0070597

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

COMPLETE COPY OF DATA PACKAGE TO:

RECEIVED
AUG 2 1 2006
EDMC

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

COMMENTS:

SDG E2846 SAF-RC-051

Rad only X Chem only Rad & Chem

X Complete Partial

Corrected Bluegrass Report for Soil Plant Toxicity for Sample J10DV2

Waste Site: Upland Native Reference-Central Plateau

ELR Consulting, Inc.

PROJECT MANAGEMENT, ENGINEERING, & TECHNICAL SERVICES

July 20, 2006

RECEIVED
JUL 2006
CORRESPONDENCE

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

E2846

Table 2: Bluegrass Chronic Test Results for Washington Closure Hanford

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

ns indicates a non statistically significant result; [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 Jan 25, 2006																			
Laboratory Control		88	--	45.7	--	125	--	63.9	--	12.4	--	113	--	7.87	--	177	--	20.2	--
BG1542-01	J10DW4	60	E [5]	41.4	ns	--	--	40.5	E [5]	7.30	E [5]	72.4	ns	3.27	E [5]	113	E [5]	10.6	E [5]
BG1542-02	J10DV4	64	ns	55.3	ns	--	--	76.2	ns	14.9	ns	123	ns	6.98	ns	199	ns	21.8	ns
BG1542-03	J10DT8	84	ns	--	--	--	--	90.9	ns	16.7	ns	172	ns	10.0	ns	263	ns	26.7	ns
BG1542-04	J10DV2	72	ns	48.6	ns	122	ns	58.5	ns	10.7	ns	101	ns	6.59	ns	160	ns	17.3	ns
BG1542-05	J10DV1	36	E [5]	41.8	ns	91.3	E [5]	30.8	E [5]	6.70	E [5]	41.0	E [5]	3.33	E [5]	71.8	E [5]	10.0	E [5]
BG1542-06	J10DV3	64	ns	47.4	ns	108	ns	60.4	ns	8.92	ns	84.5	ns	5.13	ns	145	ns	14.0	ns
BG1542-07	J10DV0	76	ns	41.5	ns	80.9	E [5]	76.9	ns	14.7	ns	124	ns	9.10	ns	201	ns	23.8	ns
BG1542-08	J10LJ5	92	ns	--	--	--	--	78.3	ns	11.0	ns	127	ns	5.37	ns	206	ns	16.3	ns
BG1542-09	J10DT9	48	E [5]	37.9	ns	85.2	E [5]	51.0	ns	8.66	ns	90.7	ns	5.06	ns	142	ns	13.7	ns

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

Report Amended July 18, 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. B1542-01 thru 09
SDG Number BG1542

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INTRODUCTION

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

The statistical analysis presented in the original report (March 28, 2006) were recalculated for shoot height and root length. This document serves as an amended to the original 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 sub irrigation.

TEST CONCENTRATIONS

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

SAMPLE COLLECTION

Individual soil samples used during the testing were collected between October 31, 2005, and December 6, 2005. The samples were stored in the dark at 4°C until the initiation of the initiation of the tests. Chain of Custody for sample collection is provided in Appendix C.

SAMPLE CROSS-REFERENCE TABLE

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

Table 1
Sample Cross-Reference

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

SAMPLE PREPARATION

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

TEST INITIATION

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

TEST MONITORING

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

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

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

TEST TERMINATION

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

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

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

DATA ANALYSIS

For each test chamber, the following endpoints were calculated:

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

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

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

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

RESULTS AND DISCUSSION

Table 2 summarizes the results of the bluegrass tests.

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

The results for sample J10DV1 indicated a statistically significant reduction in germination, average 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 J10DV0 indicated a statistically significant reduction in average root length when compared to the laboratory control.

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

Table 2: Bluegrass Chronic Test Results for Washington Closure Hanford

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

ns indicates a non statistically significant result; ^{S}, 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 Jan 23, 2006																			
Laboratory Control		88	--	45.7	--	125	--	63.9	--	12.4	--	113	--	7.87	--	177	--	20.2	--
BG1542-01	J10DW4	60	E^{S}	41.4	ns	--	--	40.5	E^{S}	7.30	E^{S}	72.4	ns	3.27	E^{S}	113	E^{S}	10.6	E^{S}
BG1542-02	J10DV4	64	ns	55.3	ns	--	--	76.2	ns	14.9	ns	123	ns	6.98	ns	199	ns	21.8	ns
BG1542-03	J10DT8	84	ns	--	--	--	--	90.9	ns	16.7	ns	172	ns	10.0	ns	263	ns	26.7	ns
BG1542-04	J10DV2	72	ns	48.6	ns	122	ns	58.5	ns	10.7	ns	101	ns	6.59	ns	160	ns	17.3	ns
BG1542-05	J10DV1	36	E^{S}	41.8	ns	91.3	E^{S}	30.8	E^{S}	6.70	E^{S}	41.0	E^{S}	3.33	E^{S}	71.8	E^{S}	10.0	E^{S}
BG1542-06	J10DV3	64	ns	47.4	ns	108	ns	60.4	ns	8.92	ns	84.5	ns	5.13	ns	145	ns	14.0	ns
BG1542-07	J10DV0	76	ns	41.5	ns	80.9	E^{S}	76.9	ns	14.7	ns	124	ns	9.10	ns	201	ns	23.8	ns
BG1542-08	J10LJ5	92	ns	--	--	--	--	78.3	ns	11.0	ns	127	ns	5.37	ns	206	ns	16.3	ns
BG1542-09	J10DT9	48	E^{S}	37.9	ns	85.2	E^{S}	51.0	ns	8.66	ns	90.7	ns	5.06	ns	142	ns	13.7	ns

CERTIFICATION STATEMENT

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

APPENDIX A
RAW DATA SHEETS

BLUEGRASS GROWTH TEST

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

Initials: Day 0 B — Day 12 NJ — Day 14 B — Day 16 B — Day 21 AP — Day 28 B — DH37 B

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

CONC.	REPLICATE	# seeds germinated: PRE-EMERGENCE (12 days after planting)	@ EMERGENCE (14 days after planting)	POST-EMERGENCE (16 days after planting)	21	7-DAYS POST-EMERGENCE (21 days after planting)	23	14-DAYS POST-EMERGENCE (28 days after planting)	pH: INITIAL (@ planting)	FINAL (28 days after planting)
Control	A	2	3	3	3	5	5	5	6.7	6.4
	B	1	3	6	7	7	7→5	5		
	C	5	6	7	7	7	5	5		
	D	0	2	2	4	4	3	3		
	E	2	3	3	3	3	3	4		

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

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

14-Days Post-Emergence: Describe shoot appearance:

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

Measure Shoot Height (above ground)

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

Measure Shoot Weight (above ground)

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

Describe root appearance:

Replicate A
Replicate B
Replicate C
Replicate D
Replicate E

Measure Root Length (longest root)

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

Measure Root Weight (longest root)

	Tin Tare Wt. (mg)	Wet Wt (mg)	Dry Wt. (mg)
Replicate A	987.99	1704.8	1031.77
Replicate B	977.88	1681.0	1019.85
Replicate C	993.58	1786.2	1084.12
Replicate D	981.03	1197.1	992.37
Replicate E	976.75	1183.3	993.93

Comments: 60g dry wt. / rep

BLUEGRASS GROWTH TEST

Client: Hanford Project

Test Start Date: 01/25/2006

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

Sample ID: E274801-SOI2 B1542-01

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

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

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

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

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

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

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

14-Days Post-Emergence: Describe shoot appearance:

Replicate A: 3 medium plants

Replicate B: 2 small plants / has a brown shoot

Replicate C: 2 small plants

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

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

Measure Shoot Height: (above ground)

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

Measure Shoot Weight: (above ground)

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

Describe root appearance:

Replicate A

Replicate B

Replicate C

Replicate D

Replicate E

Measure Root Length: (longest root)

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

Measure Root Weight: (longest root)

	Tin Tare Wt. (mg)	Wet Wt (mg)	Dry Wt. (mg)
Replicate A	1022.45	1367.6	1036.40
Replicate B	1012.46	1094.5	1017.15
Replicate C	1003.84	1092.6	1007.87
Replicate D	990.52	1324.7	1003.66
Replicate E	988.23	1313.1	1004.41

Comments: 90 g dry wt. / rep

CETIS Test Summary

Report Date: 18 Jul-06 1:29 PM
Test Link: 07-4737-3144/B154201psB

Plant Bioassay - Chronic — **CH2M Hill**

Test No:	03-0376-5225	**Test Type:**	Plant Chronic	**Duration:**	N/A
Start Date:	25 Jan-06	**Protocol:**	ASTM E1963-02 (2002)	**Species:**	Poa sandbergii
Ending Date:		**Dil Water:**		**Source:**	
Setup Date:	25 Jan-06	**Brine:**			

Comments: recalculated Height and Length data July 18, 2006

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

Comments: J10DW4, E274801

Comparison Summary

Analysis	Endpoint	NOEL	LOEL	ChV	PMSD	Method
04-6686-9248	% Germination	< 100	100	N/A	23.72%	Equal Variance t Two-Sample
03-4698-4423	Average Height (mm)	100	> 100	N/A	16.50%	Equal Variance t Two-Sample
10-5567-7574	Average AG Wt (Wet, mg)	< 100	100	N/A	27.27%	Equal Variance t Two-Sample
19-4244-1707	Average AG Wt (Dry, mg)	< 100	100	N/A	38.24%	Equal Variance t Two-Sample
02-5160-3380	Average Root Wt. (Wet, mg	100	> 100	N/A	41.42%	Equal Variance t Two-Sample
06-2774-2762	Average Root Wt. (Dry, mg)	< 100	100	N/A	45.60%	Equal Variance t Two-Sample
14-6818-7289	Average Total Wt (Wet, mg	< 100	100	N/A	33.72%	Equal Variance t Two-Sample
13-2652-1747	Average Total Wt (Dry, mg)	< 100	100	N/A	40.05%	Equal Variance t Two-Sample

CETIS Test Summary

Report Date: 18 Jul-06 1:29 PM
Test Link: 07-4737-3144/B154201psB

% Germination Summary

Conc-%	Control Type	Reps	Mean	Minimum	Maximum	SE	SD	CV
0	Artificial Soil/S	5	0.88000	0.60000	1.00000	0.08000	0.17889	20.33%
100		5	0.60000	0.40000	0.80000	0.08944	0.20000	33.33%

Average Height (mm) Summary

Conc-%	Control Type	Reps	Mean	Minimum	Maximum	SE	SD	CV
0	Artificial Soil/S	5	45.68	36.700	55.8	3.3695	7.5344	16.49%
100		5	41.390	33.5	46.25	2.2538	5.0396	12.18%

Average AG Wt (Wet, mg) Summary

Conc-%	Control Type	Reps	Mean	Minimum	Maximum	SE	SD	CV
0	Artificial Soil/S	5	63.903	41.475	82.338	7.1313	15.946	24.95%
100		5	40.525	19.54	55.457	6.0773	13.589	33.53%

Average AG Wt (Dry, mg) Summary

Conc-%	Control Type	Reps	Mean	Minimum	Maximum	SE	SD	CV
0	Artificial Soil/S	5	12.351	7.9275	19.276	2.1347	4.7733	38.65%
100		5	7.2993	3.675	10.637	1.3763	3.0775	42.16%

Average Root Wt. (Wet, mg) Summary

Conc-%	Control Type	Reps	Mean	Minimum	Maximum	SE	SD	CV
0	Artificial Soil/S	5	113.23	51.638	158.52	21.449	47.962	42.36%
100		5	72.356	40.920	111.72	13.274	29.681	41.02%

Average Root Wt. (Dry, mg) Summary

Conc-%	Control Type	Reps	Mean	Minimum	Maximum	SE	SD	CV
0	Artificial Soil/S	5	7.8666	3.78	14.108	1.8639	4.1678	52.98%
100		5	3.268	2.015	4.6500	0.4968	1.1108	33.99%

Average Total Wt (Wet, mg) Summary

Conc-%	Control Type	Reps	Mean	Minimum	Maximum	SE	SD	CV
0	Artificial Soil/S	5	177.14	93.113	240.86	26.086	58.331	32.93%
100		5	112.88	60.46	167.17	18.747	41.919	37.14%

Average Total Wt (Dry, mg) Summary

Conc-%	Control Type	Reps	Mean	Minimum	Maximum	SE	SD	CV
0	Artificial Soil/S	5	20.217	12.223	33.384	3.9407	8.8117	43.58%
100		5	10.567	6.02	15.287	1.8513	4.1395	39.17%

CETIS Test Summary

Report Date: 18 Jul-06 1:29 PM
Test Link: 07-4737-3144/B154201psB

% Germination Detail

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

Average Height (mm) Detail

Conc-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Artificial Soil/S	50.6 ✓	41.8 ✓	55.8 ✓	36.7000 ✓	43.5 ✓
100		43.7000	39.5	33.5	44	46.25

Average AG Wt (Wet, mg) Detail

Conc-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Artificial Soil/S	67.2900	55.1900	82.338	73.2233	41.4750
100		55.4567	19.54	38.2900	40.4250	48.9125

Average AG Wt (Dry, mg) Detail

Conc-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Artificial Soil/S	15.1720	10.552	19.276	8.82666	7.92751
100		10.6366	3.67499	5.23001	6.6675	10.2875

Average Root Wt. (Wet, mg) Detail

Conc-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Artificial Soil/S	143.362	140.624	158.524	72.0233	51.6375
100		111.717	40.9200	44.38	83.545	81.2175

Average Root Wt. (Dry, mg) Detail

Conc-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Artificial Soil/S	8.75601	8.39399	14.108	3.77999	4.295
100		4.65000	2.34500	2.01498	3.28499	4.045

Average Total Wt (Wet, mg) Detail

Conc-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Artificial Soil/S	210.652	195.814	240.862	145.247	93.1125
100		167.173	60.46	82.6700	123.97	130.130

Average Total Wt (Dry, mg) Detail

Conc-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Artificial Soil/S	23.9280	18.946	33.384	12.6066	12.2225
100		15.2866	6.01999	7.245	9.95248	14.3325

CETIS Analysis Detail

Plant Bioassay - Chronic — CH2M Hill

Endpoint	Analysis Type	Sample Link	Control Link	Date Analyzed	Version
% Germination	Comparison	07-4737-3144	07-4737-3144	18 Jul-06 1:28 PM	CETISv1.1.2

Method	Alt H	Data Transform	Zeta	NOEL	LOEL	Toxic Units	ChV	PMSD
Equal Variance t Two-Sample	C > T	Angular (Corrected)		<100	100		N/A	23.72%

Group Comparisons

Control vs	Conc-%	Statistic	Critical	P-Value	MSD	Decision(0.05)
Artificial Soil/Sedi	100	2.36128	1.85955	0.0229	0.24559	Significant Effect

ANOVA Table

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

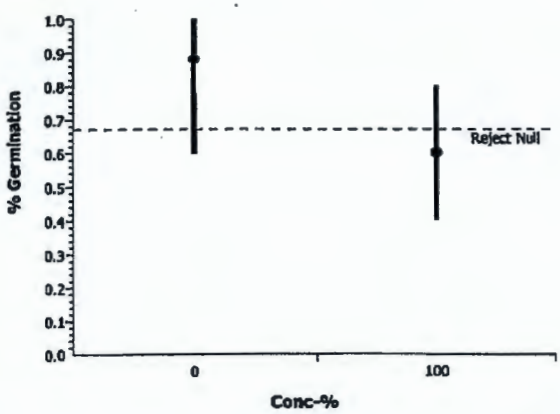
ANOVA Assumptions

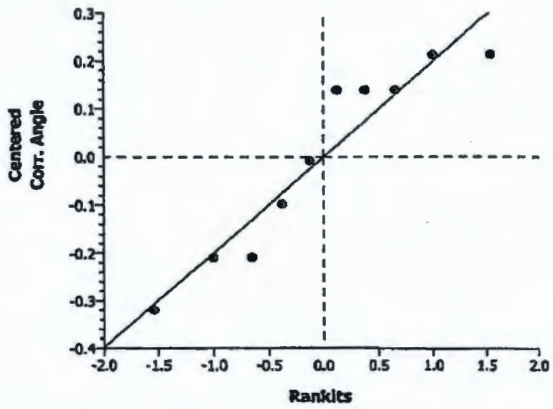
Attribute	Test	Statistic	Critical	P-Value	Decision(0.01)
Variances	Variance Ratio F	1.04816	23.15450	0.96473	Equal Variances
Distribution	Shapiro-Wilk W	0.88173		0.13660	Normal Distribution

Data Summary

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

Graphics





CETIS Analysis Detail

Plant Bioassay - Chronic — **CH2M Hill**

Endpoint	Analysis Type	Sample Link	Control Link	Date Analyzed	Version
Average Height (mm)	Comparison	07-4737-3144	07-4737-3144	18 Jul-06 1:28 PM	CETISv1.1.2

Method	Alt H	Data Transform	Zeta	NOEL	LOEL	Toxic Units	ChV	PMSD
Equal Variance t Two-Sample	C > T	Untransformed		100	>100	1	N/A	16.50%

Group Comparisons

Control	vs	Conc-%	Statistic	Critical	P-Value	MSD	Decision(0.05)
Artificial Soil/Sedi		100	1.05828	1.85955	0.1604	7.53817	Non-Significant Effect

ANOVA Table

Source	Sum of Squares	Mean Square	DF	F Statistic	P-Value	Decision(0.05)
Between	46.01024	46.01024	1	1.12	0.32083	Non-Significant Effect
Error	328.66	41.0825	8			
Total	374.670212	87.092735	9			

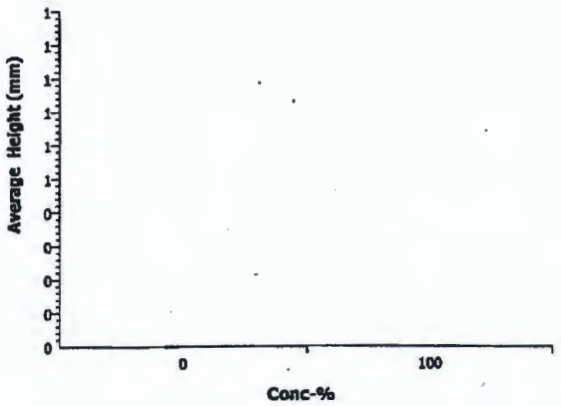
ANOVA Assumptions

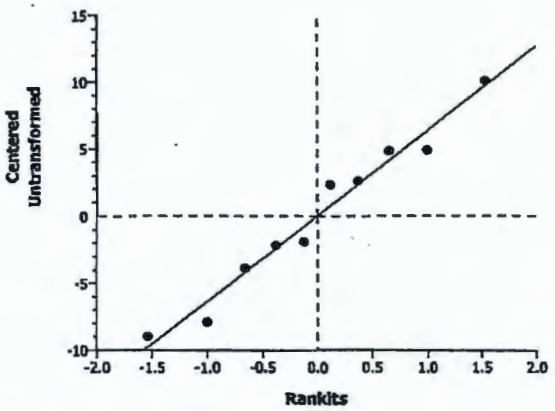
Attribute	Test	Statistic	Critical	P-Value	Decision(0.01)
Variances	Variance Ratio F	2.23510	23.15450	0.45515	Equal Variances
Distribution	Shapiro-Wilk W	0.96425		0.83306	Normal Distribution

Data Summary

			Original Data				Transformed Data			
Conc-%	Control Type	Count	Mean	Minimum	Maximum	SD	Mean	Minimum	Maximum	SD
0	Artificial Soil/S	5	45.68	36.7	55.8	7.5344				
100		5	41.390	33.5	46.25	5.0396				

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	07-4737-3144	07-4737-3144	18 Jul-06 1:28 PM	CETISv1.1.2

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

Group Comparisons

Control	vs	Conc-%	Statistic	Critical	P-Value	MSD	Decision(0.05)
Artificial Soil/Sedi		100	2.49513	1.85955	0.0186	17.4233	Significant Effect

ANOVA Table

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

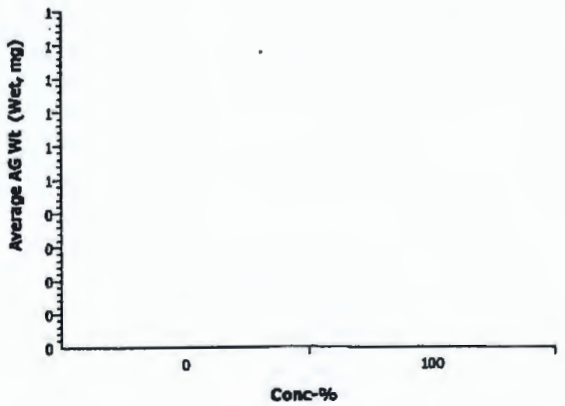
ANOVA Assumptions

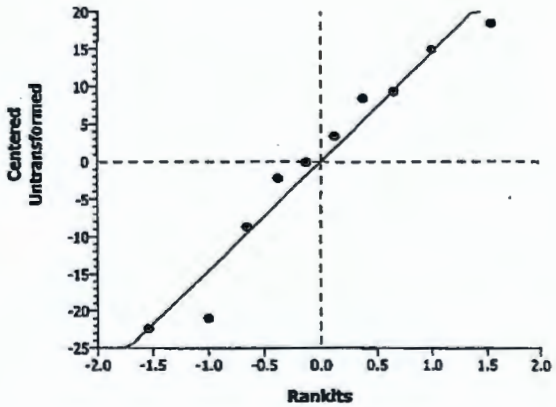
Attribute	Test	Statistic	Critical	P-Value	Decision(0.01)
Variances	Variance Ratio F	1.37694	23.15450	0.76412	Equal Variances
Distribution	Shapiro-Wilk W	0.93736		0.52406	Normal Distribution

Data Summary

			Original Data				Transformed Data			
Conc-%	Control Type	Count	Mean	Minimum	Maximum	SD	Mean	Minimum	Maximum	SD
0	Artificial Soil/S	5	63.903	41.475	82.338	15.946				
100		5	40.525	19.54	55.457	13.589				

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	07-4737-3144	07-4737-3144	18 Jul-06 1:28 PM	CETISv1.1.2

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

Group Comparisons

Control	vs	Conc-%	Statistic	Critical	P-Value	MSD	Decision(0.05)
Artificial Soil/Sedi		100	1.98886	1.85955	0.0410	4.72307	Significant Effect

ANOVA Table

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

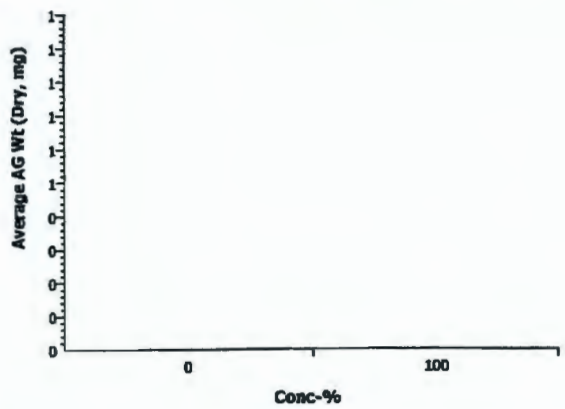
ANOVA Assumptions

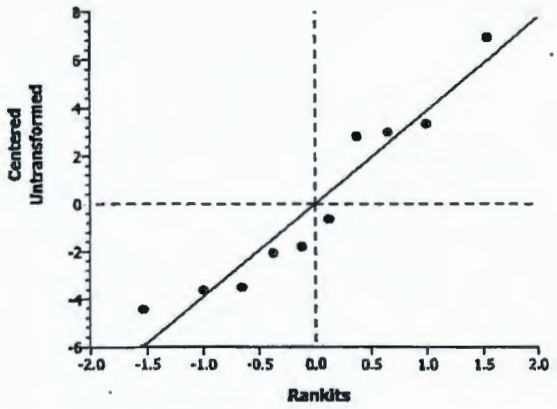
Attribute	Test	Statistic	Critical	P-Value	Decision(0.01)
Variances	Variance Ratio F	2.40572	23.15450	0.41603	Equal Variances
Distribution	Shapiro-Wilk W	0.91144		0.29103	Normal Distribution

Data Summary

			Original Data				Transformed Data			
Conc-%	Control Type	Count	Mean	Minimum	Maximum	SD	Mean	Minimum	Maximum	SD
0	Artificial Soil/S	5	12.351	7.9275	19.276	4.7733				
100		5	7.2993	3.675	10.637	3.0775				

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	07-4737-3144	07-4737-3144	18 Jul-06 1:29 PM	CETISv1.1.2

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

Group Comparisons

Control	vs	Conc-%	Statistic	Critical	P-Value	MSD	Decision(0.05)
Artificial Soil/Sedi		100	1.62059	1.85955	0.0719	46.906	Non-Significant Effect

ANOVA Table

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

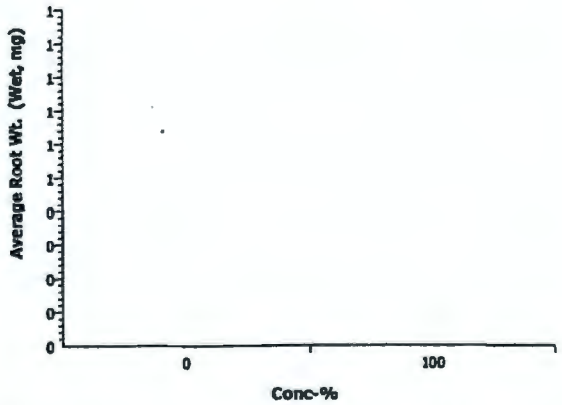
ANOVA Assumptions

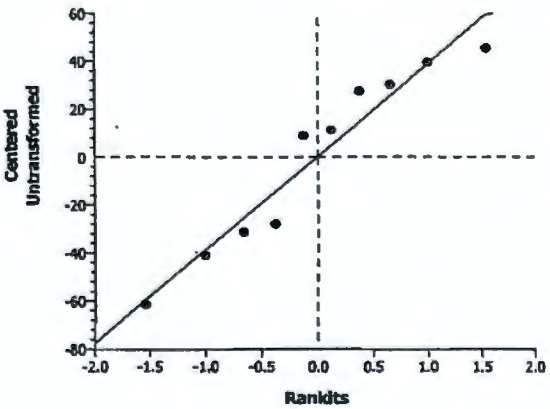
Attribute	Test	Statistic	Critical	P-Value	Decision(0.01)
Variances	Variance Ratio F	2.61121	23.15450	0.37516	Equal Variances
Distribution	Shapiro-Wilk W	0.91516		0.31837	Normal Distribution

Data Summary

			Original Data				Transformed Data			
Conc-%	Control Type	Count	Mean	Minimum	Maximum	SD	Mean	Minimum	Maximum	SD
0	Artificial Soil/S	5	113.23	51.638	158.52	47.962				
100		5	72.356	40.920	111.72	29.681				

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	07-4737-3144	07-4737-3144	18 Jul-06 1:29 PM	CETISv1.1.2

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

Group Comparisons

Control	vs	Conc-%	Statistic	Critical	P-Value	MSD	Decision(0.05)
Artificial Soil/Sedi		100	2.38399	1.85955	0.0221	3.58697	Significant Effect

ANOVA Table

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

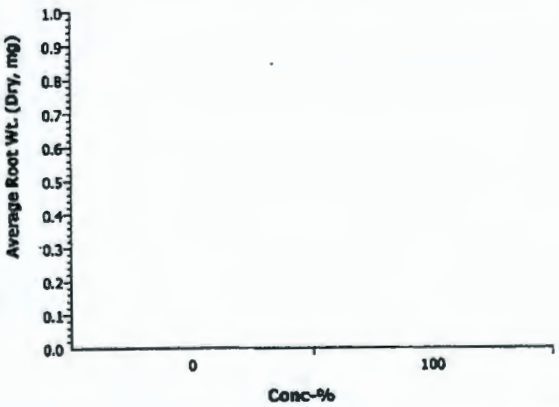
ANOVA Assumptions

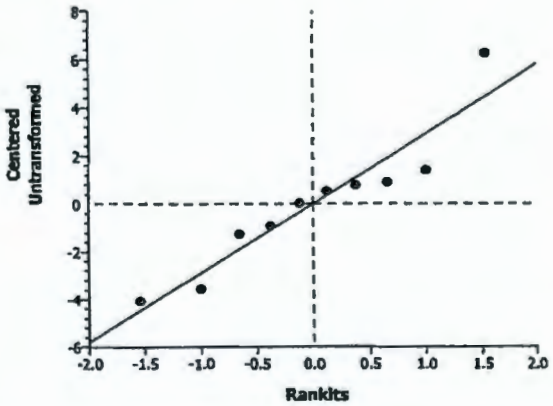
Attribute	Test	Statistic	Critical	P-Value	Decision(0.01)
Variances	Variance Ratio F	14.07658	23.15450	0.02523	Equal Variances
Distribution	Shapiro-Wilk W	0.91314		0.30324	Normal Distribution

Data Summary

			Original Data				Transformed Data			
Conc-%	Control Type	Count	Mean	Minimum	Maximum	SD	Mean	Minimum	Maximum	SD
0	Artificial Soil/S	5	7.8666	3.78	14.108	4.1678				
100		5	3.268	2.015	4.6500	1.1108				

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	07-4737-3144	07-4737-3144	18 Jul-06 1:29 PM	CETISv1.1.2

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

Group Comparisons

Control	vs	Conc-%	Statistic	Critical	P-Value	MSD	Decision(0.05)
Artificial Soil/Sedi		100	2.00028	1.85955	0.0402	59.7359	Significant Effect

ANOVA Table

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

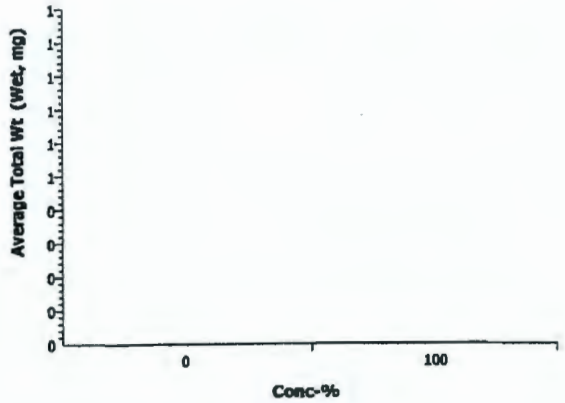
ANOVA Assumptions

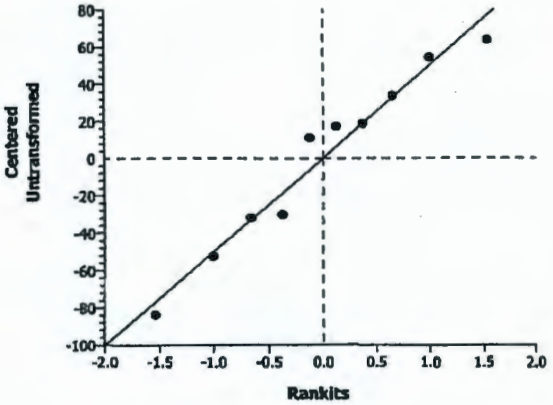
Attribute	Test	Statistic	Critical	P-Value	Decision(0.01)
Variances	Variance Ratio F	1.93632	23.15450	0.53790	Equal Variances
Distribution	Shapiro-Wilk W	0.95158		0.68718	Normal Distribution

Data Summary

			Original Data				Transformed Data			
Conc-%	Control Type	Count	Mean	Minimum	Maximum	SD	Mean	Minimum	Maximum	SD
0	Artificial Soil/S	5	177.14	93.113	240.86	58.331				
100		5	112.88	60.46	167.17	41.919				

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	07-4737-3144	07-4737-3144	18 Jul-06 1:29 PM	CETISv1.1.2

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

Group Comparisons

Control	vs	Conc-%	Statistic	Critical	P-Value	MSD	Decision(0.05)
Artificial Soil/Sedi		100	2.21643	1.85955	0.0288	8.09629	Significant Effect

ANOVA Table

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

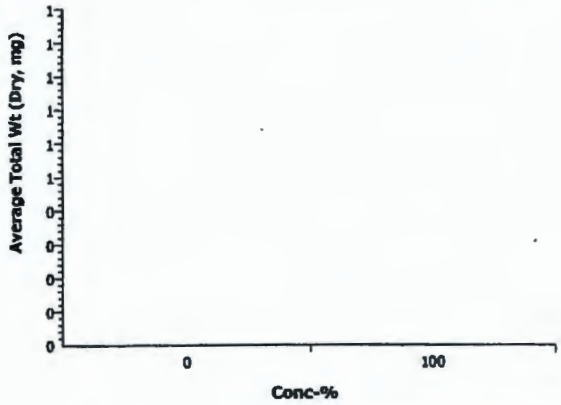
ANOVA Assumptions

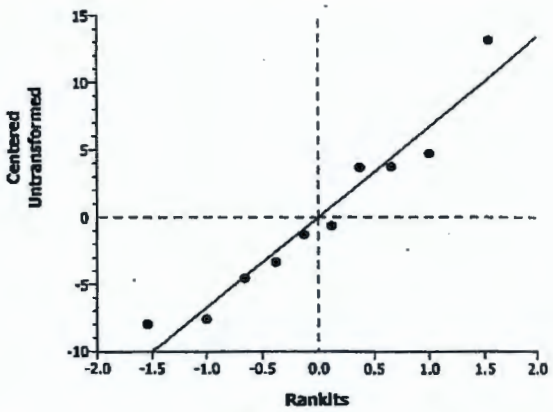
Attribute	Test	Statistic	Critical	P-Value	Decision(0.01)
Variances	Variance Ratio F	4.53128	23.15450	0.17247	Equal Variances
Distribution	Shapiro-Wilk W	0.93905		0.54254	Normal Distribution

Data Summary

			Original Data				Transformed Data			
Conc-%	Control Type	Count	Mean	Minimum	Maximum	SD	Mean	Minimum	Maximum	SD
0	Artificial Soil/S	5	20.217	12.223	33.384	8.8117				
100		5	10.567	6.02	15.287	4.1395				

Graphics





BLUEGRASS GROWTH TEST

Client: Hanford Project

Test Start Date: 01/25/2006

Initials: Day 0 BN Day 12 NT Day 14 BN Day 16 NT Day 21 BB Day 28 BN

Sample ID: E280101-SOI2 B1542-02

CONC.	REPLICATE	# seeds germinated: PRE-EMERGENCE (12 days after planting)	@ EMERGENCE (14 days after planting)	POST-EMERGENCE (18 days after planting)	# alive: 21	23	7-DAYS POST-EMERGENCE (21 days after planting)	14-DAYS POST-EMERGENCE (28 days after planting)	pH: INITIAL (@ planting)	FINAL (28 days after planting)
100%	A	3	4	4	5	5	5	5	7.1	7.1
	B	2	3	3	3	3	3	3		
	C	1	2	3	3	3	1	1		
	D	4	6	6	7	7	7.05	5		
	E	1	1	1	2	3	3	2		

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

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

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

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

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

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

14-Days Post-Emergence: Describe shoot appearance:

Replicate A: 1 large 4 medium all look good

Replicate B: NS 5 2 small 1 very small 1 brown shoot on smaller one

Replicate C: NS 1 medium looks good

Replicate D: 3 medium 1 small look good

Replicate E: 2 medium 3 large plants look good

Measure Shoot Height: (above ground)

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

Measure Shoot Weight: (above ground)

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

Describe root appearance:

Replicate A

Replicate B

Replicate C

Replicate D

Replicate E

Measure Root Length: (longest root)

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

Measure Root Weight: (longest root)

	Tin Tare Wt. (mg)	Wet Wt (mg)	Dry Wt. (mg)
Replicate A	982.54	1685.7	1024.49
Replicate B	983.40	1122.6	992.50
Replicate C	1000.19	1202.5	1013.56
Replicate D	993.62	1455.7	1017.39
Replicate E	969.97	1254.1	981.99

Comments: 90 gl dry wt /rep

CETIS Test Summary

Report Date: 18 Jul-06 2:17 PM
Test Link: 16-8985-7214/B154202psB

Plant Bioassay - Chronic — **CH2M Hill**

Test No:	16-7149-5301	**Test Type:**	Plant Chronic	**Duration:**	N/A
Start Date:	25 Jan-06	**Protocol:**	ASTM E1963-02 (2002)	**Species:**	Poa sandbergii
Ending Date:		**Dil Water:**		**Source:**	
Setup Date:	25 Jan-06	**Brine:**			

Comments: recalculated Height and Length data July 18, 2006

Sample No:	07-3307-9513	**Code:**	B1542-02	**Client:**	
Sample Date:	08 Nov-05	**Material:**	Soil	**Project:**	
Receive Date:		**Source:**	Hanford		
Sample Age:	78d 0h	**Station:**			

Comments: J10DV4, J10DV5, J10DV6, J10DV7, J10DV8.
E280101

Comparison Summary

Analysis	Endpoint	NOEL	LOEL	ChV	PMSD	Method
09-8154-0700	% Germination	100	> 100	N/A	37.51%	Equal Variance t Two-Sample
06-2016-8600	Average Height (mm)	100	> 100	N/A	35.14%	Equal Variance t Two-Sample
02-5596-9334	Average AG Wt (Wet, mg)	100	> 100	N/A	49.90%	Equal Variance t Two-Sample
14-0494-7651	Average AG Wt (Dry, mg)	100	> 100	N/A	59.46%	Equal Variance t Two-Sample
10-5875-1041	Average Root Wt. (Wet, mg	100	> 100	N/A	55.35%	Equal Variance t Two-Sample
07-0264-8106	Average Root Wt. (Dry, mg)	100	> 100	N/A	62.43%	Equal Variance t Two-Sample
06-1145-5351	Average Total Wt (Wet, mg	100	> 100	N/A	51.32%	Equal Variance t Two-Sample
06-7364-8671	Average Total Wt (Dry, mg)	100	> 100	N/A	59.60%	Equal Variance t Two-Sample

CETIS Test Summary

Report Date: 18 Jul-06 2:17 PM
Test Link: 16-8985-7214/B154202psB

% Germination Summary

Conc-%	Control Type	Reps	Mean	Minimum	Maximum	SE	SD	CV
0	Artificial Soil/S	5	0.88000	0.60000	1.00000	0.08000	0.17889	20.33%
100		5	0.64000	0.20000	1.00000	0.16000	0.35777	55.90%

Average Height (mm) Summary

Conc-%	Control Type	Reps	Mean	Minimum	Maximum	SE	SD	CV
0	Artificial Soil/S	5	45.68	36.700	55.8	3.3695	7.5344	16.49%
100		5	55.3	28.700	78	7.9481	17.772	32.14%

Average AG Wt (Wet, mg) Summary

Conc-%	Control Type	Reps	Mean	Minimum	Maximum	SE	SD	CV
0	Artificial Soil/S	5	63.903	41.475	82.338	7.1313	15.946	24.95%
100		5	76.157	23.653	115.05	15.595	34.870	45.79%

Average AG Wt (Dry, mg) Summary

Conc-%	Control Type	Reps	Mean	Minimum	Maximum	SE	SD	CV
0	Artificial Soil/S	5	12.351	7.9275	19.276	2.1347	4.7733	38.65%
100		5	14.852	4.1033	24.8	3.3228	7.4301	50.03%

Average Root Wt. (Wet, mg) Summary

Conc-%	Control Type	Reps	Mean	Minimum	Maximum	SE	SD	CV
0	Artificial Soil/S	5	113.23	51.638	158.52	21.449	47.962	42.36%
100		5	122.76	46.4	202.31	25.995	58.126	47.35%

Average Root Wt. (Dry, mg) Summary

Conc-%	Control Type	Reps	Mean	Minimum	Maximum	SE	SD	CV
0	Artificial Soil/S	5	7.8666	3.78	14.108	1.8639	4.1678	52.98%
100		5	6.9781	2.3667	13.37	1.8708	4.1833	59.95%

Average Total Wt (Wet, mg) Summary

Conc-%	Control Type	Reps	Mean	Minimum	Maximum	SE	SD	CV
0	Artificial Soil/S	5	177.14	93.113	240.86	26.086	58.331	32.93%
100		5	198.92	70.053	317.36	41.348	92.456	46.48%

Average Total Wt (Dry, mg) Summary

Conc-%	Control Type	Reps	Mean	Minimum	Maximum	SE	SD	CV
0	Artificial Soil/S	5	20.217	12.223	33.384	3.9407	8.8117	43.58%
100		5	21.830	6.47	38.17	5.1432	11.500	52.68%

CETIS Test Summary

Report Date: 18 Jul-06 2:17 PM
Test Link: 16-8985-7214/B154202psB

% Germination Detail

Conc-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Artificial Soil/S	1.00000	1.00000	1.00000	0.60000	0.80000
100		1.00000	0.60000	0.20000	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	50.6	41.8	55.8	36.7000	43.5
100		56.2000	28.7000	61	52.6	78

Average AG Wt (Wet, mg) Detail

Conc-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Artificial Soil/S	67.2900	55.1900	82.338	73.2233	41.4750
100		90.872	23.6533	115.05	61.868	89.34

Average AG Wt (Dry, mg) Detail

Conc-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Artificial Soil/S	15.1720	10.552	19.276	8.82666	7.92751
100		16.948	4.10333	24.8	13.4640	14.9450

Average Root Wt. (Wet, mg) Detail

Conc-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Artificial Soil/S	143.362	140.624	158.524	72.0233	51.6375
100		130.632	46.4	202.31	92.416	142.065

Average Root Wt. (Dry, mg) Detail

Conc-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Artificial Soil/S	8.75601	8.39399	14.108	3.77999	4.295
100		8.39000	2.36666	13.37	4.75400	6.01001

Average Total Wt (Wet, mg) Detail

Conc-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Artificial Soil/S	210.652	195.814	240.862	145.247	93.1125
100		221.504	70.0533	317.360	154.284	231.405

Average Total Wt (Dry, mg) Detail

Conc-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Artificial Soil/S	23.9280	18.946	33.384	12.6066	12.2225
100		25.3380	6.46999	38.17	18.2180	20.9550

CETIS Analysis Detail

Plant Bioassay - Chronic — **CH2M Hill**

Endpoint	Analysis Type	Sample Link	Control Link	Date Analyzed	Version
% Germination	Comparison	16-8985-7214	16-8985-7214	18 Jul-06 2:17 PM	CETISv1.1.2

Method	Alt H	Data Transform	Zeta	NOEL	LOEL	Toxic Units	ChV	PMSD
Equal Variance t Two-Sample	C > T	Angular (Corrected)		100	>100	1	N/A	37.51%

Group Comparisons

Control	vs	Conc-%	Statistic	Critical	P-Value	MSD	Decision(0.05)
Artificial Soil/Sedi		100	1.30924	1.85955	0.1134	0.37044	Non-Significant Effect

ANOVA Table

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

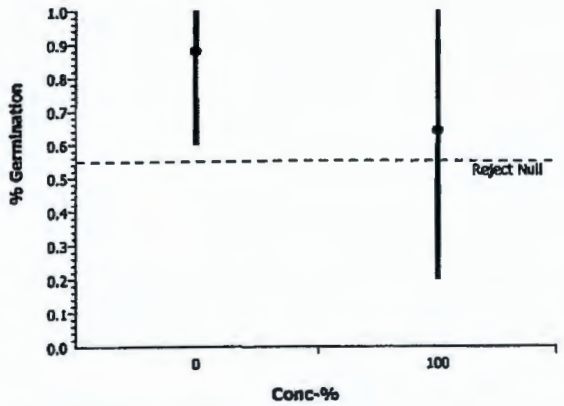
ANOVA Assumptions

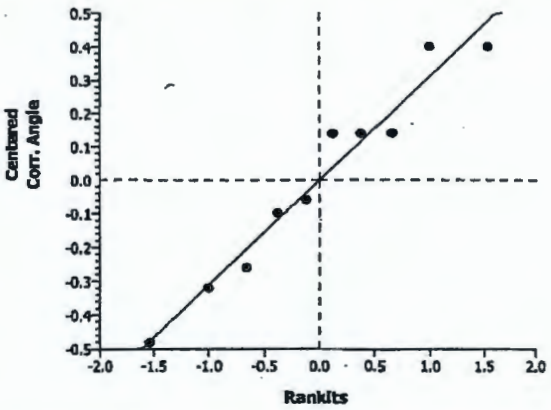
Attribute	Test	Statistic	Critical	P-Value	Decision(0.01)
Variances	Variance Ratio F	3.65997	23.15450	0.23677	Equal Variances
Distribution	Shapiro-Wilk W	0.94392		0.59737	Normal Distribution

Data Summary

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

Graphics





CETIS Analysis Detail

Plant Bioassay - Chronic — **CH2M Hill**

Endpoint	Analysis Type	Sample Link	Control Link	Date Analyzed	Version
Average Height (mm)	Comparison	16-8985-7214	16-8985-7214	18 Jul-06 2:17 PM	CETISv1.1.2

Method	Alt H	Data Transform	Zeta	NOEL	LOEL	Toxic Units	ChV	PMSD
Equal Variance t Two-Sample	C > T	Untransformed		100	>100	1	N/A	35.14%

Group Comparisons

Control	vs	Conc-%	Statistic	Critical	P-Value	MSD	Decision(0.05)
Artificial Soil/Sedi		100	-1.1144	1.85955	0.8513	16.0531	Non-Significant Effect

ANOVA Table

Source	Sum of Squares	Mean Square	DF	F Statistic	P-Value	Decision(0.05)
Between	231.361	231.361	1	1.24	0.29748	Non-Significant Effect
Error	1490.508	186.3135	8			
Total	1721.86896	417.67451	9			

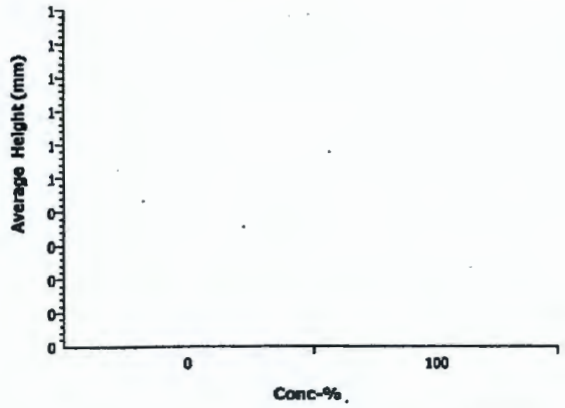
ANOVA Assumptions

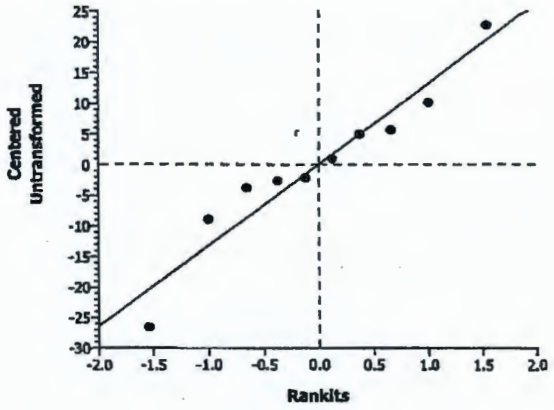
Attribute	Test	Statistic	Critical	P-Value	Decision(0.01)
Variances	Variance Ratio F	5.56415	23.15450	0.12511	Equal Variances
Distribution	Shapiro-Wilk W	0.95255		0.69875	Normal Distribution

Data Summary

			Original Data				Transformed Data			
Conc-%	Control Type	Count	Mean	Minimum	Maximum	SD	Mean	Minimum	Maximum	SD
0	Artificial Soil/S	5	45.68	36.7	55.8	7.5344				
100		5	55.3	28.7	78	17.772				

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	16-8985-7214	16-8985-7214	18 Jul-06 2:17 PM	CETISv1.1.2

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

Group Comparisons

Control	vs	Conc-%	Statistic	Critical	P-Value	MSD	Decision(0.05)
Artificial Soil/Sedi		100	-0.7146	1.85955	0.7524	31.8871	Non-Significant Effect

ANOVA Table

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

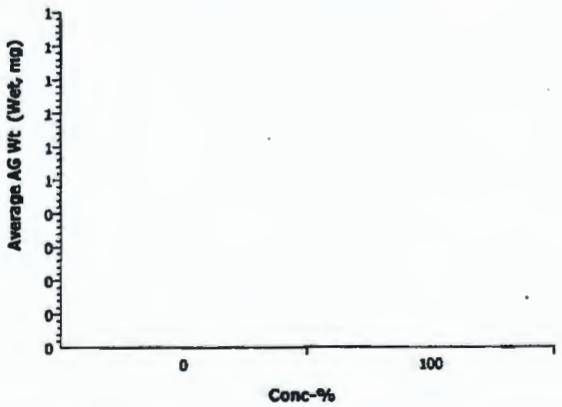
ANOVA Assumptions

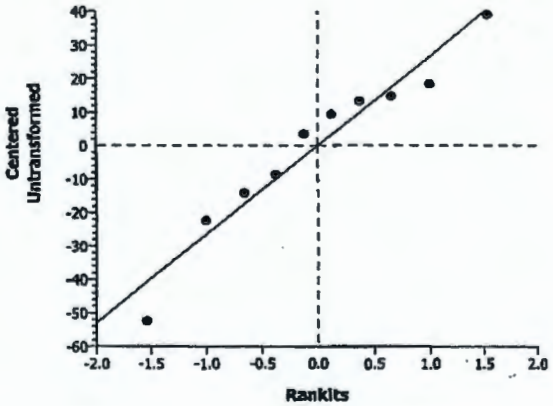
Attribute	Test	Statistic	Critical	P-Value	Decision(0.01)
Variances	Variance Ratio F	4.78193	23.15450	0.15878	Equal Variances
Distribution	Shapiro-Wilk W	0.95704		0.75167	Normal Distribution

Data Summary

			Original Data				Transformed Data			
Conc-%	Control Type	Count	Mean	Minimum	Maximum	SD	Mean	Minimum	Maximum	SD
0	Artificial Soil/S	5	63.903	41.475	82.338	15.946				
100		5	76.157	23.653	115.05	34.870				

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	16-8985-7214	16-8985-7214	18 Jul-06 2:17 PM	CETISv1.1.2

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

Group Comparisons

Control	vs	Conc-%	Statistic	Critical	P-Value	MSD	Decision(0.05)
Artificial Soil/Sedi		100	-0.6333	1.85955	0.7279	7.34419	Non-Significant Effect

ANOVA Table

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

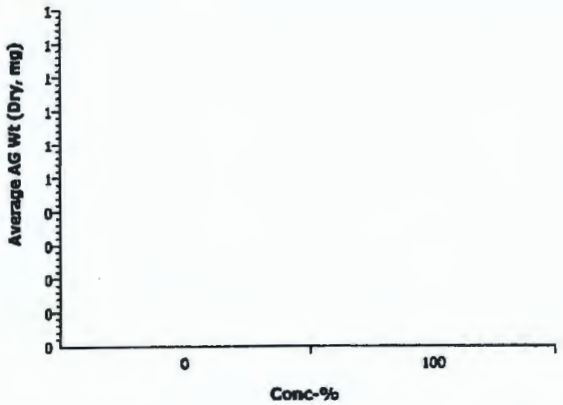
ANOVA Assumptions

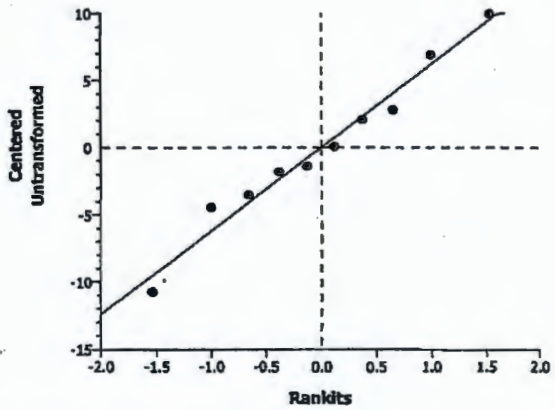
Attribute	Test	Statistic	Critical	P-Value	Decision(0.01)
Variances	Variance Ratio F	2.42296	23.15450	0.41235	Equal Variances
Distribution	Shapiro-Wilk W	0.98225		0.97606	Normal Distribution

Data Summary

			Original Data				Transformed Data			
Conc-%	Control Type	Count	Mean	Minimum	Maximum	SD	Mean	Minimum	Maximum	SD
0	Artificial Soil/S	5	12.351	7.9275	19.276	4.7733				
100		5	14.852	4.1033	24.8	7.4301				

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	16-8985-7214	16-8985-7214	18 Jul-06 2:17 PM	CETISv1.1.2

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

Group Comparisons

Control	vs	Conc-%	Statistic	Critical	P-Value	MSD	Decision(0.05)
Artificial Soil/Sedi		100	-0.2828	1.85955	0.6077	62.6698	Non-Significant Effect

ANOVA Table

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

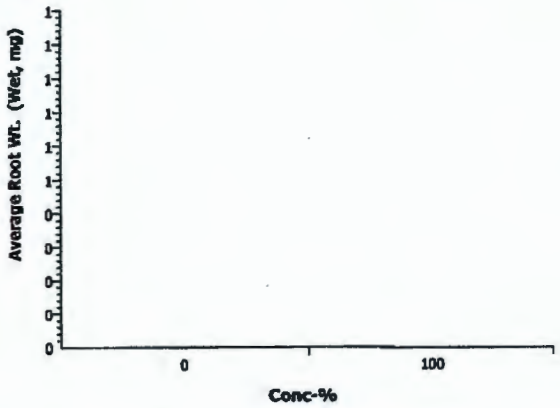
ANOVA Assumptions

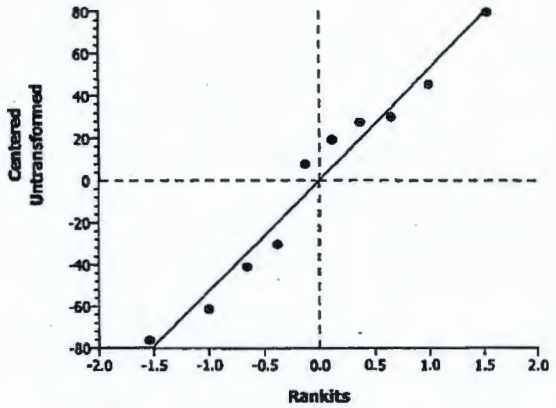
Attribute	Test	Statistic	Critical	P-Value	Decision(0.01)
Variances	Variance Ratio F	1.46872	23.15450	0.71863	Equal Variances
Distribution	Shapiro-Wilk W	0.95710		0.75234	Normal Distribution

Data Summary

			Original Data				Transformed Data			
Conc-%	Control Type	Count	Mean	Minimum	Maximum	SD	Mean	Minimum	Maximum	SD
0	Artificial Soil/S	5	113.23	51.638	158.52	47.962				
100		5	122.76	46.4	202.31	58.126				

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	16-8985-7214	16-8985-7214	18 Jul-06 2:17 PM	CETISv1.1.2

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

Group Comparisons

Control	vs	Conc-%	Statistic	Critical	P-Value	MSD	Decision(0.05)
Artificial Soil/Sedi		100	0.33643	1.85955	0.3726	4.91076	Non-Significant Effect

ANOVA Table

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

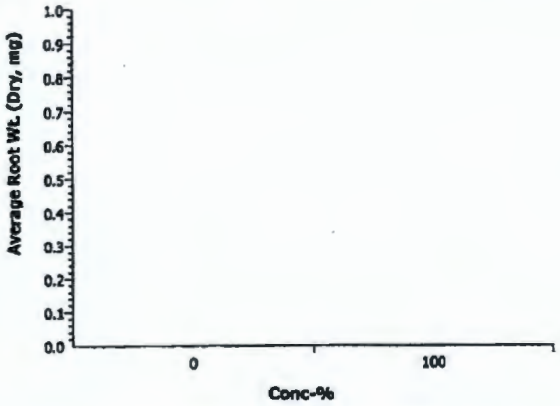
ANOVA Assumptions

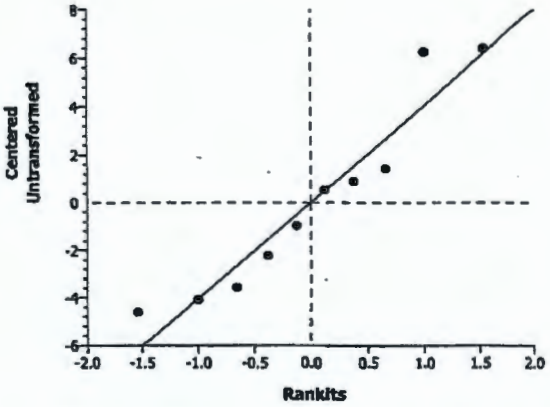
Attribute	Test	Statistic	Critical	P-Value	Decision(0.01)
Variances	Variance Ratio F	1.00746	23.15450	0.99443	Equal Variances
Distribution	Shapiro-Wilk W	0.90269		0.23446	Normal Distribution

Data Summary

			Original Data				Transformed Data			
Conc-%	Control Type	Count	Mean	Minimum	Maximum	SD	Mean	Minimum	Maximum	SD
0	Artificial Soil/S	5	7.8666	3.78	14.108	4.1678				
100		5	6.9781	2.3667	13.37	4.1833				

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	16-8985-7214	16-8985-7214	18 Jul-06 2:17 PM	CETISv1.1.2

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

Group Comparisons

Control	vs	Conc-%	Statistic	Critical	P-Value	MSD	Decision(0.05)
Artificial Soil/Sedi		100	-0.4456	1.85955	0.6661	90.9112	Non-Significant Effect

ANOVA Table

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

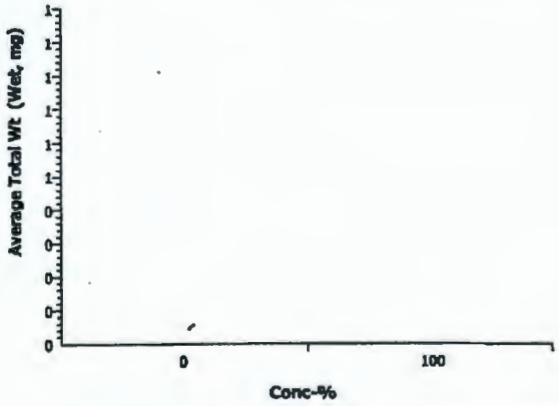
ANOVA Assumptions

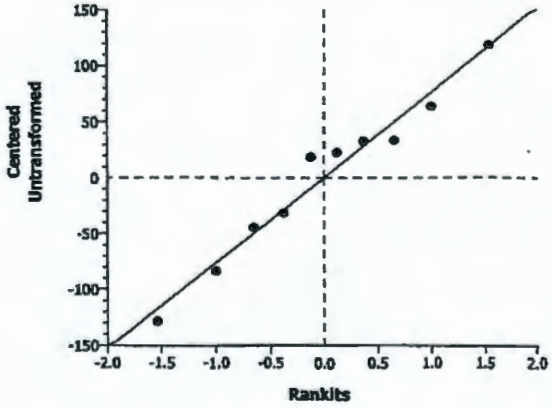
Attribute	Test	Statistic	Critical	P-Value	Decision(0.01)
Variances	Variance Ratio F	2.51228	23.15450	0.39406	Equal Variances
Distribution	Shapiro-Wilk W	0.96972		0.88820	Normal Distribution

Data Summary

			Original Data				Transformed Data			
Conc-%	Control Type	Count	Mean	Minimum	Maximum	SD	Mean	Minimum	Maximum	SD
0	Artificial Soil/S	5	177.14	93.113	240.86	58.331				
100		5	198.92	70.053	317.36	92.456				

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	16-8985-7214	16-8985-7214	18 Jul-06 2:17 PM	CETISv1.1.2

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

Group Comparisons

Control	vs	Conc-%	Statistic	Critical	P-Value	MSD	Decision(0.05)
Artificial Soil/Sedi		100	-0.2489	1.85955	0.5951	12.0486	Non-Significant Effect

ANOVA Table

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

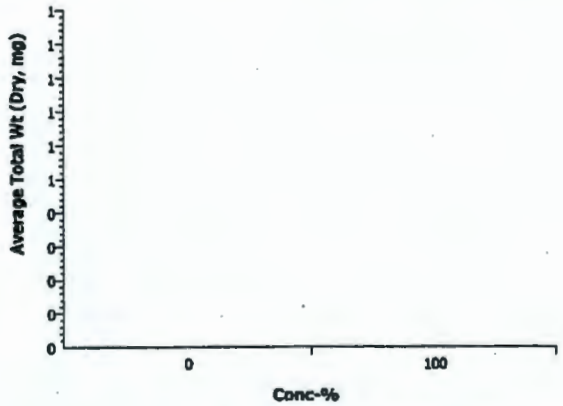
ANOVA Assumptions

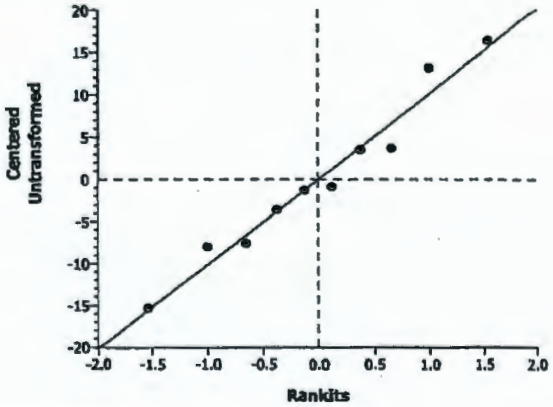
Attribute	Test	Statistic	Critical	P-Value	Decision(0.01)
Variances	Variance Ratio F	1.70337	23.15450	0.61853	Equal Variances
Distribution	Shapiro-Wilk W	0.96503		0.84128	Normal Distribution

Data Summary

			Original Data				Transformed Data			
Conc-%	Control Type	Count	Mean	Minimum	Maximum	SD	Mean	Minimum	Maximum	SD
0	Artificial Soil/S	5	20.217	12.223	33.384	8.8117				
100		5	21.830	6.47	38.17	11.500				

Graphics





BLUEGRASS GROWTH TEST

Client: Hanford Project

Test Start Date: 01/25/2006

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

Sample ID: E283101-SO12 B1542-03

CONC.	REPLICATE	PRE-EMERGENCE (12 days after planting)	0 EMERGENCE (14 days after planting)	POST-EMERGENCE (16 days after planting)	7-DAYS POST-EMERGENCE (21 days after planting)			14-DAYS POST-EMERGENCE (26 days after planting)	pH INITIAL (@ planting)	pH FINAL (28 days after planting)
		# seeds germinated			live					
					21	23	30			
100%	A	1	3	4	4	4	4	4	7.2	7.3
	B	4	5	5	6	6	6→5	5		
	C	3	3	4	4	4	3	3		
	D	2	2	3	4	4	4	4		
	E	3	4	4	4	4	5	5		

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

Replicate A: 3 medium + 1 small dead in good shape

Replicate B: 6 medium in good shape - smallest removed

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

Replicate D: 3 medium + 1 small in good shape

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

14-Days Post-Emergence: Describe shoot appearance:

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

Replicate B: 4 medium - all green & good shape

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

Replicate D: 4 medium - all green & in good shape

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

Measure Shoot Height: (above ground)

	1st Seedling	2nd Seedling	3rd Seedling	4th Seedling	5th Seedling	# of shoots
Replicate A	46 ~~62~~ NJ mm	mm	mm	mm	mm	42
Replicate B	55 mm	mm	mm	mm	mm	76
Replicate C	74 mm	mm	mm	mm	mm	51
Replicate D	55 mm	mm	mm	mm	mm	37
Replicate E	69 mm	mm	mm	mm	mm	

Measure Shoot Weight: (above ground)

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

Describe root appearance:

Replicate A

Replicate B

Replicate C

Replicate D

Replicate E

Measure Root Length: (longest root)

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

Measure Root Weight: (longest root)

	Tin Tare Wt. (mg)	Wet Wt. (mg)	Dry Wt. (mg)
Replicate A	NJ ~~994.12~~	1556.2	1046.86
Replicate B	965.79	1826.7	1021.39
Replicate C	1015.00	1826.5	1064.27
Replicate D	991.78	1479.4	1015.98
Replicate E	1000.25	1807.0	1045.22

Tin Tare Wt. (mg) 1017.14

Comments: 35 g dry wt/rep

CETIS Test Summary

Report Date: 18 Jul-06 2:22 PM
Test Link: 10-7237-4516/B154203psB

Plant Bioassay - Chronic — **CH2M Hill**

Test No:	12-8841-7685	**Test Type:**	Plant Chronic	**Duration:**	N/A
Start Date:	25 Jan-06	**Protocol:**	ASTM E1963-02 (2002)	**Species:**	Poa sandbergii
Ending Date:		**Dil Water:**		**Source:**	
Setup Date:	25 Jan-06	**Brine:**			

Comments: recalculated Height and Length data July 18, 2006

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

Comments: J10DT8, E283101

Comparison Summary

Analysis	Endpoint	NOEL	LOEL	ChV	PMSD	Method
12-3597-7958	% Germination	100	> 100	N/A	22.60%	Equal Variance t Two-Sample
12-1749-2677	Average AG Wt (Wet, mg)	100	> 100	N/A	50.83%	Equal Variance t Two-Sample
08-2416-9275	Average AG Wt (Dry, mg)	100	> 100	N/A	63.25%	Equal Variance t Two-Sample
06-5621-9654	Average Root Wt. (Wet, mg	100	> 100	N/A	55.58%	Equal Variance t Two-Sample
01-5964-0324	Average Root Wt. (Dry, mg)	100	> 100	N/A	61.46%	Equal Variance t Two-Sample
03-3064-1258	Average Total Wt (Wet, mg	100	> 100	N/A	51.72%	Equal Variance t Two-Sample
08-5109-6105	Average Total Wt (Dry, mg)	100	> 100	N/A	61.50%	Equal Variance t Two-Sample

% Germination Summary

Conc-%	Control Type	Reps	Mean	Minimum	Maximum	SE	SD	CV
0	Artificial Soil/S	5	0.88000	0.60000	1.00000	0.08000	0.17889	20.33%
100		5	0.84000	0.60000	1.00000	0.07483	0.16733	19.92%

Average AG Wt (Wet, mg) Summary

Conc-%	Control Type	Reps	Mean	Minimum	Maximum	SE	SD	CV
0	Artificial Soil/S	5	63.903	41.475	82.338	7.1313	15.946	24.95%
100		5	90.866	60.345	151.71	15.946	35.657	39.24%

Average AG Wt (Dry, mg) Summary

Conc-%	Control Type	Reps	Mean	Minimum	Maximum	SE	SD	CV
0	Artificial Soil/S	5	12.351	7.9275	19.276	2.1347	4.7733	38.65%
100		5	16.718	11.128	30.637	3.6185	8.0912	48.40%

Average Root Wt. (Wet, mg) Summary

Conc-%	Control Type	Reps	Mean	Minimum	Maximum	SE	SD	CV
0	Artificial Soil/S	5	113.23	51.638	158.52	21.449	47.962	42.36%
100		5	172.14	121.90	270.5	26.184	58.548	34.01%

Average Root Wt. (Dry, mg) Summary

Conc-%	Control Type	Reps	Mean	Minimum	Maximum	SE	SD	CV
0	Artificial Soil/S	5	7.8666	3.78	14.108	1.8639	4.1678	52.98%
100		5	10.003	6.05	16.423	1.8129	4.0538	40.52%

Average Total Wt (Wet, mg) Summary

Conc-%	Control Type	Reps	Mean	Minimum	Maximum	SE	SD	CV
0	Artificial Soil/S	5	177.14	93.113	240.86	26.086	58.331	32.93%
100		5	263.01	195.11	422.21	41.799	93.465	35.54%

Average Total Wt (Dry, mg) Summary

Conc-%	Control Type	Reps	Mean	Minimum	Maximum	SE	SD	CV
0	Artificial Soil/S	5	20.217	12.223	33.384	3.9407	8.8117	43.58%
100		5	26.721	17.177	47.060	5.4021	12.079	45.21%

CETIS Test Summary

Report Date: 18 Jul-06 2:22 PM
Test Link: 10-7237-4516/B154203psB

% Germination Detail

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

Average AG Wt (Wet, mg) Detail

Conc-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Artificial Soil/S	67.2900	55.1900	82.338	73.2233	41.4750
100		60.3450	90.5860	151.707	75.0575	76.6360

Average AG Wt (Dry, mg) Detail

Conc-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Artificial Soil/S	15.1720	10.552	19.276	8.82666	7.92751
100		11.4500	16.6780	30.6367	11.1275	13.696

Average Root Wt. (Wet, mg) Detail

Conc-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Artificial Soil/S	143.362	140.624	158.524	72.0233	51.6375
100		134.765	172.182	270.5	121.905	161.350

Average Root Wt. (Dry, mg) Detail

Conc-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Artificial Soil/S	8.75601	8.39399	14.108	3.77999	4.295
100		7.42999	11.1200	16.4233	6.04999	8.99399

Average Total Wt (Wet, mg) Detail

Conc-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Artificial Soil/S	210.652	195.814	240.862	145.247	93.1125
100		195.11	262.768	422.207	196.963	237.986

Average Total Wt (Dry, mg) Detail

Conc-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Artificial Soil/S	23.9280	18.946	33.384	12.6066	12.2225
100		18.8800	27.7980	47.0600	17.1775	22.69

CETIS Analysis Detail

Plant Bioassay - Chronic — **CH2M Hill**

Endpoint	Analysis Type	Sample Link	Control Link	Date Analyzed	Version
% Germination	Comparison	10-7237-4516	10-7237-4516	18 Jul-06 2:22 PM	CETISv1.1.2

Method	Alt H	Data Transform	Zeta	NOEL	LOEL	Toxic Units	ChV	PMSD
Equal Variance t Two-Sample	C > T	Angular (Corrected)		100	>100	1	N/A	22.60%

Group Comparisons

Control	vs	Conc-%	Statistic	Critical	P-Value	MSD	Decision(0.05)
Artificial Soil/Sedi		100	0.37677	1.85955	0.3581	0.23506	Non-Significant Effect

ANOVA Table

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

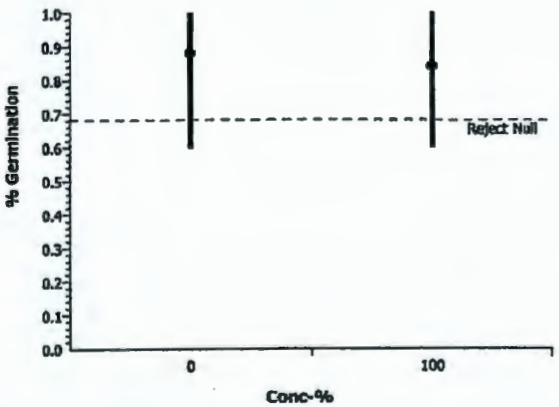
ANOVA Assumptions

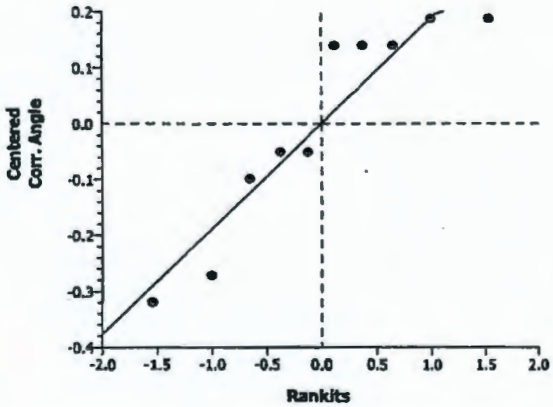
Attribute	Test	Statistic	Critical	P-Value	Decision(0.01)
Variances	Variance Ratio F	1.14108	23.15450	0.90131	Equal Variances
Distribution	Shapiro-Wilk W	0.85889		0.07404	Normal Distribution

Data Summary

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

Graphics





CETIS Analysis Detail

Plant Bioassay - Chronic — **CH2M Hill**

Endpoint	Analysis Type	Sample Link	Control Link	Date Analyzed	Version
Average AG Wt (Wet, mg)	Comparison	10-7237-4516	10-7237-4516	18 Jul-06 2:22 PM	CETISv1.1.2

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

Group Comparisons

Control	vs	Conc-%	Statistic	Critical	P-Value	MSD	Decision(0.05)
Artificial Soil/Sedi		100	-1.5436	1.85955	0.9194	32.4828	Non-Significant Effect

ANOVA Table

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

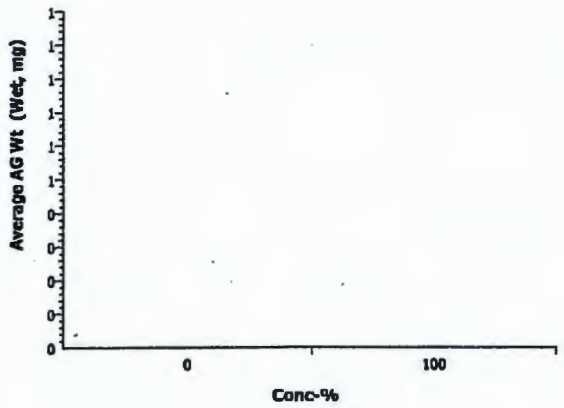
ANOVA Assumptions

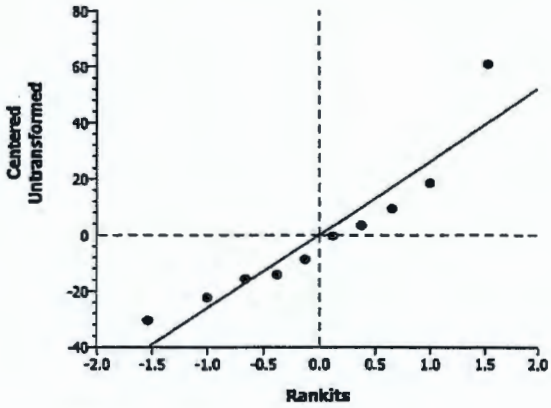
Attribute	Test	Statistic	Critical	P-Value	Decision(0.01)
Variances	Variance Ratio F	5.00000	23.15450	0.14815	Equal Variances
Distribution	Shapiro-Wilk W	0.89115		0.17471	Normal Distribution

Data Summary

			Original Data				Transformed Data			
Conc-%	Control Type	Count	Mean	Minimum	Maximum	SD	Mean	Minimum	Maximum	SD
0	Artificial Soil/S	5	63.903	41.475	82.338	15.946				
100		5	90.866	60.345	151.71	35.657				

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	10-7237-4516	10-7237-4516	18 Jul-06 2:22 PM	CETISv1.1.2

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

Group Comparisons

Control	vs	Conc-%	Statistic	Critical	P-Value	MSD	Decision(0.05)
Artificial Soil/Sedi		100	-1.0394	1.85955	0.8355	7.8124	Non-Significant Effect

ANOVA Table

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

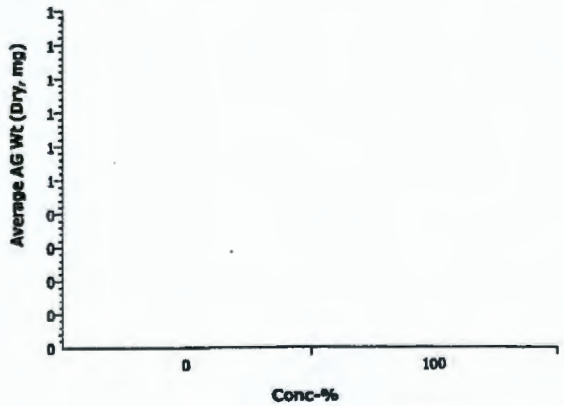
ANOVA Assumptions

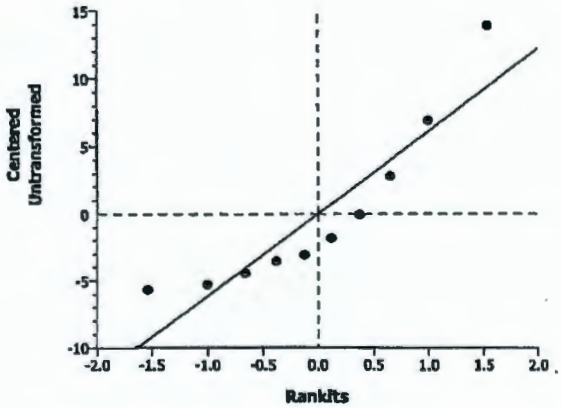
Attribute	Test	Statistic	Critical	P-Value	Decision(0.01)
Variances	Variance Ratio F	2.87331	23.15450	0.33110	Equal Variances
Distribution	Shapiro-Wilk W	0.84132		0.04576	Normal Distribution

Data Summary

			Original Data				Transformed Data			
Conc-%	Control Type	Count	Mean	Minimum	Maximum	SD	Mean	Minimum	Maximum	SD
0	Artificial Soil/S	5	12.351	7.9275	19.276	4.7733				
100		5	16.718	11.128	30.637	8.0912				

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	10-7237-4516	10-7237-4516	18 Jul-06 2:22 PM	CETISv1.1.2

Method	Alt H	Data Transform	Zeta	NOEL	LOEL	Toxic Units	ChV	PMSD
Equal Variance t Two-Sample	C > T	Untransformed		100	>100	1	N/A	55.58%

Group Comparisons

Control	vs	Conc-%	Statistic	Critical	P-Value	MSD	Decision(0.05)
Artificial Soil/Sedi		100	-1.7403	1.85955	0.9400	62.9411	Non-Significant Effect

ANOVA Table

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

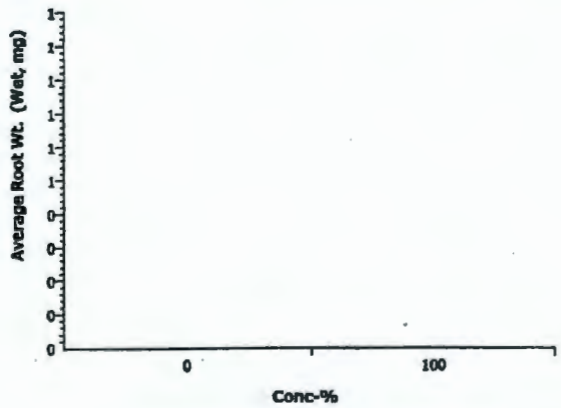
ANOVA Assumptions

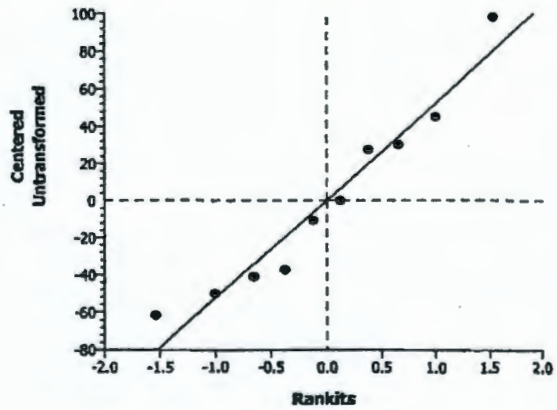
Attribute	Test	Statistic	Critical	P-Value	Decision(0.01)
Variances	Variance Ratio F	1.49014	23.15450	0.70857	Equal Variances
Distribution	Shapiro-Wilk W	0.94145		0.56924	Normal Distribution

Data Summary

			Original Data				Transformed Data			
Conc-%	Control Type	Count	Mean	Minimum	Maximum	SD	Mean	Minimum	Maximum	SD
0	Artificial Soil/S	5	113.23	51.638	158.52	47.962				
100		5	172.14	121.91	270.5	58.548				

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	10-7237-4516	10-7237-4516	18 Jul-06 2:22 PM	CETISv1.1.2

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

Group Comparisons

Control	vs	Conc-%	Statistic	Critical	P-Value	MSD	Decision(0.05)
Artificial Soil/Sedi		100	-0.8218	1.85955	0.7825	4.83508	Non-Significant Effect

ANOVA Table

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

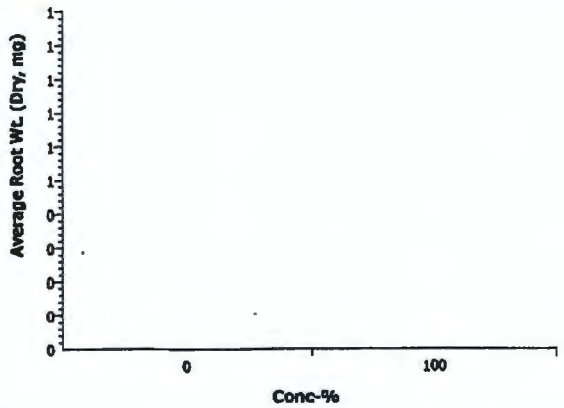
ANOVA Assumptions

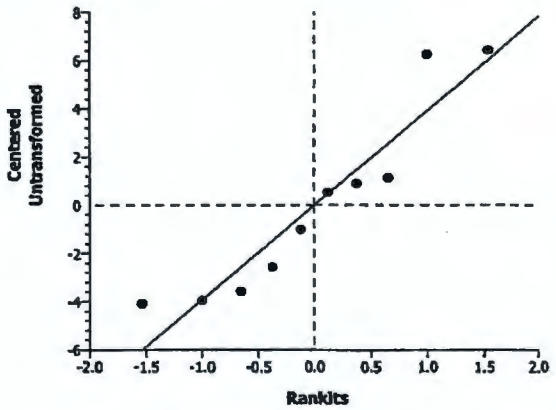
Attribute	Test	Statistic	Critical	P-Value	Decision(0.01)
Variances	Variance Ratio F	1.05701	23.15450	0.95844	Equal Variances
Distribution	Shapiro-Wilk W	0.87437		0.11238	Normal Distribution

Data Summary

			Original Data				Transformed Data			
Conc-%	Control Type	Count	Mean	Minimum	Maximum	SD	Mean	Minimum	Maximum	SD
0	Artificial Soil/S	5	7.8666	3.78	14.108	4.1678				
100		5	10.003	6.05	16.423	4.0538				

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	10-7237-4516	10-7237-4516	18 Jul-06 2:22 PM	CETISv1.1.2

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

Group Comparisons

Control	vs	Conc-%	Statistic	Critical	P-Value	MSD	Decision(0.05)
Artificial Soil/Sedi		100	-1.7428	1.85955	0.9402	91.6218	Non-Significant Effect

ANOVA Table

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

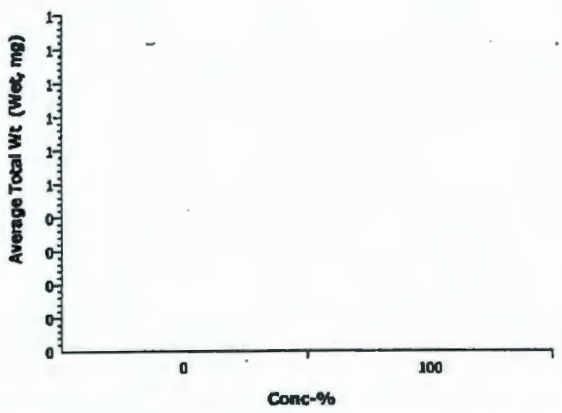
ANOVA Assumptions

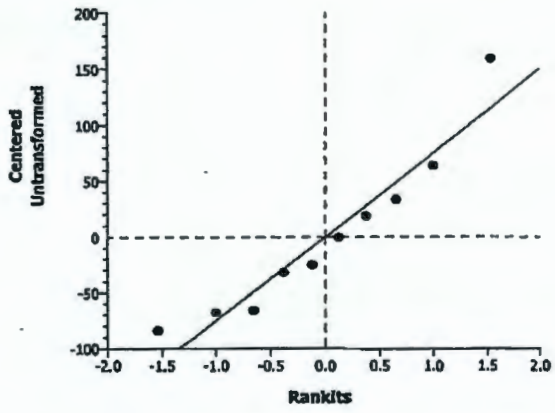
Attribute	Test	Statistic	Critical	P-Value	Decision(0.01)
Variances	Variance Ratio F	2.56740	23.15450	0.38336	Equal Variances
Distribution	Shapiro-Wilk W	0.92031		0.35952	Normal Distribution

Data Summary

			Original Data				Transformed Data			
Conc-%	Control Type	Count	Mean	Minimum	Maximum	SD	Mean	Minimum	Maximum	SD
0	Artificial Soil/S	5	177.14	93.113	240.86	58.331				
100		5	263.01	195.11	422.21	93.465				

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	10-7237-4516	10-7237-4516	18 Jul-06 2:22 PM	CETISv1.1.2

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

Group Comparisons

Control	vs	Conc-%	Statistic	Critical	P-Value	MSD	Decision(0.05)
Artificial Soil/Sedi		100	-0.9726	1.85955	0.8204	12.4342	Non-Significant Effect

ANOVA Table

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

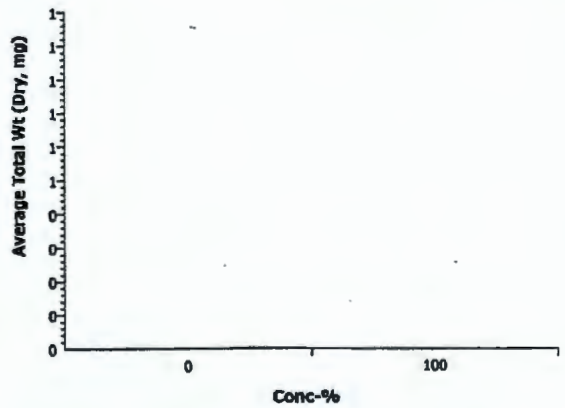
ANOVA Assumptions

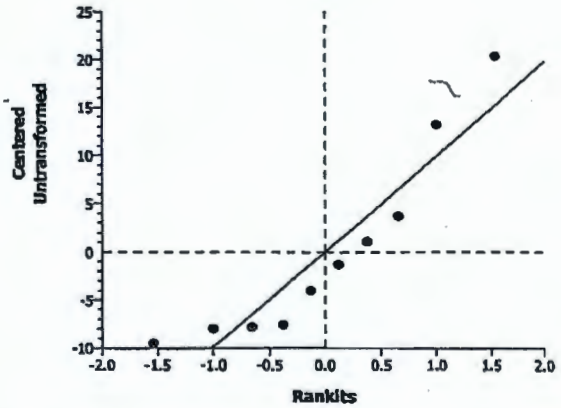
Attribute	Test	Statistic	Critical	P-Value	Decision(0.01)
Variances	Variance Ratio F	1.87917	23.15450	0.55620	Equal Variances
Distribution	Shapiro-Wilk W	0.86171		0.07992	Normal Distribution

Data Summary

			Original Data				Transformed Data			
Conc-%	Control Type	Count	Mean	Minimum	Maximum	SD	Mean	Minimum	Maximum	SD
0	Artificial Soil/S	5	20.217	12.223	33.384	8.8117				
100		5	26.721	17.177	47.060	12.079				

Graphics





BLUEGRASS GROWTH TEST

Client: Hanford Project

Test Start Date: 01/25/2006

Initials: Day 0 Bm Day 12 NS Day 14 Bm Day 16 NS Day 21 RD Day 28 Bm

Sample ID: E284601-SOI2 31542-04

CONC.	REPLICATE	# seeds germinated: PRE-EMERGENCE (12 days after planting)	@ EMERGENCE (14 days after planting)	POST-EMERGENCE (16 days after planting)	7-DAYS POST-EMERGENCE (21 days after planting)	14-DAYS POST-EMERGENCE (28 days after planting)	pH: INITIAL (@ planting)	FINAL (26 days after planting)
100%	A	2	2	NJ ~~2~~ 3	5	3	6.5	7.1
	B	0	2	3	4	4		
	C	0	1	2	2	2		
	D	3	6	7	7	5		
	E	0	1	2	6	7→5		

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

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

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

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

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

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

14-Days Post-Emergence: Describe shoot appearance:

Replicate A: 3 medium plants look good

Replicate B: 3 medium plants look good

Replicate C: 2 medium plants look good

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

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

Measure Shoot Height: (above ground)

	1st Seedling	2nd Seedling	3rd Seedling	4th Seedling	5th Seedling	# Shoots
Replicate A	40 mm	49 mm	48 mm	— mm	— mm	6, 11, 11
Replicate B	40 mm	40 mm	51 mm	— mm	— mm	4, 12, 4
Replicate C	60 mm	40 mm	— mm	— mm	— mm	9, 9
Replicate D	20 mm	41 mm	50 mm	62 mm	39 mm	2, 13, 13, 12, 7
Replicate E	42 mm	45 mm	50 mm	62 mm	106 mm	6, 4, 10, 8, 12

Measure Shoot Weight: (above ground)

	Tin Tare Wt. (mg)	Wet Wt (mg)	Dry Wt. (mg)
Replicate A	993.35	1180.7	1027.52
Replicate B	1015.99	1156.0	1043.63
Replicate C	995.41	1112.9	1015.73
Replicate D	996.70	1257.8	1051.81
Replicate E	999.42	1332.6	1056.72

Describe root appearance:

Replicate A:

Replicate B:

Replicate C:

Replicate D:

Replicate E:

Measure Root Length: (longest root)

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

Measure Root Weight: (longest root)

	Tin Tare Wt. (mg)	Wet Wt (mg)	Dry Wt. (mg)
Replicate A	975.91	1323.6	995.69
Replicate B	992.17	1233.4	1010.81
Replicate C	998.33	1212.3	1012.18
Replicate D	991.57	1491.2	1024.03
Replicate E	1006.36	1575.1	1040.11

Comments: 90 g dry wt. / rep

CETIS Test Summary

Report Date: 18 Jul-06 2:29 PM
Test Link: 20-0117-8477/B154204psB

Plant Bioassay - Chronic — **CH2M Hill**

Test No:	07-0052-4534	**Test Type:**	Plant Chronic	**Duration:**	N/A
Start Date:	25 Jan-06	**Protocol:**	ASTM E1963-02 (2002)	**Species:**	Poa sandbergii
Ending Date:		**Dil Water:**		**Source:**	
Setup Date:	25 Jan-06	**Brine:**			

Comments: recalculated Height and Length data July 18, 2006

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

Comments: J10DV2, E284601

Comparison Summary

Analysis	Endpoint	NOEL	LOEL	ChV	PMSD	Method
04-1690-0445	% Germination	100	> 100	N/A	29.92%	Equal Variance t Two-Sample
08-2900-5287	Average Height (mm)	100	> 100	N/A	19.39%	Equal Variance t Two-Sample
13-6243-3925	Average Length (mm)	100	> 100	N/A	21.46%	Equal Variance t Two-Sample
08-7538-5589	Average AG Wt (Wet, mg)	100	> 100	N/A	22.90%	Equal Variance t Two-Sample
08-4706-2181	Average AG Wt (Dry, mg)	100	> 100	N/A	32.76%	Equal Variance t Two-Sample
13-2902-4328	Average Root Wt. (Wet, mg	100	> 100	N/A	36.51%	Equal Variance t Two-Sample
07-1398-9419	Average Root Wt. (Dry, mg)	100	> 100	N/A	44.15%	Equal Variance t Two-Sample
17-2700-9201	Average Total Wt (Wet, mg	100	> 100	N/A	28.88%	Equal Variance t Two-Sample
07-7227-4367	Average Total Wt (Dry, mg)	100	> 100	N/A	36.53%	Equal Variance t Two-Sample

CETIS Test Summary

Report Date: 18 Jul-06 2:29 PM
Test Link: 20-0117-8477/B154204psB

% Germination Summary

Conc-%	Control Type	Reps	Mean	Minimum	Maximum	SE	SD	CV
0	Artificial Soil/S	5	0.88000	0.60000	1.00000	0.08000	0.17889	20.33%
100		5	0.72000	0.40000	1.00000	0.12000	0.26833	37.27%

Average Height (mm) Summary

Conc-%	Control Type	Reps	Mean	Minimum	Maximum	SE	SD	CV
0	Artificial Soil/S	5	45.68	36.700	55.8	3.3695	7.5344	16.49%
100		5	48.560	42.400	61	3.3658	7.5262	15.50%

Average Length (mm) Summary

Conc-%	Control Type	Reps	Mean	Minimum	Maximum	SE	SD	CV
0	Artificial Soil/S	5	124.62	89.800	153.2	12.597	28.167	22.60%
100		5	122.46	109.6	146.5	6.9375	15.513	12.67%

Average AG Wt (Wet, mg) Summary

Conc-%	Control Type	Reps	Mean	Minimum	Maximum	SE	SD	CV
0	Artificial Soil/S	5	63.903	41.475	82.338	7.1313	15.946	24.95%
100		5	58.544	46.670	66.636	3.3307	7.4477	12.72%

Average AG Wt (Dry, mg) Summary

Conc-%	Control Type	Reps	Mean	Minimum	Maximum	SE	SD	CV
0	Artificial Soil/S	5	12.351	7.9275	19.276	2.1347	4.7733	38.65%
100		5	10.669	9.2133	11.46	0.4217	0.9429	8.84%

Average Root Wt. (Wet, mg) Summary

Conc-%	Control Type	Reps	Mean	Minimum	Maximum	SE	SD	CV
0	Artificial Soil/S	5	113.23	51.638	158.52	21.449	47.962	42.36%
100		5	100.99	80.410	115.9	5.8455	13.071	12.94%

Average Root Wt. (Dry, mg) Summary

Conc-%	Control Type	Reps	Mean	Minimum	Maximum	SE	SD	CV
0	Artificial Soil/S	5	7.8666	3.78	14.108	1.8639	4.1678	52.98%
100		5	6.5947	6.2133	6.925	0.1202	0.2689	4.08%

Average Total Wt (Wet, mg) Summary

Conc-%	Control Type	Reps	Mean	Minimum	Maximum	SE	SD	CV
0	Artificial Soil/S	5	177.14	93.113	240.86	26.086	58.331	32.93%
100		5	159.54	127.08	178.35	8.7345	19.531	12.24%

Average Total Wt (Dry, mg) Summary

Conc-%	Control Type	Reps	Mean	Minimum	Maximum	SE	SD	CV
0	Artificial Soil/S	5	20.217	12.223	33.384	3.9407	8.8117	43.58%
100		5	17.264	15.427	18.21	0.4928	1.1019	6.38%

CETIS Test Summary

Report Date: 18 Jul-06 2:29 PM
Test Link: 20-0117-8477/B154204psB

% Germination Detail

Conc-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Artificial Soil/S	1.00000	1.00000	1.00000	0.60000	0.80000
100		0.60000	0.60000	0.40000	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	50.6	41.8	55.8	36.7000	43.5
100		45.7000	43.7000	50	42.4000	61

Average Length (mm) Detail

Conc-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Artificial Soil/S	138.800	142	153.2	99.3000	89.8000
100		129.300	115.7	146.5	111.2	109.6

Average AG Wt (Wet, mg) Detail

Conc-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Artificial Soil/S	67.2900	55.1900	82.338	73.2233	41.4750
100		62.45	46.6700	58.7450	58.2200	66.6360

Average AG Wt (Dry, mg) Detail

Conc-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Artificial Soil/S	15.1720	10.552	19.276	8.82666	7.92751
100		11.3900	9.21334	10.2600	11.0220	11.46

Average Root Wt. (Wet, mg) Detail

Conc-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Artificial Soil/S	143.362	140.624	158.524	72.0233	51.6375
100		115.897	80.4100	106.985	99.926	101.748

Average Root Wt. (Dry, mg) Detail

Conc-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Artificial Soil/S	8.75601	8.39399	14.108	3.77999	4.295
100		6.59334	6.21334	6.92499	6.49200	6.75

Average Total Wt (Wet, mg) Detail

Conc-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Artificial Soil/S	210.652	195.814	240.862	145.247	93.1125
100		178.347	127.080	165.730	158.146	168.384

Average Total Wt (Dry, mg) Detail

Conc-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Artificial Soil/S	23.9280	18.946	33.384	12.6066	12.2225
100		17.9834	15.4267	17.185	17.5140	18.21

CETIS Analysis Detail

Plant Bioassay - Chronic — **CH2M Hill**

Endpoint	Analysis Type	Sample Link	Control Link	Date Analyzed	Version
% Germination	Comparison	20-0117-8477	20-0117-8477	18 Jul-06 2:25 PM	CETISv1.1.2

Method	Alt H	Data Transform	Zeta	NOEL	LOEL	Toxic Units	ChV	PMSD
Equal Variance t Two-Sample	C > T	Angular (Corrected)		100	>100	1	N/A	29.92%

Group Comparisons

Control	vs	Conc-%	Statistic	Critical	P-Value	MSD	Decision(0.05)
Artificial Soil/Sedi		100	1.08340	1.85955	0.1551	0.30265	Non-Significant Effect

ANOVA Table

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

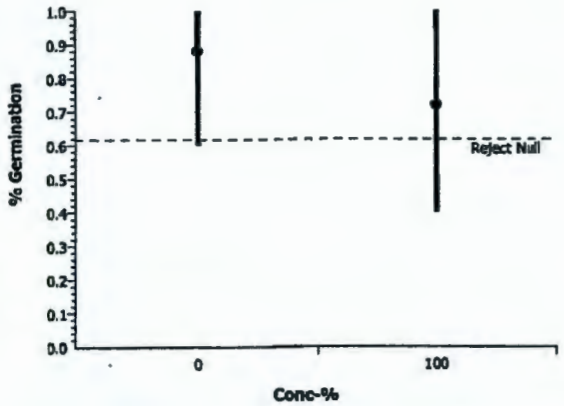
ANOVA Assumptions

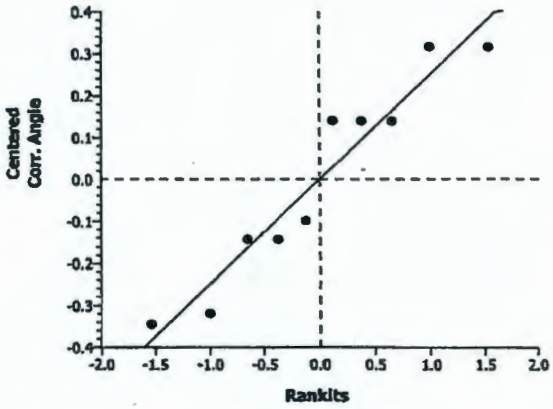
Attribute	Test	Statistic	Critical	P-Value	Decision(0.01)
Variances	Variance Ratio F	2.11043	23.15450	0.48725	Equal Variances
Distribution	Shapiro-Wilk W	0.90642		0.25730	Normal Distribution

Data Summary

			Original Data				Transformed Data			
Conc-%	Control Type	Count	Mean	Minimum	Maximum	SD	Mean	Minimum	Maximum	SD
0	Artificial Soil/S	5	0.88000	0.60000	1.00000	0.17889	1.20581	0.88608	1.34528	0.20635
100		5	0.72000	0.40000	1.00000	0.26833	1.02949	0.68472	1.34528	0.29977

Graphics





CETIS Analysis Detail

Plant Bioassay - Chronic — **CH2M Hill**

Endpoint	Analysis Type	Sample Link	Control Link	Date Analyzed	Version
Average Height (mm)	Comparison	20-0117-8477	20-0117-8477	18 Jul-06 2:25 PM	CETISv1.1.2

Method	Alt H	Data Transform	Zeta	NOEL	LOEL	Toxic Units	ChV	PMSD
Equal Variance t Two-Sample	C > T	Untransformed		100	>100	1	N/A	19.39%

Group Comparisons

Control	vs	Conc-%	Statistic	Critical	P-Value	MSD	Decision(0.05)
Artificial Soil/Sedi		100	-0.6047	1.85955	0.7189	8.85621	Non-Significant Effect

ANOVA Table

Source	Sum of Squares	Mean Square	DF	F Statistic	P-Value	Decision(0.05)
Between	20.73602	20.73602	1	0.37	0.56212	Non-Significant Effect
Error	453.6399	56.70499	8			
Total	474.375938	77.441006	9			

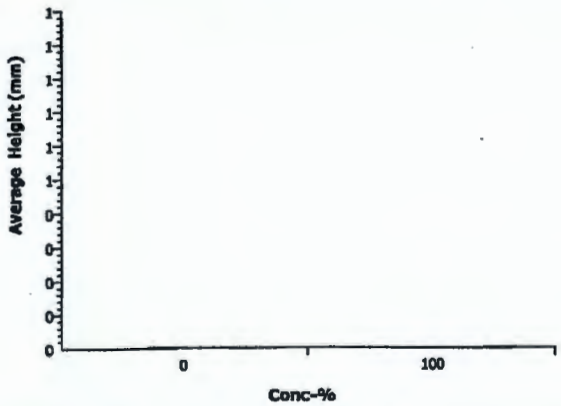
ANOVA Assumptions

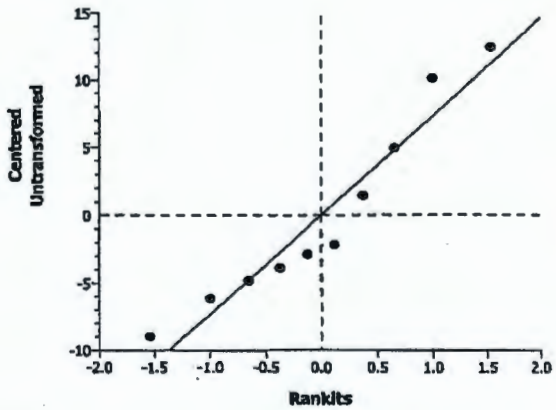
Attribute	Test	Statistic	Critical	P-Value	Decision(0.01)
Variances	Variance Ratio F	1.00219	23.15450	0.99836	Equal Variances
Distribution	Shapiro-Wilk W	0.91931		0.35123	Normal Distribution

Data Summary

			Original Data				Transformed Data			
Conc-%	Control Type	Count	Mean	Minimum	Maximum	SD	Mean	Minimum	Maximum	SD
0	Artificial Soil/S	5	45.68	36.7	55.8	7.5344				
100		5	48.560	42.4	61	7.5262				

Graphics





CETIS Analysis Detail

Plant Bioassay - Chronic — **CH2M Hill**

Endpoint	Analysis Type	Sample Link	Control Link	Date Analyzed	Version
Average Length (mm)	Comparison	20-0117-8477	20-0117-8477	18 Jul-06 2:28 PM	CETISv1.1.2

Method	Alt H	Data Transform	Zeta	NOEL	LOEL	Toxic Units	ChV	PMSD
Equal Variance t Two-Sample	C > T	Untransformed		100	>100	1	N/A	21.46%

Group Comparisons

Control	vs	Conc-%	Statistic	Critical	P-Value	MSD	Decision(0.05)
Artificial Soil/Sedi		100	0.15020	1.85955	0.4422	26.7415	Non-Significant Effect

ANOVA Table

Source	Sum of Squares	Mean Square	DF	F Statistic	P-Value	Decision(0.05)
Between	11.66402	11.66402	1	0.02	0.88432	Non-Significant Effect
Error	4136.06	517.0074	8			
Total	4147.72359	528.67147	9			

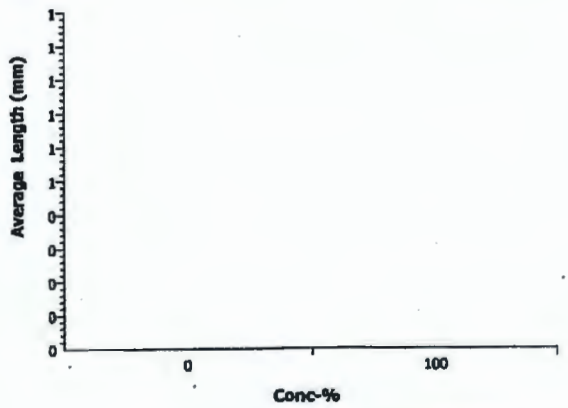
ANOVA Assumptions

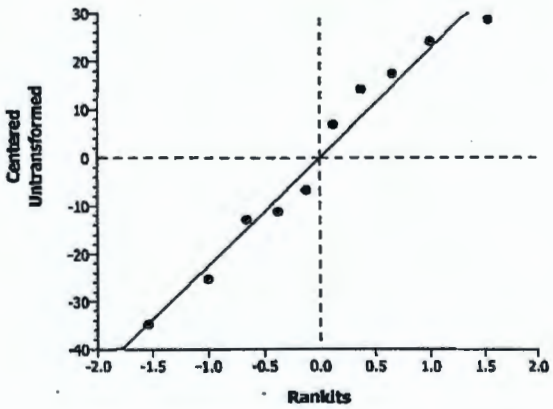
Attribute	Test	Statistic	Critical	P-Value	Decision(0.01)
Variances	Variance Ratio F	3.29688	23.15450	0.27455	Equal Variances
Distribution	Shapiro-Wilk W	0.95238		0.69675	Normal Distribution

Data Summary

			Original Data				Transformed Data			
Conc-%	Control Type	Count	Mean	Minimum	Maximum	SD	Mean	Minimum	Maximum	SD
0	Artificial Soil/S	5	124.62	89.8	153.2	28.167				
100		5	122.46	109.6	146.5	15.513				

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	20-0117-8477	20-0117-8477	18 Jul-06 2:28 PM	CETISv1.1.2

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

Group Comparisons

Control	vs	Conc-%	Statistic	Critical	P-Value	MSD	Decision(0.05)
Artificial Soil/Sedi		100	0.68088	1.85955	0.2576	14.6362	Non-Significant Effect

ANOVA Table

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

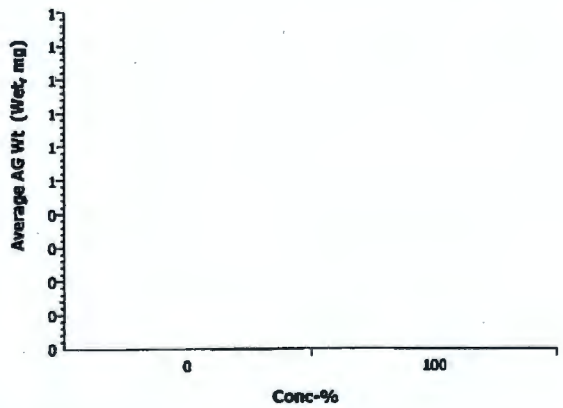
ANOVA Assumptions

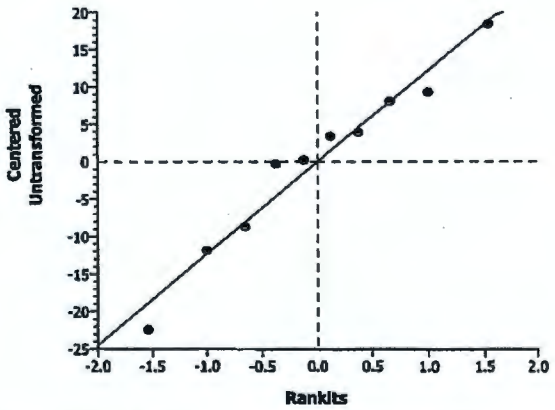
Attribute	Test	Statistic	Critical	P-Value	Decision(0.01)
Variances	Variance Ratio F	4.58421	23.15450	0.16944	Equal Variances
Distribution	Shapiro-Wilk W	0.96988		0.88975	Normal Distribution

Data Summary

			Original Data				Transformed Data			
Conc-%	Control Type	Count	Mean	Minimum	Maximum	SD	Mean	Minimum	Maximum	SD
0	Artificial Soil/S	5	63.903	41.475	82.338	15.946				
100		5	58.544	46.67	66.636	7.4477				

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	20-0117-8477	20-0117-8477	18 Jul-06 2:28 PM	CETISv1.1.2

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

Group Comparisons

Control	vs	Conc-%	Statistic	Critical	P-Value	MSD	Decision(0.05)
Artificial Soil/Sedi		100	0.77289	1.85955	0.2309	4.04627	Non-Significant Effect

ANOVA Table

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

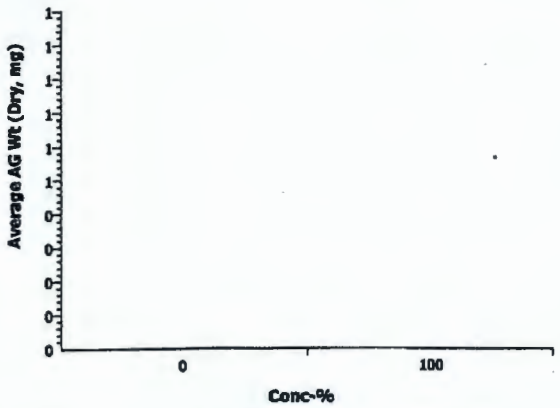
ANOVA Assumptions

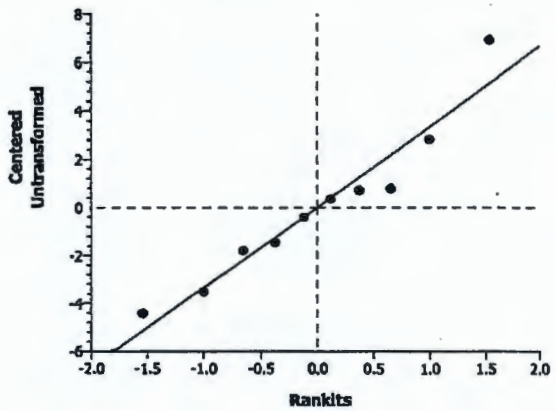
Attribute	Test	Statistic	Critical	P-Value	Decision(0.01)
Variances	Variance Ratio F	25.62671	23.15450	0.00825	Unequal Variances
Distribution	Shapiro-Wilk W	0.94329		0.59015	Normal Distribution

Data Summary

			Original Data				Transformed Data			
Conc-%	Control Type	Count	Mean	Minimum	Maximum	SD	Mean	Minimum	Maximum	SD
0	Artificial Soil/S	5	12.351	7.9275	19.276	4.7733				
100		5	10.669	9.2133	11.46	0.9429				

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	20-0117-8477	20-0117-8477	18 Jul-06 2:28 PM	CETISv1.1.2

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

Group Comparisons

Control	vs	Conc-%	Statistic	Critical	P-Value	MSD	Decision(0.05)
Artificial Soil/Sedi		100	0.55061	1.85955	0.2985	41.3408	Non-Significant Effect

ANOVA Table

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

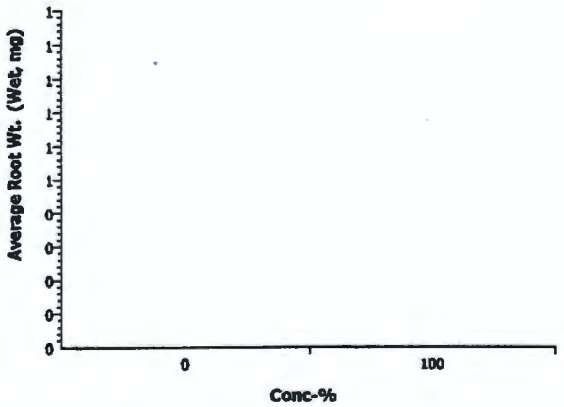
ANOVA Assumptions

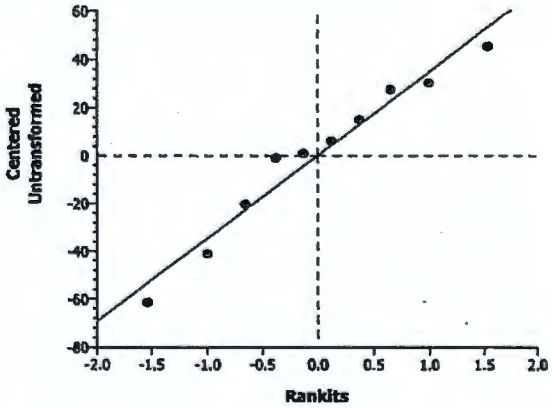
Attribute	Test	Statistic	Critical	P-Value	Decision(0.01)
Variances	Variance Ratio F	13.46452	23.15450	0.02736	Equal Variances
Distribution	Shapiro-Wilk W	0.95666		0.74721	Normal Distribution

Data Summary

			Original Data				Transformed Data			
Conc-%	Control Type	Count	Mean	Minimum	Maximum	SD	Mean	Minimum	Maximum	SD
0	Artificial Soil/S	5	113.23	51.638	158.52	47.962				
100		5	100.99	80.410	115.9	13.071				

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	20-0117-8477	20-0117-8477	18 Jul-06 2:28 PM	CETISv1.1.2

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

Group Comparisons

Control	vs	Conc-%	Statistic	Critical	P-Value	MSD	Decision(0.05)
Artificial Soil/Sedi		100	0.68096	1.85955	0.2576	3.47318	Non-Significant Effect

ANOVA Table

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

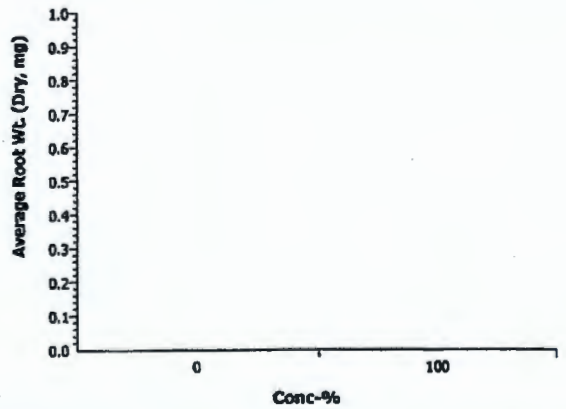
ANOVA Assumptions

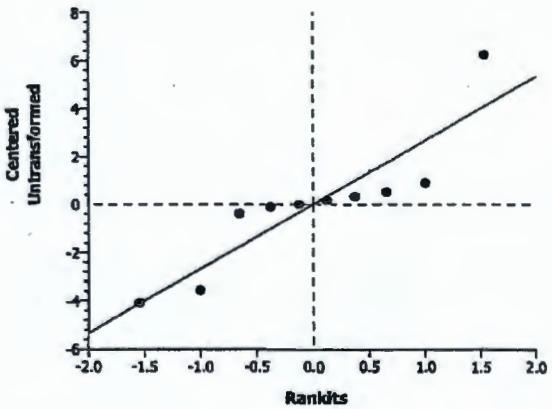
Attribute	Test	Statistic	Critical	P-Value	Decision(0.01)
Variances	Variance Ratio F	240.25800	23.15450	0.00010	Unequal Variances
Distribution	Shapiro-Wilk W	0.83816		0.04194	Normal Distribution

Data Summary

			Original Data				Transformed Data			
Conc-%	Control Type	Count	Mean	Minimum	Maximum	SD	Mean	Minimum	Maximum	SD
0	Artificial Soil/S	5	7.8666	3.78	14.108	4.1678				
100		5	6.5947	6.2133	6.925	0.2689				

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	20-0117-8477	20-0117-8477	18 Jul-06 2:28 PM	CETISv1.1.2

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

Group Comparisons

Control	vs	Conc-%	Statistic	Critical	P-Value	MSD	Decision(0.05)
Artificial Soil/Sedi		100	0.63977	1.85955	0.2701	51.156	Non-Significant Effect

ANOVA Table

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

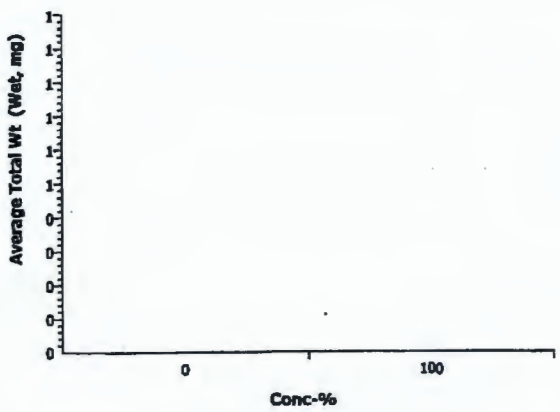
ANOVA Assumptions

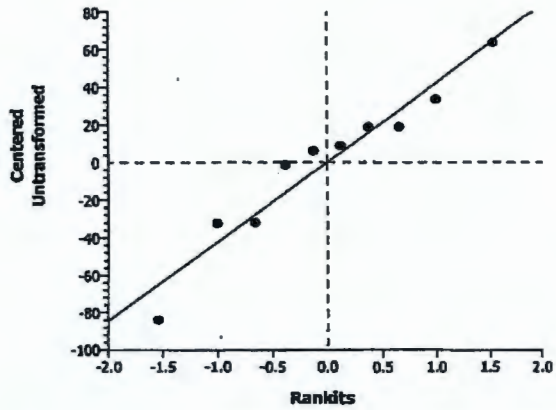
Attribute	Test	Statistic	Critical	P-Value	Decision(0.01)
Variances	Variance Ratio F	8.91986	23.15450	0.05688	Equal Variances
Distribution	Shapiro-Wilk W	0.94991		0.66738	Normal Distribution

Data Summary

			Original Data				Transformed Data			
Conc-%	Control Type	Count	Mean	Minimum	Maximum	SD	Mean	Minimum	Maximum	SD
0	Artificial Soil/S	5	177.14	93.113	240.86	58.331				
100		5	159.54	127.08	178.35	19.531				

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	20-0117-8477	20-0117-8477	18 Jul-06 2:28 PM	CETISv1.1.2

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

Group Comparisons

Control	vs	Conc-%	Statistic	Critical	P-Value	MSD	Decision(0.05)
Artificial Soil/Sedi		100	0.74372	1.85955	0.2392	7.38505	Non-Significant Effect

ANOVA Table

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

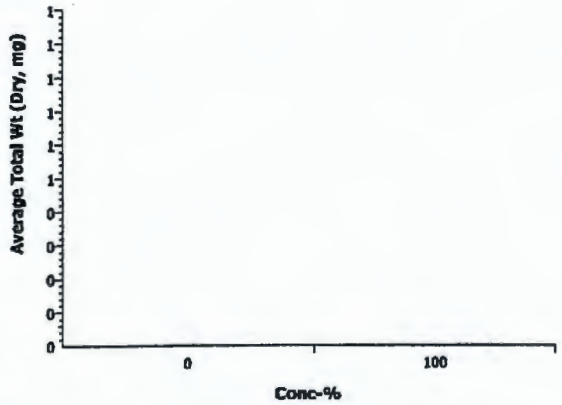
ANOVA Assumptions

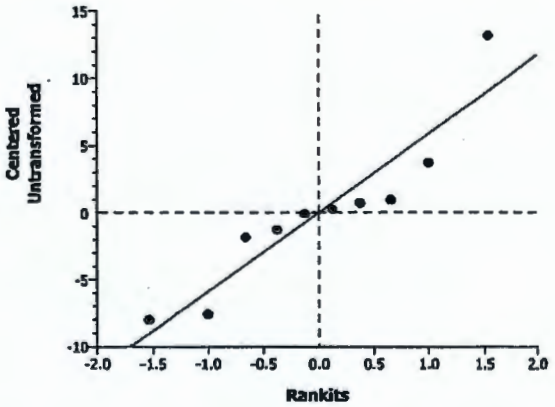
Attribute	Test	Statistic	Critical	P-Value	Decision(0.01)
Variances	Variance Ratio F	63.94633	23.15450	0.00141	Unequal Variances
Distribution	Shapiro-Wilk W	0.88617		0.15347	Normal Distribution

Data Summary

			Original Data				Transformed Data			
Conc-%	Control Type	Count	Mean	Minimum	Maximum	SD	Mean	Minimum	Maximum	SD
0	Artificial Soil/S	5	20.217	12.223	33.384	8.8117				
100		5	17.264	15.427	18.21	1.1019				

Graphics





BLUEGRASS GROWTH TEST

Client: Hanford Project

Test Start Date: 01/25/2006

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

Sample ID: E284701-SOI2 B1542-05

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

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

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

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

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

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

Replicate E: 1 single shoot dead plant

14-Days Post-Emergence: Describe shoot appearance:

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

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

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

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

Replicate E: no plants

Measure Shoot Height: (above ground)

	1st Seedling	2nd Seedling	3rd Seedling	4th Seedling	5th Seedling	# Shoots
Replicate A	34 mm	~~65~~ MS mm	MS ~~28~~ mm	— mm	— mm	6
Replicate B	65 mm	36 mm	MS ~~66~~ mm	— mm	— mm	9 8
Replicate C	25 mm	66 mm	MS ~~36~~ 34 mm	20 mm	— mm	4, 6, 5, 7
Replicate D	55 mm	25 mm	MS ~~40~~ mm	— mm	— mm	4, 5
Replicate E	— mm	— mm	— mm	— mm	— mm	

Measure Shoot Weight: (above ground)

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

Describe root appearance:

Replicate A

Replicate B

Replicate C

Replicate D

Replicate E

Measure Root Length: (longest root)

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

Measure Root Weight: (longest root)

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

Comments:

MS

CETIS Test Summary

Report Date: 18 Jul-06 2:52 PM
Test Link: 06-7949-1832/B154205psB

Plant Bioassay - Chronic — **CH2M Hill**

Test No:	11-2341-2652	**Test Type:**	Plant Chronic	**Duration:**	N/A
Start Date:	25 Jan-06	**Protocol:**	ASTM E1963-02 (2002)	**Species:**	Poa sandbergii
Ending Date:		**Dil Water:**		**Source:**	
Setup Date:	25 Jan-06	**Brine:**			

Comments: recalculated Height and Length data July 18, 2006

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

Comments: J10DV1, E284701

Comparison Summary

Analysis	Endpoint	NOEL	LOEL	ChV	PMSD	Method
03-1273-9210	% Germination	< 100	100	N/A	31.94%	Equal Variance t Two-Sample
15-6901-9966	Average Height (mm)	100	> 100	N/A	20.15%	Equal Variance t Two-Sample
16-8177-0725	Average Length (mm)	< 100	100	N/A	22.34%	Equal Variance t Two-Sample
07-6293-8217	Average AG Wt (Wet, mg)	< 100	100	N/A	24.95%	Equal Variance t Two-Sample
03-1375-3588	Average AG Wt (Dry, mg)	< 100	100	N/A	38.05%	Equal Variance t Two-Sample
05-7553-9392	Average Root Wt. (Wet, mg	< 100	100	N/A	43.27%	Equal Variance t Two-Sample
15-2030-1795	Average Root Wt. (Dry, mg)	< 100	100	N/A	54.04%	Equal Variance t Two-Sample
08-5494-7845	Average Total Wt (Wet, mg	< 100	100	N/A	33.77%	Equal Variance t Two-Sample
06-5495-1290	Average Total Wt (Dry, mg)	< 100	100	N/A	43.45%	Equal Variance t Two-Sample

↳ 100% rep E removed from stats for all but % germination endpoint (0% germ)
Bm

CETIS Test Summary

Report Date: 18 Jul-06 2:52 PM
Test Link: 06-7949-1832/B154205psB

% Germination Summary

Conc-%	Control Type	Reps	Mean	Minimum	Maximum	SE	SD	CV
0	Artificial Soil/S	5	0.88000	0.60000	1.00000	0.08000	0.17889	20.33%
100		5	0.36000	0.00000	0.80000	0.13266	0.29665	82.40%

Average Height (mm) Summary

Conc-%	Control Type	Reps	Mean	Minimum	Maximum	SE	SD	CV
0	Artificial Soil/S	5	45.68	36.700	55.8	3.3695	7.5344	16.49%
100		5	41.75	34	50.5	3.4187	6.8374	16.38%

Average Length (mm) Summary

Conc-%	Control Type	Reps	Mean	Minimum	Maximum	SE	SD	CV
0	Artificial Soil/S	5	124.62	89.800	153.2	12.597	28.167	22.60%
100		5	91.325	83.300	100.5	3.9303	7.8606	8.61%

Average AG Wt (Wet, mg) Summary

Conc-%	Control Type	Reps	Mean	Minimum	Maximum	SE	SD	CV
0	Artificial Soil/S	5	63.903	41.475	82.338	7.1313	15.946	24.95%
100		5	30.859	24.98	37.84	2.6585	5.317	17.23%

Average AG Wt (Dry, mg) Summary

Conc-%	Control Type	Reps	Mean	Minimum	Maximum	SE	SD	CV
0	Artificial Soil/S	5	12.351	7.9275	19.276	2.1347	4.7733	38.65%
100		5	6.7013	5.2401	8.25	0.6181	1.2361	18.45%

Average Root Wt. (Wet, mg) Summary

Conc-%	Control Type	Reps	Mean	Minimum	Maximum	SE	SD	CV
0	Artificial Soil/S	5	113.23	51.638	158.52	21.449	47.962	42.36%
100		5	40.987	24.595	68.755	10.002	20.005	48.81%

Average Root Wt. (Dry, mg) Summary

Conc-%	Control Type	Reps	Mean	Minimum	Maximum	SE	SD	CV
0	Artificial Soil/S	5	7.8666	3.78	14.108	1.8639	4.1678	52.98%
100		5	3.33	2.02	5.8500	0.8586	1.7172	51.57%

Average Total Wt (Wet, mg) Summary

Conc-%	Control Type	Reps	Mean	Minimum	Maximum	SE	SD	CV
0	Artificial Soil/S	5	177.14	93.113	240.86	26.086	58.331	32.93%
100		5	71.846	49.575	106.59	12.573	25.146	35.00%

Average Total Wt (Dry, mg) Summary

Conc-%	Control Type	Reps	Mean	Minimum	Maximum	SE	SD	CV
0	Artificial Soil/S	5	20.217	12.223	33.384	3.9407	8.8117	43.58%
100		5	10.031	7.8101	14.100	1.4105	2.821	28.12%

CETIS Test Summary

Report Date: 18 Jul-06 2:52 PM
Test Link: 06-7949-1832/B154205psB

% Germination Detail

Conc-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Artificial Soil/S	1.00000	1.00000	1.00000	0.60000	0.80000
100		0.20000	0.40000	0.80000	0.40000	0.00000

Average Height (mm) Detail

Conc-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Artificial Soil/S	50.6	41.8	55.8	36.7000	43.5
100		34	50.5	42.5	40	Missing

Average Length (mm) Detail

Conc-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Artificial Soil/S	138.800	142	153.2	99.3000	89.8000
100		95	100.5	83.3000	86.5	Missing

Average AG Wt (Wet, mg) Detail

Conc-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Artificial Soil/S	67.2900	55.1900	82.338	73.2233	41.4750
100		30.98	37.84	29.635	24.98	Missing

Average AG Wt (Dry, mg) Detail

Conc-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Artificial Soil/S	15.1720	10.552	19.276	8.82666	7.92751
100		5.24005	8.25	6.50499	6.81	Missing

Average Root Wt. (Wet, mg) Detail

Conc-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Artificial Soil/S	143.362	140.624	158.524	72.0233	51.6375
100		42.23	68.755	28.3675	24.5950	Missing

Average Root Wt. (Dry, mg) Detail

Conc-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Artificial Soil/S	8.75601	8.39399	14.108	3.77999	4.295
100		2.57001	5.85001	2.01999	2.87997	Missing

Average Total Wt (Wet, mg) Detail

Conc-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Artificial Soil/S	210.652	195.814	240.862	145.247	93.1125
100		73.21	106.595	58.0025	49.575	Missing

Average Total Wt (Dry, mg) Detail

Conc-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Artificial Soil/S	23.9280	18.946	33.384	12.6066	12.2225
100		7.81006	14.1000	8.52499	9.68997	Missing

CETIS Analysis Detail

Plant Bioassay - Chronic — **CH2M Hill**

Endpoint	Analysis Type	Sample Link	Control Link	Date Analyzed	Version
% Germination	Comparison	06-7949-1832	06-7949-1832	18 Jul-06 2:51 PM	CETISv1.1.2

Method	Alt H	Data Transform	Zeta	NOEL	LOEL	Toxic Units	ChV	PMSD
Equal Variance t Two-Sample	C > T	Angular (Corrected)		<100	100		N/A	31.94%

Group Comparisons

Control	vs	Conc-%	Statistic	Critical	P-Value	MSD	Decision(0.05)
Artificial Soil/Sedi		100	3.31955	1.85955	0.0053	0.3208	Significant Effect

ANOVA Table

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

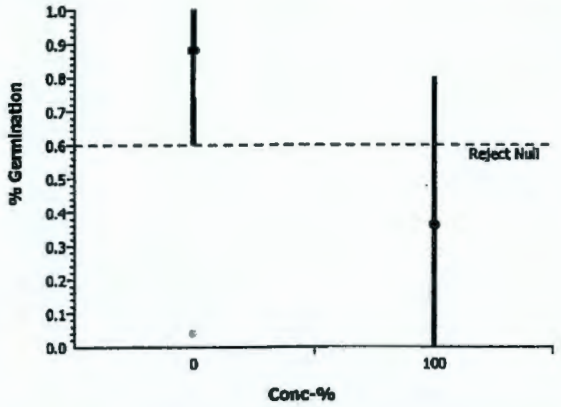
ANOVA Assumptions

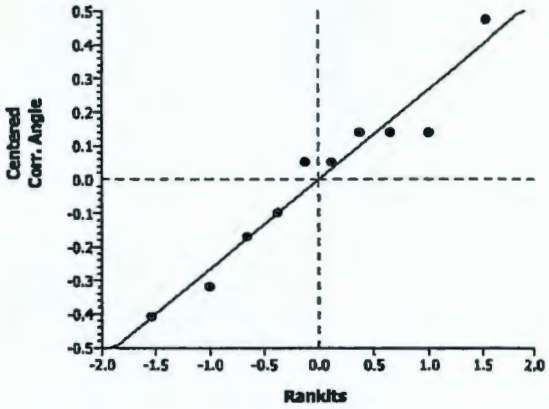
Attribute	Test	Statistic	Critical	P-Value	Decision(0.01)
Variances	Variance Ratio F	2.49465	23.15450	0.39757	Equal Variances
Distribution	Shapiro-Wilk W	0.95095		0.67970	Normal Distribution

Data Summary

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

Graphics





CETIS Analysis Detail

Plant Bioassay - Chronic — **CH2M Hill**

Endpoint	Analysis Type	Sample Link	Control Link	Date Analyzed	Version
Average Height (mm)	Comparison	06-7949-1832	06-7949-1832	18 Jul-06 2:51 PM	CETISv1.1.2

Method	Alt H	Data Transform	Zeta	NOEL	LOEL	Toxic Units	ChV	PMSD
Equal Variance t Two-Sample	C > T	Untransformed		100	>100	1	N/A	20.15%

Group Comparisons

Control	vs	Conc-%	Statistic	Critical	P-Value	MSD	Decision(0.05)
Artificial Soil/Sedi		100	0.80875	1.89458	0.2226	9.20642	Non-Significant Effect

ANOVA Table

Source	Sum of Squares	Mean Square	DF	F Statistic	P-Value	Decision(0.05)
Between	34.32199	34.32199	1	0.65	0.44527	Non-Significant Effect
Error	367.318	52.474	7			
Total	401.639954	86.795986	8			

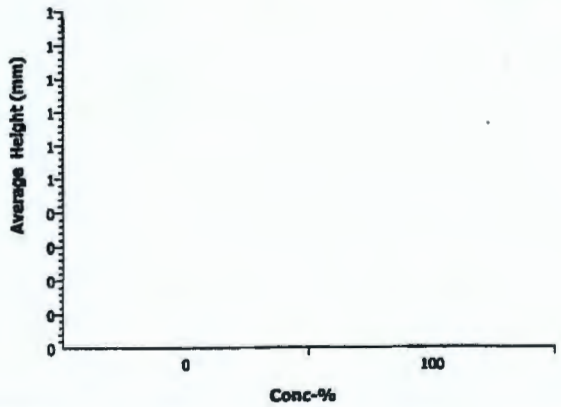
ANOVA Assumptions

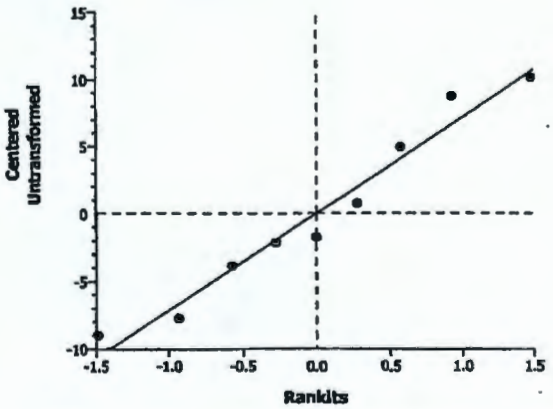
Attribute	Test	Statistic	Critical	P-Value	Decision(0.01)
Variances	Variance Ratio F	1.21427	46.19462	0.90942	Equal Variances
Distribution	Shapiro-Wilk W	0.94354		0.61966	Normal Distribution

Data Summary

			Original Data				Transformed Data			
Conc-%	Control Type	Count	Mean	Minimum	Maximum	SD	Mean	Minimum	Maximum	SD
0	Artificial Soil/S	5	45.68	36.7	55.8	7.5344				
100		4	41.75	34	50.5	6.8374				

Graphics





CETIS Analysis Detail

Plant Bioassay - Chronic — **CH2M Hill**

Endpoint	Analysis Type	Sample Link	Control Link	Date Analyzed	Version
Average Length (mm)	Comparison	06-7949-1832	06-7949-1832	18 Jul-06 2:51 PM	CETISv1.1.2

Method	Alt H	Data Transform	Zeta	NOEL	LOEL	Toxic Units	ChV	PMSD
Equal Variance t Two-Sample	C > T	Untransformed		<100	100		N/A	22.34%

Group Comparisons

Control	vs	Conc-%	Statistic	Critical	P-Value	MSD	Decision(0.05)
Artificial Soil/Sedi		100	2.26582	1.89458	0.0289	27.8398	Significant Effect

ANOVA Table

Source	Sum of Squares	Mean Square	DF	F Statistic	P-Value	Decision(0.05)
Between	2463.46	2463.46	1	5.13	0.05783	Non-Significant Effect
Error	3358.855	479.8364	7			
Total	5822.31519	2943.2966	8			

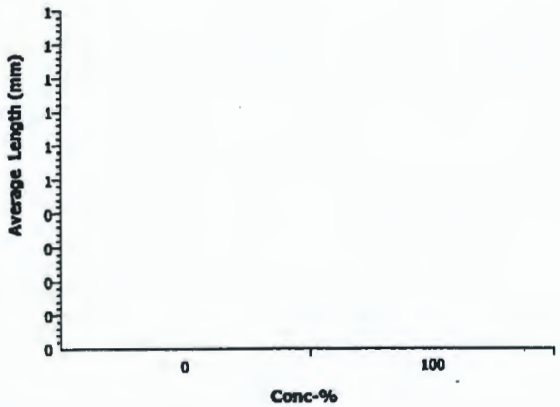
ANOVA Assumptions

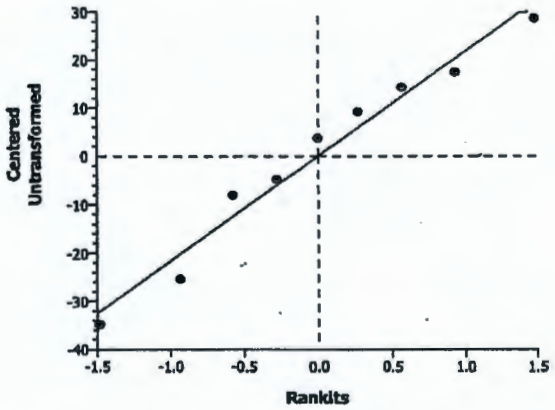
Attribute	Test	Statistic	Critical	P-Value	Decision(0.01)
Variances	Variance Ratio F	12.83999	46.19462	0.06268	Equal Variances
Distribution	Shapiro-Wilk W	0.96390		0.83816	Normal Distribution

Data Summary

			Original Data				Transformed Data			
Conc-%	Control Type	Count	Mean	Minimum	Maximum	SD	Mean	Minimum	Maximum	SD
0	Artificial Soil/S	5	124.62	89.8	153.2	28.167				
100		4	91.325	83.3	100.5	7.8606				

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	06-7949-1832	06-7949-1832	18 Jul-06 2:51 PM	CETISv1.1.2

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

Group Comparisons

Control	vs	Conc-%	Statistic	Critical	P-Value	MSD	Decision(0.05)
Artificial Soil/Sedi		100	3.92614	1.89458	0.0029	15.9458	Significant Effect

ANOVA Table

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

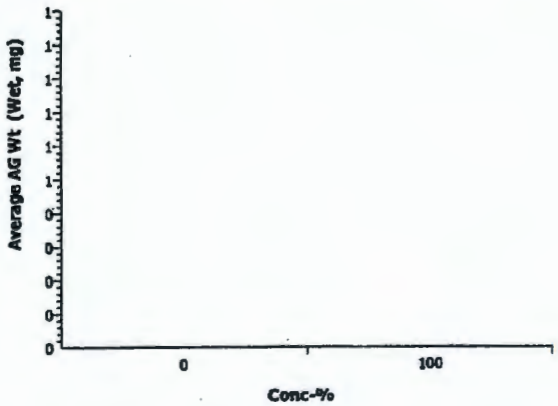
ANOVA Assumptions

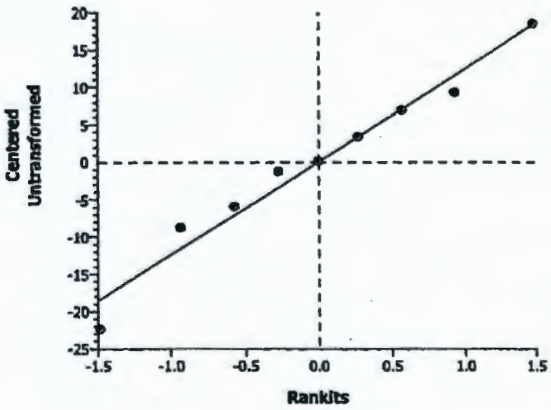
Attribute	Test	Statistic	Critical	P-Value	Decision(0.01)
Variances	Variance Ratio F	8.99470	46.19462	0.10183	Equal Variances
Distribution	Shapiro-Wilk W	0.98165		0.97222	Normal Distribution

Data Summary

			Original Data				Transformed Data			
Conc-%	Control Type	Count	Mean	Minimum	Maximum	SD	Mean	Minimum	Maximum	SD
0	Artificial Soil/S	5	63.903	41.475	82.338	15.946				
100		4	30.859	24.98	37.84	5.317				

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	06-7949-1832	06-7949-1832	18 Jul-06 2:51 PM	CETISv1.1.2

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

Group Comparisons

Control	vs	Conc-%	Statistic	Critical	P-Value	MSD	Decision(0.05)
Artificial Soil/Sedi		100	2.27746	1.89458	0.0284	4.69977	Significant Effect

ANOVA Table

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

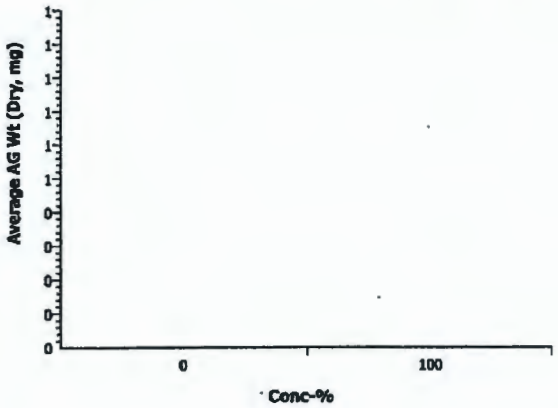
ANOVA Assumptions

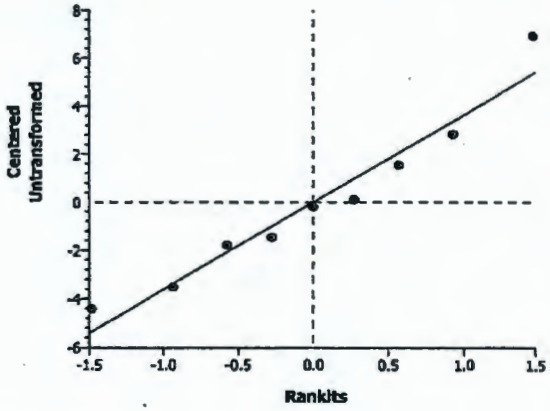
Attribute	Test	Statistic	Critical	P-Value	Decision(0.01)
Variances	Variance Ratio F	14.91113	46.19462	0.05089	Equal Variances
Distribution	Shapiro-Wilk W	0.95295		0.72240	Normal Distribution

Data Summary

			Original Data				Transformed Data			
Conc-%	Control Type	Count	Mean	Minimum	Maximum	SD	Mean	Minimum	Maximum	SD
0	Artificial Soil/S	5	12.351	7.9275	19.276	4.7733				
100		4	6.7013	5.2401	8.25	1.2361				

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	06-7949-1832	06-7949-1832	18 Jul-06 2:51 PM	CETISv1.1.2

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

Group Comparisons

Control	vs	Conc-%	Statistic	Critical	P-Value	MSD	Decision(0.05)
Artificial Soil/Sedi		100	2.79386	1.89458	0.0134	48.9926	Significant Effect

ANOVA Table

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

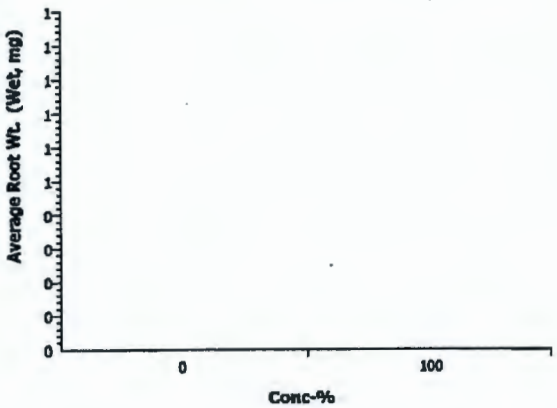
ANOVA Assumptions

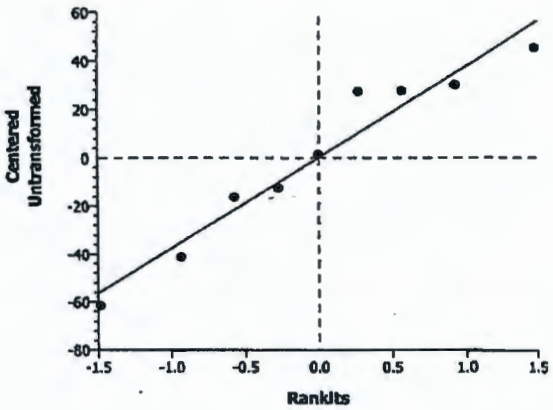
Attribute	Test	Statistic	Critical	P-Value	Decision(0.01)
Variances	Variance Ratio F	5.74830	46.19462	0.18247	Equal Variances
Distribution	Shapiro-Wilk W	0.93481		0.52849	Normal Distribution

Data Summary

			Original Data				Transformed Data			
Conc-%	Control Type	Count	Mean	Minimum	Maximum	SD	Mean	Minimum	Maximum	SD
0	Artificial Soil/S	5	113.23	51.638	158.52	47.962				
100		4	40.987	24.595	68.755	20.005				

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	06-7949-1832	06-7949-1832	18 Jul-06 2:51 PM	CETISv1.1.2

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

Group Comparisons

Control	vs	Conc-%	Statistic	Critical	P-Value	MSD	Decision(0.05)
Artificial Soil/Sedi		100	2.0217	1.89458	0.0415	4.25136	Significant Effect

ANOVA Table

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

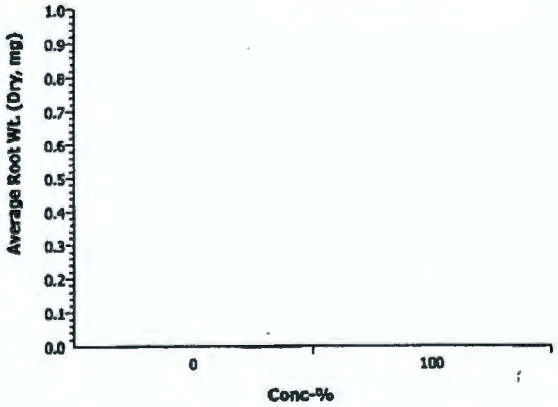
ANOVA Assumptions

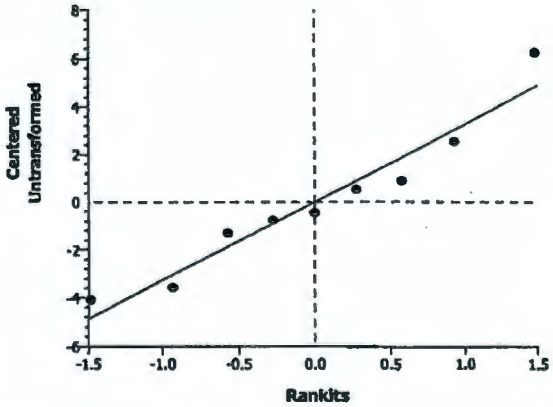
Attribute	Test	Statistic	Critical	P-Value	Decision(0.01)
Variances	Variance Ratio F	5.89043	46.19462	0.17693	Equal Variances
Distribution	Shapiro-Wilk W	0.94719		0.65928	Normal Distribution

Data Summary

			Original Data				Transformed Data			
Conc-%	Control Type	Count	Mean	Minimum	Maximum	SD	Mean	Minimum	Maximum	SD
0	Artificial Soil/S	5	7.8666	3.78	14.108	4.1678				
100		4	3.33	2.02	5.8500	1.7172				

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	06-7949-1832	06-7949-1832	18 Jul-06 2:51 PM	CETISv1.1.2

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

Group Comparisons

Control	vs	Conc-%	Statistic	Critical	P-Value	MSD	Decision(0.05)
Artificial Soil/Sedi		100	3.33482	1.89458	0.0063	59.8184	Significant Effect

ANOVA Table

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

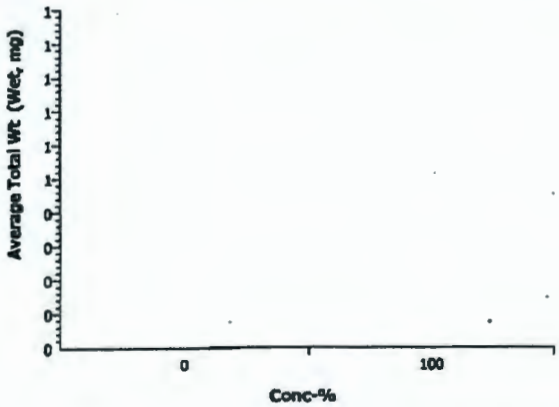
ANOVA Assumptions

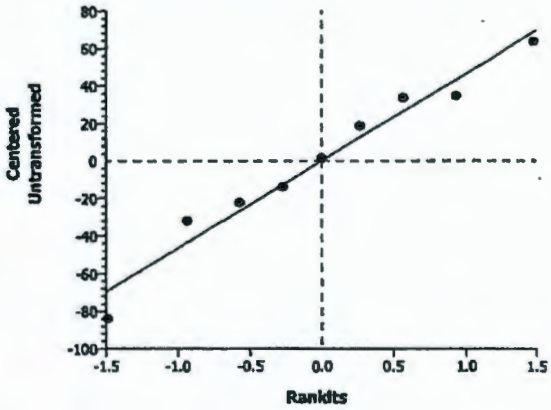
Attribute	Test	Statistic	Critical	P-Value	Decision(0.01)
Variances	Variance Ratio F	5.38092	46.19462	0.19823	Equal Variances
Distribution	Shapiro-Wilk W	0.97138		0.90629	Normal Distribution

Data Summary

			Original Data				Transformed Data			
Conc-%	Control Type	Count	Mean	Minimum	Maximum	SD	Mean	Minimum	Maximum	SD
0	Artificial Soil/S	5	177.14	93.113	240.86	58.331				
100		4	71.846	49.575	106.59	25.146				

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	06-7949-1832	06-7949-1832	18 Jul-06 2:51 PM	CETISv1.1.2

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

Group Comparisons

Control	vs	Conc-%	Statistic	Critical	P-Value	MSD	Decision(0.05)
Artificial Soil/Sedi		100	2.19676	1.89458	0.0320	8.78501	Significant Effect

ANOVA Table

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

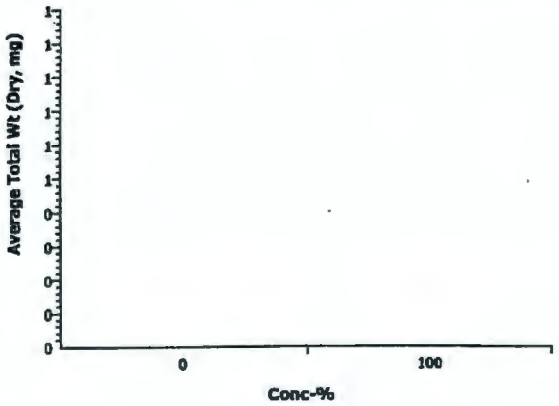
ANOVA Assumptions

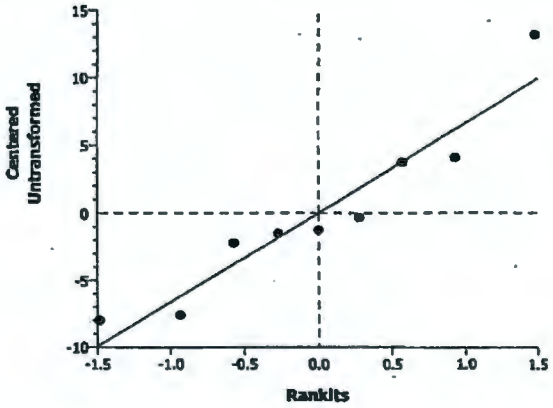
Attribute	Test	Statistic	Critical	P-Value	Decision(0.01)
Variances	Variance Ratio F	9.75715	46.19462	0.09127	Equal Variances
Distribution	Shapiro-Wilk W	0.91888		0.38302	Normal Distribution

Data Summary

			Original Data				Transformed Data			
Conc-%	Control Type	Count	Mean	Minimum	Maximum	SD	Mean	Minimum	Maximum	SD
0	Artificial Soil/S	5	20.217	12.223	33.384	8.8117				
100		4	10.031	7.8101	14.100	2.821				

Graphics





BLUEGRASS GROWTH TEST

Client: Hanford Project

Test Start Date: 01/25/2006

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

Sample ID: E285701-SOI2 B1542-06

CONC.	REPLICATE	# seeds germinated: PRE-EMERGENCE (12 days after planting)	@ EMERGENCE (14 days after planting)	POST-EMERGENCE (16 days after planting)		7-DAYS POST-EMERGENCE (21 days after planting)		14-DAYS POST-EMERGENCE (28 days after planting)	pH: INITIAL (@ planting)	pH: FINAL (28 days after planting)
					21	23	30			
100%	A	1	2	3	5	5	1	1	7.3	7.3
	B	0	5	5	5	6	5	5		
	C	5	5	5	6	6	6→5	5		
	D	2	4	5*	5*	5*	4	3		
	E	0	1	2	3	4	2	2		

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

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

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

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

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

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

14-Days Post-Emergence: Describe shoot appearance:

Replicate A: 1 large - good color - no brown

Replicate B: 4 medium + 1 small - good color

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

Replicate D: 3 medium - good color + 1 dead

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

Measure Shoot Height: (above ground)

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

Measure Shoot Weight: (above ground)

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

Describe root appearance:

Replicate A

Replicate B

Replicate C

Replicate D

Replicate E

Measure Root Length: (longest root)

	1st Seedling	2nd Seedling	3rd Seedling	4th Seedling	5th Seedling
Replicate A	142 mm	mm	mm	mm	mm
Replicate B	94 mm	100 mm	94 mm	95 mm	55 mm
Replicate C	40 mm	97 mm	101 mm	136 mm	105 mm
Replicate D	114 mm	102 mm	106 mm	mm	mm
Replicate E	123 mm	77 mm	mm	mm	mm

Measure Root Weight: (longest root)

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

Comments: 90 stems dry wt / rep.

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

CETIS Test Summary

Report Date: 18 Jul-06 3:05 PM
Test Link: 16-3653-4731/B154206psB

Plant Bioassay - Chronic — CH2M Hill

Test No:	19-1698-5639	**Test Type:**	Plant Chronic	**Duration:**	N/A
Start Date:	25 Jan-06	**Protocol:**	ASTM E1963-02 (2002)	**Species:**	Poa sandbergii
Ending Date:		**Dil Water:**		**Source:**	
Setup Date:	25 Jan-06	**Brine:**			

Comments: recalculated Height and Length data July 18, 2006

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

Comments: J10DV3, E285701

Comparison Summary

Analysis	Endpoint	NOEL	LOEL	ChV	PMSD	Method
11-4813-1916	% Germination	100	> 100	N/A	37.51%	Equal Variance t Two-Sample
09-3544-9763	Average Height (mm)	100	> 100	N/A	25.79%	Equal Variance t Two-Sample
01-3057-6016	Average Length (mm)	100	> 100	N/A	24.52%	Equal Variance t Two-Sample
09-4937-3263	Average AG Wt (Wet, mg)	100	> 100	N/A	44.89%	Equal Variance t Two-Sample
17-9077-0135	Average AG Wt (Dry, mg)	100	> 100	N/A	33.63%	Equal Variance t Two-Sample
10-4892-3286	Average Root Wt. (Wet, mg	100	> 100	N/A	37.75%	Equal Variance t Two-Sample
13-4344-1355	Average Root Wt. (Dry, mg)	100	> 100	N/A	45.34%	Equal Variance t Two-Sample
07-1360-0140	Average Total Wt (Wet, mg	100	> 100	N/A	34.83%	Equal Variance t Two-Sample
06-4394-4993	Average Total Wt (Dry, mg)	100	> 100	N/A	37.33%	Equal Variance t Two-Sample

CETIS Test Summary

Report Date: 18 Jul-06 3:05 PM
Test Link: 16-3653-4731/B154206psB

% Germination Summary

Conc-%	Control Type	Reps	Mean	Minimum	Maximum	SE	SD	CV
0	Artificial Soil/S	5	0.88000	0.60000	1.00000	0.08000	0.17889	20.33%
100		5	0.64000	0.20000	1.00000	0.16000	0.35777	55.90%

Average Height (mm) Summary

Conc-%	Control Type	Reps	Mean	Minimum	Maximum	SE	SD	CV
0	Artificial Soil/S	5	45.68	36.700	55.8	3.3695	7.5344	16.49%
100		5	47.36	36	64	5.3659	11.998	25.33%

Average Length (mm) Summary

Conc-%	Control Type	Reps	Mean	Minimum	Maximum	SE	SD	CV
0	Artificial Soil/S	5	124.62	89.800	153.2	12.597	28.167	22.60%
100		5	107.74	87.6	148	10.557	23.607	21.91%

Average AG Wt (Wet, mg) Summary

Conc-%	Control Type	Reps	Mean	Minimum	Maximum	SE	SD	CV
0	Artificial Soil/S	5	63.903	41.475	82.338	7.1313	15.946	24.95%
100		5	60.421	36.58	110.67	13.681	30.591	50.63%

Average AG Wt (Dry, mg) Summary

Conc-%	Control Type	Reps	Mean	Minimum	Maximum	SE	SD	CV
0	Artificial Soil/S	5	12.351	7.9275	19.276	2.1347	4.7733	38.65%
100		5	8.9213	7.106	10.867	0.6582	1.4718	16.50%

Average Root Wt. (Wet, mg) Summary

Conc-%	Control Type	Reps	Mean	Minimum	Maximum	SE	SD	CV
0	Artificial Soil/S	5	113.23	51.638	158.52	21.449	47.962	42.36%
100		5	84.544	64.510	103.88	8.2686	18.489	21.87%

Average Root Wt. (Dry, mg) Summary

Conc-%	Control Type	Reps	Mean	Minimum	Maximum	SE	SD	CV
0	Artificial Soil/S	5	7.8666	3.78	14.108	1.8639	4.1678	52.98%
100		5	5.1266	3.9520	6.24	0.4523	1.0114	19.73%

Average Total Wt (Wet, mg) Summary

Conc-%	Control Type	Reps	Mean	Minimum	Maximum	SE	SD	CV
0	Artificial Soil/S	5	177.14	93.113	240.86	26.086	58.331	32.93%
100		5	144.97	101.89	208.61	20.496	45.832	31.62%

Average Total Wt (Dry, mg) Summary

Conc-%	Control Type	Reps	Mean	Minimum	Maximum	SE	SD	CV
0	Artificial Soil/S	5	20.217	12.223	33.384	3.9407	8.8117	43.58%
100		5	14.048	11.058	15.850	0.9693	2.1673	15.43%

CETIS Test Summary

Report Date: 18 Jul-06 3:05 PM
Test Link: 16-3653-4731/B154206psB

% Germination Detail

Conc-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Artificial Soil/S	1.00000	1.00000	1.00000	0.60000	0.80000
100		0.20000	1.00000	1.00000	0.60000	0.40000

Average Height (mm) Detail

Conc-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Artificial Soil/S	50.6	41.8	55.8	36.7000	43.5
100		64	38.6	36	55.7000	42.5

Average Length (mm) Detail

Conc-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Artificial Soil/S	138.800	142	153.2	99.3000	89.8000
100		148	87.6	95.8000	107.300	100

Average AG Wt (Wet, mg) Detail

Conc-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Artificial Soil/S	67.2900	55.1900	82.338	73.2233	41.4750
100		110.67	36.58	51.1600	66.2900	37.405

Average AG Wt (Dry, mg) Detail

Conc-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Artificial Soil/S	15.1720	10.552	19.276	8.82666	7.92751
100		8.94000	7.10599	9.73401	10.8667	7.96002

Average Root Wt. (Wet, mg) Detail

Conc-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Artificial Soil/S	143.362	140.624	158.524	72.0233	51.6375
100		97.9399	65.3100	91.082	103.88	64.5100

Average Root Wt. (Dry, mg) Detail

Conc-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Artificial Soil/S	8.75601	8.39399	14.108	3.77999	4.295
100		6.23999	3.95200	6.11600	4.83999	4.48499

Average Total Wt (Wet, mg) Detail

Conc-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Artificial Soil/S	210.652	195.814	240.862	145.247	93.1125
100		208.61	101.890	142.242	170.17	101.915

Average Total Wt (Dry, mg) Detail

Conc-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Artificial Soil/S	23.9280	18.946	33.384	12.6066	12.2225
100		15.18	11.058	15.8500	15.7066	12.4450

CETIS Analysis Detail

Plant Bioassay - Chronic — **CH2M Hill**

Endpoint	Analysis Type	Sample Link	Control Link	Date Analyzed	Version
% Germination	Comparison	16-3653-4731	16-3653-4731	18 Jul-06 3:05 PM	CETISv1.1.2

Method	Alt H	Data Transform	Zeta	NOEL	LOEL	Toxic Units	ChV	PMSD
Equal Variance t Two-Sample	C > T	Angular (Corrected)		100	>100	1	N/A	37.51%

Group Comparisons

Control	vs	Conc-%	Statistic	Critical	P-Value	MSD	Decision(0.05)
Artificial Soil/Sedi		100	1.30924	1.85955	0.1134	0.37044	Non-Significant Effect

ANOVA Table

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

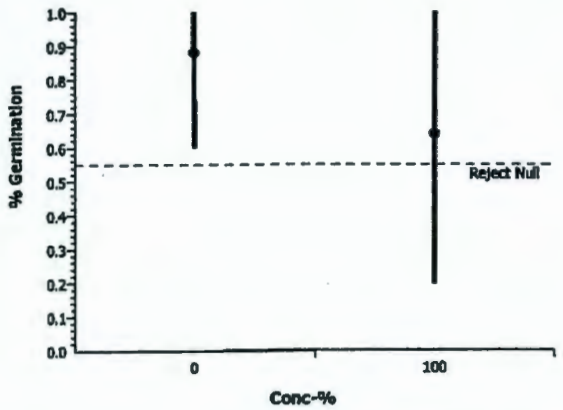
ANOVA Assumptions

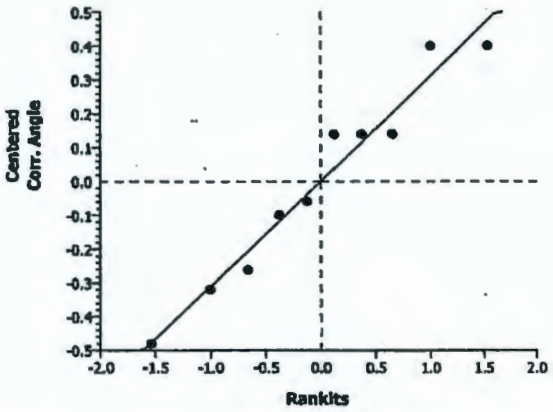
Attribute	Test	Statistic	Critical	P-Value	Decision(0.01)
Variances	Variance Ratio F	3.65997	23.15450	0.23677	Equal Variances
Distribution	Shapiro-Wilk W	0.94392		0.59737	Normal Distribution

Data Summary

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

Graphics





CETIS Analysis Detail

Plant Bioassay - Chronic — **CH2M Hill**

Endpoint	Analysis Type	Sample Link	Control Link	Date Analyzed	Version
Average Height (mm)	Comparison	16-3653-4731	16-3653-4731	18 Jul-06 3:05 PM	CETISv1.1.2

Method	Alt H	Data Transform	Zeta	NOEL	LOEL	Toxic Units	ChV	PMSD
Equal Variance t Two-Sample	C > T	Untransformed		100	>100	1	N/A	25.79%

Group Comparisons

Control	vs	Conc-%	Statistic	Critical	P-Value	MSD	Decision(0.05)
Artificial Soil/Sedi		100	-0.2651	1.85955	0.6012	11.7823	Non-Significant Effect

ANOVA Table

Source	Sum of Squares	Mean Square	DF	F Statistic	P-Value	Decision(0.05)
Between	7.056003	7.056003	1	0.07	0.79760	Non-Significant Effect
Error	802.92	100.365	8			
Total	809.975986	107.42100	9			

ANOVA Assumptions

Attribute	Test	Statistic	Critical	P-Value	Decision(0.01)
Variances	Variance Ratio F	2.53603	23.15450	0.38939	Equal Variances
Distribution	Shapiro-Wilk W	0.92698		0.41889	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	45.68	36.7	55.8	7.5344				
100		5	47.36	36	64	11.998				

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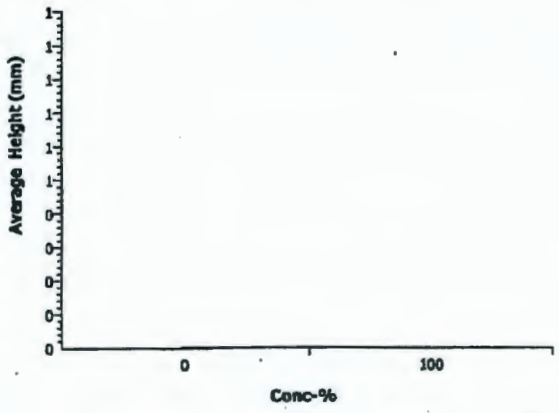
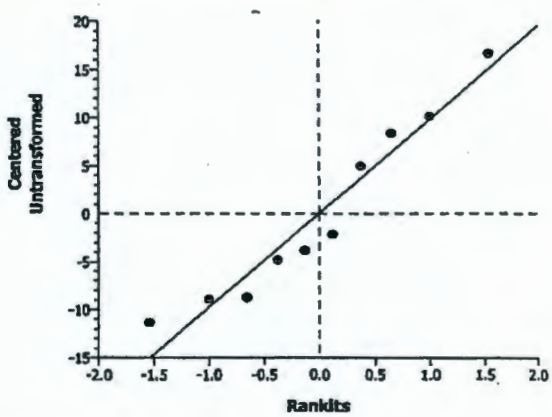




CETIS Analysis Detail

Plant Bioassay - Chronic — **CH2M Hill**

Endpoint	Analysis Type	Sample Link	Control Link	Date Analyzed	Version
Average Length (mm)	Comparison	16-3653-4731	16-3653-4731	18 Jul-06 3:05 PM	CETISv1.1.2

Method	Alt H	Data Transform	Zeta	NOEL	LOEL	Toxic Units	ChV	PMSD
Equal Variance t Two-Sample	C > T	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	1.02703	1.85955	0.1672	30.563	Non-Significant Effect

ANOVA Table

Source	Sum of Squares	Mean Square	DF	F Statistic	P-Value	Decision(0.05)
Between	712.336	712.336	1	1.05	0.33445	Non-Significant Effect
Error	5402.64	675.33	8			
Total	6114.97565	1387.666	9			

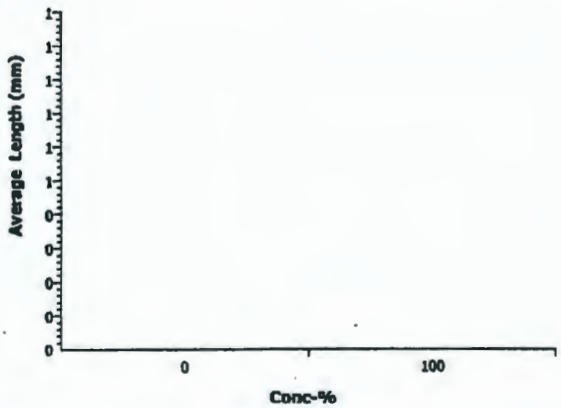
ANOVA Assumptions

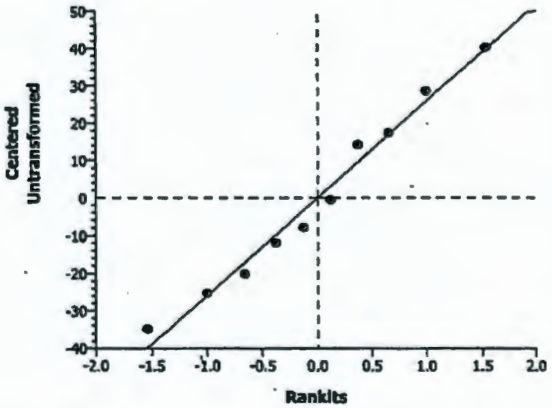
Attribute	Test	Statistic	Critical	P-Value	Decision(0.01)
Variances	Variance Ratio F	1.42363	23.15450	0.74048	Equal Variances
Distribution	Shapiro-Wilk W	0.96884		0.87986	Normal Distribution

Data Summary

			Original Data				Transformed Data			
Conc-%	Control Type	Count	Mean	Minimum	Maximum	SD	Mean	Minimum	Maximum	SD
0	Artificial Soil/S	5	124.62	89.8	153.2	28.167				
100		5	107.74	87.6	148	23.607				

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	16-3653-4731	16-3653-4731	18 Jul-06 3:05 PM	CETISv1.1.2

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

Group Comparisons

Control	vs	Conc-%	Statistic	Critical	P-Value	MSD	Decision(0.05)
Artificial Soil/Sedi		100	0.22571	1.85955	0.4135	28.689	Non-Significant Effect

ANOVA Table

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

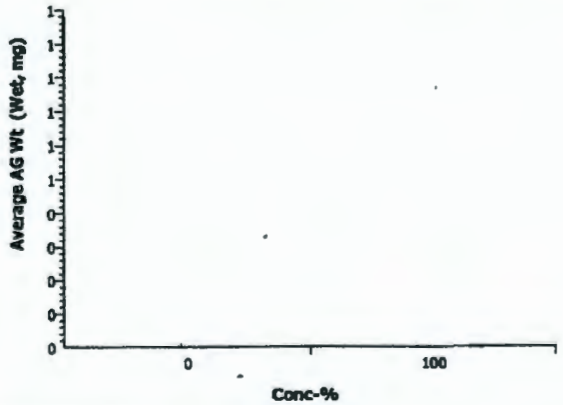
ANOVA Assumptions

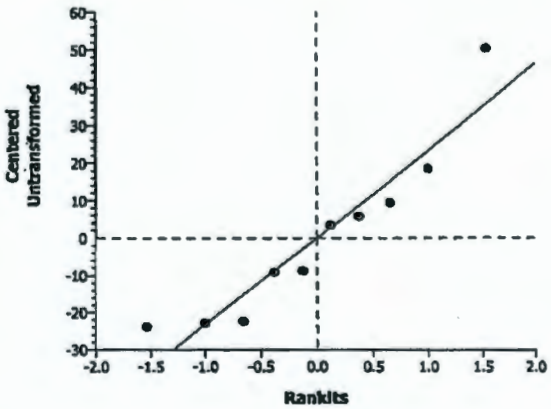
Attribute	Test	Statistic	Critical	P-Value	Decision(0.01)
Variances	Variance Ratio F	3.68029	23.15450	0.23489	Equal Variances
Distribution	Shapiro-Wilk W	0.89548		0.19531	Normal Distribution

Data Summary

			Original Data				Transformed Data			
Conc-%	Control Type	Count	Mean	Minimum	Maximum	SD	Mean	Minimum	Maximum	SD
0	Artificial Soil/S	5	63.903	41.475	82.338	15.946				
100		5	60.421	36.58	110.67	30.591				

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	16-3653-4731	16-3653-4731	18 Jul-06 3:05 PM	CETISv1.1.2

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

Group Comparisons

Control	vs	Conc-%	Statistic	Critical	P-Value	MSD	Decision(0.05)
Artificial Soil/Sedi		100	1.53523	1.85955	0.0816	4.15398	Non-Significant Effect

ANOVA Table

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

ANOVA Assumptions

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

Data Summary

			Original Data				Transformed Data			
Conc-%	Control Type	Count	Mean	Minimum	Maximum	SD	Mean	Minimum	Maximum	SD
0	Artificial Soil/S	5	12.351	7.9275	19.276	4.7733				
100		5	8.9213	7.106	10.867	1.4718				

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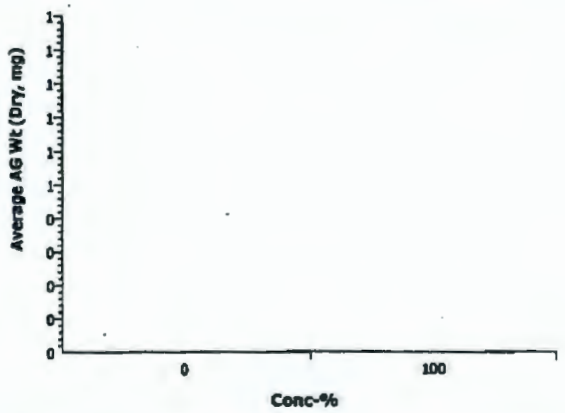

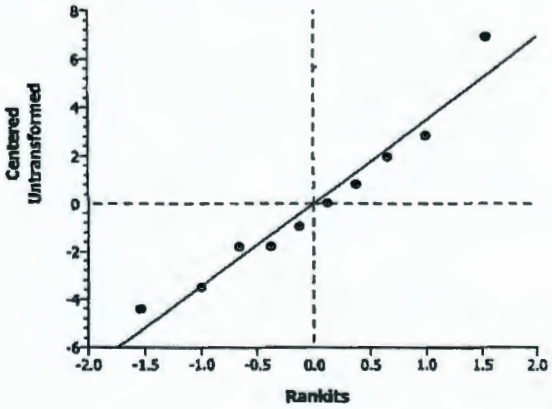

CETIS Analysis Detail

Plant Bioassay - Chronic — **CH2M Hill**

Endpoint	Analysis Type	Sample Link	Control Link	Date Analyzed	Version
Average Root Wt. (Wet, mg)	Comparison	16-3653-4731	16-3653-4731	18 Jul-06 3:05 PM	CETISv1.1.2

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

Group Comparisons

Control	vs	Conc-%	Statistic	Critical	P-Value	MSD	Decision(0.05)
Artificial Soil/Sedi		100	1.24804	1.85955	0.1237	42.7472	Non-Significant Effect

ANOVA Table

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

ANOVA Assumptions

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

Data Summary

			Original Data				Transformed Data			
Conc-%	Control Type	Count	Mean	Minimum	Maximum	SD	Mean	Minimum	Maximum	SD
0	Artificial Soil/S	5	113.23	51.638	158.52	47.962				
100		5	84.544	64.510	103.88	18.489				

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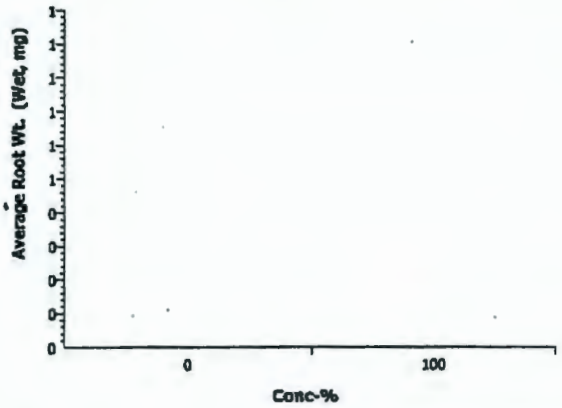

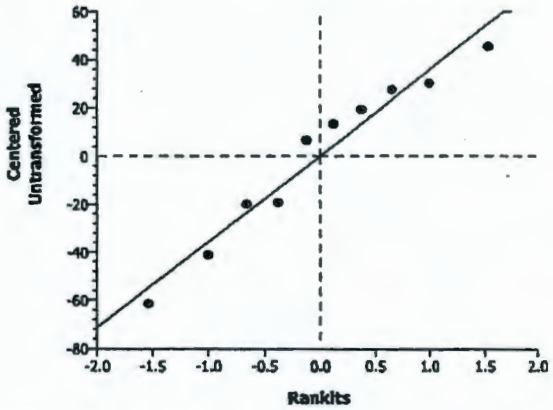

CETIS Analysis Detail

Plant Bioassay - Chronic — **CH2M Hill**

Endpoint	Analysis Type	Sample Link	Control Link	Date Analyzed	Version
Average Root Wt. (Dry, mg)	Comparison	16-3653-4731	16-3653-4731	18 Jul-06 3:05 PM	CETISv1.1.2

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

Group Comparisons

Control	vs	Conc-%	Statistic	Critical	P-Value	MSD	Decision(0.05)
Artificial Soil/Sedi		100	1.42859	1.85955	0.0955	3.56658	Non-Significant Effect

ANOVA Table

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

ANOVA Assumptions

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

Data Summary

			Original Data				Transformed Data			
Conc-%	Control Type	Count	Mean	Minimum	Maximum	SD	Mean	Minimum	Maximum	SD
0	Artificial Soil/S	5	7.8666	3.78	14.108	4.1678				
100		5	5.1266	3.9520	6.24	1.0114				

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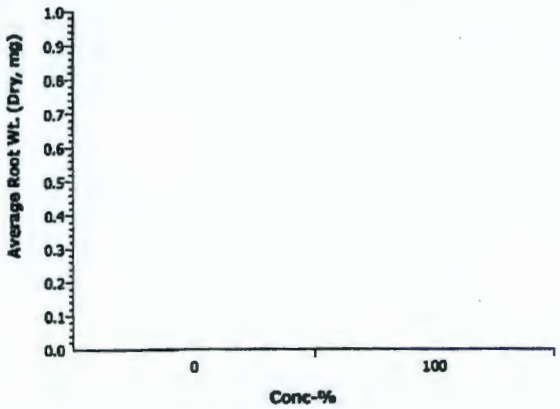

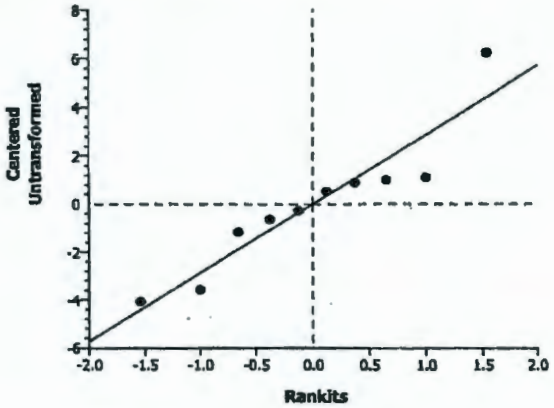

CETIS Analysis Detail

Plant Bioassay - Chronic — **CH2M HILL**

Endpoint	Analysis Type	Sample Link	Control Link	Date Analyzed	Version
Average Total Wt (Wet, mg)	Comparison	16-3653-4731	16-3653-4731	18 Jul-06 3:05 PM	CETISv1.1.2

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

Group Comparisons

Control	vs	Conc-%	Statistic	Critical	P-Value	MSD	Decision(0.05)
Artificial Soil/Sedi		100	0.96975	1.85955	0.1803	61.6913	Non-Significant Effect

ANOVA Table

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

ANOVA Assumptions

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

Data Summary

			Original Data				Transformed Data			
Conc-%	Control Type	Count	Mean	Minimum	Maximum	SD	Mean	Minimum	Maximum	SD
0	Artificial Soil/S	5	177.14	93.113	240.86	58.331				
100		5	144.97	101.89	208.61	45.832				

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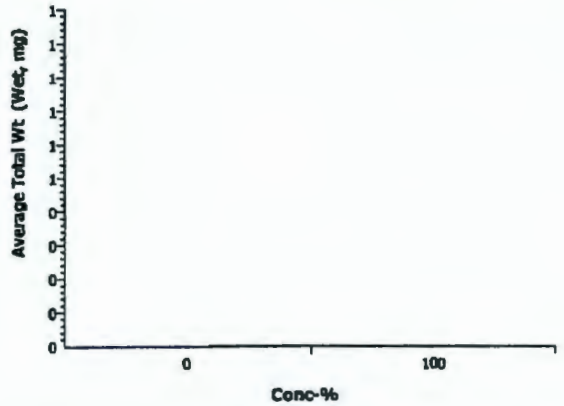
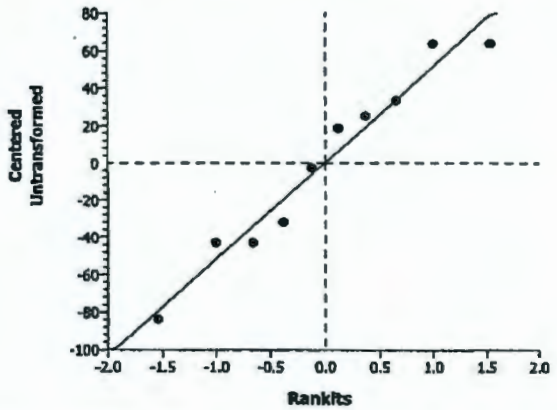




CETIS Analysis Detail

Plant Bioassay - Chronic — **CH2M Hill**

Endpoint	Analysis Type	Sample Link	Control Link	Date Analyzed	Version
Average Total Wt (Dry, mg)	Comparison	16-3653-4731	16-3653-4731	18 Jul-06 3:05 PM	CETISv1.1.2

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

Group Comparisons

Control	vs	Conc-%	Statistic	Critical	P-Value	MSD	Decision(0.05)
Artificial Soil/Sedi		100	1.52026	1.85955	0.0835	7.54637	Non-Significant Effect

ANOVA Table

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

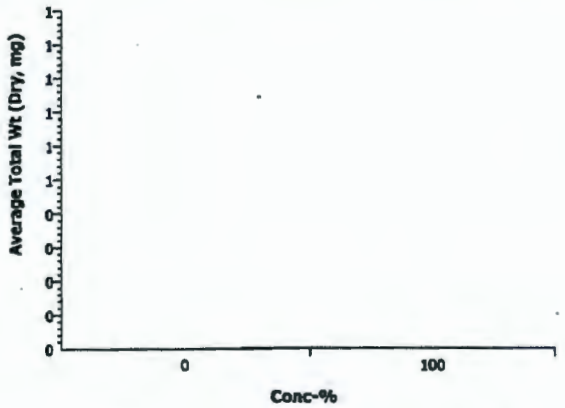
ANOVA Assumptions

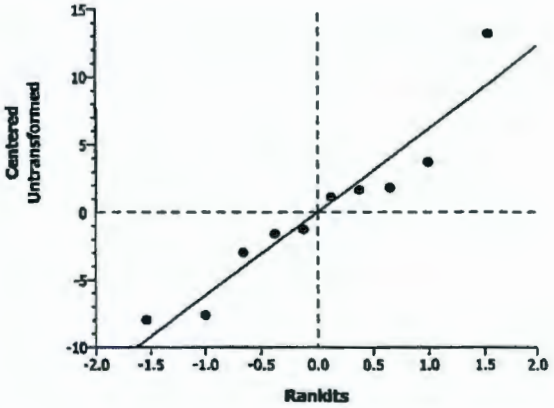
Attribute	Test	Statistic	Critical	P-Value	Decision(0.01)
Variances	Variance Ratio F	16.52981	23.15450	0.01878	Equal Variances
Distribution	Shapiro-Wilk W	0.91804		0.34089	Normal Distribution

Data Summary

			Original Data				Transformed Data			
Conc-%	Control Type	Count	Mean	Minimum	Maximum	SD	Mean	Minimum	Maximum	SD
0	Artificial Soil/S	5	20.217	12.223	33.384	8.8117				
100		5	14.048	11.058	15.850	2.1673				

Graphics





BLUEGRASS GROWTH TEST

Client: Hanford Project

Test Start Date: 01/25/2006

Initials: Day 0 BM Day 12 NJ Day 14 BM Day 16 NJ Day 21 (illegible) Day 28 30 BM

Sample ID: E287701-SOI2 Z 1547-07

CONC.	REPLICATE	PRE-EMERGENCE (12 days after planting)	@ EMERGENCE (14 days after planting)	POST-EMERGENCE (16 days after planting)		7-DAYS POST-EMERGENCE (21 days after planting)		14-DAYS POST-EMERGENCE (28 days after planting)	pH INITIAL (@ planting)	pH FINAL (28 days after planting)
		# seeds germinated				A alive				
					21	23	30			
100%	A	5	5	5	5	5	5	4	6.9	6.8
	B	3	5	6	6	6	6→5	5		
	C	1	1	1	1	1	2	2		
	D	4	4	6	7	7	6→5	5		
	E	4	5	5	5	5	3	3		

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

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

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

Replicate C: 1 medium + 1 small in good shape

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

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

14-Days Post-Emergence: Describe shoot appearance:

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

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

Replicate C: 2 small plants 1 browning @ tips

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

Replicate E: 3 medium plants all look good

Measure Shoot Height: (above ground)

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

Measure Shoot Weight: (above ground)

	Tin Tare Wt. (mg)	Wet Wt (mg)	Dry Wt. (mg)
Replicate A	1007.68	1502.0	1084.10
Replicate B	984.36	1298.9	1041.08
Replicate C	1004.73	1069.5	1025.72
Replicate D	1022.04	1428.1	1104.91
Replicate E	995.72	1249.3	1042.75

Describe root appearance:

Replicate A:

Replicate B:

Replicate C:

Replicate D: "bushy" many branches

Replicate E:

Measure Root Length: (longest root)

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

Measure Root Weight: (longest root)

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

Comments: 90 g dry wt. / rep. 2-14-06 removed other sporting plants (broad leaves)

CETIS Test Summary

Report Date: 18 Jul-06 3:18 PM
Test Link: 04-8263-2299/B154207psB

Plant Bioassay - Chronic — **CH2M Hill**

Test No:	12-6229-3369	**Test Type:**	Plant Chronic	**Duration:**	N/A
Start Date:	25 Jan-06	**Protocol:**	ASTM E1963-02 (2002)	**Species:**	Poa sandbergii
Ending Date:		**Dil Water:**		**Source:**	
Setup Date:	25 Jan-06	**Brine:**			

Comments: recalculated Height and Length data July 18, 2006

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

Comments: J10DV0, E287701

Comparison Summary

Analysis	Endpoint	NOEL	LOEL	ChV	PMSD	Method
07-1683-8343	% Germination	100	> 100	N/A	29.15%	Equal Variance t Two-Sample
05-9865-5166	Average Height (mm)	100	> 100	N/A	21.86%	Equal Variance t Two-Sample
11-1712-0855	Average Length (mm)	< 100	100	N/A	21.06%	Equal Variance t Two-Sample
14-2807-8527	Average AG Wt (Wet, mg)	100	> 100	N/A	48.02%	Equal Variance t Two-Sample
07-3121-1221	Average AG Wt (Dry, mg)	100	> 100	N/A	40.28%	Equal Variance t Two-Sample
01-1999-8693	Average Root Wt. (Wet, mg	100	> 100	N/A	61.63%	Equal Variance t Two-Sample
11-1044-3638	Average Root Wt. (Dry, mg)	100	> 100	N/A	55.59%	Equal Variance t Two-Sample
10-3674-4783	Average Total Wt (Wet, mg	100	> 100	N/A	55.04%	Equal Variance t Two-Sample
09-9540-8099	Average Total Wt (Dry, mg)	100	> 100	N/A	45.41%	Equal Variance t Two-Sample

CETIS Test Summary

Report Date: 18 Jul-06 3:18 PM
Test Link: 04-8263-2299/B154207psB

% Germination Summary

Conc-%	Control Type	Reps	Mean	Minimum	Maximum	SE	SD	CV
0	Artificial Soil/S	5	0.88000	0.60000	1.00000	0.08000	0.17889	20.33%
100		5	0.76000	0.40000	1.00000	0.11662	0.26077	34.31%

Average Height (mm) Summary

Conc-%	Control Type	Reps	Mean	Minimum	Maximum	SE	SD	CV
0	Artificial Soil/S	5	45.68	36.700	55.8	3.3695	7.5344	16.49%
100		5	41.47	28.5	54	4.1819	9.3510	22.55%

Average Length (mm) Summary

Conc-%	Control Type	Reps	Mean	Minimum	Maximum	SE	SD	CV
0	Artificial Soil/S	5	124.62	89.800	153.2	12.597	28.167	22.60%
100		5	80.92	64	102.7	6.3638	14.23	17.59%

Average AG Wt (Wet, mg) Summary

Conc-%	Control Type	Reps	Mean	Minimum	Maximum	SE	SD	CV
0	Artificial Soil/S	5	63.903	41.475	82.338	7.1313	15.946	24.95%
100		5	76.856	32.385	123.58	14.88	33.272	43.29%

Average AG Wt (Dry, mg) Summary

Conc-%	Control Type	Reps	Mean	Minimum	Maximum	SE	SD	CV
0	Artificial Soil/S	5	12.351	7.9275	19.276	2.1347	4.7733	38.65%
100		5	14.659	10.595	19.105	1.6121	3.6047	24.59%

Average Root Wt. (Wet, mg) Summary

Conc-%	Control Type	Reps	Mean	Minimum	Maximum	SE	SD	CV
0	Artificial Soil/S	5	113.23	51.638	158.52	21.449	47.962	42.36%
100		5	123.91	37.985	226.38	30.793	68.855	55.57%

Average Root Wt. (Dry, mg) Summary

Conc-%	Control Type	Reps	Mean	Minimum	Maximum	SE	SD	CV
0	Artificial Soil/S	5	7.8666	3.78	14.108	1.8639	4.1678	52.98%
100		5	9.1010	6.465	13.887	1.4338	3.2061	35.23%

Average Total Wt (Wet, mg) Summary

Conc-%	Control Type	Reps	Mean	Minimum	Maximum	SE	SD	CV
0	Artificial Soil/S	5	177.14	93.113	240.86	26.086	58.331	32.93%
100		5	200.76	70.37	349.96	45.485	101.71	50.66%

Average Total Wt (Dry, mg) Summary

Conc-%	Control Type	Reps	Mean	Minimum	Maximum	SE	SD	CV
0	Artificial Soil/S	5	20.217	12.223	33.384	3.9407	8.8117	43.58%
100		5	23.76	17.060	32.992	2.9736	6.6492	27.98%

CETIS Test Summary

Report Date: 18 Jul-06 3:18 PM
Test Link: 04-8263-2299/B154207psB

% Germination Detail

Conc-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Artificial Soil/S	1.00000	1.00000	1.00000	0.60000	0.80000
100		0.80000	1.00000	0.40000	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	50.6	41.8	55.8	36.7000	43.5
100		43.25	37.6	28.5	44	54

Average Length (mm) Detail

Conc-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Artificial Soil/S	138.800	142	153.2	99.3000	89.8000
100		84.3000	75.4000	64	78.2	102.7

Average AG Wt (Wet, mg) Detail

Conc-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Artificial Soil/S	67.2900	55.1900	82.338	73.2233	41.4750
100		123.580	62.9080	32.3850	81.212	84.1934

Average AG Wt (Dry, mg) Detail

Conc-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Artificial Soil/S	15.1720	10.552	19.276	8.82666	7.92751
100		19.105	11.344	10.5950	16.5740	15.6767

Average Root Wt. (Wet, mg) Detail

Conc-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Artificial Soil/S	143.362	140.624	158.524	72.0233	51.6375
100		226.382	97.668	37.985	141.882	115.61

Average Root Wt. (Dry, mg) Detail

Conc-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Artificial Soil/S	8.75601	8.39399	14.108	3.77999	4.295
100		13.8875	6.68201	6.465	10.874	7.59666

Average Total Wt (Wet, mg) Detail

Conc-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Artificial Soil/S	210.652	195.814	240.862	145.247	93.1125
100		349.963	160.576	70.37	223.094	199.803

Average Total Wt (Dry, mg) Detail

Conc-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Artificial Soil/S	23.9280	18.946	33.384	12.6066	12.2225
100		32.9925	18.0260	17.0601	27.448	23.2733

CETIS Analysis Detail

Plant Bioassay - Chronic — **CH2M Hill**

Endpoint	Analysis Type	Sample Link	Control Link	Date Analyzed	Version
% Germination	Comparison	04-8263-2299	04-8263-2299	18 Jul-06 3:14 PM	CETISv1.1.2

Method	Alt H	Data Transform	Zeta	NOEL	LOEL	Toxic Units	ChV	PMSD
Equal Variance t Two-Sample	C > T	Angular (Corrected)		100	>100	1	N/A	29.15%

Group Comparisons

Control	vs	Conc-%	Statistic	Critical	P-Value	MSD	Decision(0.05)
Artificial Soil/Sedi		100	0.83103	1.85955	0.2150	0.29562	Non-Significant Effect

ANOVA Table

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

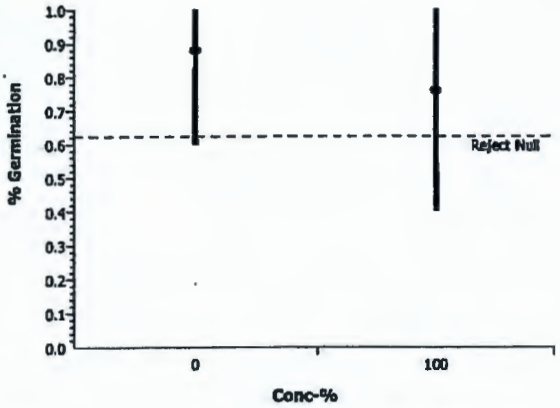
ANOVA Assumptions

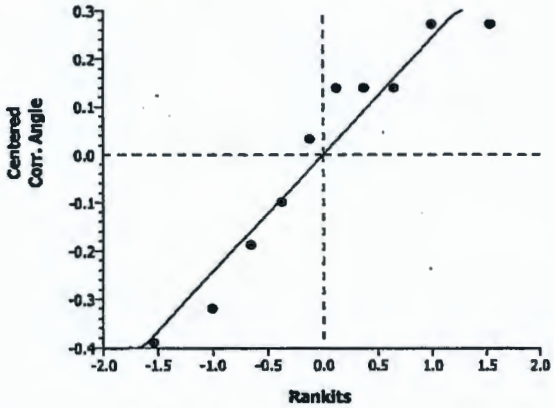
Attribute	Test	Statistic	Critical	P-Value	Decision(0.01)
Variances	Variance Ratio F	1.96770	23.15450	0.52822	Equal Variances
Distribution	Shapiro-Wilk W	0.90703		0.26121	Normal Distribution

Data Summary

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

Graphics





CETIS Analysis Detail

Plant Bioassay - Chronic — **CH2M Hill**

Endpoint	Analysis Type	Sample Link	Control Link	Date Analyzed	Version
Average Height (mm)	Comparison	04-8263-2299	04-8263-2299	18 Jul-06 3:18 PM	CETISv1.1.2

Method	Alt H	Data Transform	Zeta	NOEL	LOEL	Toxic Units	ChV	PMSD
Equal Variance t Two-Sample	C > T	Untransformed		100	>100	1	N/A	21.86%

Group Comparisons

Control	vs	Conc-%	Statistic	Critical	P-Value	MSD	Decision(0.05)
Artificial Soil/Sedi		100	0.78392	1.85955	0.2278	9.98662	Non-Significant Effect

ANOVA Table

Source	Sum of Squares	Mean Square	DF	F Statistic	P-Value	Decision(0.05)
Between	44.31025	44.31025	1	0.61	0.45567	Non-Significant Effect
Error	576.836	72.1045	8			
Total	621.146244	116.41475	9			

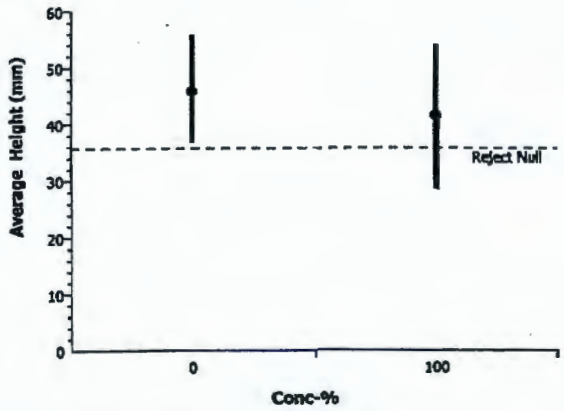
ANOVA Assumptions

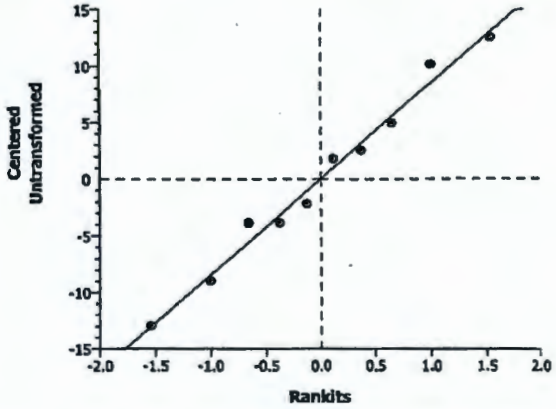
Attribute	Test	Statistic	Critical	P-Value	Decision(0.01)
Variances	Variance Ratio F	1.54037	23.15450	0.68574	Equal Variances
Distribution	Shapiro-Wilk W	0.97736		0.94947	Normal Distribution

Data Summary

			Original Data				Transformed Data			
Conc-%	Control Type	Count	Mean	Minimum	Maximum	SD	Mean	Minimum	Maximum	SD
0	Artificial Soil/S	5	45.68	36.7	55.8	7.5344				
100		5	41.47	28.5	54	9.3510				

Graphics





CETIS Analysis Detail

Plant Bioassay - Chronic — **CH2M Hill**

Endpoint	Analysis Type	Sample Link	Control Link	Date Analyzed	Version
Average Length (mm)	Comparison	04-8263-2299	04-8263-2299	18 Jul-06 3:14 PM	CETISv1.1.2

Method	Alt H	Data Transform	Zeta	NOEL	LOEL	Toxic Units	ChV	PMSD
Equal Variance t Two-Sample	C > T	Untransformed		<100	100		N/A	21.06%

Group Comparisons

Control	vs	Conc-%	Statistic	Critical	P-Value	MSD	Decision(0.05)
Artificial Soil/Sedi		100	3.09848	1.85955	0.0074	26.2435	Significant Effect

ANOVA Table

Source	Sum of Squares	Mean Square	DF	F Statistic	P-Value	Decision(0.05)
Between	4774.225	4774.225	1	9.59	0.01474	Significant Effect
Error	3983.436	497.9294	8			
Total	8757.66064	5272.1545	9			

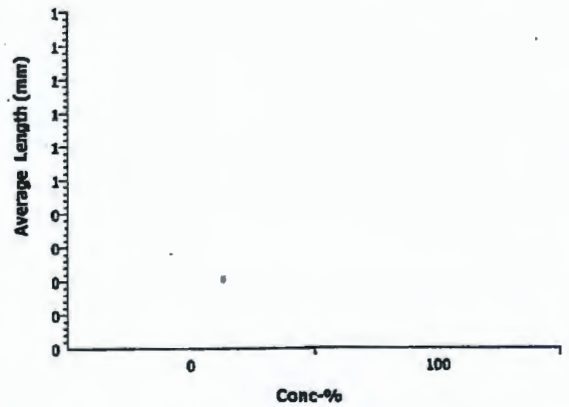
ANOVA Assumptions

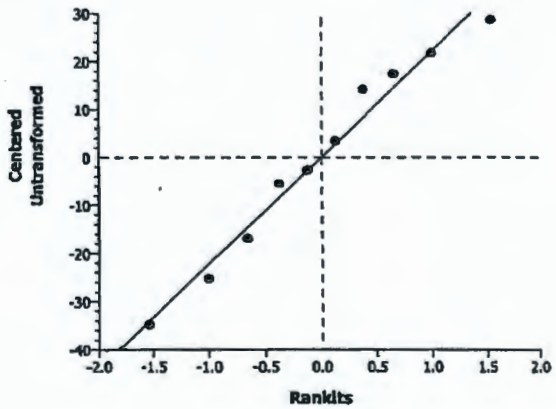
Attribute	Test	Statistic	Critical	P-Value	Decision(0.01)
Variances	Variance Ratio F	3.91814	23.15450	0.21443	Equal Variances
Distribution	Shapiro-Wilk W	0.96138		0.80147	Normal Distribution

Data Summary

			Original Data				Transformed Data			
Conc-%	Control Type	Count	Mean	Minimum	Maximum	SD	Mean	Minimum	Maximum	SD
0	Artificial Soil/S	5	124.62	89.8	153.2	28.167				
100		5	80.92	64	102.7	14.23				

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	04-8263-2299	04-8263-2299	18 Jul-06 3:14 PM	CETISv1.1.2

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

Group Comparisons

Control	vs	Conc-%	Statistic	Critical	P-Value	MSD	Decision(0.05)
Artificial Soil/Sedi		100	-0.785	1.85955	0.7725	30.6833	Non-Significant Effect

ANOVA Table

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

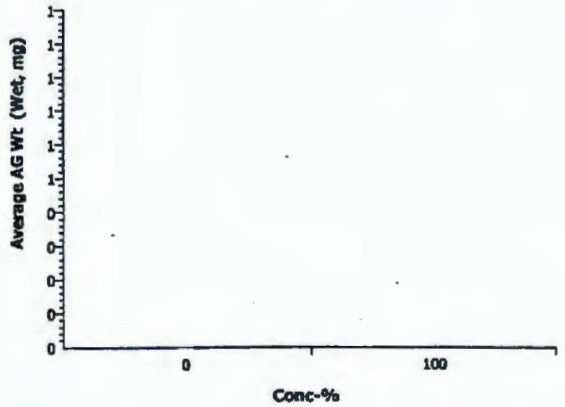
ANOVA Assumptions

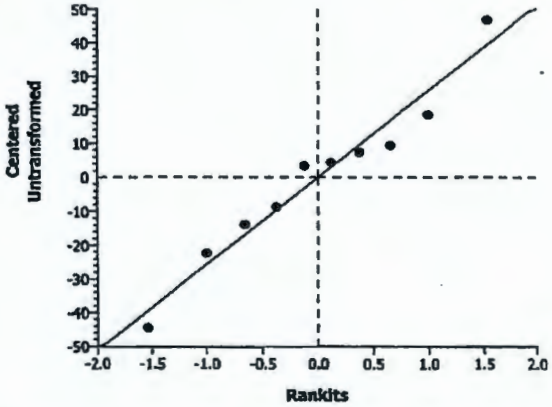
Attribute	Test	Statistic	Critical	P-Value	Decision(0.01)
Variances	Variance Ratio F	4.35362	23.15450	0.18327	Equal Variances
Distribution	Shapiro-Wilk W	0.97222		0.91060	Normal Distribution

Data Summary

			Original Data				Transformed Data			
Conc-%	Control Type	Count	Mean	Minimum	Maximum	SD	Mean	Minimum	Maximum	SD
0	Artificial Soil/S	5	63.903	41.475	82.338	15.946				
100		5	76.856	32.385	123.58	33.272				

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	04-8263-2299	04-8263-2299	18 Jul-06 3:14 PM	CETISv1.1.2

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

Group Comparisons

Control	vs	Conc-%	Statistic	Critical	P-Value	MSD	Decision(0.05)
Artificial Soil/Sedi		100	-0.8628	1.85955	0.7933	4.97430	Non-Significant Effect

ANOVA Table

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

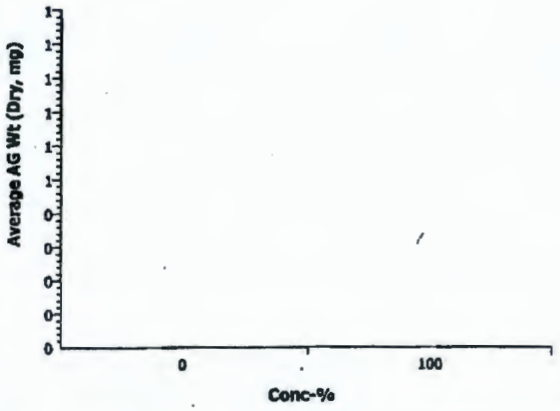
ANOVA Assumptions

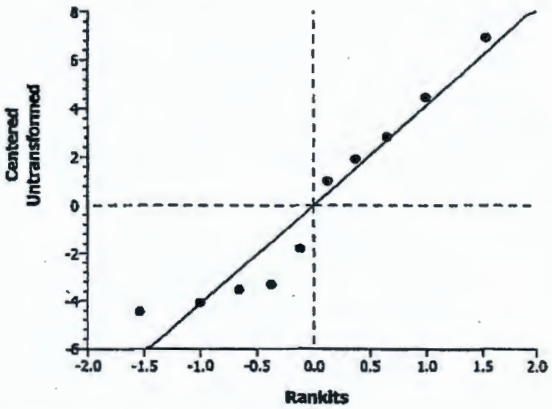
Attribute	Test	Statistic	Critical	P-Value	Decision(0.01)
Variances	Variance Ratio F	1.75351	23.15450	0.59977	Equal Variances
Distribution	Shapiro-Wilk W	0.91217		0.29621	Normal Distribution

Data Summary

			Original Data				Transformed Data			
Conc-%	Control Type	Count	Mean	Minimum	Maximum	SD	Mean	Minimum	Maximum	SD
0	Artificial Soil/S	5	12.351	7.9275	19.276	4.7733				
100		5	14.659	10.595	19.105	3.6047				

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	04-8263-2299	04-8263-2299	18 Jul-06 3:14 PM	CETISv1.1.2

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

Group Comparisons

Control	vs	Conc-%	Statistic	Critical	P-Value	MSD	Decision(0.05)
Artificial Soil/Sedi		100	-0.2844	1.85955	0.6083	69.7836	Non-Significant Effect

ANOVA Table

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

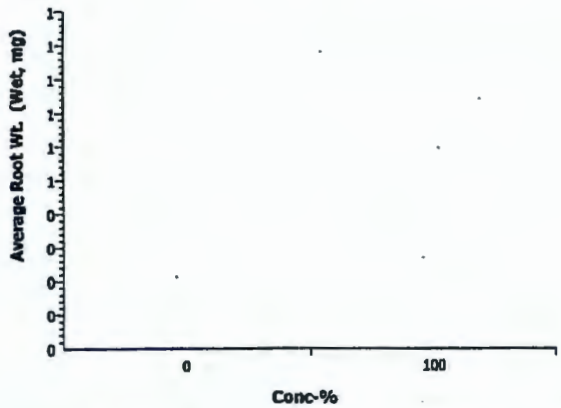
ANOVA Assumptions

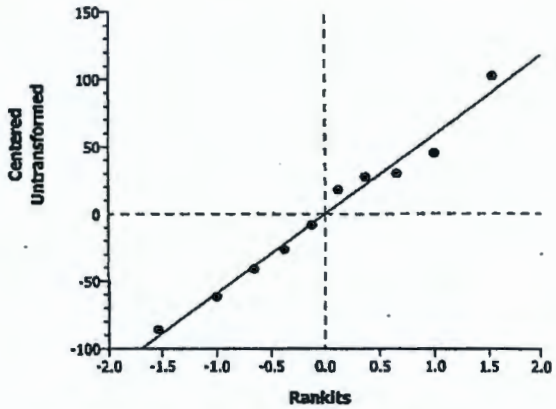
Attribute	Test	Statistic	Critical	P-Value	Decision(0.01)
Variances	Variance Ratio F	2.06099	23.15450	0.50090	Equal Variances
Distribution	Shapiro-Wilk W	0.98045		0.96755	Normal Distribution

Data Summary

			Original Data				Transformed Data			
Conc-%	Control Type	Count	Mean	Minimum	Maximum	SD	Mean	Minimum	Maximum	SD
0	Artificial Soil/S	5	113.23	51.638	158.52	47.962				
100		5	123.91	37.985	226.38	68.855				

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	04-8263-2299	04-8263-2299	18 Jul-06 3:14 PM	CETISv1.1.2

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

Group Comparisons

Control vs	Conc-%	Statistic	Critical	P-Value	MSD	Decision(0.05)
Artificial Soil/Sedi	100	-0.5249	1.85955	0.6931	4.37287	Non-Significant Effect

ANOVA Table

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

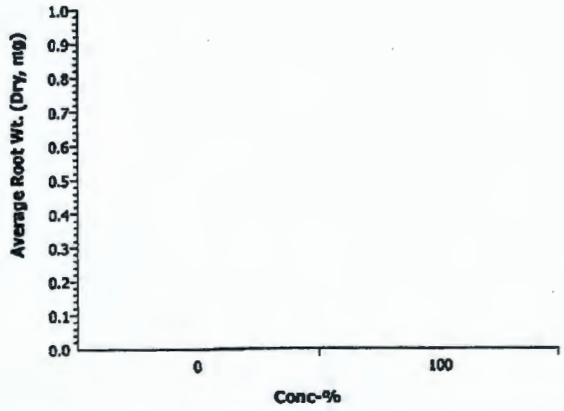
ANOVA Assumptions

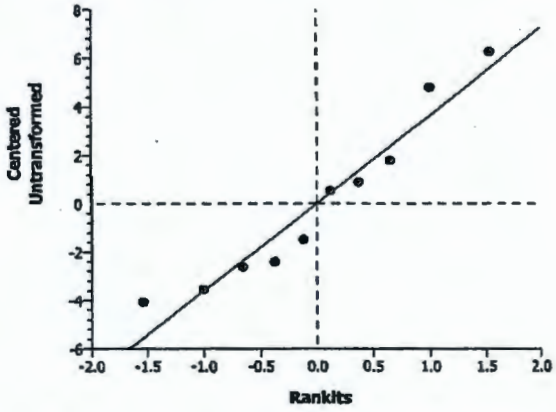
Attribute	Test	Statistic	Critical	P-Value	Decision(0.01)
Variances	Variance Ratio F	1.68983	23.15450	0.62375	Equal Variances
Distribution	Shapiro-Wilk W	0.92375		0.38925	Normal Distribution

Data Summary

			Original Data				Transformed Data			
Conc-%	Control Type	Count	Mean	Minimum	Maximum	SD	Mean	Minimum	Maximum	SD
0	Artificial Soil/S	5	7.8666	3.78	14.108	4.1678				
100		5	9.1010	6.465	13.888	3.2061				

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	04-8263-2299	04-8263-2299	18 Jul-06 3:14 PM	CETISv1.1.2

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

Group Comparisons

Control	vs	Conc-%	Statistic	Critical	P-Value	MSD	Decision(0.05)
Artificial Soil/Sedi		100	-0.4505	1.85955	0.6679	97.5044	Non-Significant Effect

ANOVA Table

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

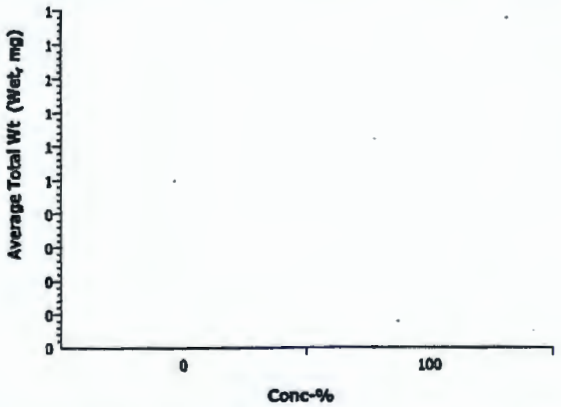
ANOVA Assumptions

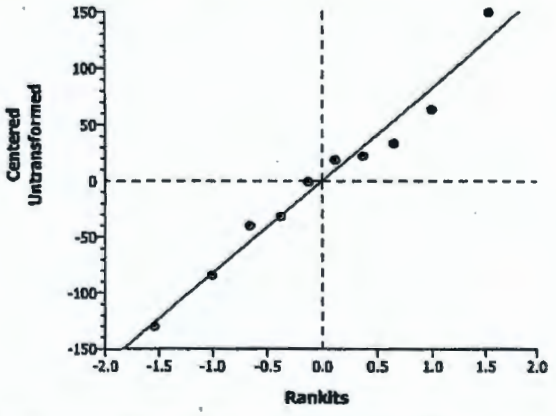
Attribute	Test	Statistic	Critical	P-Value	Decision(0.01)
Variances	Variance Ratio F	3.04021	23.15450	0.30692	Equal Variances
Distribution	Shapiro-Wilk W	0.98099		0.97023	Normal Distribution

Data Summary

			Original Data				Transformed Data			
Conc-%	Control Type	Count	Mean	Minimum	Maximum	SD	Mean	Minimum	Maximum	SD
0	Artificial Soil/S	5	177.14	93.113	240.86	58.331				
100		5	200.76	70.37	349.96	101.71				

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	04-8263-2299	04-8263-2299	18 Jul-06 3:14 PM	CETISv1.1.2

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

Group Comparisons

Control	vs	Conc-%	Statistic	Critical	P-Value	MSD	Decision(0.05)
Artificial Soil/Sedi		100	-0.7176	1.85955	0.7533	9.18014	Non-Significant Effect

ANOVA Table

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

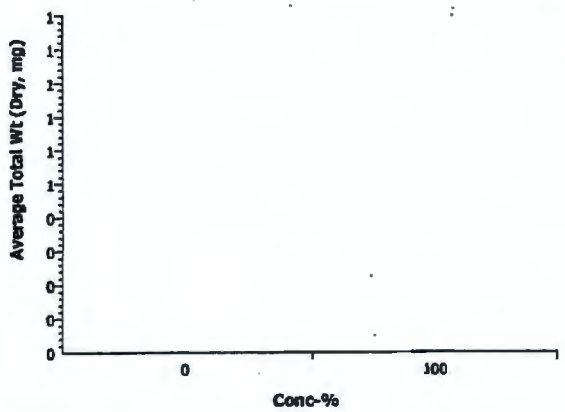
ANOVA Assumptions

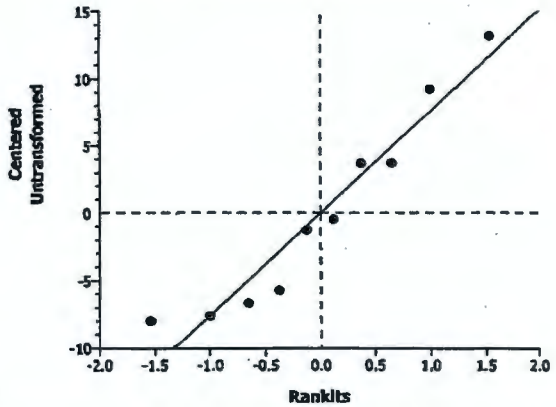
Attribute	Test	Statistic	Critical	P-Value	Decision(0.01)
Variances	Variance Ratio F	1.75627	23.15450	0.59876	Equal Variances
Distribution	Shapiro-Wilk W	0.91351		0.30596	Normal Distribution

Data Summary

			Original Data				Transformed Data			
Conc-%	Control Type	Count	Mean	Minimum	Maximum	SD	Mean	Minimum	Maximum	SD
0	Artificial Soil/S	5	20.217	12.223	33.384	8.8117				
100		5	23.76	17.060	32.992	6.6491				

Graphics





BLUEGRASS GROWTH TEST

Client: Hanford Project

Test Start Date: 01/25/2006

Initials: Day 0 Bm Day 12 NJ Day 14 Bm Day 16 NT Day 21 (R) Day 28 30 Bm

Sample ID: E289701-SOI2 B1542-08

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

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

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

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

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

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

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

14-Days Post-Emergence: Describe shoot appearance:

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

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

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

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

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

Measure Shoot Height: (above ground)

	1st Seedling	2nd Seedling	3rd Seedling	4th Seedling	5th Seedling	# of shoots
Replicate A	55.7 mm	mm	mm	mm	mm	46
Replicate B	240 NT mm	mm	mm	mm	mm	26
Replicate C	800 NT mm	mm	mm	mm	mm	68
Replicate D	570 NT mm	mm	mm	mm	mm	22
Replicate E	980 NT mm	mm	mm	mm	mm	84

Measure Shoot Weight: (above ground)

	Tin Tare Wt. (mg)	Wet Wt (mg)	Dry Wt. (mg)
Replicate A	986.95	1277.6	1038.96
Replicate B	978.08	1060.6	992.01
Replicate C	1013.99	1578.3	1095.87
Replicate D	976.55	1071.9	995.07
Replicate E	1012.66	1879.0	1108.04

Describe root appearance:

Replicate A

Replicate B

Replicate C

Replicate D

Replicate E

Measure Root Length: (longest root)

	1st Seedling	2nd Seedling	3rd Seedling	4th Seedling	5th Seedling
Replicate A	175 mm	mm	mm	mm	mm
Replicate B	160 mm	mm	mm	mm	mm
Replicate C	178 mm	mm	mm	mm	mm
Replicate D	122 mm	mm	mm	mm	mm
Replicate E	270 mm	mm	mm	mm	mm

Measure Root Weight: (longest root)

	Tin Tare Wt. (mg)	Wet Wt (mg)	Dry Wt. (mg)
Replicate A	967.35	1731.0	989.02
Replicate B	1024.31	1102.5	1031.92
Replicate C	964.73	1911.4	1003.88
Replicate D	1003.90	~~NT~~ 1315.2	1011.33
Replicate E	997.67	2177.7	1037.86

Comments: 90% dry out replicate, broadleaf plants removed 2nd wk

NJ

CETIS Test Summary

Report Date: 18 Jul-06 3:22 PM
Test Link: 08-1616-5737/B154208psB

Plant Bioassay - Chronic — **CH2M Hill**

Test No:	04-2827-7585	**Test Type:**	Plant Chronic	**Duration:**	N/A
Start Date:	25 Jan-06	**Protocol:**	ASTM E1963-02 (2002)	**Species:**	Poa sandbergii
Ending Date:		**Dil Water:**		**Source:**	
Setup Date:	25 Jan-06	**Brine:**			

Comments: recalculated Height and Length data July 18, 2006

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

Comments: J10LJ5, E289701

Comparison Summary

Analysis	Endpoint	NOEL	LOEL	ChV	PMSD	Method
08-3096-8743	% Germination	100	> 100	N/A	23.35%	Wilcoxon Rank Sum Two-Sample
17-4986-7382	Average AG Wt (Wet, mg)	100	> 100	N/A	85.91%	Equal Variance t Two-Sample
08-3301-7719	Average AG Wt (Dry, mg)	100	> 100	N/A	55.97%	Equal Variance t Two-Sample
09-1519-5887	Average Root Wt. (Wet, mg	100	> 100	N/A	72.60%	Equal Variance t Two-Sample
19-1974-3646	Average Root Wt. (Dry, mg)	100	> 100	N/A	52.48%	Equal Variance t Two-Sample
01-8008-0233	Average Total Wt (Wet, mg	100	> 100	N/A	74.97%	Equal Variance t Two-Sample
07-1829-7693	Average Total Wt (Dry, mg)	100	> 100	N/A	52.88%	Equal Variance t Two-Sample

% Germination Summary

Conc-%	Control Type	Reps	Mean	Minimum	Maximum	SE	SD	CV
0	Artificial Soil/S	5	0.88000	0.60000	1.00000	0.08000	0.17889	20.33%
100		5	0.92000	0.60000	1.00000	0.08000	0.17889	19.44%

Average AG Wt (Wet, mg) Summary

Conc-%	Control Type	Reps	Mean	Minimum	Maximum	SE	SD	CV
0	Artificial Soil/S	5	63.903	41.475	82.338	7.1313	15.946	24.95%
100		5	78.309	16.504	172.27	28.648	64.058	81.80%

Average AG Wt (Dry, mg) Summary

Conc-%	Control Type	Reps	Mean	Minimum	Maximum	SE	SD	CV
0	Artificial Soil/S	5	12.351	7.9275	19.276	2.1347	4.7733	38.65%
100		5	10.963	2.786	19.076	3.0434	6.8052	62.08%

Average Root Wt. (Wet, mg) Summary

Conc-%	Control Type	Reps	Mean	Minimum	Maximum	SE	SD	CV
0	Artificial Soil/S	5	113.23	51.638	158.52	21.449	47.962	42.36%
100		5	127.49	15.638	236.01	38.654	86.433	67.79%

Average Root Wt. (Dry, mg) Summary

Conc-%	Control Type	Reps	Mean	Minimum	Maximum	SE	SD	CV
0	Artificial Soil/S	5	7.8666	3.78	14.108	1.8639	4.1678	52.98%
100		5	5.3735	1.522	8.0380	1.2063	2.6973	50.20%

Average Total Wt (Wet, mg) Summary

Conc-%	Control Type	Reps	Mean	Minimum	Maximum	SE	SD	CV
0	Artificial Soil/S	5	177.14	93.113	240.86	26.086	58.331	32.93%
100		5	205.80	32.142	408.27	66.483	148.66	72.23%

Average Total Wt (Dry, mg) Summary

Conc-%	Control Type	Reps	Mean	Minimum	Maximum	SE	SD	CV
0	Artificial Soil/S	5	20.217	12.223	33.384	3.9407	8.8117	43.58%
100		5	16.336	4.3080	27.114	4.1865	9.3612	57.30%

CETIS Test Summary

Report Date: 18 Jul-06 3:22 PM
Test Link: 08-1616-5737/B154208psB

% Germination Detail

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

Average AG Wt (Wet, mg) Detail

Conc-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Artificial Soil/S	67.2900	55.1900	82.338	73.2233	41.4750
100		58.13	16.504	112.862	31.7833	172.268

Average AG Wt (Dry, mg) Detail

Conc-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Artificial Soil/S	15.1720	10.552	19.276	8.82666	7.92751
100		10.402	2.786	16.3760	6.17334	19.0760

Average Root Wt. (Wet, mg) Detail

Conc-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Artificial Soil/S	143.362	140.624	158.524	72.0233	51.6375
100		92.7300	15.638	189.334	103.767	236.006

Average Root Wt. (Dry, mg) Detail

Conc-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Artificial Soil/S	8.75601	8.39399	14.108	3.77999	4.295
100		4.33401	1.522	7.83000	5.14333	8.03800

Average Total Wt (Wet, mg) Detail

Conc-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Artificial Soil/S	210.652	195.814	240.862	145.247	93.1125
100		150.86	32.142	302.196	135.550	408.274

Average Total Wt (Dry, mg) Detail

Conc-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Artificial Soil/S	23.9280	18.946	33.384	12.6066	12.2225
100		14.7360	4.30801	24.2060	11.3167	27.1140

CETIS Analysis Detail

Plant Bioassay - Chronic — **CH2M Hill**

Endpoint	Analysis Type	Sample Link	Control Link	Date Analyzed	Version
% Germination	Comparison	08-1616-5737	08-1616-5737	18 Jul-06 3:22 PM	CETISv1.1.2

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

Group Comparisons

Control	vs	Conc-%	Statistic	Critical	P-Value	Ties	Decision(0.05)
Artificial Soil/Sedi		100	29.5		0.5794	3	Non-Significant Effect

ANOVA Table

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

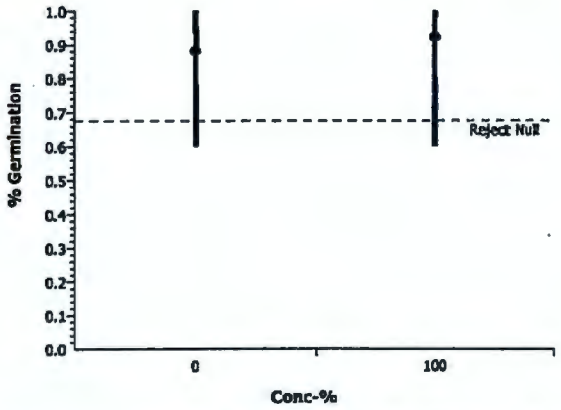
ANOVA Assumptions

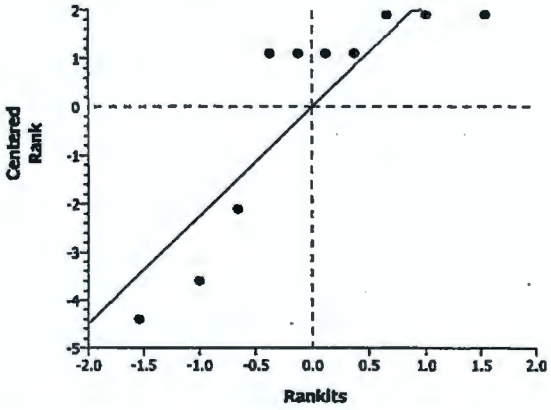
Attribute	Test	Statistic	Critical	P-Value	Decision(0.01)
Variances	Variance Ratio F	1.00963	23.15450	0.99281	Equal Variances
Distribution	Shapiro-Wilk W	0.71659		0.00140	Non-normal Distribution

Data Summary

			Original Data				Transformed Data			
Conc-%	Control Type	Count	Mean	Minimum	Maximum	SD	Mean	Minimum	Maximum	SD
0	Artificial Soil/S	5	0.88000	0.60000	1.00000	0.17889	5.10000	1.50000	7.00000	2.65518
100		5	0.92000	0.60000	1.00000	0.17889	5.90000	1.50000	7.00000	2.45967

Graphics





CETIS Analysis Detail

Plant Bioassay - Chronic — **CH2M Hill**

Endpoint	Analysis Type	Sample Link	Control Link	Date Analyzed	Version
Average AG Wt (Wet, mg)	Comparison	08-1616-5737	08-1616-5737	18 Jul-06 3:22 PM	CETISv1.1.2

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

Group Comparisons

Control	vs	Conc-%	Statistic	Critical	P-Value	MSD	Decision(0.05)
Artificial Soil/Sedi		100	-0.488	1.85955	0.6807	54.8976	Non-Significant Effect

ANOVA Table

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

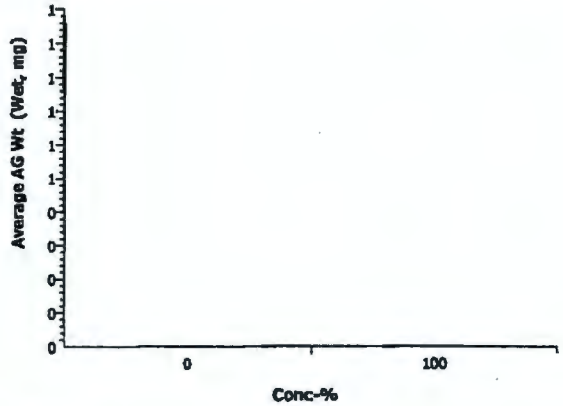
ANOVA Assumptions

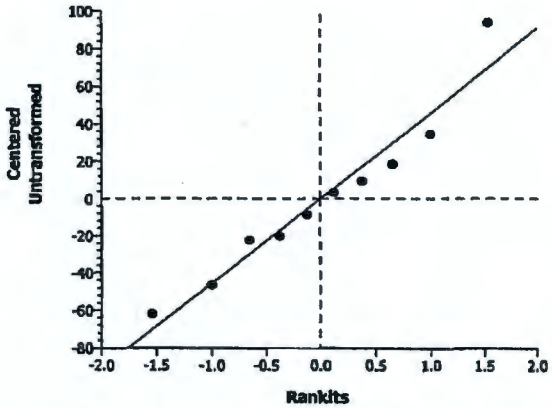
Attribute	Test	Statistic	Critical	P-Value	Decision(0.01)
Variances	Variance Ratio F	16.13761	23.15450	0.01963	Equal Variances
Distribution	Shapiro-Wilk W	0.95324		0.70689	Normal Distribution

Data Summary

			Original Data				Transformed Data			
Conc-%	Control Type	Count	Mean	Minimum	Maximum	SD	Mean	Minimum	Maximum	SD
0	Artificial Soil/S	5	63.903	41.475	82.338	15.946				
100		5	78.309	16.504	172.27	64.058				

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	08-1616-5737	08-1616-5737	18 Jul-06 3:22 PM	CETISv1.1.2

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

Group Comparisons

Control	vs	Conc-%	Statistic	Critical	P-Value	MSD	Decision(0.05)
Artificial Soil/Sedi		100	0.37342	1.85955	0.3593	6.91265	Non-Significant Effect

ANOVA Table

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

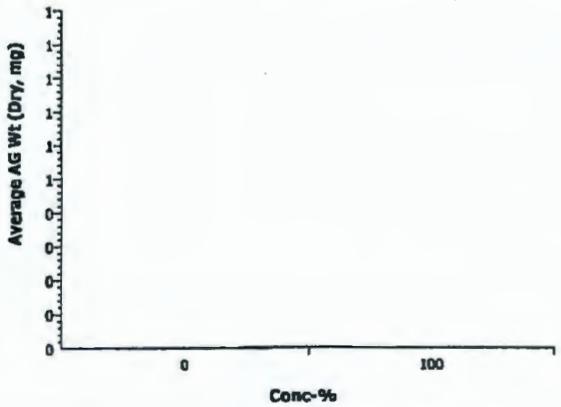
ANOVA Assumptions

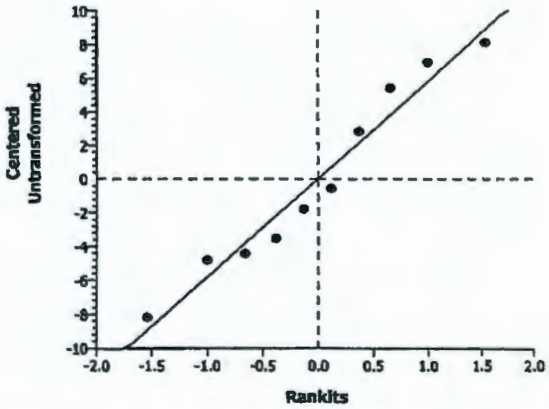
Attribute	Test	Statistic	Critical	P-Value	Decision(0.01)
Variances	Variance Ratio F	2.03252	23.15450	0.50901	Equal Variances
Distribution	Shapiro-Wilk W	0.94217		0.57742	Normal Distribution

Data Summary

			Original Data				Transformed Data			
Conc-%	Control Type	Count	Mean	Minimum	Maximum	SD	Mean	Minimum	Maximum	SD
0	Artificial Soil/S	5	12.351	7.9275	19.276	4.7733				
100		5	10.963	2.786	19.076	6.8052				

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	08-1616-5737	08-1616-5737	18 Jul-06 3:22 PM	CETISv1.1.2

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

Group Comparisons

Control	vs	Conc-%	Statistic	Critical	P-Value	MSD	Decision(0.05)
Artificial Soil/Sedi		100	-0.3226	1.85955	0.6224	82.2037	Non-Significant Effect

ANOVA Table

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

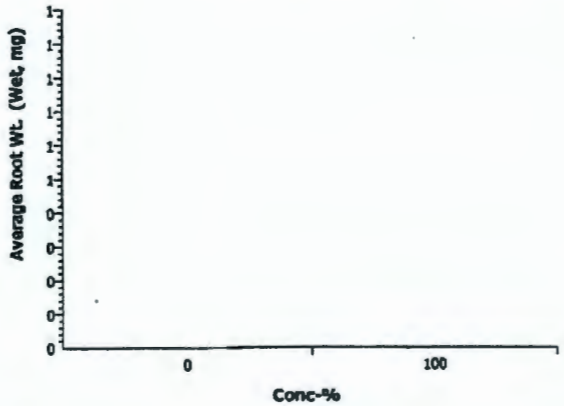
ANOVA Assumptions

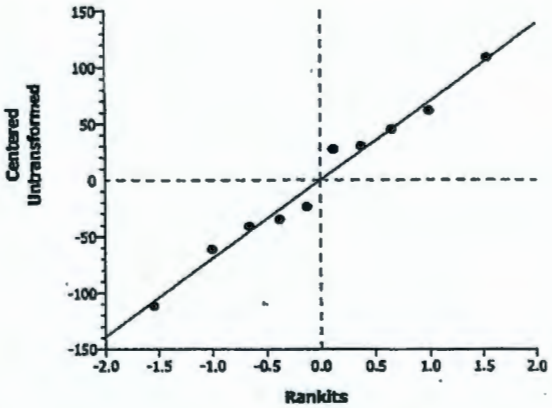
Attribute	Test	Statistic	Critical	P-Value	Decision(0.01)
Variances	Variance Ratio F	3.24754	23.15450	0.28037	Equal Variances
Distribution	Shapiro-Wilk W	0.97884		0.95867	Normal Distribution

Data Summary

			Original Data				Transformed Data			
Conc-%	Control Type	Count	Mean	Minimum	Maximum	SD	Mean	Minimum	Maximum	SD
0	Artificial Soil/S	5	113.23	51.638	158.52	47.962				
100		5	127.49	15.638	236.01	86.433				

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	08-1616-5737	08-1616-5737	18 Jul-06 3:22 PM	CETISv1.1.2

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

Group Comparisons

Control	vs	Conc-%	Statistic	Critical	P-Value	MSD	Decision(0.05)
Artificial Soil/Sedi		100	1.12295	1.85955	0.1470	4.1285	Non-Significant Effect

ANOVA Table

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

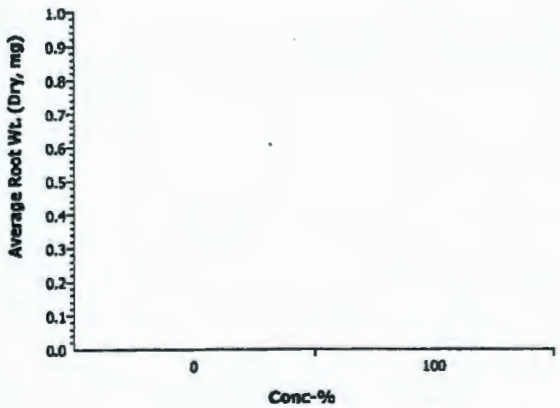
ANOVA Assumptions

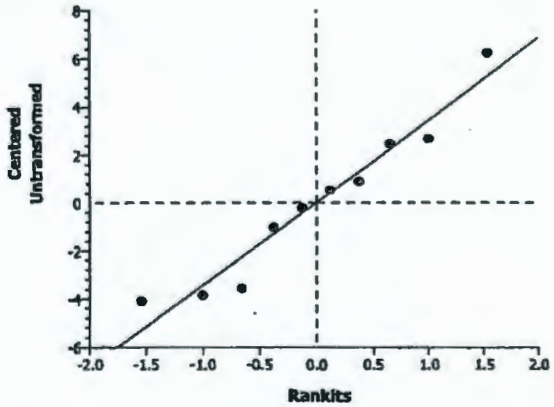
Attribute	Test	Statistic	Critical	P-Value	Decision(0.01)
Variances	Variance Ratio F	2.38753	23.15450	0.41996	Equal Variances
Distribution	Shapiro-Wilk W	0.94036		0.55702	Normal Distribution

Data Summary

			Original Data				Transformed Data			
Conc-%	Control Type	Count	Mean	Minimum	Maximum	SD	Mean	Minimum	Maximum	SD
0	Artificial Soil/S	5	7.8666	3.78	14.108	4.1678				
100		5	5.3735	1.522	8.038	2.6973				

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	08-1616-5737	08-1616-5737	18 Jul-06 3:22 PM	CETISv1.1.2

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

Group Comparisons

Control	vs	Conc-%	Statistic	Critical	P-Value	MSD	Decision(0.05)
Artificial Soil/Sedi		100	-0.4014	1.85955	0.6507	132.804	Non-Significant Effect

ANOVA Table

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

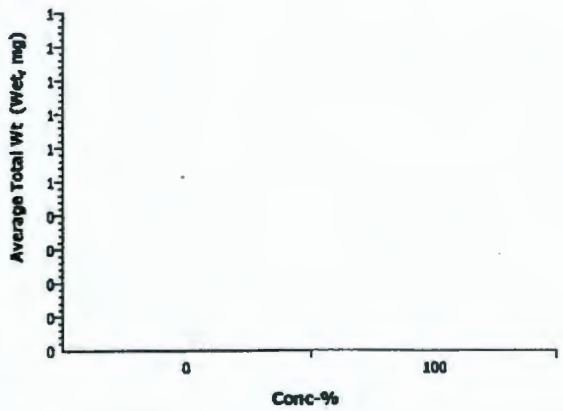
ANOVA Assumptions

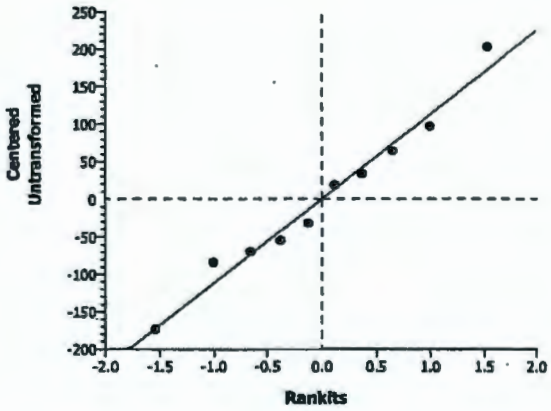
Attribute	Test	Statistic	Critical	P-Value	Decision(0.01)
Variances	Variance Ratio F	6.49508	23.15450	0.09731	Equal Variances
Distribution	Shapiro-Wilk W	0.98356		0.98135	Normal Distribution

Data Summary

			Original Data				Transformed Data			
Conc-%	Control Type	Count	Mean	Minimum	Maximum	SD	Mean	Minimum	Maximum	SD
0	Artificial Soil/S	5	177.14	93.113	240.86	58.331				
100		5	205.80	32.142	408.27	148.66				

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	08-1616-5737	08-1616-5737	18 Jul-06 3:22 PM	CETISv1.1.2

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

Group Comparisons

Control	vs	Conc-%	Statistic	Critical	P-Value	MSD	Decision(0.05)
Artificial Soil/Sedi		100	0.67508	1.85955	0.2593	10.6913	Non-Significant Effect

ANOVA Table

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

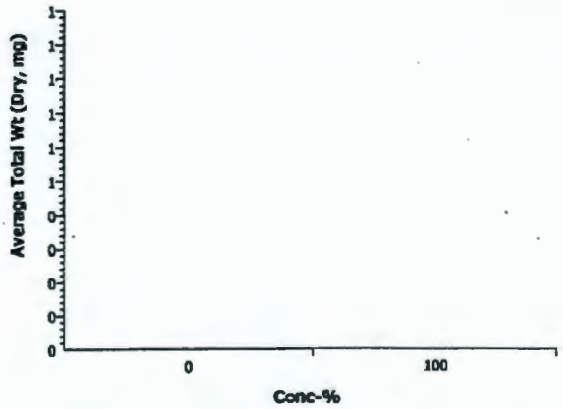
ANOVA Assumptions

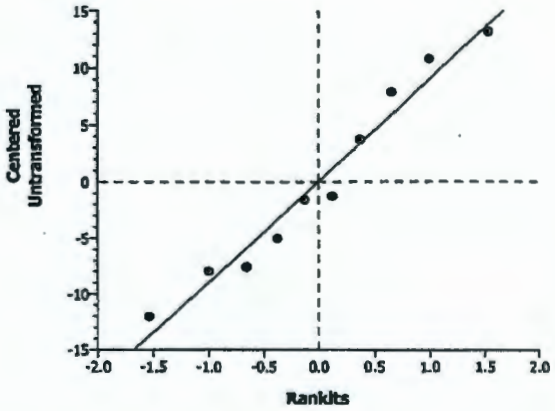
Attribute	Test	Statistic	Critical	P-Value	Decision(0.01)
Variances	Variance Ratio F	1.12860	23.15450	0.90949	Equal Variances
Distribution	Shapiro-Wilk W	0.94792		0.64396	Normal Distribution

Data Summary

			Original Data				Transformed Data			
Conc-%	Control Type	Count	Mean	Minimum	Maximum	SD	Mean	Minimum	Maximum	SD
0	Artificial Soil/S	5	20.217	12.223	33.384	8.8117				
100		5	16.336	4.3080	27.114	9.3612				

Graphics





BLUEGRASS GROWTH TEST

Client: Hanford Project

Test Start Date: 01/25/2006

Initials: Day 0 Bw Day 12 NJ Day 14 Bw Day 16 NT Day 21 (PA) Day 28 Bw

Sample ID: E295301-SDI2 B542-09

CONC.	REPLICATE	PRE-EMERGENCE (12 days after planting)	@ EMERGENCE (14 days after planting)	POST-EMERGENCE (16 days after planting)		7-DAYS POST-EMERGENCE (21 days after planting)		14-DAYS POST-EMERGENCE (28 days after planting)	pH INITIAL (@ planting)	pH FINAL (28 days after planting)
		# seeds germinated alive 30								
					21	23				
100%	A	1	1	1	1	1	2	2	7.4	7.2
	B	1	1	3	3	3	3	3		
	C	0	~~3~~ 2	2	2	3	3	3		
	D	0	1	1	2	2	3	2		
	E	0	2	3	5	3	2	2		

04/21

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

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

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

Replicate C: 2 medium + 1 small - good color

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

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

14-Days Post-Emergence: Describe shoot appearance:

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

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

Replicate C: 2 medium / small look good

Replicate D: 2 medium / look good

Replicate E: 2 plants / small / medium

Measure Shoot Height: (above ground)

	1st Seedling	2nd Seedling	3rd Seedling	4th Seedling	5th Seedling	# Shoots/Header
Replicate A	40 mm	27 mm	— mm	— mm	— mm	2, 10
Replicate B	20 mm	21 mm	68 mm	— mm	— mm	2, 2, 19
Replicate C	46 mm	50 mm	15 mm	— mm	— mm	12, 17, 3
Replicate D	55 mm	45 mm	mm	mm	mm	8, 14
Replicate E	36 mm	29 mm	mm	mm	mm	10, 4, 5 ms

Measure Shoot Weight: (above ground)

	Tin Tare Wt. (mg)	Wet Wt (mg)	Dry Wt. (mg)
Replicate A	974.32	1014.3	981.89
Replicate B	982.82	1204.1	1019.02
Replicate C	989.34	1196.5	1022.48
Replicate D	986.00	1127.6	1009.69
Replicate E	983.66	1031.8	992.79

Describe root appearance:

Replicate A:

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

Replicate C:

Replicate D:

Replicate E:

Measure Root Length: (longest root)

	1st Seedling	2nd Seedling	3rd Seedling	4th Seedling	5th Seedling
Replicate A	55 mm	122 mm	mm	mm	mm
Replicate B	209 mm	30 mm	32 mm	mm	mm
Replicate C	100 mm	27 mm	110 mm	mm	mm
Replicate D	92 mm	~~39~~ mm	104 mm	mm	mm
Replicate E	20 mm	60 mm	mm	mm	mm

Measure Root Weight: (longest root)

	Tin Tare Wt. (mg)	Wet Wt (mg)	Dry Wt. (mg)
Replicate A	1018.20	1130.0	1025.72
Replicate B	1016.76	1310.8	1030.89
Replicate C	1028.37	1338.6	1044.24
Replicate D	1008.21	1298.4	1024.74
Replicate E	1017.37	1119.6	1023.91

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

CETIS Test Summary

Report Date: 18 Jul-06 3:46 PM
Test Link: 06-6326-6028/B154209psB

Plant Bioassay - Chronic — **CH2M Hill**

Test No:	08-0327-1621	**Test Type:**	Plant Chronic	**Duration:**	N/A
Start Date:	25 Jan-06	**Protocol:**	ASTM E1963-02 (2002)	**Species:**	Poa sandbergii
Ending Date:		**Dil Water:**		**Source:**	
Setup Date:	25 Jan-06	**Brine:**			

Comments: recalculated Height and Length data July 18, 2006

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

Comments: J10DT9, E295301

Comparison Summary

Analysis	Endpoint	NOEL	LOEL	ChV	PMSD	Method
03-9052-5158	% Germination	< 100	100	N/A	18.38%	Equal Variance t Two-Sample
02-7014-0591	Average Height (mm)	100	> 100	N/A	18.77%	Equal Variance t Two-Sample
02-3798-4672	Average Length (mm)	< 100	100	N/A	20.14%	Equal Variance t Two-Sample
17-3204-0544	Average AG Wt (Wet, mg)	100	> 100	N/A	40.33%	Equal Variance t Two-Sample
05-2477-1090	Average AG Wt (Dry, mg)	100	> 100	N/A	42.47%	Equal Variance t Two-Sample
04-2228-1027	Average Root Wt. (Wet, mg	100	> 100	N/A	45.20%	Equal Variance t Two-Sample
03-5331-7481	Average Root Wt. (Dry, mg)	100	> 100	N/A	48.68%	Equal Variance t Two-Sample
06-4830-6917	Average Total Wt (Wet, mg	100	> 100	N/A	40.21%	Equal Variance t Two-Sample
04-0188-8910	Average Total Wt (Dry, mg)	100	> 100	N/A	43.16%	Equal Variance t Two-Sample

CETIS Test Summary

Report Date: 18 Jul-06 3:46 PM
Test Link: 06-6326-6028/B154209psB

% Germination Summary

Conc-%	Control Type	Reps	Mean	Minimum	Maximum	SE	SD	CV
0	Artificial Soil/S	5	0.88000	0.60000	1.00000	0.08000	0.17889	20.33%
100		5	0.48000	0.40000	0.60000	0.04899	0.10954	22.82%

Average Height (mm) Summary

Conc-%	Control Type	Reps	Mean	Minimum	Maximum	SE	SD	CV
0	Artificial Soil/S	5	45.68	36.700	55.8	3.3695	7.5344	16.49%
100		5	37.86	32.5	50	3.1487	7.0408	18.60%

Average Length (mm) Summary

Conc-%	Control Type	Reps	Mean	Minimum	Maximum	SE	SD	CV
0	Artificial Soil/S	5	124.62	89.800	153.2	12.597	28.167	22.60%
100		5	85.160	70	98	4.8488	10.842	12.73%

Average AG Wt (Wet, mg) Summary

Conc-%	Control Type	Reps	Mean	Minimum	Maximum	SE	SD	CV
0	Artificial Soil/S	5	63.903	41.475	82.338	7.1313	15.946	24.95%
100		5	51.001	19.99	73.76	11.883	26.571	52.10%

Average AG Wt (Dry, mg) Summary

Conc-%	Control Type	Reps	Mean	Minimum	Maximum	SE	SD	CV
0	Artificial Soil/S	5	12.351	7.9275	19.276	2.1347	4.7733	38.65%
100		5	8.6617	3.7850	12.067	1.8436	4.1225	47.59%

Average Root Wt. (Wet, mg) Summary

Conc-%	Control Type	Reps	Mean	Minimum	Maximum	SE	SD	CV
0	Artificial Soil/S	5	113.23	51.638	158.52	21.449	47.962	42.36%
100		5	90.707	51.115	145.1	17.251	38.574	42.53%

Average Root Wt. (Dry, mg) Summary

Conc-%	Control Type	Reps	Mean	Minimum	Maximum	SE	SD	CV
0	Artificial Soil/S	5	7.8666	3.78	14.108	1.8639	4.1678	52.98%
100		5	5.059	3.27	8.265	0.8758	1.9584	38.71%

Average Total Wt (Wet, mg) Summary

Conc-%	Control Type	Reps	Mean	Minimum	Maximum	SE	SD	CV
0	Artificial Soil/S	5	177.14	93.113	240.86	26.086	58.331	32.93%
100		5	141.71	75.185	213.39	28.05	62.721	44.26%

Average Total Wt (Dry, mg) Summary

Conc-%	Control Type	Reps	Mean	Minimum	Maximum	SE	SD	CV
0	Artificial Soil/S	5	20.217	12.223	33.384	3.9407	8.8117	43.58%
100		5	13.721	7.5450	20.11	2.5474	5.6962	41.52%

CETIS Test Summary

Report Date: 18 Jul-06 3:46 PM
Test Link: 06-6326-6028/B154209psB

% Germination Detail

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

Average Height (mm) Detail

Conc-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Artificial Soil/S	50.6	41.8	55.8	36.7000	43.5
100		33.5	36.3	37	50	32.5

Average Length (mm) Detail

Conc-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Artificial Soil/S	138.800	142	153.2	99.3000	89.8000
100		88.5	90.3000	79	98	70

Average AG Wt (Wet, mg) Detail

Conc-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Artificial Soil/S	67.2900	55.1900	82.338	73.2233	41.4750
100		19.99	73.76	68.8867	68.3	24.0700

Average AG Wt (Dry, mg) Detail

Conc-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Artificial Soil/S	15.1720	10.552	19.276	8.82666	7.92751
100		3.78500	12.0667	11.0467	11.8450	4.56500

Average Root Wt. (Wet, mg) Detail

Conc-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Artificial Soil/S	143.362	140.624	158.524	72.0233	51.6375
100		55.9	98.0133	103.41	145.095	51.115

Average Root Wt. (Dry, mg) Detail

Conc-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Artificial Soil/S	8.75601	8.39399	14.108	3.77999	4.295
100		3.75998	4.71000	5.29	8.26498	3.26999

Average Total Wt (Wet, mg) Detail

Conc-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Artificial Soil/S	210.652	195.814	240.862	145.247	93.1125
100		75.89	171.773	172.297	213.395	75.185

Average Total Wt (Dry, mg) Detail

Conc-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Artificial Soil/S	23.9280	18.946	33.384	12.6066	12.2225
100		7.54501	16.7767	16.3366	20.11	7.83502

CETIS Analysis Detail

Plant Bioassay - Chronic — **CH2M Hill**

Endpoint	Analysis Type	Sample Link	Control Link	Date Analyzed	Version
% Germination	Comparison	06-6326-6028	06-6326-6028	18 Jul-06 3:46 PM	CETISv1.1.2

Method	Alt H	Data Transform	Zeta	NOEL	LOEL	Toxic Units	ChV	PMSD
Equal Variance t Two-Sample	C > T	Angular (Corrected)		<100	100		N/A	18.38%

Group Comparisons

Control	vs	Conc-%	Statistic	Critical	P-Value	MSD	Decision(0.05)
Artificial Soil/Sedi		100	4.21032	1.85955	0.0015	0.19458	Significant Effect

ANOVA Table

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

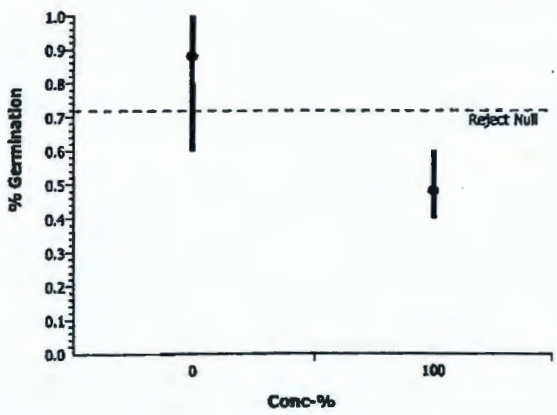
ANOVA Assumptions

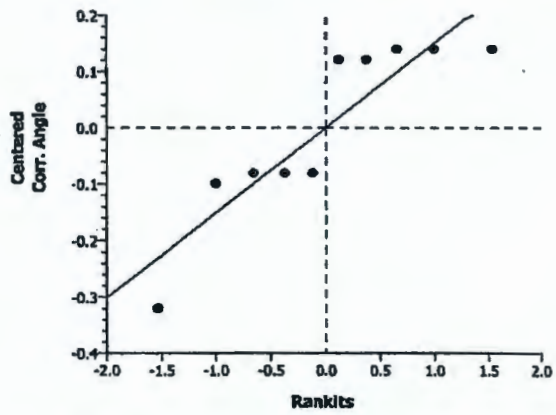
Attribute	Test	Statistic	Critical	P-Value	Decision(0.01)
Variances	Variance Ratio F	3.50066	23.15450	0.25233	Equal Variances
Distribution	Shapiro-Wilk W	0.81229		0.02044	Normal Distribution

Data Summary

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

Graphics





CETIS Analysis Detail

Plant Bioassay - Chronic — **CH2M Hill**

Endpoint	Analysis Type	Sample Link	Control Link	Date Analyzed	Version
Average Height (mm)	Comparison	06-6326-6028	06-6326-6028	18 Jul-06 3:46 PM	CETISv1.1.2

Method	Alt H	Data Transform	Zeta	NOEL	LOEL	Toxic Units	ChV	PMSD
Equal Variance t Two-Sample	C > T	Untransformed		100	>100	1	N/A	18.77%

Group Comparisons

Control	vs	Conc-%	Statistic	Critical	P-Value	MSD	Decision(0.05)
Artificial Soil/Sedi		100	1.69568	1.85955	0.0642	8.57572	Non-Significant Effect

ANOVA Table

Source	Sum of Squares	Mean Square	DF	F Statistic	P-Value	Decision(0.05)
Between	152.881	152.881	1	2.88	0.12839	Non-Significant Effect
Error	425.36	53.16999	8			
Total	578.240936	206.05098	9			

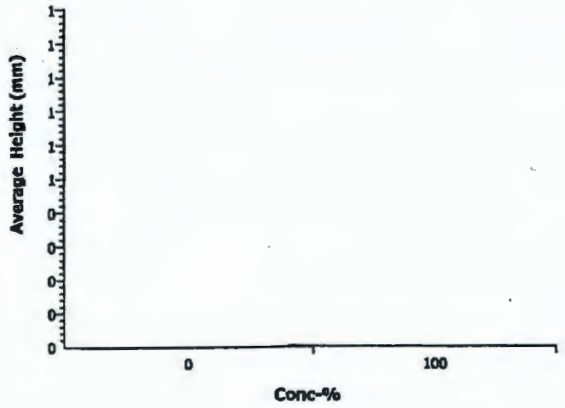
ANOVA Assumptions

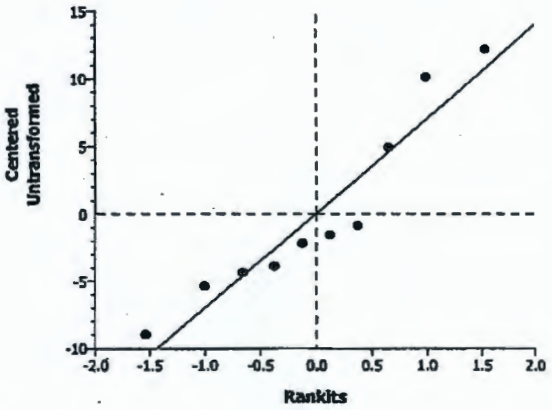
Attribute	Test	Statistic	Critical	P-Value	Decision(0.01)
Variances	Variance Ratio F	1.14512	23.15450	0.89868	Equal Variances
Distribution	Shapiro-Wilk W	0.90260		0.23393	Normal Distribution

Data Summary

			Original Data				Transformed Data			
Conc-%	Control Type	Count	Mean	Minimum	Maximum	SD	Mean	Minimum	Maximum	SD
0	Artificial Soil/S	5	45.68	36.7	55.8	7.5344				
100		5	37.86	32.5	50	7.0408				

Graphics





CETIS Analysis Detail

Plant Bioassay - Chronic — **CH2M Hill**

Endpoint	Analysis Type	Sample Link	Control Link	Date Analyzed	Version
Average Length (mm)	Comparison	06-6326-6028	06-6326-6028	18 Jul-06 3:46 PM	CETISv1.1.2

Method	Alt H	Data Transform	Zeta	NOEL	LOEL	Toxic Units	ChV	PMSD
Equal Variance t Two-Sample	C > T	Untransformed		<100	100		N/A	20.14%

Group Comparisons

Control	vs	Conc-%	Statistic	Critical	P-Value	MSD	Decision(0.05)
Artificial Soil/Sedi		100	2.92349	1.85955	0.0096	25.0994	Significant Effect

ANOVA Table

Source	Sum of Squares	Mean Square	DF	F Statistic	P-Value	Decision(0.05)
Between	3892.729	3892.729	1	8.55	0.01919	Significant Effect
Error	3643.699	455.4624	8			
Total	7536.42847	4348.1914	9			

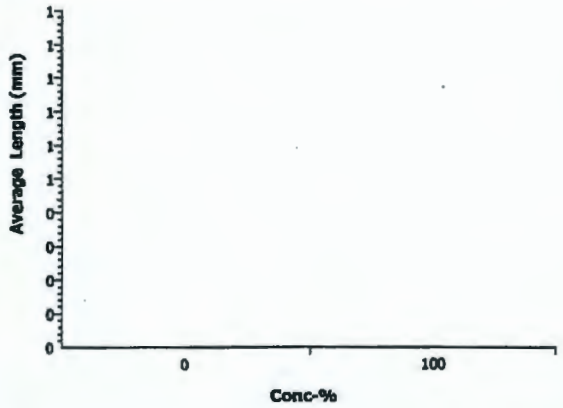
ANOVA Assumptions

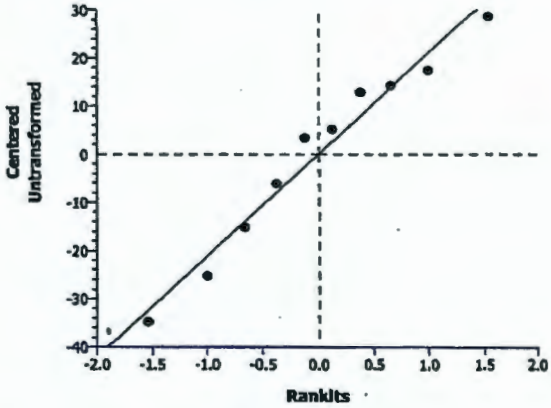
Attribute	Test	Statistic	Critical	P-Value	Decision(0.01)
Variances	Variance Ratio F	6.74906	23.15450	0.09132	Equal Variances
Distribution	Shapiro-Wilk W	0.95907		0.77517	Normal Distribution

Data Summary

			Original Data				Transformed Data			
Conc-%	Control Type	Count	Mean	Minimum	Maximum	SD	Mean	Minimum	Maximum	SD
0	Artificial Soil/S	5	124.62	89.8	153.2	28.167				
100		5	85.160	70	98	10.842				

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	06-6326-6028	06-6326-6028	18 Jul-06 3:46 PM	CETISv1.1.2

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

Group Comparisons

Control	vs	Conc-%	Statistic	Critical	P-Value	MSD	Decision(0.05)
Artificial Soil/Sedi		100	0.93097	1.85955	0.1896	25.7707	Non-Significant Effect

ANOVA Table

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

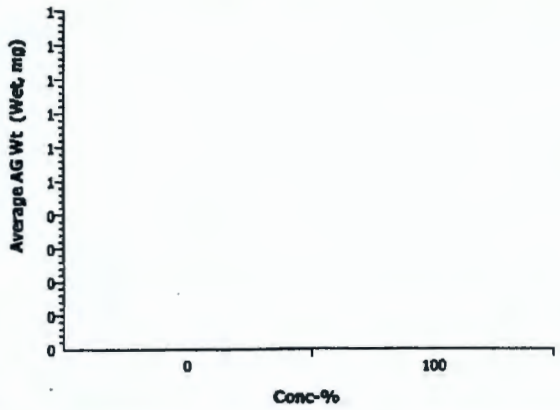
ANOVA Assumptions

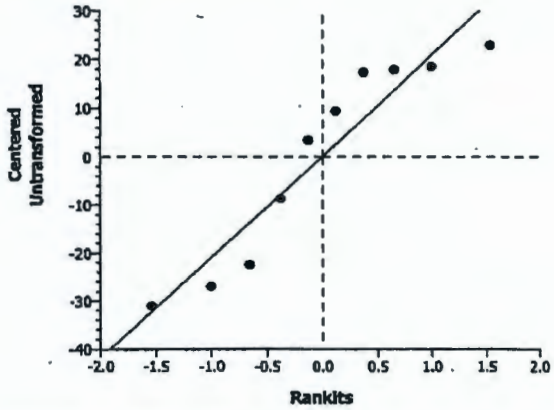
Attribute	Test	Statistic	Critical	P-Value	Decision(0.01)
Variances	Variance Ratio F	2.77655	23.15450	0.34643	Equal Variances
Distribution	Shapiro-Wilk W	0.87112		0.10300	Normal Distribution

Data Summary

			Original Data				Transformed Data			
Conc-%	Control Type	Count	Mean	Minimum	Maximum	SD	Mean	Minimum	Maximum	SD
0	Artificial Soil/S	5	63.903	41.475	82.338	15.946				
100		5	51.001	19.99	73.76	26.571				

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	06-6326-6028	06-6326-6028	18 Jul-06 3:46 PM	CETISv1.1.2

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

Group Comparisons

Control	vs	Conc-%	Statistic	Critical	P-Value	MSD	Decision(0.05)
Artificial Soil/Sedi		100	1.30792	1.85955	0.1136	5.24509	Non-Significant Effect

ANOVA Table

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

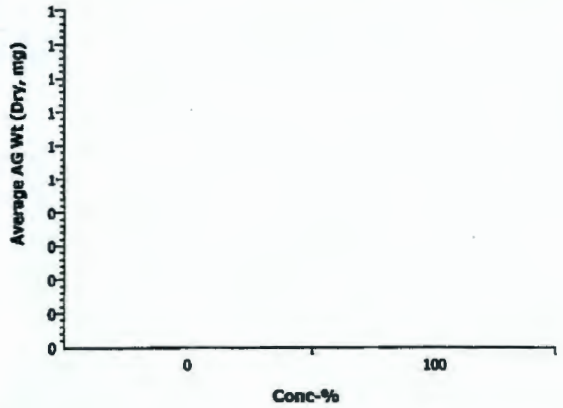
ANOVA Assumptions

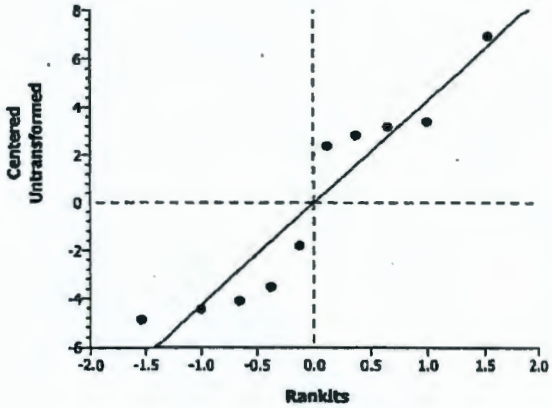
Attribute	Test	Statistic	Critical	P-Value	Decision(0.01)
Variances	Variance Ratio F	1.34066	23.15450	0.78323	Equal Variances
Distribution	Shapiro-Wilk W	0.88302		0.14132	Normal Distribution

Data Summary

			Original Data				Transformed Data			
Conc-%	Control Type	Count	Mean	Minimum	Maximum	SD	Mean	Minimum	Maximum	SD
0	Artificial Soil/S	5	12.351	7.9275	19.276	4.7733				
100		5	8.6617	3.7850	12.067	4.1225				

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	06-6326-6028	06-6326-6028	18 Jul-06 3:46 PM	CETISv1.1.2

Method	Alt H	Data Transform	Zeta	NOEL	LOEL	Toxic Units	ChV	PMSD
Equal Variance t Two-Sample	C > T	Untransformed		100	>100	1	N/A	45.20%

Group Comparisons

Control	vs	Conc-%	Statistic	Critical	P-Value	MSD	Decision(0.05)
Artificial Soil/Sedi		100	0.81841	1.85955	0.2184	51.1856	Non-Significant Effect

ANOVA Table

Source	Sum of Squares	Mean Square	DF	F Statistic	P-Value	Decision(0.05)
Between	1268.721	1268.721	1	0.67	0.43682	Non-Significant Effect
Error	15153.4	1894.175	8			
Total	16422.1190	3162.8954	9			

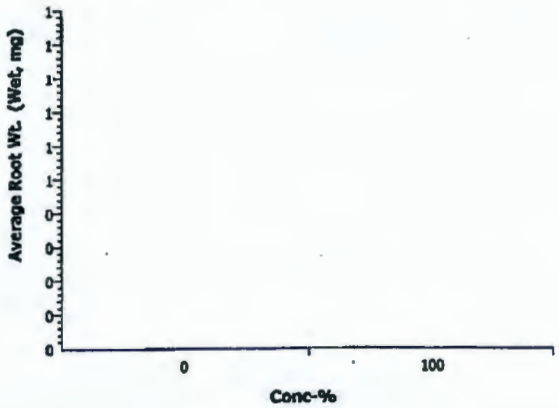
ANOVA Assumptions

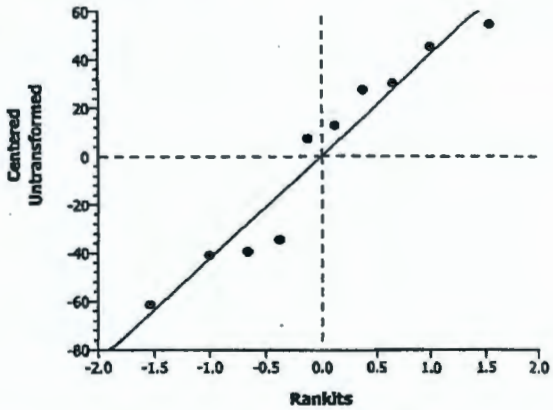
Attribute	Test	Statistic	Critical	P-Value	Decision(0.01)
Variances	Variance Ratio F	1.54599	23.15450	0.68325	Equal Variances
Distribution	Shapiro-Wilk W	0.91570		0.32247	Normal Distribution

Data Summary

			Original Data				Transformed Data			
Conc-%	Control Type	Count	Mean	Minimum	Maximum	SD	Mean	Minimum	Maximum	SD
0	Artificial Soil/S	5	113.23	51.638	158.52	47.962				
100		5	90.707	51.115	145.1	38.574				

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	06-6326-6028	06-6326-6028	18 Jul-06 3:46 PM	CETISv1.1.2

Method	Alt H	Data Transform	Zeta	NOEL	LOEL	Toxic Units	ChV	PMSD
Equal Variance t Two-Sample	C > T	Untransformed		100	>100	1	N/A	48.68%

Group Comparisons

Control vs	Conc-%	Statistic	Critical	P-Value	MSD	Decision(0.05)
Artificial Soil/Sedi	100	1.36331	1.85955	0.1050	3.82955	Non-Significant Effect

ANOVA Table

Source	Sum of Squares	Mean Square	DF	F Statistic	P-Value	Decision(0.05)
Between	19.70663	19.70663	1	1.86	0.20991	Non-Significant Effect
Error	84.82246	10.60281	8			
Total	104.529087	30.309438	9			

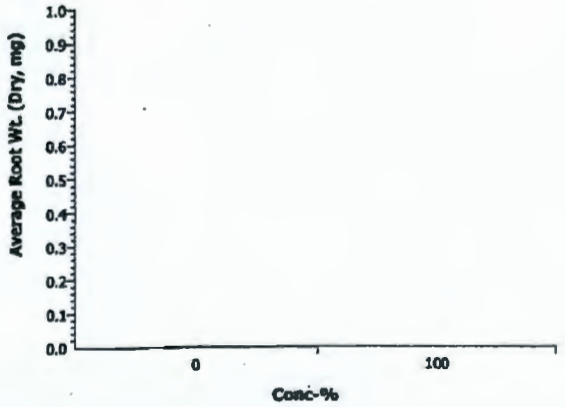
ANOVA Assumptions

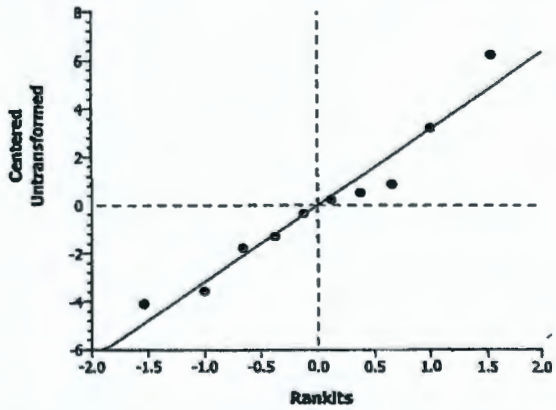
Attribute	Test	Statistic	Critical	P-Value	Decision(0.01)
Variances	Variance Ratio F	4.52895	23.15450	0.17261	Equal Variances
Distribution	Shapiro-Wilk W	0.94997		0.66819	Normal Distribution

Data Summary

			Original Data				Transformed Data			
Conc-%	Control Type	Count	Mean	Minimum	Maximum	SD	Mean	Minimum	Maximum	SD
0	Artificial Soil/S	5	7.8666	3.78	14.108	4.1678				
100		5	5.059	3.27	8.265	1.9584				

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	06-6326-6028	06-6326-6028	18 Jul-06 3:46 PM	CETISv1.1.2

Method	Alt H	Data Transform	Zeta	NOEL	LOEL	Toxic Units	ChV	PMSD
Equal Variance t Two-Sample	C > T	Untransformed		100	>100	1	N/A	40.21%

Group Comparisons

Control	vs	Conc-%	Statistic	Critical	P-Value	MSD	Decision(0.05)
Artificial Soil/Sedi		100	0.92492	1.85955	0.1910	71.2307	Non-Significant Effect

ANOVA Table

Source	Sum of Squares	Mean Square	DF	F Statistic	P-Value	Decision(0.05)
Between	3138.11	3138.11	1	0.86	0.38206	Non-Significant Effect
Error	29346.01	3668.251	8			
Total	32484.1157	6806.3606	9			

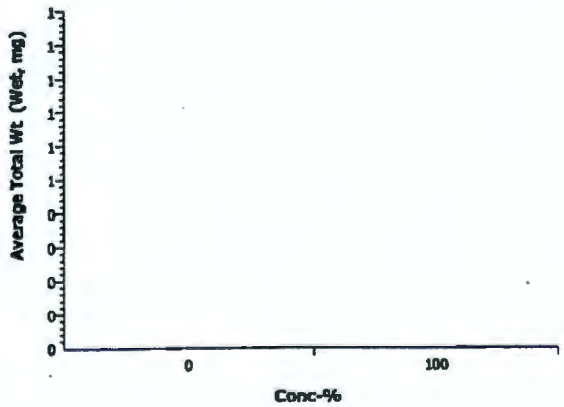
ANOVA Assumptions

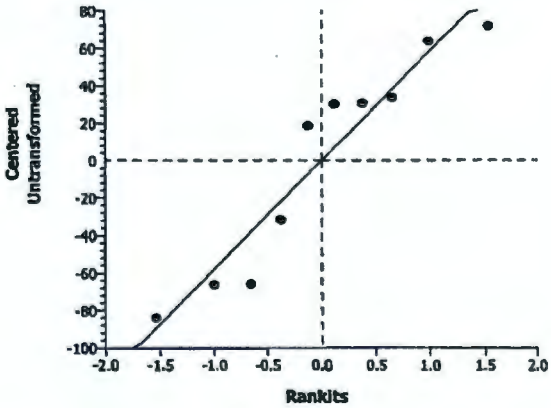
Attribute	Test	Statistic	Critical	P-Value	Decision(0.01)
Variances	Variance Ratio F	1.15620	23.15450	0.89153	Equal Variances
Distribution	Shapiro-Wilk W	0.88991		0.16917	Normal Distribution

Data Summary

			Original Data				Transformed Data			
Conc-%	Control Type	Count	Mean	Minimum	Maximum	SD	Mean	Minimum	Maximum	SD
0	Artificial Soil/S	5	177.14	93.113	240.86	58.331				
100		5	141.71	75.185	213.4	62.721				

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	06-6326-6028	06-6326-6028	18 Jul-06 3:46 PM	CETISv1.1.2

Method	Alt H	Data Transform	Zeta	NOEL	LOEL	Toxic Units	ChV	PMSD
Equal Variance t Two-Sample	C > T	Untransformed		100	>100	1	N/A	43.16%

Group Comparisons

Control	vs	Conc-%	Statistic	Critical	P-Value	MSD	Decision(0.05)
Artificial Soil/Sedi		100	1.38453	1.85955	0.1018	8.72574	Non-Significant Effect

ANOVA Table

Source	Sum of Squares	Mean Square	DF	F Statistic	P-Value	Decision(0.05)
Between	105.52	105.52	1	1.92	0.20359	Non-Significant Effect
Error	440.3715	55.04644	8			
Total	545.891441	160.56639	9			

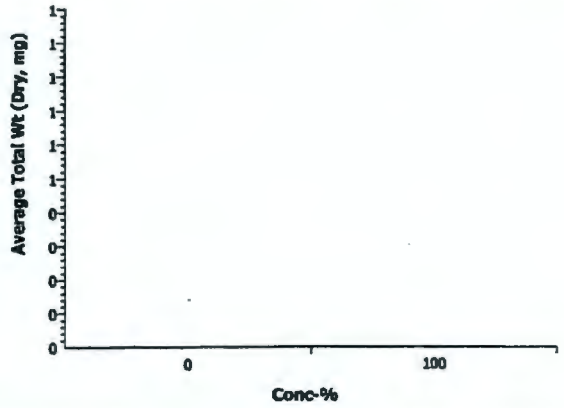
ANOVA Assumptions

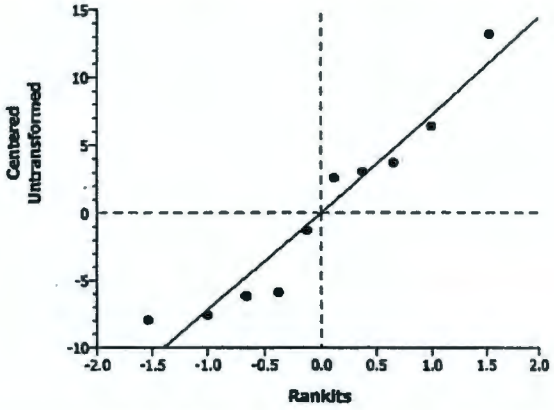
Attribute	Test	Statistic	Critical	P-Value	Decision(0.01)
Variances	Variance Ratio F	2.39308	23.15450	0.41876	Equal Variances
Distribution	Shapiro-Wilk W	0.91918		0.35017	Normal Distribution

Data Summary

			Original Data				Transformed Data			
Conc-%	Control Type	Count	Mean	Minimum	Maximum	SD	Mean	Minimum	Maximum	SD
0	Artificial Soil/S	5	20.217	12.223	33.384	8.8117				
100		5	13.721	7.5450	20.11	5.6962				

Graphics





APPENDIX B
CHAIN OF CUSTODY

E 2748

Washington Closure Hanford	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST	RC-051-3	Page 1 of 1

Collector L. COLLOM	Company Contact JOAN KESSNER	Telephone No. 375-4688	Project Coordinator KESSNER, JH	Price Code 8L Air Quality [ ]	Data Turnaround 45 Days
Project Designation 100 & 300 Area Component of the RCBRA - Incremental So	Sampling Location 600-131		SAF No. RC-051		
Ice Chest No.	Field Logbook No. EL-1596	COA BESRAS6520	Method of Shipment		
Shipped To CH2MHILL	Offsite Property No. A060151		Bill of Lading/Air Bill No.		

POSSIBLE SAMPLE HAZARDS/REMARKS

NONE

Special Handling and/or Storage

NONE

Preservation	None	None									
Type of Container	G/P	P/G									
No. of Container(s)	1	1									
Volume	1000g	~~2000g~~ 4000g									
SAMPLE ANALYSIS	See item (1) in Special Instructions.	Soil Plant Toxicity ASTM E1963; Soil Nematode Toxicity ASTM E2172									

11-1-05 LRC

Sample No.	Matrix *	Sample Date	Sample Time										
~~J10DV0~~ J10DW4	SOIL	10-31-05	1530	X	X								
~~J10DW0~~	SOIL												
~~J10DW1~~	SOIL												
~~J10DW2~~	SOIL												
~~J10DW3~~	SOIL												

CHAIN OF POSSESSION	Date/Time	Sign/Print Names: Received By/Stored In	Date/Time
Relinquished By/Removed From	11-1-05 @1000	Received By/Stored In	11-1-05 10:3
Relinquished By/Removed From	Date/Time	Received By/Stored In	Date/Time
Relinquished By/Removed From	Date/Time	Received By/Stored In	Date/Time
Relinquished By/Removed From	Date/Time	Received By/Stored In	Date/Time
Relinquished By/Removed From	Date/Time	Received By/Stored In	Date/Time
Relinquished By/Removed From	Date/Time	Received By/Stored In	Date/Time

SPECIAL INSTRUCTIONS

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

Bioassay ID = B1542-01

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

E 2801

Washington Closure Hanford	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST	RC-051-4	Page 1 of 1

Collector L. COLLOM	Company Contact JOAN KESSNER	Telephone No. 375-4688	Project Coordinator KESSNER, JH
Project Designation 100 & 300 Area Component of the RCBRA - Incremental 'So	Sampling Location PIT 23		SAF No. RC-051
Ice Chest No.	Field Logbook No. EL-1596	COA BESRAS6520	Method of Shipment
Shipped To CH2MHILL	Offsite Property No. A060151		Bill of Lading/Air Bill No.

Price Code 8L

Air Quality [ ]

Data Turnaround 45 Days

POSSIBLE SAMPLE HAZARDS/REMARKS

NONE

Special Handling and/or Storage

NONE

Preservation	None	None									
Type of Container	G/P	P/G									
No. of Container(s)	1	1									
Volume	1000g	~~3000g~~ 1000g	ET 11-8-5								
SAMPLE ANALYSIS	See item (1) in Special Instructions.	Soil Plant Toxicity ASTM E1963; Soil Nematode Toxicity ASTM E2172									

Sample No.	Matrix *	Sample Date	Sample Time										
J10DV4	SOIL	11-8-05	16:00	1	1								~1
J10DV5	SOIL												
J10DV6	SOIL												
J10DV7	SOIL												
J10DV8	SOIL												

CHAIN OF POSSESSION	Date/Time	Sign/Print Names: Received By/Stored In	Date/Time
Relinquished By/Removed From: Elizabeth M Tolles	11-9-05 12:00	[illegible]	11-9-05 12:30
Relinquished By/Removed From	Date/Time	Received By/Stored In	Date/Time
Relinquished By/Removed From	Date/Time	Received By/Stored In	Date/Time
Relinquished By/Removed From	Date/Time	Received By/Stored In	Date/Time
Relinquished By/Removed From	Date/Time	Received By/Stored In	Date/Time
Relinquished By/Removed From	Date/Time	Received By/Stored In	Date/Time

SPECIAL INSTRUCTIONS

This chain of custody form documents the transfer of bulk field collected soils to the CH2M Hill Corvallis laboratory for incremental preparation and aliquoting.

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

ET 11/10/05 As per Rich Weisz

Bioassay ID = B1542-02

Matrix *

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

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

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

E2P31

Washington Closure Hanford	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST		RC-051-9	Page 1 of 1
Collector L. COLLOM	Company Contact JOAN KESSNER	Telephone No. 375-4688	Project Coordinator KESSNER, JH	Price Code 8L Air Quality
Data Turnaround 45 Days				
Project Designation 100 & 300 Area Component of the RCBRA - Incremental So	Sampling Location Upland Backfill Elevated-100-F-2		SAF No. RC-051	
Ice Chest No.	Field Logbook No. EL-1596	COA BESRAS6520	Method of Shipment	
Shipped To CH2MHILL	Offsite Property No. A060151		Bill of Lading/Air Bill No.	

POSSIBLE SAMPLE HAZARDS/REMARKS

Potentially Radioactive.

Special Handling and/or Storage

NONE

Preservation	None	None									
Type of Container	G/P	P/G									
No. of Container(s)	1	1									
Volume	1000g	4000g									
SAMPLE ANALYSIS	See item (1) in Special Instructions.	Soil Plant Toxicity ASTM E1963; Soil Nematode Toxicity ASTM E2172									
Sample No.	Matrix *	Sample Date	Sample Time								
J10DT8	SOIL	11/14/05	17:21	1	1						

CHAIN OF POSSESSION	Date/Time	Sign/Print Names	Date/Time
Relinquished By/Removed From Elizabeth Tepper	11:20 11/15/05	Received By/Stored In Dayna Kaumann	11/15/05 11:01
Relinquished By/Removed From Elizabeth Tepper		Received By/Stored In	
Relinquished By/Removed From		Received By/Stored In	
Relinquished By/Removed From		Received By/Stored In	
Relinquished By/Removed From		Received By/Stored In	
Relinquished By/Removed From		Received By/Stored In	

SPECIAL INSTRUCTIONS

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

Bioassay ID = B1542-03

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

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

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

E 2846

Washington Closure Hanford	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST	RC-051-15	Page 1 of 1

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

POSSIBLE SAMPLE HAZARDS/REMARKS
NONE

Special Handling and/or Storage
NONE

Preservation			None	None								
Type of Container			G/P	P/G								
No. of Container(s)			1	1								
Volume			1000g	4000g								
SAMPLE ANALYSIS			See item (1) in Special Instructions.	Soil Plant Toxicity ASTM E1963; Soil Nematode Toxicity ASTM E2172								
Sample No.	Matrix *	Sample Date	Sample Time									
J10DV2	SOIL	11-15-05	20:00	1	1							1

CHAIN OF POSSESSION	Sign/Print Names.		
Relinquished By/Removed From Elizabeth Tepper	Date/Time 14:30	Received By/Stored In NA	Date/Time
Relinquished By/Removed From Elizabeth Tepper	Date/Time 11-16-05	Received By/Stored In [illegible] CH2MHill	Date/Time 11/16/05 14:31
Relinquished By/Removed From	Date/Time	Received By/Stored In	Date/Time
Relinquished By/Removed From	Date/Time	Received By/Stored In	Date/Time
Relinquished By/Removed From	Date/Time	Received By/Stored In	Date/Time
Relinquished By/Removed From	Date/Time	Received By/Stored In	Date/Time

SPECIAL INSTRUCTIONS
This chain of custody form documents the transfer of bulk field collected soils to the CH2M Hill Corvallis laboratory for incremental preparation and aliquoting.

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

Bioassay ID = B1542-04

Matrix *
S=Soil
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

BHFE-011 (08/29/2005)

E 2847

Washington Closure Hanford	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST	RC-051-12	Page 1 of 1
Collector: L. COLLOM	Company Contact: JOAN KESSNER; Telephone No.: 375-4688	Project Coordinator: KESSNER, JH	Price Code: 8L; Air Quality; Data Turnaround: 45 Days
Project Designation: 100 & 300 Area Component of the RCBRA - Incremental So	Sampling Location: Upland Backfill Low-116-DR-1&2	SAF No.: RC-051	
Ice Chest No.	Field Logbook No.: EL-1596; COA: BESRAS6520	Method of Shipment	
Shipped To: CH2MHILL	Offsite Property No.: A060151	Bill of Lading/Air Bill No.	

POSSIBLE SAMPLE HAZARDS/REMARKS
NONE

Special Handling and/or Storage
NONE

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

Sample No.	Matrix *	Sample Date	Sample Time										
J10DV1	SOIL	11-15-05	20:05	1	1								-1

CHAIN OF POSSESSION	Sign/Print Names		
Relinquished By/Removed From: CH2MHill Elizabeth Tepper	Date/Time: 14:30	Received By/Stored In: NP	Date/Time:
Relinquished By/Removed From: Elizabeth Tepper	Date/Time: 11-16-05	Received By/Stored In: [illegible] CH2MHill	Date/Time:
Relinquished By/Removed From:	Date/Time:	Received By/Stored In:	Date/Time: 11/16/05 14:31
Relinquished By/Removed From	Date/Time	Received By/Stored In	Date/Time
Relinquished By/Removed From	Date/Time	Received By/Stored In	Date/Time
Relinquished By/Removed From	Date/Time	Received By/Stored In	Date/Time

SPECIAL INSTRUCTIONS
This chain of custody form documents the transfer of bulk field collected soils to the CH2M Hill Corvallis laboratory for incremental preparation and aliquoting.

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

Bioassay ID = B1542-05

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

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

BHI-EP2011 (08/29/2005)

E2857

Washington Closure Hanford	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST	RC-051-16	Page 1 of 1

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

POSSIBLE SAMPLE HAZARDS/REMARKS

NONE

Special Handling and/or Storage

NONE

Preservation	None	None									
Type of Container	G/P	P/G									
No. of Container(s)	1	1									
Volume	1000g	4000g									
SAMPLE ANALYSIS	See item (1) in Special Instructions.	Soil Plant Toxicity ASTM E1963; Soil Nematode Toxicity ASTM E2172									
Sample No. / Matrix * / Sample Date / Sample Time											
J10DV3 / SOIL / 11/16/05 / 15:27	1	1									

CHAIN OF POSSESSION	Sign/Print Names		
Relinquished By/Removed From Elizabeth Tepper	Date/Time 11/17/05 10:00	Received By/Stored In NA	Date/Time
Relinquished By/Removed From Elizabeth Tepper CH2MHill	Date/Time	Received By/Stored In Melody Becker	Date/Time 11/17/05 10:15
Relinquished By/Removed From	Date/Time	Received By/Stored In	Date/Time
Relinquished By/Removed From	Date/Time	Received By/Stored In	Date/Time
Relinquished By/Removed From	Date/Time	Received By/Stored In	Date/Time
Relinquished By/Removed From	Date/Time	Received By/Stored In	Date/Time

SPECIAL INSTRUCTIONS

This chain of custody form documents the transfer of bulk field collected soils to the CH2M Hill Corvallis laboratory for incremental preparation and aliquoting.

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

Bioassay ID = B1542-06

Matrix.*

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

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

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

E2817

Washington Closure Hanford	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST	RC-051-11	Page 1 of 1

Collector L. COLLOM	Company Contact JOAN KESSNER	Telephone No. 375-4688	Project Coordinator KESSNER, JH
Project Designation 100 & 300 Area Component of the RCBRA - Incremental So	Sampling Location Riparian Elevated-Site #3 Upriver 100-D		SAF No. RC-051
Ice Chest No.	Field Logbook No. EL-1596	COA BESRAS6520	Method of Shipment
Shipped To CH2MHILL	Offsite Property No. A060151		Bill of Lading/Air Bill No.

Price Code 8L

Data Turnaround 45 Days

Air Quality

POSSIBLE SAMPLE HAZARDS/REMARKS

NONE

Special Handling and/or Storage

NONE

Preservation	None	None									
Type of Container	G/P	P/G									
No. of Container(s)	1	1									
Volume	1000g	~~3000g~~ 4000g	ST 11-21-05								
SAMPLE ANALYSIS	See item (1) in Special Instructions.	Soil Plant Toxicity ASTM E1963; Soil Nematode Toxicity ASTM E2172									

Sample No.	Matrix *	Sample Date	Sample Time										
J10DV0	SOIL	11-21-05	16:00	1	1								

CHAIN OF POSSESSION		Sign/Print Names	
Relinquished By/Removed From	Date/Time	Received By/Stored In	Date/Time
Elizabeth Tepper CH2MHILL		[illegible]	
Relinquished By/Removed From	Date/Time	Received By/Stored In	Date/Time
Elizabeth M Tepper	11/22/05 9:00	[illegible]	11/22/05
Relinquished By/Removed From	Date/Time	Received By/Stored In	Date/Time 9:01
Relinquished By/Removed From	Date/Time	Received By/Stored In	Date/Time
Relinquished By/Removed From	Date/Time	Received By/Stored In	Date/Time
Relinquished By/Removed From	Date/Time	Received By/Stored In	Date/Time

SPECIAL INSTRUCTIONS

This chain of custody form documents the transfer of bulk field collected soils to the CH2M Hill Corvallis laboratory for incremental preparation and aliquoting.

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

Bioassay ID = B1542-07

Matrix *

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

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

BHI-EE-0 9/29/2005)

E2897 E2897

Washington Closure Hanford	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST	RC-051-20	Page 1 of 1
Collector: L. COLLOM	Company Contact: JOAN KESSNER; Telephone No.: 375-4688	Project Coordinator: KESSNER, JH	Price Code: 8L; Data Turnaround: 45 Days
Project Designation: 100 & 300 Area Component of the RCBRA - Incremental So	Sampling Location: Riparian Low-Site#10 Downriver 100-D	SAF No.: RC-051	Air Quality
Ice Chest No.	Field Logbook No.: EL-1596; COA: BESRAS6520	Method of Shipment	
Shipped To: CH2MHILL	Offsite Property No.: A060151	Bill of Lading/Air Bill No.	

POSSIBLE SAMPLE HAZARDS/REMARKS
NONE

Special Handling and/or Storage
NONE

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

CT 11-28-05

Sample No.	Matrix *	Sample Date	Sample Time										
J10LJ5	SOIL	11-28-05	~~16:19~~ 16:19	1	1								-1

CHAIN OF POSSESSION	Sign/Print Names		
Relinquished By/Removed From: CH2MHILL Elizabeth Tepper	Date/Time: 11-28-05 16:25	Received By/Stored In: Melinda Duckworth	Date/Time: 11-28-05 16:25
Relinquished By/Removed From	Date/Time	Received By/Stored In	Date/Time
Relinquished By/Removed From	Date/Time	Received By/Stored In	Date/Time
Relinquished By/Removed From	Date/Time	Received By/Stored In	Date/Time
Relinquished By/Removed From	Date/Time	Received By/Stored In	Date/Time
Relinquished By/Removed From	Date/Time	Received By/Stored In	Date/Time

SPECIAL INSTRUCTIONS
This chain of custody form documents the transfer of bulk field collected soils to the CH2M Hill Corvallis laboratory for incremental preparation and aliquoting.

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

Bioassay ID = B1542-08

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

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

BHI-EE-0 3/29/2005)

E2953

Washington Closure Hanford	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST	RC-051-6	Page 1 of 1
Collector: L. COLLOM	Company Contact: JOAN KESSNER; Telephone No.: 375-4688	Project Coordinator: KESSNER, JH	Price Code: 8L; Data Turnaround: 45 Days
Project Designation: 100 & 300 Area Component of the RCBRA - Incremental So	Sampling Location: Riparian Reference-Site #13 Vernita Bridge	SAF No.: RC-051	Air Quality
Ice Chest No.	Field Logbook No.: EL-1596; COA: BESRAS6520	Method of Shipment	
Shipped To: CH2MHILL	Offsite Property No.: A060151	Bill of Lading/Air Bill No.	

POSSIBLE SAMPLE HAZARDS/REMARKS

NONE

Special Handling and/or Storage

NONE

Preservation	None	None									
Type of Container	G/P	P/G									
No. of Container(s)	1	1	ET 12-6-05								
Volume	1000g	~~3000g~~ 4000g									
SAMPLE ANALYSIS	See item (1) in Special Instructions.	Soil Plant Toxicity ASTM E1963; Soil Nematode Toxicity ASTM E2172									

Sample No.	Matrix *	Sample Date	Sample Time										
J10DT9	SOIL	12-6-05	16:00	X	X								-1

CHAIN OF POSSESSION	Date/Time	Sign/Print Names: Received By/Stored In	Date/Time
Relinquished By/Removed From: Elizabeth Tepper		Received By/Stored In: CH2M Hill	→
Relinquished By/Removed From: Elizabeth M Tepper	12/6/05 16:00	Received By/Stored In: [illegible]	12-6-05 16:15
Relinquished By/Removed From		Received By/Stored In	
Relinquished By/Removed From		Received By/Stored In	
Relinquished By/Removed From		Received By/Stored In	
Relinquished By/Removed From		Received By/Stored In	

SPECIAL INSTRUCTIONS

This chain of custody form documents the transfer of bulk field collected soils to the CH2M Hill Corvallis laboratory for incremental preparation and aliquoting.

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

Bioassay ID = B1542-09

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

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

BHI-EE-0 9/29/2005)