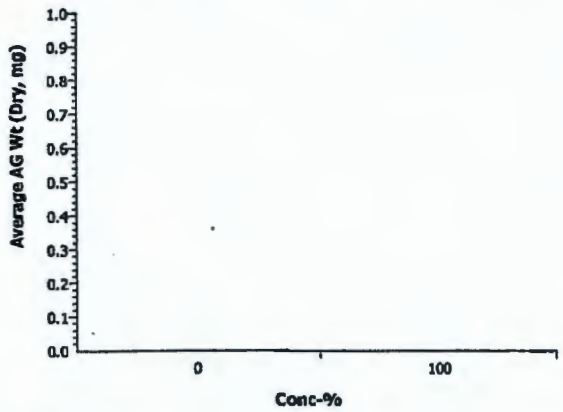
**ANOVA Assumptions**

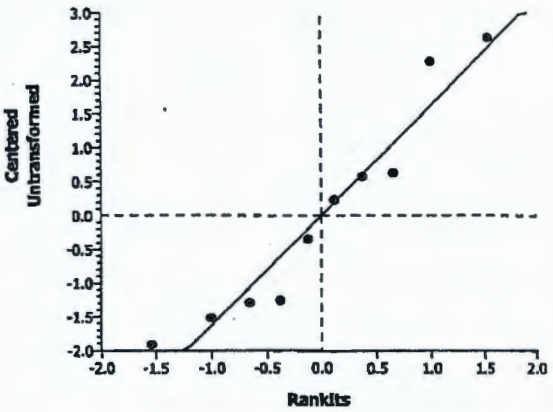
| Attribute | Test | Statistic | Critical | P-Value | Decision(0.01) |
|---|---|---|---|---|---|
| Variances | Variance Ratio F | 1.47550 | 23.15450 | 0.71542 | Equal Variances |
| Distribution | Shapiro-Wilk W | 0.91713 | | 0.33365 | Normal Distribution |

**Data Summary**

| | | | Original Data | | | | Transformed Data | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Conc-% | Control Type | Count | Mean | Minimum | Maximum | SD | Mean | Minimum | Maximum | SD |
| 0 | Artificial Soil/S | 5 | 6.05361 | 4.14001 | 8.68201 | 1.82070 | | | | |
| 100 | | 5 | 4.52810 | 3.23401 | 6.80499 | 1.49889 | | | | |

**Graphics**



# CETIS Analysis Detail

**Plant Bioassay - Chronic** — **CH2M Hill**

| Endpoint | Analysis Type | Sample Link | Control Link | Date Analyzed | Version |
|---|---|---|---|---|---|
| Average Root Wt. (Wet, mg) | Comparison | 12-0913-8299 | 12-0913-8299 | 19 Jul-06 10:27 AM | 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 | 55.30% |

**Group Comparisons**

| Control vs | Conc-% | Statistic | Critical | P-Value | MSD | Decision(0.05) |
|---|---|---|---|---|---|---|
| Artificial Soil/Sedi | 100 | -0.1871 | 1.85955 | 0.5719 | 20.0418 | Non-Significant Effect |

**ANOVA Table**

| Source | Sum of Squares | Mean Square | DF | F Statistic | P-Value | Decision(0.05) |
|---|---|---|---|---|---|---|
| Between | 10.17064 | 10.17064 | 1 | 0.04 | 0.85621 | Non-Significant Effect |
| Error | 2323.215 | 290.4018 | 8 | | | |
| Total | 2333.38524 | 300.57246 | 9 | | | |

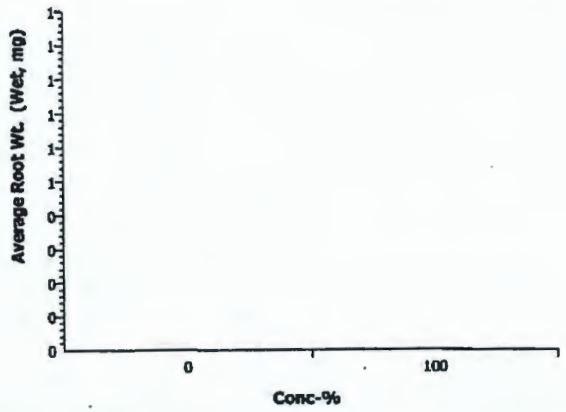
**ANOVA Assumptions**

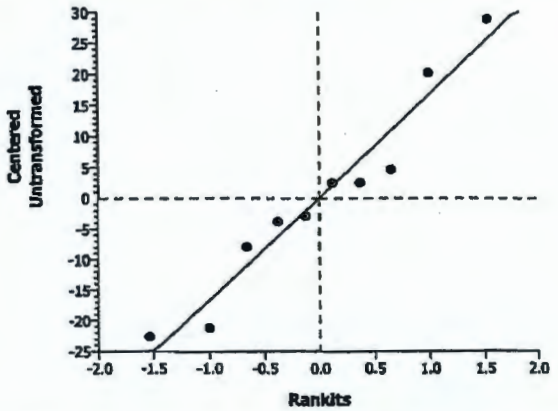
| Attribute | Test | Statistic | Critical | P-Value | Decision(0.01) |
|---|---|---|---|---|---|
| Variances | Variance Ratio F | 1.62064 | 23.15450 | 0.65140 | Equal Variances |
| Distribution | Shapiro-Wilk W | 0.94540 | | 0.61452 | Normal Distribution |

**Data Summary**

| | | | Original Data | | | | Transformed Data | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Conc-% | Control Type | Count | Mean | Minimum | Maximum | SD | Mean | Minimum | Maximum | SD |
| 0 | Artificial Soil/S | 5 | 36.242 | 13.590 | 65.054 | 18.952 | | | | |
| 100 | | 5 | 38.259 | 17.02 | 58.457 | 14.887 | | | | |

**Graphics**



# CETIS Analysis Detail

**Plant Bioassay - Chronic** — CH2M Hill

| Endpoint | Analysis Type | Sample Link | Control Link | Date Analyzed | Version |
|---|---|---|---|---|---|
| Average Root Wt. (Dry, mg) | Comparison | 12-0913-8299 | 12-0913-8299 | 19 Jul-06 10:27 AM | 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 | 46.09% |

**Group Comparisons**

| Control | vs | Conc-% | Statistic | Critical | P-Value | MSD | Decision(0.05) |
|---|---|---|---|---|---|---|---|
| Artificial Soil/Sedi | | 100 | -0.657 | 1.85955 | 0.7352 | 0.70791 | Non-Significant Effect |

**ANOVA Table**

| Source | Sum of Squares | Mean Square | DF | F Statistic | P-Value | Decision(0.05) |
|---|---|---|---|---|---|---|
| Between | 0.1563821 | 0.156382 | 1 | 0.43 | 0.52964 | Non-Significant Effect |
| Error | 2.898527 | 0.362316 | 8 | | | |
| Total | 3.05490872 | 0.5186979 | 9 | | | |

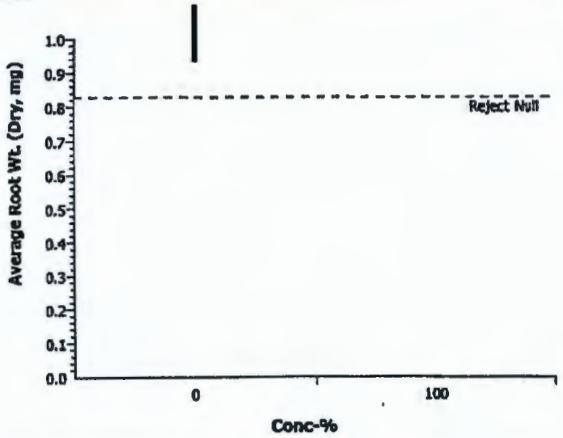
**ANOVA Assumptions**

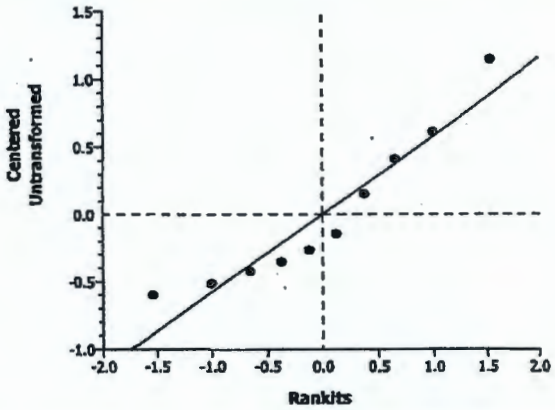
| Attribute | Test | Statistic | Critical | P-Value | Decision(0.01) |
|---|---|---|---|---|---|
| Variances | Variance Ratio F | 2.02940 | 23.15450 | 0.50991 | Equal Variances |
| Distribution | Shapiro-Wilk W | 0.90272 | | 0.23460 | Normal Distribution |

**Data Summary**

| | | | Original Data | | | | Transformed Data | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Conc-% | Control Type | Count | Mean | Minimum | Maximum | SD | Mean | Minimum | Maximum | SD |
| 0 | Artificial Soil/S | 5 | 1.53579 | 0.93500 | 2.67798 | 0.69673 | | | | |
| 100 | | 5 | 1.78590 | 1.26799 | 2.39749 | 0.48908 | | | | |

**Graphics**



# CETIS Analysis Detail

**Plant Bioassay - Chronic** — **CH2M Hill**

| Endpoint | Analysis Type | Sample Link | Control Link | Date Analyzed | Version |
|---|---|---|---|---|---|
| Average Total Wt (Wet, mg) | Comparison | 12-0913-8299 | 12-0913-8299 | 19 Jul-06 10:27 AM | 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 | 46.90% |

**Group Comparisons**

| Control | vs | Conc-% | Statistic | Critical | P-Value | MSD | Decision(0.05) |
|---|---|---|---|---|---|---|---|
| Artificial Soil/Sedi | | 100 | 0.27978 | 1.85955 | 0.3934 | 33.0335 | Non-Significant Effect |

**ANOVA Table**

| Source | Sum of Squares | Mean Square | DF | F Statistic | P-Value | Decision(0.05) |
|---|---|---|---|---|---|---|
| Between | 61.75508 | 61.75508 | 1 | 0.08 | 0.78674 | Non-Significant Effect |
| Error | 6311.363 | 788.9204 | 8 | | | |
| Total | 6373.11836 | 850.67549 | 9 | | | |

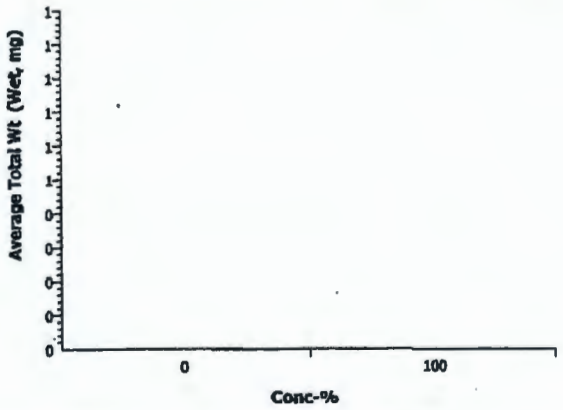
**ANOVA Assumptions**

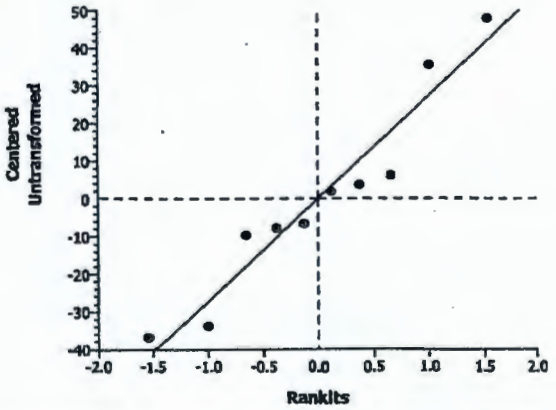
| Attribute | Test | Statistic | Critical | P-Value | Decision(0.01) |
|---|---|---|---|---|---|
| Variances | Variance Ratio F | 1.48202 | 23.15450 | 0.71236 | Equal Variances |
| Distribution | Shapiro-Wilk W | 0.92915 | | 0.43960 | Normal Distribution |

**Data Summary**

| | | | Original Data | | | | Transformed Data | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Conc-% | Control Type | Count | Mean | Minimum | Maximum | SD | Mean | Minimum | Maximum | SD |
| 0 | Artificial Soil/S | 5 | 70.439 | 33.550 | 118.26 | 30.694 | | | | |
| 100 | | 5 | 65.469 | 31.642 | 101.01 | 25.213 | | | | |

**Graphics**



# CETIS Analysis Detail

**Plant Bioassay - Chronic** — **CH2M Hill**

| Endpoint | Analysis Type | Sample Link | Control Link | Date Analyzed | Version |
|---|---|---|---|---|---|
| Average Total Wt (Dry, mg) | Comparison | 12-0913-8299 | 12-0913-8299 | 19 Jul-06 10:27 AM | 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 | 34.60% |

**Group Comparisons**

| Control | vs | Conc-% | Statistic | Critical | P-Value | MSD | Decision(0.05) |
|---|---|---|---|---|---|---|---|
| Artificial Soil/Sedi | | 100 | 0.90317 | 1.85955 | 0.1964 | 2.62595 | Non-Significant Effect |

**ANOVA Table**

| Source | Sum of Squares | Mean Square | DF | F Statistic | P-Value | Decision(0.05) |
|---|---|---|---|---|---|---|
| Between | 4.066611 | 4.066611 | 1 | 0.82 | 0.39282 | Non-Significant Effect |
| Error | 39.88291 | 4.985364 | 8 | | | |
| Total | 43.9495225 | 9.0519748 | 9 | | | |

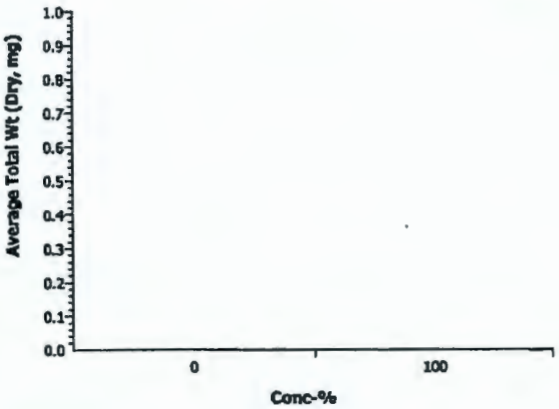
**ANOVA Assumptions**

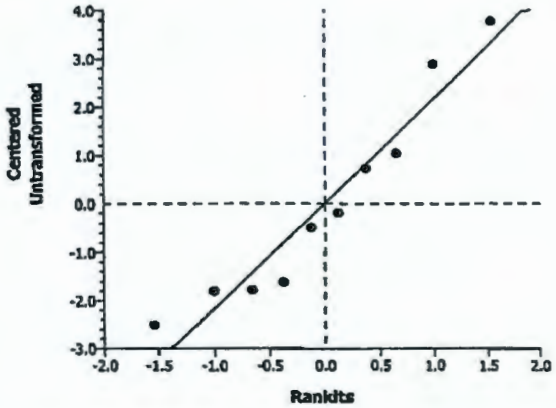
| Attribute | Test | Statistic | Critical | P-Value | Decision(0.01) |
|---|---|---|---|---|---|
| Variances | Variance Ratio F | 1.55825 | 23.15450 | 0.67787 | Equal Variances |
| Distribution | Shapiro-Wilk W | 0.92039 | | 0.36024 | Normal Distribution |

**Data Summary**

| | | | Original Data | | | | Transformed Data | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Conc-% | Control Type | Count | Mean | Minimum | Maximum | SD | Mean | Minimum | Maximum | SD |
| 0 | Artificial Soil/S | 5 | 7.5894 | 5.0750 | 11.36 | 2.4644 | | | | |
| 100 | | 5 | 6.314 | 4.5020 | 9.2025 | 1.9742 | | | | |

**Graphics**



# BLUEGRASS GROWTH TEST

Client: Washington Closure Hanford Project

Test Start Date: 4-26-06

Day 0 [illegible] Day 12 ____ Day 14 NJ Day 16 NJ Day 19 TP Day 21 NJ Day 23 ____ Day 28 TP Day 35 [illegible]

Bioassay Lab ID: BG 1575- 64 Sample No: JIIJJO

| CONC. | REPLICATE | # seeds germinated: Emergence: 12 days after planting | 14 days after planting | 16 days after planting | 19 days after planting | 21 days after planting | 23 days after planting | 7-DAYS POST-EMERGENCE (28 days after planting) | 14-DAYS POST-EMERGENCE (35 days after planting) | pH: INITIAL (@ planting) | FINAL (@ 14 days Post-Emergence) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Control | A | | 5 | 5 | 5 | 6 | 6 | 6->5 | 5 | 6.4 | 7.4 |
| | B | | 6 | 6 | 8 | 8 | 8 | 9->5 | 5 | | |
| | C | | 3 | 3 | 3 | 4 | 4 | 4->4 | 4 | | |
| | D | | 4 | 4 | 5 | 5 | 5 | 5->5 | 5 | | |
| | E | | 5 | 6 | 6 | 6 | 7 | 8->5 | 5 | | |

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

Replicate A: 2 Lg (G), 3 med (G) removed: 1 med (G)

Replicate B: 1 Lg (G), 4 med (G) 1 w/B shoot removed: 4 sm (G)

Replicate C: 1 Lg (G), 3 sm (G)

Replicate D: 2 med (G) 1 w/B shoot, 3 sm (G)

Replicate E: 4 Lg (G), 1 med (G) removed: 3 sm (G)

Appearance Code: Good (G) = deep green color with no brown. Brown (B) = brown color noted, # Lg = # of large plants (tallest, 6+ shoots). # Med = # of plants (smaller than large, fewer shoots). # Sm = # small plants (1-3 shoots)

14-Days Post-Emergence: Describe shoot appearance:

Replicate A: ~~3 Lg G, 2 Md G Br~~ 2 Lg G, 3 Md G

Replicate B: 1 Lg G, 3 Md G, 1 Md w/1 B shoot.

Replicate C: 1 Md G, 3 Sm G — 1 brown leaf plant removed

Replicate D: 2 Md each w/1 B shoot 3 Sm G

Replicate E: 2 Lg G, 1 Lg G w/1 B shoot, 2 Md G

Measure Shoot Height: Individual height of each seedling (above ground)

| | 1st Seedling | 2nd Seedling | 3rd Seedling | 4th Seedling | 5th Seedling |
|---|---|---|---|---|---|
| Replicate A | 110 ~~73 Br~~ mm | 93 ~~34 Br~~ mm | 0 ~~76 Br~~ mm | 90 ~~76 Br~~ mm | ~~56 TNB Br~~ mm |
| Replicate B | 73 mm | 60 mm | 95 mm | 56 mm | 67 mm |
| Replicate C | 80 mm | 25 mm | 20 mm | 20 mm | mm |
| Replicate D | 64 mm | 73 mm | 44 mm | 14 mm | 12 mm |
| Replicate E | 93 mm | 51 mm | 96 mm | 86 mm | 85 mm |

Measure Shoot Weight: Total mass of all seedlings (above ground)

| | Tin Tare Wt. (mg) | Wet Wt (mg) | Dry Wt. (mg) |
|---|---|---|---|
| Replicate A | 993.53 | 1157.5 | 1018.15 |
| Replicate B | 1246.04 | 1392.1 | 1265.64 |
| Replicate C | 1240.64 | 1346.7 | 1251.53 |
| Replicate D | 1248.45 | 1303.2 | 1256.43 |
| Replicate E | 1252.65 | 1400.1 | 1275.50 |

Describe root appearance:

Replicate A

Replicate B

Replicate C

Replicate D

Replicate E

Measure Root Length: Individual length of the longest root from each seedling

| | 1st Seedling | 2nd Seedling | 3rd Seedling | 4th Seedling | 5th Seedling |
|---|---|---|---|---|---|
| Replicate A | 106 mm | 47 mm | 132 mm | 78 mm | 52 mm |
| Replicate B | 104 mm | 87 mm | 73 mm | 74 mm | 55 mm |
| Replicate C | 115 mm | 38 mm | 55 mm | 51 mm | mm |
| Replicate D | 10 mm | 95 mm | 71 mm | 76 mm | 33 mm |
| Replicate E | 94 mm | 40 mm | 39 mm | 95 mm | 108 mm |

Measure Root Weight: Total mass of all roots from all seedlings

| | Tin Tare Wt. (mg) | Wet Wt (mg) | Dry Wt. (mg) |
|---|---|---|---|
| Replicate A | 991.97 | 1189.5 | 1004.04 |
| Replicate B | 1248.55 | 1423.0 | 1259.01 |
| Replicate C | 1247.77 | 1355.4 | 1254.43 |
| Replicate D | 1242.68 | 1341.8 | 1247.85 |
| Replicate E | 1248.87 | 1467.4 | 1260.92 |

Comments:

# CETIS Test Summary

Report Date: 19 Jul-06 10:30 AM
Test Link: 17-7073-4826

**Plant Bioassay - Chronic** — **CH2M Hill**

| | | | | | |
|---|---|---|---|---|---|
| **Test No:** | 14-1638-0563 | **Test Type:** | Plant Chronic | **Duration:** | N/A |
| **Start Date:** | 26 Apr-06 | **Protocol:** | ASTM E1963-02 (2002) | **Species:** | Poa sandbergii |
| **Ending Date:** | | **Dil Water:** | | **Source:** | |
| **Setup Date:** | 26 Apr-06 | **Brine:** | | | |

**Comments:** recalculated Height and Length data July 19, 2006

| | | | | | |
|---|---|---|---|---|---|
| **Sample No:** | 07-9940-6935 | **Code:** | B1574-04 | **Client:** | |
| **Sample Date:** | 12 Apr-06 | **Material:** | Soil | **Project:** | |
| **Receive Date:** | | **Source:** | Hanford | | |
| **Sample Age:** | 14d 0h | **Station:** | | | |

**Comments:** J11JJ0

**Comparison Summary**

| Analysis | Endpoint | NOEL | LOEL | ChV | PMSD | Method |
|---|---|---|---|---|---|---|
| 08-9009-7717 | % Germination | 100 | > 100 | N/A | 24.60% | Wilcoxon Rank Sum Two-Sample |
| 15-9718-1812 | Average Height (mm) | < 100 | 100 | N/A | 26.33% | Equal Variance t Two-Sample |
| 06-1259-2004 | Average Length (mm) | < 100 | 100 | N/A | 14.18% | Equal Variance t Two-Sample |
| 02-3239-0201 | Average AG Wt (Wet, mg) | 100 | > 100 | N/A | 35.96% | Equal Variance t Two-Sample |
| 13-1142-1377 | Average AG Wt (Dry, mg) | < 100 | 100 | N/A | 31.32% | Equal Variance t Two-Sample |
| 07-3437-3041 | Average Root Wt. (Wet, mg | 100 | > 100 | N/A | 48.78% | Equal Variance t Two-Sample |
| 08-5764-6415 | Average Root Wt. (Dry, mg) | 100 | > 100 | N/A | 49.22% | Equal Variance t Two-Sample |
| 15-9803-2435 | Average Total Wt (Wet, mg | 100 | > 100 | N/A | 41.74% | Equal Variance t Two-Sample |
| 05-9277-8850 | Average Total Wt (Dry, mg) | 100 | > 100 | N/A | 34.45% | Equal Variance t Two-Sample |

# CETIS Test Summary

Report Date: 19 Jul-06 10:30 AM
Test Link: 17-7073-4826

**% Germination Summary**

| Conc-% | Control Type | Reps | Mean | Minimum | Maximum | SE | SD | CV |
|---|---|---|---|---|---|---|---|---|
| 0 | Artificial Soil/S | 5 | 0.88000 | 0.40000 | 1.00000 | 0.12000 | 0.26833 | 30.49% |
| 100 | | 5 | 0.96000 | 0.80000 | 1.00000 | 0.04000 | 0.08944 | 9.32% |

**Average Height (mm) Summary**

| Conc-% | Control Type | Reps | Mean | Minimum | Maximum | SE | SD | CV |
|---|---|---|---|---|---|---|---|---|
| 0 | Artificial Soil/S | 5 | 88.560 | 67 | 115.40 | 8.048 | 17.996 | 20.32% |
| 100 | | 5 | 62.26 | 36.3 | 83.2 | 9.6176 | 21.506 | 34.54% |

**Average Length (mm) Summary**

| Conc-% | Control Type | Reps | Mean | Minimum | Maximum | SE | SD | CV |
|---|---|---|---|---|---|---|---|---|
| 0 | Artificial Soil/S | 5 | 106.34 | 82.5 | 120 | 6.5745 | 14.701 | 13.82% |
| 100 | | 5 | 71.72 | 57 | 83 | 4.75 | 10.621 | 14.81% |

**Average AG Wt (Wet, mg) Summary**

| Conc-% | Control Type | Reps | Mean | Minimum | Maximum | SE | SD | CV |
|---|---|---|---|---|---|---|---|---|
| 0 | Artificial Soil/S | 5 | 34.197 | 19.960 | 53.208 | 5.3829 | 12.036 | 35.20% |
| 100 | | 5 | 25.792 | 10.95 | 32.794 | 3.8419 | 8.5908 | 33.31% |

**Average AG Wt (Dry, mg) Summary**

| Conc-% | Control Type | Reps | Mean | Minimum | Maximum | SE | SD | CV |
|---|---|---|---|---|---|---|---|---|
| 0 | Artificial Soil/S | 5 | 6.05361 | 4.14001 | 8.68201 | 0.81424 | 1.82070 | 30.08% |
| 100 | | 5 | 3.54850 | 1.60601 | 4.92400 | 0.61356 | 1.37195 | 38.66% |

**Average Root Wt. (Wet, mg) Summary**

| Conc-% | Control Type | Reps | Mean | Minimum | Maximum | SE | SD | CV |
|---|---|---|---|---|---|---|---|---|
| 0 | Artificial Soil/S | 5 | 36.242 | 13.590 | 65.054 | 8.4756 | 18.952 | 52.29% |
| 100 | | 5 | 32.967 | 19.824 | 43.706 | 4.3084 | 9.6338 | 29.22% |

**Average Root Wt. (Dry, mg) Summary**

| Conc-% | Control Type | Reps | Mean | Minimum | Maximum | SE | SD | CV |
|---|---|---|---|---|---|---|---|---|
| 0 | Artificial Soil/S | 5 | 1.53579 | 0.93500 | 2.67798 | 0.31159 | 0.69673 | 45.37% |
| 100 | | 5 | 1.92300 | 1.03398 | 2.41400 | 0.26113 | 0.58389 | 30.36% |

**Average Total Wt (Wet, mg) Summary**

| Conc-% | Control Type | Reps | Mean | Minimum | Maximum | SE | SD | CV |
|---|---|---|---|---|---|---|---|---|
| 0 | Artificial Soil/S | 5 | 70.439 | 33.550 | 118.26 | 13.727 | 30.694 | 43.58% |
| 100 | | 5 | 58.759 | 30.774 | 73.196 | 7.8485 | 17.55 | 29.87% |

**Average Total Wt (Dry, mg) Summary**

| Conc-% | Control Type | Reps | Mean | Minimum | Maximum | SE | SD | CV |
|---|---|---|---|---|---|---|---|---|
| 0 | Artificial Soil/S | 5 | 7.5894 | 5.0750 | 11.36 | 1.1021 | 2.4644 | 32.47% |
| 100 | | 5 | 5.4715 | 2.64 | 7.338 | 0.8730 | 1.9522 | 35.68% |

# CETIS Test Summary

Report Date: 19 Jul-06 10:30 AM
Test Link: 17-7073-4826

**% Germination Detail**

| Conc-% | Control Type | Rep 1 | Rep 2 | Rep 3 | Rep 4 | Rep 5 |
|---|---|---|---|---|---|---|
| 0 | Artificial Soil/S | 1.00000 | 1.00000 | 0.40000 | 1.00000 | 1.00000 |
| 100 | | 1.00000 | 1.00000 | 0.80000 | 1.00000 | 1.00000 |

**Average Height (mm) Detail**

| Conc-% | Control Type | Rep 1 | Rep 2 | Rep 3 | Rep 4 | Rep 5 |
|---|---|---|---|---|---|---|
| 0 | Artificial Soil/S | 78.6 | 91 | 67 | 90.8000 | 115.400 |
| 100 | | 78.8000 | 70.6 | 36.3 | 42.4000 | 83.2 |

**Average Length (mm) Detail**

| Conc-% | Control Type | Rep 1 | Rep 2 | Rep 3 | Rep 4 | Rep 5 |
|---|---|---|---|---|---|---|
| 0 | Artificial Soil/S | 102.800 | 114.400 | 82.5 | 112 | 120 |
| 100 | | 83 | 78.6 | 64.8000 | 57 | 75.2 |

**Average AG Wt (Wet, mg) Detail**

| Conc-% | Control Type | Rep 1 | Rep 2 | Rep 3 | Rep 4 | Rep 5 |
|---|---|---|---|---|---|---|
| 0 | Artificial Soil/S | 30.4100 | 33.172 | 19.9600 | 34.2360 | 53.2080 |
| 100 | | 32.794 | 29.212 | 26.515 | 10.95 | 29.49 |

**Average AG Wt (Dry, mg) Detail**

| Conc-% | Control Type | Rep 1 | Rep 2 | Rep 3 | Rep 4 | Rep 5 |
|---|---|---|---|---|---|---|
| 0 | Artificial Soil/S | 4.53401 | 6.62400 | 4.14001 | 6.28801 | 8.68201 |
| 100 | | 4.92400 | 3.92000 | 2.72250 | 1.60601 | 4.56999 |

**Average Root Wt. (Wet, mg) Detail**

| Conc-% | Control Type | Rep 1 | Rep 2 | Rep 3 | Rep 4 | Rep 5 |
|---|---|---|---|---|---|---|
| 0 | Artificial Soil/S | 33.3280 | 40.9320 | 13.5900 | 28.3060 | 65.054 |
| 100 | | 39.5060 | 34.89 | 26.9075 | 19.824 | 43.7060 |

**Average Root Wt. (Dry, mg) Detail**

| Conc-% | Control Type | Rep 1 | Rep 2 | Rep 3 | Rep 4 | Rep 5 |
|---|---|---|---|---|---|---|
| 0 | Artificial Soil/S | 1.26801 | 1.68799 | 0.93500 | 1.10999 | 2.67798 |
| 100 | | 2.41400 | 2.09199 | 1.66501 | 1.03398 | 2.41001 |

**Average Total Wt (Wet, mg) Detail**

| Conc-% | Control Type | Rep 1 | Rep 2 | Rep 3 | Rep 4 | Rep 5 |
|---|---|---|---|---|---|---|
| 0 | Artificial Soil/S | 63.7360 | 74.1040 | 33.5500 | 62.5420 | 118.262 |
| 100 | | 72.3000 | 64.102 | 53.4225 | 30.774 | 73.196 |

**Average Total Wt (Dry, mg) Detail**

| Conc-% | Control Type | Rep 1 | Rep 2 | Rep 3 | Rep 4 | Rep 5 |
|---|---|---|---|---|---|---|
| 0 | Artificial Soil/S | 5.80201 | 8.31199 | 5.07501 | 7.398 | 11.36 |
| 100 | | 7.33799 | 6.01199 | 4.38751 | 2.63999 | 6.98000 |

# CETIS Analysis Detail

**Plant Bioassay - Chronic** — **CH2M Hill**

| Endpoint | Analysis Type | Sample Link | Control Link | Date Analyzed | Version |
|---|---|---|---|---|---|
| % Germination | Comparison | 17-7073-4826 | 17-7073-4826 | 19 Jul-06 10:29 AM | 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 | 24.60% |

**Group Comparisons**

| Control | vs | Conc-% | Statistic | Critical | P-Value | Ties | Decision(0.05) |
|---|---|---|---|---|---|---|---|
| Artificial Soil/Sedi | | 100 | 28 | | 0.5000 | 4 | Non-Significant Effect |

**ANOVA Table**

| Source | Sum of Squares | Mean Square | DF | F Statistic | P-Value | Decision(0.05) |
|---|---|---|---|---|---|---|
| Between | 0.0178447 | 0.017845 | 1 | 0.36 | 0.56410 | Non-Significant Effect |
| Error | 0.3944419 | 0.049305 | 8 | | | |
| Total | 0.41228654 | 0.0671499 | 9 | | | |

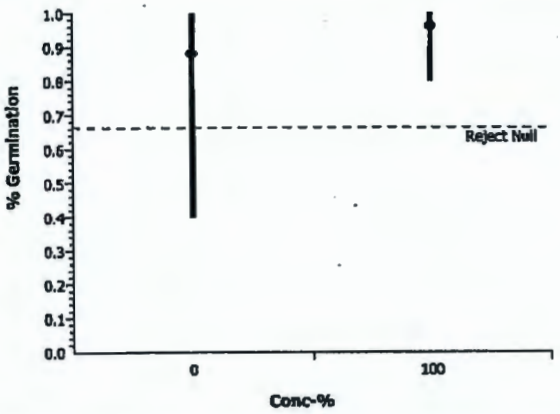
**ANOVA Assumptions**

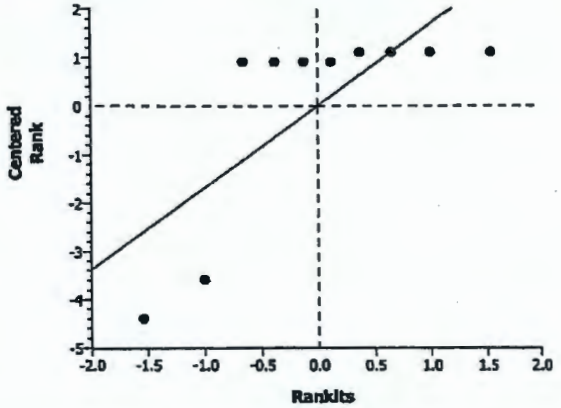
| Attribute | Test | Statistic | Critical | P-Value | Decision(0.01) |
|---|---|---|---|---|---|
| Variances | Variance Ratio F | 7.69460 | 23.15450 | 0.07328 | Equal Variances |
| Distribution | Shapiro-Wilk W | 0.66873 | | 0.00037 | Non-normal Distribution |

**Data Summary**

| | | | Original Data | | | | Transformed Data | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Conc-% | Control Type | Count | Mean | Minimum | Maximum | SD | Mean | Minimum | Maximum | SD |
| 0 | Artificial Soil/S | 5 | 0.88000 | 0.40000 | 1.00000 | 0.26833 | 5.40000 | 1.00000 | 6.50000 | 2.45967 |
| 100 | | 5 | 0.96000 | 0.80000 | 1.00000 | 0.08944 | 5.60000 | 2.00000 | 6.50000 | 2.01246 |

**Graphics**



# CETIS Analysis Detail

**Plant Bioassay - Chronic** — **CH2M Hill**

| Endpoint | Analysis Type | Sample Link | Control Link | Date Analyzed | Version |
|---|---|---|---|---|---|
| Average Height (mm) | Comparison | 17-7073-4826 | 17-7073-4826 | 19 Jul-06 10:29 AM | 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 | 26.33% |

**Group Comparisons**

| Control | vs | Conc-% | Statistic | Critical | P-Value | MSD | Decision(0.05) |
|---|---|---|---|---|---|---|---|
| Artificial Soil/Sedi | | 100 | 2.09719 | 1.85955 | 0.0346 | 23.3199 | Significant Effect |

**ANOVA Table**

| Source | Sum of Squares | Mean Square | DF | F Statistic | P-Value | Decision(0.05) |
|---|---|---|---|---|---|---|
| Between | 1729.225 | 1729.225 | 1 | 4.40 | 0.06924 | Non-Significant Effect |
| Error | 3145.344 | 393.168 | 8 | | | |
| Total | 4874.56909 | 2122.3931 | 9 | | | |

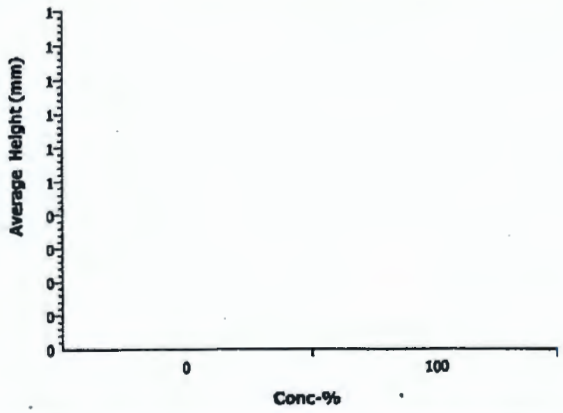
**ANOVA Assumptions**

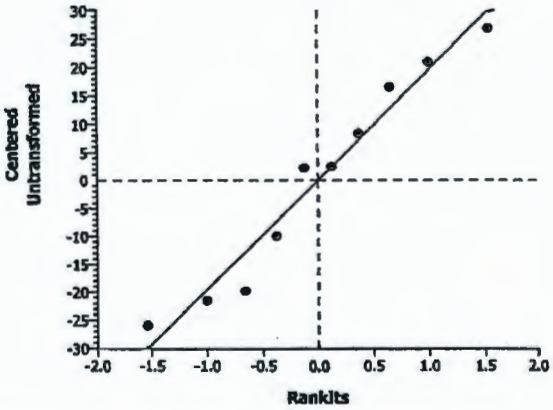
| Attribute | Test | Statistic | Critical | P-Value | Decision(0.01) |
|---|---|---|---|---|---|
| Variances | Variance Ratio F | 1.42810 | 23.15450 | 0.73827 | Equal Variances |
| Distribution | Shapiro-Wilk W | 0.93848 | | 0.53619 | Normal Distribution |

**Data Summary**

| | | | Original Data | | | | Transformed Data | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Conc-% | Control Type | Count | Mean | Minimum | Maximum | SD | Mean | Minimum | Maximum | SD |
| 0 | Artificial Soil/S | 5 | 88.560 | 67 | 115.4 | 17.996 | | | | |
| 100 | | 5 | 62.26 | 36.3 | 83.2 | 21.506 | | | | |

**Graphics**



# CETIS Analysis Detail

**Plant Bioassay - Chronic** — **CH2M Hill**

| Endpoint | Analysis Type | Sample Link | Control Link | Date Analyzed | Version |
|---|---|---|---|---|---|
| Average Length (mm) | Comparison | 17-7073-4826 | 17-7073-4826 | 19 Jul-06 10:29 AM | 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 | 14.18% |

**Group Comparisons**

| Control | vs | Conc-% | Statistic | Critical | P-Value | MSD | Decision(0.05) |
|---|---|---|---|---|---|---|---|
| Artificial Soil/Sedi | | 100 | 4.26835 | 1.85955 | 0.0014 | 15.0825 | Significant Effect |

**ANOVA Table**

| Source | Sum of Squares | Mean Square | DF | F Statistic | P-Value | Decision(0.05) |
|---|---|---|---|---|---|---|
| Between | 2996.361 | 2996.361 | 1 | 18.22 | 0.00273 | Significant Effect |
| Error | 1315.72 | 164.465 | 8 | | | |
| Total | 4312.0813 | 3160.8263 | 9 | | | |

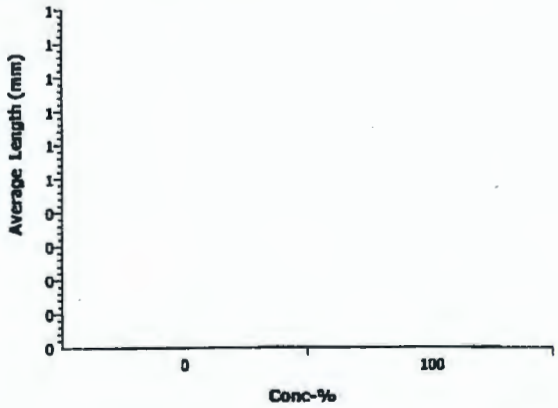
**ANOVA Assumptions**

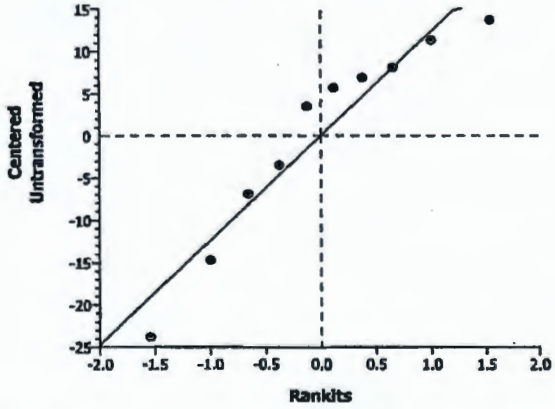
| Attribute | Test | Statistic | Critical | P-Value | Decision(0.01) |
|---|---|---|---|---|---|
| Variances | Variance Ratio F | 1.91574 | 23.15450 | 0.54439 | Equal Variances |
| Distribution | Shapiro-Wilk W | 0.91228 | | 0.29699 | Normal Distribution |

**Data Summary**

| | | | Original Data | | | | Transformed Data | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Conc-% | Control Type | Count | Mean | Minimum | Maximum | SD | Mean | Minimum | Maximum | SD |
| 0 | Artificial Soil/S | 5 | 106.34 | 82.5 | 120 | 14.701 | | | | |
| 100 | | 5 | 71.72 | 57 | 83 | 10.621 | | | | |

**Graphics**



# CETIS Analysis Detail

**Plant Bioassay - Chronic** — CH2M Hill

| Endpoint | Analysis Type | Sample Link | Control Link | Date Analyzed | Version |
|---|---|---|---|---|---|
| Average AG Wt (Wet, mg) | Comparison | 17-7073-4826 | 17-7073-4826 | 19 Jul-06 10:29 AM | 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 | 35.96% |

**Group Comparisons**

| Control | vs | Conc-% | Statistic | Critical | P-Value | MSD | Decision(0.05) |
|---|---|---|---|---|---|---|---|
| Artificial Soil/Sedi | | 100 | 1.27093 | 1.85955 | 0.1197 | 12.2977 | Non-Significant Effect |

**ANOVA Table**

| Source | Sum of Squares | Mean Square | DF | F Statistic | P-Value | Decision(0.05) |
|---|---|---|---|---|---|---|
| Between | 176.6108 | 176.6108 | 1 | 1.62 | 0.23946 | Non-Significant Effect |
| Error | 874.7104 | 109.3388 | 8 | | | |
| Total | 1051.32129 | 285.94965 | 9 | | | |

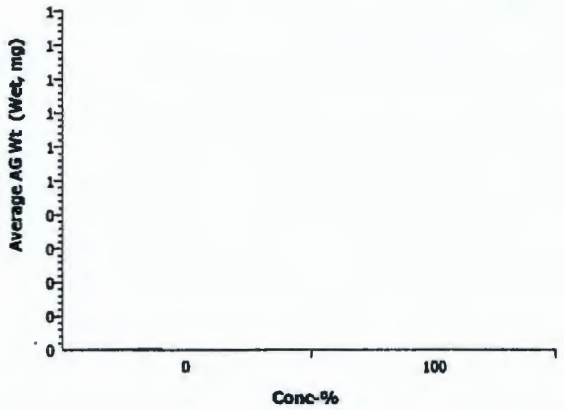
**ANOVA Assumptions**

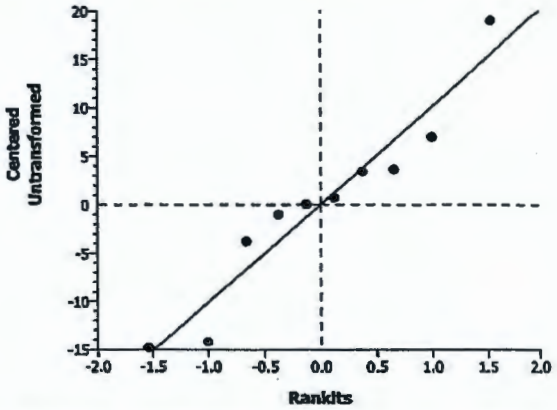
| Attribute | Test | Statistic | Critical | P-Value | Decision(0.01) |
|---|---|---|---|---|---|
| Variances | Variance Ratio F | 1.96304 | 23.15450 | 0.52964 | Equal Variances |
| Distribution | Shapiro-Wilk W | 0.93424 | | 0.49090 | Normal Distribution |

**Data Summary**

| | | | Original Data | | | | Transformed Data | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Conc-% | Control Type | Count | Mean | Minimum | Maximum | SD | Mean | Minimum | Maximum | SD |
| 0 | Artificial Soil/S | 5 | 34.197 | 19.960 | 53.208 | 12.036 | | | | |
| 100 | | 5 | 25.792 | 10.95 | 32.794 | 8.5908 | | | | |

**Graphics**



# CETIS Analysis Detail

**Plant Bioassay - Chronic** — **CH2M Hill**

| Endpoint | Analysis Type | Sample Link | Control Link | Date Analyzed | Version |
|---|---|---|---|---|---|
| Average AG Wt (Dry, mg) | Comparison | 17-7073-4826 | 17-7073-4826 | 19 Jul-06 10:29 AM | 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 | 31.32% |

**Group Comparisons**

| Control | vs | Conc-% | Statistic | Critical | P-Value | MSD | Decision(0.05) |
|---|---|---|---|---|---|---|---|
| Artificial Soil/Sedi | | 100 | 2.45712 | 1.85955 | 0.0197 | 1.89586 | Significant Effect |

**ANOVA Table**

| Source | Sum of Squares | Mean Square | DF | F Statistic | P-Value | Decision(0.05) |
|---|---|---|---|---|---|---|
| Between | 15.68892 | 15.68892 | 1 | 6.04 | 0.03950 | Significant Effect |
| Error | 20.7888 | 2.5986 | 8 | | | |
| Total | 36.4777279 | 18.287525 | 9 | | | |

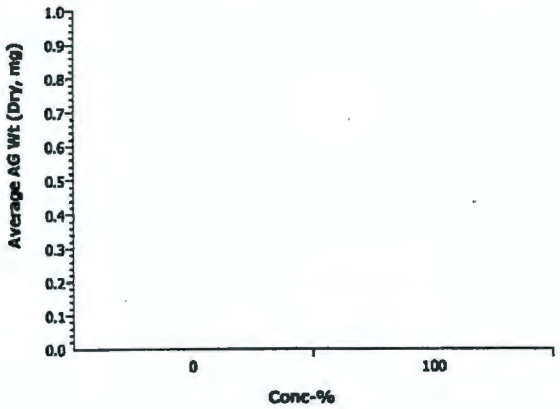
**ANOVA Assumptions**

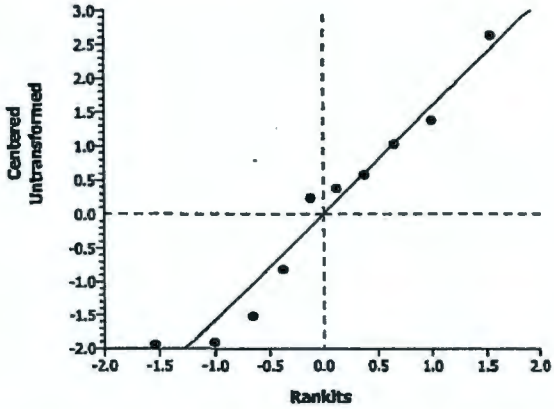
| Attribute | Test | Statistic | Critical | P-Value | Decision(0.01) |
|---|---|---|---|---|---|
| Variances | Variance Ratio F | 1.76116 | 23.15450 | 0.59697 | Equal Variances |
| Distribution | Shapiro-Wilk W | 0.94233 | | 0.57918 | Normal Distribution |

**Data Summary**

| | | | Original Data | | | | Transformed Data | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Conc-% | Control Type | Count | Mean | Minimum | Maximum | SD | Mean | Minimum | Maximum | SD |
| 0 | Artificial Soil/S | 5 | 6.05361 | 4.14001 | 8.68201 | 1.82070 | | | | |
| 100 | | 5 | 3.54850 | 1.60601 | 4.92400 | 1.37195 | | | | |

**Graphics**



# CETIS Analysis Detail

**Plant Bioassay - Chronic** — **CH2M Hill**

| Endpoint | Analysis Type | Sample Link | Control Link | Date Analyzed | Version |
|---|---|---|---|---|---|
| Average Root Wt. (Wet, mg) | Comparison | 17-7073-4826 | 17-7073-4826 | 19 Jul-06 10:30 AM | 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 | 48.78% |

**Group Comparisons**

| Control | vs | Conc-% | Statistic | Critical | P-Value | MSD | Decision(0.05) |
|---|---|---|---|---|---|---|---|
| Artificial Soil/Sedi | | 100 | 0.34449 | 1.85955 | 0.3697 | 17.6801 | Non-Significant Effect |

**ANOVA Table**

| Source | Sum of Squares | Mean Square | DF | F Statistic | P-Value | Decision(0.05) |
|---|---|---|---|---|---|---|
| Between | 26.81907 | 26.81907 | 1 | 0.12 | 0.73936 | Non-Significant Effect |
| Error | 1807.948 | 225.9935 | 8 | | | |
| Total | 1834.76719 | 252.81259 | 9 | | | |

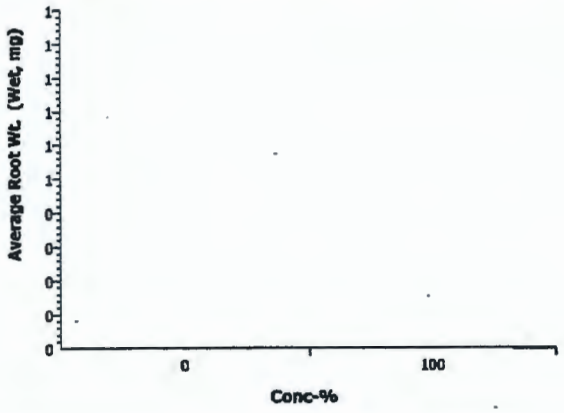
**ANOVA Assumptions**

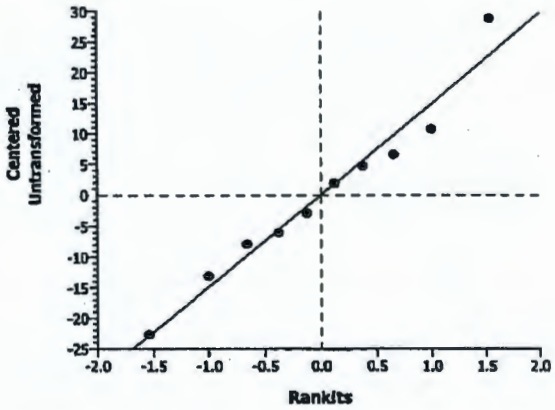
| Attribute | Test | Statistic | Critical | P-Value | Decision(0.01) |
|---|---|---|---|---|---|
| Variances | Variance Ratio F | 3.87004 | 23.15450 | 0.21835 | Equal Variances |
| Distribution | Shapiro-Wilk W | 0.97563 | | 0.93759 | Normal Distribution |

**Data Summary**

| | | | Original Data | | | | Transformed Data | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Conc-% | Control Type | Count | Mean | Minimum | Maximum | SD | Mean | Minimum | Maximum | SD |
| 0 | Artificial Soil/S | 5 | 36.242 | 13.590 | 65.054 | 18.952 | | | | |
| 100 | | 5 | 32.967 | 19.824 | 43.706 | 9.6338 | | | | |

**Graphics**



# CETIS Analysis Detail

**Plant Bioassay - Chronic** — **CH2M Hill**

| Endpoint | Analysis Type | Sample Link | Control Link | Date Analyzed | Version |
|---|---|---|---|---|---|
| Average Root Wt. (Dry, mg) | Comparison | 17-7073-4826 | 17-7073-4826 | 19 Jul-06 10:30 AM | 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 | 49.22% |

**Group Comparisons**

| Control | vs | Conc-% | Statistic | Critical | P-Value | MSD | Decision(0.05) |
|---|---|---|---|---|---|---|---|
| Artificial Soil/Sedi | | 100 | -0.9525 | 1.85955 | 0.8156 | 0.75598 | Non-Significant Effect |

**ANOVA Table**

| Source | Sum of Squares | Mean Square | DF | F Statistic | P-Value | Decision(0.05) |
|---|---|---|---|---|---|---|
| Between | 0.3748256 | 0.374826 | 1 | 0.91 | 0.36875 | Non-Significant Effect |
| Error | 3.305456 | 0.413182 | 8 | | | |
| Total | 3.68028203 | 0.7880077 | 9 | | | |

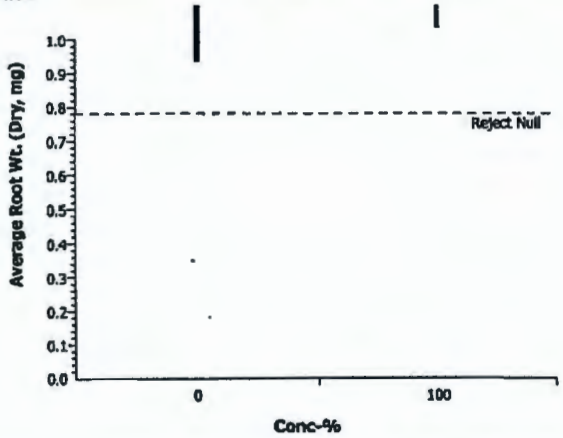
**ANOVA Assumptions**

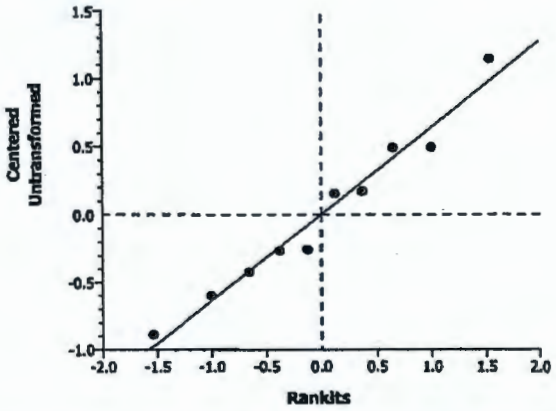
| Attribute | Test | Statistic | Critical | P-Value | Decision(0.01) |
|---|---|---|---|---|---|
| Variances | Variance Ratio F | 1.42384 | 23.15450 | 0.74038 | Equal Variances |
| Distribution | Shapiro-Wilk W | 0.96959 | | 0.88704 | Normal Distribution |

**Data Summary**

| | | | Original Data | | | | Transformed Data | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Conc-% | Control Type | Count | Mean | Minimum | Maximum | SD | Mean | Minimum | Maximum | SD |
| 0 | Artificial Soil/S | 5 | 1.53579 | 0.93500 | 2.67798 | 0.69673 | | | | |
| 100 | | 5 | 1.92300 | 1.03398 | 2.41400 | 0.58389 | | | | |

**Graphics**



# CETIS Analysis Detail

**Plant Bioassay - Chronic** — **CH2M Hill**

| Endpoint | Analysis Type | Sample Link | Control Link | Date Analyzed | Version |
|---|---|---|---|---|---|
| Average Total Wt (Wet, mg) | Comparison | 17-7073-4826 | 17-7073-4826 | 19 Jul-06 10:30 AM | 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 | 41.74% |

**Group Comparisons**

| Control | vs | Conc-% | Statistic | Critical | P-Value | MSD | Decision(0.05) |
|---|---|---|---|---|---|---|---|
| Artificial Soil/Sedi | | 100 | 0.73869 | 1.85955 | 0.2406 | 29.4035 | Non-Significant Effect |

**ANOVA Table**

| Source | Sum of Squares | Mean Square | DF | F Statistic | P-Value | Decision(0.05) |
|---|---|---|---|---|---|---|
| Between | 341.0749 | 341.0749 | 1 | 0.55 | 0.48120 | Non-Significant Effect |
| Error | 5000.502 | 625.0627 | 8 | | | |
| Total | 5341.57687 | 966.13766 | 9 | | | |

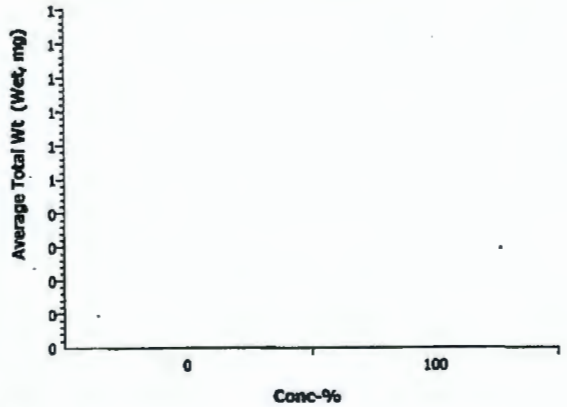
**ANOVA Assumptions**

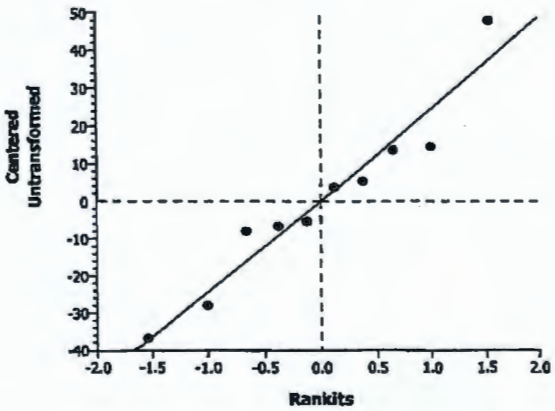
| Attribute | Test | Statistic | Critical | P-Value | Decision(0.01) |
|---|---|---|---|---|---|
| Variances | Variance Ratio F | 3.05894 | 23.15450 | 0.30437 | Equal Variances |
| Distribution | Shapiro-Wilk W | 0.95186 | | 0.69052 | Normal Distribution |

**Data Summary**

| | | | Original Data | | | | Transformed Data | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Conc-% | Control Type | Count | Mean | Minimum | Maximum | SD | Mean | Minimum | Maximum | SD |
| 0 | Artificial Soil/S | 5 | 70.439 | 33.550 | 118.26 | 30.694 | | | | |
| 100 | | 5 | 58.759 | 30.774 | 73.196 | 17.55 | | | | |

**Graphics**



# CETIS Analysis Detail

**Plant Bioassay - Chronic** — **CH2M Hill**

| Endpoint | Analysis Type | Sample Link | Control Link | Date Analyzed | Version |
|---|---|---|---|---|---|
| Average Total Wt (Dry, mg) | Comparison | 17-7073-4826 | 17-7073-4826 | 19 Jul-06 10:30 AM | 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 | 34.45% |

**Group Comparisons**

| Control | vs | Conc-% | Statistic | Critical | P-Value | MSD | Decision(0.05) |
|---|---|---|---|---|---|---|---|
| Artificial Soil/Sedi | | 100 | 1.50633 | 1.85955 | 0.0852 | 2.61453 | Non-Significant Effect |

**ANOVA Table**

| Source | Sum of Squares | Mean Square | DF | F Statistic | P-Value | Decision(0.05) |
|---|---|---|---|---|---|---|
| Between | 11.21378 | 11.21378 | 1 | 2.27 | 0.17041 | Non-Significant Effect |
| Error | 39.53694 | 4.942118 | 8 | | | |
| Total | 50.7507219 | 16.155898 | 9 | | | |

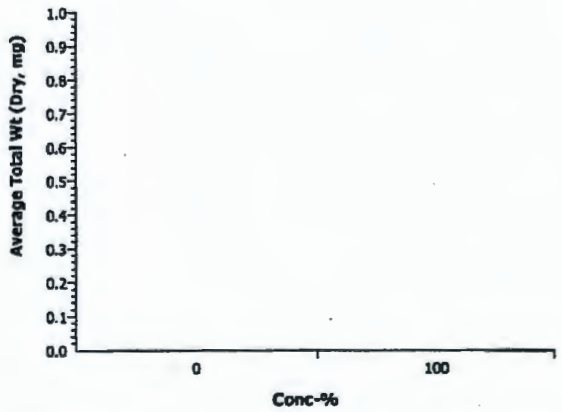
**ANOVA Assumptions**

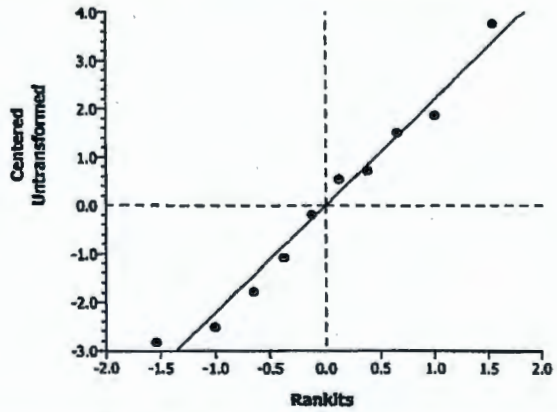
| Attribute | Test | Statistic | Critical | P-Value | Decision(0.01) |
|---|---|---|---|---|---|
| Variances | Variance Ratio F | 1.59361 | 23.15450 | 0.66268 | Equal Variances |
| Distribution | Shapiro-Wilk W | 0.96804 | | 0.87208 | Normal Distribution |

**Data Summary**

| | | | Original Data | | | | Transformed Data | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Conc-% | Control Type | Count | Mean | Minimum | Maximum | SD | Mean | Minimum | Maximum | SD |
| 0 | Artificial Soil/S | 5 | 7.5894 | 5.0750 | 11.36 | 2.4644 | | | | |
| 100 | | 5 | 5.4715 | 2.64 | 7.338 | 1.9522 | | | | |

**Graphics**



# BLUEGRASS GROWTH TEST

Client: Washington Closure Hanford Project

Test Start Date: 4-26-06

Initials: Day 0 (TP) Day 12 _____ Day 14 NJ Day 16 NJ Day 19 (TP) Day 21 NJ Day 23 NJ Day 28 NJ Day 35 Bm

Bioassay Lab ID: BG 1575- 05 Sample No: J11J49

| CONC. | REPLICATE | # seeds germinated: Emergence: 12 days after planting | 14 days after planting | 16 days after planting | 19 days after planting | 21 days after planting | 23 days after planting | 7-DAYS POST-EMERGENCE (28 days after planting) | 14-DAYS POST-EMERGENCE (35 days after planting) | pH: INITIAL (@ planting) | FINAL (@ 14 days Post-Emergence) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Control | A | | 5 | 5 | 5 | 5 | 4 | 4 | 4 | 6.4 | 7.1 |
| | B | | 4 | 5 | 6 | 7 | 7 | 5 | 5 | | |
| | C | | 2 | 3 | 3 | 3 | 4 | 4 | 4 | | |
| | D | | 2 | 2 | 2 | 2 | 2 | 3 | 3 | | |
| | E | | 4 | 4 | 4 | 4 | 4 | 4 | 3 live, 1 dead | | |

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

Replicate A: 2 lg G, 2 med G

Replicate B: 4 med G, 1 sm G Removed 2 sm G w/ 1 B tip

Replicate C: 1 lg G w/ 1 B tip, 2 med G, 1 sm G

Replicate D: 1 lg G, 1 med G, 1 sm G

Replicate E: 1 lg G, 2 med G, 1 sm B

Appearance Code: Good (G) = deep green color with no brown, Brown (B) = brown color noted, # Lg = # of large plants (tallest, 6+ shoots), # Med = # of plants (smaller than large, fewer shoots), # Sm = # small plants (1-3 shoots)

14-Days Post-Emergence: Describe shoot appearance:

Replicate A: 1 Lg G, 3 Med G

Replicate B: 3 Lg G, 2 Med G

Replicate C: 3 Lg G, 1 Sm G

Replicate D: 1 Lg G, 1 Med G w/ 1 B shoot, 1 Sm G

Replicate E: 3 Lg G, * removed: 1 Sm dead

Measure Shoot Height: Individual height of each seedling (above ground)

| | 1st Seedling | 2nd Seedling | 3rd Seedling | 4th Seedling | 5th Seedling |
|---|---|---|---|---|---|
| Replicate A | 84 mm | 112 mm | 95 mm | 74 mm | mm |
| Replicate B | 87 mm | 83 mm | 52 mm | 46 mm | 32 mm |
| Replicate C | 74 mm | 86 mm | 51 mm | 33 mm | mm |
| Replicate D | 74 mm | 51 mm | 15 mm | mm | mm |
| Replicate E | 102 mm | 92 mm | 78 mm | mm | mm |

Measure Shoot Weight: Total mass of all seedlings (above ground)

| | Tin Tare Wt. (mg) | Wet Wt (mg) | Dry Wt. (mg) |
|---|---|---|---|
| Replicate A | 1029.66 | 1177.0 | 1054.19 |
| Replicate B | 1253.67 | 1363.3 | 1272.95 |
| Replicate C | 1250.91 | 1338.8 | 1264.48 |
| Replicate D | 1248.54 | 1309.5 | 1253.21 |
| Replicate E | 1243.07 | 1367.0 | 1264.01 |

Describe root appearance:

Replicate A

Replicate B

Replicate C

Replicate D

Replicate E

Measure Root Length: Individual length of the longest root from each seedling

| | 1st Seedling | 2nd Seedling | 3rd Seedling | 4th Seedling | 5th Seedling |
|---|---|---|---|---|---|
| Replicate A | 97 mm | 79 mm | 57 mm | 93 mm | mm |
| Replicate B | 41 mm | 31 mm | 67 mm | 89 mm | 72 mm |
| Replicate C | 93 mm | 53 mm | 36 mm | 89 mm | mm |
| Replicate D | 8 mm | 57 mm | 71 mm | mm | mm |
| Replicate E | 92 mm | 85 mm | 98 mm | mm | mm |

Measure Root Weight: Total mass of all roots from all seedlings

| | Tin Tare Wt. (mg) | Wet Wt (mg) | Dry Wt. (mg) |
|---|---|---|---|
| Replicate A | 981.54 | 1272.9 | 991.00 |
| Replicate B | 1253.38 | 1422.8 | 1265.08 |
| Replicate C | ~~1556.41~~ NJ | 1434.9 | 1263.26 |
| Replicate D | 1247.10 | 1320.6 | 1251.39 |
| Replicate E | 1252.35 | 1422.1 | 1260.99 |

tare wt. C 1256.41 →

Comments:

MS

64

# CETIS Test Summary

Report Date: 19 Jul-06 10:32 AM
Test Link: 08-9399-8188/B157505psB

**Plant Bioassay - Chronic** — **CH2M Hill**

| | | | | | |
|---|---|---|---|---|---|
| **Test No:** | 17-9867-8011 | **Test Type:** | Plant Chronic | **Duration:** | N/A |
| **Start Date:** | 26 Apr-06 | **Protocol:** | ASTM E1963-02 (2002) | **Species:** | Poa sandbergii |
| **Ending Date:** | | **Dil Water:** | | **Source:** | |
| **Setup Date:** | 26 Apr-06 | **Brine:** | | | |

**Comments:** recalculated Height and Length data July 19, 2006

| | | | | | |
|---|---|---|---|---|---|
| **Sample No:** | 06-5440-2928 | **Code:** | B1574-05 | **Client:** | |
| **Sample Date:** | 13 Apr-06 | **Material:** | Soil | **Project:** | |
| **Receive Date:** | | **Source:** | Hanford | | |
| **Sample Age:** | 13d 0h | **Station:** | | | |

**Comments:** J11JH9

**Comparison Summary**

| Analysis | Endpoint | NOEL | LOEL | ChV | PMSD | Method |
|---|---|---|---|---|---|---|
| 16-3373-6483 | % Germination | 100 | > 100 | N/A | 28.01% | Equal Variance t Two-Sample |
| 05-1922-2077 | Average Height (mm) | 100 | > 100 | N/A | 24.84% | Equal Variance t Two-Sample |
| 03-1617-1202 | Average Length (mm) | < 100 | 100 | N/A | 18.25% | Equal Variance t Two-Sample |
| 11-5956-3311 | Average AG Wt (Wet, mg) | 100 | > 100 | N/A | 37.90% | Equal Variance t Two-Sample |
| 11-2140-1017 | Average AG Wt (Dry, mg) | 100 | > 100 | N/A | 34.42% | Equal Variance t Two-Sample |
| 06-6375-4460 | Average Root Wt. (Wet, mg | 100 | > 100 | N/A | 61.56% | Equal Variance t Two-Sample |
| 10-3095-7414 | Average Root Wt. (Dry, mg) | 100 | > 100 | N/A | 48.94% | Equal Variance t Two-Sample |
| 01-6425-9390 | Average Total Wt (Wet, mg | 100 | > 100 | N/A | 48.91% | Equal Variance t Two-Sample |
| 07-6583-2798 | Average Total Wt (Dry, mg) | 100 | > 100 | N/A | 36.49% | Equal Variance t Two-Sample |

# CETIS Test Summary

Report Date: 19 Jul-06 10:32 AM
Test Link: 08-9399-8188/B157505psB

**% Germination Summary**

| Conc-% | Control Type | Reps | Mean | Minimum | Maximum | SE | SD | CV |
|---|---|---|---|---|---|---|---|---|
| 0 | Artificial Soil/S | 5 | 0.88000 | 0.40000 | 1.00000 | 0.12000 | 0.26833 | 30.49% |
| 100 | | 5 | 0.76000 | 0.60000 | 1.00000 | 0.07483 | 0.16733 | 22.02% |

**Average Height (mm) Summary**

| Conc-% | Control Type | Reps | Mean | Minimum | Maximum | SE | SD | CV |
|---|---|---|---|---|---|---|---|---|
| 0 | Artificial Soil/S | 5 | 88.560 | 67 | 115.40 | 8.048 | 17.996 | 20.32% |
| 100 | | 5 | 69.440 | 46.700 | 90.7 | 8.6725 | 19.392 | 27.93% |

**Average Length (mm) Summary**

| Conc-% | Control Type | Reps | Mean | Minimum | Maximum | SE | SD | CV |
|---|---|---|---|---|---|---|---|---|
| 0 | Artificial Soil/S | 5 | 106.34 | 82.5 | 120 | 6.5745 | 14.701 | 13.82% |
| 100 | | 5 | 69.5 | 45.3 | 91.7 | 8.1024 | 18.118 | 26.07% |

**Average AG Wt (Wet, mg) Summary**

| Conc-% | Control Type | Reps | Mean | Minimum | Maximum | SE | SD | CV |
|---|---|---|---|---|---|---|---|---|
| 0 | Artificial Soil/S | 5 | 34.197 | 19.960 | 53.208 | 5.3829 | 12.036 | 35.20% |
| 100 | | 5 | 28.406 | 19.987 | 41.310 | 4.4262 | 9.8973 | 34.84% |

**Average AG Wt (Dry, mg) Summary**

| Conc-% | Control Type | Reps | Mean | Minimum | Maximum | SE | SD | CV |
|---|---|---|---|---|---|---|---|---|
| 0 | Artificial Soil/S | 5 | 6.05361 | 4.14001 | 8.68201 | 0.81424 | 1.82070 | 30.08% |
| 100 | | 5 | 4.71685 | 3.22331 | 6.98002 | 0.76979 | 1.72131 | 36.49% |

**Average Root Wt. (Wet, mg) Summary**

| Conc-% | Control Type | Reps | Mean | Minimum | Maximum | SE | SD | CV |
|---|---|---|---|---|---|---|---|---|
| 0 | Artificial Soil/S | 5 | 36.242 | 13.590 | 65.054 | 8.4756 | 18.952 | 52.29% |
| 100 | | 5 | 46.486 | 24.5 | 72.840 | 8.4916 | 18.988 | 40.85% |

**Average Root Wt. (Dry, mg) Summary**

| Conc-% | Control Type | Reps | Mean | Minimum | Maximum | SE | SD | CV |
|---|---|---|---|---|---|---|---|---|
| 0 | Artificial Soil/S | 5 | 1.53579 | 0.93500 | 2.67798 | 0.31159 | 0.69673 | 45.37% |
| 100 | | 5 | 2.14590 | 1.43001 | 2.88000 | 0.25746 | 0.57570 | 26.83% |

**Average Total Wt (Wet, mg) Summary**

| Conc-% | Control Type | Reps | Mean | Minimum | Maximum | SE | SD | CV |
|---|---|---|---|---|---|---|---|---|
| 0 | Artificial Soil/S | 5 | 70.439 | 33.550 | 118.26 | 13.727 | 30.694 | 43.58% |
| 100 | | 5 | 74.892 | 44.487 | 109.68 | 12.443 | 27.823 | 37.15% |

**Average Total Wt (Dry, mg) Summary**

| Conc-% | Control Type | Reps | Mean | Minimum | Maximum | SE | SD | CV |
|---|---|---|---|---|---|---|---|---|
| 0 | Artificial Soil/S | 5 | 7.5894 | 5.0750 | 11.36 | 1.1021 | 2.4644 | 32.47% |
| 100 | | 5 | 6.8628 | 4.6533 | 9.8600 | 1.0017 | 2.2399 | 32.64% |

# CETIS Test Summary

Report Date: 19 Jul-06 10:32 AM
Test Link: 08-9399-8188/B157505psB

**% Germination Detail**

| Conc-% | Control Type | Rep 1 | Rep 2 | Rep 3 | Rep 4 | Rep 5 |
|---|---|---|---|---|---|---|
| 0 | Artificial Soil/S | 1.00000 | 1.00000 | 0.40000 | 1.00000 | 1.00000 |
| 100 | | 0.80000 | 1.00000 | 0.80000 | 0.60000 | 0.60000 |

**Average Height (mm) Detail**

| Conc-% | Control Type | Rep 1 | Rep 2 | Rep 3 | Rep 4 | Rep 5 |
|---|---|---|---|---|---|---|
| 0 | Artificial Soil/S | 78.6 | 91 | 67 | 90.8000 | 115.400 |
| 100 | | 88.8000 | 60 | 61 | 46.7000 | 90.7 |

**Average Length (mm) Detail**

| Conc-% | Control Type | Rep 1 | Rep 2 | Rep 3 | Rep 4 | Rep 5 |
|---|---|---|---|---|---|---|
| 0 | Artificial Soil/S | 102.800 | 114.400 | 82.5 | 112 | 120 |
| 100 | | 81.5 | 60 | 69 | 45.3 | 91.7 |

**Average AG Wt (Wet, mg) Detail**

| Conc-% | Control Type | Rep 1 | Rep 2 | Rep 3 | Rep 4 | Rep 5 |
|---|---|---|---|---|---|---|
| 0 | Artificial Soil/S | 30.4100 | 33.172 | 19.9600 | 34.2360 | 53.2080 |
| 100 | | 36.835 | 21.9260 | 21.9725 | 19.9867 | 41.3100 |

**Average AG Wt (Dry, mg) Detail**

| Conc-% | Control Type | Rep 1 | Rep 2 | Rep 3 | Rep 4 | Rep 5 |
|---|---|---|---|---|---|---|
| 0 | Artificial Soil/S | 4.53401 | 6.62400 | 4.14001 | 6.28801 | 8.68201 |
| 100 | | 6.13248 | 3.85598 | 3.39249 | 3.22331 | 6.98002 |

**Average Root Wt. (Wet, mg) Detail**

| Conc-% | Control Type | Rep 1 | Rep 2 | Rep 3 | Rep 4 | Rep 5 |
|---|---|---|---|---|---|---|
| 0 | Artificial Soil/S | 33.3280 | 40.9320 | 13.5900 | 28.3060 | 65.054 |
| 100 | | 72.8400 | 33.8840 | 44.6225 | 24.5 | 56.5833 |

**Average Root Wt. (Dry, mg) Detail**

| Conc-% | Control Type | Rep 1 | Rep 2 | Rep 3 | Rep 4 | Rep 5 |
|---|---|---|---|---|---|---|
| 0 | Artificial Soil/S | 1.26801 | 1.68799 | 0.93500 | 1.10999 | 2.67798 |
| 100 | | 2.36501 | 2.34199 | 1.71249 | 1.43001 | 2.88000 |

**Average Total Wt (Wet, mg) Detail**

| Conc-% | Control Type | Rep 1 | Rep 2 | Rep 3 | Rep 4 | Rep 5 |
|---|---|---|---|---|---|---|
| 0 | Artificial Soil/S | 63.7380 | 74.1040 | 33.5500 | 62.5420 | 118.262 |
| 100 | | 109.675 | 55.8100 | 66.5950 | 44.4867 | 97.8933 |

**Average Total Wt (Dry, mg) Detail**

| Conc-% | Control Type | Rep 1 | Rep 2 | Rep 3 | Rep 4 | Rep 5 |
|---|---|---|---|---|---|---|
| 0 | Artificial Soil/S | 5.80201 | 8.31199 | 5.07501 | 7.398 | 11.36 |
| 100 | | 8.49748 | 6.19797 | 5.10498 | 4.65332 | 9.86003 |

# CETIS Analysis Detail

**Plant Bioassay - Chronic** — **CH2M Hill**

| Endpoint | Analysis Type | Sample Link | Control Link | Date Analyzed | Version |
|---|---|---|---|---|---|
| % Germination | Comparison | 08-9399-8188 | 08-9399-8188 | 19 Jul-06 10:32 AM | CETISv1.1.2 |

| Method | Alt H | Data Transform | Zeta | NOEL | LOEL | Toxic Units | ChV | PMSD |
|---|---|---|---|---|---|---|---|---|
| Equal Variance t Two-Sample | C > T | Angular (Corrected) | | 100 | >100 | 1 | N/A | 28.01% |

**Group Comparisons**

| Control | vs | Conc-% | Statistic | Critical | P-Value | MSD | Decision(0.05) |
|---|---|---|---|---|---|---|---|
| Artificial Soil/Sedi | | 100 | 0.93308 | 1.85955 | 0.1890 | 0.29261 | Non-Significant Effect |

**ANOVA Table**

| Source | Sum of Squares | Mean Square | DF | F Statistic | P-Value | Decision(0.05) |
|---|---|---|---|---|---|---|
| Between | 0.0538927 | 0.053893 | 1 | 0.87 | 0.37808 | Non-Significant Effect |
| Error | 0.4952048 | 0.061901 | 8 | | | |
| Total | 0.54909748 | 0.1157933 | 9 | | | |

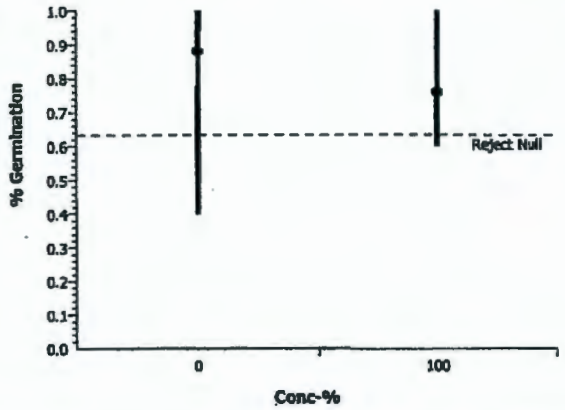
**ANOVA Assumptions**

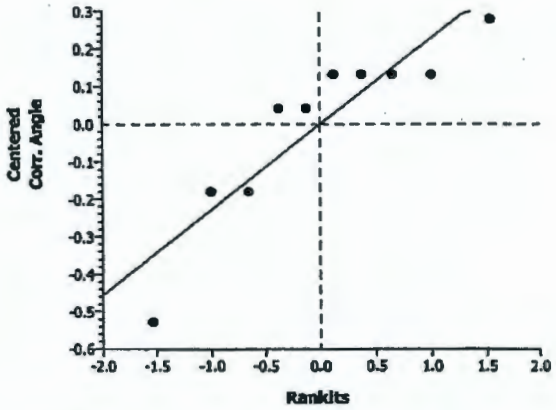
| Attribute | Test | Statistic | Critical | P-Value | Decision(0.01) |
|---|---|---|---|---|---|
| Variances | Variance Ratio F | 2.38881 | 23.15450 | 0.41968 | Equal Variances |
| Distribution | Shapiro-Wilk W | 0.84743 | | 0.05414 | Normal Distribution |

**Data Summary**

| | | | Original Data | | | | Transformed Data | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Conc-% | Control Type | Count | Mean | Minimum | Maximum | SD | Mean | Minimum | Maximum | SD |
| 0 | Artificial Soil/S | 5 | 0.88000 | 0.40000 | 1.00000 | 0.26833 | 1.21317 | 0.68472 | 1.34528 | 0.29541 |
| 100 | | 5 | 0.76000 | 0.60000 | 1.00000 | 0.16733 | 1.06635 | 0.88608 | 1.34528 | 0.19113 |

**Graphics**



# CETIS Analysis Detail

**Plant Bioassay - Chronic** — **CH2M Hill**

| Endpoint | Analysis Type | Sample Link | Control Link | Date Analyzed | Version |
|---|---|---|---|---|---|
| Average Height (mm) | Comparison | 08-9399-8188 | 08-9399-8188 | 19 Jul-06 10:32 AM | 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 | 24.84% |

**Group Comparisons**

| Control | vs | Conc-% | Statistic | Critical | P-Value | MSD | Decision(0.05) |
|---|---|---|---|---|---|---|---|
| Artificial Soil/Sedi | | 100 | 1.61604 | 1.85955 | 0.0724 | 22.0011 | Non-Significant Effect |

**ANOVA Table**

| Source | Sum of Squares | Mean Square | DF | F Statistic | P-Value | Decision(0.05) |
|---|---|---|---|---|---|---|
| Between | 913.936 | 913.936 | 1 | 2.61 | 0.14475 | Non-Significant Effect |
| Error | 2799.644 | 349.9555 | 8 | | | |
| Total | 3713.58008 | 1263.8915 | 9 | | | |

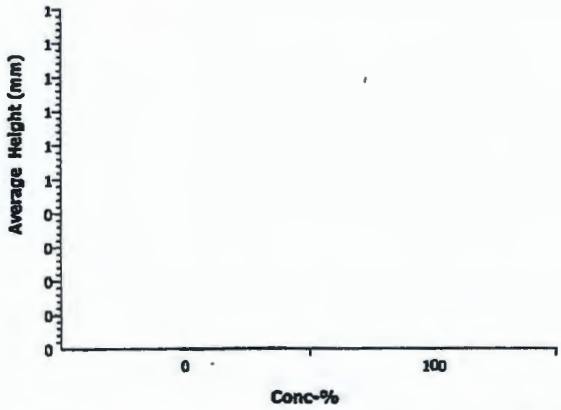
**ANOVA Assumptions**

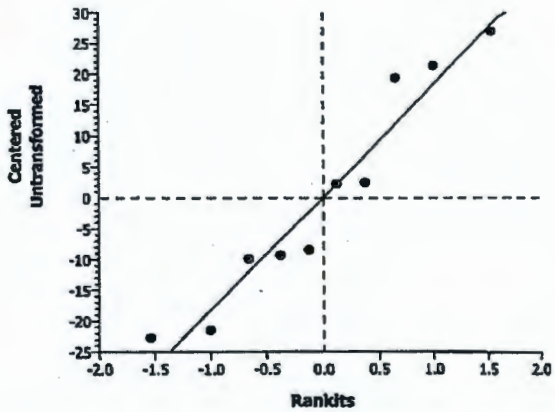
| Attribute | Test | Statistic | Critical | P-Value | Decision(0.01) |
|---|---|---|---|---|---|
| Variances | Variance Ratio F | 1.16123 | 23.15450 | 0.88830 | Equal Variances |
| Distribution | Shapiro-Wilk W | 0.91825 | | 0.34262 | Normal Distribution |

**Data Summary**

| | | | Original Data | | | | Transformed Data | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Conc-% | Control Type | Count | Mean | Minimum | Maximum | SD | Mean | Minimum | Maximum | SD |
| 0 | Artificial Soil/S | 5 | 88.560 | 67 | 115.4 | 17.996 | | | | |
| 100 | | 5 | 69.440 | 46.7 | 90.7 | 19.392 | | | | |

**Graphics**



# CETIS Analysis Detail

**Plant Bioassay - Chronic** — **CH2M Hill**

| Endpoint | Analysis Type | Sample Link | Control Link | Date Analyzed | Version |
|---|---|---|---|---|---|
| Average Length (mm) | Comparison | 08-9399-8188 | 08-9399-8188 | 19 Jul-06 10:32 AM | 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 | 18.25% |

**Group Comparisons**

| Control | vs | Conc-% | Statistic | Critical | P-Value | MSD | Decision(0.05) |
|---|---|---|---|---|---|---|---|
| Artificial Soil/Sedi | | 100 | 3.5307 | 1.85955 | 0.0039 | 19.4029 | Significant Effect |

**ANOVA Table**

| Source | Sum of Squares | Mean Square | DF | F Statistic | P-Value | Decision(0.05) |
|---|---|---|---|---|---|---|
| Between | 3392.964 | 3392.964 | 1 | 12.47 | 0.00772 | Significant Effect |
| Error | 2177.452 | 272.1815 | 8 | | | |
| Total | 5570.41626 | 3665.1458 | 9 | | | |

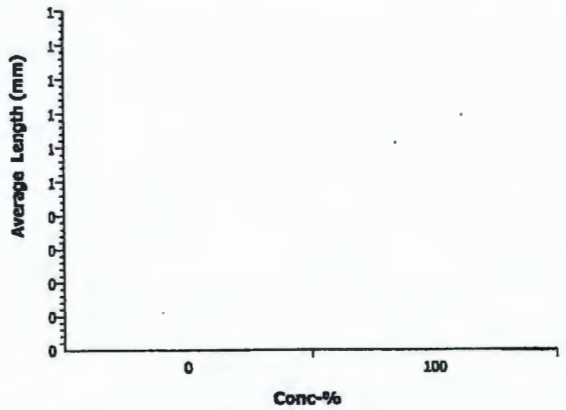
**ANOVA Assumptions**

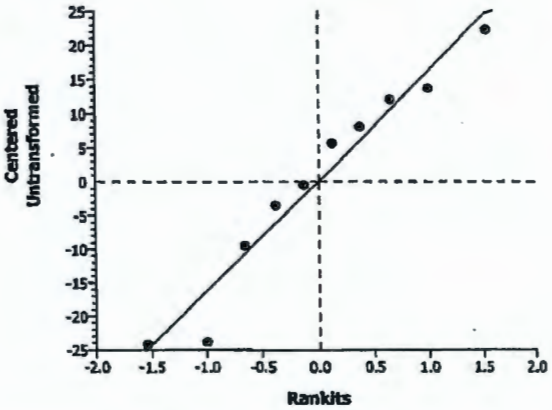
| Attribute | Test | Statistic | Critical | P-Value | Decision(0.01) |
|---|---|---|---|---|---|
| Variances | Variance Ratio F | 1.51882 | 23.15450 | 0.69540 | Equal Variances |
| Distribution | Shapiro-Wilk W | 0.93979 | | 0.55067 | Normal Distribution |

**Data Summary**

| | | | Original Data | | | | Transformed Data | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Conc-% | Control Type | Count | Mean | Minimum | Maximum | SD | Mean | Minimum | Maximum | SD |
| 0 | Artificial Soil/S | 5 | 106.34 | 82.5 | 120 | 14.701 | | | | |
| 100 | | 5 | 69.5 | 45.3 | 91.7 | 18.118 | | | | |

**Graphics**



# CETIS Analysis Detail

**Plant Bioassay - Chronic** — **CH2M Hill**

| Endpoint | Analysis Type | Sample Link | Control Link | Date Analyzed | Version |
|---|---|---|---|---|---|
| Average AG Wt (Wet, mg) | Comparison | 08-9399-8188 | 08-9399-8188 | 19 Jul-06 10:32 AM | 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 | 37.90% |

**Group Comparisons**

| Control | vs | Conc-% | Statistic | Critical | P-Value | MSD | Decision(0.05) |
|---|---|---|---|---|---|---|---|
| Artificial Soil/Sedi | | 100 | 0.83099 | 1.85955 | 0.2150 | 12.9591 | Non-Significant Effect |

**ANOVA Table**

| Source | Sum of Squares | Mean Square | DF | F Statistic | P-Value | Decision(0.05) |
|---|---|---|---|---|---|---|
| Between | 83.84431 | 83.84431 | 1 | 0.69 | 0.43008 | Non-Significant Effect |
| Error | 971.3306 | 121.4163 | 8 | | | |
| Total | 1055.17493 | 205.26064 | 9 | | | |

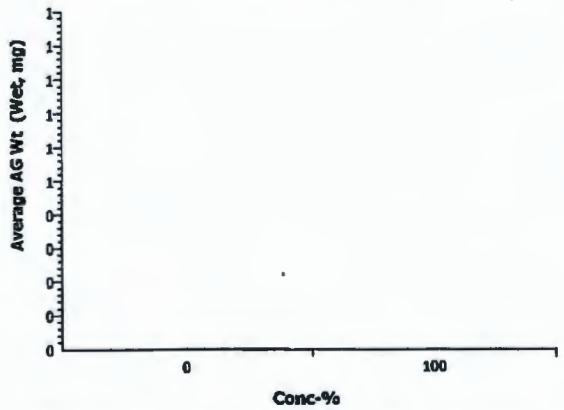
**ANOVA Assumptions**

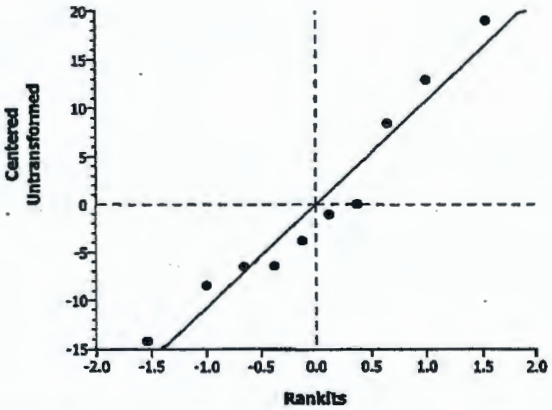
| Attribute | Test | Statistic | Critical | P-Value | Decision(0.01) |
|---|---|---|---|---|---|
| Variances | Variance Ratio F | 1.47898 | 23.15450 | 0.71378 | Equal Variances |
| Distribution | Shapiro-Wilk W | 0.93839 | | 0.53521 | Normal Distribution |

**Data Summary**

| | | | Original Data | | | | Transformed Data | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Conc-% | Control Type | Count | Mean | Minimum | Maximum | SD | Mean | Minimum | Maximum | SD |
| 0 | Artificial Soil/S | 5 | 34.197 | 19.960 | 53.208 | 12.036 | | | | |
| 100 | | 5 | 28.406 | 19.987 | 41.310 | 9.8973 | | | | |

**Graphics**



# CETIS Analysis Detail

**Plant Bioassay - Chronic** — **CH2M Hill**

| Endpoint | Analysis Type | Sample Link | Control Link | Date Analyzed | Version |
|---|---|---|---|---|---|
| Average AG Wt (Dry, mg) | Comparison | 08-9399-8188 | 08-9399-8188 | 19 Jul-06 10:32 AM | 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 | 34.42% |

**Group Comparisons**

| Control | vs | Conc-% | Statistic | Critical | P-Value | MSD | Decision(0.05) |
|---|---|---|---|---|---|---|---|
| Artificial Soil/Sedi | | 100 | 1.19297 | 1.85955 | 0.1335 | 2.08367 | Non-Significant Effect |

**ANOVA Table**

| Source | Sum of Squares | Mean Square | DF | F Statistic | P-Value | Decision(0.05) |
|---|---|---|---|---|---|---|
| Between | 4.467277 | 4.467277 | 1 | 1.42 | 0.26706 | Non-Significant Effect |
| Error | 25.11144 | 3.13893 | 8 | | | |
| Total | 29.5787134 | 7.6062062 | 9 | | | |

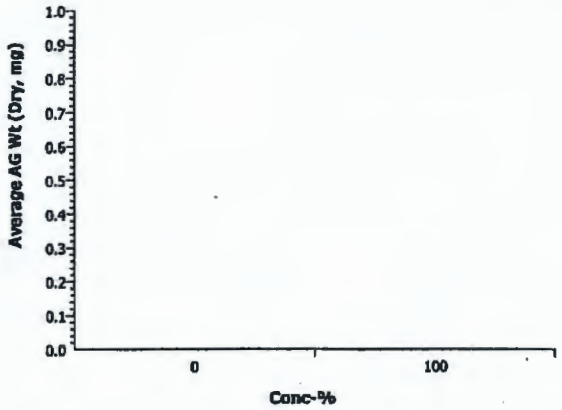
**ANOVA Assumptions**

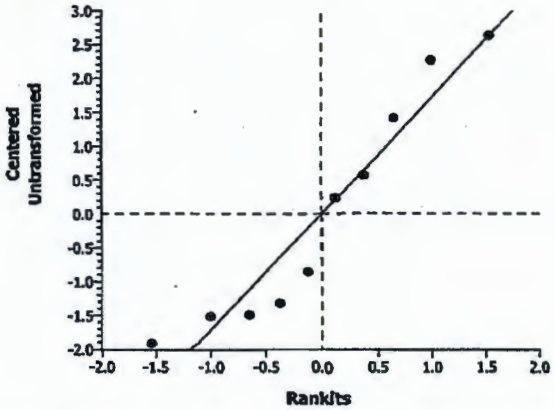
| Attribute | Test | Statistic | Critical | P-Value | Decision(0.01) |
|---|---|---|---|---|---|
| Variances | Variance Ratio F | 1.11881 | 23.15450 | 0.91597 | Equal Variances |
| Distribution | Shapiro-Wilk W | 0.89863 | | 0.21165 | Normal Distribution |

**Data Summary**

| | | | Original Data | | | | Transformed Data | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Conc-% | Control Type | Count | Mean | Minimum | Maximum | SD | Mean | Minimum | Maximum | SD |
| 0 | Artificial Soil/S | 5 | 6.05361 | 4.14001 | 8.68201 | 1.82070 | | | | |
| 100 | | 5 | 4.71685 | 3.22331 | 6.98002 | 1.72131 | | | | |

**Graphics**



# CETIS Analysis Detail

**Plant Bioassay - Chronic** — **CH2M Hill**

| Endpoint | Analysis Type | Sample Link | Control Link | Date Analyzed | Version |
|---|---|---|---|---|---|
| Average Root Wt. (Wet, mg) | Comparison | 08-9399-8188 | 08-9399-8188 | 19 Jul-06 10:32 AM | 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 | 61.56% |

**Group Comparisons**

| Control vs | Conc-% | Statistic | Critical | P-Value | MSD | Decision(0.05) |
|---|---|---|---|---|---|---|
| Artificial Soil/Sedi | 100 | -0.8538 | 1.85955 | 0.7910 | 22.3102 | Non-Significant Effect |

**ANOVA Table**

| Source | Sum of Squares | Mean Square | DF | F Statistic | P-Value | Decision(0.05) |
|---|---|---|---|---|---|---|
| Between | 262.347 | 262.347 | 1 | 0.73 | 0.41803 | Non-Significant Effect |
| Error | 2878.866 | 359.8583 | 8 | | | |
| Total | 3141.21344 | 622.20529 | 9 | | | |

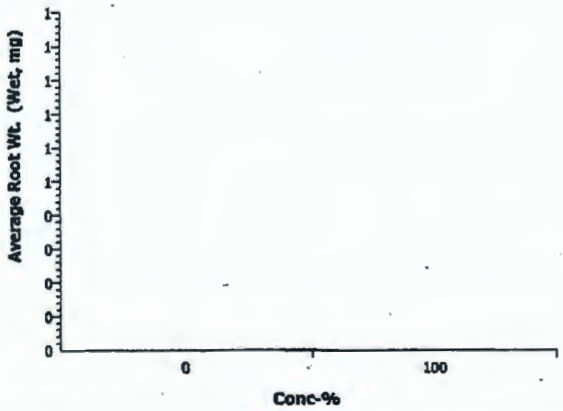
**ANOVA Assumptions**

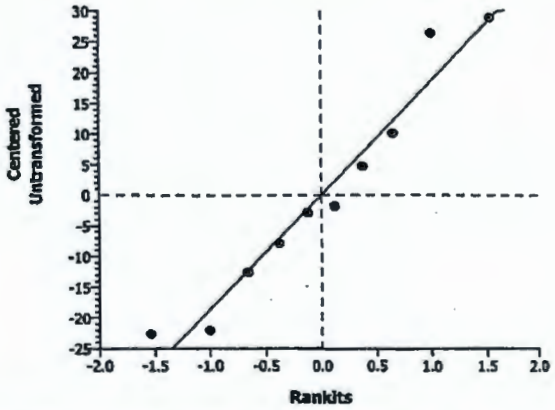
| Attribute | Test | Statistic | Critical | P-Value | Decision(0.01) |
|---|---|---|---|---|---|
| Variances | Variance Ratio F | 1.00379 | 23.15450 | 0.99716 | Equal Variances |
| Distribution | Shapiro-Wilk W | 0.93515 | | 0.50039 | Normal Distribution |

**Data Summary**

| | | | Original Data | | | | Transformed Data | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Conc-% | Control Type | Count | Mean | Minimum | Maximum | SD | Mean | Minimum | Maximum | SD |
| 0 | Artificial Soil/S | 5 | 36.242 | 13.590 | 65.054 | 18.952 | | | | |
| 100 | | 5 | 46.486 | 24.5 | 72.840 | 18.988 | | | | |

**Graphics**



# CETIS Analysis Detail

**Plant Bioassay - Chronic** — **CH2M Hill**

| Endpoint | Analysis Type | Sample Link | Control Link | Date Analyzed | Version |
|---|---|---|---|---|---|
| Average Root Wt. (Dry, mg) | Comparison | 08-9399-8188 | 08-9399-8188 | 19 Jul-06 10:32 AM | 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 | 48.94% |

**Group Comparisons**

| Control | vs | Conc-% | Statistic | Critical | P-Value | MSD | Decision(0.05) |
|---|---|---|---|---|---|---|---|
| Artificial Soil/Sedi | | 100 | -1.5095 | 1.85955 | 0.9152 | 0.75162 | Non-Significant Effect |

**ANOVA Table**

| Source | Sum of Squares | Mean Square | DF | F Statistic | P-Value | Decision(0.05) |
|---|---|---|---|---|---|---|
| Between | 0.9305882 | 0.930588 | 1 | 2.28 | 0.16962 | Non-Significant Effect |
| Error | 3.267433 | 0.408429 | 8 | | | |
| Total | 4.19802111 | 1.3390173 | 9 | | | |

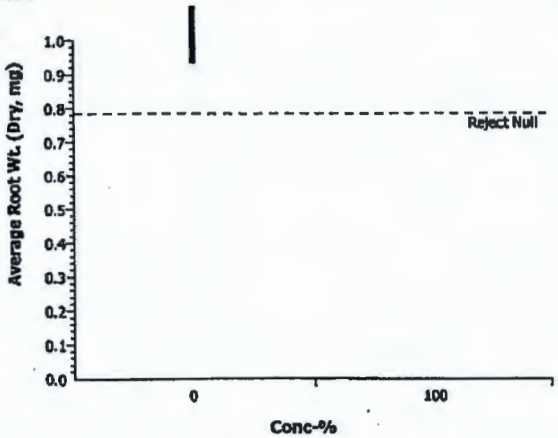
**ANOVA Assumptions**

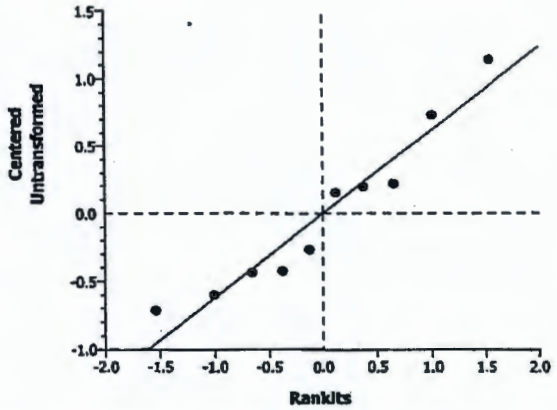
| Attribute | Test | Statistic | Critical | P-Value | Decision(0.01) |
|---|---|---|---|---|---|
| Variances | Variance Ratio F | 1.46468 | 23.15450 | 0.72055 | Equal Variances |
| Distribution | Shapiro-Wilk W | 0.92470 | | 0.39778 | Normal Distribution |

**Data Summary**

| | | | Original Data | | | | Transformed Data | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Conc-% | Control Type | Count | Mean | Minimum | Maximum | SD | Mean | Minimum | Maximum | SD |
| 0 | Artificial Soil/S | 5 | 1.53579 | 0.93500 | 2.67798 | 0.69673 | | | | |
| 100 | | 5 | 2.14590 | 1.43001 | 2.88000 | 0.57570 | | | | |

**Graphics**



# CETIS Analysis Detail

**Plant Bioassay - Chronic** — **CH2M Hill**

| Endpoint | Analysis Type | Sample Link | Control Link | Date Analyzed | Version |
|---|---|---|---|---|---|
| Average Total Wt (Wet, mg) | Comparison | 08-9399-8188 | 08-9399-8188 | 19 Jul-06 10:32 AM | 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 | 48.91% |

**Group Comparisons**

| Control | vs | Conc-% | Statistic | Critical | P-Value | MSD | Decision(0.05) |
|---|---|---|---|---|---|---|---|
| Artificial Soil/Sedi | | 100 | -0.2403 | 1.85955 | 0.5919 | 34.4516 | Non-Significant Effect |

**ANOVA Table**

| Source | Sum of Squares | Mean Square | DF | F Statistic | P-Value | Decision(0.05) |
|---|---|---|---|---|---|---|
| Between | 49.56828 | 49.56828 | 1 | 0.06 | 0.81611 | Non-Significant Effect |
| Error | 6864.897 | 858.1122 | 8 | | | |
| Total | 6914.46574 | 907.68046 | 9 | | | |

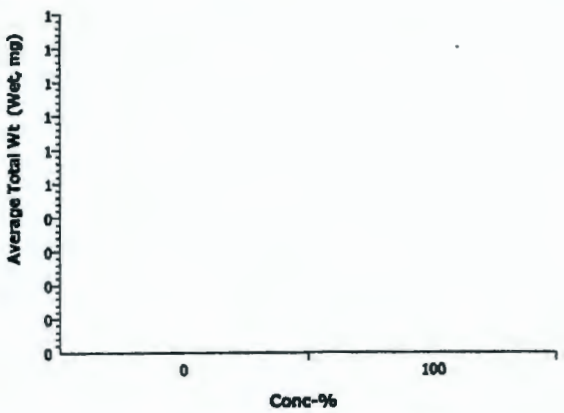
**ANOVA Assumptions**

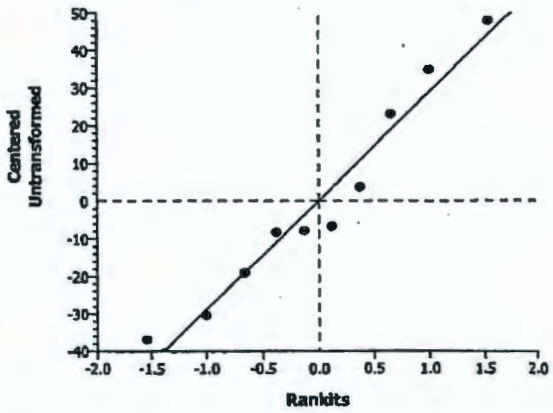
| Attribute | Test | Statistic | Critical | P-Value | Decision(0.01) |
|---|---|---|---|---|---|
| Variances | Variance Ratio F | 1.21708 | 23.15450 | 0.85360 | Equal Variances |
| Distribution | Shapiro-Wilk W | 0.94591 | | 0.62044 | Normal Distribution |

**Data Summary**

| | | | Original Data | | | | Transformed Data | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Conc-% | Control Type | Count | Mean | Minimum | Maximum | SD | Mean | Minimum | Maximum | SD |
| 0 | Artificial Soil/S | 5 | 70.439 | 33.550 | 118.26 | 30.694 | | | | |
| 100 | | 5 | 74.892 | 44.487 | 109.68 | 27.823 | | | | |

**Graphics**



# CETIS Analysis Detail

**Plant Bioassay - Chronic** — **CH2M Hill**

| Endpoint | Analysis Type | Sample Link | Control Link | Date Analyzed | Version |
|---|---|---|---|---|---|
| Average Total Wt (Dry, mg) | Comparison | 08-9399-8188 | 08-9399-8188 | 19 Jul-06 10:32 AM | 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 | 36.49% |

**Group Comparisons**

| Control | vs | Conc-% | Statistic | Critical | P-Value | MSD | Decision(0.05) |
|---|---|---|---|---|---|---|---|
| Artificial Soil/Sedi | | 100 | 0.4879 | 1.85955 | 0.3194 | 2.76949 | Non-Significant Effect |

**ANOVA Table**

| Source | Sum of Squares | Mean Square | DF | F Statistic | P-Value | Decision(0.05) |
|---|---|---|---|---|---|---|
| Between | 1.320024 | 1.320024 | 1 | 0.24 | 0.63871 | Non-Significant Effect |
| Error | 44.36225 | 5.545281 | 8 | | | |
| Total | 45.6822753 | 6.8653054 | 9 | | | |

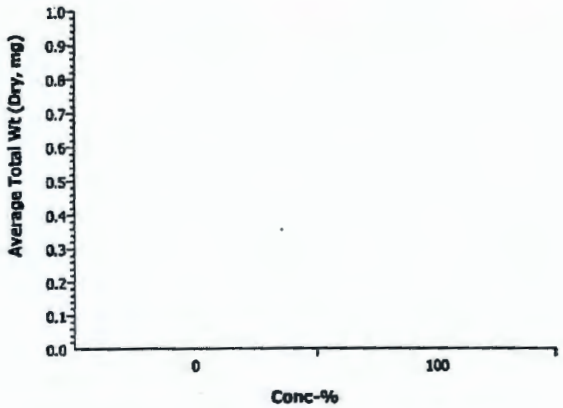
**ANOVA Assumptions**

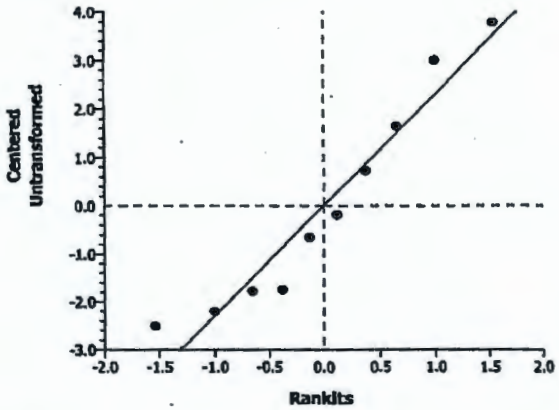
| Attribute | Test | Statistic | Critical | P-Value | Decision(0.01) |
|---|---|---|---|---|---|
| Variances | Variance Ratio F | 1.21046 | 23.15450 | 0.85762 | Equal Variances |
| Distribution | Shapiro-Wilk W | 0.91631 | | 0.32720 | Normal Distribution |

**Data Summary**

| | | | Original Data | | | | Transformed Data | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Conc-% | Control Type | Count | Mean | Minimum | Maximum | SD | Mean | Minimum | Maximum | SD |
| 0 | Artificial Soil/S | 5 | 7.5894 | 5.0750 | 11.36 | 2.4644 | | | | |
| 100 | | 5 | 6.8628 | 4.6533 | 9.8600 | 2.2399 | | | | |

**Graphics**



# BLUEGRASS GROWTH TEST

Client: Washington Closure Hanford Project

Test Start Date: 4-26-06

Initials: Day 0 [illegible] Day 12 ____ Day 14 NJ Day 16 NJ Day 19 [illegible] Day 21 NJ Day 23 NJ Day 28 [illegible] Day 35 DW [illegible]

Bioassay Lab ID: BG 1575- 06 Sample No: J1IJB6

| CONC. | REPLICATE | # seeds germinated: Emergence: 12 days after planting | 14 days after planting | 16 days after planting | 19 days after planting | 21 days after planting | 23 days after planting | 7-DAYS POST-EMERGENCE (28 days after planting) | 14-DAYS POST-EMERGENCE (35 days after planting) | pH: INITIAL (@ planting) | FINAL (@ 14 days Post-Emergence) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Control | A | | 3 | 3 | 3 | 4 | 4 | 5→5 | 5 | 6.6 | 7.2 |
| | B | | 1 | 1 | 1 | 2 | 2 | 2→2 | 2 | | |
| | C | | 5 | 5 | 5 | 5 | 6 | 6→5 | 5 | | |
| | D | | 5 | 5 | 6 | 6 | 6 | 7→5 | 5 | | |
| | E | | 1 | 1 | 3 | 3 | 3 | 3→3 | 3 | | |

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

Replicate A: 1Lg (G) w/B tip, 2 med (G), 2 sm (G)

Replicate B: 1Lg (G), 1 med (G)

Replicate C: 4Lg (G) w/B tips, 1sm (G) removed 1sm (B)

Replicate D: 3Lg (G) 1 w/B tip, 2 sm (G) removed 2 sm (G)

Replicate E: 1Lg (G) 2 med (G)

Appearance Code: Good (G) = deep green color with no brown, Brown (B) = brown color noted, # Lg = # of large plants (tallest, 6+ shoots), # Med = # of plants (smaller than large, fewer shoots), # Sm = # small plants (1-3 shoots)

14-Days Post-Emergence: Describe shoot appearance:

Replicate A: 3 Lg G, 1 Sm G; 1 Sm w/ B tip

Replicate B: 1 Lg w/ B tip 1 Med G

Replicate C: 3 Lg G, 1 Lg w/ B tip, 1 Sm G

Replicate D: 2 Med G w/ B tip 1 Med G 2 Sm G

Replicate E: 1 Lg w/ 1 B shoot, 2 Med G

Measure Shoot Height:
Individual height of each seedling (above ground)

| | 1st Seedling | 2nd Seedling | 3rd Seedling | 4th Seedling | 5th Seedling |
|---|---|---|---|---|---|
| Replicate A | 104 mm | 52 mm | 59 mm | 9 mm | 11 mm |
| Replicate B | 117 mm | 58 mm | mm | mm | mm |
| Replicate C | 76 mm | 97 mm | 90 mm | 71 mm | 26 mm |
| Replicate D | 32 mm | 62 mm | 73 mm | 83 mm | 14 mm |
| Replicate E | 67 mm | 121 mm | 74 mm | mm | mm |

Measure Shoot Weight:
Total mass of all seedlings (above ground)

| | Tin Tare Wt (mg) | Wet Wt (mg) | Dry Wt (mg) |
|---|---|---|---|
| Replicate A | 1014.63 | 1097.98 | 1028.58 |
| Replicate B | 1249.53 | 1340.03 | 1262.79 |
| Replicate C | 1248.55 | ~~1476.07~~* | 1273.85 |
| Replicate D | 1246.92 | 1456.10 | 1268.79 |
| Replicate E | 1242.53 | 1366.09 | 1261.62 |

*1410.88 D.N.

Describe root appearance:

Replicate A

Replicate B

Replicate C

Replicate D

Replicate E

Measure Root Length:
Individual length of the longest root from each seedling

| | 1st Seedling | 2nd Seedling | 3rd Seedling | 4th Seedling | 5th Seedling |
|---|---|---|---|---|---|
| Replicate A | 42 mm | 23 mm | 15 mm | 42 mm | 71 mm |
| Replicate B | 101 mm | 40 mm | mm | mm | mm |
| Replicate C | 118 mm | 61 mm | 79 mm | 45 mm | 26 mm |
| Replicate D | 34 mm | 21 mm | 82 mm | 69 mm | 90 mm |
| Replicate E | 88 mm | 50 mm | 62 mm | mm | mm |

Measure Root Weight:
Total mass of all roots from all seedlings

| | Tin Tare Wt (mg) | Wet Wt (mg) | Dry Wt (mg) |
|---|---|---|---|
| Replicate A | 1031.27 | 1118.90 | 1036.29 |
| Replicate B | 1249.32 | 1390.79 | 1254.73 |
| Replicate C | 1247.27 | 1476.07 | 1258.19 |
| Replicate D | 1246.96 | 1475.40 | 1254.32 |
| Replicate E | 1245.62 | 1388.22 | 1250.64 |

Comments:

# CETIS Test Summary

Report Date: 19 Jul-06 10:40 AM
Test Link: 08-5625-4031/B157506psB

**Plant Bioassay - Chronic** — **CH2M Hill**

| | | | | | |
|---|---|---|---|---|---|
| **Test No:** | 16-0517-4753 | **Test Type:** | Plant Chronic | **Duration:** | N/A |
| **Start Date:** | 26 Apr-06 | **Protocol:** | ASTM E1963-02 (2002) | **Species:** | Poa sandbergii |
| **Ending Date:** | | **Dil Water:** | | **Source:** | |
| **Setup Date:** | 26 Apr-06 | **Brine:** | | | |

**Comments:** recalculated Height and Length data July 19, 2006

| | | | | | |
|---|---|---|---|---|---|
| **Sample No:** | 16-8873-9688 | **Code:** | B1580-05 | **Client:** | |
| **Sample Date:** | 19 Apr-06 | **Material:** | Soil | **Project:** | |
| **Receive Date:** | | **Source:** | Hanford | | |
| **Sample Age:** | 7d 0h | **Station:** | | | |

**Comments:** J11JB6

**Comparison Summary**

| Analysis | Endpoint | NOEL | LOEL | ChV | PMSD | Method |
|---|---|---|---|---|---|---|
| 15-4607-6345 | % Germination | 100 | > 100 | N/A | 35.39% | Wilcoxon Rank Sum Two-Sample |
| 18-7752-2627 | Average Height (mm) | 100 | > 100 | N/A | 24.52% | Equal Variance t Two-Sample |
| 20-6546-5938 | Average Length (mm) | < 100 | 100 | N/A | 15.20% | Equal Variance t Two-Sample |
| 11-6676-3410 | Average AG Wt (Wet, mg) | 100 | > 100 | N/A | 40.52% | Equal Variance t Two-Sample |
| 08-3990-5002 | Average AG Wt (Dry, mg) | 100 | > 100 | N/A | 32.97% | Equal Variance t Two-Sample |
| 05-0009-6638 | Average Root Wt. (Wet, mg | 100 | > 100 | N/A | 61.36% | Equal Variance t Two-Sample |
| 06-6844-5416 | Average Root Wt. (Dry, mg) | 100 | > 100 | N/A | 51.83% | Equal Variance t Two-Sample |
| 05-3404-7522 | Average Total Wt (Wet, mg | 100 | > 100 | N/A | 50.41% | Equal Variance t Two-Sample |
| 06-9252-1593 | Average Total Wt (Dry, mg) | 100 | > 100 | N/A | 35.67% | Equal Variance t Two-Sample |

# CETIS Test Summary

Report Date: 19 Jul-06 10:40 AM
Test Link: 08-5625-4031/B157506psB

**% Germination Summary**

| Conc-% | Control Type | Reps | Mean | Minimum | Maximum | SE | SD | CV |
|---|---|---|---|---|---|---|---|---|
| 0 | Artificial Soil/S | 5 | 0.88000 | 0.40000 | 1.00000 | 0.12000 | 0.26833 | 30.49% |
| 100 | | 5 | 0.80000 | 0.40000 | 1.00000 | 0.12649 | 0.28284 | 35.36% |

**Average Height (mm) Summary**

| Conc-% | Control Type | Reps | Mean | Minimum | Maximum | SE | SD | CV |
|---|---|---|---|---|---|---|---|---|
| 0 | Artificial Soil/S | 5 | 88.560 | 67 | 115.40 | 8.048 | 17.996 | 20.32% |
| 100 | | 5 | 69.320 | 47 | 87.5 | 8.4619 | 18.921 | 27.30% |

**Average Length (mm) Summary**

| Conc-% | Control Type | Reps | Mean | Minimum | Maximum | SE | SD | CV |
|---|---|---|---|---|---|---|---|---|
| 0 | Artificial Soil/S | 5 | 106.34 | 82.5 | 120 | 6.5745 | 14.701 | 13.82% |
| 100 | | 5 | 60.16 | 38.6 | 70.5 | 5.6888 | 12.721 | 21.14% |

**Average AG Wt (Wet, mg) Summary**

| Conc-% | Control Type | Reps | Mean | Minimum | Maximum | SE | SD | CV |
|---|---|---|---|---|---|---|---|---|
| 0 | Artificial Soil/S | 5 | 34.197 | 19.960 | 53.208 | 5.3829 | 12.036 | 35.20% |
| 100 | | 5 | 35.481 | 16.674 | 45.235 | 5.1521 | 11.521 | 32.47% |

**Average AG Wt (Dry, mg) Summary**

| Conc-% | Control Type | Reps | Mean | Minimum | Maximum | SE | SD | CV |
|---|---|---|---|---|---|---|---|---|
| 0 | Artificial Soil/S | 5 | 6.05361 | 4.14001 | 8.68201 | 0.81424 | 1.82070 | 30.08% |
| 100 | | 5 | 5.04346 | 2.78999 | 6.63000 | 0.69949 | 1.56411 | 31.01% |

**Average Root Wt. (Wet, mg) Summary**

| Conc-% | Control Type | Reps | Mean | Minimum | Maximum | SE | SD | CV |
|---|---|---|---|---|---|---|---|---|
| 0 | Artificial Soil/S | 5 | 36.242 | 13.590 | 65.054 | 8.4756 | 18.952 | 52.29% |
| 100 | | 5 | 45.449 | 17.526 | 70.740 | 8.4374 | 18.867 | 41.51% |

**Average Root Wt. (Dry, mg) Summary**

| Conc-% | Control Type | Reps | Mean | Minimum | Maximum | SE | SD | CV |
|---|---|---|---|---|---|---|---|---|
| 0 | Artificial Soil/S | 5 | 1.53579 | 0.93500 | 2.67798 | 0.31159 | 0.69673 | 45.37% |
| 100 | | 5 | 1.80767 | 1.00400 | 2.70502 | 0.29355 | 0.65640 | 36.31% |

**Average Total Wt (Wet, mg) Summary**

| Conc-% | Control Type | Reps | Mean | Minimum | Maximum | SE | SD | CV |
|---|---|---|---|---|---|---|---|---|
| 0 | Artificial Soil/S | 5 | 70.439 | 33.550 | 118.26 | 13.727 | 30.694 | 43.58% |
| 100 | | 5 | 80.930 | 34.200 | 115.98 | 13.273 | 29.678 | 36.67% |

**Average Total Wt (Dry, mg) Summary**

| Conc-% | Control Type | Reps | Mean | Minimum | Maximum | SE | SD | CV |
|---|---|---|---|---|---|---|---|---|
| 0 | Artificial Soil/S | 5 | 7.5894 | 5.0750 | 11.36 | 1.1021 | 2.4644 | 32.47% |
| 100 | | 5 | 6.8511 | 3.794 | 9.3350 | 0.9509 | 2.1264 | 31.04% |

# CETIS Test Summary

Report Date: 19 Jul-06 10:40 AM
Test Link: 08-5625-4031/B157506psB

**% Germination Detail**

| Conc-% | Control Type | Rep 1 | Rep 2 | Rep 3 | Rep 4 | Rep 5 |
|---|---|---|---|---|---|---|
| 0 | Artificial Soil/S | 1.00000 | 1.00000 | 0.40000 | 1.00000 | 1.00000 |
| 100 | | 1.00000 | 0.40000 | 1.00000 | 1.00000 | 0.60000 |

**Average Height (mm) Detail**

| Conc-% | Control Type | Rep 1 | Rep 2 | Rep 3 | Rep 4 | Rep 5 |
|---|---|---|---|---|---|---|
| 0 | Artificial Soil/S | 78.6 | 91 | 67 | 90.8000 | 115.400 |
| 100 | | 47 | 87.5 | 72 | 52.8 | 87.3000 |

**Average Length (mm) Detail**

| Conc-% | Control Type | Rep 1 | Rep 2 | Rep 3 | Rep 4 | Rep 5 |
|---|---|---|---|---|---|---|
| 0 | Artificial Soil/S | 102.800 | 114.400 | 82.5 | 112 | 120 |
| 100 | | 38.6 | 70.5 | 65.8000 | 59.2000 | 66.7 |

**Average AG Wt (Wet, mg) Detail**

| Conc-% | Control Type | Rep 1 | Rep 2 | Rep 3 | Rep 4 | Rep 5 |
|---|---|---|---|---|---|---|
| 0 | Artificial Soil/S | 30.4100 | 33.172 | 19.9600 | 34.2360 | 53.2080 |
| 100 | | 16.674 | 45.235 | 32.47 | 41.836 | 41.19 |

**Average AG Wt (Dry, mg) Detail**

| Conc-% | Control Type | Rep 1 | Rep 2 | Rep 3 | Rep 4 | Rep 5 |
|---|---|---|---|---|---|---|
| 0 | Artificial Soil/S | 4.53401 | 6.62400 | 4.14001 | 6.28801 | 8.68201 |
| 100 | | 2.78999 | 6.63000 | 5.05999 | 4.37400 | 6.36332 |

**Average Root Wt. (Wet, mg) Detail**

| Conc-% | Control Type | Rep 1 | Rep 2 | Rep 3 | Rep 4 | Rep 5 |
|---|---|---|---|---|---|---|
| 0 | Artificial Soil/S | 33.3280 | 40.9320 | 13.5900 | 28.3060 | 65.054 |
| 100 | | 17.5260 | 70.7401 | 45.766 | 45.6880 | 47.5267 |

**Average Root Wt. (Dry, mg) Detail**

| Conc-% | Control Type | Rep 1 | Rep 2 | Rep 3 | Rep 4 | Rep 5 |
|---|---|---|---|---|---|---|
| 0 | Artificial Soil/S | 1.26801 | 1.68799 | 0.93500 | 1.10999 | 2.67798 |
| 100 | | 1.00400 | 2.70502 | 2.18398 | 1.47200 | 1.67334 |

**Average Total Wt (Wet, mg) Detail**

| Conc-% | Control Type | Rep 1 | Rep 2 | Rep 3 | Rep 4 | Rep 5 |
|---|---|---|---|---|---|---|
| 0 | Artificial Soil/S | 63.7380 | 74.1040 | 33.5500 | 62.5420 | 118.262 |
| 100 | | 34.2000 | 115.975 | 78.236 | 87.5240 | 88.7166 |

**Average Total Wt (Dry, mg) Detail**

| Conc-% | Control Type | Rep 1 | Rep 2 | Rep 3 | Rep 4 | Rep 5 |
|---|---|---|---|---|---|---|
| 0 | Artificial Soil/S | 5.80201 | 8.31199 | 5.07501 | 7.398 | 11.36 |
| 100 | | 3.79399 | 9.33502 | 7.24397 | 5.846 | 8.03666 |

# CETIS Analysis Detail

**Plant Bioassay - Chronic** — **CH2M Hill**

| Endpoint | Analysis Type | Sample Link | Control Link | Date Analyzed | Version |
|---|---|---|---|---|---|
| % Germination | Comparison | 08-5625-4031 | 08-5625-4031 | 19 Jul-06 10:40 AM | 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 | 35.39% |

**Group Comparisons**

| Control | vs | Conc-% | Statistic | Critical | P-Value | Ties | Decision(0.05) |
|---|---|---|---|---|---|---|---|
| Artificial Soil/Sedl | | 100 | 25.5 | | 0.3452 | 4 | Non-Significant Effect |

**ANOVA Table**

| Source | Sum of Squares | Mean Square | DF | F Statistic | P-Value | Decision(0.05) |
|---|---|---|---|---|---|---|
| Between | 0.021087 | 0.021087 | 1 | 0.23 | 0.64701 | Non-Significant Effect |
| Error | 0.7455132 | 0.093189 | 8 | | | |
| Total | 0.7666002 | 0.1142761 | 9 | | | |

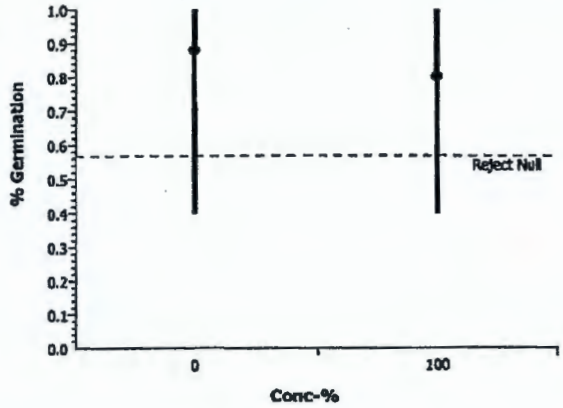
**ANOVA Assumptions**

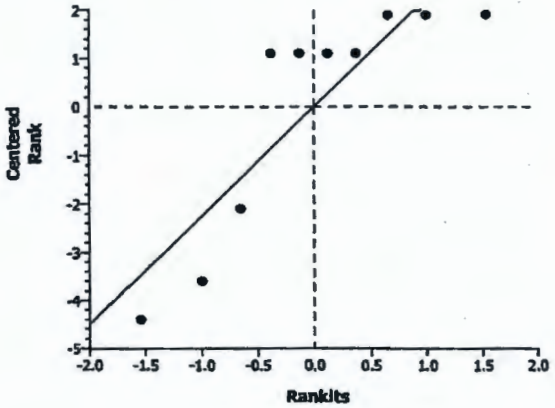
| Attribute | Test | Statistic | Critical | P-Value | Decision(0.01) |
|---|---|---|---|---|---|
| Variances | Variance Ratio F | 1.13568 | 23.15450 | 0.90483 | Equal Variances |
| Distribution | Shapiro-Wilk W | 0.74930 | | 0.00350 | Non-normal Distribution |

**Data Summary**

| | | | Original Data | | | | Transformed Data | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Conc-% | Control Type | Count | Mean | Minimum | Maximum | SD | Mean | Minimum | Maximum | SD |
| 0 | Artificial Soil/S | 5 | 0.88000 | 0.40000 | 1.00000 | 0.26833 | 5.90000 | 1.50000 | 7.00000 | 2.45967 |
| 100 | | 5 | 0.80000 | 0.40000 | 1.00000 | 0.28284 | 5.10000 | 1.50000 | 7.00000 | 2.65518 |

**Graphics**



# CETIS Analysis Detail

**Plant Bioassay - Chronic** — **CH2M Hill**

| Endpoint | Analysis Type | Sample Link | Control Link | Date Analyzed | Version |
|---|---|---|---|---|---|
| Average Height (mm) | Comparison | 08-5625-4031 | 08-5625-4031 | 19 Jul-06 10:40 AM | 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 | 24.52% |

**Group Comparisons**

| Control | vs | Conc-% | Statistic | Critical | P-Value | MSD | Decision(0.05) |
|---|---|---|---|---|---|---|---|
| Artificial Soil/Sedi | | 100 | 1.64756 | 1.85955 | 0.0690 | 21.7156 | Non-Significant Effect |

**ANOVA Table**

| Source | Sum of Squares | Mean Square | DF | F Statistic | P-Value | Decision(0.05) |
|---|---|---|---|---|---|---|
| Between | 925.444 | 925.444 | 1 | 2.71 | 0.13806 | Non-Significant Effect |
| Error | 2727.46 | 340.9325 | 8 | | | |
| Total | 3652.90424 | 1266.3766 | 9 | | | |

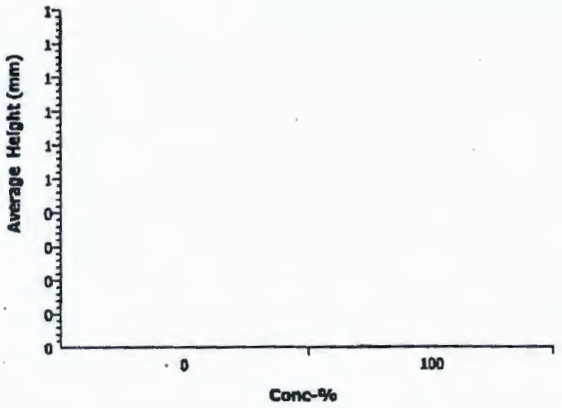
**ANOVA Assumptions**

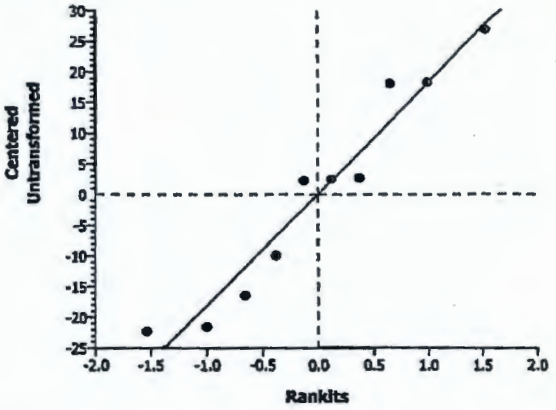
| Attribute | Test | Statistic | Critical | P-Value | Decision(0.01) |
|---|---|---|---|---|---|
| Variances | Variance Ratio F | 1.10551 | 23.15450 | 0.92490 | Equal Variances |
| Distribution | Shapiro-Wilk W | 0.92514 | | 0.40180 | Normal Distribution |

**Data Summary**

| | | | Original Data | | | | Transformed Data | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Conc-% | Control Type | Count | Mean | Minimum | Maximum | SD | Mean | Minimum | Maximum | SD |
| 0 | Artificial Soil/S | 5 | 88.560 | 67 | 115.4 | 17.996 | | | | |
| 100 | | 5 | 69.320 | 47 | 87.5 | 18.921 | | | | |

**Graphics**



# CETIS Analysis Detail

**Plant Bioassay - Chronic** — **CH2M Hill**

| Endpoint | Analysis Type | Sample Link | Control Link | Date Analyzed | Version |
|---|---|---|---|---|---|
| Average Length (mm) | Comparison | 08-5625-4031 | 08-5625-4031 | 19 Jul-06 10:40 AM | 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 | 15.20% |

**Group Comparisons**

| Control | vs | Conc-% | Statistic | Critical | P-Value | MSD | Decision(0.05) |
|---|---|---|---|---|---|---|---|
| Artificial Soil/Sedi | | 100 | 5.31169 | 1.85955 | 0.0004 | 16.167 | Significant Effect |

**ANOVA Table**

| Source | Sum of Squares | Mean Square | DF | F Statistic | P-Value | Decision(0.05) |
|---|---|---|---|---|---|---|
| Between | 5331.481 | 5331.481 | 1 | 28.21 | 0.00072 | Significant Effect |
| Error | 1511.724 | 188.9655 | 8 | | | |
| Total | 6843.20557 | 5520.447 | 9 | | | |

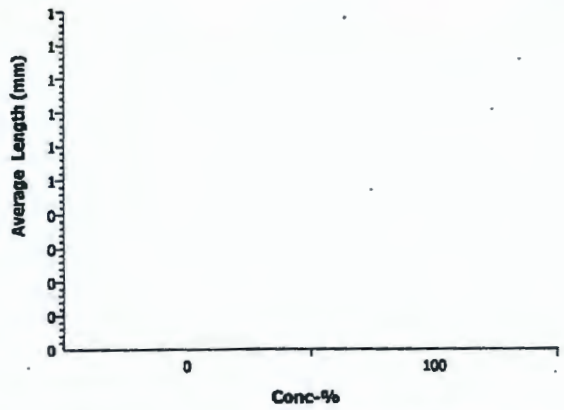
**ANOVA Assumptions**

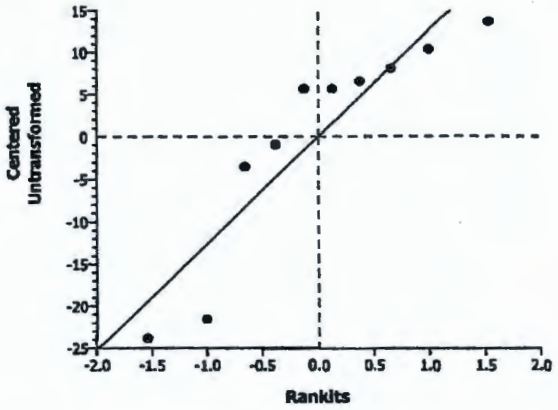
| Attribute | Test | Statistic | Critical | P-Value | Decision(0.01) |
|---|---|---|---|---|---|
| Variances | Variance Ratio F | 1.33560 | 23.15450 | 0.78595 | Equal Variances |
| Distribution | Shapiro-Wilk W | 0.82974 | | 0.03322 | Normal Distribution |

**Data Summary**

| | | | Original Data | | | | Transformed Data | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Conc-% | Control Type | Count | Mean | Minimum | Maximum | SD | Mean | Minimum | Maximum | SD |
| 0 | Artificial Soil/S | 5 | 106.34 | 82.5 | 120 | 14.701 | | | | |
| 100 | | 5 | 60.16 | 38.6 | 70.5 | 12.721 | | | | |

**Graphics**



# CETIS Analysis Detail

**Plant Bioassay - Chronic** — **CH2M Hill**

| Endpoint | Analysis Type | Sample Link | Control Link | Date Analyzed | Version |
|---|---|---|---|---|---|
| Average AG Wt (Wet, mg) | Comparison | 08-5625-4031 | 08-5625-4031 | 19 Jul-06 10:40 AM | 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 | 40.52% |

**Group Comparisons**

| Control | vs | Conc-% | Statistic | Critical | P-Value | MSD | Decision(0.05) |
|---|---|---|---|---|---|---|---|
| Artificial Soil/Sedi | | 100 | -0.1723 | 1.85955 | 0.5663 | 13.8558 | Non-Significant Effect |

**ANOVA Table**

| Source | Sum of Squares | Mean Square | DF | F Statistic | P-Value | Decision(0.05) |
|---|---|---|---|---|---|---|
| Between | 4.12023 | 4.12023 | 1 | 0.03 | 0.86749 | Non-Significant Effect |
| Error | 1110.391 | 138.7989 | 8 | | | |
| Total | 1114.51159 | 142.91915 | 9 | | | |

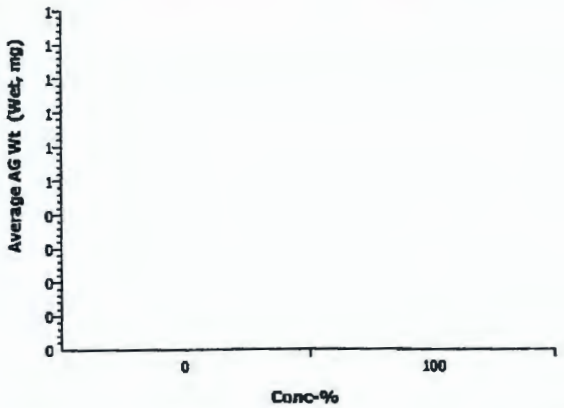
**ANOVA Assumptions**

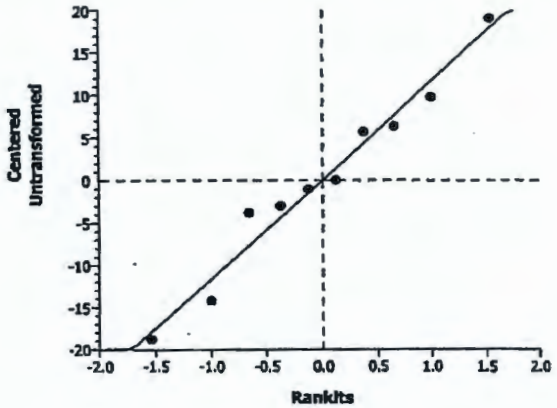
| Attribute | Test | Statistic | Critical | P-Value | Decision(0.01) |
|---|---|---|---|---|---|
| Variances | Variance Ratio F | 1.09157 | 23.15450 | 0.93437 | Equal Variances |
| Distribution | Shapiro-Wilk W | 0.97340 | | 0.92046 | Normal Distribution |

**Data Summary**

| | | | Original Data | | | | Transformed Data | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Conc-% | Control Type | Count | Mean | Minimum | Maximum | SD | Mean | Minimum | Maximum | SD |
| 0 | Artificial Soil/S | 5 | 34.197 | 19.960 | 53.208 | 12.036 | | | | |
| 100 | | 5 | 35.481 | 16.674 | 45.235 | 11.521 | | | | |

**Graphics**



# CETIS Analysis Detail

**Plant Bioassay - Chronic** — CH2M Hill

| Endpoint | Analysis Type | Sample Link | Control Link | Date Analyzed | Version |
|---|---|---|---|---|---|
| Average AG Wt (Dry, mg) | Comparison | 08-5625-4031 | 08-5625-4031 | 19 Jul-06 10:40 AM | 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 | 32.97% |

**Group Comparisons**

| Control | vs | Conc-% | Statistic | Critical | P-Value | MSD | Decision(0.05) |
|---|---|---|---|---|---|---|---|
| Artificial Soil/Sedi | | 100 | 0.94104 | 1.85955 | 0.1871 | 1.99612 | Non-Significant Effect |

**ANOVA Table**

| Source | Sum of Squares | Mean Square | DF | F Statistic | P-Value | Decision(0.05) |
|---|---|---|---|---|---|---|
| Between | 2.550998 | 2.550998 | 1 | 0.89 | 0.37423 | Non-Significant Effect |
| Error | 23.04553 | 2.880691 | 8 | | | |
| Total | 25.5965288 | 5.4316897 | 9 | | | |

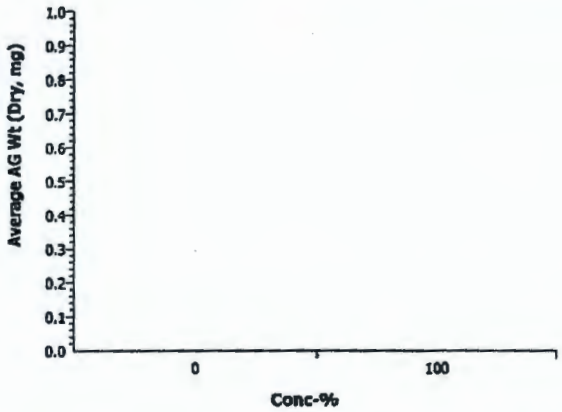
**ANOVA Assumptions**

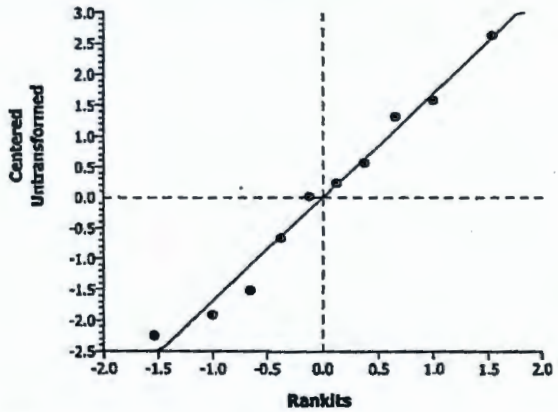
| Attribute | Test | Statistic | Critical | P-Value | Decision(0.01) |
|---|---|---|---|---|---|
| Variances | Variance Ratio F | 1.35501 | 23.15450 | 0.77559 | Equal Variances |
| Distribution | Shapiro-Wilk W | 0.96747 | | 0.86646 | Normal Distribution |

**Data Summary**

| | | | Original Data | | | | Transformed Data | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Conc-% | Control Type | Count | Mean | Minimum | Maximum | SD | Mean | Minimum | Maximum | SD |
| 0 | Artificial Soil/S | 5 | 6.05361 | 4.14001 | 8.68201 | 1.82070 | | | | |
| 100 | | 5 | 5.04346 | 2.78999 | 6.63000 | 1.56411 | | | | |

**Graphics**



# CETIS Analysis Detail

**Plant Bioassay - Chronic** — **CH2M HILL**

| Endpoint | Analysis Type | Sample Link | Control Link | Date Analyzed | Version |
|---|---|---|---|---|---|
| Average Root Wt. (Wet, mg) | Comparison | 08-5625-4031 | 08-5625-4031 | 19 Jul-06 10:40 AM | 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 | 61.36% |

**Group Comparisons**

| Control | vs | Conc-% | Statistic | Critical | P-Value | MSD | Decision(0.05) |
|---|---|---|---|---|---|---|---|
| Artificial Soil/Sedi | | 100 | -0.7699 | 1.85955 | 0.7683 | 22.239 | Non-Significant Effect |

**ANOVA Table**

| Source | Sum of Squares | Mean Square | DF | F Statistic | P-Value | Decision(0.05) |
|---|---|---|---|---|---|---|
| Between | 211.9376 | 211.9376 | 1 | 0.59 | 0.46349 | Non-Significant Effect |
| Error | 2860.515 | 357.5644 | 8 | | | |
| Total | 3072.45245 | 569.50192 | 9 | | | |

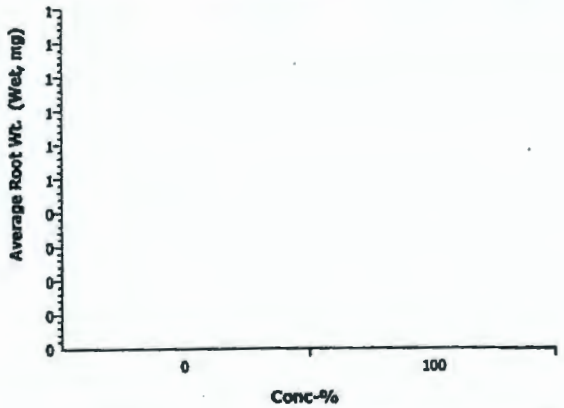
**ANOVA Assumptions**

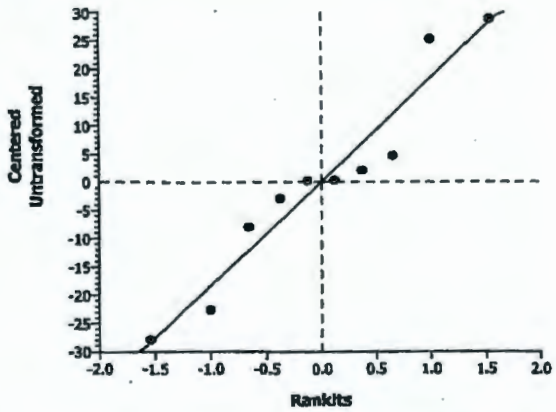
| Attribute | Test | Statistic | Critical | P-Value | Decision(0.01) |
|---|---|---|---|---|---|
| Variances | Variance Ratio F | 1.00906 | 23.15450 | 0.99323 | Equal Variances |
| Distribution | Shapiro-Wilk W | 0.93238 | | 0.47175 | Normal Distribution |

**Data Summary**

| | | | Original Data | | | | Transformed Data | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Conc-% | Control Type | Count | Mean | Minimum | Maximum | SD | Mean | Minimum | Maximum | SD |
| 0 | Artificial Soil/S | 5 | 36.242 | 13.590 | 65.054 | 18.952 | | | | |
| 100 | | 5 | 45.449 | 17.526 | 70.740 | 18.867 | | | | |

**Graphics**



# CETIS Analysis Detail

**Plant Bioassay - Chronic** — **CH2M Hill**

| Endpoint | Analysis Type | Sample Link | Control Link | Date Analyzed | Version |
|---|---|---|---|---|---|
| Average Root Wt. (Dry, mg) | Comparison | 08-5625-4031 | 08-5625-4031 | 19 Jul-06 10:40 AM | 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 | 51.83% |

**Group Comparisons**

| Control | vs | Conc-% | Statistic | Critical | P-Value | MSD | Decision(0.05) |
|---|---|---|---|---|---|---|---|
| Artificial Soil/Sedi | | 100 | -0.6351 | 1.85955 | 0.7285 | 0.79605 | Non-Significant Effect |

**ANOVA Table**

| Source | Sum of Squares | Mean Square | DF | F Statistic | P-Value | Decision(0.05) |
|---|---|---|---|---|---|---|
| Between | 0.1847933 | 0.184793 | 1 | 0.40 | 0.54310 | Non-Significant Effect |
| Error | 3.665173 | 0.458147 | 8 | | | |
| Total | 3.84996636 | 0.6429399 | 9 | | | |

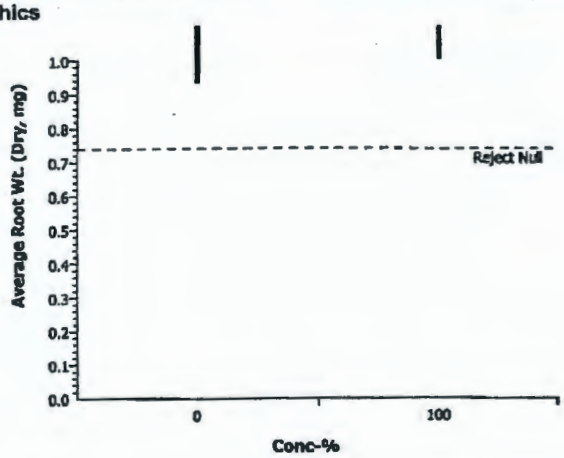
**ANOVA Assumptions**

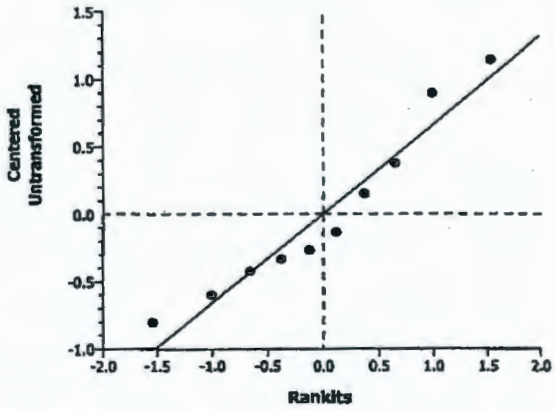
| Attribute | Test | Statistic | Critical | P-Value | Decision(0.01) |
|---|---|---|---|---|---|
| Variances | Variance Ratio F | 1.12666 | 23.15450 | 0.91077 | Equal Variances |
| Distribution | Shapiro-Wilk W | 0.93016 | | 0.44943 | Normal Distribution |

**Data Summary**

| | | | Original Data | | | | Transformed Data | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Conc-% | Control Type | Count | Mean | Minimum | Maximum | SD | Mean | Minimum | Maximum | SD |
| 0 | Artificial Soil/S | 5 | 1.53579 | 0.93500 | 2.67798 | 0.69673 | | | | |
| 100 | | 5 | 1.80767 | 1.00400 | 2.70502 | 0.65640 | | | | |

**Graphics**



# CETIS Analysis Detail

**Plant Bioassay - Chronic** — **CH2M Hill**

| Endpoint | Analysis Type | Sample Link | Control Link | Date Analyzed | Version |
|---|---|---|---|---|---|
| Average Total Wt (Wet, mg) | Comparison | 08-5625-4031 | 08-5625-4031 | 19 Jul-06 10:40 AM | 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 | 50.41% |

**Group Comparisons**

| Control | vs | Conc-% | Statistic | Critical | P-Value | MSD | Decision(0.05) |
|---|---|---|---|---|---|---|---|
| Artificial Soil/Sedi | | 100 | -0.5494 | 1.85955 | 0.7011 | 35.5065 | Non-Significant Effect |

**ANOVA Table**

| Source | Sum of Squares | Mean Square | DF | F Statistic | P-Value | Decision(0.05) |
|---|---|---|---|---|---|---|
| Between | 275.1588 | 275.1588 | 1 | 0.30 | 0.59770 | Non-Significant Effect |
| Error | 7291.748 | 911.4685 | 8 | | | |
| Total | 7566.90686 | 1186.6273 | 9 | | | |

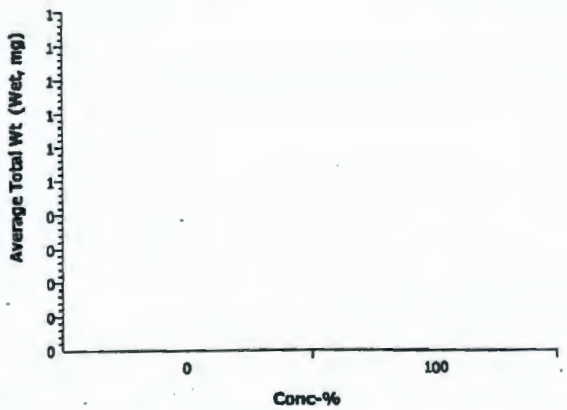
**ANOVA Assumptions**

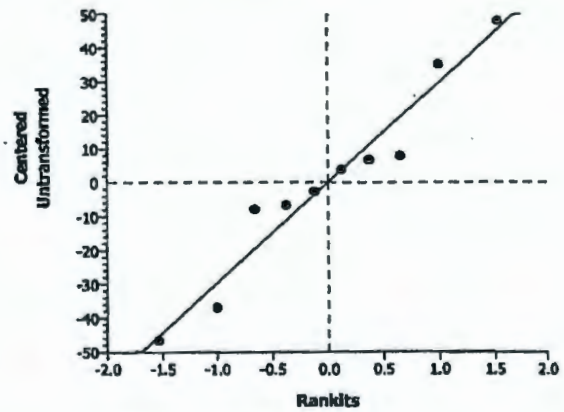
| Attribute | Test | Statistic | Critical | P-Value | Decision(0.01) |
|---|---|---|---|---|---|
| Variances | Variance Ratio F | 1.06963 | 23.15450 | 0.94956 | Equal Variances |
| Distribution | Shapiro-Wilk W | 0.94841 | | 0.64969 | Normal Distribution |

**Data Summary**

| | | | Original Data | | | | Transformed Data | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Conc-% | Control Type | Count | Mean | Minimum | Maximum | SD | Mean | Minimum | Maximum | SD |
| 0 | Artificial Soil/S | 5 | 70.439 | 33.550 | 118.26 | 30.694 | | | | |
| 100 | | 5 | 80.930 | 34.2 | 115.98 | 29.678 | | | | |

**Graphics**



# CETIS Analysis Detail

**Plant Bioassay - Chronic** — **CH2M Hill**

| Endpoint | Analysis Type | Sample Link | Control Link | Date Analyzed | Version |
|---|---|---|---|---|---|
| Average Total Wt (Dry, mg) | Comparison | 08-5625-4031 | 08-5625-4031 | 19 Jul-06 10:40 AM | 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 | 35.67% |

**Group Comparisons**

| Control vs | Conc-% | Statistic | Critical | P-Value | MSD | Decision(0.05) |
|---|---|---|---|---|---|---|
| Artificial Soil/Sedi | 100 | 0.50717 | 1.85955 | 0.3129 | 2.70687 | Non-Significant Effect |

**ANOVA Table**

| Source | Sum of Squares | Mean Square | DF | F Statistic | P-Value | Decision(0.05) |
|---|---|---|---|---|---|---|
| Between | 1.362608 | 1.362608 | 1 | 0.26 | 0.62572 | Non-Significant Effect |
| Error | 42.37888 | 5.297359 | 8 | | | |
| Total | 43.7414842 | 6.6599679 | 9 | | | |

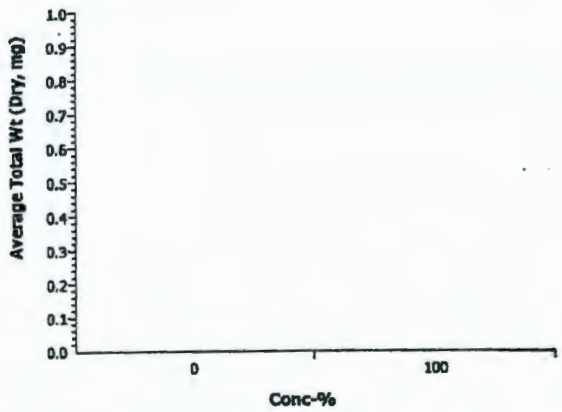
**ANOVA Assumptions**

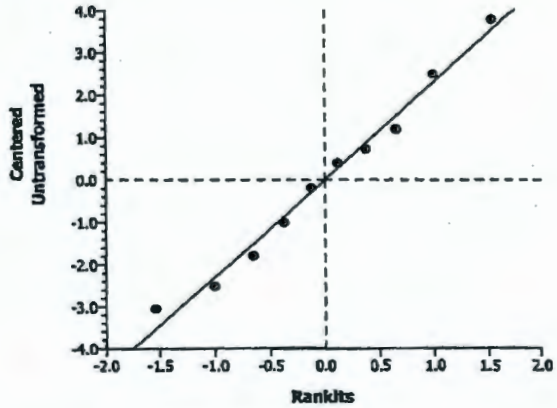
| Attribute | Test | Statistic | Critical | P-Value | Decision(0.01) |
|---|---|---|---|---|---|
| Variances | Variance Ratio F | 1.34320 | 23.15450 | 0.78187 | Equal Variances |
| Distribution | Shapiro-Wilk W | 0.97689 | | 0.94641 | Normal Distribution |

**Data Summary**

| | | | Original Data | | | | Transformed Data | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Conc-% | Control Type | Count | Mean | Minimum | Maximum | SD | Mean | Minimum | Maximum | SD |
| 0 | Artificial Soil/S | 5 | 7.5894 | 5.0750 | 11.36 | 2.4644 | | | | |
| 100 | | 5 | 6.8511 | 3.794 | 9.3350 | 2.1264 | | | | |

**Graphics**



# BLUEGRASS GROWTH TEST

Client: Washington Closure Hanford Project

Test Start Date: 4-26-06

Initials: Day 0 DW Day 12 _____ Day 14 NJ Day 16 NJ Day 19 PR Day 21 NJ Day 23 NJ Day 28 NJ Day 30 DW

Bioassay Lab ID: BG 1575- 07 Sample No: JIIK 34

| CONC. | REPLICATE | # seeds germinated: Emergence: 12 days after planting | 14 days after planting | 16 days after planting | 19 days after planting | 21 days after planting | 23 days after planting | 7-DAYS POST-EMERGENCE (28 days after planting) | 14-DAYS POST-EMERGENCE (35 days after planting) | pH: INITIAL (@ planting) | FINAL (@ 14 days Post-Emergence) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Control | A | | 5 | 5 | 5 | 5 | 5 | 5 | ~~5~~ 4L, 1dead | 7.9 | 7.2 |
| | B | | 2 | 2 | 2 | 2 | 2 | 2 | 1L, 1dead | | |
| | C | | 5 | 6 | 6 | 6 | 7 | 5 | 4L, 1dead | | |
| | D | | 4 | 4 | 4 | 5 | 5 | 5 | 4L, 1dead | | |
| | E | | 6 | 6 | 6 | 6 | 6 | 5 | 5 | | |

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

Replicate A: 1 Lg G, 3 md G, 1 sm B

Replicate B: 2 md G, one Brown tip

Replicate C: 3 lg G, 3 md G - one brown tip  Removed 1 md w/ brown tip

Replicate D: 3 lg G, 1 sm G

Replicate E: 3 md G, 2 sm

Appearance Code: Good (G) = deep green color with no brown, Brown (B) = brown color noted, # Lg = # of large plants (tallest, 6+ shoots), # Med = # of plants (smaller than large, fewer shoots), # Sm = # small plants (1-3 shoots)

14-Days Post-Emergence: Describe shoot appearance:

Replicate A: 4 Med w/ B shoots, 1 Sm dead - removed

Replicate B: 1 Med w/ 1 B shoot  removed: 1 Med dead

Replicate C: 2 Med G, 2 Med w/ B shoots  removed: 1 Med dead

Replicate D: 3 Med w/ B shoots 1 Sm G  removed: 1 Sm dead

Replicate E: 2 Med G, 2 Med w/ B shoots, 1 Sm w/ B shoots

Measure Shoot Height: Individual height of each seedling (above ground)

| | 1st Seedling | 2nd Seedling | 3rd Seedling | 4th Seedling | 5th Seedling |
|---|---|---|---|---|---|
| Replicate A | 89 mm | 87 mm | 59 mm | 73 mm | mm |
| Replicate B | 79 mm | mm | mm | mm | mm |
| Replicate C | 57 mm | 49 mm | 75 mm | 51 mm | mm |
| Replicate D | 73 mm | 65 mm | 67 mm | 65 mm | mm |
| Replicate E | 74 mm | 58 mm | 31 mm | 107 mm | 40 mm |

Measure Shoot Weight: Total mass of all seedlings (above ground)

| | Tin Tare Wt. (mg) | Wet Wt (mg) | Dry Wt. (mg) |
|---|---|---|---|
| Replicate A | 1011.02 | 1104.90 | 1027.39 |
| Replicate B | 1248.66 | 1269.20 | 1251.62 |
| Replicate C | 1254.45 | 1310.42 | 1264.83 |
| Replicate D | 1239.00 | 1305.91 | 1252.42 |
| Replicate E | 1233.11 | 1280.37 | 1241.57 |

Describe root appearance:

Replicate A

Replicate B

Replicate C

Replicate D

Replicate E

Measure Root Length: Individual length of the longest root from each seedling

| | 1st Seedling | 2nd Seedling | 3rd Seedling | 4th Seedling | 5th Seedling |
|---|---|---|---|---|---|
| Replicate A | 83 mm | 54 mm | 61 mm | 71 mm | mm |
| Replicate B | 68 mm | mm | mm | mm | mm |
| Replicate C | 49 mm | 89 mm | 106 mm | 75 mm | mm |
| Replicate D | 18 mm | 64 mm | 82 mm | 71 mm | mm |
| Replicate E | 24 mm | 22 mm | 48 mm | 98 mm | 56 mm |

Measure Root Weight: Total mass of all roots from all seedlings

| | Tin Tare Wt. (mg) | Wet Wt (mg) | Dry Wt. (mg) |
|---|---|---|---|
| Replicate A | 1008.93 | 1068.90 | 1011.51 |
| Replicate B | 1239.51 | 1252.35 | 1239.98 |
| Replicate C | 1243.09 | 1304.50 | 1245.08 |
| Replicate D | 1246.25 | 1327.57 | 1248.43 |
| Replicate E | 1247.92 | 1289.25 | 1249.56 |

Comments:

# CETIS Test Summary

Report Date: 19 Jul-06 10:37 AM
Test Link: 09-3204-9748/B157507psB

**Plant Bioassay - Chronic** — **CH2M Hill**

| | | | | | |
|---|---|---|---|---|---|
| **Test No:** | 06-1366-1686 | **Test Type:** | Plant Chronic | **Duration:** | N/A |
| **Start Date:** | 26 Apr-06 | **Protocol:** | ASTM E1963-02 (2002) | **Species:** | Poa sandbergii |
| **Ending Date:** | | **Dil Water:** | | **Source:** | |
| **Setup Date:** | 26 Apr-06 | **Brine:** | | | |

**Comments:** recalculated Height and Length data July 19, 2006

| | | | | | |
|---|---|---|---|---|---|
| **Sample No:** | 03-3122-0322 | **Code:** | B1580-01 | **Client:** | |
| **Sample Date:** | 19 Apr-06 | **Material:** | Soil | **Project:** | |
| **Receive Date:** | | **Source:** | Hanford | | |
| **Sample Age:** | 7d 0h | **Station:** | | | |

**Comments:** J11K34

**Comparison Summary**

| Analysis | Endpoint | NOEL | LOEL | ChV | PMSD | Method |
|---|---|---|---|---|---|---|
| 07-0572-9254 | % Germination | 100 | > 100 | N/A | 36.50% | Wilcoxon Rank Sum Two-Sample |
| 12-1229-8837 | Average Height (mm) | < 100 | 100 | N/A | 19.69% | Equal Variance t Two-Sample |
| 18-0210-6223 | Average Length (mm) | < 100 | 100 | N/A | 14.49% | Equal Variance t Two-Sample |
| 03-3936-1757 | Average AG Wt (Wet, mg) | < 100 | 100 | N/A | 32.17% | Equal Variance t Two-Sample |
| 07-8222-1220 | Average AG Wt (Dry, mg) | < 100 | 100 | N/A | 27.85% | Equal Variance t Two-Sample |
| 17-4034-7881 | Average Root Wt. (Wet, mg | < 100 | 100 | N/A | 44.63% | Equal Variance t Two-Sample |
| 04-9425-8317 | Average Root Wt. (Dry, mg) | < 100 | 100 | N/A | 38.24% | Equal Variance t Two-Sample |
| 11-5277-6375 | Average Total Wt (Wet, mg | < 100 | 100 | N/A | 37.55% | Equal Variance t Two-Sample |
| 06-0742-0043 | Average Total Wt (Dry, mg) | < 100 | 100 | N/A | 29.16% | Equal Variance t Two-Sample |

# CETIS Test Summary

Report Date: 19 Jul-06 10:37 AM
Test Link: 09-3204-9748/B157507psB

**% Germination Summary**

| Conc-% | Control Type | Reps | Mean | Minimum | Maximum | SE | SD | CV |
|---|---|---|---|---|---|---|---|---|
| 0 | Artificial Soil/S | 5 | 0.88000 | 0.40000 | 1.00000 | 0.12000 | 0.26833 | 30.49% |
| 100 | | 5 | 0.72000 | 0.20000 | 1.00000 | 0.13565 | 0.30332 | 42.13% |

**Average Height (mm) Summary**

| Conc-% | Control Type | Reps | Mean | Minimum | Maximum | SE | SD | CV |
|---|---|---|---|---|---|---|---|---|
| 0 | Artificial Soil/S | 5 | 88.560 | 67 | 115.40 | 8.048 | 17.996 | 20.32% |
| 100 | | 5 | 66.46 | 56.3 | 79 | 4.8116 | 10.759 | 16.19% |

**Average Length (mm) Summary**

| Conc-% | Control Type | Reps | Mean | Minimum | Maximum | SE | SD | CV |
|---|---|---|---|---|---|---|---|---|
| 0 | Artificial Soil/S | 5 | 106.34 | 82.5 | 120 | 6.5745 | 14.701 | 13.82% |
| 100 | | 5 | 64.700 | 49.6 | 79.800 | 5.0422 | 11.275 | 17.43% |

**Average AG Wt (Wet, mg) Summary**

| Conc-% | Control Type | Reps | Mean | Minimum | Maximum | SE | SD | CV |
|---|---|---|---|---|---|---|---|---|
| 0 | Artificial Soil/S | 5 | 34.197 | 19.960 | 53.208 | 5.3829 | 12.036 | 35.20% |
| 100 | | 5 | 16.836 | 9.4580 | 23.470 | 2.4524 | 5.4838 | 32.57% |

**Average AG Wt (Dry, mg) Summary**

| Conc-% | Control Type | Reps | Mean | Minimum | Maximum | SE | SD | CV |
|---|---|---|---|---|---|---|---|---|
| 0 | Artificial Soil/S | 5 | 6.05361 | 4.14001 | 8.68201 | 0.81424 | 1.82070 | 30.08% |
| 100 | | 5 | 2.93889 | 1.69199 | 4.09250 | 0.39859 | 0.89127 | 30.33% |

**Average Root Wt. (Wet, mg) Summary**

| Conc-% | Control Type | Reps | Mean | Minimum | Maximum | SE | SD | CV |
|---|---|---|---|---|---|---|---|---|
| 0 | Artificial Soil/S | 5 | 36.242 | 13.590 | 65.054 | 8.4756 | 18.952 | 52.29% |
| 100 | | 5 | 14.37 | 8.2760 | 20.337 | 1.9531 | 4.3672 | 30.39% |

**Average Root Wt. (Dry, mg) Summary**

| Conc-% | Control Type | Reps | Mean | Minimum | Maximum | SE | SD | CV |
|---|---|---|---|---|---|---|---|---|
| 0 | Artificial Soil/S | 5 | 1.53579 | 0.93500 | 2.67798 | 0.31159 | 0.69673 | 45.37% |
| 100 | | 5 | 0.49710 | 0.32800 | 0.64500 | 0.05172 | 0.11565 | 23.27% |

**Average Total Wt (Wet, mg) Summary**

| Conc-% | Control Type | Reps | Mean | Minimum | Maximum | SE | SD | CV |
|---|---|---|---|---|---|---|---|---|
| 0 | Artificial Soil/S | 5 | 70.439 | 33.550 | 118.26 | 13.727 | 30.694 | 43.58% |
| 100 | | 5 | 31.206 | 17.734 | 38.463 | 3.7207 | 8.3198 | 26.66% |

**Average Total Wt (Dry, mg) Summary**

| Conc-% | Control Type | Reps | Mean | Minimum | Maximum | SE | SD | CV |
|---|---|---|---|---|---|---|---|---|
| 0 | Artificial Soil/S | 5 | 7.5894 | 5.0750 | 11.36 | 1.1021 | 2.4644 | 32.47% |
| 100 | | 5 | 3.436 | 2.02 | 4.7375 | 0.4490 | 1.0040 | 29.22% |

# CETIS Test Summary

Report Date: 19 Jul-06 10:37 AM
Test Link: 09-3204-9748/B157507psB

**% Germination Detail**

| Conc-% | Control Type | Rep 1 | Rep 2 | Rep 3 | Rep 4 | Rep 5 |
|---|---|---|---|---|---|---|
| 0 | Artificial Soil/S | 1.00000 | 1.00000 | 0.40000 | 1.00000 | 1.00000 |
| 100 | | 0.80000 | 0.20000 | 0.80000 | 0.80000 | 1.00000 |

**Average Height (mm) Detail**

| Conc-% | Control Type | Rep 1 | Rep 2 | Rep 3 | Rep 4 | Rep 5 |
|---|---|---|---|---|---|---|
| 0 | Artificial Soil/S | 78.6 | 91 | 67 | 90.8000 | 115.400 |
| 100 | | 77 | 79 | 58 | 56.3 | 62 |

**Average Length (mm) Detail**

| Conc-% | Control Type | Rep 1 | Rep 2 | Rep 3 | Rep 4 | Rep 5 |
|---|---|---|---|---|---|---|
| 0 | Artificial Soil/S | 102.800 | 114.400 | 82.5 | 112 | 120 |
| 100 | | 67.3000 | 68 | 79.8000 | 58.8 | 49.6 |

**Average AG Wt (Wet, mg) Detail**

| Conc-% | Control Type | Rep 1 | Rep 2 | Rep 3 | Rep 4 | Rep 5 |
|---|---|---|---|---|---|---|
| 0 | Artificial Soil/S | 30.4100 | 33.172 | 19.9600 | 34.2360 | 53.2080 |
| 100 | | 23.4700 | 20.5399 | 13.9875 | 16.7250 | 9.45801 |

**Average AG Wt (Dry, mg) Detail**

| Conc-% | Control Type | Rep 1 | Rep 2 | Rep 3 | Rep 4 | Rep 5 |
|---|---|---|---|---|---|---|
| 0 | Artificial Soil/S | 4.53401 | 6.62400 | 4.14001 | 6.28801 | 8.68201 |
| 100 | | 4.09250 | 2.95996 | 2.59500 | 3.35501 | 1.69199 |

**Average Root Wt. (Wet, mg) Detail**

| Conc-% | Control Type | Rep 1 | Rep 2 | Rep 3 | Rep 4 | Rep 5 |
|---|---|---|---|---|---|---|
| 0 | Artificial Soil/S | 33.3280 | 40.9320 | 13.5900 | 28.3060 | 65.054 |
| 100 | | 14.9925 | 12.8900 | 15.3525 | 20.3375 | 8.27600 |

**Average Root Wt. (Dry, mg) Detail**

| Conc-% | Control Type | Rep 1 | Rep 2 | Rep 3 | Rep 4 | Rep 5 |
|---|---|---|---|---|---|---|
| 0 | Artificial Soil/S | 1.26801 | 1.68799 | 0.93500 | 1.10999 | 2.67798 |
| 100 | | 0.64500 | 0.46997 | 0.49750 | 0.54501 | 0.32800 |

**Average Total Wt (Wet, mg) Detail**

| Conc-% | Control Type | Rep 1 | Rep 2 | Rep 3 | Rep 4 | Rep 5 |
|---|---|---|---|---|---|---|
| 0 | Artificial Soil/S | 63.7380 | 74.1040 | 33.5500 | 62.5420 | 118.262 |
| 100 | | 38.4625 | 33.4299 | 29.3400 | 37.0625 | 17.7340 |

**Average Total Wt (Dry, mg) Detail**

| Conc-% | Control Type | Rep 1 | Rep 2 | Rep 3 | Rep 4 | Rep 5 |
|---|---|---|---|---|---|---|
| 0 | Artificial Soil/S | 5.80201 | 8.31199 | 5.07501 | 7.398 | 11.36 |
| 100 | | 4.73750 | 3.42993 | 3.0925 | 3.90002 | 2.02 |

# CETIS Analysis Detail

**Plant Bioassay - Chronic** — **CH2M Hill**

| Endpoint | Analysis Type | Sample Link | Control Link | Date Analyzed | Version |
|---|---|---|---|---|---|
| % Germination | Comparison | 09-3204-9748 | 09-3204-9748 | 19 Jul-06 10:37 AM | 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 | 36.50% |

**Group Comparisons**

| Control | vs | Conc-% | Statistic | Critical | P-Value | Ties | Decision(0.05) |
|---|---|---|---|---|---|---|---|
| Artificial Soil/Sedi | | 100 | 21 | | 0.1111 | 0 | Non-Significant Effect |

**ANOVA Table**

| Source | Sum of Squares | Mean Square | DF | F Statistic | P-Value | Decision(0.05) |
|---|---|---|---|---|---|---|
| Between | 0.0875112 | 0.087511 | 1 | 0.89 | 0.37321 | Non-Significant Effect |
| Error | 0.7870126 | 0.098377 | 8 | | | |
| Total | 0.87452383 | 0.1858878 | 9 | | | |

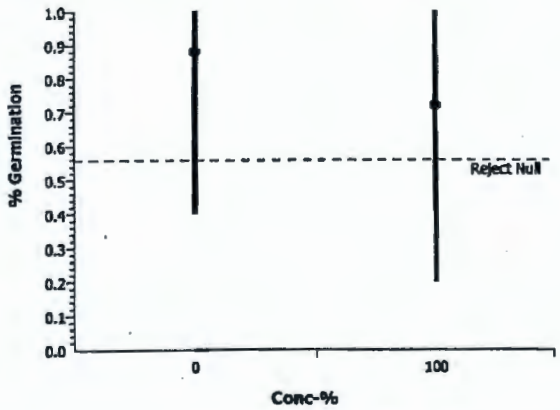
**ANOVA Assumptions**

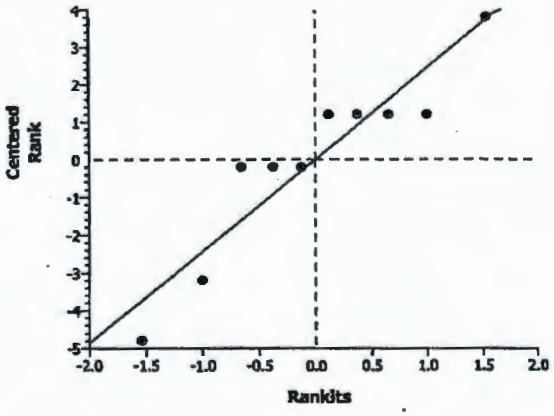
| Attribute | Test | Statistic | Critical | P-Value | Decision(0.01) |
|---|---|---|---|---|---|
| Variances | Variance Ratio F | 1.25456 | 23.15450 | 0.83135 | Equal Variances |
| Distribution | Shapiro-Wilk W | 0.70025 | | 0.00089 | Non-normal Distribution |

**Data Summary**

| | | | Original Data | | | | Transformed Data | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Conc-% | Control Type | Count | Mean | Minimum | Maximum | SD | Mean | Minimum | Maximum | SD |
| 0 | Artificial Soil/S | 5 | 0.88000 | 0.40000 | 1.00000 | 0.26833 | 6.80000 | 2.00000 | 8.00000 | 2.68328 |
| 100 | | 5 | 0.72000 | 0.20000 | 1.00000 | 0.30332 | 4.20000 | 1.00000 | 8.00000 | 2.48998 |

**Graphics**



# CETIS Analysis Detail

**Plant Bioassay - Chronic** — **CH2M Hill**

| Endpoint | Analysis Type | Sample Link | Control Link | Date Analyzed | Version |
|---|---|---|---|---|---|
| Average Height (mm) | Comparison | 09-3204-9748 | 09-3204-9748 | 19 Jul-06 10:37 AM | 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 | 19.69% |

**Group Comparisons**

| Control | vs | Conc-% | Statistic | Critical | P-Value | MSD | Decision(0.05) |
|---|---|---|---|---|---|---|---|
| Artificial Soil/Sedi | | 100 | 2.35692 | 1.85955 | 0.0231 | 17.4363 | Significant Effect |

**ANOVA Table**

| Source | Sum of Squares | Mean Square | DF | F Statistic | P-Value | Decision(0.05) |
|---|---|---|---|---|---|---|
| Between | 1221.025 | 1221.025 | 1 | 5.56 | 0.04618 | Significant Effect |
| Error | 1758.424 | 219.803 | 8 | | | |
| Total | 2979.44922 | 1440.8280 | 9 | | | |

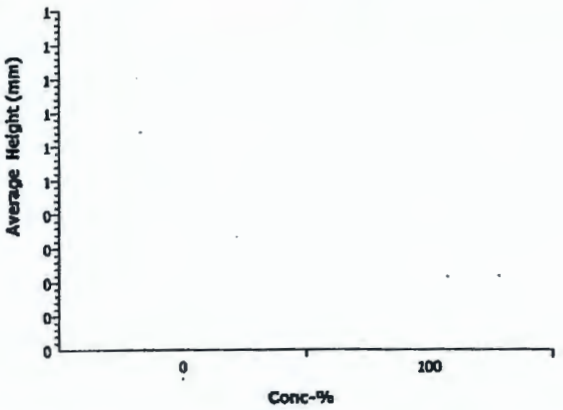
**ANOVA Assumptions**

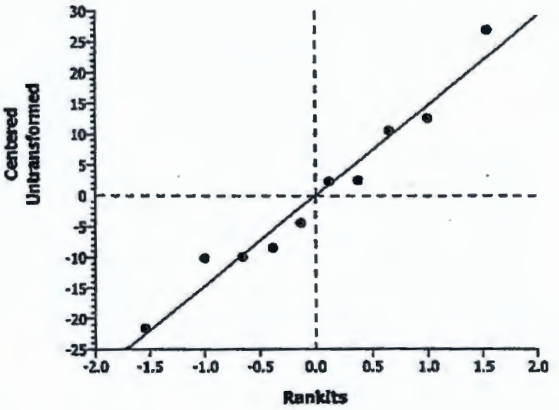
| Attribute | Test | Statistic | Critical | P-Value | Decision(0.01) |
|---|---|---|---|---|---|
| Variances | Variance Ratio F | 2.79763 | 23.15450 | 0.34300 | Equal Variances |
| Distribution | Shapiro-Wilk W | 0.96703 | | 0.86206 | Normal Distribution |

**Data Summary**

| | | | Original Data | | | | Transformed Data | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Conc-% | Control Type | Count | Mean | Minimum | Maximum | SD | Mean | Minimum | Maximum | SD |
| 0 | Artificial Soil/S | 5 | 88.560 | 67 | 115.4 | 17.996 | | | | |
| 100 | | 5 | 66.46 | 56.3 | 79 | 10.759 | | | | |

**Graphics**



# CETIS Analysis Detail

**Plant Bioassay - Chronic** — **CH2M Hill**

| Endpoint | Analysis Type | Sample Link | Control Link | Date Analyzed | Version |
|---|---|---|---|---|---|
| Average Length (mm) | Comparison | 09-3204-9748 | 09-3204-9748 | 19 Jul-06 10:37 AM | 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 | 14.49% |

**Group Comparisons**

| Control | vs | Conc-% | Statistic | Critical | P-Value | MSD | Decision(0.05) |
|---|---|---|---|---|---|---|---|
| Artificial Soil/Sedi | | 100 | 5.02572 | 1.85955 | 0.0005 | 15.4071 | Significant Effect |

**ANOVA Table**

| Source | Sum of Squares | Mean Square | DF | F Statistic | P-Value | Decision(0.05) |
|---|---|---|---|---|---|---|
| Between | 4334.724 | 4334.724 | 1 | 25.26 | 0.00102 | Significant Effect |
| Error | 1372.952 | 171.619 | 8 | | | |
| Total | 5707.67627 | 4506.3431 | 9 | | | |

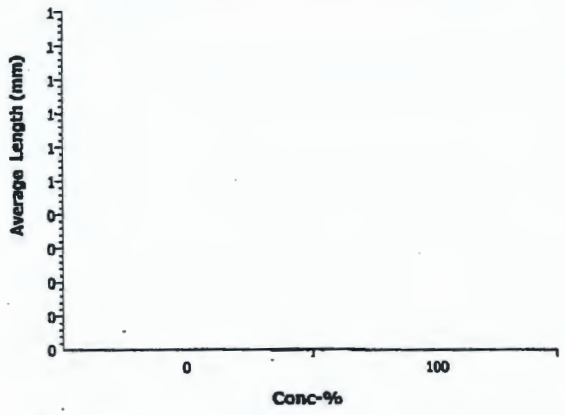
**ANOVA Assumptions**

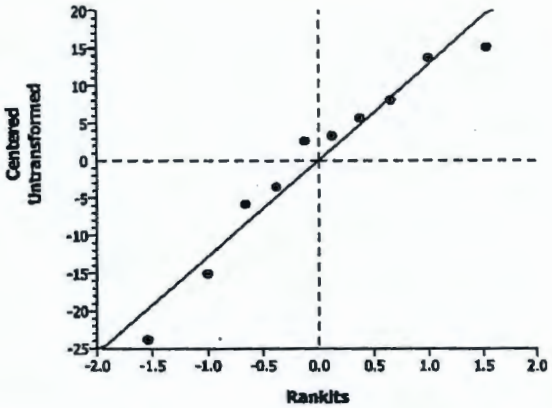
| Attribute | Test | Statistic | Critical | P-Value | Decision(0.01) |
|---|---|---|---|---|---|
| Variances | Variance Ratio F | 1.70011 | 23.15450 | 0.61978 | Equal Variances |
| Distribution | Shapiro-Wilk W | 0.94142 | | 0.56891 | Normal Distribution |

**Data Summary**

| | | | Original Data | | | | Transformed Data | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Conc-% | Control Type | Count | Mean | Minimum | Maximum | SD | Mean | Minimum | Maximum | SD |
| 0 | Artificial Soil/S | 5 | 106.34 | 82.5 | 120 | 14.701 | | | | |
| 100 | | 5 | 64.700 | 49.6 | 79.8 | 11.275 | | | | |

**Graphics**



# CETIS Analysis Detail

**Plant Bioassay - Chronic** — **CH2M Hill**

| Endpoint | Analysis Type | Sample Link | Control Link | Date Analyzed | Version |
|---|---|---|---|---|---|
| Average AG Wt (Wet, mg) | Comparison | 09-3204-9748 | 09-3204-9748 | 19 Jul-06 10:37 AM | 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 | 32.17% |

**Group Comparisons**

| Control | vs | Conc-% | Statistic | Critical | P-Value | MSD | Decision(0.05) |
|---|---|---|---|---|---|---|---|
| Artificial Soil/Sedi | | 100 | 2.935 | 1.85955 | 0.0094 | 10.9996 | Significant Effect |

**ANOVA Table**

| Source | Sum of Squares | Mean Square | DF | F Statistic | P-Value | Decision(0.05) |
|---|---|---|---|---|---|---|
| Between | 753.5212 | 753.5212 | 1 | 8.61 | 0.01885 | Significant Effect |
| Error | 699.7933 | 87.47417 | 8 | | | |
| Total | 1453.31451 | 840.99535 | 9 | | | |

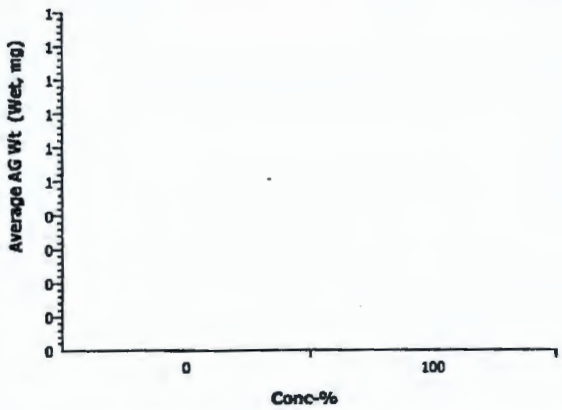
**ANOVA Assumptions**

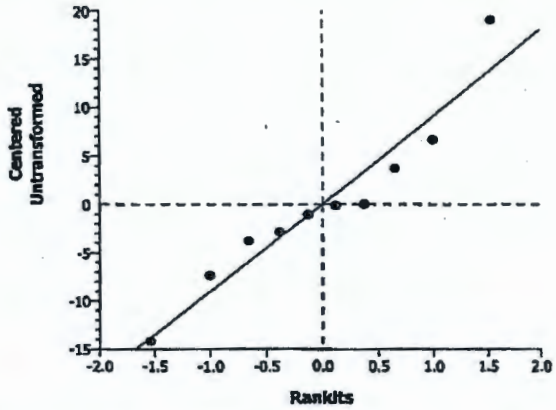
| Attribute | Test | Statistic | Critical | P-Value | Decision(0.01) |
|---|---|---|---|---|---|
| Variances | Variance Ratio F | 4.81756 | 23.15450 | 0.15697 | Equal Variances |
| Distribution | Shapiro-Wilk W | 0.94246 | | 0.58070 | Normal Distribution |

**Data Summary**

| | | | Original Data | | | | Transformed Data | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Conc-% | Control Type | Count | Mean | Minimum | Maximum | SD | Mean | Minimum | Maximum | SD |
| 0 | Artificial Soil/S | 5 | 34.197 | 19.960 | 53.208 | 12.036 | | | | |
| 100 | | 5 | 16.836 | 9.4580 | 23.47 | 5.4838 | | | | |

**Graphics**



# CETIS Analysis Detail

**Plant Bioassay - Chronic** — **CH2M Hill**

| Endpoint | Analysis Type | Sample Link | Control Link | Date Analyzed | Version |
|---|---|---|---|---|---|
| Average AG Wt (Dry, mg) | Comparison | 09-3204-9748 | 09-3204-9748 | 19 Jul-06 10:37 AM | 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 | 27.85% |

**Group Comparisons**

| Control | vs | Conc-% | Statistic | Critical | P-Value | MSD | Decision(0.05) |
|---|---|---|---|---|---|---|---|
| Artificial Soil/Sedi | | 100 | 3.43573 | 1.85955 | 0.0044 | 1.68580 | Significant Effect |

**ANOVA Table**

| Source | Sum of Squares | Mean Square | DF | F Statistic | P-Value | Decision(0.05) |
|---|---|---|---|---|---|---|
| Between | 24.25363 | 24.25363 | 1 | 11.80 | 0.00888 | Significant Effect |
| Error | 16.43722 | 2.054652 | 8 | | | |
| Total | 40.6908531 | 26.308286 | 9 | | | |

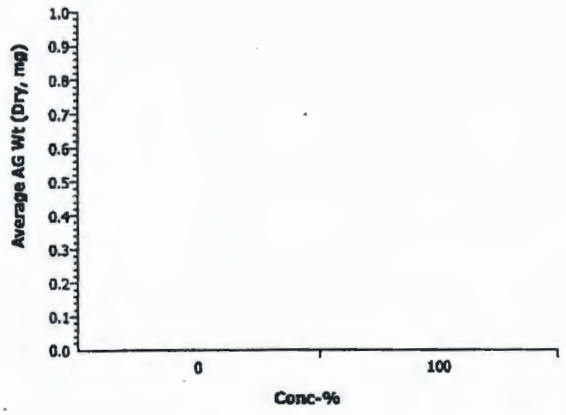
**ANOVA Assumptions**

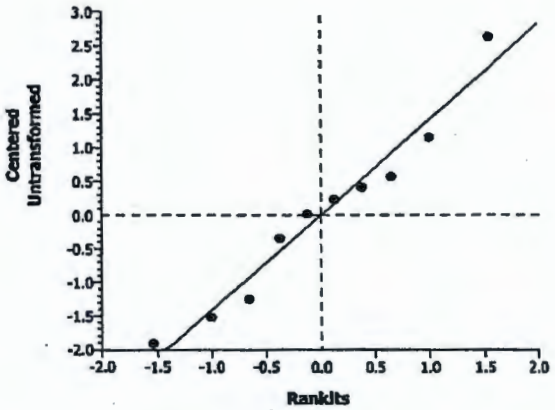
| Attribute | Test | Statistic | Critical | P-Value | Decision(0.01) |
|---|---|---|---|---|---|
| Variances | Variance Ratio F | 4.17312 | 23.15450 | 0.19531 | Equal Variances |
| Distribution | Shapiro-Wilk W | 0.96206 | | 0.80903 | Normal Distribution |

**Data Summary**

| | | | Original Data | | | | Transformed Data | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Conc-% | Control Type | Count | Mean | Minimum | Maximum | SD | Mean | Minimum | Maximum | SD |
| 0 | Artificial Soil/S | 5 | 6.05361 | 4.14001 | 8.68201 | 1.82070 | | | | |
| 100 | | 5 | 2.93889 | 1.69199 | 4.09250 | 0.89127 | | | | |

**Graphics**



# CETIS Analysis Detail

**Plant Bioassay - Chronic** — **CH2M Hill**

| Endpoint | Analysis Type | Sample Link | Control Link | Date Analyzed | Version |
|---|---|---|---|---|---|
| Average Root Wt. (Wet, mg) | Comparison | 09-3204-9748 | 09-3204-9748 | 19 Jul-06 10:37 AM | 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 | 44.63% |

**Group Comparisons**

| Control | vs | Conc-% | Statistic | Critical | P-Value | MSD | Decision(0.05) |
|---|---|---|---|---|---|---|---|
| Artificial Soil/Sedi | | 100 | 2.51472 | 1.85955 | 0.0181 | 16.1738 | Significant Effect |

**ANOVA Table**

| Source | Sum of Squares | Mean Square | DF | F Statistic | P-Value | Decision(0.05) |
|---|---|---|---|---|---|---|
| Between | 1195.994 | 1195.994 | 1 | 6.32 | 0.03610 | Significant Effect |
| Error | 1513 | 189.1251 | 8 | | | |
| Total | 2708.99438 | 1385.119 | 9 | | | |

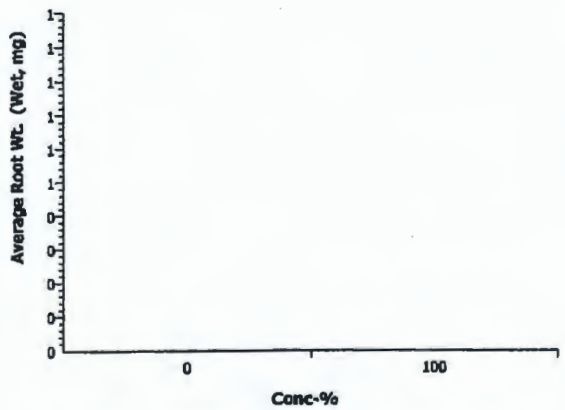
**ANOVA Assumptions**

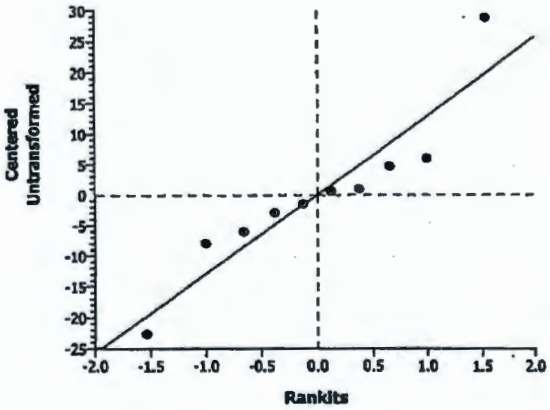
| Attribute | Test | Statistic | Critical | P-Value | Decision(0.01) |
|---|---|---|---|---|---|
| Variances | Variance Ratio F | 18.83196 | 23.15450 | 0.01474 | Equal Variances |
| Distribution | Shapiro-Wilk W | 0.90354 | | 0.23952 | Normal Distribution |

**Data Summary**

| | | | Original Data | | | | Transformed Data | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Conc-% | Control Type | Count | Mean | Minimum | Maximum | SD | Mean | Minimum | Maximum | SD |
| 0 | Artificial Soil/S | 5 | 36.242 | 13.590 | 65.054 | 18.952 | | | | |
| 100 | | 5 | 14.37 | 8.2760 | 20.337 | 4.3672 | | | | |

**Graphics**



# CETIS Analysis Detail

**Plant Bioassay - Chronic** — **CH2M Hill**

| Endpoint | Analysis Type | Sample Link | Control Link | Date Analyzed | Version |
|---|---|---|---|---|---|
| Average Root Wt. (Dry, mg) | Comparison | 09-3204-9748 | 09-3204-9748 | 19 Jul-06 10:37 AM | 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) |
|---|---|---|---|---|---|---|---|
| Artificial Soil/Sedi | | 100 | 3.28856 | 1.85955 | 0.0055 | 0.58734 | Significant Effect |

**ANOVA Table**

| Source | Sum of Squares | Mean Square | DF | F Statistic | P-Value | Decision(0.05) |
|---|---|---|---|---|---|---|
| Between | 2.697209 | 2.697209 | 1 | 10.81 | 0.01105 | Significant Effect |
| Error | 1.99523 | 0.249404 | 8 | | | |
| Total | 4.6924392 | 2.9466129 | 9 | | | |

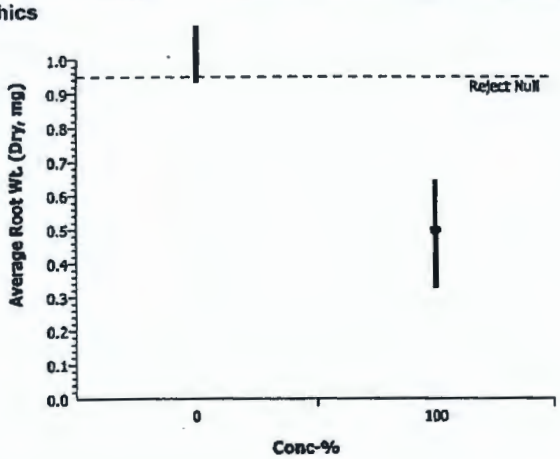
**ANOVA Assumptions**

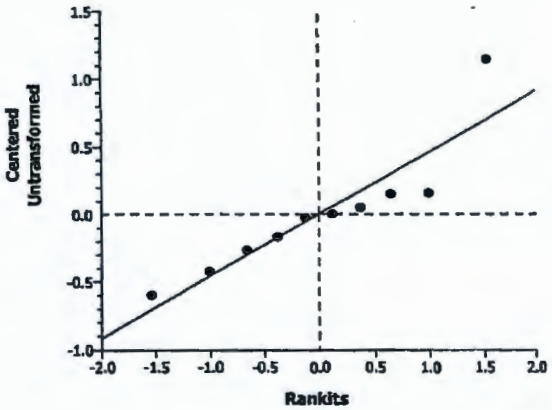
| Attribute | Test | Statistic | Critical | P-Value | Decision(0.01) |
|---|---|---|---|---|---|
| Variances | Variance Ratio F | 36.29308 | 23.15450 | 0.00424 | Unequal Variances |
| Distribution | Shapiro-Wilk W | 0.85613 | | 0.06869 | Normal Distribution |

**Data Summary**

| | | | Original Data | | | | Transformed Data | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Conc-% | Control Type | Count | Mean | Minimum | Maximum | SD | Mean | Minimum | Maximum | SD |
| 0 | Artificial Soil/S | 5 | 1.53579 | 0.93500 | 2.67798 | 0.69673 | | | | |
| 100 | | 5 | 0.49710 | 0.32800 | 0.64500 | 0.11565 | | | | |

**Graphics**



# CETIS Analysis Detail

**Plant Bioassay - Chronic** — **CH2M Hill**

| Endpoint | Analysis Type | Sample Link | Control Link | Date Analyzed | Version |
|---|---|---|---|---|---|
| Average Total Wt (Wet, mg) | Comparison | 09-3204-9748 | 09-3204-9748 | 19 Jul-06 10:37 AM | 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 | 37.55% |

**Group Comparisons**

| Control | vs | Conc-% | Statistic | Critical | P-Value | MSD | Decision(0.05) |
|---|---|---|---|---|---|---|---|
| Artificial Soil/Sedi | | 100 | 2.75861 | 1.85955 | 0.0124 | 26.4468 | Significant Effect |

**ANOVA Table**

| Source | Sum of Squares | Mean Square | DF | F Statistic | P-Value | Decision(0.05) |
|---|---|---|---|---|---|---|
| Between | 3848.153 | 3848.153 | 1 | 7.61 | 0.02473 | Significant Effect |
| Error | 4045.408 | 505.676 | 8 | | | |
| Total | 7893.56152 | 4353.8293 | 9 | | | |

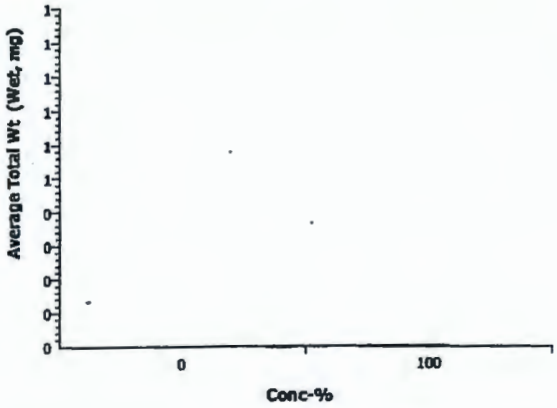
**ANOVA Assumptions**

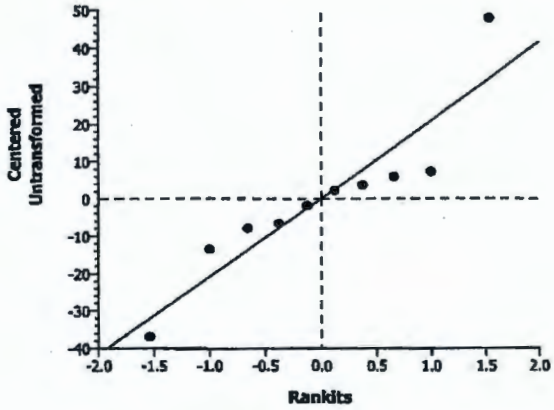
| Attribute | Test | Statistic | Critical | P-Value | Decision(0.01) |
|---|---|---|---|---|---|
| Variances | Variance Ratio F | 13.61081 | 23.15450 | 0.02682 | Equal Variances |
| Distribution | Shapiro-Wilk W | 0.88411 | | 0.14541 | Normal Distribution |

**Data Summary**

| | | | Original Data | | | | Transformed Data | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Conc-% | Control Type | Count | Mean | Minimum | Maximum | SD | Mean | Minimum | Maximum | SD |
| 0 | Artificial Soil/S | 5 | 70.439 | 33.550 | 118.26 | 30.694 | | | | |
| 100 | | 5 | 31.206 | 17.734 | 38.463 | 8.3198 | | | | |

**Graphics**



# CETIS Analysis Detail

**Plant Bioassay - Chronic** — **CH2M Hill**

| Endpoint | Analysis Type | Sample Link | Control Link | Date Analyzed | Version |
|---|---|---|---|---|---|
| Average Total Wt (Dry, mg) | Comparison | 09-3204-9748 | 09-3204-9748 | 19 Jul-06 10:37 AM | 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 | 29.16% |

**Group Comparisons**

| Control | vs | Conc-% | Statistic | Critical | P-Value | MSD | Decision(0.05) |
|---|---|---|---|---|---|---|---|
| Artificial Soil/Sedi | | 100 | 3.49006 | 1.85955 | 0.0041 | 2.21299 | Significant Effect |

**ANOVA Table**

| Source | Sum of Squares | Mean Square | DF | F Statistic | P-Value | Decision(0.05) |
|---|---|---|---|---|---|---|
| Between | 43.12701 | 43.12701 | 1 | 12.18 | 0.00820 | Significant Effect |
| Error | 28.3253 | 3.540663 | 8 | | | |
| Total | 71.4523125 | 46.667673 | 9 | | | |

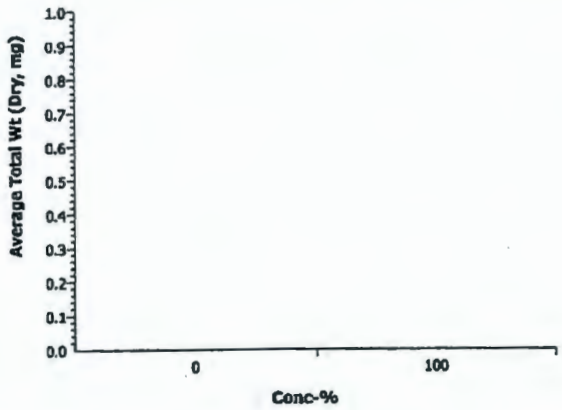
**ANOVA Assumptions**

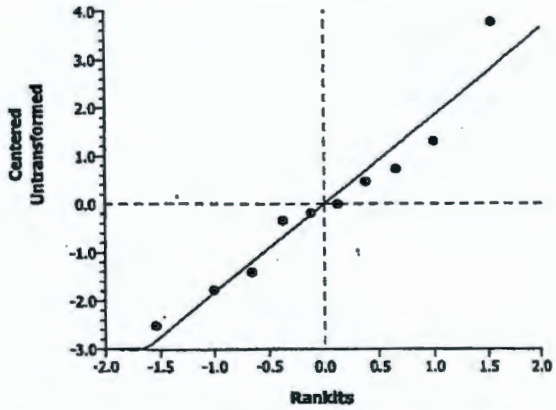
| Attribute | Test | Statistic | Critical | P-Value | Decision(0.01) |
|---|---|---|---|---|---|
| Variances | Variance Ratio F | 6.02455 | 23.15450 | 0.11005 | Equal Variances |
| Distribution | Shapiro-Wilk W | 0.94983 | | 0.66648 | Normal Distribution |

**Data Summary**

| | | | Original Data | | | | Transformed Data | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Conc-% | Control Type | Count | Mean | Minimum | Maximum | SD | Mean | Minimum | Maximum | SD |
| 0 | Artificial Soil/S | 5 | 7.5894 | 5.0750 | 11.36 | 2.4644 | | | | |
| 100 | | 5 | 3.436 | 2.02 | 4.7375 | 1.0040 | | | | |

**Graphics**



# BLUEGRASS GROWTH TEST

Client: Washington Closure Hanford Project

Test Start Date: 4-26-06

Initials: Day 0 [illegible] Day 12 _____ Day 14 NJ Day 16 NJ Day 19 TP Day 21 NJ Day 23 NJ Day 28 NJ Day 35 Bm

Bioassay Lab ID: BG 1575- 08 Sample No: JIIK28

| CONC. | REPLICATE | # seeds germinated: Emergence 12 days after planting | 14 days after planting | 18 days after planting | 19 days after planting | 21 days after planting | 23 days after planting | 7-DAYS POST-EMERGENCE (28 days after planting) | 14-DAYS POST-EMERGENCE (35 days after planting) | pH: INITIAL (@ planting) | FINAL (@ 14 days Post-Emergence) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Control | A | | 0 | 0 | 1 | 1 | 1 | 1 | 1 | 7.6 | 7.4 |
| | B | | 2 | 3 | 3 | 3 | 3 | 3 | 3 | | |
| | C | | 0 | 0 | 1 | 1 | 1 | 1 | 1 | | |
| | D | | 5 | 5 | 6 | 6 | 6 | 5 | 5 | | |
| | E | | 0 | 1 | 1 | 1 | 1 | 1 | 1 | | |

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

Replicate A: 1 md G

Replicate B: 2 md G, 1 sm G

Replicate C: 1 sm G

Replicate D: 2 lg G, 3 md G Removed 1 sm G

Replicate E: 1 md G

Appearance Code: Good (G) = deep green color with no brown, Brown (B) = brown color noted, # Lg = # of large plants (tallest, 6+ shoots), # Med = # of plants (smaller than large, fewer shoots), # Sm = # small plants (1-3 shoots)

14-Days Post-Emergence: Describe shoot appearance:

Replicate A: 1 md G

Replicate B: 2 med G, 1 md w/ 3 B shoots

Replicate C: 1 med G

Replicate D: 1 Lg w 2 B shoots, 4 med w/ B shoots

Replicate E: 1 Md G

Measure Shoot Height:
Individual height of each seedling (above ground)

| | 1st Seedling | 2nd Seedling | 3rd Seedling | 4th Seedling | 5th Seedling |
|---|---|---|---|---|---|
| Replicate A | 65 mm | mm | mm | mm | mm |
| Replicate B | 72 mm | 53 mm | 62 mm | mm | mm |
| Replicate C | 54 mm | mm | mm | mm | mm |
| Replicate D | 91 mm | 91 mm | 63 mm | 66 mm | 78 mm |
| Replicate E | 60 mm | mm | mm | mm | mm |

Measure Shoot Weight:
Total mass of all seedlings (above ground)

| | Tin Tare Wt. (mg) | Wet Wt. (mg) | Dry Wt. (mg) |
|---|---|---|---|
| Replicate A | 1046.42 | 1059.2 | 1048.53 |
| Replicate B | 1248.24 | 1289.3 | 1256.82 |
| Replicate C | 1251.57 | 1260.0 | 1252.72 |
| Replicate D | 1245.92 | 1356.7 | 1270.28 |
| Replicate E | 1256.67 | 1265.9 | 1253.83 |

Describe root appearance:

Replicate A

Replicate B

Replicate C

Replicate D

Replicate E

Measure Root Length:
Individual length of the longest root from each seedling

| | 1st Seedling | 2nd Seedling | 3rd Seedling | 4th Seedling | 5th Seedling |
|---|---|---|---|---|---|
| Replicate A | 53 mm | mm | mm | mm | mm |
| Replicate B | 64 mm | 45 mm | 48 mm | mm | mm |
| Replicate C | 45 mm | mm | mm | mm | mm |
| Replicate D | 73 mm | 72 mm | 70 mm | 49 mm | 54 mm |
| Replicate E | 80 mm | mm | mm | mm | mm |

Measure Root Weight:
Total mass of all roots from all seedlings

| | Tin Tare Wt. (mg) | Wet Wt. (mg) | Dry Wt. (mg) |
|---|---|---|---|
| Replicate A | 1025.38 | 1033.4 | 1025.87 |
| Replicate B | 1249.64 | 1280.4 | 1253.32 |
| Replicate C | 1248.09 | 1253.7 | 1248.21 |
| Replicate D | 1250.63 | 1324.2 | 1255.78 |
| Replicate E | 1247.86 | 1254.8 | 1248.49 |

Comments:

# CETIS Test Summary

Report Date: 19 Jul-06 10:43 AM
Test Link: 16-4458-6532/B157508psB

**Plant Bioassay - Chronic** — CH2M Hill

| | | | | | |
|---|---|---|---|---|---|
| **Test No:** | 01-8480-3393 | **Test Type:** | Plant Chronic | **Duration:** | N/A |
| **Start Date:** | 26 Apr-06 | **Protocol:** | ASTM E1963-02 (2002) | **Species:** | Poa sandbergii |
| **Ending Date:** | | **Dil Water:** | | **Source:** | |
| **Setup Date:** | 26 Apr-06 | **Brine:** | | | |

**Comments:** recalculated Height and Length data July 19, 2006

| | | | | | |
|---|---|---|---|---|---|
| **Sample No:** | 01-3222-3250 | **Code:** | B1580-02 | **Client:** | |
| **Sample Date:** | 20 Apr-06 | **Material:** | Soil | **Project:** | |
| **Receive Date:** | | **Source:** | Hanford | | |
| **Sample Age:** | 6d 0h | **Station:** | | | |

**Comments:** J11K28

**Comparison Summary**

| Analysis | Endpoint | NOEL | LOEL | ChV | PMSD | Method |
|---|---|---|---|---|---|---|
| 16-1061-0186 | % Germination | < 100 | 100 | N/A | 40.98% | Equal Variance t Two-Sample |
| 16-9419-6903 | Average Height (mm) | < 100 | 100 | N/A | 18.81% | Equal Variance t Two-Sample |
| 14-4652-5120 | Average Length (mm) | < 100 | 100 | N/A | 15.66% | Equal Variance t Two-Sample |
| 03-6501-2715 | Average AG Wt (Wet, mg) | < 100 | 100 | N/A | 32.14% | Equal Variance t Two-Sample |
| 04-0840-3706 | Average AG Wt (Dry, mg) | < 100 | 100 | N/A | 31.49% | Equal Variance t Two-Sample |
| 17-3741-6870 | Average Root Wt. (Wet, mg | < 100 | 100 | N/A | 44.25% | Equal Variance t Two-Sample |
| 13-5476-1322 | Average Root Wt. (Dry, mg) | < 100 | 100 | N/A | 44.60% | Equal Variance t Two-Sample |
| 07-2282-6336 | Average Total Wt (Wet, mg | < 100 | 100 | N/A | 37.76% | Equal Variance t Two-Sample |
| 18-0405-9774 | Average Total Wt (Dry, mg) | < 100 | 100 | N/A | 33.12% | Equal Variance t Two-Sample |

# CETIS Test Summary

Report Date: 19 Jul-06 10:43 AM
Test Link: 16-4458-6532/B157508psB

**% Germination Summary**

| Conc-% | Control Type | Reps | Mean | Minimum | Maximum | SE | SD | CV |
|---|---|---|---|---|---|---|---|---|
| 0 | Artificial Soil/S | 5 | 0.88000 | 0.40000 | 1.00000 | 0.12000 | 0.26833 | 30.49% |
| 100 | | 5 | 0.44000 | 0.20000 | 1.00000 | 0.16000 | 0.35777 | 81.31% |

**Average Height (mm) Summary**

| Conc-% | Control Type | Reps | Mean | Minimum | Maximum | SE | SD | CV |
|---|---|---|---|---|---|---|---|---|
| 0 | Artificial Soil/S | 5 | 88.560 | 67 | 115.40 | 8.048 | 17.996 | 20.32% |
| 100 | | 5 | 63.820 | 54 | 77.800 | 3.9381 | 8.8058 | 13.80% |

**Average Length (mm) Summary**

| Conc-% | Control Type | Reps | Mean | Minimum | Maximum | SE | SD | CV |
|---|---|---|---|---|---|---|---|---|
| 0 | Artificial Soil/S | 5 | 106.34 | 82.5 | 120 | 6.5745 | 14.701 | 13.82% |
| 100 | | 5 | 58.78 | 45 | 80 | 6.0779 | 13.591 | 23.12% |

**Average AG Wt (Wet, mg) Summary**

| Conc-% | Control Type | Reps | Mean | Minimum | Maximum | SE | SD | CV |
|---|---|---|---|---|---|---|---|---|
| 0 | Artificial Soil/S | 5 | 34.197 | 19.960 | 53.208 | 5.3829 | 12.036 | 35.20% |
| 100 | | 5 | 13.257 | 8.4301 | 22.156 | 2.4405 | 5.4571 | 41.17% |

**Average AG Wt (Dry, mg) Summary**

| Conc-% | Control Type | Reps | Mean | Minimum | Maximum | SE | SD | CV |
|---|---|---|---|---|---|---|---|---|
| 0 | Artificial Soil/S | 5 | 6.05361 | 4.14001 | 8.68201 | 0.81424 | 1.82070 | 30.08% |
| 100 | | 5 | 2.63038 | 1.15002 | 4.87200 | 0.62294 | 1.39294 | 52.96% |

**Average Root Wt. (Wet, mg) Summary**

| Conc-% | Control Type | Reps | Mean | Minimum | Maximum | SE | SD | CV |
|---|---|---|---|---|---|---|---|---|
| 0 | Artificial Soil/S | 5 | 36.242 | 13.590 | 65.054 | 8.4756 | 18.952 | 52.29% |
| 100 | | 5 | 9.1075 | 5.61 | 14.714 | 1.5947 | 3.5658 | 39.15% |

**Average Root Wt. (Dry, mg) Summary**

| Conc-% | Control Type | Reps | Mean | Minimum | Maximum | SE | SD | CV |
|---|---|---|---|---|---|---|---|---|
| 0 | Artificial Soil/S | 5 | 1.53579 | 0.93500 | 2.67798 | 0.31159 | 0.69673 | 45.37% |
| 100 | | 5 | 0.69933 | 0.12000 | 1.22664 | 0.19643 | 0.43922 | 62.81% |

**Average Total Wt (Wet, mg) Summary**

| Conc-% | Control Type | Reps | Mean | Minimum | Maximum | SE | SD | CV |
|---|---|---|---|---|---|---|---|---|
| 0 | Artificial Soil/S | 5 | 70.439 | 33.550 | 118.26 | 13.727 | 30.694 | 43.58% |
| 100 | | 5 | 22.364 | 14.040 | 38.87 | 4.0187 | 8.9862 | 40.18% |

**Average Total Wt (Dry, mg) Summary**

| Conc-% | Control Type | Reps | Mean | Minimum | Maximum | SE | SD | CV |
|---|---|---|---|---|---|---|---|---|
| 0 | Artificial Soil/S | 5 | 7.5894 | 5.0750 | 11.36 | 1.1021 | 2.4644 | 32.47% |
| 100 | | 5 | 3.3297 | 1.2700 | 5.9020 | 0.7828 | 1.7504 | 52.57% |

# CETIS Test Summary

Report Date: 19 Jul-06 10:43 AM
Test Link: 16-4458-6532/B157508psB

**% Germination Detail**

| Conc-% | Control Type | Rep 1 | Rep 2 | Rep 3 | Rep 4 | Rep 5 |
|---|---|---|---|---|---|---|
| 0 | Artificial Soil/S | 1.00000 | 1.00000 | 0.40000 | 1.00000 | 1.00000 |
| 100 | | 0.20000 | 0.60000 | 0.20000 | 1.00000 | 0.20000 |

**Average Height (mm) Detail**

| Conc-% | Control Type | Rep 1 | Rep 2 | Rep 3 | Rep 4 | Rep 5 |
|---|---|---|---|---|---|---|
| 0 | Artificial Soil/S | 78.6 | 91 | 67 | 90.8000 | 115.400 |
| 100 | | 65 | 62.3 | 54 | 77.8000 | 60 |

**Average Length (mm) Detail**

| Conc-% | Control Type | Rep 1 | Rep 2 | Rep 3 | Rep 4 | Rep 5 |
|---|---|---|---|---|---|---|
| 0 | Artificial Soil/S | 102.800 | 114.400 | 82.5 | 112 | 120 |
| 100 | | 53 | 52.3 | 45 | 63.6 | 80 |

**Average AG Wt (Wet, mg) Detail**

| Conc-% | Control Type | Rep 1 | Rep 2 | Rep 3 | Rep 4 | Rep 5 |
|---|---|---|---|---|---|---|
| 0 | Artificial Soil/S | 30.4100 | 33.172 | 19.9600 | 34.2360 | 53.2080 |
| 100 | | 12.7799 | 13.6867 | 8.43005 | 22.156 | 9.22998 |

**Average AG Wt (Dry, mg) Detail**

| Conc-% | Control Type | Rep 1 | Rep 2 | Rep 3 | Rep 4 | Rep 5 |
|---|---|---|---|---|---|---|
| 0 | Artificial Soil/S | 4.53401 | 6.62400 | 4.14001 | 6.28801 | 8.68201 |
| 100 | | 2.10999 | 2.85999 | 1.15002 | 4.87200 | 2.15991 |

**Average Root Wt. (Wet, mg) Detail**

| Conc-% | Control Type | Rep 1 | Rep 2 | Rep 3 | Rep 4 | Rep 5 |
|---|---|---|---|---|---|---|
| 0 | Artificial Soil/S | 33.3280 | 40.9320 | 13.5900 | 28.3060 | 65.054 |
| 100 | | 8.02002 | 10.2533 | 5.60999 | 14.714 | 6.94006 |

**Average Root Wt. (Dry, mg) Detail**

| Conc-% | Control Type | Rep 1 | Rep 2 | Rep 3 | Rep 4 | Rep 5 |
|---|---|---|---|---|---|---|
| 0 | Artificial Soil/S | 1.26801 | 1.68799 | 0.93500 | 1.10999 | 2.67798 |
| 100 | | 0.48999 | 1.22664 | 0.12000 | 1.03000 | 0.63000 |

**Average Total Wt (Wet, mg) Detail**

| Conc-% | Control Type | Rep 1 | Rep 2 | Rep 3 | Rep 4 | Rep 5 |
|---|---|---|---|---|---|---|
| 0 | Artificial Soil/S | 63.7380 | 74.1040 | 33.5500 | 62.5420 | 118.262 |
| 100 | | 20.7999 | 23.9400 | 14.0400 | 36.87 | 16.1700 |

**Average Total Wt (Dry, mg) Detail**

| Conc-% | Control Type | Rep 1 | Rep 2 | Rep 3 | Rep 4 | Rep 5 |
|---|---|---|---|---|---|---|
| 0 | Artificial Soil/S | 5.80201 | 8.31199 | 5.07501 | 7.398 | 11.36 |
| 100 | | 2.59998 | 4.08663 | 1.27002 | 5.90200 | 2.78992 |

# CETIS Analysis Detail

**Plant Bioassay - Chronic** — **CH2M Hill**

| Endpoint | Analysis Type | Sample Link | Control Link | Date Analyzed | Version |
|---|---|---|---|---|---|
| % Germination | Comparison | 16-4458-6532 | 16-4458-6532 | 19 Jul-06 10:43 AM | 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 | 40.98% |

**Group Comparisons**

| Control | vs | Conc-% | Statistic | Critical | P-Value | MSD | Decision(0.05) |
|---|---|---|---|---|---|---|---|
| Artificial Soil/Sedi | | 100 | 2.22522 | 1.85955 | 0.0284 | 0.4084 | Significant Effect |

**ANOVA Table**

| Source | Sum of Squares | Mean Square | DF | F Statistic | P-Value | Decision(0.05) |
|---|---|---|---|---|---|---|
| Between | 0.5970927 | 0.597093 | 1 | 4.95 | 0.05672 | Non-Significant Effect |
| Error | 0.964686 | 0.120586 | 8 | | | |
| Total | 1.56177872 | 0.7176784 | 9 | | | |

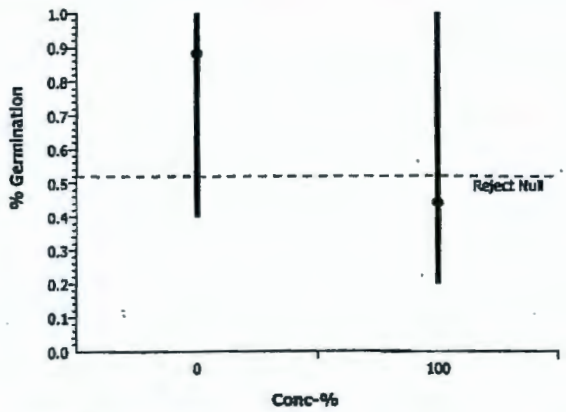
**ANOVA Assumptions**

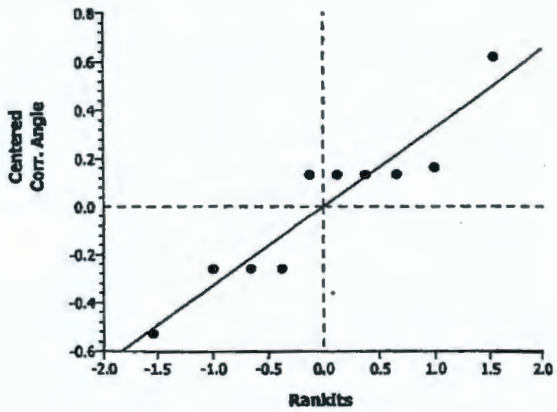
| Attribute | Test | Statistic | Critical | P-Value | Decision(0.01) |
|---|---|---|---|---|---|
| Variances | Variance Ratio F | 1.76355 | 23.15450 | 0.59611 | Equal Variances |
| Distribution | Shapiro-Wilk W | 0.89809 | | 0.20874 | Normal Distribution |

**Data Summary**

| | | | Original Data | | | | Transformed Data | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Conc-% | Control Type | Count | Mean | Minimum | Maximum | SD | Mean | Minimum | Maximum | SD |
| 0 | Artificial Soil/S | 5 | 0.88000 | 0.40000 | 1.00000 | 0.26833 | 1.21317 | 0.68472 | 1.34528 | 0.29541 |
| 100 | | 5 | 0.44000 | 0.20000 | 1.00000 | 0.35777 | 0.72446 | 0.46365 | 1.34528 | 0.39230 |

**Graphics**



# CETIS Analysis Detail

**Plant Bioassay - Chronic** — **CH2M Hill**

| Endpoint | Analysis Type | Sample Link | Control Link | Date Analyzed | Version |
|---|---|---|---|---|---|
| Average Height (mm) | Comparison | 16-4458-6532 | 16-4458-6532 | 19 Jul-06 10:43 AM | 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 | 18.81% |

**Group Comparisons**

| Control | vs | Conc-% | Statistic | Critical | P-Value | MSD | Decision(0.05) |
|---|---|---|---|---|---|---|---|
| Artificial Soil/Sedi | | 100 | 2.76122 | 1.85955 | 0.0123 | 16.6612 | Significant Effect |

**ANOVA Table**

| Source | Sum of Squares | Mean Square | DF | F Statistic | P-Value | Decision(0.05) |
|---|---|---|---|---|---|---|
| Between | 1530.169 | 1530.169 | 1 | 7.62 | 0.02463 | Significant Effect |
| Error | 1605.56 | 200.695 | 8 | | | |
| Total | 3135.72925 | 1730.8641 | 9 | | | |

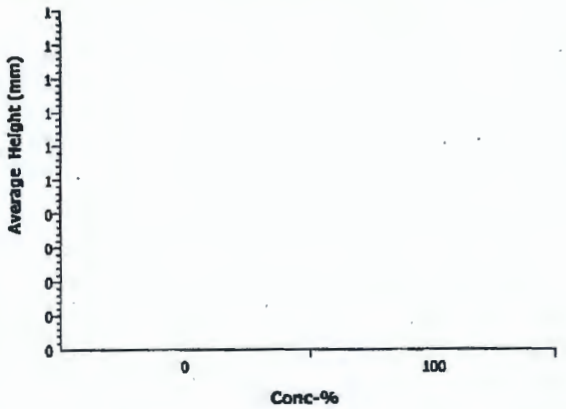
**ANOVA Assumptions**

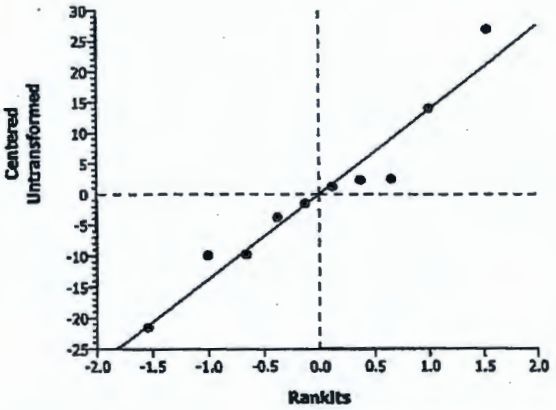
| Attribute | Test | Statistic | Critical | P-Value | Decision(0.01) |
|---|---|---|---|---|---|
| Variances | Variance Ratio F | 4.17642 | 23.15450 | 0.19508 | Equal Variances |
| Distribution | Shapiro-Wilk W | 0.95335 | | 0.70816 | Normal Distribution |

**Data Summary**

| | | | Original Data | | | | Transformed Data | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Conc-% | Control Type | Count | Mean | Minimum | Maximum | SD | Mean | Minimum | Maximum | SD |
| 0 | Artificial Soil/S | 5 | 88.560 | 67 | 115.4 | 17.996 | | | | |
| 100 | | 5 | 63.820 | 54 | 77.8 | 8.8058 | | | | |

**Graphics**



# CETIS Analysis Detail

**Plant Bioassay - Chronic** — **CH2M Hill**

| Endpoint | Analysis Type | Sample Link | Control Link | Date Analyzed | Version |
|---|---|---|---|---|---|
| Average Length (mm) | Comparison | 16-4458-6532 | 16-4458-6532 | 19 Jul-06 10:43 AM | 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 | 15.66% |

**Group Comparisons**

| Control | vs | Conc-% | Statistic | Critical | P-Value | MSD | Decision(0.05) |
|---|---|---|---|---|---|---|---|
| Artificial Soil/Sedi | | 100 | 5.31193 | 1.85955 | 0.0004 | 16.6493 | Significant Effect |

**ANOVA Table**

| Source | Sum of Squares | Mean Square | DF | F Statistic | P-Value | Decision(0.05) |
|---|---|---|---|---|---|---|
| Between | 5654.884 | 5654.884 | 1 | 28.22 | 0.00072 | Significant Effect |
| Error | 1603.28 | 200.41 | 8 | | | |
| Total | 7258.16431 | 5855.2943 | 9 | | | |

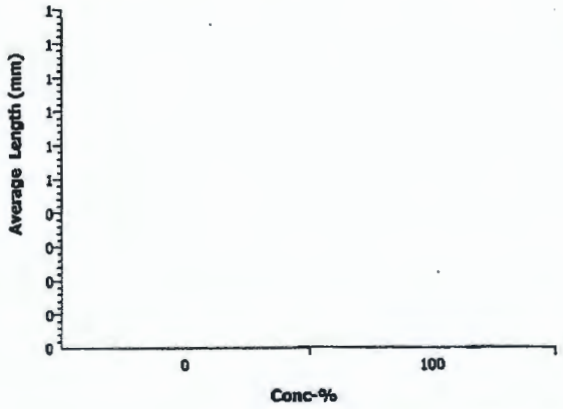
**ANOVA Assumptions**

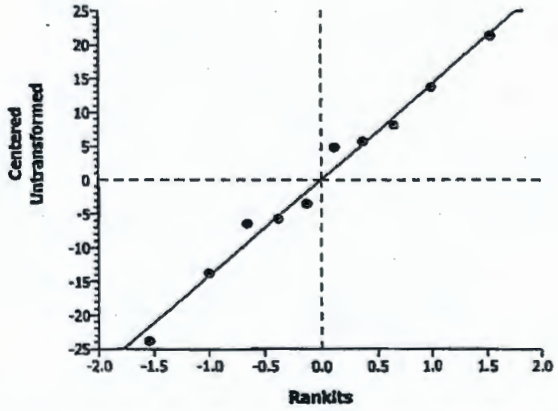
| Attribute | Test | Statistic | Critical | P-Value | Decision(0.01) |
|---|---|---|---|---|---|
| Variances | Variance Ratio F | 1.17009 | 23.15450 | 0.88267 | Equal Variances |
| Distribution | Shapiro-Wilk W | 0.98478 | | 0.98557 | Normal Distribution |

**Data Summary**

| | | | Original Data | | | | Transformed Data | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Conc-% | Control Type | Count | Mean | Minimum | Maximum | SD | Mean | Minimum | Maximum | SD |
| 0 | Artificial Soil/S | 5 | 106.34 | 82.5 | 120 | 14.701 | | | | |
| 100 | | 5 | 58.78 | 45 | 80 | 13.591 | | | | |

**Graphics**



# CETIS Analysis Detail

**Plant Bioassay - Chronic** — **CH2M Hill**

| Endpoint | Analysis Type | Sample Link | Control Link | Date Analyzed | Version |
|---|---|---|---|---|---|
| Average AG Wt (Wet, mg) | Comparison | 16-4458-6532 | 16-4458-6532 | 19 Jul-06 10:43 AM | 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 | 32.14% |

**Group Comparisons**

| Control | vs | Conc-% | Statistic | Critical | P-Value | MSD | Decision(0.05) |
|---|---|---|---|---|---|---|---|
| Artificial Soil/Sedi | | 100 | 3.54311 | 1.85955 | 0.0038 | 10.9904 | Significant Effect |

**ANOVA Table**

| Source | Sum of Squares | Mean Square | DF | F Statistic | P-Value | Decision(0.05) |
|---|---|---|---|---|---|---|
| Between | 1096.281 | 1096.281 | 1 | 12.55 | 0.00759 | Significant Effect |
| Error | 698.6238 | 87.32798 | 8 | | | |
| Total | 1794.90485 | 1183.609 | 9 | | | |

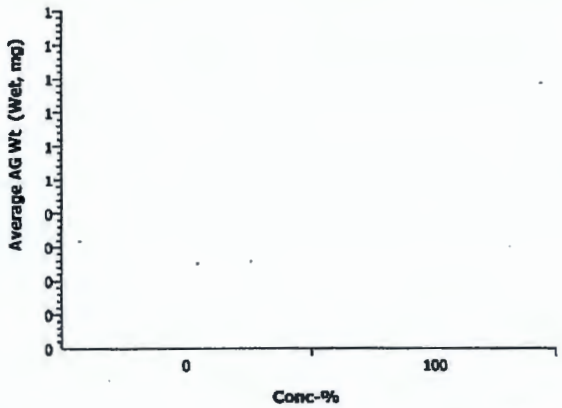
**ANOVA Assumptions**

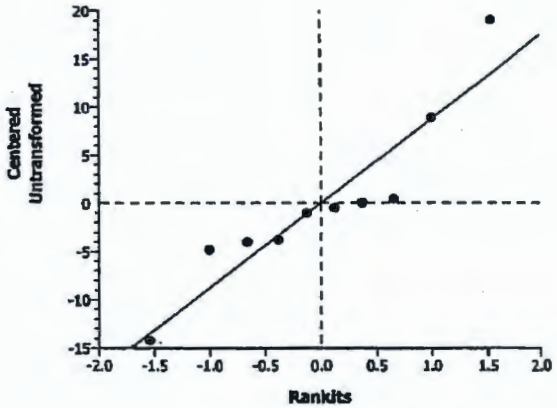
| Attribute | Test | Statistic | Critical | P-Value | Decision(0.01) |
|---|---|---|---|---|---|
| Variances | Variance Ratio F | 4.86485 | 23.15450 | 0.15461 | Equal Variances |
| Distribution | Shapiro-Wilk W | 0.89729 | | 0.20454 | Normal Distribution |

**Data Summary**

| | | | Original Data | | | | Transformed Data | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Conc-% | Control Type | Count | Mean | Minimum | Maximum | SD | Mean | Minimum | Maximum | SD |
| 0 | Artificial Soil/S | 5 | 34.197 | 19.960 | 53.208 | 12.036 | | | | |
| 100 | | 5 | 13.257 | 8.4301 | 22.156 | 5.4571 | | | | |

**Graphics**



# CETIS Analysis Detail

**Plant Bioassay - Chronic** — CH2M Hill

| Endpoint | Analysis Type | Sample Link | Control Link | Date Analyzed | Version |
|---|---|---|---|---|---|
| Average AG Wt (Dry, mg) | Comparison | 16-4458-6532 | 16-4458-6532 | 19 Jul-06 10:43 AM | 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 | 31.49% |

**Group Comparisons**

| Control | vs | Conc-% | Statistic | Critical | P-Value | MSD | Decision(0.05) |
|---|---|---|---|---|---|---|---|
| Artificial Soil/Sedi | | 100 | 3.33906 | 1.85955 | 0.0051 | 1.90642 | Significant Effect |

**ANOVA Table**

| Source | Sum of Squares | Mean Square | DF | F Statistic | P-Value | Decision(0.05) |
|---|---|---|---|---|---|---|
| Between | 29.29622 | 29.29622 | 1 | 11.15 | 0.01025 | Significant Effect |
| Error | 21.02096 | 2.62762 | 8 | | | |
| Total | 50.3171787 | 31.923839 | 9 | | | |

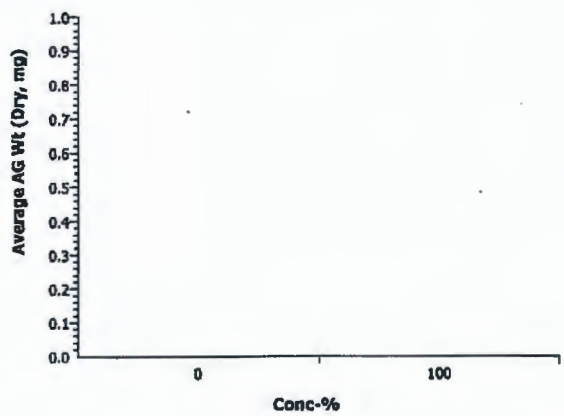
**ANOVA Assumptions**

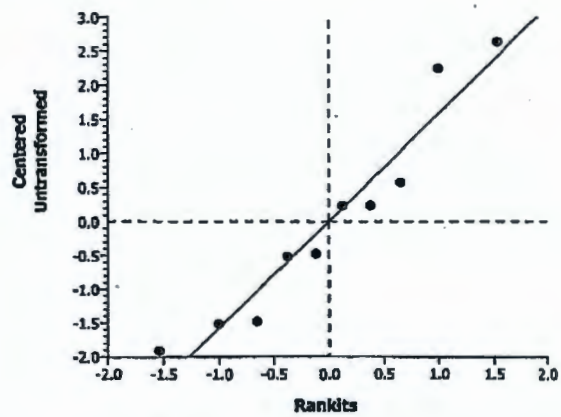
| Attribute | Test | Statistic | Critical | P-Value | Decision(0.01) |
|---|---|---|---|---|---|
| Variances | Variance Ratio F | 1.70848 | 23.15450 | 0.61658 | Equal Variances |
| Distribution | Shapiro-Wilk W | 0.92243 | | 0.37770 | Normal Distribution |

**Data Summary**

| | | | Original Data | | | | Transformed Data | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Conc-% | Control Type | Count | Mean | Minimum | Maximum | SD | Mean | Minimum | Maximum | SD |
| 0 | Artificial Soil/S | 5 | 6.05361 | 4.14001 | 8.68201 | 1.82070 | | | | |
| 100 | | 5 | 2.63038 | 1.15002 | 4.87200 | 1.39294 | | | | |

**Graphics**



# CETIS Analysis Detail

**Plant Bioassay - Chronic** — **CH2M Hill**

| Endpoint | Analysis Type | Sample Link | Control Link | Date Analyzed | Version |
|---|---|---|---|---|---|
| Average Root Wt. (Wet, mg) | Comparison | 16-4458-6532 | 16-4458-6532 | 19 Jul-06 10:43 AM | 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 | 44.25% |

**Group Comparisons**

| Control | vs | Conc-% | Statistic | Critical | P-Value | MSD | Decision(0.05) |
|---|---|---|---|---|---|---|---|
| Artificial Soil/Sedi | | 100 | 3.14629 | 1.85955 | 0.0068 | 16.0373 | Significant Effect |

**ANOVA Table**

| Source | Sum of Squares | Mean Square | DF | F Statistic | P-Value | Decision(0.05) |
|---|---|---|---|---|---|---|
| Between | 1840.706 | 1840.706 | 1 | 9.90 | 0.01367 | Significant Effect |
| Error | 1487.568 | 185.946 | 8 | | | |
| Total | 3328.27454 | 2026.6524 | 9 | | | |

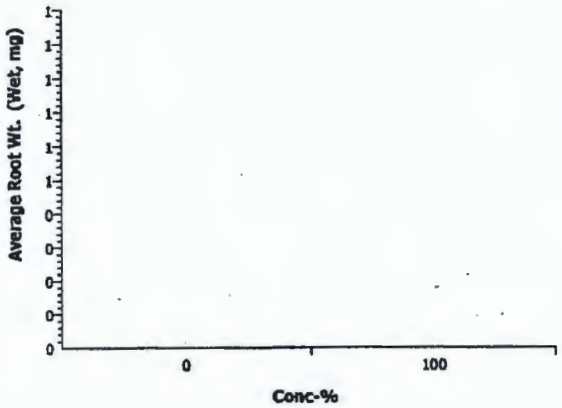
**ANOVA Assumptions**

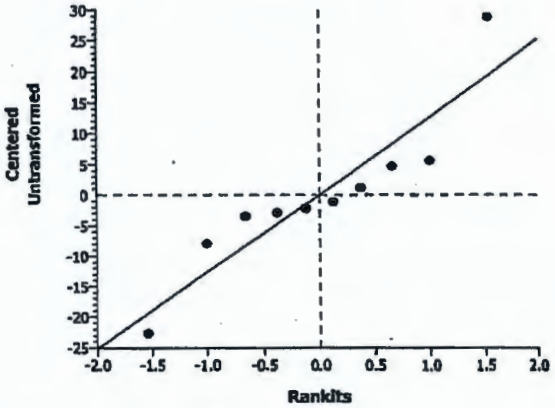
| Attribute | Test | Statistic | Critical | P-Value | Decision(0.01) |
|---|---|---|---|---|---|
| Variances | Variance Ratio F | 28.24906 | 23.15450 | 0.00685 | Unequal Variances |
| Distribution | Shapiro-Wilk W | 0.88470 | | 0.14770 | Normal Distribution |

**Data Summary**

| | | | Original Data | | | | Transformed Data | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Conc-% | Control Type | Count | Mean | Minimum | Maximum | SD | Mean | Minimum | Maximum | SD |
| 0 | Artificial Soil/S | 5 | 36.242 | 13.590 | 65.054 | 18.952 | | | | |
| 100 | | 5 | 9.1075 | 5.61 | 14.714 | 3.5658 | | | | |

**Graphics**



# CETIS Analysis Detail

**Plant Bioassay - Chronic** — **CH2M Hill**

| Endpoint | Analysis Type | Sample Link | Control Link | Date Analyzed | Version |
|---|---|---|---|---|---|
| Average Root Wt. (Dry, mg) | Comparison | 16-4458-6532 | 16-4458-6532 | 19 Jul-06 10:43 AM | 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 | 44.60% |

**Group Comparisons**

| Control vs | Conc-% | Statistic | Critical | P-Value | MSD | Decision(0.05) |
|---|---|---|---|---|---|---|
| Artificial Soil/Sedi | 100 | 2.27094 | 1.85955 | 0.0264 | 0.68493 | Significant Effect |

**ANOVA Table**

| Source | Sum of Squares | Mean Square | DF | F Statistic | P-Value | Decision(0.05) |
|---|---|---|---|---|---|---|
| Between | 1.749177 | 1.749177 | 1 | 5.16 | 0.05281 | Non-Significant Effect |
| Error | 2.713392 | 0.339174 | 8 | | | |
| Total | 4.46256924 | 2.0883508 | 9 | | | |

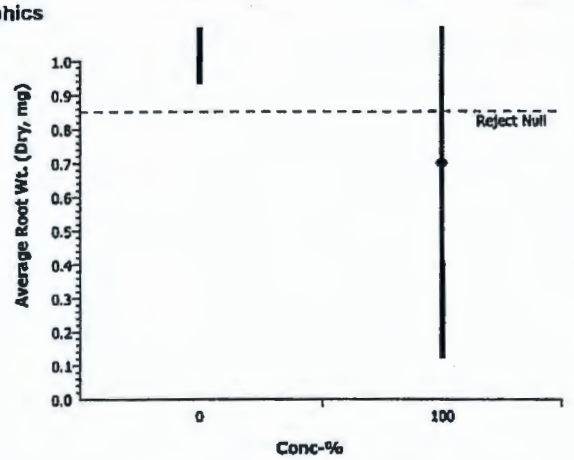
**ANOVA Assumptions**

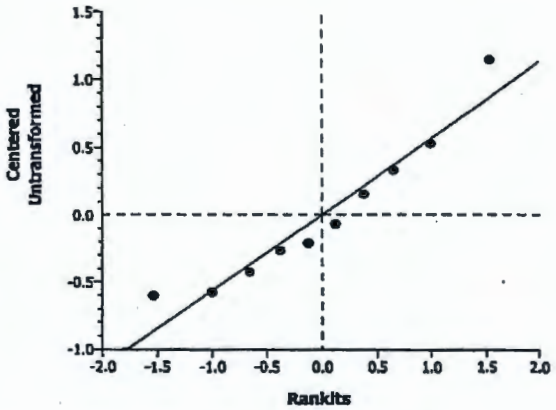
| Attribute | Test | Statistic | Critical | P-Value | Decision(0.01) |
|---|---|---|---|---|---|
| Variances | Variance Ratio F | 2.51629 | 23.15450 | 0.39326 | Equal Variances |
| Distribution | Shapiro-Wilk W | 0.92395 | | 0.39107 | Normal Distribution |

**Data Summary**

| | | | Original Data | | | | Transformed Data | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Conc-% | Control Type | Count | Mean | Minimum | Maximum | SD | Mean | Minimum | Maximum | SD |
| 0 | Artificial Soil/S | 5 | 1.53579 | 0.93500 | 2.67798 | 0.69673 | | | | |
| 100 | | 5 | 0.69933 | 0.12000 | 1.22664 | 0.43922 | | | | |

**Graphics**



# CETIS Analysis Detail

**Plant Bioassay - Chronic** — **CH2M Hill**

| Endpoint | Analysis Type | Sample Link | Control Link | Date Analyzed | Version |
|---|---|---|---|---|---|
| Average Total Wt (Wet, mg) | Comparison | 16-4458-6532 | 16-4458-6532 | 19 Jul-06 10:43 AM | 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 | 37.76% |

**Group Comparisons**

| Control | vs | Conc-% | Statistic | Critical | P-Value | MSD | Decision(0.05) |
|---|---|---|---|---|---|---|---|
| Artificial Soil/Sedi | | 100 | 3.36119 | 1.85955 | 0.0050 | 26.5972 | Significant Effect |

**ANOVA Table**

| Source | Sum of Squares | Mean Square | DF | F Statistic | P-Value | Decision(0.05) |
|---|---|---|---|---|---|---|
| Between | 5778.066 | 5778.066 | 1 | 11.30 | 0.00991 | Significant Effect |
| Error | 4091.537 | 511.4421 | 8 | | | |
| Total | 9869.60303 | 6289.5081 | 9 | | | |

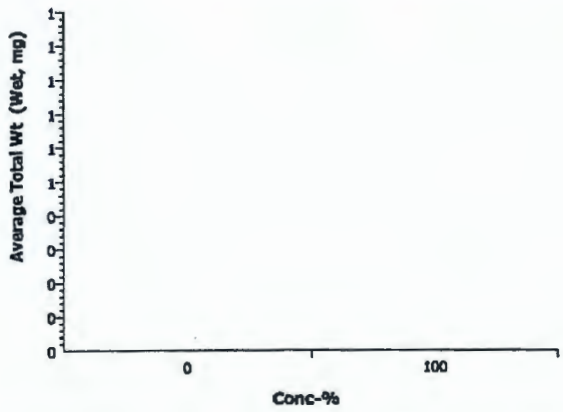
**ANOVA Assumptions**

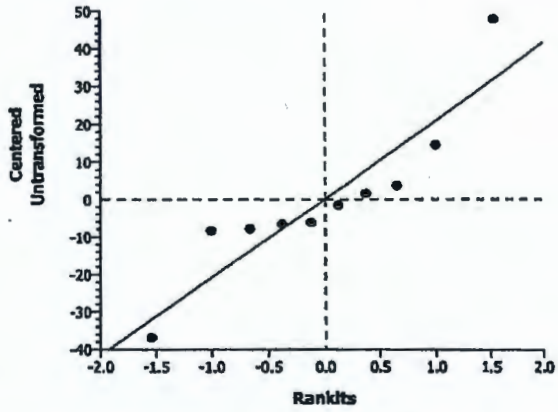
| Attribute | Test | Statistic | Critical | P-Value | Decision(0.01) |
|---|---|---|---|---|---|
| Variances | Variance Ratio F | 11.66703 | 23.15450 | 0.03543 | Equal Variances |
| Distribution | Shapiro-Wilk W | 0.87375 | | 0.11052 | Normal Distribution |

**Data Summary**

| | | | Original Data | | | | Transformed Data | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Conc-% | Control Type | Count | Mean | Minimum | Maximum | SD | Mean | Minimum | Maximum | SD |
| 0 | Artificial Soil/S | 5 | 70.439 | 33.550 | 118.26 | 30.694 | | | | |
| 100 | | 5 | 22.364 | 14.040 | 36.87 | 8.9862 | | | | |

**Graphics**



# CETIS Analysis Detail

**Plant Bioassay - Chronic** — **CH2M Hill**

| Endpoint | Analysis Type | Sample Link | Control Link | Date Analyzed | Version |
|---|---|---|---|---|---|
| Average Total Wt (Dry, mg) | Comparison | 16-4458-6532 | 16-4458-6532 | 19 Jul-06 10:43 AM | 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 | 33.12% |

**Group Comparisons**

| Control | vs | Conc-% | Statistic | Critical | P-Value | MSD | Decision(0.05) |
|---|---|---|---|---|---|---|---|
| Artificial Soil/Sedi | | 100 | 3.15106 | 1.85955 | 0.0068 | 2.51379 | Significant Effect |

**ANOVA Table**

| Source | Sum of Squares | Mean Square | DF | F Statistic | P-Value | Decision(0.05) |
|---|---|---|---|---|---|---|
| Between | 45.36241 | 45.36241 | 1 | 9.93 | 0.01358 | Significant Effect |
| Error | 36.5488 | 4.5686 | 8 | | | |
| Total | 81.9112129 | 49.931012 | 9 | | | |

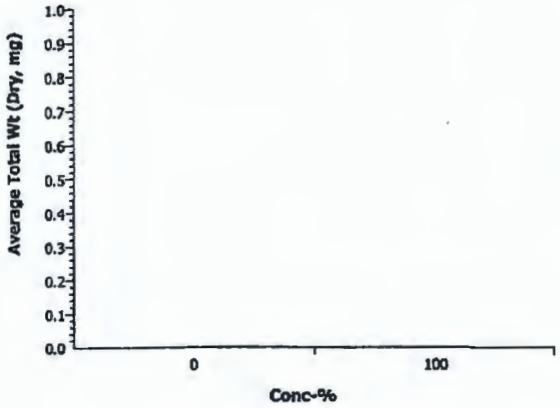
**ANOVA Assumptions**

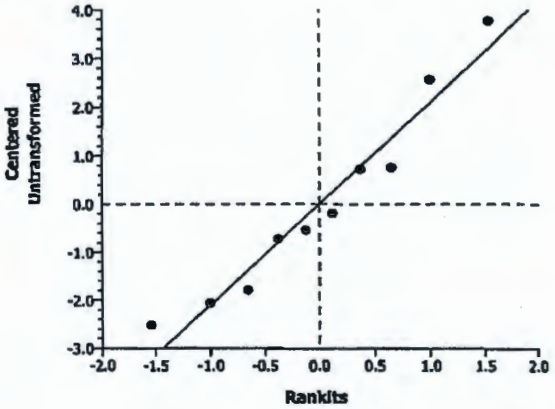
| Attribute | Test | Statistic | Critical | P-Value | Decision(0.01) |
|---|---|---|---|---|---|
| Variances | Variance Ratio F | 1.98216 | 23.15450 | 0.52384 | Equal Variances |
| Distribution | Shapiro-Wilk W | 0.94188 | | 0.57406 | Normal Distribution |

**Data Summary**

| | | | Original Data | | | | Transformed Data | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Conc-% | Control Type | Count | Mean | Minimum | Maximum | SD | Mean | Minimum | Maximum | SD |
| 0 | Artificial Soil/S | 5 | 7.5894 | 5.0750 | 11.36 | 2.4644 | | | | |
| 100 | | 5 | 3.3297 | 1.2700 | 5.9020 | 1.7504 | | | | |

**Graphics**



# BLUEGRASS GROWTH TEST

Client: Washington Closure Hanford Project

Test Start Date: 4-26-06

Initials: Day 0 [illegible] Day 12 _____ Day 14 NJ Day 16 NJ Day 19 TP Day 21 NJ Day 23 NJ Day 28 TP Day 35 DW

Bioassay Lab ID: BG 1575- 09 Sample No: J11K61

| CONC. | REPLICATE | # seeds germinated: Emergence: 12 days after planting | 14 days after planting | 16 days after planting | 19 days after planting | 21 days after planting | 23 days after planting | 7-DAYS POST-EMERGENCE (28 days after planting) | 14-DAYS POST-EMERGENCE (35 days after planting) | pH: INITIAL (@ planting) | FINAL (@ 14 days Post-Emergence) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Control | A | | 3 | 3 | 5 | 5 | 6 | 6 -> 5 | 5 | 7.6 | 7.5 |
| | B | | 5 | 5 | 5 | 5 | 5 | 5 -> 5 | 5 | | |
| | C | | 2 | 3 | 3 | 3 | 3 | 3 -> 3 | 3 | | |
| | D | | 4 | 5 | 5 | 5 | 5 | 5 -> 5 | 5 | | |
| | E | | 1 | 1 | 2 | 2 | 2 | 2 -> 2 | 2 | | |

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

Replicate A: 2Lg (G) 1 w/B tip, 3 med w/B tips (removed, 1sm (G))

Replicate B: 2Lg (G) w/B shoots, 3 med 1 w/B Tip

Replicate C: 1Lg (G), 1 med w/B Tip, 1sm (G)

Replicate D: 3Lg (G) w/B tips, 2 med (G)

Replicate E: 2 Med w/B Tips

Appearance Code: Good (G) = deep green color with no brown, Brown (B) = brown color noted, # Lg = # of large plants (tallest, 6+ shoots), # Med = # of plants (smaller than large, fewer shoots), # Sm = # small plants (1-3 shoots)

14-Days Post-Emergence: Describe shoot appearance:

Replicate A: 3 Lg each w 1 B shoot, 1 Md w/ B shoot, 1 Md G

Replicate B: 3 Lg w/ B shoots, 2 Md G

Replicate C: 1 Md w/ 1 B shoot, 2 Md w/ B tips

Replicate D: 1 Lg G, 3 Md G, 1 Md w/ 2 B shoots

Replicate E: 1 Lg G, 1 Lg w/ B tip (141 mm plant w/ only 3 shoots)

Measure Shoot Height: Individual height of each seedling (above ground)

| | 1st Seedling | 2nd Seedling | 3rd Seedling | 4th Seedling | 5th Seedling |
|---|---|---|---|---|---|
| Replicate A | 80 mm | 95 mm | 102 mm | 96 mm | 72 mm |
| Replicate B | 91 mm | 101 mm | 84 mm | 111 mm | 132 mm |
| Replicate C | 84 mm | 54 mm | 75 mm | mm | mm |
| Replicate D | 81 mm | 69 mm | 82 mm | 107 mm | 66 mm |
| Replicate E | 141 mm | 102 mm | mm | mm | mm |

Measure Shoot Weight: Total mass of all seedlings (above ground)

| | Tin Tare Wt. (mg) | Wet Wt (mg) | Dry Wt. (mg) |
|---|---|---|---|
| Replicate A | 1029.31 | 1210.46 | 1059.05 |
| Replicate B | 1249.78 | 1443.66 | 1284.26 |
| Replicate C | 1254.19 | 1325.90 | 1266.45 |
| Replicate D | 1250.36 | 1433.61 | 1281.67 |
| Replicate E | 1255.70 | 1328.16 | 1266.78 |

Describe root appearance:

Replicate A

Replicate B

Replicate C

Replicate D

Replicate E

Measure Root Length: Individual length of the longest root from each seedling

| | 1st Seedling | 2nd Seedling | 3rd Seedling | 4th Seedling | 5th Seedling |
|---|---|---|---|---|---|
| Replicate A | 126 mm | 77 mm | 64 mm | 96 mm | 122 mm |
| Replicate B | 81 mm | 69 mm | 94 mm | 116 mm | 86 mm |
| Replicate C | 76 mm | 96 mm | 62 mm | ~~X~~ DW mm | mm |
| Replicate D | 80 mm | 80 mm | 111 mm | 76 mm | 87 mm |
| Replicate E | 97 mm | 92 mm | mm | mm | mm |

Measure Root Weight: Total mass of all roots from all seedlings

| | Tin Tare Wt. (mg) | Wet Wt (mg) | Dry Wt. (mg) |
|---|---|---|---|
| Replicate A | 988.24 | 1170.22 | 994.99 |
| Replicate B | 1242.04 | 1497.40 | 1251.33 |
| Replicate C | 1260.94 | 1344.10 | 1262.86 |
| Replicate D | 1245.49 | 1434.96 | 1251.49 |
| Replicate E | 1247.50 | 1332.49 | 1249.84 |

Comments:

~~116~~ 115

# CETIS Test Summary

Report Date: 19 Jul-06 10:46 AM
Test Link: 12-9834-0775/B157509psB

**Plant Bioassay - Chronic** — **CH2M Hill**

| | | | | | |
|---|---|---|---|---|---|
| **Test No:** | 08-5612-0296 | **Test Type:** | Plant Chronic | **Duration:** | N/A |
| **Start Date:** | 26 Apr-06 | **Protocol:** | ASTM E1963-02 (2002) | **Species:** | Poa sandbergii |
| **Ending Date:** | | **Dil Water:** | | **Source:** | |
| **Setup Date:** | 26 Apr-06 | **Brine:** | | | |

**Comments:** recalculated Height and Length data July 19, 2006

| | | | | | |
|---|---|---|---|---|---|
| **Sample No:** | 12-9621-5455 | **Code:** | B1580-03 | **Client:** | |
| **Sample Date:** | 24 Apr-06 | **Material:** | Soil | **Project:** | |
| **Receive Date:** | | **Source:** | Hanford | | |
| **Sample Age:** | 48h | **Station:** | | | |

**Comments:** J11K61

**Comparison Summary**

| Analysis | Endpoint | NOEL | LOEL | ChV | PMSD | Method |
|---|---|---|---|---|---|---|
| 03-0657-1184 | % Germination | 100 | > 100 | N/A | 35.39% | Wilcoxon Rank Sum Two-Sample |
| 11-5656-4800 | Average Height (mm) | 100 | > 100 | N/A | 25.14% | Equal Variance t Two-Sample |
| 09-3085-4123 | Average Length (mm) | < 100 | 100 | N/A | 12.88% | Equal Variance t Two-Sample |
| 08-8767-5701 | Average AG Wt (Wet, mg) | 100 | > 100 | N/A | 32.64% | Equal Variance t Two-Sample |
| 19-7714-3866 | Average AG Wt (Dry, mg) | 100 | > 100 | N/A | 28.89% | Equal Variance t Two-Sample |
| 12-3870-1618 | Average Root Wt. (Wet, mg | 100 | > 100 | N/A | 47.72% | Equal Variance t Two-Sample |
| 06-5691-4930 | Average Root Wt. (Dry, mg) | 100 | > 100 | N/A | 45.74% | Equal Variance t Two-Sample |
| 05-2112-4308 | Average Total Wt (Wet, mg | 100 | > 100 | N/A | 39.79% | Equal Variance t Two-Sample |
| 05-3755-9845 | Average Total Wt (Dry, mg) | 100 | > 100 | N/A | 31.57% | Equal Variance t Two-Sample |

# CETIS Test Summary

Report Date: 19 Jul-06 10:46 AM
Test Link: 12-9834-0775/B157509psB

**% Germination Summary**

| Conc-% | Control Type | Reps | Mean | Minimum | Maximum | SE | SD | CV |
|---|---|---|---|---|---|---|---|---|
| 0 | Artificial Soil/S | 5 | 0.88000 | 0.40000 | 1.00000 | 0.12000 | 0.26833 | 30.49% |
| 100 | | 5 | 0.80000 | 0.40000 | 1.00000 | 0.12649 | 0.28284 | 35.36% |

**Average Height (mm) Summary**

| Conc-% | Control Type | Reps | Mean | Minimum | Maximum | SE | SD | CV |
|---|---|---|---|---|---|---|---|---|
| 0. | Artificial Soil/S | 5 | 88.560 | 67 | 115.40 | 8.048 | 17.996 | 20.32% |
| 100 | | 5 | 93.260 | 71 | 121.5 | 8.8672 | 19.828 | 21.26% |

**Average Length (mm) Summary**

| Conc-% | Control Type | Reps | Mean | Minimum | Maximum | SE | SD | CV |
|---|---|---|---|---|---|---|---|---|
| 0 | Artificial Soil/S | 5 | 106.34 | 82.5 | 120 | 6.5745 | 14.701 | 13.82% |
| 100 | | 5 | 89.1 | 78 | 97 | 3.3172 | 7.4175 | 8.32% |

**Average AG Wt (Wet, mg) Summary**

| Conc-% | Control Type | Reps | Mean | Minimum | Maximum | SE | SD | CV |
|---|---|---|---|---|---|---|---|---|
| 0 | Artificial Soil/S | 5 | 34.197 | 19.960 | 53.208 | 5.3829 | 12.036 | 35.20% |
| 100 | | 5 | 34.365 | 23.903 | 38.784 | 2.6575 | 5.9424 | 17.29% |

**Average AG Wt (Dry, mg) Summary**

| Conc-% | Control Type | Reps | Mean | Minimum | Maximum | SE | SD | CV |
|---|---|---|---|---|---|---|---|---|
| 0 | Artificial Soil/S | 5 | 6.05361 | 4.14001 | 8.68201 | 0.81424 | 1.82070 | 30.08% |
| 100 | | 5 | 5.74654 | 4.08667 | 6.89600 | 0.47039 | 1.05183 | 18.30% |

**Average Root Wt. (Wet, mg) Summary**

| Conc-% | Control Type | Reps | Mean | Minimum | Maximum | SE | SD | CV |
|---|---|---|---|---|---|---|---|---|
| 0 | Artificial Soil/S | 5 | 36.242 | 13.590 | 65.054 | 8.4756 | 18.952 | 52.29% |
| 100 | | 5 | 39.097 | 27.720 | 51.072 | 3.8302 | 8.5646 | 21.91% |

**Average Root Wt. (Dry, mg) Summary**

| Conc-% | Control Type | Reps | Mean | Minimum | Maximum | SE | SD | CV |
|---|---|---|---|---|---|---|---|---|
| 0 | Artificial Soil/S | 5 | 1.53579 | 0.93500 | 2.67798 | 0.31159 | 0.69673 | 45.37% |
| 100 | | 5 | 1.24360 | 0.64001 | 1.95798 | 0.21354 | 0.47750 | 38.40% |

**Average Total Wt (Wet, mg) Summary**

| Conc-% | Control Type | Reps | Mean | Minimum | Maximum | SE | SD | CV |
|---|---|---|---|---|---|---|---|---|
| 0 | Artificial Soil/S | 5 | 70.439 | 33.550 | 118.26 | 13.727 | 30.694 | 43.58% |
| 100 | | 5 | 73.462 | 51.623 | 89.856 | 6.2262 | 13.922 | 18.95% |

**Average Total Wt (Dry, mg) Summary**

| Conc-% | Control Type | Reps | Mean | Minimum | Maximum | SE | SD | CV |
|---|---|---|---|---|---|---|---|---|
| 0 | Artificial Soil/S | 5 | 7.5894 | 5.0750 | 11.36 | 1.1021 | 2.4644 | 32.47% |
| 100 | | 5 | 6.9901 | 4.7267 | 8.854 | 0.6674 | 1.4924 | 21.35% |

# CETIS Test Summary

Report Date: 19 Jul-06 10:46 AM
Test Link: 12-9834-0775/B157509psB

**% Germination Detail**

| Conc-% | Control Type | Rep 1 | Rep 2 | Rep 3 | Rep 4 | Rep 5 |
|---|---|---|---|---|---|---|
| 0 | Artificial Soil/S | 1.00000 | 1.00000 | 0.40000 | 1.00000 | 1.00000 |
| 100 | | 1.00000 | 1.00000 | 0.60000 | 1.00000 | 0.40000 |

**Average Height (mm) Detail**

| Conc-% | Control Type | Rep 1 | Rep 2 | Rep 3 | Rep 4 | Rep 5 |
|---|---|---|---|---|---|---|
| 0 | Artificial Soil/S | 78.6 | 91 | 67 | 90.8000 | 115.400 |
| 100 | | 89 | 103.800 | 71 | 81 | 121.5 |

**Average Length (mm) Detail**

| Conc-% | Control Type | Rep 1 | Rep 2 | Rep 3 | Rep 4 | Rep 5 |
|---|---|---|---|---|---|---|
| 0 | Artificial Soil/S | 102.800 | 114.400 | 82.5 | 112 | 120 |
| 100 | | 97 | 89.2 | 78 | 86.8000 | 94.5 |

**Average AG Wt (Wet, mg) Detail**

| Conc-% | Control Type | Rep 1 | Rep 2 | Rep 3 | Rep 4 | Rep 5 |
|---|---|---|---|---|---|---|
| 0 | Artificial Soil/S | 30.4100 | 33.172 | 19.9600 | 34.2360 | 53.2080 |
| 100 | | 36.238 | 38.784 | 23.9034 | 36.648 | 36.25 |

**Average AG Wt (Dry, mg) Detail**

| Conc-% | Control Type | Rep 1 | Rep 2 | Rep 3 | Rep 4 | Rep 5 |
|---|---|---|---|---|---|---|
| 0 | Artificial Soil/S | 4.53401 | 6.62400 | 4.14001 | 6.28801 | 8.68201 |
| 100 | | 5.94800 | 6.89600 | 4.08667 | 6.26201 | 5.54004 |

**Average Root Wt. (Wet, mg) Detail**

| Conc-% | Control Type | Rep 1 | Rep 2 | Rep 3 | Rep 4 | Rep 5 |
|---|---|---|---|---|---|---|
| 0 | Artificial Soil/S | 33.3280 | 40.9320 | 13.5900 | 28.3060 | 65.054 |
| 100 | | 36.392 | 51.072 | 27.7200 | 37.8020 | 42.5 |

**Average Root Wt. (Dry, mg) Detail**

| Conc-% | Control Type | Rep 1 | Rep 2 | Rep 3 | Rep 4 | Rep 5 |
|---|---|---|---|---|---|---|
| 0 | Artificial Soil/S | 1.26801 | 1.68799 | 0.93500 | 1.10999 | 2.67798 |
| 100 | | 1.35000 | 1.95798 | 0.64001 | 1.10000 | 1.16998 |

**Average Total Wt (Wet, mg) Detail**

| Conc-% | Control Type | Rep 1 | Rep 2 | Rep 3 | Rep 4 | Rep 5 |
|---|---|---|---|---|---|---|
| 0 | Artificial Soil/S | 63.7380 | 74.1040 | 33.5500 | 62.5420 | 118.262 |
| 100 | | 72.63 | 89.856 | 51.6234 | 74.45 | 78.75 |

**Average Total Wt (Dry, mg) Detail**

| Conc-% | Control Type | Rep 1 | Rep 2 | Rep 3 | Rep 4 | Rep 5 |
|---|---|---|---|---|---|---|
| 0 | Artificial Soil/S | 5.80201 | 8.31199 | 5.07501 | 7.398 | 11.36 |
| 100 | | 7.298 | 8.85398 | 4.72668 | 7.36201 | 6.71002 |

# CETIS Analysis Detail

**Plant Bioassay - Chronic** — **CH2M Hill**

| Endpoint | Analysis Type | Sample Link | Control Link | Date Analyzed | Version |
|---|---|---|---|---|---|
| % Germination | Comparison | 12-9834-0775 | 12-9834-0775 | 19 Jul-06 10:46 AM | 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 | 35.39% |

**Group Comparisons**

| Control | vs | Conc-% | Statistic | Critical | P-Value | Ties | Decision(0.05) |
|---|---|---|---|---|---|---|---|
| Artificial Soil/Sedi | | 100 | 25.5 | | 0.3452 | 4 | Non-Significant Effect |

**ANOVA Table**

| Source | Sum of Squares | Mean Square | DF | F Statistic | P-Value | Decision(0.05) |
|---|---|---|---|---|---|---|
| Between | 0.021087 | 0.021087 | 1 | 0.23 | 0.64701 | Non-Significant Effect |
| Error | 0.7455132 | 0.093189 | 8 | | | |
| Total | 0.7666002 | 0.1142761 | 9 | | | |

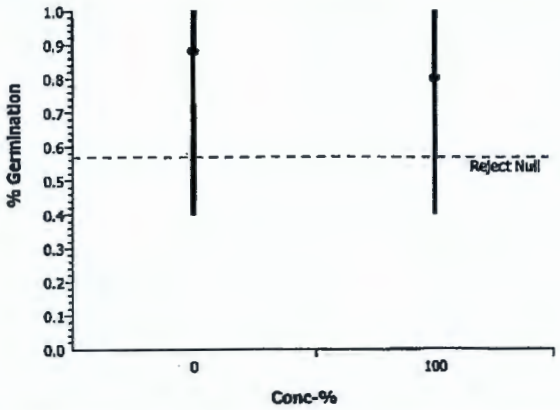
**ANOVA Assumptions**

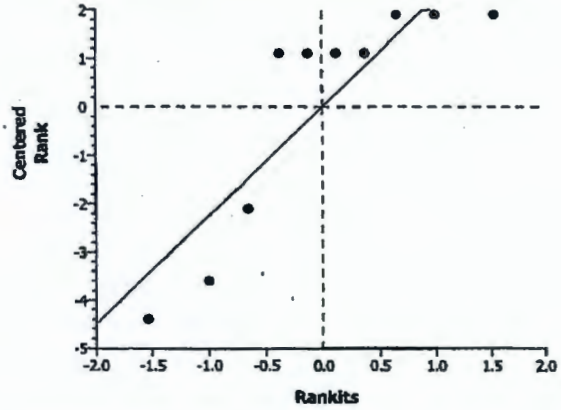
| Attribute | Test | Statistic | Critical | P-Value | Decision(0.01) |
|---|---|---|---|---|---|
| Variances | Variance Ratio F | 1.13568 | 23.15450 | 0.90483 | Equal Variances |
| Distribution | Shapiro-Wilk W | 0.74930 | | 0.00350 | Non-normal Distribution |

**Data Summary**

| | | | Original Data | | | | Transformed Data | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Conc-% | Control Type | Count | Mean | Minimum | Maximum | SD | Mean | Minimum | Maximum | SD |
| 0 | Artificial Soil/S | 5 | 0.88000 | 0.40000 | 1.00000 | 0.26833 | 5.90000 | 1.50000 | 7.00000 | 2.45967 |
| 100 | | 5 | 0.80000 | 0.40000 | 1.00000 | 0.28284 | 5.10000 | 1.50000 | 7.00000 | 2.65518 |

**Graphics**



# CETIS Analysis Detail

**Plant Bioassay - Chronic** — **CH2M Hill**

| Endpoint | Analysis Type | Sample Link | Control Link | Date Analyzed | Version |
|---|---|---|---|---|---|
| Average Height (mm) | Comparison | 12-9834-0775 | 12-9834-0775 | 19 Jul-06 10:46 AM | 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 | 25.14% |

**Group Comparisons**

| Control vs | Conc-% | Statistic | Critical | P-Value | MSD | Decision(0.05) |
|---|---|---|---|---|---|---|
| Artificial Soil/Sedi | 100 | -0.3925 | 1.85955 | 0.6475 | 22.2678 | Non-Significant Effect |

**ANOVA Table**

| Source | Sum of Squares | Mean Square | DF | F Statistic | P-Value | Decision(0.05) |
|---|---|---|---|---|---|---|
| Between | 55.225 | 55.225 | 1 | 0.15 | 0.70495 | Non-Significant Effect |
| Error | 2867.944 | 358.493 | 8 | | | |
| Total | 2923.16909 | 413.71801 | 9 | | | |

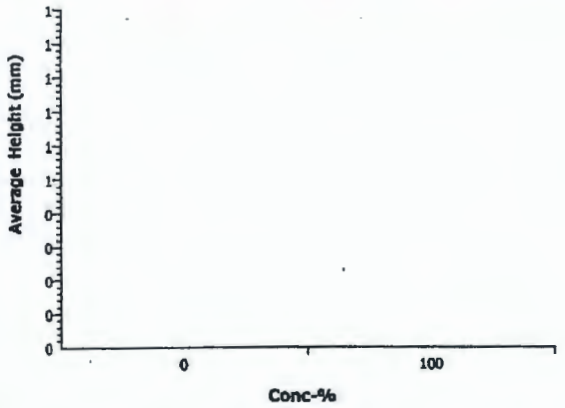
**ANOVA Assumptions**

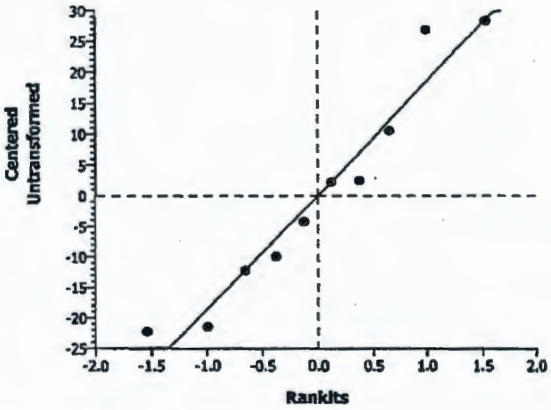
| Attribute | Test | Statistic | Critical | P-Value | Decision(0.01) |
|---|---|---|---|---|---|
| Variances | Variance Ratio F | 1.21396 | 23.15450 | 0.85549 | Equal Variances |
| Distribution | Shapiro-Wilk W | 0.92713 | | 0.42027 | Normal Distribution |

**Data Summary**

| | | | Original Data | | | | Transformed Data | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Conc-% | Control Type | Count | Mean | Minimum | Maximum | SD | Mean | Minimum | Maximum | SD |
| 0 | Artificial Soil/S | 5 | 88.560 | 67 | 115.4 | 17.996 | | | | |
| 100 | | 5 | 93.260 | 71 | 121.5 | 19.828 | | | | |

**Graphics**



# CETIS Analysis Detail

**Plant Bioassay - Chronic** — **CH2M Hill**

| Endpoint | Analysis Type | Sample Link | Control Link | Date Analyzed | Version |
|---|---|---|---|---|---|
| Average Length (mm) | Comparison | 12-9834-0775 | 12-9834-0775 | 19 Jul-06 10:46 AM | 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 | 12.88% |

**Group Comparisons**

| Control | vs | Conc-% | Statistic | Critical | P-Value | MSD | Decision(0.05) |
|---|---|---|---|---|---|---|---|
| Artificial Soil/Sedi | | 100 | 2.34114 | 1.85955 | 0.0237 | 13.6936 | Significant Effect |

**ANOVA Table**

| Source | Sum of Squares | Mean Square | DF | F Statistic | P-Value | Decision(0.05) |
|---|---|---|---|---|---|---|
| Between | 743.0441 | 743.0441 | 1 | 5.48 | 0.04733 | Significant Effect |
| Error | 1084.552 | 135.569 | 8 | | | |
| Total | 1827.59607 | 878.61307 | 9 | | | |

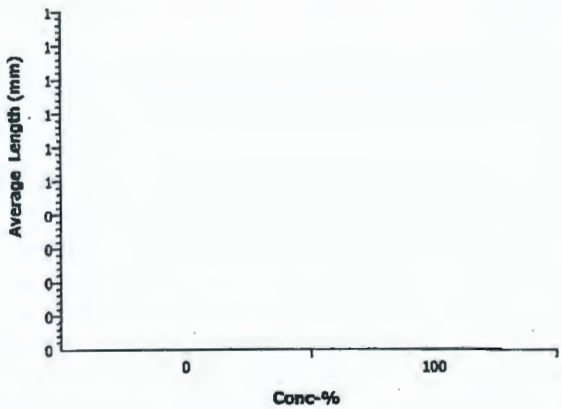
**ANOVA Assumptions**

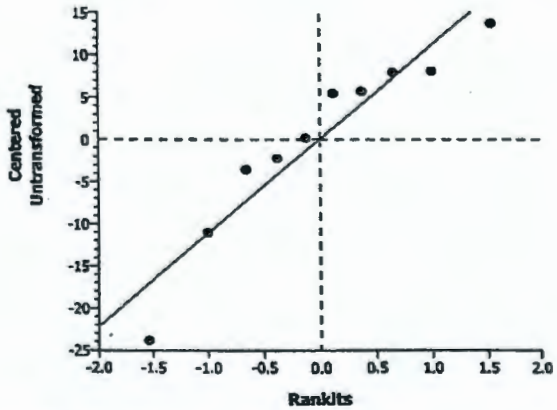
| Attribute | Test | Statistic | Critical | P-Value | Decision(0.01) |
|---|---|---|---|---|---|
| Variances | Variance Ratio F | 3.92799 | 23.15450 | 0.21364 | Equal Variances |
| Distribution | Shapiro-Wilk W | 0.91254 | | 0.29888 | Normal Distribution |

**Data Summary**

| | | | Original Data | | | | Transformed Data | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Conc-% | Control Type | Count | Mean | Minimum | Maximum | SD | Mean | Minimum | Maximum | SD |
| 0 | Artificial Soil/S | 5 | 106.34 | 82.5 | 120 | 14.701 | | | | |
| 100 | | 5 | 89.1 | 78 | 97 | 7.4176 | | | | |

**Graphics**



# CETIS Analysis Detail

**Plant Bioassay - Chronic** — **CH2M Hill**

| Endpoint | Analysis Type | Sample Link | Control Link | Date Analyzed | Version |
|---|---|---|---|---|---|
| Average AG Wt (Wet, mg) | Comparison | 12-9834-0775 | 12-9834-0775 | 19 Jul-06 10:46 AM | 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 | 32.64% |

**Group Comparisons**

| Control vs | Conc-% | Statistic | Critical | P-Value | MSD | Decision(0.05) |
|---|---|---|---|---|---|---|
| Artificial Soil/Sedi | 100 | -0.0279 | 1.85955 | 0.5108 | 11.1631 | Non-Significant Effect |

**ANOVA Table**

| Source | Sum of Squares | Mean Square | DF | F Statistic | P-Value | Decision(0.05) |
|---|---|---|---|---|---|---|
| Between | 0.0701045 | 0.070104 | 1 | 0.00 | 0.97843 | Non-Significant Effect |
| Error | 720.7501 | 90.09377 | 8 | | | |
| Total | 720.820227 | 90.16387 | 9 | | | |

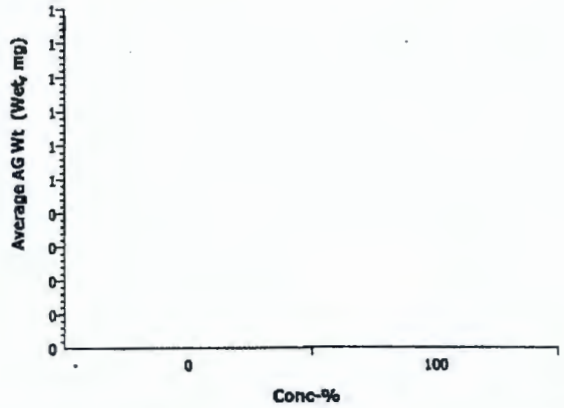
**ANOVA Assumptions**

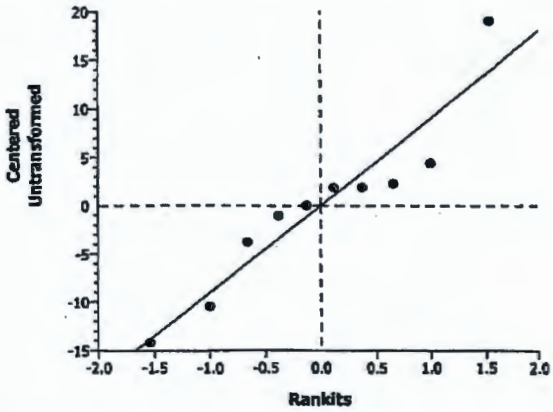
| Attribute | Test | Statistic | Critical | P-Value | Decision(0.01) |
|---|---|---|---|---|---|
| Variances | Variance Ratio F | 4.10277 | 23.15450 | 0.20032 | Equal Variances |
| Distribution | Shapiro-Wilk W | 0.91656 | | 0.32912 | Normal Distribution |

**Data Summary**

| | | | Original Data | | | | Transformed Data | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Conc-% | Control Type | Count | Mean | Minimum | Maximum | SD | Mean | Minimum | Maximum | SD |
| 0 | Artificial Soil/S | 5 | 34.197 | 19.960 | 53.208 | 12.036 | | | | |
| 100 | | 5 | 34.365 | 23.903 | 38.784 | 5.9424 | | | | |

**Graphics**



# CETIS Analysis Detail

**Plant Bioassay - Chronic** — **CH2M Hill**

| Endpoint | Analysis Type | Sample Link | Control Link | Date Analyzed | Version |
|---|---|---|---|---|---|
| Average AG Wt (Dry, mg) | Comparison | 12-9834-0775 | 12-9834-0775 | 19 Jul-06 10:46 AM | 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 | 28.89% |

**Group Comparisons**

| Control | vs | Conc-% | Statistic | Critical | P-Value | MSD | Decision(0.05) |
|---|---|---|---|---|---|---|---|
| Artificial Soil/Sedi | | 100 | 0.32654 | 1.85955 | 0.3762 | 1.74863 | Non-Significant Effect |

**ANOVA Table**

| Source | Sum of Squares | Mean Square | DF | F Statistic | P-Value | Decision(0.05) |
|---|---|---|---|---|---|---|
| Between | 0.235723 | 0.235723 | 1 | 0.11 | 0.75239 | Non-Significant Effect |
| Error | 17.68515 | 2.210644 | 8 | | | |
| Total | 17.9208732 | 2.4463668 | 9 | | | |

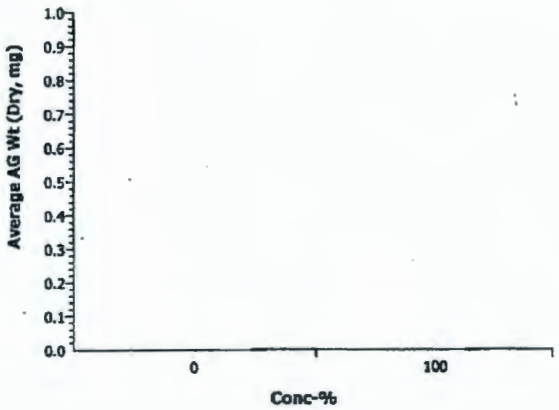
**ANOVA Assumptions**

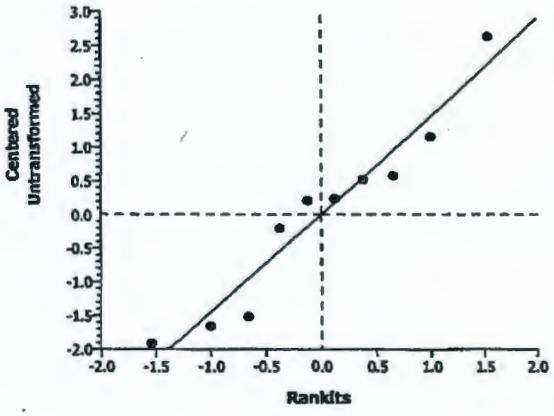
| Attribute | Test | Statistic | Critical | P-Value | Decision(0.01) |
|---|---|---|---|---|---|
| Variances | Variance Ratio F | 2.99632 | 23.15450 | 0.31302 | Equal Variances |
| Distribution | Shapiro-Wilk W | 0.93571 | | 0.50637 | Normal Distribution |

**Data Summary**

| | | | Original Data | | | | Transformed Data | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Conc-% | Control Type | Count | Mean | Minimum | Maximum | SD | Mean | Minimum | Maximum | SD |
| 0 | Artificial Soil/S | 5 | 6.05361 | 4.14001 | 8.68201 | 1.82070 | | | | |
| 100 | | 5 | 5.74654 | 4.08667 | 6.89600 | 1.05183 | | | | |

**Graphics**



# CETIS Analysis Detail

**Plant Bioassay - Chronic** — **CH2M Hill**

| Endpoint | Analysis Type | Sample Link | Control Link | Date Analyzed | Version |
|---|---|---|---|---|---|
| Average Root Wt. (Wet, mg) | Comparison | 12-9834-0775 | 12-9834-0775 | 19 Jul-06 10:46 AM | 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 | 47.72% |

**Group Comparisons**

| Control | vs | Conc-% | Statistic | Critical | P-Value | MSD | Decision(0.05) |
|---|---|---|---|---|---|---|---|
| Artificial Soil/Sedi | | 100 | -0.307 | 1.85955 | 0.6167 | 17.2954 | Non-Significant Effect |

**ANOVA Table**

| Source | Sum of Squares | Mean Square | DF | F Statistic | P-Value | Decision(0.05) |
|---|---|---|---|---|---|---|
| Between | 20.38033 | 20.38033 | 1 | 0.09 | 0.76670 | Non-Significant Effect |
| Error | 1730.12 | 216.2651 | 8 | | | |
| Total | 1750.50082 | 236.64539 | 9 | | | |

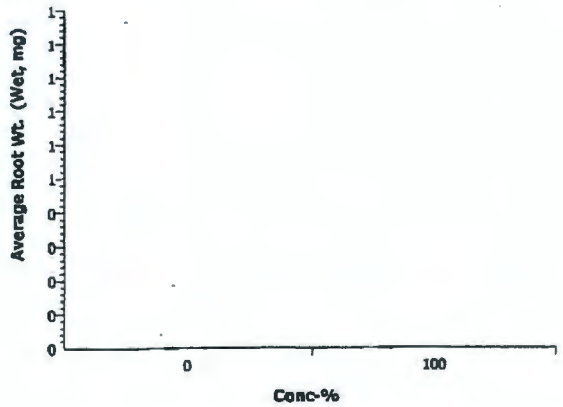
**ANOVA Assumptions**

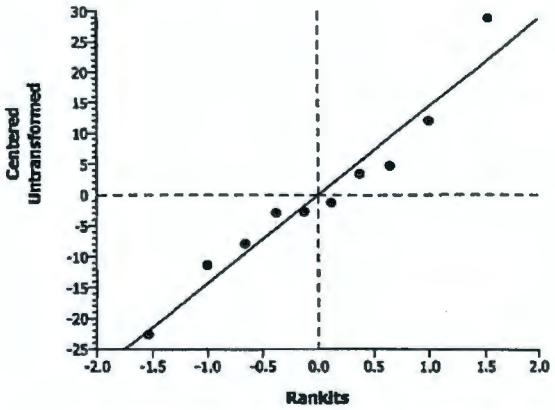
| Attribute | Test | Statistic | Critical | P-Value | Decision(0.01) |
|---|---|---|---|---|---|
| Variances | Variance Ratio F | 4.89658 | 23.15450 | 0.15305 | Equal Variances |
| Distribution | Shapiro-Wilk W | 0.95962 | | 0.78153 | Normal Distribution |

**Data Summary**

| | | | Original Data | | | | Transformed Data | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Conc-% | Control Type | Count | Mean | Minimum | Maximum | SD | Mean | Minimum | Maximum | SD |
| 0 | Artificial Soil/S | 5 | 36.242 | 13.590 | 65.054 | 18.952 | | | | |
| 100 | | 5 | 39.097 | 27.720 | 51.072 | 8.5646 | | | | |

**Graphics**



# CETIS Analysis Detail

**Plant Bioassay - Chronic** — **CH2M Hill**

| Endpoint | Analysis Type | Sample Link | Control Link | Date Analyzed | Version |
|---|---|---|---|---|---|
| Average Root Wt. (Dry, mg) | Comparison | 12-9834-0775 | 12-9834-0775 | 19 Jul-06 10:46 AM | 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 | 45.74% |

**Group Comparisons**

| Control | vs | Conc-% | Statistic | Critical | P-Value | MSD | Decision(0.05) |
|---|---|---|---|---|---|---|---|
| Artificial Soil/Sedi | | 100 | 0.77353 | 1.85955 | 0.2307 | 0.70243 | Non-Significant Effect |

**ANOVA Table**

| Source | Sum of Squares | Mean Square | DF | F Statistic | P-Value | Decision(0.05) |
|---|---|---|---|---|---|---|
| Between | 0.2134445 | 0.213445 | 1 | 0.60 | 0.46145 | Non-Significant Effect |
| Error | 2.853749 | 0.356719 | 8 | | | |
| Total | 3.06719357 | 0.5701632 | 9 | | | |

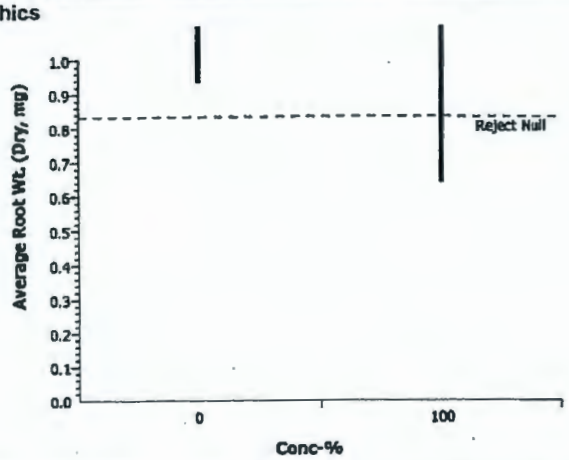
**ANOVA Assumptions**

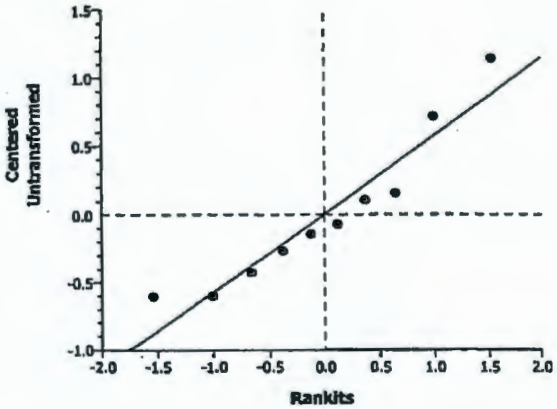
| Attribute | Test | Statistic | Critical | P-Value | Decision(0.01) |
|---|---|---|---|---|---|
| Variances | Variance Ratio F | 2.12904 | 23.15450 | 0.48225 | Equal Variances |
| Distribution | Shapiro-Wilk W | 0.90479 | | 0.24709 | Normal Distribution |

**Data Summary**

| | | | Original Data | | | | Transformed Data | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Conc-% | Control Type | Count | Mean | Minimum | Maximum | SD | Mean | Minimum | Maximum | SD |
| 0 | Artificial Soil/S | 5 | 1.53579 | 0.93500 | 2.67798 | 0.69673 | | | | |
| 100 | | 5 | 1.24360 | 0.64001 | 1.95798 | 0.47750 | | | | |

**Graphics**



# CETIS Analysis Detail

**Plant Bioassay - Chronic** — **CH2M Hill**

| Endpoint | Analysis Type | Sample Link | Control Link | Date Analyzed | Version |
|---|---|---|---|---|---|
| Average Total Wt (Wet, mg) | Comparison | 12-9834-0775 | 12-9834-0775 | 19 Jul-06 10:46 AM | 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 | 39.79% |

**Group Comparisons**

| Control | vs | Conc-% | Statistic | Critical | P-Value | MSD | Decision(0.05) |
|---|---|---|---|---|---|---|---|
| Artificial Soil/Sedi | | 100 | -0.2005 | 1.85955 | 0.5770 | 28.0288 | Non-Significant Effect |

**ANOVA Table**

| Source | Sum of Squares | Mean Square | DF | F Statistic | P-Value | Decision(0.05) |
|---|---|---|---|---|---|---|
| Between | 22.84103 | 22.84103 | 1 | 0.04 | 0.84607 | Non-Significant Effect |
| Error | 4543.85 | 567.9813 | 8 | | | |
| Total | 4566.69113 | 590.8223 | 9 | | | |

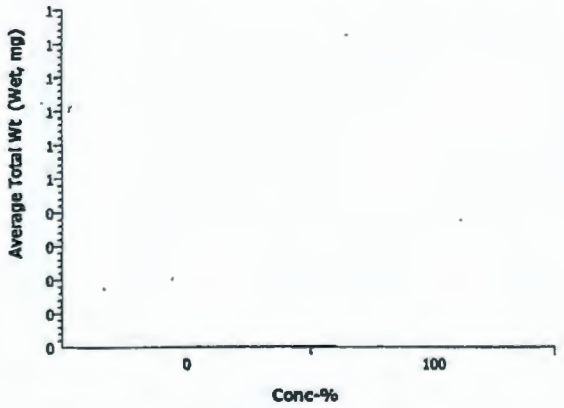
**ANOVA Assumptions**

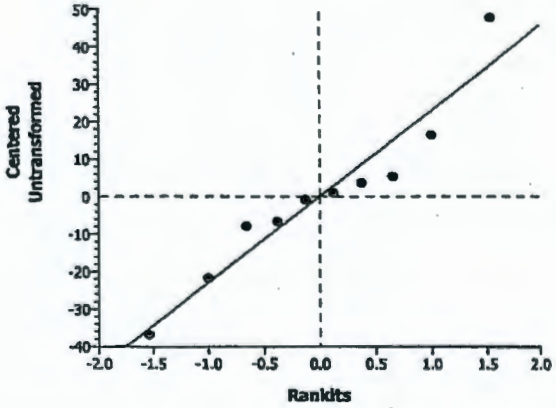
| Attribute | Test | Statistic | Critical | P-Value | Decision(0.01) |
|---|---|---|---|---|---|
| Variances | Variance Ratio F | 4.86062 | 23.15450 | 0.15482 | Equal Variances |
| Distribution | Shapiro-Wilk W | 0.93987 | | 0.55153 | Normal Distribution |

**Data Summary**

| | | | Original Data | | | | Transformed Data | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Conc-% | Control Type | Count | Mean | Minimum | Maximum | SD | Mean | Minimum | Maximum | SD |
| 0 | Artificial Soil/S | 5 | 70.439 | 33.550 | 118.26 | 30.694 | | | | |
| 100 | | 5 | 73.462 | 51.623 | 89.856 | 13.922 | | | | |

**Graphics**



# CETIS Analysis Detail

**Plant Bioassay - Chronic** — **CH2M Hill**

| Endpoint | Analysis Type | Sample Link | Control Link | Date Analyzed | Version |
|---|---|---|---|---|---|
| Average Total Wt (Dry, mg) | Comparison | 12-9834-0775 | 12-9834-0775 | 19 Jul-06 10:46 AM | 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 | 31.57% |

**Group Comparisons**

| Control | vs | Conc-% | Statistic | Critical | P-Value | MSD | Decision(0.05) |
|---|---|---|---|---|---|---|---|
| Artificial Soil/Sedi | | 100 | 0.46510 | 1.85955 | 0.3271 | 2.39592 | Non-Significant Effect |

**ANOVA Table**

| Source | Sum of Squares | Mean Square | DF | F Statistic | P-Value | Decision(0.05) |
|---|---|---|---|---|---|---|
| Between | 0.8977821 | 0.897782 | 1 | 0.22 | 0.65425 | Non-Significant Effect |
| Error | 33.20163 | 4.150204 | 8 | | | |
| Total | 34.0994155 | 5.0479863 | 9 | | | |

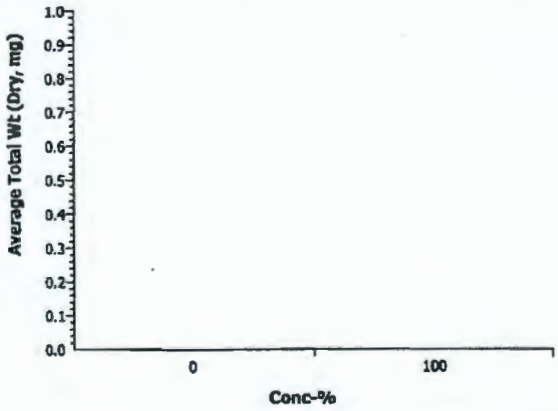
**ANOVA Assumptions**

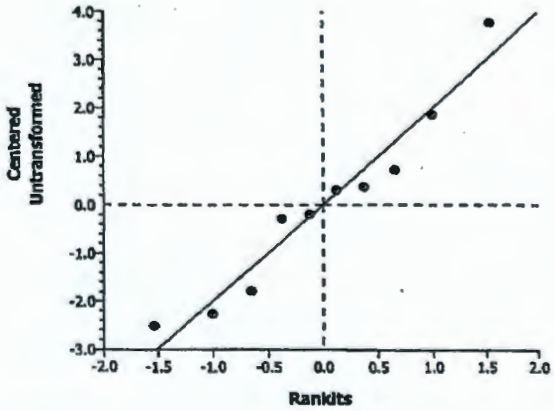
| Attribute | Test | Statistic | Critical | P-Value | Decision(0.01) |
|---|---|---|---|---|---|
| Variances | Variance Ratio F | 2.72689 | 23.15450 | 0.35470 | Equal Variances |
| Distribution | Shapiro-Wilk W | 0.94508 | | 0.61078 | Normal Distribution |

**Data Summary**

| | | | Original Data | | | | Transformed Data | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Conc-% | Control Type | Count | Mean | Minimum | Maximum | SD | Mean | Minimum | Maximum | SD |
| 0 | Artificial Soil/S | 5 | 7.5894 | 5.0750 | 11.36 | 2.4644 | | | | |
| 100 | | 5 | 6.9901 | 4.7267 | 8.854 | 1.4924 | | | | |

**Graphics**



# BLUEGRASS GROWTH TEST

Client: Washington Closure Hanford Project

Test Start Date: 4-26-06

Initials: Day 0 VB Day 12 _____ Day 14 NJ Day 16 NJ Day 19 JP Day 21 NJ Day 23 NJ Day 28 NJ Day 30 [illegible]

Bioassay Lab ID: BG 1575- 10 Sample No: J11K40

| CONC. | REPLICATE | # seeds germinated: Emergence: 12 days after planting | 14 days after planting | 16 days after planting | 18 days after planting | 21 days after planting | 23 days after planting | 7-DAYS POST-EMERGENCE (28 days after planting) | 14-DAYS POST-EMERGENCE (35 days after planting) | pH: INITIAL (@ planting) | FINAL (@ 14 days Post-Emergence) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Control | A | | 3 | 3 | 3 | 3 | 3 | 4 | 4 | 6.4 | 6.9 |
| | B | | 1 | 2 | 3 | 3 | 3 | 3 | 3 | | |
| | C | | 5 | 5 | 6 | 6 | 6 | 5 | 5 | | |
| | D | | 3 | 5 | 8 | 8 | 8 | 5 | 5 | | |
| | E | | 2 | 2 | 3 | 3 | 3 | 3 | 3 | | |

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

Replicate A 1lg G, 2 md G w/1 brown shoot, 1sm G

Replicate B 2lg G, 1md G

Replicate C 4lg G, 2 1md G Removed-1md G

Replicate D 1lg G, 4md G . Removed- 2md G + 1sm G w/1B tip

Replicate E 2lg G w/1B tip, 1md G

Appearance Code: Good (G) = deep green color with no brown, Brown (B) = brown color noted, # Lg = # of large plants (tallest, 6+ shoots), # Med = # of plants (smaller than large, fewer shoots), # Sm = # small plants (1-3 shoots)

14-Days Post-Emergence: Describe shoot appearance:

Replicate A 1 Lg w/ 3 B shoots, 2 md G, 1 Sm G

Replicate B 2 Lg G, 1 Md G

Replicate C 2 Lg G w/ 1 B shoot 3 Lg G

Replicate D 1 Lg w/ 1B shoot, 1 med 1 1B shoot, 3 med G

Replicate E 1 Lg w/ 2 B shoots, 2 med G

Measure Shoot Height:

Individual height of each seedling (above ground)

| | 1st Seedling | 2nd Seedling | 3rd Seedling | 4th Seedling | 5th Seedling |
|---|---|---|---|---|---|
| Replicate A | 52 mm | 84 mm | 52 mm | 106 mm | mm |
| Replicate B | 111 mm | 64 mm | 95 mm | mm | mm |
| Replicate C | 83 mm | 84 mm | 95 mm | 100 mm | 110 mm |
| Replicate D | 85 mm | 69 mm | 70 mm | 83 mm | 133 mm |
| Replicate E | 71 mm | 89 mm | 86 mm | mm | mm |

Measure Shoot Weight:

Total mass of all seedlings (above ground)

| | Tin Tare Wt. (mg) | Wet Wt (mg) | Dry Wt. (mg) |
|---|---|---|---|
| Replicate A | 1018.85 | 1109.9 | 1034.61 |
| Replicate B | 989.91 | 1069.9 | 1002.57 |
| Replicate C | 1009.75 | 1193.7 | 1039.62 |
| Replicate D | 995.16 | 1169.8 | 1024.80 |
| Replicate E | 995.56 | 1182.8 | 1015.03 |

Describe root appearance:

Replicate A

Replicate B

Replicate C

Replicate D

Replicate E

Measure Root Length:

Individual length of the longest root from each seedling

| | 1st Seedling | 2nd Seedling | 3rd Seedling | 4th Seedling | 5th Seedling |
|---|---|---|---|---|---|
| Replicate A | 47 mm | 116 mm | 31 mm | 30 mm | mm |
| Replicate B | 70 mm | 82 mm | 51 mm | mm | mm |
| Replicate C | 66 mm | 87 mm | 116 mm | 132 mm | 66 mm |
| Replicate D | 80 mm | 110 mm | 64 mm | 48 mm | 75 mm |
| Replicate E | 152 mm | 116 mm | 59 mm | mm | mm |

Measure Root Weight:

Total mass of all roots from all seedlings

| | Tin Tare Wt. (mg) | Wet Wt (mg) | Dry Wt. (mg) |
|---|---|---|---|
| Replicate A | 995.71 | 1082.0 | 999.71 |
| Replicate B | 989.80 | 1060.3 | 993.16 |
| Replicate C | 1003.94 | 1199.5 | 1012.74 |
| Replicate D | 991.11 | 1201.5 | 998.96 |
| Replicate E | 1242.74 | 1383.7 | 1251.42 |

Comments:

# CETIS Test Summary

Report Date: 19 Jul-06 10:55 AM
Test Link: 04-5366-5275/B157510psB

**Plant Bioassay - Chronic** — **CH2M Hill**

| | | | | | |
|---|---|---|---|---|---|
| **Test No:** | 16-5408-0141 | **Test Type:** | Plant Chronic | **Duration:** | N/A |
| **Start Date:** | 26 Apr-06 | **Protocol:** | ASTM E1963-02 (2002) | **Species:** | Poa sandbergii |
| **Ending Date:** | | **Dil Water:** | | **Source:** | |
| **Setup Date:** | 26 Apr-06 | **Brine:** | | | |

**Comments:** recalculated Height and Length data July 19, 2006

| | | | | | |
|---|---|---|---|---|---|
| **Sample No:** | 02-2878-1148 | **Code:** | B1580-04 | **Client:** | |
| **Sample Date:** | 25 Apr-06 | **Material:** | Soil | **Project:** | |
| **Receive Date:** | | **Source:** | Hanford | | |
| **Sample Age:** | 24h | **Station:** | | | |

**Comments:** J11K40

**Comparison Summary**

| Analysis | Endpoint | NOEL | LOEL | ChV | PMSD | Method |
|---|---|---|---|---|---|---|
| 11-8667-5158 | % Germination | 100 | > 100 | N/A | 30.05% | Equal Variance t Two-Sample |
| 21-3036-3807 | Average Height (mm) | 100 | > 100 | N/A | 18.76% | Equal Variance t Two-Sample |
| 16-3471-0962 | Average Length (mm) | < 100 | 100 | N/A | 20.06% | Equal Variance t Two-Sample |
| 12-6467-2807 | Average AG Wt (Wet, mg) | 100 | > 100 | N/A | 47.70% | Equal Variance t Two-Sample |
| 02-2964-9778 | Average AG Wt (Dry, mg) | 100 | > 100 | N/A | 29.58% | Equal Variance t Two-Sample |
| 06-1575-1703 | Average Root Wt. (Wet, mg | 100 | > 100 | N/A | 50.78% | Equal Variance t Two-Sample |
| 16-6561-4323 | Average Root Wt. (Dry, mg) | 100 | > 100 | N/A | 55.54% | Equal Variance t Two-Sample |
| 14-3220-8722 | Average Total Wt (Wet, mg | 100 | > 100 | N/A | 47.40% | Equal Variance t Two-Sample |
| 12-5776-1422 | Average Total Wt (Dry, mg) | 100 | > 100 | N/A | 33.67% | Equal Variance t Two-Sample |

# CETIS Test Summary

Report Date: 19 Jul-06 10:55 AM
Test Link: 04-5366-5275/B157510psB

**% Germination Summary**

| Conc-% | Control Type | Reps | Mean | Minimum | Maximum | SE | SD | CV |
|---|---|---|---|---|---|---|---|---|
| 0 | Artificial Soil/S | 5 | 0.88000 | 0.40000 | 1.00000 | 0.12000 | 0.26833 | 30.49% |
| 100 | | 5 | 0.80000 | 0.60000 | 1.00000 | 0.08944 | 0.20000 | 25.00% |

**Average Height (mm) Summary**

| Conc-% | Control Type | Reps | Mean | Minimum | Maximum | SE | SD | CV |
|---|---|---|---|---|---|---|---|---|
| 0 | Artificial Soil/S | 5 | 88.560 | 67 | 115.40 | 8.048 | 17.996 | 20.32% |
| 100 | | 5 | 86.380 | 73.5 | 95.400 | 3.8787 | 8.6731 | 10.04% |

**Average Length (mm) Summary**

| Conc-% | Control Type | Reps | Mean | Minimum | Maximum | SE | SD | CV |
|---|---|---|---|---|---|---|---|---|
| 0 | Artificial Soil/S | 5 | 106.34 | 82.5 | 120 | 6.5745 | 14.701 | 13.82% |
| 100 | | 5 | 80.3 | 56 | 109 | 9.4036 | 21.027 | 26.19% |

**Average AG Wt (Wet, mg) Summary**

| Conc-% | Control Type | Reps | Mean | Minimum | Maximum | SE | SD | CV |
|---|---|---|---|---|---|---|---|---|
| 0 | Artificial Soil/S | 5 | 34.197 | 19.960 | 53.208 | 5.3829 | 12.036 | 35.20% |
| 100 | | 5 | 36.711 | 22.763 | 62.413 | 6.9257 | 15.486 | 42.18% |

**Average AG Wt (Dry, mg) Summary**

| Conc-% | Control Type | Reps | Mean | Minimum | Maximum | SE | SD | CV |
|---|---|---|---|---|---|---|---|---|
| 0 | Artificial Soil/S | 5 | 6.05361 | 4.14001 | 8.68201 | 0.81424 | 1.82070 | 30.08% |
| 100 | | 5 | 5.31041 | 3.94000 | 6.49001 | 0.51382 | 1.14894 | 21.64% |

**Average Root Wt. (Wet, mg) Summary**

| Conc-% | Control Type | Reps | Mean | Minimum | Maximum | SE | SD | CV |
|---|---|---|---|---|---|---|---|---|
| 0 | Artificial Soil/S | 5 | 36.242 | 13.590 | 65.054 | 8.4756 | 18.952 | 52.29% |
| 100 | | 5 | 34.65 | 21.572 | 46.987 | 5.1119 | 11.430 | 32.99% |

**Average Root Wt. (Dry, mg) Summary**

| Conc-% | Control Type | Reps | Mean | Minimum | Maximum | SE | SD | CV |
|---|---|---|---|---|---|---|---|---|
| 0 | Artificial Soil/S | 5 | 1.53579 | 0.93500 | 2.67798 | 0.31159 | 0.69673 | 45.37% |
| 100 | | 5 | 1.66867 | 1.00000 | 2.89335 | 0.33661 | 0.75268 | 45.11% |

**Average Total Wt (Wet, mg) Summary**

| Conc-% | Control Type | Reps | Mean | Minimum | Maximum | SE | SD | CV |
|---|---|---|---|---|---|---|---|---|
| 0 | Artificial Soil/S | 5 | 70.439 | 33.550 | 118.26 | 13.727 | 30.694 | 43.58% |
| 100 | | 5 | 71.361 | 44.335 | 109.4 | 11.574 | 25.880 | 36.27% |

**Average Total Wt (Dry, mg) Summary**

| Conc-% | Control Type | Reps | Mean | Minimum | Maximum | SE | SD | CV |
|---|---|---|---|---|---|---|---|---|
| 0 | Artificial Soil/S | 5 | 7.5894 | 5.0750 | 11.36 | 1.1021 | 2.4644 | 32.47% |
| 100 | | 5 | 6.9791 | 4.9400 | 9.3834 | 0.8205 | 1.8347 | 26.29% |

# CETIS Test Summary

Report Date: 19 Jul-06 10:55 AM
Test Link: 04-5366-5275/B157510psB

**% Germination Detail**

| Conc-% | Control Type | Rep 1 | Rep 2 | Rep 3 | Rep 4 | Rep 5 |
|---|---|---|---|---|---|---|
| 0 | Artificial Soil/S | 1.00000 | 1.00000 | 0.40000 | 1.00000 | 1.00000 |
| 100 | | 0.80000 | 0.60000 | 1.00000 | 1.00000 | 0.60000 |

**Average Height (mm) Detail**

| Conc-% | Control Type | Rep 1 | Rep 2 | Rep 3 | Rep 4 | Rep 5 |
|---|---|---|---|---|---|---|
| 0 | Artificial Soil/S | 78.6 | 91 | 67 | 90.8000 | 115.400 |
| 100 | | 73.5 | 90 | 95.4000 | 91 | 82 |

**Average Length (mm) Detail**

| Conc-% | Control Type | Rep 1 | Rep 2 | Rep 3 | Rep 4 | Rep 5 |
|---|---|---|---|---|---|---|
| 0 | Artificial Soil/S | 102.800 | 114.400 | 82.5 | 112 | 120 |
| 100 | | 56 | 67.7 | 93.4000 | 75.4000 | 109 |

**Average AG Wt (Wet, mg) Detail**

| Conc-% | Control Type | Rep 1 | Rep 2 | Rep 3 | Rep 4 | Rep 5 |
|---|---|---|---|---|---|---|
| 0 | Artificial Soil/S | 30.4100 | 33.172 | 19.9600 | 34.2360 | 53.2080 |
| 100 | | 22.7625 | 26.6634 | 36.79 | 34.9280 | 62.4133 |

**Average AG Wt (Dry, mg) Detail**

| Conc-% | Control Type | Rep 1 | Rep 2 | Rep 3 | Rep 4 | Rep 5 |
|---|---|---|---|---|---|---|
| 0 | Artificial Soil/S | 4.53401 | 6.62400 | 4.14001 | 6.28801 | 8.68201 |
| 100 | | 3.94000 | 4.22001 | 5.97400 | 5.92802 | 6.49001 |

**Average Root Wt. (Wet, mg) Detail**

| Conc-% | Control Type | Rep 1 | Rep 2 | Rep 3 | Rep 4 | Rep 5 |
|---|---|---|---|---|---|---|
| 0 | Artificial Soil/S | 33.3280 | 40.9320 | 13.5900 | 28.3060 | 65.054 |
| 100 | | 21.5725 | 23.5000 | 39.112 | 42.0780 | 46.9867 |

**Average Root Wt. (Dry, mg) Detail**

| Conc-% | Control Type | Rep 1 | Rep 2 | Rep 3 | Rep 4 | Rep 5 |
|---|---|---|---|---|---|---|
| 0 | Artificial Soil/S | 1.26801 | 1.68799 | 0.93500 | 1.10999 | 2.67798 |
| 100 | | 1.00000 | 1.12000 | 1.76000 | 1.57001 | 2.89335 |

**Average Total Wt (Wet, mg) Detail**

| Conc-% | Control Type | Rep 1 | Rep 2 | Rep 3 | Rep 4 | Rep 5 |
|---|---|---|---|---|---|---|
| 0 | Artificial Soil/S | 63.7380 | 74.1040 | 33.5500 | 62.5420 | 118.262 |
| 100 | | 44.3350 | 50.1633 | 75.902 | 77.0060 | 109.4 |

**Average Total Wt (Dry, mg) Detail**

| Conc-% | Control Type | Rep 1 | Rep 2 | Rep 3 | Rep 4 | Rep 5 |
|---|---|---|---|---|---|---|
| 0 | Artificial Soil/S | 5.80201 | 8.31199 | 5.07501 | 7.398 | 11.36 |
| 100 | | 4.94000 | 5.34001 | 7.734 | 7.49802 | 9.38338 |

# CETIS Analysis Detail

**Plant Bioassay - Chronic** — **CH2M Hill**

| Endpoint | Analysis Type | Sample Link | Control Link | Date Analyzed | Version |
|---|---|---|---|---|---|
| % Germination | Comparison | 04-5366-5275 | 04-5366-5275 | 19 Jul-06 10:54 AM | 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 | 30.05% |

**Group Comparisons**

| Control | vs | Conc-% | Statistic | Critical | P-Value | MSD | Decision(0.05) |
|---|---|---|---|---|---|---|---|
| Artificial Soil/Sedi | | 100 | 0.59281 | 1.85955 | 0.2848 | 0.31116 | Non-Significant Effect |

**ANOVA Table**

| Source | Sum of Squares | Mean Square | DF | F Statistic | P-Value | Decision(0.05) |
|---|---|---|---|---|---|---|
| Between | 0.0245998 | 0.0246 | 1 | 0.35 | 0.56968 | Non-Significant Effect |
| Error | 0.5600038 | 0.070000 | 8 | | | |
| Total | 0.58460358 | 0.0946003 | 9 | | | |

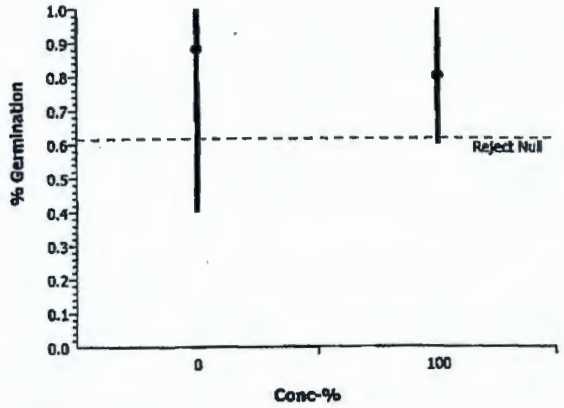
**ANOVA Assumptions**

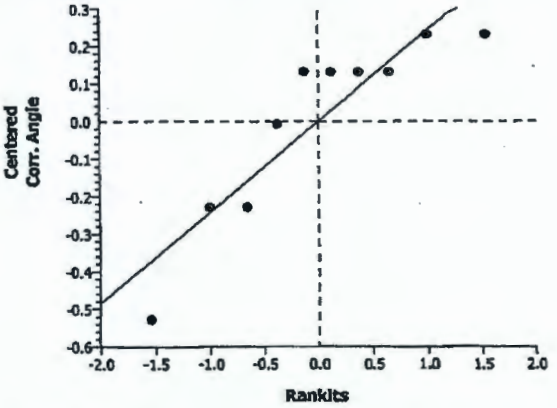
| Attribute | Test | Statistic | Critical | P-Value | Decision(0.01) |
|---|---|---|---|---|---|
| Variances | Variance Ratio F | 1.65495 | 23.15450 | 0.63747 | Equal Variances |
| Distribution | Shapiro-Wilk W | 0.82857 | | 0.03216 | Normal Distribution |

**Data Summary**

| | | | Original Data | | | | Transformed Data | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Conc-% | Control Type | Count | Mean | Minimum | Maximum | SD | Mean | Minimum | Maximum | SD |
| 0 | Artificial Soil/S | 5 | 0.88000 | 0.40000 | 1.00000 | 0.26833 | 1.21317 | 0.68472 | 1.34528 | 0.29541 |
| 100 | | 5 | 0.80000 | 0.60000 | 1.00000 | 0.20000 | 1.11397 | 0.88608 | 1.34528 | 0.22963 |

**Graphics**



# CETIS Analysis Detail

**Plant Bioassay - Chronic** — **CH2M Hill**

| Endpoint | Analysis Type | Sample Link | Control Link | Date Analyzed | Version |
|---|---|---|---|---|---|
| Average Height (mm) | Comparison | 04-5366-5275 | 04-5366-5275 | 19 Jul-06 10:55 AM | 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 | 18.76% |

**Group Comparisons**

| Control | vs | Conc-% | Statistic | Critical | P-Value | MSD | Decision(0.05) |
|---|---|---|---|---|---|---|---|
| Artificial Soil/Sedi | | 100 | 0.24402 | 1.85955 | 0.4067 | 16.613 | Non-Significant Effect |

**ANOVA Table**

| Source | Sum of Squares | Mean Square | DF | F Statistic | P-Value | Decision(0.05) |
|---|---|---|---|---|---|---|
| Between | 11.881 | 11.881 | 1 | 0.06 | 0.81336 | Non-Significant Effect |
| Error | 1596.28 | 199.535 | 8 | | | |
| Total | 1608.16115 | 211.41602 | 9 | | | |

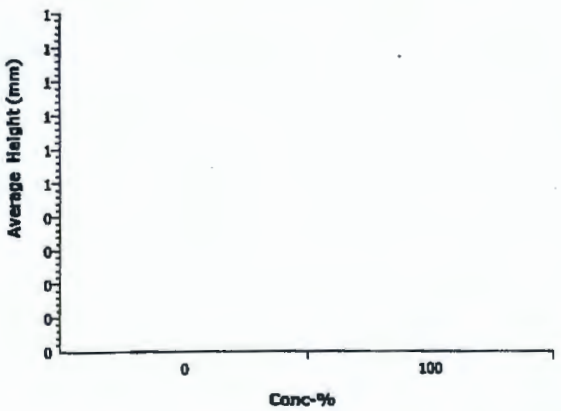
**ANOVA Assumptions**

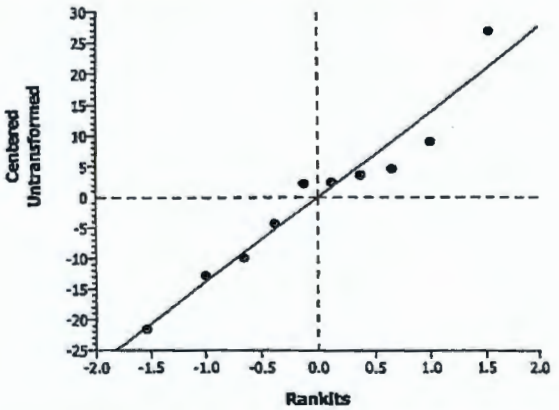
| Attribute | Test | Statistic | Critical | P-Value | Decision(0.01) |
|---|---|---|---|---|---|
| Variances | Variance Ratio F | 4.30523 | 23.15450 | 0.18639 | Equal Variances |
| Distribution | Shapiro-Wilk W | 0.95713 | | 0.75277 | Normal Distribution |

**Data Summary**

| | | | Original Data | | | | Transformed Data | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Conc-% | Control Type | Count | Mean | Minimum | Maximum | SD | Mean | Minimum | Maximum | SD |
| 0 | Artificial Soil/S | 5 | 88.560 | 67 | 115.4 | 17.996 | | | | |
| 100 | | 5 | 86.380 | 73.5 | 95.4 | 8.6731 | | | | |

**Graphics**



# CETIS Analysis Detail

**Plant Bioassay - Chronic** — **CH2M Hill**

| Endpoint | Analysis Type | Sample Link | Control Link | Date Analyzed | Version |
|---|---|---|---|---|---|
| Average Length (mm) | Comparison | 04-5366-5275 | 04-5366-5275 | 19 Jul-06 10:55 AM | 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 | 20.06% |

**Group Comparisons**

| Control | vs | Conc-% | Statistic | Critical | P-Value | MSD | Decision(0.05) |
|---|---|---|---|---|---|---|---|
| Artificial Soil/Sedi | | 100 | 2.26949 | 1.85955 | 0.0265 | 21.3364 | Significant Effect |

**ANOVA Table**

| Source | Sum of Squares | Mean Square | DF | F Statistic | P-Value | Decision(0.05) |
|---|---|---|---|---|---|---|
| Between | 1695.204 | 1695.204 | 1 | 5.15 | 0.05293 | Non-Significant Effect |
| Error | 2633.032 | 329.129 | 8 | | | |
| Total | 4328.23633 | 2024.3331 | 9 | | | |

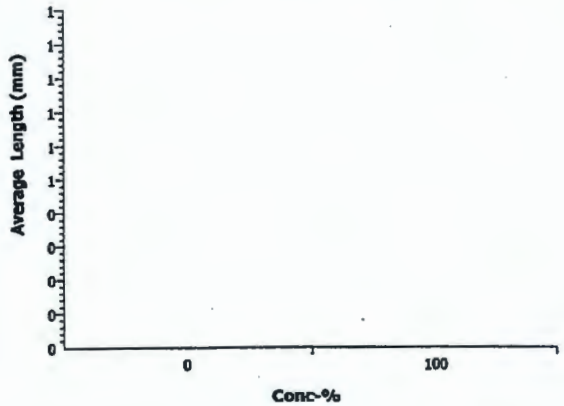
**ANOVA Assumptions**

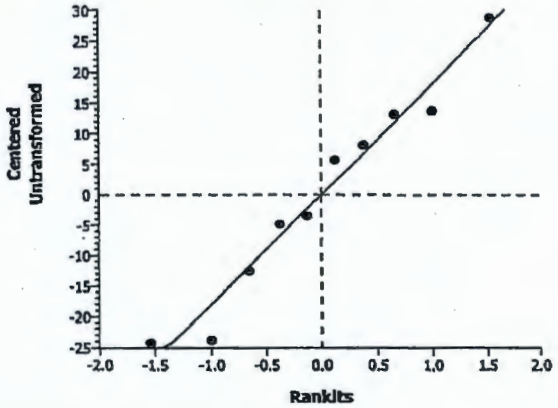
| Attribute | Test | Statistic | Critical | P-Value | Decision(0.01) |
|---|---|---|---|---|---|
| Variances | Variance Ratio F | 2.04583 | 23.15450 | 0.50520 | Equal Variances |
| Distribution | Shapiro-Wilk W | 0.95755 | | 0.75764 | Normal Distribution |

**Data Summary**

| | | | Original Data | | | | Transformed Data | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Conc-% | Control Type | Count | Mean | Minimum | Maximum | SD | Mean | Minimum | Maximum | SD |
| 0 | Artificial Soil/S | 5 | 106.34 | 82.5 | 120 | 14.701 | | | | |
| 100 | | 5 | 80.3 | 56 | 109 | 21.027 | | | | |

**Graphics**



# CETIS Analysis Detail

**Plant Bioassay - Chronic** — **CH2M Hill**

| Endpoint | Analysis Type | Sample Link | Control Link | Date Analyzed | Version |
|---|---|---|---|---|---|
| Average AG Wt (Wet, mg) | Comparison | 04-5366-5275 | 04-5366-5275 | 19 Jul-06 10:55 AM | 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 | 47.70% |

**Group Comparisons**

| Control | vs | Conc-% | Statistic | Critical | P-Value | MSD | Decision(0.05) |
|---|---|---|---|---|---|---|---|
| Artificial Soil/Sedi | | 100 | -0.2866 | 1.85955 | 0.6092 | 16.3112 | Non-Significant Effect |

**ANOVA Table**

| Source | Sum of Squares | Mean Square | DF | F Statistic | P-Value | Decision(0.05) |
|---|---|---|---|---|---|---|
| Between | 15.80343 | 15.80343 | 1 | 0.08 | 0.78168 | Non-Significant Effect |
| Error | 1538.815 | 192.3519 | 8 | | | |
| Total | 1554.61837 | 208.15530 | 9 | | | |

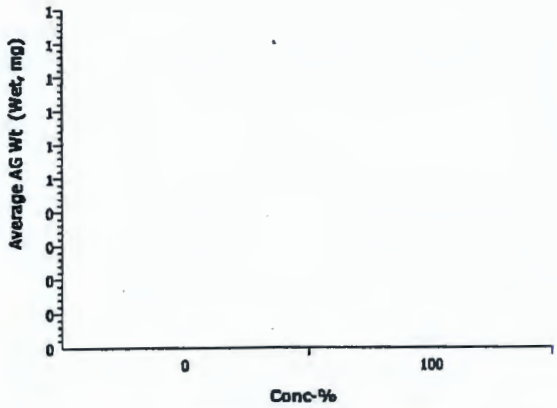
**ANOVA Assumptions**

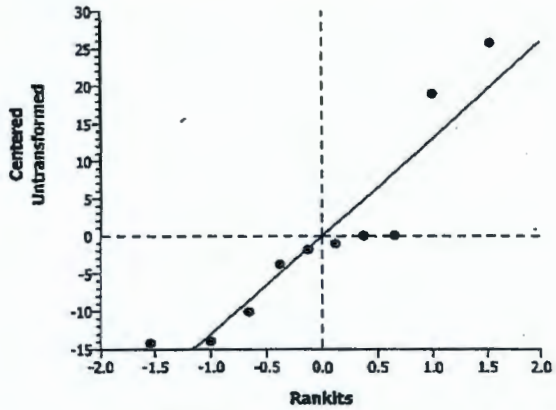
| Attribute | Test | Statistic | Critical | P-Value | Decision(0.01) |
|---|---|---|---|---|---|
| Variances | Variance Ratio F | 1.65540 | 23.15450 | 0.63729 | Equal Variances |
| Distribution | Shapiro-Wilk W | 0.86232 | | 0.08125 | Normal Distribution |

**Data Summary**

| | | | Original Data | | | | Transformed Data | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Conc-% | Control Type | Count | Mean | Minimum | Maximum | SD | Mean | Minimum | Maximum | SD |
| 0 | Artificial Soil/S | 5 | 34.197 | 19.960 | 53.208 | 12.036 | | | | |
| 100 | | 5 | 36.711 | 22.763 | 62.413 | 15.486 | | | | |

**Graphics**



# CETIS Analysis Detail

**Plant Bioassay - Chronic** — **CH2M Hill**

| Endpoint | Analysis Type | Sample Link | Control Link | Date Analyzed | Version |
|---|---|---|---|---|---|
| Average AG Wt (Dry, mg) | Comparison | 04-5366-5275 | 04-5366-5275 | 19 Jul-06 10:55 AM | 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 | 29.58% |

**Group Comparisons**

| Control | vs | Conc-% | Statistic | Critical | P-Value | MSD | Decision(0.05) |
|---|---|---|---|---|---|---|---|
| Artificial Soil/Sedi | | 100 | 0.77191 | 1.85955 | 0.2312 | 1.79039 | Non-Significant Effect |

**ANOVA Table**

| Source | Sum of Squares | Mean Square | DF | F Statistic | P-Value | Decision(0.05) |
|---|---|---|---|---|---|---|
| Between | 1.380868 | 1.380868 | 1 | 0.60 | 0.46236 | Non-Significant Effect |
| Error | 18.54002 | 2.317503 | 8 | | | |
| Total | 19.9208920 | 3.6983712 | 9 | | | |

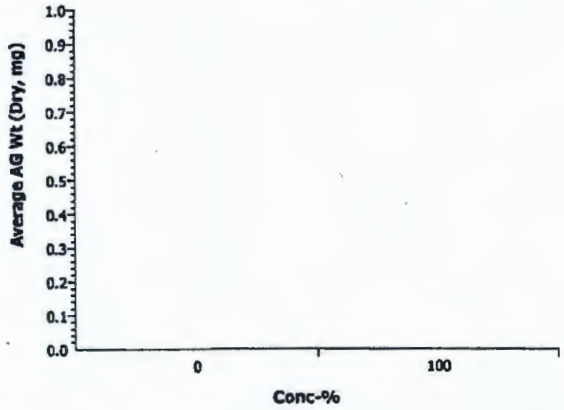
**ANOVA Assumptions**

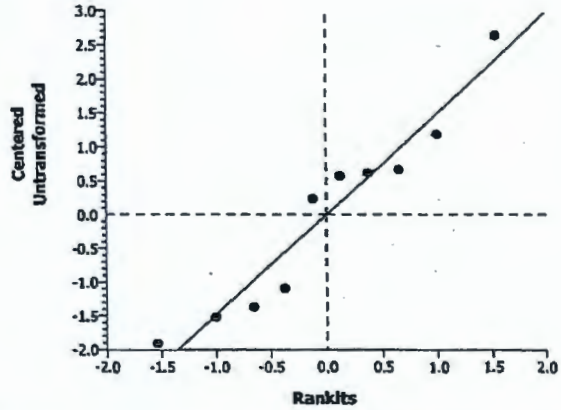
| Attribute | Test | Statistic | Critical | P-Value | Decision(0.01) |
|---|---|---|---|---|---|
| Variances | Variance Ratio F | 2.51121 | 23.15450 | 0.39427 | Equal Variances |
| Distribution | Shapiro-Wilk W | 0.93026 | | 0.45041 | Normal Distribution |

**Data Summary**

| | | | Original Data | | | | Transformed Data | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Conc-% | Control Type | Count | Mean | Minimum | Maximum | SD | Mean | Minimum | Maximum | SD |
| 0 | Artificial Soil/S | 5 | 6.05361 | 4.14001 | 8.68201 | 1.82070 | | | | |
| 100 | | 5 | 5.31041 | 3.94000 | 6.49001 | 1.14894 | | | | |

**Graphics**



# CETIS Analysis Detail

**Plant Bioassay - Chronic** — **CH2M Hill**

| Endpoint | Analysis Type | Sample Link | Control Link | Date Analyzed | Version |
|---|---|---|---|---|---|
| Average Root Wt. (Wet, mg) | Comparison | 04-5366-5275 | 04-5366-5275 | 19 Jul-06 10:55 AM | 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 | 50.78% |

**Group Comparisons**

| Control | vs | Conc-% | Statistic | Critical | P-Value | MSD | Decision(0.05) |
|---|---|---|---|---|---|---|---|
| Artificial Soil/Sedi | | 100 | 0.16086 | 1.85955 | 0.4381 | 18.4054 | Non-Significant Effect |

**ANOVA Table**

| Source | Sum of Squares | Mean Square | DF | F Statistic | P-Value | Decision(0.05) |
|---|---|---|---|---|---|---|
| Between | 6.337531 | 6.337531 | 1 | 0.03 | 0.87619 | Non-Significant Effect |
| Error | 1959.33 | 244.9163 | 8 | | | |
| Total | 1965.66785 | 251.25382 | 9 | | | |

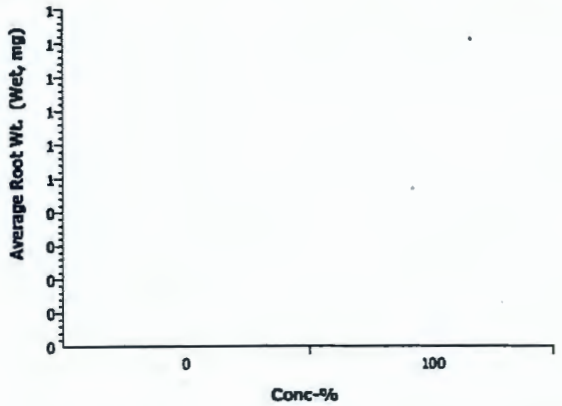
**ANOVA Assumptions**

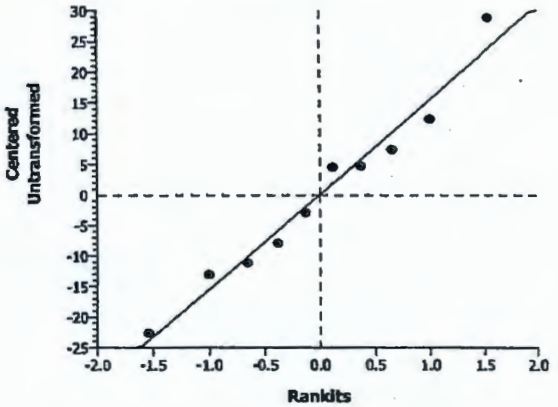
| Attribute | Test | Statistic | Critical | P-Value | Decision(0.01) |
|---|---|---|---|---|---|
| Variances | Variance Ratio F | 2.74905 | 23.15450 | 0.35097 | Equal Variances |
| Distribution | Shapiro-Wilk W | 0.97530 | | 0.93521 | Normal Distribution |

**Data Summary**

| | | | Original Data | | | | Transformed Data | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Conc-% | Control Type | Count | Mean | Minimum | Maximum | SD | Mean | Minimum | Maximum | SD |
| 0 | Artificial Soil/S | 5 | 36.242 | 13.590 | 65.054 | 18.952 | | | | |
| 100 | | 5 | 34.65 | 21.572 | 46.987 | 11.430 | | | | |

**Graphics**



# CETIS Analysis Detail

**Plant Bioassay - Chronic** — **CH2M Hill**

| Endpoint | Analysis Type | Sample Link | Control Link | Date Analyzed | Version |
|---|---|---|---|---|---|
| Average Root Wt. (Dry, mg) | Comparison | 04-5366-5275 | 04-5366-5275 | 19 Jul-06 10:55 AM | 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 | 55.54% |

**Group Comparisons**

| Control | vs | Conc-% | Statistic | Critical | P-Value | MSD | Decision(0.05) |
|---|---|---|---|---|---|---|---|
| Artificial Soil/Sedi | | 100 | -0.2897 | 1.85955 | 0.6103 | 0.85294 | Non-Significant Effect |

**ANOVA Table**

| Source | Sum of Squares | Mean Square | DF | F Statistic | P-Value | Decision(0.05) |
|---|---|---|---|---|---|---|
| Between | 0.0441422 | 0.044142 | 1 | 0.08 | 0.77941 | Non-Significant Effect |
| Error | 4.207812 | 0.525977 | 8 | | | |
| Total | 4.25195407 | 0.5701187 | 9 | | | |

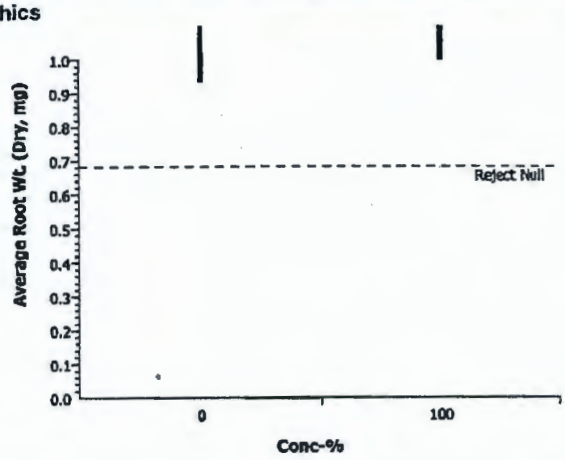
**ANOVA Assumptions**

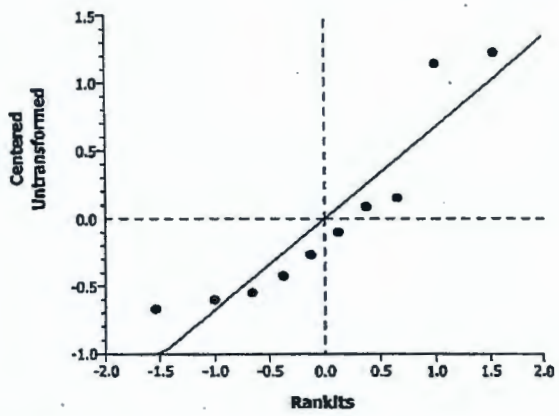
| Attribute | Test | Statistic | Critical | P-Value | Decision(0.01) |
|---|---|---|---|---|---|
| Variances | Variance Ratio F | 1.16704 | 23.15450 | 0.88460 | Equal Variances |
| Distribution | Shapiro-Wilk W | 0.84009 | | 0.04423 | Normal Distribution |

**Data Summary**

| | | | Original Data | | | | Transformed Data | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Conc-% | Control Type | Count | Mean | Minimum | Maximum | SD | Mean | Minimum | Maximum | SD |
| 0 | Artificial Soil/S | 5 | 1.53579 | 0.93500 | 2.67798 | 0.69673 | | | | |
| 100 | | 5 | 1.66867 | 1.00000 | 2.89335 | 0.75268 | | | | |

**Graphics**



# CETIS Analysis Detail

**Plant Bioassay - Chronic** — **CH2M Hill**

| Endpoint | Analysis Type | Sample Link | Control Link | Date Analyzed | Version |
|---|---|---|---|---|---|
| Average Total Wt (Wet, mg) | Comparison | 04-5366-5275 | 04-5366-5275 | 19 Jul-06 10:55 AM | 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 | 47.40% |

**Group Comparisons**

| Control | vs | Conc-% | Statistic | Critical | P-Value | MSD | Decision(0.05) |
|---|---|---|---|---|---|---|---|
| Artificial Soil/Sedi | | 100 | -0.0514 | 1.85955 | 0.5198 | 33.3884 | Non-Significant Effect |

**ANOVA Table**

| Source | Sum of Squares | Mean Square | DF | F Statistic | P-Value | Decision(0.05) |
|---|---|---|---|---|---|---|
| Between | 2.125471 | 2.125471 | 1 | 0.00 | 0.96030 | Non-Significant Effect |
| Error | 6447.727 | 805.9658 | 8 | | | |
| Total | 6449.85203 | 808.09129 | 9 | | | |

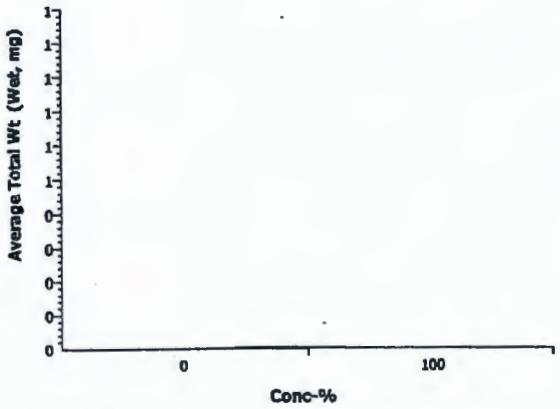
**ANOVA Assumptions**

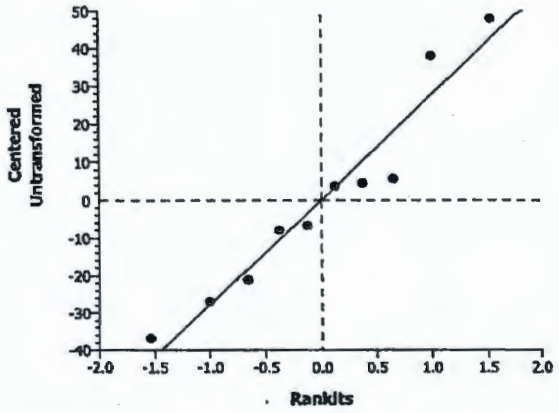
| Attribute | Test | Statistic | Critical | P-Value | Decision(0.01) |
|---|---|---|---|---|---|
| Variances | Variance Ratio F | 1.40659 | 23.15450 | 0.74899 | Equal Variances |
| Distribution | Shapiro-Wilk W | 0.93638 | | 0.51346 | Normal Distribution |

**Data Summary**

| | | | Original Data | | | | Transformed Data | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Conc-% | Control Type | Count | Mean | Minimum | Maximum | SD | Mean | Minimum | Maximum | SD |
| 0 | Artificial Soil/S | 5 | 70.439 | 33.550 | 118.26 | 30.694 | | | | |
| 100 | | 5 | 71.361 | 44.335 | 109.4 | 25.880 | | | | |

**Graphics**



# CETIS Analysis Detail

**Plant Bioassay - Chronic** — **CH2M Hill**

| Endpoint | Analysis Type | Sample Link | Control Link | Date Analyzed | Version |
|---|---|---|---|---|---|
| Average Total Wt (Dry, mg) | Comparison | 04-5366-5275 | 04-5366-5275 | 19 Jul-06 10:55 AM | 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 | 33.67% |

**Group Comparisons**

| Control | vs | Conc-% | Statistic | Critical | P-Value | MSD | Decision(0.05) |
|---|---|---|---|---|---|---|---|
| Artificial Soil/Sedi | | 100 | 0.44419 | 1.85955 | 0.3343 | 2.55501 | Non-Significant Effect |

**ANOVA Table**

| Source | Sum of Squares | Mean Square | DF | F Statistic | P-Value | Decision(0.05) |
|---|---|---|---|---|---|---|
| Between | 0.9312184 | 0.931218 | 1 | 0.20 | 0.66867 | Non-Significant Effect |
| Error | 37.75724 | 4.719655 | 8 | | | |
| Total | 38.6884587 | 5.6508734 | 9 | | | |

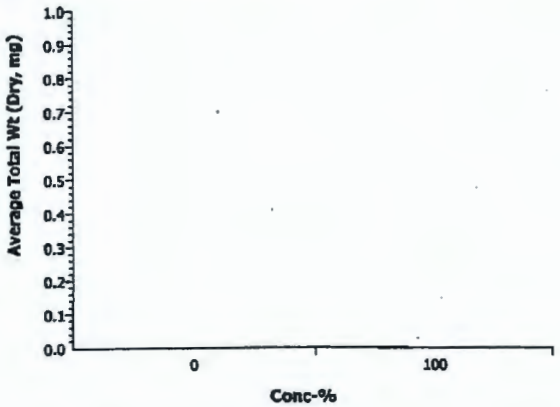
**ANOVA Assumptions**

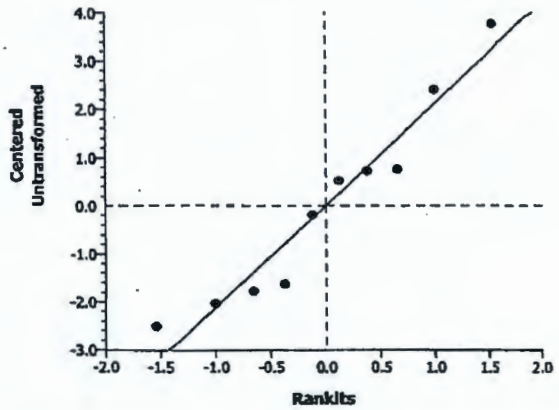
| Attribute | Test | Statistic | Critical | P-Value | Decision(0.01) |
|---|---|---|---|---|---|
| Variances | Variance Ratio F | 1.80426 | 23.15450 | 0.58160 | Equal Variances |
| Distribution | Shapiro-Wilk W | 0.93163 | | 0.46414 | Normal Distribution |

**Data Summary**

| | | | Original Data | | | | Transformed Data | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Conc-% | Control Type | Count | Mean | Minimum | Maximum | SD | Mean | Minimum | Maximum | SD |
| 0 | Artificial Soil/S | 5 | 7.5894 | 5.0750 | 11.36 | 2.4644 | | | | |
| 100 | | 5 | 6.9791 | 4.9400 | 9.3834 | 1.8347 | | | | |

**Graphics**



# BLUEGRASS GROWTH TEST

Client: Washington Closure Hanford Project

Test Start Date: 4-26-06

Initials: Day 0 [illegible] Day 12 _____ Day 14 NJ Day 16 NJ Day 19 TB Day 21 NJ Day 23 NJ Day 28 NJ Day 35 DW

Bioassay Lab ID: BG 1575- 11 Sample No: J115X6

| CONC. | REPLICATE | # seeds germinated: Emergence: 12 days after planting | 14 days after planting | 16 days after planting | 19 days after planting | 21 days after planting | 23 days after planting | 7-DAYS POST-EMERGENCE (29 days after planting) | 14-DAYS POST-EMERGENCE (35 days after planting) | pH: INITIAL (@ planting) | FINAL (@ 14 days Post-Emergence) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Control | A | | 4 | 5 | 6 | 6 | 6 | 5 | 5 | 8.1 | 7.6 |
| | B | | 1 | 1 | 1 | 1 | 1 | 1 | 1 | | |
| | C | | 3 | 3 | 4 | 4 | 4 | 4 | 4 | | |
| | D | | 2 | 3 | 4 | 4 | 4 | 4 | 4 | | |
| | E | | 1 | 1 | 3 | 3 | 3 | 3 | 3 | | |

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

Replicate A: 3 lg G, 2 md G Removed 1 md G

Replicate B: 1 Lg G

Replicate C: 1 lg G, 2 md G, 1 sm G

Replicate D: 1 lg G, 2 md G, 1 sm G

Replicate E: 1 lg G, 2 md G

Appearance Code: Good (G) = deep green color with no brown, Brown (B) = brown color noted, # Lg = # of large plants (tallest, 6+ shoots), # Med = # of plants (smaller than large, fewer shoots), # Sm = # small plants (1-3 shoots)

14-Days Post-Emergence: Describe shoot appearance:

Replicate A: 3 Lg G, 1 Md G, 1 Med w 1 B tip

Replicate B: 1 Lg G

Replicate C: 2 Lg G, 2 Med G

Replicate D: 1 Lg G, 2 Md G, 1 Sm G

Replicate E: 1 Lg G, 2 Md G

Measure Shoot Height: Individual height of each seedling (above ground)

| | 1st Seedling | 2nd Seedling | 3rd Seedling | 4th Seedling | 5th Seedling |
|---|---|---|---|---|---|
| Replicate A | 72 mm | 84 mm | 96 mm | 96 mm | 111 mm |
| Replicate B | 90 mm | mm | mm | mm | mm |
| Replicate C | 87 mm | 108 mm | 67 mm | 40 mm | mm |
| Replicate D | 75 mm | 34 mm | 90 mm | 73 mm | mm |
| Replicate E | 57 mm | 69 mm | 105 mm | mm | mm |

Measure Shoot Weight: Total mass of all seedlings (above ground)

| | Tin Tare Wt. (mg) | Wet Wt (mg) | Dry Wt. (mg) |
|---|---|---|---|
| Replicate A | 1006.97 | 1188.01 | 1038.49 |
| Replicate B | 1236.50 | 1272.62 | 1243.36 |
| Replicate C | 1256.52 | 1361.96 | 1272.57 |
| Replicate D | 1246.56 | 1310.54 | 1256.27 |
| Replicate E | 1249.55 | 1311.90 | 1260.30 |

Describe root appearance:

Replicate A

Replicate B

Replicate C

Replicate D

Replicate E

Measure Root Length: Individual length of the longest root from each seedling

| | 1st Seedling | 2nd Seedling | 3rd Seedling | 4th Seedling | 5th Seedling |
|---|---|---|---|---|---|
| Replicate A | 121 ~~134~~ mm | 105 mm | 93 mm | 117 mm | 73 mm |
| Replicate B | 135 mm | mm | mm | mm | mm |
| Replicate C | 21 mm | 59 mm | 122 mm | 93 mm | mm |
| Replicate D | 82 mm | 51 mm | 25 mm | 46 mm | mm |
| Replicate E | 131 mm | 77 mm | 43 mm | mm | mm |

Measure Root Weight: Total mass of all roots from all seedlings

| | Tin Tare Wt. (mg) | Wet Wt (mg) | Dry Wt. (mg) |
|---|---|---|---|
| Replicate A | 1004.84 | 1256.70 | 1016.55 |
| Replicate B | 1241.52 | 1282.70 | 1243.55 |
| Replicate C | 1247.82 | 1410.42 | 1255.03 |
| Replicate D | 1249.26 | 1373.10 | 1252.52 |
| Replicate E | 1247.43 | 1308.10 | 1253.53 |

Comments:

# CETIS Test Summary

Report Date: 19 Jul-06 11:03 AM
Test Link: 20-6118-5633/B157511psB

**Plant Bioassay - Chronic** — **CH2M Hill**

| | | | | | |
|---|---|---|---|---|---|
| **Test No:** | 02-3118-3841 | **Test Type:** | Plant Chronic | **Duration:** | N/A |
| **Start Date:** | 26 Apr-06 | **Protocol:** | ASTM E1963-02 (2002) | **Species:** | Poa sandbergii |
| **Ending Date:** | | **Dil Water:** | | **Source:** | |
| **Setup Date:** | 26 Apr-06 | **Brine:** | | | |

**Comments:** recalculated Height and Length data July 19, 2006

| | | | | | |
|---|---|---|---|---|---|
| **Sample No:** | 12-7590-7138 | **Code:** | B1584-01 | **Client:** | |
| **Sample Date:** | 26 Apr-06 | **Material:** | Soil | **Project:** | |
| **Receive Date:** | | **Source:** | Hanford | | |
| **Sample Age:** | N/A | **Station:** | | | |

**Comments:** J11JX6

**Comparison Summary**

| Analysis | Endpoint | NOEL | LOEL | ChV | PMSD | Method |
|---|---|---|---|---|---|---|
| 00-3402-1654 | % Germination | 100 | > 100 | N/A | 36.59% | Wilcoxon Rank Sum Two-Sample |
| 06-5850-7386 | Average Height (mm) | 100 | > 100 | N/A | 19.40% | Equal Variance t Two-Sample |
| 13-9496-2061 | Average Length (mm) | 100 | > 100 | N/A | 27.22% | Equal Variance t Two-Sample |
| 12-9427-6780 | Average AG Wt (Wet, mg) | 100 | > 100 | N/A | 36.63% | Equal Variance t Two-Sample |
| 16-6961-7138 | Average AG Wt (Dry, mg) | 100 | > 100 | N/A | 35.93% | Equal Variance t Two-Sample |
| 06-2987-4159 | Average Root Wt. (Wet, mg | 100 | > 100 | N/A | 50.84% | Equal Variance t Two-Sample |
| 03-7634-3813 | Average Root Wt. (Dry, mg) | 100 | > 100 | N/A | 49.28% | Equal Variance t Two-Sample |
| 02-9373-0181 | Average Total Wt (Wet, mg | 100 | > 100 | N/A | 42.91% | Equal Variance t Two-Sample |
| 18-7094-8075 | Average Total Wt (Dry, mg) | 100 | > 100 | N/A | 37.34% | Equal Variance t Two-Sample |

# CETIS Test Summary

Report Date: 19 Jul-06 11:03 AM
Test Link: 20-6118-5633/B157511psB

**% Germination Summary**

| Conc-% | Control Type | Reps | Mean | Minimum | Maximum | SE | SD | CV |
|---|---|---|---|---|---|---|---|---|
| 0 | Artificial Soil/S | 5 | 0.88000 | 0.40000 | 1.00000 | 0.12000 | 0.26833 | 30.49% |
| 100 | | 5 | 0.68000 | 0.20000 | 1.00000 | 0.13565 | 0.30332 | 44.61% |

**Average Height (mm) Summary**

| Conc-% | Control Type | Reps | Mean | Minimum | Maximum | SE | SD | CV |
|---|---|---|---|---|---|---|---|---|
| 0 | Artificial Soil/S | 5 | 88.560 | 67 | 115.40 | 8.048 | 17.996 | 20.32% |
| 100 | | 5 | 80.460 | 68 | 91.800 | 4.5356 | 10.142 | 12.60% |

**Average Length (mm) Summary**

| Conc-% | Control Type | Reps | Mean | Minimum | Maximum | SE | SD | CV |
|---|---|---|---|---|---|---|---|---|
| 0 | Artificial Soil/S | 5 | 106.34 | 82.5 | 120 | 6.5745 | 14.701 | 13.82% |
| 100 | | 5 | 89.060 | 51 | 135 | 14.112 | 31.555 | 35.43% |

**Average AG Wt (Wet, mg) Summary**

| Conc-% | Control Type | Reps | Mean | Minimum | Maximum | SE | SD | CV |
|---|---|---|---|---|---|---|---|---|
| 0 | Artificial Soil/S | 5 | 34.197 | 19.960 | 53.208 | 5.3829 | 12.036 | 35.20% |
| 100 | | 5 | 27.089 | 15.985 | 36.206 | 4.0490 | 9.0539 | 33.42% |

**Average AG Wt (Dry, mg) Summary**

| Conc-% | Control Type | Reps | Mean | Minimum | Maximum | SE | SD | CV |
|---|---|---|---|---|---|---|---|---|
| 0 | Artificial Soil/S | 5 | 6.05361 | 4.14001 | 8.68201 | 0.81424 | 1.82070 | 30.08% |
| 100 | | 5 | 4.63746 | 2.42749 | 6.85999 | 0.83972 | 1.87768 | 40.49% |

**Average Root Wt. (Wet, mg) Summary**

| Conc-% | Control Type | Reps | Mean | Minimum | Maximum | SE | SD | CV |
|---|---|---|---|---|---|---|---|---|
| 0 | Artificial Soil/S | 5 | 36.242 | 13.590 | 65.054 | 8.4756 | 18.952 | 52.29% |
| 100 | | 5 | 36.676 | 20.223 | 50.372 | 5.1331 | 11.478 | 31.30% |

**Average Root Wt. (Dry, mg) Summary**

| Conc-% | Control Type | Reps | Mean | Minimum | Maximum | SE | SD | CV |
|---|---|---|---|---|---|---|---|---|
| 0 | Artificial Soil/S | 5 | 1.53579 | 0.93500 | 2.67798 | 0.31159 | 0.69673 | 45.37% |
| 100 | | 5 | 1.80457 | 0.81500 | 2.34199 | 0.26184 | 0.58550 | 32.45% |

**Average Total Wt (Wet, mg) Summary**

| Conc-% | Control Type | Reps | Mean | Minimum | Maximum | SE | SD | CV |
|---|---|---|---|---|---|---|---|---|
| 0 | Artificial Soil/S | 5 | 70.439 | 33.550 | 118.26 | 13.727 | 30.694 | 43.58% |
| 100 | | 5 | 63.765 | 41.007 | 86.578 | 8.7020 | 19.458 | 30.52% |

**Average Total Wt (Dry, mg) Summary**

| Conc-% | Control Type | Reps | Mean | Minimum | Maximum | SE | SD | CV |
|---|---|---|---|---|---|---|---|---|
| 0 | Artificial Soil/S | 5 | 7.5894 | 5.0750 | 11.36 | 1.1021 | 2.4644 | 32.47% |
| 100 | | 5 | 6.4420 | 3.2425 | 8.8900 | 1.0527 | 2.3538 | 36.54% |

# CETIS Test Summary

Report Date: 19 Jul-06 11:03 AM
Test Link: 20-6118-5633/B157511psB

**% Germination Detail**

| Conc-% | Control Type | Rep 1 | Rep 2 | Rep 3 | Rep 4 | Rep 5 |
|---|---|---|---|---|---|---|
| 0 | Artificial Soil/S | 1.00000 | 1.00000 | 0.40000 | 1.00000 | 1.00000 |
| 100 | | 1.00000 | 0.20000 | 0.80000 | 0.80000 | 0.60000 |

**Average Height (mm) Detail**

| Conc-% | Control Type | Rep 1 | Rep 2 | Rep 3 | Rep 4 | Rep 5 |
|---|---|---|---|---|---|---|
| 0 | Artificial Soil/S | 78.6 | 91 | 67 | 90.8000 | 115.400 |
| 100 | | 91.8000 | 90 | 75.5 | 68 | 77 |

**Average Length (mm) Detail**

| Conc-% | Control Type | Rep 1 | Rep 2 | Rep 3 | Rep 4 | Rep 5 |
|---|---|---|---|---|---|---|
| 0 | Artificial Soil/S | 102.800 | 114.400 | 82.5 | 112 | 120 |
| 100 | | 101.800 | 135 | 73.8000 | 51 | 83.7 |

**Average AG Wt (Wet, mg) Detail**

| Conc-% | Control Type | Rep 1 | Rep 2 | Rep 3 | Rep 4 | Rep 5 |
|---|---|---|---|---|---|---|
| 0 | Artificial Soil/S | 30.4100 | 33.172 | 19.9600 | 34.2360 | 53.2080 |
| 100 | | 36.2060 | 36.1 | 26.37 | 15.985 | 20.7833 |

**Average AG Wt (Dry, mg) Detail**

| Conc-% | Control Type | Rep 1 | Rep 2 | Rep 3 | Rep 4 | Rep 5 |
|---|---|---|---|---|---|---|
| 0 | Artificial Soil/S | 4.53401 | 6.62400 | 4.14001 | 6.28801 | 8.68201 |
| 100 | | 6.30400 | 6.85999 | 4.01248 | 2.42749 | 3.58333 |

**Average Root Wt. (Wet, mg) Detail**

| Conc-% | Control Type | Rep 1 | Rep 2 | Rep 3 | Rep 4 | Rep 5 |
|---|---|---|---|---|---|---|
| 0 | Artificial Soil/S | 33.3280 | 40.9320 | 13.5900 | 28.3060 | 65.054 |
| 100 | | 50.372 | 41.1799 | 40.6450 | 30.96 | 20.2233 |

**Average Root Wt. (Dry, mg) Detail**

| Conc-% | Control Type | Rep 1 | Rep 2 | Rep 3 | Rep 4 | Rep 5 |
|---|---|---|---|---|---|---|
| 0 | Artificial Soil/S | 1.26801 | 1.68799 | 0.93500 | 1.10999 | 2.67798 |
| 100 | | 2.34199 | 2.03003 | 1.80252 | 0.81500 | 2.03333 |

**Average Total Wt (Wet, mg) Detail**

| Conc-% | Control Type | Rep 1 | Rep 2 | Rep 3 | Rep 4 | Rep 5 |
|---|---|---|---|---|---|---|
| 0 | Artificial Soil/S | 63.7380 | 74.1040 | 33.5500 | 62.5420 | 118.262 |
| 100 | | 86.578 | 77.2799 | 67.0150 | 46.945 | 41.0066 |

**Average Total Wt (Dry, mg) Detail**

| Conc-% | Control Type | Rep 1 | Rep 2 | Rep 3 | Rep 4 | Rep 5 |
|---|---|---|---|---|---|---|
| 0 | Artificial Soil/S | 5.80201 | 8.31199 | 5.07501 | 7.398 | 11.36 |
| 100 | | 8.64601 | 8.89001 | 5.81500 | 3.24249 | 5.61666 |

# CETIS Analysis Detail

**Plant Bioassay - Chronic** — **CH2M Hill**

| Endpoint | Analysis Type | Sample Link | Control Link | Date Analyzed | Version |
|---|---|---|---|---|---|
| % Germination | Comparison | 20-6118-5633 | 20-6118-5633 | 19 Jul-06 11:02 AM | 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 | 36.59% |

**Group Comparisons**

| Control | vs | Conc-% | Statistic | Critical | P-Value | Ties | Decision(0.05) |
|---|---|---|---|---|---|---|---|
| Artificial Soil/Sedi | | 100 | 21 | | 0.1111 | 0 | Non-Significant Effect |

**ANOVA Table**

| Source | Sum of Squares | Mean Square | DF | F Statistic | P-Value | Decision(0.05) |
|---|---|---|---|---|---|---|
| Between | 0.1337598 | 0.13376 | 1 | 1.35 | 0.27810 | Non-Significant Effect |
| Error | 0.7902647 | 0.098783 | 8 | | | |
| Total | 0.92402454 | 0.2325429 | 9 | | | |

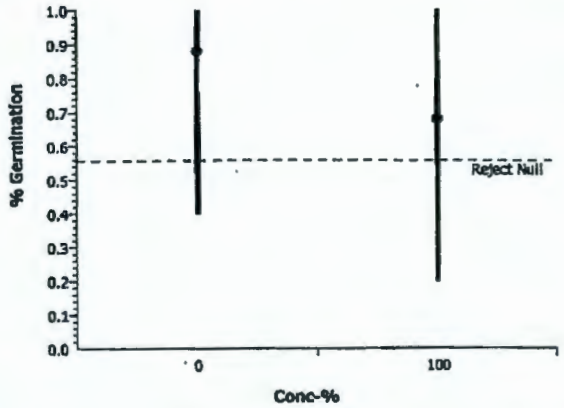
**ANOVA Assumptions**

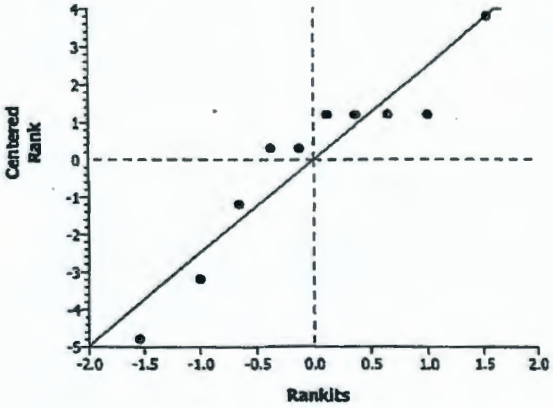
| Attribute | Test | Statistic | Critical | P-Value | Decision(0.01) |
|---|---|---|---|---|---|
| Variances | Variance Ratio F | 1.26388 | 23.15450 | 0.82595 | Equal Variances |
| Distribution | Shapiro-Wilk W | 0.76117 | | 0.00488 | Non-normal Distribution |

**Data Summary**

| | | | Original Data | | | | Transformed Data | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Conc-% | Control Type | Count | Mean | Minimum | Maximum | SD | Mean | Minimum | Maximum | SD |
| 0 | Artificial Soil/S | 5 | 0.88000 | 0.40000 | 1.00000 | 0.26833 | 6.80000 | 2.00000 | 8.00000 | 2.68328 |
| 100 | | 5 | 0.68000 | 0.20000 | 1.00000 | 0.30332 | 4.20000 | 1.00000 | 8.00000 | 2.56418 |

**Graphics**



# CETIS Analysis Detail

**Plant Bioassay - Chronic** — **CH2M Hill**

| Endpoint | Analysis Type | Sample Link | Control Link | Date Analyzed | Version |
|---|---|---|---|---|---|
| Average Height (mm) | Comparison | 20-6118-5633 | 20-6118-5633 | 19 Jul-06 11:03 AM | 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 | 19.40% |

**Group Comparisons**

| Control | vs | Conc-% | Statistic | Critical | P-Value | MSD | Decision(0.05) |
|---|---|---|---|---|---|---|---|
| Artificial Soil/Sedi | | 100 | 0.87681 | 1.85955 | 0.2031 | 17.1786 | Non-Significant Effect |

**ANOVA Table**

| Source | Sum of Squares | Mean Square | DF | F Statistic | P-Value | Decision(0.05) |
|---|---|---|---|---|---|---|
| Between | 164.025 | 164.025 | 1 | 0.77 | 0.40615 | Non-Significant Effect |
| Error | 1706.824 | 213.353 | 8 | | | |
| Total | 1870.84921 | 377.37802 | 9 | | | |

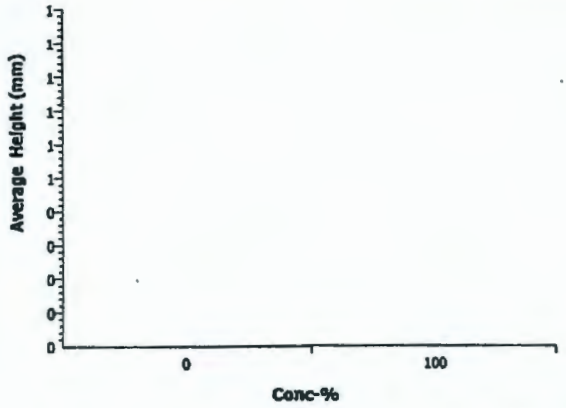
**ANOVA Assumptions**

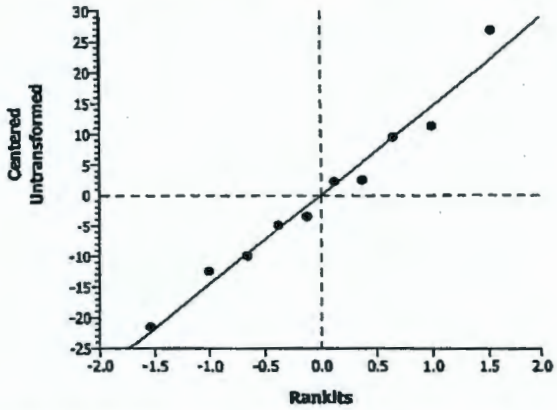
| Attribute | Test | Statistic | Critical | P-Value | Decision(0.01) |
|---|---|---|---|---|---|
| Variances | Variance Ratio F | 3.14850 | 23.15450 | 0.29261 | Equal Variances |
| Distribution | Shapiro-Wilk W | 0.98075 | | 0.96908 | Normal Distribution |

**Data Summary**

| | | | Original Data | | | | Transformed Data | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Conc-% | Control Type | Count | Mean | Minimum | Maximum | SD | Mean | Minimum | Maximum | SD |
| 0 | Artificial Soil/S | 5 | 88.560 | 67 | 115.4 | 17.996 | | | | |
| 100 | | 5 | 80.460 | 68 | 91.8 | 10.142 | | | | |

**Graphics**



# CETIS Analysis Detail

**Plant Bioassay - Chronic** — **CH2M Hill**

| Endpoint | Analysis Type | Sample Link | Control Link | Date Analyzed | Version |
|---|---|---|---|---|---|
| Average Length (mm) | Comparison | 20-6118-5633 | 20-6118-5633 | 19 Jul-06 11:03 AM | 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 | 27.22% |

**Group Comparisons**

| Control | vs | Conc-% | Statistic | Critical | P-Value | MSD | Decision(0.05) |
|---|---|---|---|---|---|---|---|
| Artificial Soil/Sedi | | 100 | 1.10995 | 1.85955 | 0.1496 | 28.95 | Non-Significant Effect |

**ANOVA Table**

| Source | Sum of Squares | Mean Square | DF | F Statistic | P-Value | Decision(0.05) |
|---|---|---|---|---|---|---|
| Between | 746.496 | 746.496 | 1 | 1.23 | 0.29927 | Non-Significant Effect |
| Error | 4847.424 | 605.928 | 8 | | | |
| Total | 5593.91986 | 1352.4240 | 9 | | | |

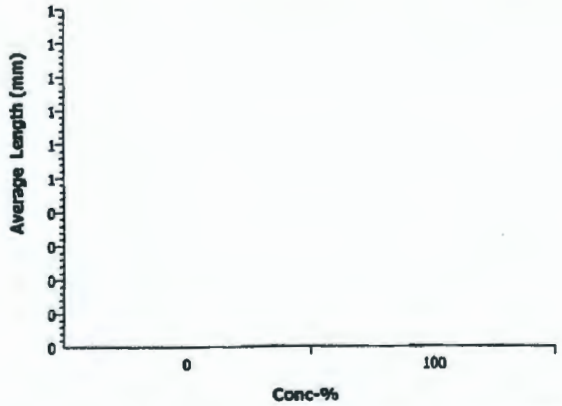
**ANOVA Assumptions**

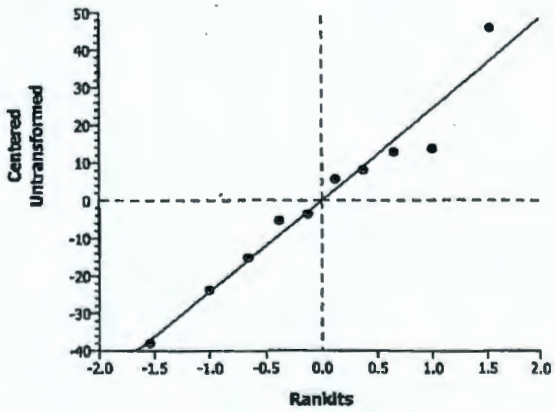
| Attribute | Test | Statistic | Critical | P-Value | Decision(0.01) |
|---|---|---|---|---|---|
| Variances | Variance Ratio F | 4.60738 | 23.15450 | 0.16814 | Equal Variances |
| Distribution | Shapiro-Wilk W | 0.96931 | | 0.88440 | Normal Distribution |

**Data Summary**

| | | | Original Data | | | | Transformed Data | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Conc-% | Control Type | Count | Mean | Minimum | Maximum | SD | Mean | Minimum | Maximum | SD |
| 0 | Artificial Soil/S | 5 | 106.34 | 82.5 | 120 | 14.701 | | | | |
| 100 | | 5 | 89.060 | 51 | 135 | 31.555 | | | | |

**Graphics**



# CETIS Analysis Detail

**Plant Bioassay - Chronic** — CH2M Hill

| Endpoint | Analysis Type | Sample Link | Control Link | Date Analyzed | Version |
|---|---|---|---|---|---|
| Average AG Wt (Wet, mg) | Comparison | 20-6118-5633 | 20-6118-5633 | 19 Jul-06 11:03 AM | 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 | 36.63% |

**Group Comparisons**

| Control | vs | Conc-% | Statistic | Critical | P-Value | MSD | Decision(0.05) |
|---|---|---|---|---|---|---|---|
| Artificial Soil/Sedi | | 100 | 1.05532 | 1.85955 | 0.1611 | 12.5254 | Non-Significant Effect |

**ANOVA Table**

| Source | Sum of Squares | Mean Square | DF | F Statistic | P-Value | Decision(0.05) |
|---|---|---|---|---|---|---|
| Between | 126.3217 | 126.3217 | 1 | 1.11 | 0.32210 | Non-Significant Effect |
| Error | 907.3985 | 113.4248 | 8 | | | |
| Total | 1033.72018 | 239.74649 | 9 | | | |

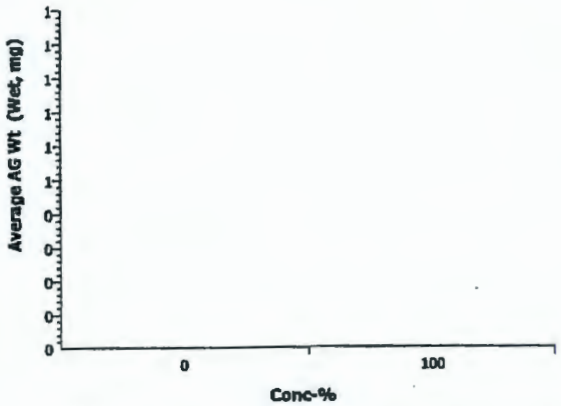
**ANOVA Assumptions**

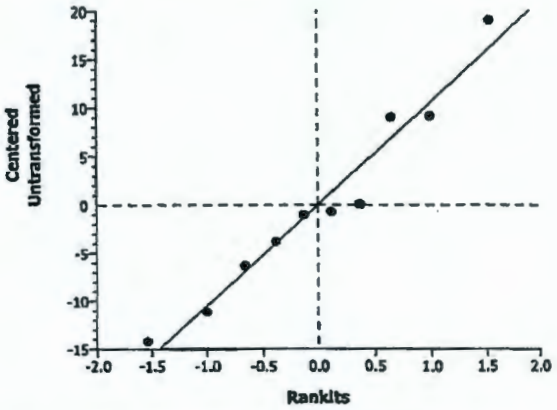
| Attribute | Test | Statistic | Critical | P-Value | Decision(0.01) |
|---|---|---|---|---|---|
| Variances | Variance Ratio F | 1.76734 | 23.15450 | 0.59473 | Equal Variances |
| Distribution | Shapiro-Wilk W | 0.95855 | | 0.76923 | Normal Distribution |

**Data Summary**

| | | | Original Data | | | | Transformed Data | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Conc-% | Control Type | Count | Mean | Minimum | Maximum | SD | Mean | Minimum | Maximum | SD |
| 0 | Artificial Soil/S | 5 | 34.197 | 19.960 | 53.208 | 12.036 | | | | |
| 100 | | 5 | 27.089 | 15.985 | 36.206 | 9.0539 | | | | |

**Graphics**



# CETIS Analysis Detail

**Plant Bioassay - Chronic** — **CH2M Hill**

| Endpoint | Analysis Type | Sample Link | Control Link | Date Analyzed | Version |
|---|---|---|---|---|---|
| Average AG Wt (Dry, mg) | Comparison | 20-6118-5633 | 20-6118-5633 | 19 Jul-06 11:03 AM | 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 | 35.93% |

**Group Comparisons**

| Control vs | Conc-% | Statistic | Critical | P-Value | MSD | Decision(0.05) |
|---|---|---|---|---|---|---|
| Artificial Soil/Sedi | 100 | 1.21073 | 1.85955 | 0.1303 | 2.17506 | Non-Significant Effect |

**ANOVA Table**

| Source | Sum of Squares | Mean Square | DF | F Statistic | P-Value | Decision(0.05) |
|---|---|---|---|---|---|---|
| Between | 5.013699 | 5.013699 | 1 | 1.47 | 0.26055 | Non-Significant Effect |
| Error | 27.36253 | 3.420316 | 8 | | | |
| Total | 32.3762269 | 8.4340150 | 9 | | | |

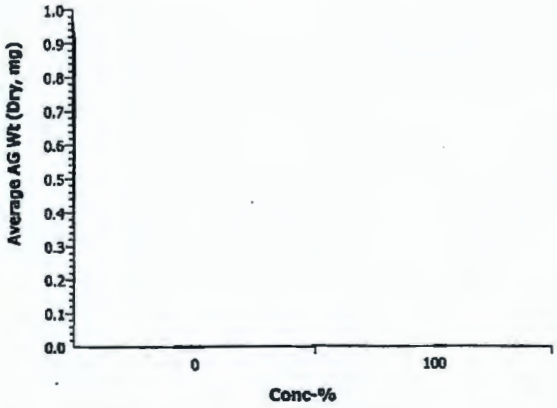
**ANOVA Assumptions**

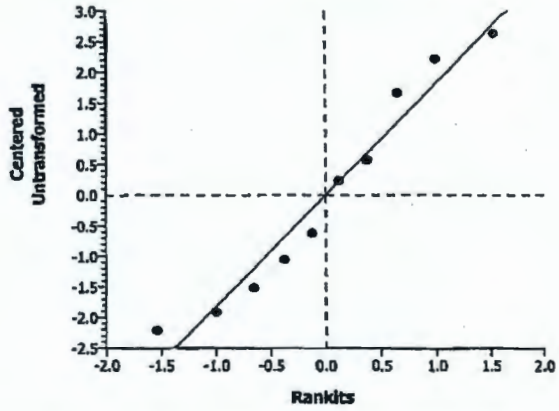
| Attribute | Test | Statistic | Critical | P-Value | Decision(0.01) |
|---|---|---|---|---|---|
| Variances | Variance Ratio F | 1.06357 | 23.15450 | 0.95380 | Equal Variances |
| Distribution | Shapiro-Wilk W | 0.93327 | | 0.48081 | Normal Distribution |

**Data Summary**

| | | | Original Data | | | | Transformed Data | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Conc-% | Control Type | Count | Mean | Minimum | Maximum | SD | Mean | Minimum | Maximum | SD |
| 0 | Artificial Soil/S | 5 | 6.05361 | 4.14001 | 8.68201 | 1.82070 | | | | |
| 100 | | 5 | 4.63746 | 2.42749 | 6.85999 | 1.87768 | | | | |

**Graphics**



# CETIS Analysis Detail

**Plant Bioassay - Chronic** — **CH2M Hill**

| Endpoint | Analysis Type | Sample Link | Control Link | Date Analyzed | Version |
|---|---|---|---|---|---|
| Average Root Wt. (Wet, mg) | Comparison | 20-6118-5633 | 20-6118-5633 | 19 Jul-06 11:03 AM | 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 | 50.84% |

**Group Comparisons**

| Control | vs | Conc-% | Statistic | Critical | P-Value | MSD | Decision(0.05) |
|---|---|---|---|---|---|---|---|
| Artificial Soil/Sedi | | 100 | -0.0438 | 1.85955 | 0.5169 | 18.4259 | Non-Significant Effect |

**ANOVA Table**

| Source | Sum of Squares | Mean Square | DF | F Statistic | P-Value | Decision(0.05) |
|---|---|---|---|---|---|---|
| Between | 0.4709786 | 0.470979 | 1 | 0.00 | 0.96613 | Non-Significant Effect |
| Error | 1963.692 | 245.4615 | 8 | | | |
| Total | 1964.16287 | 245.93247 | 9 | | | |

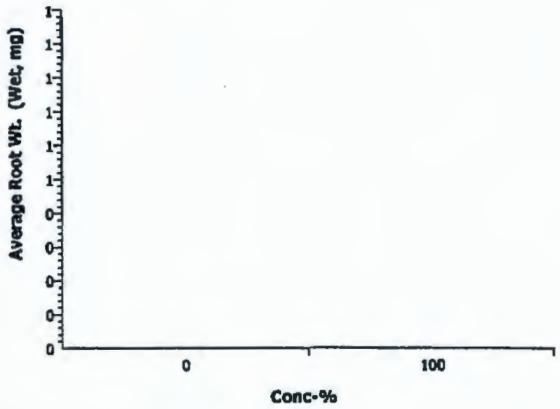
**ANOVA Assumptions**

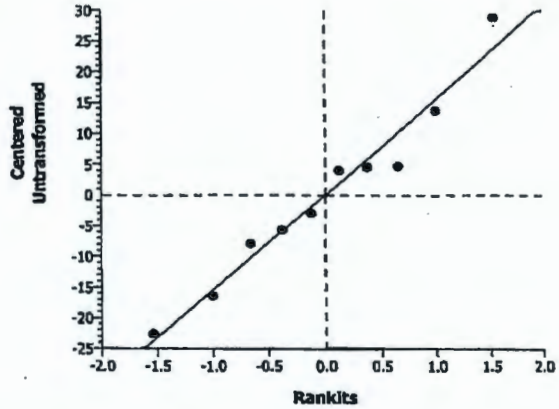
| Attribute | Test | Statistic | Critical | P-Value | Decision(0.01) |
|---|---|---|---|---|---|
| Variances | Variance Ratio F | 2.72629 | 23.15450 | 0.35480 | Equal Variances |
| Distribution | Shapiro-Wilk W | 0.97165 | | 0.90569 | Normal Distribution |

**Data Summary**

| | | | Original Data | | | | Transformed Data | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Conc-% | Control Type | Count | Mean | Minimum | Maximum | SD | Mean | Minimum | Maximum | SD |
| 0 | Artificial Soil/S | 5 | 36.242 | 13.590 | 65.054 | 18.952 | | | | |
| 100 | | 5 | 36.676 | 20.223 | 50.372 | 11.478 | | | | |

**Graphics**



# CETIS Analysis Detail

**Plant Bioassay - Chronic** — CH2M Hill

| Endpoint | Analysis Type | Sample Link | Control Link | Date Analyzed | Version |
|---|---|---|---|---|---|
| Average Root Wt. (Dry, mg) | Comparison | 20-6118-5633 | 20-6118-5633 | 19 Jul-06 11:03 AM | 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 | 49.28% |

**Group Comparisons**

| Control | vs | Conc-% | Statistic | Critical | P-Value | MSD | Decision(0.05) |
|---|---|---|---|---|---|---|---|
| Artificial Soil/Sedi | | 100 | -0.6604 | 1.85955 | 0.7362 | 0.75683 | Non-Significant Effect |

**ANOVA Table**

| Source | Sum of Squares | Mean Square | DF | F Statistic | P-Value | Decision(0.05) |
|---|---|---|---|---|---|---|
| Between | 0.1806107 | 0.180611 | 1 | 0.44 | 0.52755 | Non-Significant Effect |
| Error | 3.31296 | 0.41412 | 8 | | | |
| Total | 3.49357083 | 0.5947307 | 9 | | | |

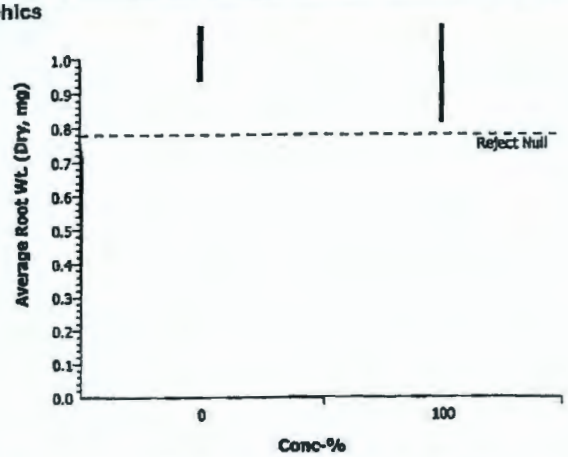
**ANOVA Assumptions**

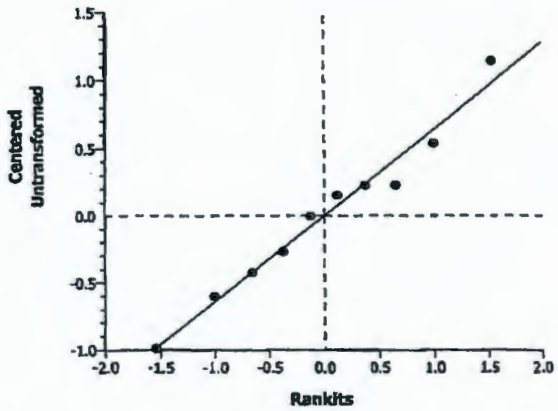
| Attribute | Test | Statistic | Critical | P-Value | Decision(0.01) |
|---|---|---|---|---|---|
| Variances | Variance Ratio F | 1.41605 | 23.15450 | 0.74425 | Equal Variances |
| Distribution | Shapiro-Wilk W | 0.98289 | | 0.97873 | Normal Distribution |

**Data Summary**

| | | | Original Data | | | | Transformed Data | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Conc-% | Control Type | Count | Mean | Minimum | Maximum | SD | Mean | Minimum | Maximum | SD |
| 0 | Artificial Soil/S | 5 | 1.53579 | 0.93500 | 2.67798 | 0.69673 | | | | |
| 100 | | 5 | 1.80457 | 0.81500 | 2.34199 | 0.58550 | | | | |

**Graphics**



# CETIS Analysis Detail

**Plant Bioassay - Chronic** — CH2M Hill

| Endpoint | Analysis Type | Sample Link | Control Link | Date Analyzed | Version |
|---|---|---|---|---|---|
| Average Total Wt (Wet, mg) | Comparison | 20-6118-5633 | 20-6118-5633 | 19 Jul-06 11:03 AM | 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 | 42.91% |

**Group Comparisons**

| Control | vs | Conc-% | Statistic | Critical | P-Value | MSD | Decision(0.05) |
|---|---|---|---|---|---|---|---|
| Artificial Soil/Sedi | | 100 | 0.41066 | 1.85955 | 0.3461 | 30.2228 | Non-Significant Effect |

**ANOVA Table**

| Source | Sum of Squares | Mean Square | DF | F Statistic | P-Value | Decision(0.05) |
|---|---|---|---|---|---|---|
| Between | 111.3661 | 111.3661 | 1 | 0.17 | 0.69210 | Non-Significant Effect |
| Error | 5283.035 | 660.3793 | 8 | | | |
| Total | 5394.40076 | 771.74543 | 9 | | | |

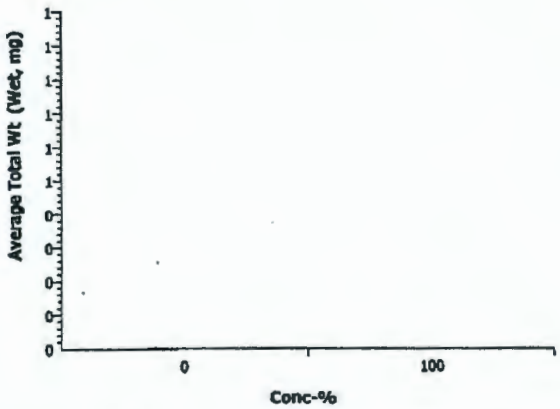
**ANOVA Assumptions**

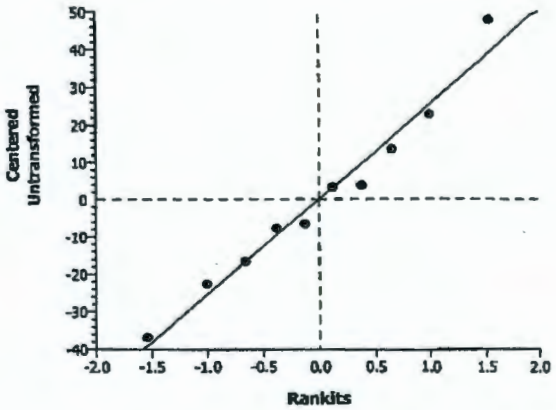
| Attribute | Test | Statistic | Critical | P-Value | Decision(0.01) |
|---|---|---|---|---|---|
| Variances | Variance Ratio F | 2.48829 | 23.15450 | 0.39885 | Equal Variances |
| Distribution | Shapiro-Wilk W | 0.97888 | | 0.95892 | Normal Distribution |

**Data Summary**

| | | | Original Data | | | | Transformed Data | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Conc-% | Control Type | Count | Mean | Minimum | Maximum | SD | Mean | Minimum | Maximum | SD |
| 0 | Artificial Soil/S | 5 | 70.439 | 33.550 | 118.26 | 30.694 | | | | |
| 100 | | 5 | 63.765 | 41.007 | 86.578 | 19.458 | | | | |

**Graphics**



# CETIS Analysis Detail

**Plant Bioassay - Chronic** — **CH2M Hill**

| Endpoint | Analysis Type | Sample Link | Control Link | Date Analyzed | Version |
|---|---|---|---|---|---|
| Average Total Wt (Dry, mg) | Comparison | 20-6118-5633 | 20-6118-5633 | 19 Jul-06 11:03 AM | 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 | 37.34% |

**Group Comparisons**

| Control | vs | Conc-% | Statistic | Critical | P-Value | MSD | Decision(0.05) |
|---|---|---|---|---|---|---|---|
| Artificial Soil/Sedi | | 100 | 0.75284 | 1.85955 | 0.2366 | 2.83404 | Non-Significant Effect |

**ANOVA Table**

| Source | Sum of Squares | Mean Square | DF | F Statistic | P-Value | Decision(0.05) |
|---|---|---|---|---|---|---|
| Between | 3.29111 | 3.29111 | 1 | 0.57 | 0.47312 | Non-Significant Effect |
| Error | 46.45456 | 5.80682 | 8 | | | |
| Total | 49.7456732 | 9.0979304 | 9 | | | |

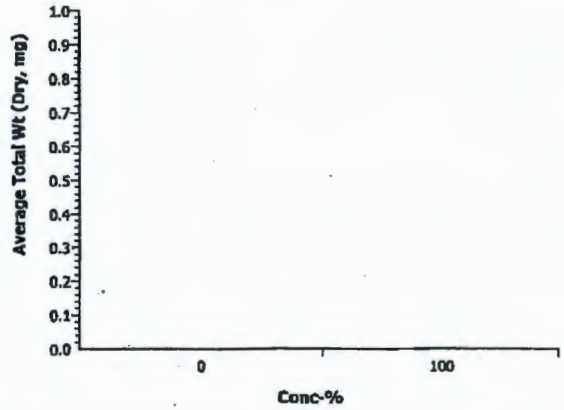
**ANOVA Assumptions**

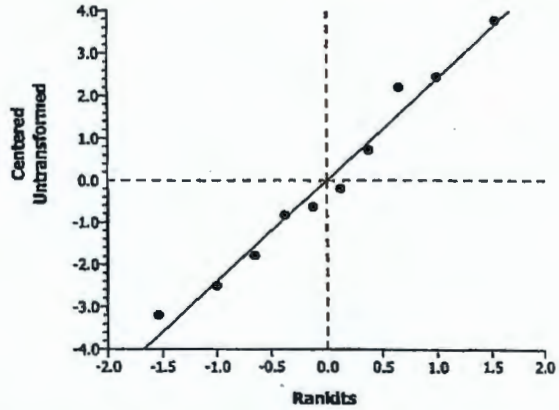
| Attribute | Test | Statistic | Critical | P-Value | Decision(0.01) |
|---|---|---|---|---|---|
| Variances | Variance Ratio F | 1.09617 | 23.15450 | 0.93123 | Equal Variances |
| Distribution | Shapiro-Wilk W | 0.96471 | | 0.83795 | Normal Distribution |

**Data Summary**

| | | | Original Data | | | | Transformed Data | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Conc-% | Control Type | Count | Mean | Minimum | Maximum | SD | Mean | Minimum | Maximum | SD |
| 0 | Artificial Soil/S | 5 | 7.5894 | 5.0750 | 11.36 | 2.4644 | | | | |
| 100 | | 5 | 6.4420 | 3.2425 | 8.8900 | 2.3538 | | | | |

**Graphics**



# APPENDIX B
# CHAIN OF CUSTODY

F1493

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

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

Price Code 8L

Air Quality ☐

Date Turnaround 45 Days

POSSIBLE SAMPLE HAZARDS/REMARKS

*NONE*

**Special Handling and/or Storage**

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

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Preservation | None | None | | | | | | | | | | |
| Type of Container | G/P | P/G | | | | | | | | | | |
| No. of Container(s) | 1 | 1 | | | | | | | | | | |
| Volume | 1000g | 4000g | | | | | | | | | | |
| SAMPLE ANALYSIS | See item (1) in Special Instructions. | Soil Plant Toxicity ASTM E1963; Soil Nematode Toxicity ASTM E2172 | | | | | | | | | | |
| Sample No. | Matrix * | Sample Date | Sample Time | | | | | | | | | |
| J11JB4 | SOIL | 4-5-06 | 18:00 | 1 | 1 | | | | | | | -1 |

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

**SPECIAL INSTRUCTIONS**

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

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

Contact Joan Kessner for any questions.

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

F1493C1-5011

BH1574-01 Nematode

BG1575-01 Bioassays

Matrix *

SwSwl
SEsSediment
SOsSolid
SlsSludge
W = Water
OsOil
AsAir
DSsDrum Solids
DLsDrum Liquids
TsTissue
WfsWipe
LsLiquid
VsVegetative
XsOther

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

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

E 1508

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

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

Price Code 8L

Air Quality ☐

Data Turnaround 45 Days

POSSIBLE SAMPLE HAZARDS/REMARKS

*NONE*

Special Handling and/or Storage

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

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

| Sample No. | Matrix * | Sample Date | Sample Time | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| J11JB5 | SOIL | 4-9-06 | 15:30 | 1 | 1 | | | | | | | | ~1 |
| | | | | | | | | | | | | | |
| | | | | | | | | | | | | | |
| | | | | | | | | | | | | | |
| | | | | | | | | | | | | | |

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

SPECIAL INSTRUCTIONS

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

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

Contact Joan Kessner for any questions.

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

This is a composite of all 5 samples from 1 Investigation Area F150801-SW2

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 |
|---|---|---|---|
| | BH1574-02 Nematode | | 361575-02 B.G. |
| FINAL SAMPLE DISPOSITION | Disposal Method | Disposed By | Date/Time |

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

E1514-01

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

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

Price Code 8L

Air Quality ☐

Data Turnaround 45 Days

**POSSIBLE SAMPLE HAZARDS/REMARKS**

*NONE*

**Special Handling and/or Storage**

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

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

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

| CHAIN OF POSSESSION | Sign/Print Names | | |
|---|---|---|---|
| Relinquished By/Removed From Elizabeth Tyring | Date/Time 10:30 4-11-06 | Received By/Stored In Clarey Hubbard CH2M HILL | Date/Time 4/11/06 10:30 |
| Relinquished By/Removed From | Date/Time | Received By/Stored In | Date/Time |
| Relinquished By/Removed From | Date/Time | Received By/Stored In | Date/Time |
| Relinquished By/Removed From | Date/Time | Received By/Stored In | Date/Time |
| Relinquished By/Removed From | Date/Time | Received By/Stored In | Date/Time |
| Relinquished By/Removed From | Date/Time | Received By/Stored In | Date/Time |

**SPECIAL INSTRUCTIONS**

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

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

Contact Joan Kessner for any questions.

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

B1574-03 Nematode

B1575-03 B.G.

**Matrix ***

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

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

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

F1518-01

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

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

Price Code 8L

Air Quality ☐

Data Turnaround 45 Days

POSSIBLE SAMPLE HAZARDS/REMARKS

*NONE*

Special Handling and/or Storage

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

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

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

SPECIAL INSTRUCTIONS

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

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

Contact Joan Kessner for any questions.

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

B1574-04 Nematode

B1575-04 B.G.

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 |

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

F1522-01

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

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

Price Code 8L

Air Quality ☐

Data Turnaround 45 Days

POSSIBLE SAMPLE HAZARDS/REMARKS

*NONE*

Special Handling and/or Storage

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

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

| CHAIN OF POSSESSION | | Sign/Print Names | |
|---|---|---|---|
| Relinquished By/Removed From CH2M<br>Elizabeth M Tiffany | Date/Time 10:30<br>4-13-06 | Received By/Stored In<br>Darin Dethlefsen CH2M HILL | Date/Time 4-13-06<br>10:30 |
| Relinquished By/Removed From | Date/Time | Received By/Stored In | Date/Time |
| Relinquished By/Removed From | Date/Time | Received By/Stored In | Date/Time |
| Relinquished By/Removed From | Date/Time | Received By/Stored In | Date/Time |
| Relinquished By/Removed From | Date/Time | Received By/Stored In | Date/Time |
| Relinquished By/Removed From | Date/Time | Received By/Stored In | Date/Time |

SPECIAL INSTRUCTIONS

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

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

Contact Joan Kessner for any questions.

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

Nematode BN 1574-05
BG 1575-05 B.G.

Matrix *

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

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

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

E1548-1

| Washington Closure Hanford | CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST | RC-051-67 | Page 1 of 1 |
|---|---|---|---|

| | | | |
|---|---|---|---|
| Collector<br>STANKOVICH, M. | Company Contact<br>JOAN KESSNER | Telephone No.<br>375-4688 | Project Coordinator<br>KESSNER, JH |
| Project Designation<br>100 & 300 Area Component of the RCBRA - Incremental So | Sampling Location<br>300-A RIPARIAN #6 | | SAF No.<br>RC-051 |
| Ice Chest No. | Field Logbook No.<br>EL-1596 | COA<br>BESRAS6520 | Method of Shipment<br>GROUND TRANSPORT |
| Shipped To<br>CH2MHILL | Offsite Property No.<br>A060151 | | Bill of Lading/Air Bill No. |

Price Code 8L. Data Turnaround 45 Days

Air Quality ☐

POSSIBLE SAMPLE HAZARDS/REMARKS

*NONE*

Special Handling and/or Storage

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

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

| Sample No. | Matrix * | Sample Date | Sample Time | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| J11JB6 | SOIL | 4-17-06 | 1530 | 1 | 1 | | | | | | | | 1 |
| | | | | | | | | | | | | | |
| | | | | | | | | | | | | | |
| | | | | | | | | | | | | | |
| | | | | | | | | | | | | | |

| CHAIN OF POSSESSION | | Sign/Print Names | |
|---|---|---|---|
| Relinquished By/Removed From<br>Elizabeth M. Tuggy | Date/Time 10:30<br>4-18-06 | Received By/Stored In<br>Nancy D. Hubbard CH2M HILL | Date/Time 4-18-06<br>8:57 |
| Relinquished By/Removed From | Date/Time | Received By/Stored In | Date/Time |
| Relinquished By/Removed From | Date/Time | Received By/Stored In | Date/Time |
| Relinquished By/Removed From | Date/Time | Received By/Stored In | Date/Time |
| Relinquished By/Removed From | Date/Time | Received By/Stored In | Date/Time |
| Relinquished By/Removed From | Date/Time | Received By/Stored In | Date/Time |

SPECIAL INSTRUCTIONS

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

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

Contact Joan Kessner for any questions.

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

BG 1575-06 Bluegrass.

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)

F1556-01

| Washington Closure Hanford | CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST | RC-051-222 | Page 1 of 1 |
|---|---|---|---|

| | | | |
|---|---|---|---|
| Collector<br>STANKOVICH, M. | Company Contact<br>JOAN KESSNER | Telephone No.<br>375-4688 | Project Coordinator<br>KESSNER, JH |
| Project Designation<br>100 & 300 Area Component of the RCBRA - Incremental So | Sampling Location<br>600--139 | | SAF No.<br>RC-051 |
| Ice Chest No. | Field Logbook No.<br>EL-1596-1 | COA<br>BESRAS6520 | Method of Shipment<br>GROUND TRANSPORT |
| Shipped To<br>CH2MHILL | Offsite Property No.<br>A060151 | | Bill of Lading/Air Bill No.<br>SEE OSPC |

Price Code 8L

Air Quality ☐

Data Turnaround 45 Days

POSSIBLE SAMPLE HAZARDS/REMARKS

*NONE*

**Special Handling and/or Storage**

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

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

| Sample No. | Matrix * | Sample Date | Sample Time | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| J11K34 | SOIL | 4-18-06 | 16:00 | 1 | 1 | | | | | | | | |
| | | | | | | | | | | | | | |
| | | | | | | | | | | | | | |
| | | | | | | | | | | | | | |
| | | | | | | | | | | | | | |

| CHAIN OF POSSESSION | Date/Time | Sign/Print Names | Date/Time |
|---|---|---|---|
| Relinquished By/Removed From<br>Elizabeth M. Tepper 4-19-06 | 10:30 | Received By/Stored In<br>Daisy J. Hubbard CH2M HILL | 4-19-06 9:03 |
| Relinquished By/Removed From | Date/Time | Received By/Stored In | Date/Time |
| Relinquished By/Removed From | Date/Time | Received By/Stored In | Date/Time |
| Relinquished By/Removed From | Date/Time | Received By/Stored In | Date/Time |
| Relinquished By/Removed From | Date/Time | Received By/Stored In | Date/Time |
| Relinquished By/Removed From | Date/Time | Received By/Stored In | Date/Time |

SPECIAL INSTRUCTIONS

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

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

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

BG 1575-07

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
Ve=Vegetation
X=Other

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

F1564-01

| Washington Closure Hanford | CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST | RC-051-216 | Page 1 of 1 |
|---|---|---|---|

| | | | |
|---|---|---|---|
| Collector<br>STANKOVICH, M. | Company Contact<br>JOAN KESSNER | Telephone No.<br>375-4688 | Project Coordinator<br>KESSNER, JH |
| Project Designation<br>100 & 300 Area Component of the RCBRA - Incremental So | Sampling Location<br>600-132/600-190 | | SAF No.<br>RC-051 |
| Ice Chest No. | Field Logbook No.<br>EL-1596-1 | COA<br>BESRAS6520 | Method of Shipment<br>GROUND TRANSPORT |
| Shipped To<br>CH2MHILL | Offsite Property No.<br>A060151 | | Bill of Lading/Air Bill No.<br>SEE OSPC |

Price Code 8L

Air Quality ☐

Data Turnaround 45 Days

POSSIBLE SAMPLE HAZARDS/REMARKS

*NONE*

Special Handling and/or Storage

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

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Preservation | None | None | | | | | | | | | | |
| Type of Container | G/P | P/G | | | | | | | | | | |
| No. of Container(s) | 1 | 1 | | | | | | | | | | |
| Volume | 1000g | 4000g | | | | | | | | | | |
| SAMPLE ANALYSIS | See item (1) in Special Instructions. | Soil Plant Toxicity ASTM E1963; Soil Nematode Toxicity ASTM E2172 | | | | | | | | | | |
| Sample No. | Matrix * | Sample Date | Sample Time | | | | | | | | | |
| J11K28 | SOIL | 4-19-06 | 16:00 | 1 | 1 | | | | | | | -01 |
| | | | | | | | | | | | | |
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| | | | | | | | | | | | | |
| | | | | | | | | | | | | |

| CHAIN OF POSSESSION | Sign/Print Names | | |
|---|---|---|---|
| Relinquished By/Removed From | Date/Time 0930 | Received By/Stored In | Date/Time 4-20-06 10:20 |
| Relinquished By/Removed From | Date/Time | Received By/Stored In | Date/Time |
| Relinquished By/Removed From | Date/Time | Received By/Stored In | Date/Time |
| Relinquished By/Removed From | Date/Time | Received By/Stored In | Date/Time |
| Relinquished By/Removed From | Date/Time | Received By/Stored In | Date/Time |
| Relinquished By/Removed From | Date/Time | Received By/Stored In | Date/Time |

SPECIAL INSTRUCTIONS

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

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

Contact Joan Kessner for any questions.

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

DG 1575-08

Matrix *

SnSnow
SlSediment
SOSoil
SlrSludge
WWater
OOil
AnAir
DSDrum Solids
DLDrum Liquids
TsTissue
WipWipe
LnLagoon
VgVegetation
XOther

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

BHI-EE011 (08/29/2005)

F15886-01

| Washington Closure Hanford | CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST | RC-051-246 | Page 1 of 1 |
|---|---|---|---|

| | | | |
|---|---|---|---|
| Collector<br>STANKOVICH, M. | Company Contact<br>JOAN KESSNER | Telephone No.<br>375-4688 | Project Coordinator<br>KESSNER, JH |
| Project Designation<br>100 & 300 Area Component of the RCBRA - Incremental So | Sampling Location<br>628-1 | | SAF No.<br>RC-051 |
| Ice Chest No. | Field Logbook No.<br>EL-1596-1 | COA<br>BESRAS6520 | Method of Shipment<br>GROUND TRANSPORT |
| Shipped To<br>CH2MHILL | Offsite Property No.<br>A060151 | | Bill of Lading/Air Bill No.<br>SEE OSPC |

Price Code 8L

Air Quality ☐

Data Turnaround 45 Days

POSSIBLE SAMPLE HAZARDS/REMARKS

*NONE*

Special Handling and/or Storage

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

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Preservation | | | None | None | | | | | | | | |
| Type of Container | | | G/P | P/G | | | | | | | | |
| No. of Container(s) | | | 1 | 1 | | | | | | | | |
| Volume | | | 1000g | 4000g | | | | | | | | |
| SAMPLE ANALYSIS | | | See item (1) in Special Instructions. | Soil Plant Toxicity ASTM E1963; Soil Nematode Toxicity ASTM E2172 | | | | | | | | |
| Sample No. | Matrix * | Sample Date | Sample Time | | | | | | | | | |
| J11K61 | SOIL | 4-24-06 | 14:00 | 1 | 1 | | | | | | | -01 |
| | | | | | | | | | | | | |
| | | | | | | | | | | | | |
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| | | | | | | | | | | | | |

| CHAIN OF POSSESSION | | Sign/Print Names | |
|---|---|---|---|
| Relinquished By/Removed From CH2M | Date/Time 14:20 | Received By/Stored In Daisy Hibbard CH2M HILL | Date/Time 4-24-06 14:40 |
| Elizabeth Nyegray 4-24-06 | | | |
| Relinquished By/Removed From | Date/Time | Received By/Stored In | Date/Time |
| Relinquished By/Removed From | Date/Time | Received By/Stored In | Date/Time |
| Relinquished By/Removed From | Date/Time | Received By/Stored In | Date/Time |
| Relinquished By/Removed From | Date/Time | Received By/Stored In | Date/Time |
| Relinquished By/Removed From | Date/Time | Received By/Stored In | Date/Time |

SPECIAL INSTRUCTIONS

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

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

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

36 1575-09

Matrix *

SoSoil
SESediment
SOSolid
SlSludge
W=Water
O=Oil
A=Air
DSDrum Solids
DLDrum Liquids
TsTissue
WIWipe
LiLiquid
VaVegetation
X=Other

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

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

F15-88-01

| Washington Closure Hanford | CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST | RC-051-228 | Page 1 of 1 |
|---|---|---|---|

| | | | |
|---|---|---|---|
| Collector<br>STANKOVICH, M. | Company Contact<br>JOAN KESSNER | Telephone No.<br>375-4688 | Project Coordinator<br>KESSNER, JH |
| Project Designation<br>100 & 300 Area Component of the RCBRA - Incremental So | Sampling Location<br>600--204 | | SAF No.<br>RC-051 |
| Ice Chest No. | Field Logbook No.<br>EL-1596-1 | COA<br>BESRAS6520 | Method of Shipment<br>GROUND TRANSPORT |
| Shipped To<br>CH2MHILL | Offsite Property No.<br>A060151 | | Bill of Lading/Air Bill No.<br>SEE OSPC |

Price Code 8L

Air Quality ☐

Data Turnaround 45 Days

POSSIBLE SAMPLE HAZARDS/REMARKS

*NONE*

Special Handling and/or Storage

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

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

| Sample No. | Matrix * | Sample Date | Sample Time | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| J11K40 | SOIL | 4-24-06 | 1722 | 1 | 1 | | | | | | | | |
| | | | | | | | | | | | | | |
| | | | | | | | | | | | | | |
| | | | | | | | | | | | | | |
| | | | | | | | | | | | | | |

| CHAIN OF POSSESSION | | Sign/Print Names | |
|---|---|---|---|
| Relinquished By/Removed From<br>Elizabeth M Terry | Date/Time 9:00<br>4-25-06 | Received By/Stored In<br>Larry Hubbard CH2M HILL | Date/Time 4/25/06<br>9:00 |
| Relinquished By/Removed From | Date/Time | Received By/Stored In | Date/Time |
| Relinquished By/Removed From | Date/Time | Received By/Stored In | Date/Time |
| Relinquished By/Removed From | Date/Time | Received By/Stored In | Date/Time |
| Relinquished By/Removed From | Date/Time | Received By/Stored In | Date/Time |
| Relinquished By/Removed From | Date/Time | Received By/Stored In | Date/Time |

SPECIAL INSTRUCTIONS

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

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

Contact Joan Kessner for any questions.

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

36 1575-10

Matrix *

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

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

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

F1600-01

| Washington Closure Hanford | CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST | RC-051-174 | Page 1 of 1 |
|---|---|---|---|

| | | | |
|---|---|---|---|
| Collector<br>STANKOVICH, M. | Company Contact<br>JOAN KESSNER | Telephone No.<br>375-4688 | Project Coordinator<br>KESSNER, JH | Price Code 8L<br>Data Turnaround 45 Days |
| Project Designation<br>100 & 300 Area Component of the RCBRA - Incremental So | Sampling Location<br>300-49 | | SAF No.<br>RC-051 | Air Quality ☐ |
| Ice Chest No. | Field Logbook No.<br>EL-1596-1 | COA<br>BESRAS6520 | Method of Shipment<br>GROUND TRANSPORT | |
| Shipped To<br>CH2MHILL | Offsite Property No.<br>A060151 | | Bill of Lading/Air Bill No.<br>SEE OSPC | |

POSSIBLE SAMPLE HAZARDS/REMARKS

*NONE*

**Special Handling and/or Storage**

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

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Preservation | None | None | | | | | | | | | | |
| Type of Container | G/P | P/G | | | | | | | | | | |
| No. of Container(s) | 1 | 1 | | | | | | | | | | |
| Volume | 1000g | 4000g | | | | | | | | | | |
| SAMPLE ANALYSIS | See item (1) in Special Instructions. | Soil Plant Toxicity ASTM E1963; Soil Nematode Toxicity ASTM E2172 | | | | | | | | | | |
| Sample No. | Matrix * | Sample Date | Sample Time | | | | | | | | | |
| J11JX6 | SOIL | 4-25-06 | 1430 | 1 | 1 | | | | | | | -01 |
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| CHAIN OF POSSESSION | Sign/Print Names | | |
|---|---|---|---|
| Relinquished By/Removed From<br>Elizabeth M Tepper 4-25-06 | Date/Time 1430 | Received By/Stored In<br>Darcy Halstead CH2M HILL | Date/Time 4-25-06 16:45 |
| Relinquished By/Removed From | Date/Time | Received By/Stored In | Date/Time |
| Relinquished By/Removed From | Date/Time | Received By/Stored In | Date/Time |
| Relinquished By/Removed From | Date/Time | Received By/Stored In | Date/Time |
| Relinquished By/Removed From | Date/Time | Received By/Stored In | Date/Time |
| Relinquished By/Removed From | Date/Time | Received By/Stored In | Date/Time |

SPECIAL INSTRUCTIONS

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

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

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

BG 1575-11

Matrix *

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

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

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