0072775

SAF-RC-080
RCBRA-Inter-Areas Shoreline Assessment – Incremental Soil Sampling
FINAL DATA PACKAGE

COMPLETE COPY OF DATA PACKAGE TO:

Jackie Queen H4-22 KW 4/25/07
Initials/Date

COMMENTS:

SDG F3193 SAF-RC-080

Rad only X Chem only Rad & Chem

X Complete Partial

Waste Site: RCBRA 4a Rip

RECEIVED
APR 30 2007
EDMC

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

CH2MHILL
Applied Sciences Laboratory

RECEIVED
JAN 2007

January 23, 2007

ELR Consulting
2328 S. Garfield Street
Kennewick, WA 99337

RE: Laboratory Report for ELR Consulting
Applied Sciences Laboratory Reference No. F3193

Dear Emmett Richards:

On December 26, 2006, CH2M HILL Applied Sciences Laboratory received one sample with a request for analysis of selected parameters. All analyses were performed by CH2M HILL unless otherwise indicated below.

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

CH2M HILL Applied Sciences Laboratory appreciates your business and looks forward to serving your analytical needs again. If you should have any questions concerning the data, or if you need additional information, please call Mike Stanaway at (541) 758-0235, extension 3161.

Sincerely,

Mark Bos
Analytical Manager

Enclosures

RC-080

CLIENT SAMPLE CROSS-REFERENCE

CH2M HILL Applied Sciences Laboratory Reference No. F3193

Sample ID	Client Sample ID	Date Collected	Time Collected
F319301	J13NY7	12/26/2006	13:00

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CH2M HILL Laboratory Reference No. F3193

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Applied Sciences Laboratory

Organic CLP and CLP Like Data Qualifiers

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

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

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

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

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

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

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

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

Inorganic CLP and CLP Like Data Qualifiers

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

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

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

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

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

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

AMMONIA
METHOD EPA 350.3

CASE NARRATIVE
AMMONIA

Analytical Method: EPA 350.3 Batch No.: F3193

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

Base/Command: ELR Consulting Prime Contractor.: _____

I. Holding Times:
All acceptance criteria were met.

II. Analysis:

A. Calibration:
All acceptance criteria were met.

B. Blanks:
All acceptance criteria were met.

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

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

E. Analytical Exception:
None.

F. Other:
None.

III. Sampling Equipment:
None.

IV. Documentation Exceptions:
None

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

Reported by: Elizabeth M Tepper Date: 1-10-07

Reviewed by: [signature] Date: 15 Jan 2007

SAMPLE DATA SUMMARY

1A-WC

GENERAL CHEMISTRY ANALYSIS DATA SHEET

Field Sample ID:

J13NY7

SDG No.: F3193

Lab Name: CH2M HILL/LAB/CVO

Matrix: SOIL

Lab Sample ID: F319301

% Moisture: 1

Date Received: 12/26/06

CAS No.	Analyte	MDL	PQL	Result	Q	Units	DF	Sample Amount	Analysis Method	Date Analyzed
7664-41-7	Ammonia-N	0.628	1.91	16.8		mg/kg	1	1.0601 G	E350.3	01/03/07

ET070116-10:11-F3193-W

FORM I GEN CHEM

1A-WC

GENERAL CHEMISTRY ANALYSIS DATA SHEET

Field Sample ID:

SB1-0103

SDG No.: F3193

Lab Name: CH2M HILL/LAB/CVO

Matrix: SOIL

Lab Sample ID: SB1-0103

% Moisture: 0

Date Received: / /

CAS No.	Analyte	MDL	PQL	Result	Q	Units	DF	Sample Amount	Analysis Method	Date Analyzed
7664-41-7	Ammonia-N	0.659	2.00	1.44	B	mg/kg	1	1 G	E350.3	01/03/07

QC DATA
SUMMARY

2-WC

GENERAL CHEMISTRY INITIAL CALIBRATION DATA

SDG No.: F3193

Lab Name: CH2M HILL/LAB/CVO

Analysis Method: E350.3

Initial Calibration Date: 01/03/07 1130

Instrument Name: NONE

Concentration Units: mg/L

Initial Calibration ID: 010307NH3

Analyte	Std 1	Resp 1	Std 2	Resp 2	Std 3	Resp 3	Std 4	Resp 4	Std 5	Resp 5	Std 6	Resp 6
Ammonia-N	0.10	164	1.0	111	10.0	57.7	100	-0.10				

Comments:

2-WC

GENERAL CHEMISTRY INITIAL CALIBRATION DATA

SDG No.: F3193

Lab Name: CH2M HILL/LAB/CVO

Analysis Method: E350.3

Initial Calibration Date: 01/03/07 1130

Instrument Name: NONE

Concentration Units: mg/L

Initial Calibration ID: 010307NH3

Analyte	Curve Type	r	Q
Ammonia-N	LNR	0.9995	

Comments:

2B-WC

GENERAL CHEMISTRY SECOND SOURCE CALIBRATION VERIFICATION DATA

SDG No.: F3193

Lab Name: CH2M HILL/LAB/CVO

Analysis Method: E350.3

Second Source ID: ICV-0103

Instrument Name: NONE

Concentration Units: mg/L

Initial Calibration ID: 010307NH3

Analyte	Expected	Found	%D	Q
Ammonia-N	10	9.15	-8.5	

Comments:

2A-WC

GENERAL CHEMISTRY CALIBRATION VERIFICATION DATA

SDG No.: F3193

Lab Name: CH2M HILL/LAB/CVO

Analysis Method: E350.3

Analytical Lot ID: 010307NH3

Instrument Name: NONE

Concentration Units: mg/L

Initial Calibration ID: 010307NH3

CCV #1 ID: CV1-0103 CCV #2 ID: CV2-0103 CCV #3 ID: CV3-0103

Analyte	Expected	Found	%D	Q	Expected	Found	%D	Q	Expected	Found	%D	Q
Ammonia-N	1	0.977	-2.3		10	9.23	-7.7		10	9.55	-4.5	

Comments:

3-WC

SOIL GENERAL CHEMISTRY METHOD BLANK SUMMARY

Field Sample ID:

SB1-0103

SDG No.: F3193

Analysis Method: E350.3

Initial Calibration ID: 010307NH3

Matrix: (Soil/Water) SOIL

Instrument: NONE

Lab Name: CH2M HILL/LAB/CVO

Lab Sample ID: SB1-0103

Date Analyzed: 01/03/07

Time Analyzed: 1155

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

	Field Sample ID	Lab Sample ID	Date Analyzed	Time Analyzed
1	BS1S0103	BS1S0103	01/03/07	1150
2	J13NY7	F319301	01/03/07	1236

Comments:

7-WC

GENERAL CHEMISTRY LABORATORY CONTROL SAMPLE

SDG No.: F3193

Lab Name: CH2M HILL/LAB/CVO

Analysis Method: E350.3

LCS ID: BS1S0103

Initial Calibration ID: 010307NH3

Date Analyzed: 01/03/07

Matrix: (Soil/Water) SOIL

Time Analyzed: 1150

Instrument: NONE

Concentration Units: mg/kg

Analyte	Expected	Found	%R	QC Limits %R	Q
Ammonia-N	200	183	91.5	75-125	

* Values outside of QC limits

Comments:

14-WC

GENERAL CHEMISTRY ANALYTICAL SEQUENCE

SDG No.: F3193

Lab Name: CH2M HILL/LAB/CVO

Analysis Method: E350.3

Lab Code: CVO

Instrument: NONE

Analytical Lot ID: 010307NH3

	Field Sample ID	Lab Sample ID	Date Analyzed	Time Analyzed
01	Level 1	Level 1	01/03/07	1130
02	Level 2	Level 2	01/03/07	1132
03	Level 3	Level 3	01/03/07	1134
04	Level 4	Level 4	01/03/07	1136
05	ICV-0103	ICV-0103	01/03/07	1142
06	CV1-0103	CV1-0103	01/03/07	1145
07	CV2-0103	CV2-0103	01/03/07	1149
08	BS1S0103	BS1S0103	01/03/07	1150
10	SB1-0103	SB1-0103	01/03/07	1155
18	J13NY7	F319301	01/03/07	1236
21	CV3-0103	CV3-0103	01/03/07	1259

Comments:

CH2MHILL
Applied Sciences Laboratory

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

01/10/07

MDL Study Report

Analytical Method: E350.3

Matrix: Soil

Instrument ID: NONE

Concentration Units: mg/kg

Analyte	Analysis Date	Amt. Spiked	Replicates 1	2	3	4	5	6	7	8	Std. Dev.	MDL
Ammonia	08/01/06	2	1.92	1.78	1.86	1.90	1.92	2.02	2.42		0.209	0.659

ANIONS
METHOD EPA 300.0

CASE NARRATIVE
ANIONS

Analytical Method: EPA 300.0 Batch No.: F3193

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

Base/Command: ELR Consulting Prime Contractor.:

I. Holding Times:
All acceptance criteria were met.

II. Analysis:

A. Calibration:
All acceptance criteria were met.

B. Blanks:
All acceptance criteria were met.

C. Matrix Spike/Matrix Spike Duplicate Sample(s):
MS/MSD recoveries for Nitrate and Fluoride were 27%/20% (Nitrate) and 28%/24% (Fluoride). Acceptance limits are 75-125.

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

E. Analytical Exception:
None.

F. Other:
None.

III. Sampling Equipment:
None.

IV. Documentation Exceptions:
None

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

Reported by: Dayna Kumann Date: 1/22/07

Reviewed by: Douglas S. Stanley Date: 1/23/07

SAMPLE DATA
SUMMARY

1A-WC

GENERAL CHEMISTRY ANALYSIS DATA SHEET

Field Sample ID:

J13NY7

SDG No.: F3193

Lab Name: CH2M HILL/LAB/CVO

Matrix: SOIL

Lab Sample ID: F319301

% Moisture: 1

Date Received: 12/26/06

CAS No.	Analyte	MDL	PQL	Result	Q	Units	DF	Sample Amount	Analysis Method	Date Analyzed
16887-00-6	Chloride	0.0603	0.577	10.2		mg/kg	1	4.38 G	E300.0A	01/03/07
16984-48-8	Fluoride	0.0510	0.577	0.454	B	mg/kg	1	4.38 G	E300.0A	01/03/07
14797-55-8	Nitrate-N	0.0292	0.577	0.577	U	mg/kg	1	4.38 G	E300.0A	01/03/07
14797-65-0	Nitrite-N	0.0345	0.577	0.577	U	mg/kg	1	4.38 G	E300.0A	01/03/07
14808-79-8	Sulfate	0.0872	0.577	17.3		mg/kg	1	4.38 G	E300.0A	01/03/07

1A-WC

GENERAL CHEMISTRY ANALYSIS DATA SHEET

Field Sample ID:

SB1-0103

SDG No.: F3193

Matrix: SOIL

% Moisture: 0

Lab Name: CH2M HILL/LAB/CVO

Lab Sample ID: SB1-0103

Date Received: / /

CAS No.	Analyte	MDL	PQL	Result	Q	Units	DF	Sample Amount	Analysis Method	Date Analyzed
16887-00-6	Chloride	0.0523	0.500	0.340	B	mg/kg	1	5 G	E300.0A	01/03/07
16984-48-8	Fluoride	0.0442	0.500	0.500	U	mg/kg	1	5 G	E300.0A	01/03/07
14797-55-8	Nitrate-N	0.0254	0.500	0.500	U	mg/kg	1	5 G	E300.0A	01/03/07
14797-65-0	Nitrite-N	0.0299	0.500	0.500	U	mg/kg	1	5 G	E300.0A	01/03/07
14808-79-8	Sulfate	0.0756	0.500	0.500	U	mg/kg	1	5 G	E300.0A	01/03/07

QC DATA
SUMMARY

2-WC

GENERAL CHEMISTRY INITIAL CALIBRATION DATA

SDG No.: F3193

Lab Name: CH2M HILL/LAB/CVO

Analysis Method: E300.0A

Initial Calibration Date: 08/31/06 20:56

Instrument Name: ICQ

Concentration Units: mg/L

Initial Calibration ID: EPA300A-083106

Analyte	Std 1	Resp 1	Std 2	Resp 2	Std 3	Resp 3	Std 4	Resp 4	Std 5	Resp 5	Std 6	Resp 6
Chloride	0.010	0.0027	0.050	0.011	0.10	0.020	0.50	0.081	1.0	0.16	5.0	0.84
Fluoride			0.050	0.0090	0.10	0.022	0.50	0.10	1.0	0.20	5.0	1.1
Nitrate-N	0.010	0.0073	0.050	0.020	0.10	0.043	0.50	0.21	1.0	0.40	5.0	2.1
Nitrite-N	0.010	0.0036	0.050	0.014	0.10	0.026	0.50	0.15	1.0	0.28	5.0	1.5
Sulfate	0.030	0.0075	0.15	0.024	0.30	0.046	1.5	0.18	3.0	0.35	15.0	1.9

Comments:

2-WC

GENERAL CHEMISTRY INITIAL CALIBRATION DATA

SDG No.: F3193

Lab Name: CH2M HILL/LAB/CVO

Analysis Method: E300.0A

Initial Calibration Date: 08/31/06 20:56

Instrument Name: ICQ

Concentration Units: mg/L

Initial Calibration ID: EPA300A-083106

Analyte	Std 7	Resp 7	Std 8	Resp 8	Std 9	Resp 9	Std 10	Resp 10				
Chloride	10.0	1.8	25.0	4.7								
Fluoride	10.0	2.4	25.0	6.1								
Nitrate-N	10.0	4.6	25.0	12.4								
Nitrite-N	10.0	3.1	25.0	7.6								
Sulfate	30.0	3.9	75.0	10.3								

Comments:

2-WC

GENERAL CHEMISTRY INITIAL CALIBRATION DATA

SDG No.: F3193

Lab Name: CH2M HILL/LAB/CVO

Analysis Method: E300.0A

Initial Calibration Date: 08/31/06 20:56

Instrument Name: ICQ

Concentration Units: mg/L

Initial Calibration ID: EPA300A-083106

Analyte	Curve Type	r	Q
Chloride	LNR	1.0000	
Fluoride	LNR	0.9999	
Nitrate-N	LNR	0.9999	
Nitrite-N	LNR	1.0000	
Sulfate	LNR	0.9999	

Comments:

2B-WC

GENERAL CHEMISTRY SECOND SOURCE CALIBRATION VERIFICATION DATA

SDG No.: F3193

Lab Name: CH2M HILL/LAB/CVO

Analysis Method: E300.0A

Second Source ID: ICV-0831

Instrument Name: ICQ

Concentration Units: mg/L

Initial Calibration ID: EPA300A-083106

Analyte	Expected	Found	%D	Q
Chloride	5	4.82	-3.6	
Fluoride	5	5.08	1.7	
Nitrate-N	7.19	7.24	0.7	
Nitrite-N	3.47	3.52	1.4	
Sulfate	5	5.04	0.8	

Comments:

2A-WC

GENERAL CHEMISTRY CALIBRATION VERIFICATION DATA

SDG No.: F3193

Lab Name: CH2M HILL/LAB/CVO

Analysis Method: E300.0A

Analytical Lot ID: 010307Q1

Instrument Name: ICQ

Concentration Units: mg/L

Initial Calibration ID: EPA300A-083106

CCV #1 ID: CV1-0103 CCV #2 ID: CV2-0103 CCV #3 ID:

Analyte	Expected	Found	%D	Q	Expected	Found	%D	Q	Expected	Found	%D	Q
Chloride	5	5.26	5.1		5	5.38	7.5					
Fluoride	5	4.78	-4.4		5	4.60	-7.9					
Nitrate-N	5	4.69	-6.2		5	4.90	-2.0					
Nitrite-N	5	5.48	9.5		5	5.43	8.6					
Sulfate	15	15.4	2.5		15	15.7	4.6					

Comments:

3-WC

SOIL GENERAL CHEMISTRY METHOD BLANK SUMMARY

Field Sample ID:

SB1-0103

SDG No.: F3193

Analysis Method: E300.0A

Initial Calibration ID: EPA300A-083106

Matrix: (Soil/Water) SOIL

Instrument: ICQ

Lab Name: CH2M HILL/LAB/CVO

Lab Sample ID: SB1-0103

Date Analyzed: 01/03/07

Time Analyzed: 1731

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

	Field Sample ID	Lab Sample ID	Date Analyzed	Time Analyzed
1	BS1S0103	BS1S0103	01/03/07	1607
2	BS2S0103	BS3S0103	01/03/07	1649
3	BS3S0103	BS2S0103	01/03/07	1710
4	J13NY7	F319301	01/03/07	2204

Comments:

7-WC

GENERAL CHEMISTRY LABORATORY CONTROL SAMPLE

SDG No.: F3193

Lab Name: CH2M HILL/LAB/CVO

Analysis Method: E300.0A

LCS ID: BS1S0103

Initial Calibration ID: EPA300A-083106

Date Analyzed: 01/03/07

Matrix: (Soil/Water) SOIL

Time Analyzed: 1607

Instrument: ICQ

Concentration Units: mg/kg

Analyte	Expected	Found	%R	QC Limits %R	Q
Chloride	25	23.8	95.0	90-110	
Fluoride	25	22.5	90.0	90-110	
Sulfate	25	25.8	103	90-110	

* Values outside of QC limits

Comments:

7-WC

GENERAL CHEMISTRY LABORATORY CONTROL SAMPLE

SDG No.: F3193

Lab Name: CH2M HILL/LAB/CVO

Analysis Method: E300.0A

LCS ID: BS2S0103

Initial Calibration ID: EPA300A-083106

Date Analyzed: 01/03/07

Matrix: (Soil/Water) SOIL

Time Analyzed: 1710

Instrument: ICQ

Concentration Units: mg/kg

Analyte	Expected	Found	%R	QC Limits %R	Q
Nitrite-N	18.7	18.0	96.1	90-110	

* Values outside of QC limits

Comments:

7-WC

GENERAL CHEMISTRY LABORATORY CONTROL SAMPLE

SDG No.: F3193

Lab Name: CH2M HILL/LAB/CVO

Analysis Method: E300.0A

LCS ID: BS3S0103

Initial Calibration ID: EPA300A-083106

Date Analyzed: 01/03/07

Matrix: (Soil/Water) SOIL

Time Analyzed: 1710

Instrument: ICQ

Concentration Units: mg/kg

Analyte	Expected	Found	%R	QC Limits %R	.Q
Nitrate-N	36	36.7	102	90-110	

* Values outside of QC limits

Comments:

14-WC

GENERAL CHEMISTRY ANALYTICAL SEQUENCE

SDG No.: F3193

Lab Name: CH2M HILL/LAB/CVO

Analysis Method: E300.0A

Lab Code: CVO

Instrument: ICQ

Analytical Lot ID: 300A-083106

	Field Sample ID	Lab Sample ID	Date Analyzed	Time Analyzed
01	ICB-0831	ICB-0831	08/31/06	1808
02	LEVEL1	LEVEL1	08/31/06	1829
03	LEVEL2	LEVEL2	08/31/06	1850
04	LEVEL3	LEVEL3	08/31/06	1911
05	LEVEL4	LEVEL4	08/31/06	1932
06	LEVEL5	LEVEL5	08/31/06	1953
07	LEVEL6	LEVEL6	08/31/06	2014
08	LEVEL7	LEVEL7	08/31/06	2035
09	LEVEL8	LEVEL8	08/31/06	2056
10	ICV-0831	ICV-0831	08/31/06	2117
11	ICV-0831	ICV-0831	08/31/06	2138
13	ICV-0831	ICV-0831	08/31/06	2220

Comments:

14-WC

GENERAL CHEMISTRY ANALYTICAL SEQUENCE

SDG No.: F3193

Lab Name: CH2M HILL/LAB/CVO

Analysis Method: E300.0A

Lab Code: CVO

Instrument: ICQ

Analytical Lot ID: 010307Q1

	Field Sample ID	Lab Sample ID	Date Analyzed	Time Analyzed
15	CV1-0103	CV1-0103	01/03/07	1546
16	BS1S0103	BS1S0103	01/03/07	1607
17	BS3S0103	BS2S0103	01/03/07	1710
19	BS2S0103	BS3S0103	01/03/07	1649
20	SB1-0103	SB1-0103	01/03/07	1731
21	J13NY7	F319301	01/03/07	2204
27	CV2-0103	CV2-0103	01/04/07	0031

Comments:

CH2MHILL
Applied Sciences Laboratory

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

01/23/07

MDL Study Report

Analytical Method: E300.0A

Matrix: Soil

Instrument ID: ICQ

Concentration Units: mg/kg

Analyte	Analysis Date	Amt. Spiked	Replicates 1	2	3	4	5	6	7	8	Std. Dev.	MDL
Nitrate	11/15/06	0.25	0.190	0.175	0.185	0.190	0.197	0.200	0.195	0.200	0.00846	0.0254
Nitrite-N	11/15/06	0.25	0.235	0.225	0.210	0.235	0.220	0.210	0.225	0.215	0.00998	0.0299
Sulfate	11/15/06	0.75	0.685	0.750	0.675	0.700	0.705	0.735	0.705	0.725	0.0252	0.0756
Chloride	11/15/06	0.25	0.370	0.355	0.346	0.320	0.334	0.365	0.359	0.365	0.0174	0.0523
Fluoride	11/15/06	0.25	0.185	0.174	0.184	0.190	0.170	0.190	0.215	0.170	0.0148	0.0442

PERCENT MOISTURE
ASTM D2216

1A-WC

GENERAL CHEMISTRY ANALYSIS DATA SHEET

Field Sample ID:

J13NY7

SDG No.: F3193

Matrix: SOIL

Lab Name: CH2M HILL/LAB/CVO

Lab Sample ID: F319301

Date Received: 12/26/06

CAS No.	Analyte	MDL	PQL	Result	Q	Units	DF	Sample Amount	Analysis Method	Date Analyzed
MOISTURE	Moisture	0.00	0.00	0.714		%	1	11.4915 G	ASTM D2216	12/27/06

PARTICLE SIZE
METHOD 422

Hanford

Particle Size

502.0 **g sample used**

Weight retained is the weight of material ON each sieve

ANALYST: **KRM** **1/12/2007**

Lab I.D.	Client I.D.	Sieve #	Sieve Size (um)	Sieve Size (mm)	Weight Retained (g)	Weight Retained (%)	Cumulative Coarser (%)	Cumulative Finer (%)
F319301	J13NY7	8	2362	2.362	0.70	0.14	0.14	99.86
		16	1180	1.180	136.30	27.19	27.33	72.67
		30	600	0.600	66.60	13.29	40.62	59.38
		50	500	0.500	49.20	9.82	50.44	49.56
		100	147	0.147	89.60	17.88	68.32	31.68
		200	75	0.075	103.00	20.55	88.87	11.13
		pan			55.80	11.13	100.00	0.00
		total			501.2			

CH2M HILL
Applied Sciences Group

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Tel 541.752.4271 Fax 541.752.0276

pH
METHOD SW9045C

1A-WC

GENERAL CHEMISTRY ANALYSIS DATA SHEET

Field Sample ID:

J13NY7

SDG No.: F3193

Matrix: SOIL

% Moisture: 1

Lab Name: CH2M HILL/LAB/CVO

Lab Sample ID: F319301

Date Received: 12/26/06

CAS No.	Analyte	MDL	PQL	Result	Q	Units	DF	Sample Amount	Analysis Method	Date Analyzed
PH	pH	0.00	0.00	6.80		pH	1	20 G	SW9045	12/27/06

TKN
METHOD EPA 351.4

CASE NARRATIVE
TKN

Analytical Method: EPA 351.4 Batch No.: F3193

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

Base/Command: ELR Consulting Prime Contractor.: _____

I. Holding Times:
All acceptance criteria were met.

II. Analysis:

A. Calibration:
All acceptance criteria were met.

B. Blanks:
All acceptance criteria were met.

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

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

E. Analytical Exception:
None.

F. Other:
None.

III. Sampling Equipment:
None.

IV. Documentation Exceptions:
None

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

Reported by: Elizabeth M Tupper Date: 1-10-07

Reviewed by: [signature] Date: 16 Jan 2007

SAMPLE DATA
SUMMARY

1A-WC

GENERAL CHEMISTRY ANALYSIS DATA SHEET

Field Sample ID:

J13NY7

SDG No.: F3193

Matrix: SOIL

% Moisture: 1

Lab Name: CH2M HILL/LAB/CVO

Lab Sample ID: F319301

Date Received: 12/26/06

CAS No.	Analyte	MDL	PQL	Result	Q	Units	DF	Sample Amount	Analysis Method	Date Analyzed
TKN	Total Kjeldahl Nitrogen as N	26.5	97.1	1580		mg/kg	1	1.04 G	E351.4	01/03/07

1A-WC

GENERAL CHEMISTRY ANALYSIS DATA SHEET

Field Sample ID:

SB1-0103

SDG No.: F3193

Matrix: SOIL

% Moisture: 0

Lab Name: CH2M HILL/LAB/CVO

Lab Sample ID: SB1-0103

Date Received: / /

CAS No.	Analyte	MDL	PQL	Result	Q	Units	DF	Sample Amount	Analysis Method	Date Analyzed
TKN	Total Kjeldahl Nitrogen as N	27.3	100	59.3	B	mg/kg	1	1 G	E351.4	01/03/07

QC DATA
SUMMARY

2-WC

GENERAL CHEMISTRY INITIAL CALIBRATION DATA

SDG No.: F3193

Lab Name: CH2M HILL/LAB/CVO

Analysis Method: E351.4

Initial Calibration Date: 01/02/07 1430

Instrument Name: NONE

Concentration Units: mg/L

Initial Calibration ID: 010307TKN

Analyte	Std 1	Resp 1	Std 2	Resp 2	Std 3	Resp 3	Std 4	Resp 4	Std 5	Resp 5	Std 6	Resp 6
Total Kjeldahl Nitrogen as N	2.0	169	20.0	113	200	57.0	2000	1.4				

Comments:

2-WC

GENERAL CHEMISTRY INITIAL CALIBRATION DATA

SDG No.: F3193

Lab Name: CH2M HILL/LAB/CVO

Analysis Method: E351.4

Initial Calibration Date: 01/02/07 1430

Instrument Name: NONE

Concentration Units: mg/L

Initial Calibration ID: 010307TKN

Analyte	Curve Type	r	Q
Total Kjeldahl Nitrogen as N	LNR	1.0000	

Comments:

2B-WC

GENERAL CHEMISTRY SECOND SOURCE CALIBRATION VERIFICATION DATA

SDG No.: F3193

Lab Name: CH2M HILL/LAB/CVO

Analysis Method: E351.4

Second Source ID: ICV-0103

Instrument Name: NONE

Concentration Units: mg/L

Initial Calibration ID: 010307TKN

Analyte	Expected	Found	%D	Q
Total Kjeldahl Nitrogen as N	18.3	18.6	1.4	

Comments:

2A-WC

GENERAL CHEMISTRY CALIBRATION VERIFICATION DATA

SDG No.: F3193

Lab Name: CH2M HILL/LAB/CVO

Analysis Method: E351.4

Analytical Lot ID: 010307TKN

Instrument Name: NONE

Concentration Units: mg/L

Initial Calibration ID: 010307TKN

CCV #1 ID: CV1-0103 CCV #2 ID: CV2-0103 CCV #3 ID: CV3-0103

Analyte	Expected	Found	%D	Q	Expected	Found	%D	Q	Expected	Found	%D	Q
Total Kjeldahl Nitrogen as N	20	20.1	0.7		200	201	0.5		200	206	3.0	

Comments:

2A-WC

GENERAL CHEMISTRY CALIBRATION VERIFICATION DATA

SDG No.: F3193

Lab Name: CH2M HILL/LAB/CVO

Analysis Method: E351.4

Analytical Lot ID: 010307TKN

Instrument Name: NONE

Concentration Units: mg/L

Initial Calibration ID: 010307TKN

CCV #4 ID: CV4-0103 CCV #5 ID: CCV #6 ID:

Analyte	Expected	Found	%D	Q	Expected	Found	%D	Q	Expected	Found	%D	Q
Total Kjeldahl Nitrogen as N	20	20.9	4.6									

Comments:

3-WC

SOIL GENERAL CHEMISTRY METHOD BLANK SUMMARY

Field Sample ID:

SB1-0103

SDG No.: F3193

Lab Name: CH2M HILL/LAB/CVO

Analysis Method: E351.4

Lab Sample ID: SB1-0103

Initial Calibration ID: 010307TKN

Date Analyzed: 01/03/07

Matrix: (Soil/Water) SOIL

Time Analyzed: 1448

Instrument: NONE

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

	Field Sample ID	Lab Sample ID	Date Analyzed	Time Analyzed
1	BS1S0103	BS1S0103	01/03/07	1444
2	J13NY7	F319301	01/03/07	1506

Comments:

7-WC

GENERAL CHEMISTRY LABORATORY CONTROL SAMPLE

SDG No.: F3193

Lab Name: CH2M HILL/LAB/CVO

Analysis Method: E351.4

LCS ID: BS1S0103

Initial Calibration ID: 010307TKN

Date Analyzed: 01/03/07

Matrix: (Soil/Water) SOIL

Time Analyzed: 1444

Instrument: NONE

Concentration Units: mg/kg

Analyte	Expected	Found	%R	QC Limits %R	Q
Total Kjeldahl Nitrogen as N	915	928	101	75-125	

* Values outside of QC limits

Comments:

14-WC

GENERAL CHEMISTRY ANALYTICAL SEQUENCE

SDG No.: F3193

Lab Name: CH2M HILL/LAB/CVO

Analysis Method: E351.4

Lab Code: CVO

Instrument: NONE

Analytical Lot ID: 010307TKN

	Field Sample ID	Lab Sample ID	Date Analyzed	Time Analyzed
01	Level 1	Level 1	01/03/07	1430
02	Level 2	Level 2	01/03/07	1432
03	Level 3	Level 3	01/03/07	1434
04	Level 4	Level 4	01/03/07	1436
05	ICV-0103	ICV-0103	01/03/07	1438
06	CV1-0103	CV1-0103	01/03/07	1440
07	CV2-0103	CV2-0103	01/03/07	1442
08	BS1S0103	BS1S0103	01/03/07	1444
10	SB1-0103	SB1-0103	01/03/07	1448
15	J13NY7	F319301	01/03/07	1506
18	CV3-0103	CV3-0103	01/03/07	1518
25	CV4-0103	CV4-0103	01/03/07	1537

Comments:

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

01/10/07

MDL Study Report

Analytical Method: E351.4

Matrix: Soil

Instrument ID: NONE

Concentration Units: mg/kg

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

TOTAL ORGANIC CARBON
BY ASTM E777

CASE NARRATIVE
TOC-SOIL

Analytical Method: ASTM E-777 | Batch No.: F3193

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

Base/Command: ELR Consulting | Prime Contractor.: _____

I. Holding Times:
All acceptance criteria were met.

II. Analysis:

A. Calibration:
All acceptance criteria were met.

B. Blanks:
All acceptance criteria were met.

C. Matrix Spike/Matrix Spike Duplicate Sample(s):
Analysis performed in accordance with the standard operation procedure.

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

E. Analytical Exception:
None.

F. Other:
None.

III. Sampling Equipment:
None.

IV. Documentation Exceptions:
None

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

Reported by: _____ Date: 1-10-07

Reviewed by: _____ Date: 1/11/07

SAMPLE DATA SUMMARY

1A-WC

GENERAL CHEMISTRY ANALYSIS DATA SHEET

Field Sample ID:

J13NY7

SDG No.: F3193

Matrix: SOIL

% Moisture: 0

Lab Name: CH2M HILL/LAB/CVO

Lab Sample ID: F319301

Date Received: 12/26/06

CAS No.	Analyte	MDL	PQL	Result	Q	Units	DF	Sample Amount	Analysis Method	Date Analyzed
TOC	Total Organic Carbon	123	290	15800		mg/kg	1	0.3443 G	ASTM E777	01/09/07

1A-WC

GENERAL CHEMISTRY ANALYSIS DATA SHEET

Field Sample ID:

SB1-0109

SDG No.: F3193

Lab Name: CH2M HILL/LAB/CVO

Matrix: SOIL

Lab Sample ID: SB1-0109

% Moisture: 0

Date Received: / /

CAS No.	Analyte	MDL	PQL	Result	Q	Units	DF	Sample Amount	Analysis Method	Date Analyzed
TOC	Total Organic Carbon	42.5	100	100	U	mg/kg	1	1 G	ASTM E777	01/09/07

QC SUMMARY

2-WC

GENERAL CHEMISTRY INITIAL CALIBRATION DATA

SDG No.: F3193

Lab Name: CH2M HILL/LAB/CVO

Analysis Method: ASTM E777

Initial Calibration Date: 01/08/07 14:57

Instrument Name: TOC SKALAR

Concentration Units: mg/kg

Initial Calibration ID: 010807S1

Analyte	Std 1	Resp 1	Std 2	Resp 2	Std 3	Resp 3	Std 4	Resp 4	Std 5	Resp 5	Std 6	Resp 6
Total Organic Carbon	100	835000	200	1760000	1000	9350000	4000	3.12E+7	8000	5.75E+7		

Comments:

FORM II GEN CHEM

AD070109-16:12-F3193-W

2-WC

GENERAL CHEMISTRY INITIAL CALIBRATION DATA

SDG No.: F3193

Lab Name: CH2M HILL/LAB/CVO

Analysis Method: ASTM E777

Initial Calibration Date: 01/08/07 14:57

Instrument Name: TOC SKALAR

Concentration Units: mg/kg

Initial Calibration ID: 010807S1

Analyte	Curve Type	r	Q
Total Organic Carbon	LNR	0.9976	

Comments:

2A-WC

GENERAL CHEMISTRY CALIBRATION VERIFICATION DATA

SDG No.: F3193

Lab Name: CH2M HILL/LAB/CVO

Analysis Method: ASTM E777

Analytical Lot ID: SB1-0109

Instrument Name: TOC SKALAR

Concentration Units: mg/kg

Initial Calibration ID: 010807S1

CCV #1 ID: CV1-0109 CCV #2 ID: CV2-0109 CCV #3 ID:

Analyte	Expected	Found	%D	Q	Expected	Found	%D	Q	Expected	Found	%D	Q
Total Organic Carbon	4000	3990	-0.2		4000	4150	3.8					

Comments:

3-WC

SOIL GENERAL CHEMISTRY METHOD BLANK SUMMARY

Field Sample ID:

SB1-0109

SDG No.: F3193

Lab Name: CH2M HILL/LAB/CVO

Analysis Method: ASTM E777

Lab Sample ID: SB1-0109

Initial Calibration ID: 010807S1

Date Analyzed: 01/09/07

Matrix: (Soil/Water) SOIL

Time Analyzed: 1023

Instrument: TOC SKALAR

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

	Field Sample ID	Lab Sample ID	Date Analyzed	Time Analyzed
1	BS1S0109	BS1S0109	01/09/07	1014
2	J13NY7	F319301	01/09/07	1133

Comments:

7-WC

GENERAL CHEMISTRY LABORATORY CONTROL SAMPLE

SDG No.: F3193

Lab Name: CH2M HILL/LAB/CVO

Analysis Method: ASTM E777

LCS ID: BS1S0109

Initial Calibration ID: 010807S1

Date Analyzed: 01/09/07

Matrix: (Soil/Water) SOIL

Time Analyzed: 1014

Instrument: TOC SKALAR

Concentration Units: mg/kg

Analyte	Expected	Found	%R	QC Limits %R	Q
Total Organic Carbon	9070	9680	107	75-125	

* Values outside of QC limits

Comments:

14-WC

GENERAL CHEMISTRY ANALYTICAL SEQUENCE

SDG No.: F3193

Lab Name: CH2M HILL/LAB/CVO

Analysis Method: ASTM E777

Lab Code: CVO

Instrument: TOC SKALAR

Analytical Lot ID: SB1-0109

	Field Sample ID	Lab Sample ID	Date Analyzed	Time Analyzed
01	CV1-0109	CV1-0109	01/09/07	0956
02	BS1S0109	BS1S0109	01/09/07	1014
03	SB1-0109	SB1-0109	01/09/07	1023
07	J13NY7	F319301	01/09/07	1133
13	CV2-0109	CV2-0109	01/09/07	1442

Comments:

CH2MHILL
Applied Sciences Laboratory

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

01/09/07

MDL Study Report

Analytical Method: ASTM E777

Instrument ID: TOC Skalar

Matrix: Soil

Concentration Units: mg/kg

Analyte	Analysis Date	Amt. Spiked	Replicates 1	2	3	4	5	6	7	8	Std. Dev.	MDL
Total Organic Carbon	09/06/06	140	53.8	79.8	81.2	45.1	58.9	68.5	57.4		13.5	42.5

CHAIN OF CUSTODY/SHIPPING DOCUMENTS

F 3193

Washington Closure Hanford	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST	RC-080-30	Page 1 of 1

Collector J. Queen	Company Contact Joan Kessner	Telephone No. 375-4688	Project Coordinator KESSNER, JH
Project Designation RCBRA-Inter-Areas Shoreline Assessment - Incremental Soi	Sampling Location RCBRA 4a Rip		SAF No. RC-080
Ice Chest No.	Field Logbook No. EL-1611	COA BESBEA6520	Method of Shipment Ground Transport
Shipped To CH2MHill - Corvallis	Offsite Property No.		Bill of Lading/Air Bill No.

Price Code 8N

Air Quality ☐

Data Turnaround 45 Days

POSSIBLE SAMPLE HAZARDS/REMARKS

Special Handling and/or Storage

Preservation	None	None									
Type of Container	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										
J13NY7	SOIL	12-26-06	1300	X	X								-1

CHAIN OF POSSESSION		Sign/Print Names	
Relinquished By/Removed From Elizabeth M Epps	Date/Time 12-26-06 1310	Received By/Stored In Kathy McKinley	Date/Time 12/26/06 1313
Relinquished By/Removed From	Date/Time	Received By/Stored In	Date/Time
Relinquished By/Removed From	Date/Time	Received By/Stored In	Date/Time
Relinquished By/Removed From	Date/Time	Received By/Stored In	Date/Time
Relinquished By/Removed From	Date/Time	Received By/Stored In	Date/Time
Relinquished By/Removed From	Date/Time	Received By/Stored In	Date/Time

SPECIAL INSTRUCTIONS

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

(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

Matrix *

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

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

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

CH2MHILL
Analytical Services

Sample Receipt Record

Batch Number: F3193 Date received: 12/26/06

Client/Project ELR - Hanford

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

Observation	YES	NO
Radiological Screening for AFCEE		X
Were custody seals intact and on the outside of the cooler?		HD
If yes, Where? Front____ Rear____ Lt Side____ Rt Side____		
Type of packing material: Ice Blue Ice Bubble wrap		HD
Was the Chain of Custody inside the cooler?		HD
Was the Chain of Custody properly filled out?	X	
Were the sample containers in good condition?	X	
Containers supplied by ASL?		X
Any sample with < 1/2 holding time remaining? If so contact LPM		X
Was there ice in the cooler? Enter temp. 18 C		X
All VOCs free of air bubbles ?		NA

VERIFICATION OF SAMPLE PRESERVATION

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

LOGIN AND pH VERIFICATIONS PERFORMED BY

KMckinley 12/26/06 1320

Date/Time Date/Time

RECEIVED
JAN 2007

BIOASSAY REPORT
ACUTE SCREENING BIOASSAYS
Conducted January 15 through 16, 2007

Prepared for

ELR CONSULTING, INC.
WASHINGTON CLOSURE HANFORD
RICHLAND, WASHINGTON

Prepared by

CH2M HILL
2300 NW Walnut Boulevard
Corvallis, Oregon 97330

January 26, 2007
Lab I.D. Nos. BN1719-06 thru -10
SDG Number BN1719b

F3193
RC-080

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

INTRODUCTION

CH2M HILL conducted acute screening bioassay tests using the nematode (*Caenorhabditis elegans*) on soil samples provided by the ELR Consulting for the Washington Closure Hanford project, Richland, Washington. The tests were conducted from January 15 through 16, 2007.

METHODS AND MATERIALS

TEST METHODS

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

TEST ORGANISMS

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

CONTROL SOIL

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

HYDRATION WATER

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

TEST CONCENTRATIONS

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

SAMPLE COLLECTION

The soil samples were collected from December 11 through 26, 2006. The samples were stored in the dark at 4°C until test solutions were prepared and tested. Chain of Custody for sample collection is provided in Appendix C.

SAMPLE CROSS-REFERENCE TABLE

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

Table 1
Sample Cross-Reference

Client ID	Sample Date	Sample Location	Nematode test SDG	Analytical Lab SDG
J13LP6	12/11/2006	Riparian Site 2c, 100-K	BN1719-06	F3102
J13NY6	12/19/2006	RCBRA 3b Rip	BN1719-07	F3174
J13LP9	12/19/2006	Riparian Site 21, 100 F Slough North	BN1719-08	F3175
J13NY5	12/19/2006	RCBRA R Ref 14	BN1719-09	F3176
J13NY7	12/26/2006	RCBRA 4a Rip	BN1719-10	F3193

SAMPLE PREPARATION

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

TEST INITIATION

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

TEST TERMINATION

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

TEST ACCEPTABILITY CRITERIA

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

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

MONITORING OF BIOASSAYS

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

DATA ANALYSIS

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

RESULTS AND DISCUSSION

ACUTE RESULTS

Table 2 summarizes the survival data for the nematode acute test initiated on January 15, 2007.

Table 2
***Caenorhabditis elegans* Results**
Test initiated on January 15, 2007

Client ID	Percent Survival	Percent Recovered
Control	100	100
J13LP6	76.7 [a]	96.7
J13NY6	90.0 [b]	93.3
J13LP9	90.0 [b]	93.3
J13NY5	40.0 [a]	93.3
J13NY7	33.3 [a]	93.3

[a] Indicates a statistically significant reduction from control at p equal to 0.05 using Equal Variance t Two-Sample test.
[b] Indicates a statistically significant reduction from control at p equal to 0.05 using Wilcoxon Rank Sum.

The nematode results indicated a statistically significant reduction in survival in the J13LP6, J13NY6, J13LP9, J13NY5, and J13NY7 samples when compared to the control.

However, the statistically significant reduction at the J13NY6 and J13LP9 represent a 10 percent reduction from the laboratory control. The coefficient of variance for the control and samples was tight (6 percent), which may be a Type 2 statistical error. The reduction for samples J13NY6 and J13 LP9 were determined to be statistically significant, however, due to the magnitude of the reduction observed, it is uncertain whether this difference is biologically significant.

Test acceptability criteria was met with control survival of 100 percent and recovery of test organisms was greater than 80 percent in all test concentrations.

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

REFERENCE TOXICANT TEST

The results of the reference toxicant test conducted in December 2006 with cupric chloride indicate that the test organisms were within their respective sensitivity range based on EPA guidelines (EPA 1994). The LC_{50} value and control chart limits are listed in the table below.

Table 3
Chronic Reference Toxicant Tests (ug/L)

Species (test)	LC_{50}	Control Chart Limits
Caenorhabditis elegans (survival)	46	35 to 125

CERTIFICATION STATEMENT

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

APPENDIX A
RAW DATA SHEETS

CH2M HILL *TOXICITY TEST ORGANISM AND WATER QUALITY DATA*

Client: BLR - Washington Closure Hanford — Test Initiation: Date 01-15-2007 — Test Termination: Date 01-16-2007

Contact: — Technician: Johnson

Test Species/ID: *Caenorhabditis elegans* / Nem 020 / /

Sample ID Number	Field ID	Collected Date	Collected Time	Total Residual Chlorine (mg/l) As Received	Total Residual Chlorine (mg/l) As Dechlor.	Ammonia NH_3-N mg/l	Hardness mg/l as $CaCO_3$	Alkalinity mg/l as $CaCO_3$
BN1719-06	J13LP6	12-11-06	-	-	-	-	-	-
BN1719-07	J13NY6	12-18-06	-	-	-	-	-	-
BN1719-08	J13LP9	12-19-06	-	-	-	-	-	-
BN1719-09	J13NY5	12-19-06	-	-	-	-	-	-
BN1719-10	J13NY7	12-26-06	-	-	-	-	-	-

Test Species Information	ID# Nem 620	ID#	ID#	ID#
	Acute			
Organism Age at Initiation	4 days			
	—			
Test Container Size	15 mm petri			
Test Volume	2.33 g dry wt.			
Feeding: Type	none			
Amount	—			
Aeration: Began	none			
Amount	—			
Dilution Water ID#	Milli-Q Equiv.			
Acclimation Period	4 days			
Test Location	#7			
Organism Source	In-house			
Size (mm)	-	-	-	-
Loading Rate	-	-	-	-

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

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

Water Quality Meters Used/ID#

Dissolved Oxygen #2 pH #3 Conductivity #2

1 of 1

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

Client: ELR - Washington Closure Hanford
Sample Description: see below
Test Species: *Caenorhabditis elegans* ID#: Nem 020

Tech. 0 Hrs NJ 24 Hrs NJ
Time 0 Hrs 0900 24 Hrs 0845

Beginning, Date 01-15-2007 Time 0900
Ending, Date 01-16-2007 Time 0845

Lab ID	Soil pH 0 hr	Soil pH 24 hr	Soil % Moisture 0 hr	Soil Temperature (°C) 0 hr	Soil Temperature (°C) 24 hr	Comments:
Lab Control	6.9	6.8		21.0	20.5	Each test chamber has 2.33 g dry wt. soil + 0.93 ml Milli-Q water (40% of dry wt.).
BN1719-06	6.1	6.2		21.0	20.5	Samples hydrated 7 days prior to test initiation.
BN1719-07	6.1	6.1		21.0	NJ ~~20~~ 20.5	
BN1719-08	6.2	6.1		21.0	20.5	All test soils were dried during sampling process.
BN1719-09	6.5	6.6		21.0	20.5	
BN1719-10	6.2	6.3		21.0	20.5	

Lab ID	Field ID	Replicate	Chamber #	Lab ID	Field ID	Replicate	Chamber #	Lab ID	Field ID	Replicate	Chamber #
Lab Control	Silica Sand	A	12	BN1719-09	J13NY5	A	16				
Lab Control	Silica Sand	B	4	BN1719-09	J13NY5	B	15				
Lab Control	Silica Sand	C	1	BN1719-09	J13NY5	C	3				
BN1719-06	J13LP6	A	9	BN1719-10	J13NY7	A	6				
BN1719-06	J13LP6	B	17	BN1719-10	J13NY7	B	10				
BN1719-06	J13LP6	C	8	BN1719-10	J13NY7	C	5				
BN1719-07	J13NY6	A	14								
BN1719-07	J13NY6	B	11								
BN1719-07	J13NY6	C	7								
BN1719-08	J13LP9	A	2								
BN1719-08	J13LP9	B	13								
BN1719-08	J13LP9	C	18								

CH2M HILL **NEMATODE TOXICITY TEST SURVIVAL DATA**

Client ELR - Washington Closure Hanford
Sample Description Lab ID#: BN1719
Test Species: *Caenorhabditis elegans* ID#: Nem 020

Beginning, Date 01-15-2007 Time 0900
Ending, Date 01-16-2007 Time 0845

Test Initiation: Tech: Tech: NJ Time: 0900

Test Termination: Tech: Tech: NJ Time: 0845

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

Chamber Number	Start Count 0	# alive found 24 hr	total # found 24 hr	Comments:
16	10	5	10	
17	10	7	9	
18	10	9	9	
19	10			
20	10			
21	10			
22	10			
23	10			
24	10			
25	10			
26	10			
27	10			
28	10			
29	10			
30	10			

CETIS Test Summary

Report Date: 23 Jan-07 9:55 AM
Test Link: 12-6168-0984/B171906cea

Nematode 24 hour Acute test — CH2M Hill

Test No:	05-4668-5131	Test Type:	Nematode Survival	Duration:	24h
Start Date:	15 Jan-07 09:00 AM	Protocol:	ASTM E2172-01 (2001)	Species:	Caenorhabditis elegans
Ending Date:	16 Jan-07 08:45 AM	Dil Water:		Source:	In-House Culture
Setup Date:	15 Jan-07 09:00 AM	Brine:			

Sample No:	09-6805-1084	Code:	B1719-06	Client:	
Sample Date:	11 Dec-06	Material:	Soil	Project:	
Receive Date:		Source:	ELR-Washington Closure Hanford		
Sample Age:	35d 9h	Station:			

Comments: J13LP6

Comparison Summary

Analysis	Endpoint	NOEL	LOEL	ChV	PMSD	Method
14-5233-8892	~~% Recovery~~	~~100~~	~~> 100~~	~~9~~	N/A	7.35%	Equal Variance t Two-Sample
11-8659-5037	% Survival	< 100	100	N/A	11.25%	Equal Variance t Two-Sample

Test Acceptability

Analysis	Endpoint	Attribute	Statistic	TAC Range	Overlap	Decision
14-5233-8892	% Recovery	Control Response	1	0.8 - NL	Yes	Passes acceptability criteria
11-8659-5037	% Survival	Control Response	1	0.9 - NL	Yes	Passes acceptability criteria

% Recovery Summary

Conc-%	Control Type	Reps	Mean	Minimum	Maximum	SE	SD	CV
0	Dilution Water	3	1.00000	1.00000	1.00000	0.00000	0.00000	0.00%
100		3	0.96667	0.90000	1.00000	0.03333	0.05774	5.97%

% Survival Summary

Conc-%	Control Type	Reps	Mean	Minimum	Maximum	SE	SD	CV
0	Dilution Water	3	1.00000	1.00000	1.00000	0.00000	0.00000	0.00%
100		3	0.76667	0.70000	0.90000	0.06667	0.11547	15.06%

% Recovery Detail

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

% Survival Detail

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

CETIS Analysis Detail

Nematode 24 hour Acute test					CH2M Hill
Endpoint	**Analysis Type**	**Sample Link**	**Control Link**	**Date Analyzed**	**Version**
% Survival	Comparison	12-6168-0984	12-6168-0984	23 Jan-07 9:55 AM	CETISv1.1.2

Method	Alt H	Data Transform	Zeta	NOEL	LOEL	Toxic Units	ChV	PMSD
Equal Variance t Two-Sample	C > T	Angular (Corrected)		<100	100		N/A	11.25%

Group Comparisons

Control	vs	Conc-%	Statistic	Critical	P-Value	MSD	Decision(0.05)
Dilution Water		100	3.89582	2.13185	0.0088	0.18326	Significant Effect

ANOVA Table

Source	Sum of Squares	Mean Square	DF	F Statistic	P-Value	Decision(0.05)
Between	0.1682335	0.168234	1	15.18	0.01760	Significant Effect
Error	0.0443379	0.011084	4			
Total	0.21257136	0.1793179	5			

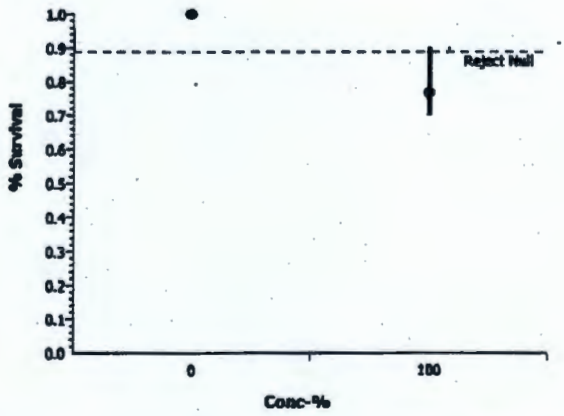
ANOVA Assumptions

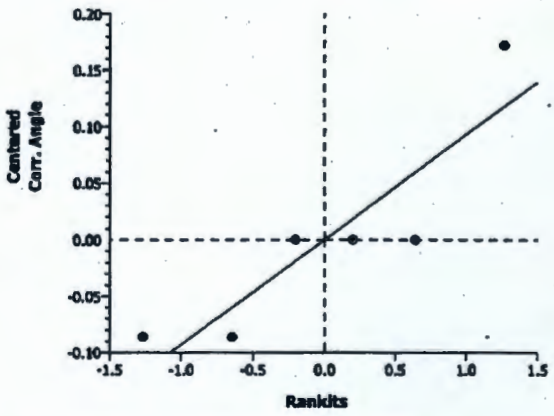
Attribute	Test	Statistic	Critical	P-Value	Decision(0.01)
Variances	Modified Levene	2.66667	21.19769	0.17781	Equal Variances
Distribution	Shapiro-Wilk W	0.81374		0.07784	Normal Distribution

Data Summary

			Original Data				Transformed Data			
Conc-%	Control Type	Count	Mean	Minimum	Maximum	SD	Mean	Minimum	Maximum	SD
0	Dilution Water	3	1.00000	1.00000	1.00000	0.00000	1.41202	1.41202	1.41202	0.00029
100		3	0.76667	0.70000	0.90000	0.11547	1.07712	0.99116	1.24905	0.14889

Graphics





CETIS Test Summary

Report Date: 23 Jan-07 10:22 AM
Test Link: 12-2559-4294/B171907cea

Nematode 24 hour Acute test — CH2M Hill

Test No:	05-4668-5131	Test Type:	Nematode Survival	Duration:	24h
Start Date:	15 Jan-07 09:00 AM	Protocol:	ASTM E2172-01 (2001)	Species:	Caenorhabditis elegans
Ending Date:	16 Jan-07 08:45 AM	Dil Water:		Source:	In-House Culture
Setup Date:	15 Jan-07 09:00 AM	Brine:			

Sample No:	10-3299-6115	Code:	B1719-07	Client:	
Sample Date:	~~18 Dec 06~~ MS	Material:	Soil	Project:	
Receive Date:		Source:	ELR-Washington Closure Hanford		
Sample Age:	28d 9h Sampled on Dec, 17 2006	Station:			

Comments: J13NY6

Comparison Summary

Analysis	Endpoint	NOEL	LOEL	ChV	PMSD	Method
00-7068-4911	~~% Recovery~~	~~100~~	~~> 100~~	N/A	7.35%	Equal Variance t Two-Sample
07-2460-5773	% Survival	< 100	100	N/A	2.50%	Wilcoxon Rank Sum Two-Sample

Test Acceptability

Analysis	Endpoint	Attribute	Statistic	TAC Range	Overlap	Decision
00-7068-4911	% Recovery	Control Response	1	0.8 - NL	Yes	Passes acceptability criteria
07-2460-5773	% Survival	Control Response	1	0.9 - NL	Yes	Passes acceptability criteria

% Recovery Summary

Conc-%	Control Type	Reps	Mean	Minimum	Maximum	SE	SD	CV
0	Dilution Water	3	1.00000	1.00000	1.00000	0.00000	0.00000	0.00%
100		3	0.93333	0.90000	1.00000	0.03333	0.05774	6.19%

% Survival Summary

Conc-%	Control Type	Reps	Mean	Minimum	Maximum	SE	SD	CV
0	Dilution Water	3	1.00000	1.00000	1.00000	0.00000	0.00000	0.00%
100		3	0.90000	0.90000	0.90000	0.00000	0.00000	0.00%

% Recovery Detail

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

% Survival Detail

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

CETIS Analysis Detail

Nematode 24 hour Acute test — CH2M Hill

Endpoint	Analysis Type	Sample Link	Control Link	Date Analyzed	Version
% Survival	Comparison	12-2559-4294	12-2559-4294	23 Jan-07 10:15 AM	CETISv1.1.2

Method	Alt H	Data Transform	Zeta	NOEL	LOEL	Toxic Units	ChV	PMSD
Wilcoxon Rank Sum Two-Sample	C > T	Rank		<100	100		N/A	2.50%

Group Comparisons

Control	vs	Conc-%	Statistic	Critical	P-Value	Ties	Decision(0.05)
Dilution Water		100	6		0.0500	0	Significant Effect

ANOVA Table

Source	Sum of Squares	Mean Square	DF	F Statistic	P-Value	Decision(0.05)
Between	0.039839	0.039839	1	65535.0	0.00000	Significant Effect
Error	0	0	4			
Total	0.039839	0.039839	5			

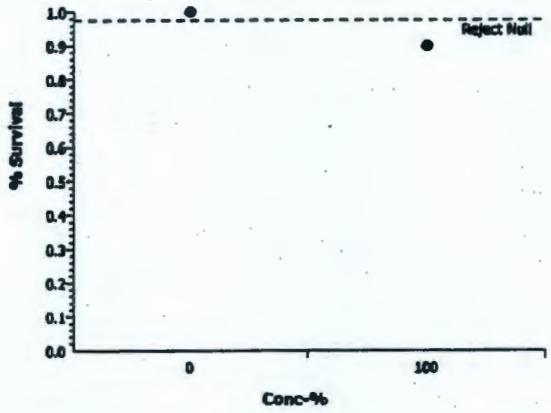
ANOVA Assumptions

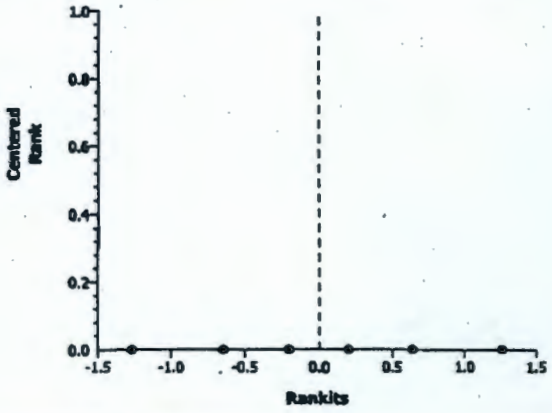
Attribute	Test	Statistic	Critical	P-Value	Decision(0.01)
Variances	Modified Levene	65535.00000	21.19769	0.00000	Unequal Variances

Data Summary

			Original Data				Transformed Data			
Conc-%	Control Type	Count	Mean	Minimum	Maximum	SD	Mean	Minimum	Maximum	SD
0	Dilution Water	3	1.00000	1.00000	1.00000	0.00000	5.00000	5.00000	5.00000	0.00000
100		3	0.90000	0.90000	0.90000	0.00015	2.00000	2.00000	2.00000	0.00000

Graphics





CETIS Test Summary

Report Date: 23 Jan-07 10:32 AM
Test Link: 08-3193-0982/B171908cea

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

Test No:	05-4668-5131	**Test Type:**	Nematode Survival	**Duration:**	24h
Start Date:	15 Jan-07 09:00 AM	**Protocol:**	ASTM E2172-01 (2001)	**Species:**	Caenorhabditis elegans
Ending Date:	16 Jan-07 08:45 AM	**Dil Water:**		**Source:**	In-House Culture
Setup Date:	15 Jan-07 09:00 AM	**Brine:**			

Sample No:	02-6014-8186	**Code:**	B1719-08	**Client:**	
Sample Date:	19 Dec-06	**Material:**	Soil	**Project:**	
Receive Date:		**Source:**	ELR-Washington Closure Hanford		
Sample Age:	27d 9h	**Station:**			

Comments: J13LP9

Comparison Summary

Analysis	Endpoint	NOEL	LOEL	ChV	PMSD	Method
07-5121-0128	~~% Recovery~~	~~100~~	~~> 100~~ 3	N/A	7.35%	Equal Variance t Two-Sample
13-4267-9883	% Survival	< 100	100	N/A	2.50%	Wilcoxon Rank Sum Two-Sample

Test Acceptability

Analysis	Endpoint	Attribute	Statistic	TAC Range	Overlap	Decision
07-5121-0128	% Recovery	Control Response	1	0.8 - NL	Yes	Passes acceptability criteria
13-4267-9883	% Survival	Control Response	1	0.9 - NL	Yes	Passes acceptability criteria

% Recovery Summary

Conc-%	Control Type	Reps	Mean	Minimum	Maximum	SE	SD	CV
0	Dilution Water	3	1.00000	1.00000	1.00000	0.00000	0.00000	0.00%
100		3	0.93333	0.90000	1.00000	0.03333	0.05774	6.19%

% Survival Summary

Conc-%	Control Type	Reps	Mean	Minimum	Maximum	SE	SD	CV
0	Dilution Water	3	1.00000	1.00000	1.00000	0.00000	0.00000	0.00%
100		3	0.90000	0.90000	0.90000	0.00000	0.00000	0.00%

% Recovery Detail

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

% Survival Detail

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

CETIS Analysis Detail

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

Endpoint	Analysis Type	Sample Link	Control Link	Date Analyzed	Version
% Survival	Comparison	08-3193-0982	08-3193-0982	23 Jan-07 10:32 AM	CETISv1.1.2

Method	Alt H	Data Transform	Zeta	NOEL	LOEL	Toxic Units	ChV	PMSD
Wilcoxon Rank Sum Two-Sample	C > T	Rank		<100	100		N/A	2.50%

Group Comparisons

Control	vs	Conc-%	Statistic	Critical	P-Value	Ties	Decision(0.05)
Dilution Water		100	6		0.0500	0	Significant Effect

ANOVA Table

Source	Sum of Squares	Mean Square	DF	F Statistic	P-Value	Decision(0.05)
Between	0.039839	0.039839	1	65535.0	0.00000	Significant Effect
Error	0	0	4			
Total	0.039839	0.039839	5			

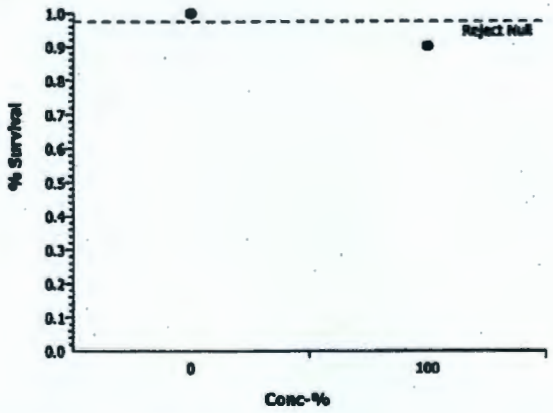
ANOVA Assumptions

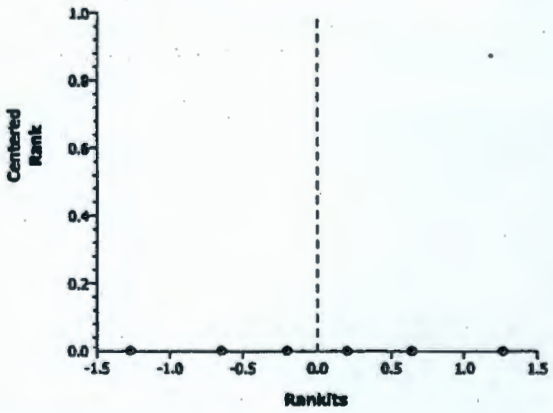
Attribute	Test	Statistic	Critical	P-Value	Decision(0.01)
Variances	Modified Levene	65535.00000	21.19769	0.00000	Unequal Variances

Data Summary

			Original Data				Transformed Data			
Conc-%	Control Type	Count	Mean	Minimum	Maximum	SD	Mean	Minimum	Maximum	SD
0	Dilution Water	3	1.00000	1.00000	1.00000	0.00000	5.00000	5.00000	5.00000	0.00000
100		3	0.90000	0.90000	0.90000	0.00015	2.00000	2.00000	2.00000	0.00000

Graphics





CETIS Test Summary

Report Date: 23 Jan-07 10:34 AM
Test Link: 06-0687-8945/B171909cea

Nematode 24 hour Acute test — CH2M Hill

Test No:	05-4668-5131	Test Type:	Nematode Survival	Duration:	24h
Start Date:	15 Jan-07 09:00 AM	Protocol:	ASTM E2172-01 (2001)	Species:	Caenorhabditis elegans
Ending Date:	16 Jan-07 08:45 AM	Dil Water:		Source:	In-House Culture
Setup Date:	15 Jan-07 09:00 AM	Brine:			

Sample No:	14-3788-3215	Code:	B1719-09	Client:	
Sample Date:	19 Dec-06	Material:	Soil	Project:	
Receive Date:		Source:	ELR-Washington Closure Hanford		
Sample Age:	27d 9h	Station:			

Comments: J13NY5

Comparison Summary

Analysis	Endpoint	NOEL	LOEL	ChV	PMSD	Method
01-8280-0259	% Recovery	100	> 100	N/A	7.35%	Equal Variance t Two-Sample
06-2143-7497	% Survival	< 100	100	N/A	7.93%	Equal Variance t Two-Sample

Test Acceptability

Analysis	Endpoint	Attribute	Statistic	TAC Range	Overlap	Decision
01-8280-0259	% Recovery	Control Response	1	0.8 - NL	Yes	Passes acceptability criteria
06-2143-7497	% Survival	Control Response	1	0.9 - NL	Yes	Passes acceptability criteria

% Recovery Summary

Conc-%	Control Type	Reps	Mean	Minimum	Maximum	SE	SD	CV
0	Dilution Water	3	1.00000	1.00000	1.00000	0.00000	0.00000	0.00%
100		3	0.93333	0.90000	1.00000	0.03333	0.05774	6.19%

% Survival Summary

Conc-%	Control Type	Reps	Mean	Minimum	Maximum	SE	SD	CV
0	Dilution Water	3	1.00000	1.00000	1.00000	0.00000	0.00000	0.00%
100		3	0.40000	0.30000	0.50000	0.05774	0.10000	25.00%

% Recovery Detail

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

% Survival Detail

Conc-%	Control Type	Rep 1	Rep 2	Rep 3
0	Dilution Water	1.00000	1.00000	1.00000
100		0.50000	0.40000	0.30000

CETIS Analysis Detail

Nematode 24 hour Acute test — CH2M Hill

Endpoint	Analysis Type	Sample Link	Control Link	Date Analyzed	Version
% Survival	Comparison	06-0687-8945	06-0687-8945	23 Jan-07 10:34 AM	CETISv1.1.2

Method	Alt H	Data Transform	Zeta	NOEL	LOEL	Toxic Units	ChV	PMSD
Equal Variance t Two-Sample	C > T	Angular (Corrected)		<100	100		N/A	7.93%

Group Comparisons

Control	vs	Conc-%	Statistic	Critical	P-Value	MSD	Decision(0.05)
Dilution Water		100	12.2684	2.13185	0.0001	0.12664	Significant Effect

ANOVA Table

Source	Sum of Squares	Mean Square	DF	F Statistic	P-Value	Decision(0.05)
Between	0.7966449	0.796645	1	150.51	0.00025	Significant Effect
Error	0.0211715	0.005293	4			
Total	0.81781636	0.8019377	5			

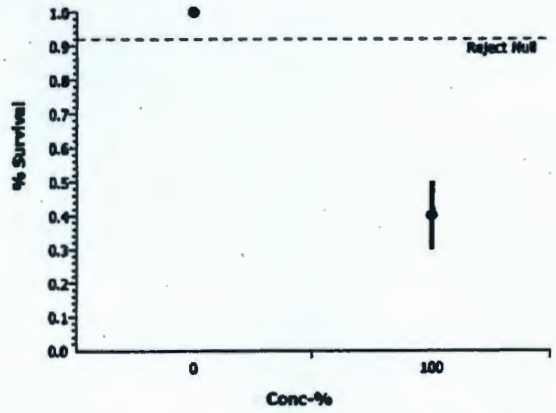
ANOVA Assumptions

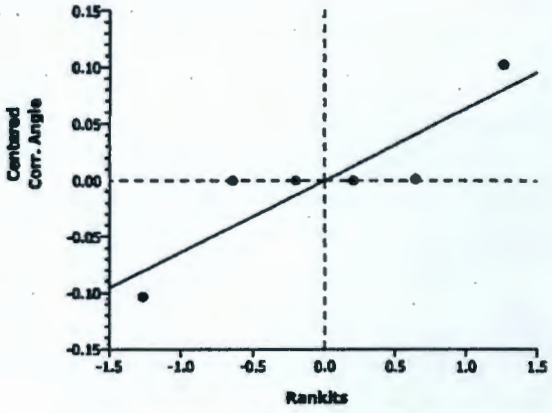
Attribute	Test	Statistic	Critical	P-Value	Decision(0.01)
Variances	Modified Levene	5830.14600	21.19769	0.00000	Unequal Variances
Distribution	Shapiro-Wilk W	0.83185		0.11144	Normal Distribution

Data Summary

			Original Data				Transformed Data			
Conc-%	Control Type	Count	Mean	Minimum	Maximum	SD	Mean	Minimum	Maximum	SD
0	Dilution Water	3	1.00000	1.00000	1.00000	0.00000	1.41202	1.41202	1.41202	0.00029
100		3	0.40000	0.30000	0.50000	0.10000	0.68325	0.57964	0.78540	0.10289

Graphics





CETIS Test Summary

Report Date: 23 Jan-07 10:35 AM
Test Link: 03-6113-5758/B171910cea

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

Test No:	05-4668-5131	**Test Type:**	Nematode Survival	**Duration:**	24h
Start Date:	15 Jan-07 09:00 AM	**Protocol:**	ASTM E2172-01 (2001)	**Species:**	Caenorhabditis elegans
Ending Date:	16 Jan-07 08:45 AM	**Dil Water:**		**Source:**	In-House Culture
Setup Date:	15 Jan-07 09:00 AM	**Brine:**			

Sample No:	11-7908-9637	**Code:**	B1719-10	**Client:**	
Sample Date:	26 Dec-06	**Material:**	Soil	**Project:**	
Receive Date:		**Source:**	ELR-Washington Closure Hanford		
Sample Age:	20d 9h	**Station:**			

Comments: J13NY7

Comparison Summary

Analysis	Endpoint	NOEL	LOEL	ChV	PMSD	Method
01-6580-2222	% Recovery	100	> 100	N/A	7.35%	Equal Variance t Two-Sample
08-5057-3742	% Survival	< 100	100	N/A	19.63%	Equal Variance t Two-Sample

Test Acceptability

Analysis	Endpoint	Attribute	Statistic	TAC Range	Overlap	Decision
01-6580-2222	% Recovery	Control Response	1	0.8 - NL	Yes	Passes acceptability criteria
08-5057-3742	% Survival	Control Response	1	0.9 - NL	Yes	Passes acceptability criteria

% Recovery Summary

Conc-%	Control Type	Reps	Mean	Minimum	Maximum	SE	SD	CV
0	Dilution Water	3	1.00000	1.00000	1.00000	0.00000	0.00000	0.00%
100		3	0.93333	0.90000	1.00000	0.03333	0.05774	6.19%

% Survival Summary

Conc-%	Control Type	Reps	Mean	Minimum	Maximum	SE	SD	CV
0	Dilution Water	3	1.00000	1.00000	1.00000	0.00000	0.00000	0.00%
100		3	0.33333	0.10000	0.50000	0.12019	0.20817	62.45%

% Recovery Detail

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

% Survival Detail

Conc-%	Control Type	Rep 1	Rep 2	Rep 3
0	Dilution Water	1.00000	1.00000	1.00000
100		0.10000	0.50000	0.40000

CETIS Analysis Detail

Nematode 24 hour Acute test — CH2M Hill

Endpoint	Analysis Type	Sample Link	Control Link	Date Analyzed	Version
% Survival	Comparison	03-6113-5758	03-6113-5758	23 Jan-07 10:35 AM	CETISv1.1.2

Method	Alt H	Data Transform	Zeta	NOEL	LOEL	Toxic Units	ChV	PMSD
Equal Variance t Two-Sample	C > T	Angular (Corrected)		<100	100		N/A	19.63%

Group Comparisons

Control	vs	Conc-%	Statistic	Critical	P-Value	MSD	Decision(0.05)
Dilution Water		100	5.78635	2.13185	0.0022	0.30017	Significant Effect

ANOVA Table

Source	Sum of Squares	Mean Square	DF	F Statistic	P-Value	Decision(0.05)
Between	0.9956697	0.99567	1	33.48	0.00443	Significant Effect
Error	0.1189505	0.029738	4			
Total	1.11462019	1.0254073	5			

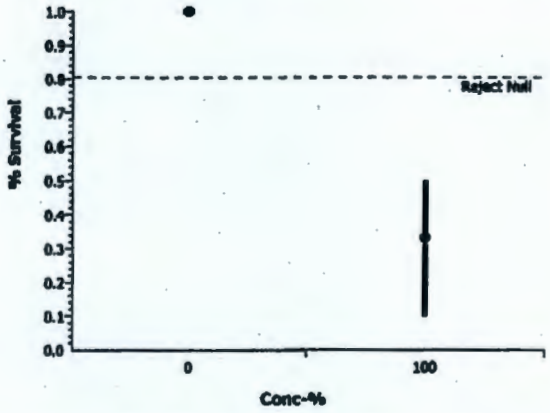
ANOVA Assumptions

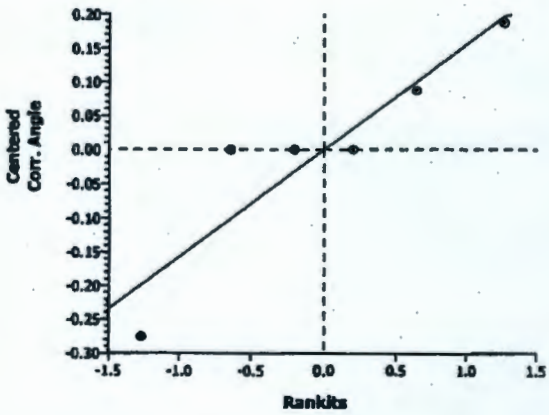
Attribute	Test	Statistic	Critical	P-Value	Decision(0.01)
Variances	Modified Levene	8.33263	21.19769	0.04471	Equal Variances
Distribution	Shapiro-Wilk W	0.87520		0.24775	Normal Distribution

Data Summary

			Original Data				Transformed Data			
Conc-%	Control Type	Count	Mean	Minimum	Maximum	SD	Mean	Minimum	Maximum	SD
0	Dilution Water	3	1.00000	1.00000	1.00000	0.00000	1.41202	1.41202	1.41202	0.00029
100		3	0.33333	0.10000	0.50000	0.20817	0.59729	0.32175	0.78540	0.24388

Graphics





APPENDIX B
REFERENCE TOXICANT DATA SHEETS

CH2M HILL **NEMATODE TOXICITY TEST SURVIVAL DATA**

Client QA / QC

Sample Description Cu as $CuCl_2xH_2O$ Lab ID#: IB 056-03

Test Species: *Caenorhabditis elegans* ID#: Nem 018

Beginning, Date 12-12-06 Time 0840

Ending, Date 12-13-06 Time 0810

Test Initiation: Tech: Tech: NJ Time: 0840 Test Termination: Tech: Tech: NJ Time: 0810

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

Endpoint	LC50	Cusum Chart Limits
Survival	46.2	35.2 to 124.5

Task Manager

Project Manager

QA Officer

CH2M HILL

NEMATODE TOXICITY TEST SOIL QUALITY AND TEST CHAMBER ASSIGNMENT DATA

Client QA / QC

Sample Description see below

Test Speci *Caenorhabditis elegans* ID#: Nem 019

Tech. 0 Hrs NJ 24 Hrs NJ

Time 0 Hrs 0840 24 Hrs 0810

Beginning, Date 12-12-06 Time 0840

Ending, Date 12-13-06 Time 0810

Lab ID	K-Medium pH		% Moisture	Temperature (°C)		Comments:
	0 hr	24 hr	0 hr	0 hr	24 hr	
Lab Control	5.6		NA	19.8	20.3	
10 mg/L Cu	5.4		NA	19.8	20.3	
50 mg/L Cu	5.4		NA	19.8	20.3	
100 mg/L Cu	5.2		NA	19.8	20.3	
250 mg/L Cu	5.0		NA	19.8	20.3	

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

CETIS Test Summary

Report Date: 13 Dec-06 10:56 AM
Test Link: 06-8604-4613/rcaa018

Nematode 24 hour Acute test — CH2M HILL

Test No:	14-0255-3072	Test Type:	Nematode Survival	Duration:	24h
Start Date:	12 Dec-06 08:40 AM	Protocol:	ASTM E2172-01 (2001)	Species:	Caenorhabditis elegans
Ending Date:	13 Dec-06 08:10 AM	Dil Water:		Source:	In-House Culture
Setup Date:	12 Dec-06 08:40 AM	Brine:			

Sample No:	11-4136-4853	Code:	1B056-03	Client:	
Sample Date:	11 Oct-06	Material:	Copper	Project:	
Receive Date:		Source:			
Sample Age:	62d 8h	Station:			

Comments: copper in K medium

Point Estimate Summary

Analysis	Endpoint	% Effect	Conc-mg/L	95% LCL	95% UCL	Method
10-5731-6521	% Survival	50	46.21395	26.15369	70.4874	Linear Regression

% Survival Summary

Conc-mg/L	Control Type	Reps	Mean	Minimum	Maximum	SE	SD	CV
0	Dilution Water	3	0.96667	0.90000	1.00000	0.03333	0.05774	5.97%
10		3	0.76667	0.70000	0.90000	0.06667	0.11547	15.06%
50		3	0.56667	0.50000	0.60000	0.03333	0.05774	10.19%
100		3	0.26667	0.10000	0.40000	0.08819	0.15275	57.28%
250		3	0.10000	0.00000	0.20000	0.05774	0.10000	100.00

% Survival Detail

Conc-mg/L	Control Type	Rep 1	Rep 2	Rep 3
0	Dilution Water	0.90000	1.00000	1.00000
10		0.90000	0.70000	0.70000
50		0.50000	0.60000	0.60000
100		0.10000	0.40000	0.30000
250		0.10000	0.00000	0.20000

CETIS Analysis Detail

Nematode 24 hour Acute test — CH2M Hill

Endpoint	Analysis Type	Sample Link	Control Link	Date Analyzed	Version
% Survival	Linear Regression	06-8604-4613	06-8604-4613	13 Dec-06 10:56 AM	CETISv1.1.2

Linear Regression Options

Model Function	Threshold Option	Threshold	Threshold Opt	Reweighted	Pooled Groups	Het Corr
Log-Normal [NED=A+B*log(X)]	Control Threshold	0.03333334	Yes	Yes	No	No

Regression Summary

Iters	Log Likelihood	Mu	Sigma	G	Chi-Sq	Critical	P-Value	Decision(0.05)
8	-64.30967	1.61894	0.65674	0.15243	8.13001	18.30704	0.61614	Non-Significant Heterogeneity

Point Estimates

% Effect	Conc-mg/L	95% LCL	95% UCL
50	46.21395	26.15369	70.4874

Regression Parameters

Parameter	Estimate	Std Error	95% LCL	95% UCL	t Statistic	P-Value	Decision(0.05)
Threshold	0.03774757	0.03461883	-0.03010534	0.1056005	1.090	0.30112	Not Significant
Slope	1.522668	0.3033121	0.9281757	2.117159	5.020	0.00052	Significant
Intercept	2.465104	0.5476061	1.391796	3.538412	4.502	0.00114	Significant

Residual Analysis

Attribute	Method	Statistic	Critical	P-Value	Decision(0.05)
Variances	Bartlett	1.696466	7.81473	0.63772	Equal Variances
Distribution	Shapiro-Wilk W	0.8655795		0.05746	Normal Distribution

Data Summary

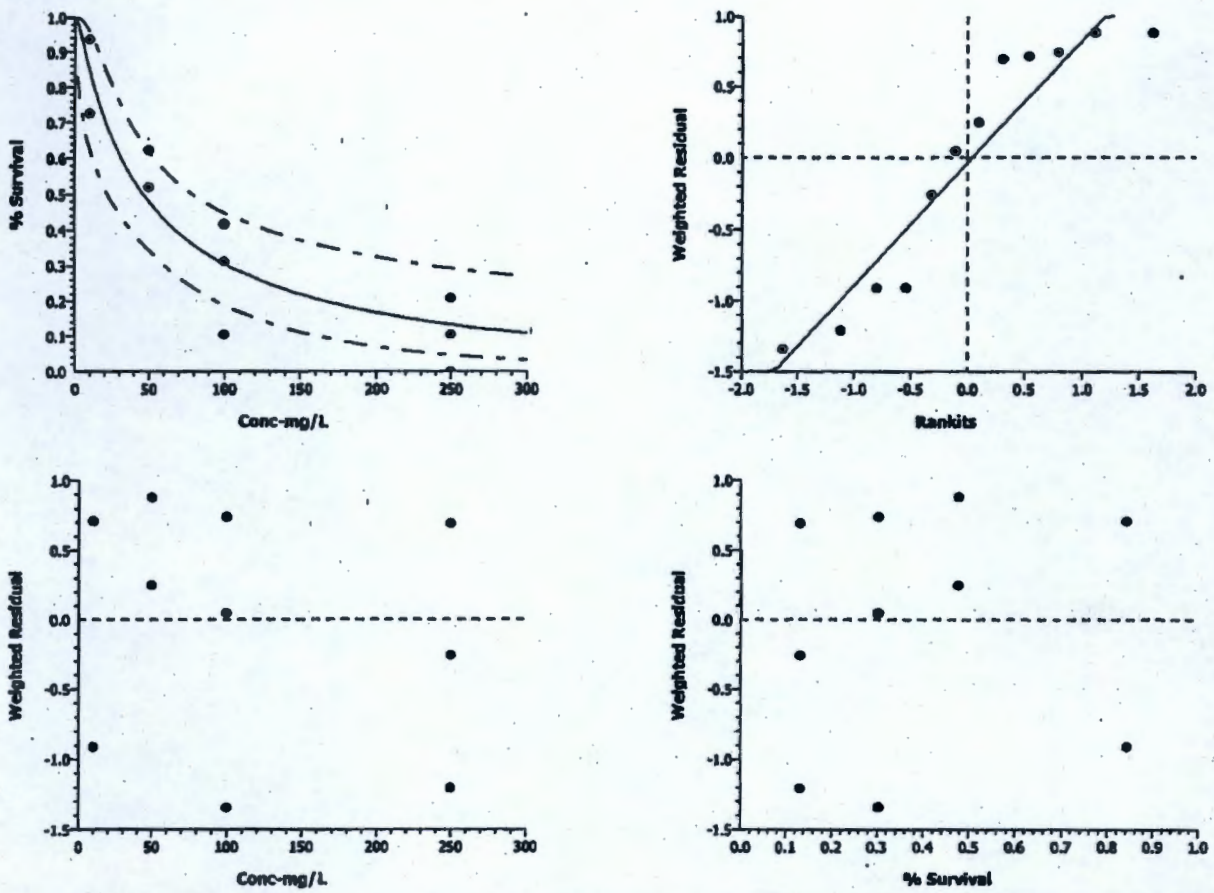
Conc-mg/	Control Type	Count	Calculated Variate(A/B) Mean	Minimum	Maximum	SE	SD	A	B
0	Dilution Water	3	0.96667	0.90000	1.00000	0.01179	0.05773	29	30
10		3	0.76667	0.70000	0.90000	0.02357	0.11547	23	30
50		3	0.56667	0.50000	0.60000	0.01179	0.05773	17	30
100		3	0.26667	0.10000	0.40000	0.03118	0.15275	8	30
250		3	0.10000	0.00000	0.20000	0.02041	0.10000	3	30

Data Detail

Conc-mg/L	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
0	Dilution Water	0.90000	1.00000	1.00000							
10		0.90000	0.70000	0.70000							
50		0.50000	0.60000	0.60000							
100		0.10000	0.40000	0.30000							
250		0.10000	0.00000	0.20000							

CETIS Analysis Detail

Graphics



APPENDIX C
CHAIN OF CUSTODY

F3102

Washington Closure Hanford	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST	RC-080-2	Page 1 of 1

Collector B. Tiller	Company Contact Joan Kessner Telephone No. 375-4688	Project Coordinator KESSNER, JH	Price Code 8N Air Quality ☐
Data Turnaround 45 Days			
Project Designation RCBRA-Inter-Areas Shoreline Assessment - Incremental Soi	Sampling Location Riparian Site 2c, 100-K	SAF No. RC-080	
Ice Chest No.	Field Logbook No. EL-1611 COA BESBEA6520	Method of Shipment ~~GROUND TRANSPORT~~ JMZ 11-30-06 Oak Harbor Freight	
Shipped To CH2MHill - Corvallis	Offsite Property No.	Bill of Lading/Air Bill No. See OSPC	

POSSIBLE SAMPLE HAZARDS/REMARKS

Special Handling and/or Storage

Preservation	None	None									
Type of Container	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										
J13LP6	SOIL	12-11-06	17:49	X	X								-1

CHAIN OF POSSESSION		Sign/Print Names	
Relinquished By/Removed From Elizabeth M Teppin	Date/Time 9:15 12-12-06	Received By/Stored In Darcy Hartland	Date/Time 12-12-06 09:15
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
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

B1719-06

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

LABORATORY SECTION	Received By	Title	Date/Time
	[signature]	Assoc. Sci	12/13/06 5:30
FINAL SAMPLE DISPOSITION	Disposal Method	Disposed By	Date/Time

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

F3174

Washington Closure Hanford	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST	RC-080-29	Page 1 of 1

Collector J. Queen	Company Contact Joan Kessner	Telephone No. 375-4688	Project Coordinator KESSNER, JH	Price Code 8N	Data Turnaround 45 Days
Project Designation RCBRA-Inter-Areas Shoreline Assessment - Incremental Soi	Sampling Location RCBRA 3b Rip		SAF No. RC-080	Air Quality ☐	
Ice Chest No.	Field Logbook No. EL-1611	COA BESBEA6520	Method of Shipment Ground Transport		
Shipped To CH2MHill - Corvallis	Offsite Property No.		Bill of Lading/Air Bill No.		

POSSIBLE SAMPLE HAZARDS/REMARKS

Special Handling and/or Storage

Preservation	None	None									
Type of Container	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										
J13NY6	SOIL	12-~~18~~-06 19 ET	1400	X	X								-1

CHAIN OF POSSESSION		Sign/Print Names	
Relinquished By/Removed From CH2mHill	Date/Time 1500 12-19-06	Received By/Stored In [illegible]	Date/Time 12/19/06 1500
Relinquished By/Removed From	Date/Time	Received By/Stored In	Date/Time
Relinquished By/Removed From	Date/Time	Received By/Stored In	Date/Time
Relinquished By/Removed From	Date/Time	Received By/Stored In	Date/Time
Relinquished By/Removed From	Date/Time	Received By/Stored In	Date/Time
Relinquished By/Removed From	Date/Time	Received By/Stored In	Date/Time

SPECIAL INSTRUCTIONS

* These marks indicate that analytes to be included with Stronium-89,90 – Total Sr analysis fraction.

(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

3719-07

Matrix *

LABORATORY SECTION	Received By [illegible]	Title $ Assoc. Sci	Date/Time 12-20-06
FINAL SAMPLE DISPOSITION	Disposal Method	Disposed By	Date/Time

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

F 31775

Washington Closure Hanford	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST	RC-080-5	Page 1 of 1

Collector B. Tiller	Company Contact Joan Kessner	Telephone No. 375-4688	Project Coordinator KESSNER, JH
Project Designation RCBRA-Inter-Areas Shoreline Assessment - Incremental Soi	Sampling Location Riparian Site 21, 100 F Slough North		SAF No. RC-080
Ice Chest No.	Field Logbook No. EL-1611	COA BESBEA6520	Method of Shipment GROUND TRANSPORT
Shipped To CH2MHill - Corvallis	Offsite Property No.		Bill of Lading/Air Bill No.

Price Code 8N

Air Quality ☐

Data Turnaround 45 Days

POSSIBLE SAMPLE HAZARDS/REMARKS

Special Handling and/or Storage

Preservation	None	None									
Type of Container	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										
J13LP9	SOIL	12-19-06	1700	X	X								-1

CHAIN OF POSSESSION	Date/Time	Sign/Print Names: Received By/Stored In	Date/Time
Relinquished By/Removed From: Elizabeth M Tiller	12-20-06 5:00	K McKinney	12/20/06 5:05
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

31719-08

Matrix *

Soil=Soil
SE=Sediment
SO=Solid
Sl=Sludge
W = Water
O=Oil
A=Air
Dd=Drum Solids
DL=Drum Liquids
To=Tissue
Wi=Wipe
Li=Liquid
Ve=Vegetation
X=Other

LABORATORY SECTION	Received By: K McKinney	Title: Asst. Si	Date/Time: 12-20-06
FINAL SAMPLE DISPOSITION	Disposal Method	Disposed By	Date/Time

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

F 3176

Washington Closure Hanford	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST	RC-080-28	Page 1 of 1
Collector: J. Queen	Company Contact: Joan Kessner; Telephone No.: 375-4688	Project Coordinator: KESSNER, JH	Price Code: 8N; Data Turnaround: 45 Days
Project Designation: RCBRA-Inter-Areas Shoreline Assessment - Incremental Soi	Sampling Location: RCBRA R Ref 14	SAF No.: RC-080	Air Quality ☐
Ice Chest No.	Field Logbook No.: EL-1611; COA: BESBEA6520	Method of Shipment: Ground Transport	
Shipped To: CH2MHill - Corvallis	Offsite Property No.	Bill of Lading/Air Bill No.	

POSSIBLE SAMPLE HAZARDS/REMARKS

Special Handling and/or Storage

Preservation	None	None									
Type of Container	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										
J13NY5	SOIL	12-19-06	1911	X	X								

CHAIN OF POSSESSION	Date/Time	Sign/Print Names: Received By/Stored In	Date/Time
Relinquished By/Removed From: [illegible]	12-20-06	Kathy [illegible]	
Relinquished By/Removed From	Date/Time	Received By/Stored In	Date/Time
Relinquished By/Removed From	Date/Time	Received By/Stored In	Date/Time
Relinquished By/Removed From	Date/Time	Received By/Stored In	Date/Time
Relinquished By/Removed From	Date/Time	Received By/Stored In	Date/Time
Relinquished By/Removed From	Date/Time	Received By/Stored In	Date/Time

SPECIAL INSTRUCTIONS

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

(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

B1719-09

Matrix *
Sa=Soil
SE=Sediment
SO=Solid
Sl=Sludge
W=Water
O=Oil
A=Air
DS=Drum Solids
DL=Drum Liquids
T=Tissue
WipWipe
LiLiquid
VaVegetation
OtOther

LABORATORY SECTION	Received By	Title	Date/Time
	[illegible]	Assoc. Sci	12-20-06
FINAL SAMPLE DISPOSITION	Disposal Method	Disposed By	Date/Time

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

F 3193

Washington Closure Hanford	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST	RC-080-30	Page: 1 of 1

Collector J. Queen	Company Contact Joan Kessner	Telephone No. 375-4688	Project Coordinator KESSNER, JH
Project Designation . RCBRA-Inter-Areas Shoreline Assessment - Incremental Soi	Sampling Location RCBRA 4a Rip		SAF No. RC-080
Ice Chest No.	Field Logbook No. EL-1611	COA BESBEA6520	Method of Shipment Ground Transport
Shipped To CH2MHill - Corvallis	Offsite Property No.		Bill of Lading/Air Bill No.

Price Code 8N

Air Quality ☐

Data Turnaround 45 Days

POSSIBLE SAMPLE HAZARDS/REMARKS

Special Handling and/or Storage

Preservation	None	None									
Type of Container	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										
J13NY7	SOIL	12-26-06	1300	X	X								-1

CHAIN OF POSSESSION		Sign/Print Names	
Relinquished By/Removed From Washington M Lyal	Date/Time 12-26-06 1310	Received By/Stored In Kathy McKinley	Date/Time 12/26/06 1313
Relinquished By/Removed From	Date/Time	Received By/Stored In	Date/Time
Relinquished By/Removed From	Date/Time	Received By/Stored In	Date/Time
Relinquished By/Removed From	Date/Time	Received By/Stored In	Date/Time
Relinquished By/Removed From	Date/Time	Received By/Stored In	Date/Time
Relinquished By/Removed From	Date/Time	Received By/Stored In	Date/Time

SPECIAL INSTRUCTIONS

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

(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

31719-10

Matrix *

LABORATORY SECTION	Received By T. Murray	Title Asst. Sci	Date/Time 12-27-06
FINAL SAMPLE DISPOSITION	Disposal Method	Disposed By	Date/Time

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

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BIOASSAY REPORT
CHRONIC SCREENING BIOASSAYS
Conducted February 23 through April 4, 2007

Prepared for

ELR CONSULTING, INC.
WASHINGTON CLOSURE HANFORD

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April 23, 2007
Lab I.D. Nos. BG1719-01 thru 11
SDG Number BG1719

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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 February 23 through April 4, 2007.

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 Granite Seed Company, Lehi, Utah (lot # 34292) (CH2M HILL Lab ID: PS001). All test conditions were maintained during planting, germination, and growth phases of the test as prescribed by the ASTM protocol.

CONTROL SOIL

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

HYDRATION WATER

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

TEST CONCENTRATIONS

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

SAMPLE COLLECTION

The soil samples were collected from November 15, 2006, through January 16, 2007. The samples were stored in the dark at 4°C until test solutions were prepared and tested. Chain of Custody for sample collection is provided in Appendix C.

SAMPLE CROSS-REFERENCE TABLE

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

Table 1
Sample Cross-Reference

Client ID	Sample Date	Sample Location	Bluegrass test SDG	Analytical Lab SDG
J13LP8	11/15/2006	Riparian Site 2j, White Bluffs Slough	BG1719-01	F2944
J13LP7	11/20/2006	Riparian Site 2f, Island 4	BG1719-02	F2972
J13P00	11/27/2006	RCBRA Bev Ref 2	BG1719-03	F2992
J13NY9	12/4/2006	RCBRA Bev Ref 1	BG1719-04	F3044
J13NY4	12/11/2006	RCBRA 2a Rip	BG1719-05	F3098
J13LP6	12/11/2006	Riparian Site 2c, 100-K	BG1719-06	F3102
J13NY6	12/19/2006	RCBRA 3b Rip	BG1719-07	F3174
J13LP9	12/19/2006	Riparian Site 21, 100 F Slough North	BG1719-08	F3175
J13NY5	12/19/2006	RCBRA R Ref 14	BG1719-09	F3176
J13NY7	12/26/2006	RCBRA 4a Rip	BG1719-10	F3193
J13NY8	01/16/2007	RCBRA 5c Rip	BG1719-11	G1067

SAMPLE PREPARATION

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

TEST INITIATION

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

TEST MONITORING

According to information provided by the seed supplier, germination should take place between 14 and 28 days. The number of seeds in each test chamber that germinated was recorded on days 12, 14, 18, 21, 24, 26, 28, and 31. Germination was determined to have occurred on day 26.

Observations of the shoot appearance were recorded 7 days after post germination (day 33 after planting). The number of germinated seeds in each test chamber was also recorded. Chambers that had more than five germinated seeds had the smallest seedlings removed until the number of seedlings was reduced to five.

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

TEST TERMINATION

Tests were terminated 14 days post germination (day 40 after planting). The number of seedlings, shoot appearance and height (tallest shoot of each plant), and root appearance and length (longest recovered root of each plant) was recorded.

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

The wet and dry weight for the roots were also obtained as described above.

DATA ANALYSIS

For each test chamber, the following endpoints were calculated:

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

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

RESULTS AND DISCUSSION

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

The results for samples J13LP8 and J13P00 indicated a statistically significant reduction in average stem height, average root length, average above ground shoot mass (wet), average above ground shoot 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 J13LP7 indicated a statistically significant reduction in 14 day post germination survival, average root length, average above ground shoot mass (wet), and average above ground shoot mass (dry) when compared to the laboratory control.

The results for sample J13NY9 indicated a statistically significant reduction in 14 day post germination survival, average stem height, average root length, average above ground shoot mass (wet), average root mass (dry), and average total mass (shoots + roots, wet) when compared to the laboratory control.

The results for sample J13NY4 indicated a statistically significant reduction in 14 day post germination survival, average stem height, average root length, average above ground shoot mass (dry), and average total mass (shoots + roots, dry) when compared to the laboratory control.

The results for sample J13LP6 indicated a statistically significant reduction in 14 day post germination survival, average stem height, average root length, average above ground shoot mass (wet), average above ground shoot mass (dry), average root mass (wet), average total mass (shoots + roots, wet), and average total mass (shoots + roots, dry) when compared to the laboratory control.

The results for samples J13NY6 and J13LP9 indicated a statistically significant reduction in 14 day post germination survival, average stem height, average root length, average above ground shoot mass (wet), average above ground shoot mass (dry), average root mass (wet), average root mass (dry), average total mass (shoots + roots, wet), and average total mass (shoots + roots, dry) when compared to the laboratory control.

The results for sample J13NY5 indicated a statistically significant reduction in 14 day post germination survival and average root length when compared to the laboratory control.

The results for sample J13NY7 indicated a statistically significant reduction in 14 day post germination survival 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; [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 May 11, 2009																			
Laboratory Control		84	–	61.2	–	47.0	–	8.38	–	1.21	–	4.56	–	0.31	–	12.94	–	1.52	–
BG1719-01	J13LP8	56	ns	36.3	E [5]	26.8	E [5]	4.46	E [5]	0.44	E [5]	2.62	ns	0.31	ns	7.08	E [5]	0.75	E [5]
BG1719-02	J13LP7	20	E [5]	43.3	ns	23.4	E [5]	3.57	E [5]	0.55	E [5]	5.03	ns	0.82	ns	8.60	ns	1.37	ns
BG1719-03	J13P00	60	ns	23.5	E [5]	17.2	E [5]	2.60	E [5]	0.35	E [5]	2.91	ns	0.29	ns	5.50	E [5]	0.64	E [5]
BG1719-04	J13NY9	4	E [5]	15.0	E [5]	9.0	E [5]	1.79	E [5]	0.41	ns	0.12	ns	0.10	E [5]	1.91	E [5]	0.51	ns
BG1719-05	J13NY4	44	E [5]	36.2	E [5]	32.8	E [5]	5.80	ns	0.65	E [5]	4.88	ns	0.26	ns	10.68	ns	0.91	E [5]
BG1719-06	J13LP6	12	E [5]	24.5	E [5]	15.3	E [5]	3.23	E [5]	0.31	E [5]	0.20	E [5]	0.18	ns	3.43	E [5]	0.49	E [5]
BG1719-07	J13NY6	44	E [5]	26.2	E [5]	16.3	E [5]	2.10	E [5]	0.25	E [5]	0.79	E [5]	0.08	E [5]	2.89	E [5]	0.33	E [5]
BG1719-08	J13LP9	28	E [5]	17.5	E [5]	17.0	E [5]	1.15	E [5]	0.18	E [5]	0.12	E [5]	0.03	E [5]	1.27	E [5]	0.21	E [5]
BG1719-09	J13NY5	4	E [5]	46.0	ns	24.0	E [5]	6.33	ns	1.18	ns	2.42	ns	0.50	ns	8.75	ns	1.68	ns
BG1719-10	J13NY7	12	E [5]	42.0	ns	44.0	ns	7.58	ns	1.19	ns	16.30	ns	0.83	ns	23.91	ns	2.02	ns
BG1719-11	J13NY8	64	ns	29.9	E [5]	26.6	E [5]	2.54	E [5]	0.31	E [5]	0.90	E [5]	0.13	E [5]	3.44	E [5]	0.44	E [5]

The results for sample J13NY8 indicated a statistically significant reduction in average stem height, average root length, average above ground shoot mass (wet), average above ground shoot mass (dry), average root mass (wet), average root mass (dry), average total mass (shoots + roots, wet), and average total mass (shoots + roots, dry) when compared to the laboratory control.

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

Greenhouse and Test Conditions for Plant Bioassays

Client: ELR- Washington Hanford **Start Date:** Feb 23, 2007

Lights: Fixture Manufacturer: Sun Systems, NewWave T5 Photoperiod: 16 hrs Light, 8 hrs Dark

Bulb Type:
- ☐ Cool White & Warm White
- ☒ Full Spectrum
- ☐ Other:

Lables on Bulbs: GE Ecolux High output

Light Intesity @ Soil surface: Protocol calls for 400 (+ 10%) footcandles

Light Intensity Readings: (footcandles)

1st Shelf:	402	412	383	399	407	← @ initiation.
~~2nd Shelf:~~						
~~3rd Shelf:~~	401	400	365	376	397	1st shelf @ termination 3 out of 4 407

Incubator (s) : # 11 Shelf distance from light source: 724 mm

Temperature: Protocol calls for: 24 °C (Day time) 24 °C (Night time)

Watering:
- ☒ Upland Condition (Soils)
- ☐ Flooded Condition (Sediments)

Type:
- ☒ Milli-Q water - initial hydration only
- ☒ 1/2 strength Hoagland's solution - for subirrigation starting day 2
- ☐ Other:

Delivery:
- ☒ Subirrigation : Soak for 24 hrs wet / 24 hr dry ~~minutes / day~~
- ☐ Surface misting: Frequency / Amount:
- ☐ Other:

Test Containers: Number of Test Chambers per Concentration: Number of Test Chambers per Hydration Chamber:

Test Chambers:
- ☒ Square pots: 52 wide x 52 tall (mm)
- ☐ Round pots: diameter x tall (mm)
- ☐ Other:

Hydration Chambers:
- ☒ Square pots: 171 wide x 51 tall (mm)
- ☐ Round pots: diameter x tall (mm)
- ☐ Other:

Number of Test chambers per Hydration Chamber : 5

Test Organisms: Species: Poa Sandbergii Lab ID #: PS~~00~~1

Supplier: Granite Seed Company Lot #: 34292

Stated germination rate: 91 % as of 08/29/2005 (date)

Planting Conditions:
- ☒ Seeds Planting Depth: Ø mm - surface
- ☐ Germinated Seedlings / Tubers # of Seeds Planted / rep: 10
- ☐ Other:

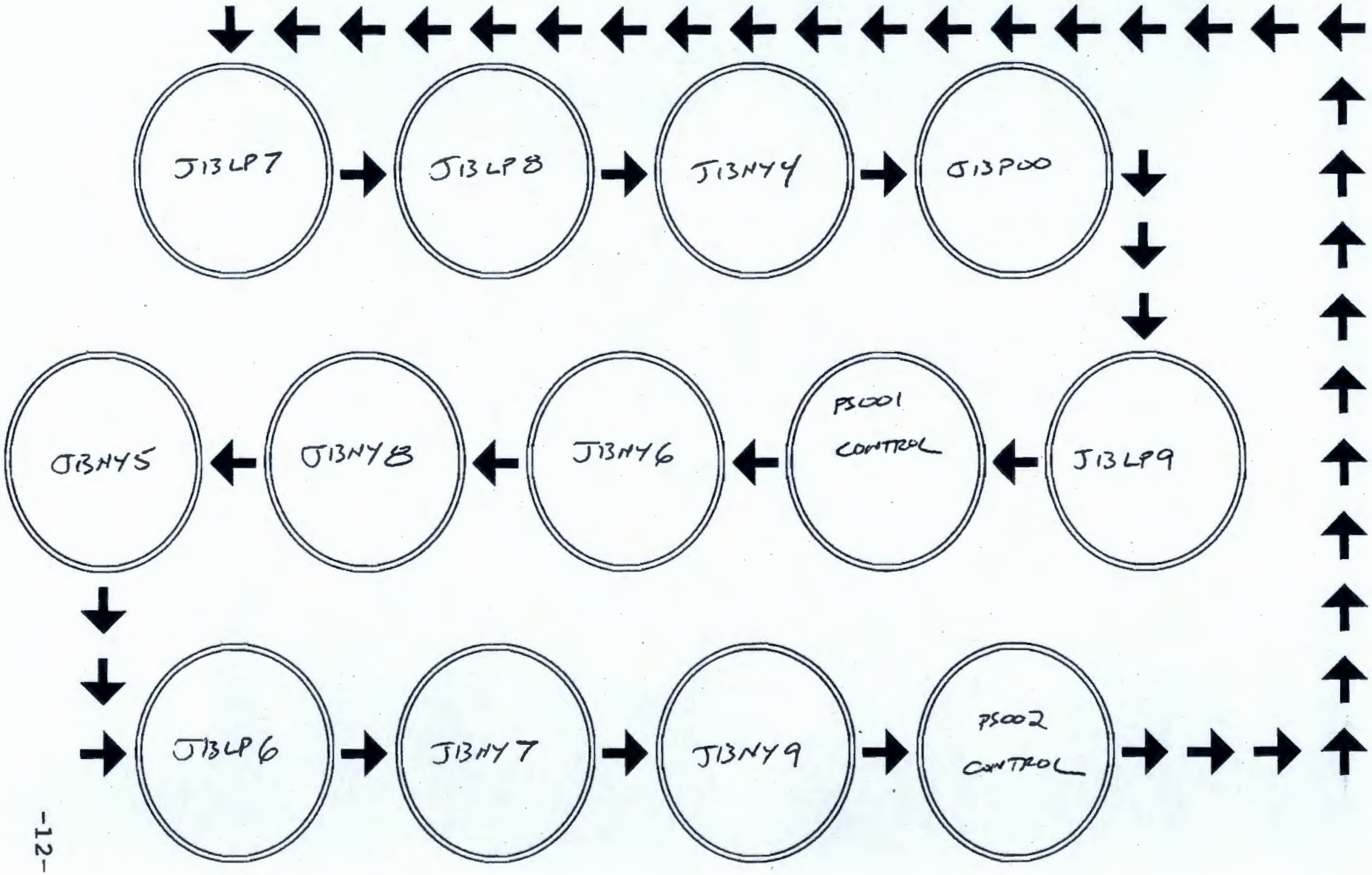
Control Soil:
- ☒ Art. Soil (Sand, Clay, Peat) Soil volume or weight (wet / dry) used per replicate: (g / ml)
- ☐ Other:

Cover Soil:
- ~~☒ none~~
- ☒ Other: 20 grade silica sand volume / weight used: ~~23 g/rep~~ 8g (~2mm depth) replicate

Comments: PS~~00~~2 (new seed control) - Granite Seed Co Lot: POSA-35285, 87% Germ on 3/31/06

Bluegrass Rotation: rotate daily following watering schedule. Client: ELR- WASH CLOSURE HANFORD

Record of postioning of chambers at test initiation on Feb 23, 2007



Bluegrass: Watering and Relative Humidity - Sign off sheet

@ Initiation : Fill hydration chamber with DI water, allow to subirrigate for 24 hours and rotate

Odd days (Day 1, 3, 5, etc.): empty hydration chamber, rotate, allow to sit "dry" for 24 hours
Even days (Day 2,4,6, etc.): Fill hydration chamber with 1/2 strength Hoagland's, rotate, allow to sit "wet" for 24 hours

	Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
	2/18/07	2/19	2/20	2/21	2/22	2/23	2/24
Initials	—	—	—	—	—	Bm	TP
Relative Humidity, Min/Max (%)	—	—	—	—	—	Hi/48	Hi/45

	2/25	2/26	2/27	2/28	3/1	3/2	3/3
Initials	TP	NJ	[illegible]	[illegible]	[illegible]	Bm	NJ
Relative Humidity, Min/Max (%)	Hi/50	Hi/53	Hi/51%	Hi/52%	Hi/52%	Hi/80%	Hi/63

	3/4	3/5	3/6	3/7	3/8	3/9	3/10
Initials	NJ	[illegible]	NJ	NJ	TP	[illegible]	TP
Relative Humidity, Min/Max (%)	Hi/59	Hi/54%	Hi/54	Hi/57	Hi/60	Hi/51	Hi/45

	3/11	3/12	3/13	3/14	3/15	3/16	3/17
Initials	TP	TP	NJ	NJ	[illegible]	[illegible]	TP
Relative Humidity, Min/Max (%)	Hi/65	Hi/64	Hi/62	Hi/50	~~[illegible]~~ Hi/51	Hi/52	Hi/46

	3/18	3/19	3/20	3/21	3/22	3/23	3/24
Initials	TP	NJ	NJ	NJ	[illegible]	Bm	Bm
Relative Humidity, Min/Max (%)	53/Hi	66/Hi	49/Hi	51/Hi	44/Hi	47/Hi	63/Hi

	3/25	3/26	3/27	3/28	3/29	3/30	3/31
Initials	[illegible]	NJ	TP	MS	[illegible]	TP	MM
Relative Humidity, Min/Max (%)	52/Hi	Hi/51	Hi/52%	51%/Hi	41/Hi	50/Hi	50-77/Hi

	4/1	4/2	4/3	4/4	4/5	4/6	4/7
Initials	MM	NJ	[illegible]	NJ			
Relative Humidity, Min/Max (%)	50/Hi	Hi/43	Hi/43	Hi/43			

Rotation procedure: remove chambers from incubator, following watering schedule, randomly reposition chambers onto the shelf.

BLUEGRASS GROWTH TEST

Client: Washington Closure Hanford Project Seed ID: SR PS/06 1 Test Start Date: February 23, 2007

Initials: Day 0 BM Day 12 NJ Day 14 AD Day 16/18 NJ Day 19 — Day 21 AD Day 24/25 NJ Day 26 NJ Day BM 28 Day 31 NJ Day 33 NJ Day 40 NJ BM

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

CONC.	REPLICATE	# seeds germinated: 12 days after planting	14 days after planting	16 days after planting (19 Emergence)	19 days after planting	21 days after planting	23 days after planting	7-DAYS POST-EMERGENCE (33 days after planting) Day 26				14-DAYS POST-EMERGENCE (40 days after planting)	pH: INITIAL (@ planting)	pH: FINAL (@ 14 days Post-Emergence)
								25	31					
Control	A	0	0	1		3	3	3	3	5	5	7→5	7.4	7.7
	B	0	0	2		2	3	3	3	3	3	3 (-2 live, -1 dead)		
	C	0	0	2		5	5	5	5	7	7→5	5		
	D	0	1	2		2	3	3	3	3	3	4		
	E	0	0	1		2	3	3	3	3	8	6→5		

7-Days Post-Emergence: Selectively thin down to 5 Seedlings (leave the 5 tallest seedlings). Describe shoot appearance: Day 25 Day 31

Replicate A: 3 Med-G, 2 Sm/B G

Replicate B: 2 Med-G, 1 Sm-B

Replicate C: 2 Med G, 2 Med G w/ 1 Brown Tip 1 Sm G removed 1 Sm G, 1 Sm B

Replicate D: 2 lg G, 1 sm G w/ one B shoot

Replicate E: 2 lg G, 1 med G w/ one B tip

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

14-Days Post-Emergence: Describe shoot appearance:

Replicate A: 3 lg G 1 sm G 1 sm G w/ 1 brown tip removed 2 sm G w/ 1 brown tip

Replicate B: 2 lg G 1 sm B

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

Replicate D: 2 lg G 1 sm G 1 sm B

Replicate E: 1 lg G w/ 1 B shoot 1 lg G 1 med G 2 sm G removed 1 sm G

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

	1st Seedling	2nd Seedling	3rd Seedling	4th Seedling	5th Seedling
Replicate A	16 mm	87 mm	14 mm	82 mm	75 mm
Replicate B	93 mm	76 mm	17 mm	dead seedling mm	mm
Replicate C	121 mm	25 mm	60 mm	55 mm	32 mm
Replicate D	104 mm	109 mm	12 mm	13 mm	mm
Replicate E	98 mm	71 mm	44 mm	14 mm	15 mm

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

	Tin Tare Wt. (mg)	Wet Wt (mg)	Dry Wt. (mg)
Replicate A	1301.29	1331.79	1305.63
Replicate B	1302.75	1323.16	1305.52
Replicate C	1297.31	1335.05	1302.09
Replicate D	1289.36	1329.15	1295.05
Replicate E	1286.77	1325.33	1292.03

Describe root appearance:

Replicate A

Replicate B

Replicate C

Replicate D

Replicate E

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

	1st Seedling	2nd Seedling	3rd Seedling	4th Seedling	5th Seedling
Replicate A	56 mm	13 mm	38 mm	75 mm	18 mm
Replicate B	53 mm	44 mm	15 mm	dead seedling mm	mm
Replicate C	23 mm	18 mm	22 mm	117 mm	38 mm
Replicate D	12 mm	74 mm	21 mm	105 mm	mm
Replicate E	05 mm	03 mm	40 mm	44 mm	102 mm

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

	Tin Tare Wt. (mg)	Wet Wt (mg)	Dry Wt. (mg)
Replicate A	1294.74	1310.23	1295.99
Replicate B	1304.41	1316.56	1305.32
Replicate C	1291.47	1305.09	1292.81
Replicate D	1302.22	1332.78	1303.59
Replicate E	1289.71	1306.00	1290.96

Comments: Dead seedling from Rep B not included in weights

BLUEGRASS GROWTH TEST

Client: Washington Closure Hanford Project Seed ID: PS001 Test Start Date: February 23, 2007

Initials: Day 0 Bm Day 12 NJ Day 14 [illegible] Day 18 NJ Day 19 — Day 21 [illegible] Day 24 NJ Day 26 NJ Day 28 Bm Day 31 NJ Day 33 NJ Day 40 NJ

Bioassay Lab ID: BG 1719-01 Sample No: J13LP8

CONC.	REPLICATE	# seeds germinated: 12 days after planting	14 days after planting	18 Emergence 17 on 20 days after planting	19 days after planting	21 days after planting	24 NJ 25 days after planting	7-DAYS POST-EMERGENCE (33 days after planting) Day 26	28	31		14-DAYS POST-EMERGENCE (40 days after planting)	pH: INITIAL (@ planting)	FINAL (@ 14 days Post-Emergence)
Control	A	1	1	3		3	5	5	5	5	5	5	7.1	7.2
	B	0	0	0		0	0	0	1	1	1	1		
	C	0	0	0		0	0	1	1	1	1	NJ 2		
	D	0	0	0		2	2	2	3	3	3	4		
	E	0	0	0		0	1	1	1	2	2	2		

Day 28 Day 31

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

Replicate A: 2 lg G, 1 med G, 2 sm G
Replicate B: 1 sm G
Replicate C: 1 sm G
Replicate D: 1 med G, 2 sm G
Replicate E: 1 med G, 1 sm G

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

14-Days Post-Emergence: Describe shoot appearance:

Replicate A: 2 lg G, 1 med G 2 sm G
Replicate B: 1 med G
Replicate C: 1 med G, 1 sm G
Replicate D: 1 med G, 3 sm G
Replicate E: 1 lg G, 1 sm G

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

	1st Seedling	2nd Seedling	3rd Seedling	4th Seedling	5th Seedling
Replicate A	116 mm	72 mm	23 mm	44 mm	7 mm
Replicate B	37 mm	mm	mm	mm	mm
Replicate C	42 mm	10 mm	mm	mm	mm
Replicate D	47 mm	32 mm	9 mm	18 mm	mm
Replicate E	62 mm	17 mm	mm	mm	mm

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

	Tin Tare Wt. (mg)	Wet Wt (mg)	Dry Wt. (mg)
Replicate A	1301.64	1313.38	1306.32
Replicate B	1290.33	1294.31	1290.68
Replicate C	1297.14	1301.01	1292.55
Replicate D	1293.71	1310.99	1294.76
Replicate E	1284.29	1291.75	1285.22

Describe root appearance:

Replicate A
Replicate B
Replicate C
Replicate D
Replicate E

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

	1st Seedling	2nd Seedling	3rd Seedling	4th Seedling	5th Seedling
Replicate A	8 mm	16 mm	20 mm	64 mm	26 mm
Replicate B	34 mm	mm	mm	mm	mm
Replicate C	37 mm	17 mm	mm	mm	mm
Replicate D	26 mm	15 mm	19 mm	5 mm	mm
Replicate E	45 mm	15 mm	mm	mm	mm

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

	Tin Tare Wt. (mg)	Wet Wt (mg)	Dry Wt. (mg)
Replicate A	1283.82	1313.62	1286.38
Replicate B	1308.45	1310.22	1308.79
Replicate C	1289.45	1291.10	1289.72
Replicate D	1289.53	1296.07	1290.48
Replicate E	1311.19	1317.01	1311.92

Comments:

CETIS Test Summary

Report Date: 16 Apr-07 10:49 AM
Test Link: 03-8056-3286/B171901psc

Plant Bioassay - Chronic — **CH2M Hill**

Test No:	13-6975-7771	**Test Type:**	Plant Chronic	**Duration:**	40d 0h
Start Date:	23 Feb-07	**Protocol:**	ASTM E1963-02 (2002)	**Species:**	Poa sandbergii
Ending Date:	04 Apr-07	**Dil Water:**		**Source:**	
Setup Date:	23 Feb-07 12:00 AM	**Brine:**			

Sample No:	08-4682-1019	**Code:**	B1719-01	**Client:**	
Sample Date:	15 Nov-06	**Material:**	Soil	**Project:**	
Receive Date:		**Source:**	ELR-Washington Closure Hanford		
Sample Age:	100d 0h	**Station:**			

Comments: J13LP8

Comparison Summary

Analysis	Endpoint	NOEL	LOEL	ChV	PMSD	Method
03-5275-4706	% Germination	100	> 100	N/A	40.77%	Equal Variance t Two-Sample
07-5056-9660	Average Height (mm)	< 100	100	N/A	23.81%	Equal Variance t Two-Sample
13-2608-1414	Average Length (mm)	< 100	100	N/A	15.14%	Equal Variance t Two-Sample
11-3896-9719	Average AG Wt (Wet, mg)	< 100	100	N/A	29.74%	Equal Variance t Two-Sample
05-6985-3506	Average AG Wt (Dry, mg)	< 100	100	N/A	32.47%	Equal Variance t Two-Sample
16-8743-3041	Average Root Wt. (Wet, mg	100	> 100	N/A	54.07%	Equal Variance t Two-Sample
05-9984-0102	Average Root Wt. (Dry, mg)	100	> 100	N/A	43.76%	Equal Variance t Two-Sample
09-6178-0901	Average Total Wt (Wet, mg	< 100	100	N/A	37.28%	Equal Variance t Two-Sample
09-7820-4561	Average Total Wt (Dry, mg)	< 100	100	N/A	34.08%	Equal Variance t Two-Sample

CETIS Test Summary

Report Date: 16 Apr-07 10:49 AM
Test Link: 03-8056-3286/B171901psc

% Germination Summary

Conc-%	Control Type	Reps	Mean	Minimum	Maximum	SE	SD	CV
0	Artificial Soil/S	5	0.84000	0.40000	1.00000	0.11662	0.26077	31.04%
100		5	0.56000	0.20000	1.00000	0.14697	0.32863	58.68%

Average Height (mm) Summary

Conc-%	Control Type	Reps	Mean	Minimum	Maximum	SE	SD	CV
0	Artificial Soil/S	5	61.2	48.400	84.5	6.1496	13.751	22.47%
100		5	36.280	26	52.400	4.8583	10.864	29.94%

Average Length (mm) Summary

Conc-%	Control Type	Reps	Mean	Minimum	Maximum	SE	SD	CV
0	Artificial Soil/S	5	46.98	38.8	53	2.4520	5.4829	11.67%
100		5	26.82	16.3	34	2.9357	6.5645	24.48%

Average AG Wt (Wet, mg) Summary

Conc-%	Control Type	Reps	Mean	Minimum	Maximum	SE	SD	CV
0	Artificial Soil/S	5	8.3775	6.1	10.580	0.8257	1.8462	22.04%
100		5	4.4626	1.935	8.348	1.0553	2.3598	52.88%

Average AG Wt (Dry, mg) Summary

Conc-%	Control Type	Reps	Mean	Minimum	Maximum	SE	SD	CV
0	Artificial Soil/S	5	1.21170	0.86799	1.76001	0.16645	0.37220	30.72%
100		5	0.44372	0.20502	0.93599	0.13064	0.29213	65.84%

Average Root Wt. (Wet, mg) Summary

Conc-%	Control Type	Reps	Mean	Minimum	Maximum	SE	SD	CV
0	Artificial Soil/S	5	4.55901	2.72400	7.64001	0.97430	2.17861	47.79%
100		5	2.62001	0.82501	5.96001	0.89874	2.00963	76.70%

Average Root Wt. (Dry, mg) Summary

Conc-%	Control Type	Reps	Mean	Minimum	Maximum	SE	SD	CV
0	Artificial Soil/S	5	0.31309	0.25000	0.45496	0.03936	0.08801	28.11%
100		5	0.30792	0.13501	0.51201	0.06229	0.13928	45.23%

Average Total Wt (Wet, mg) Summary

Conc-%	Control Type	Reps	Mean	Minimum	Maximum	SE	SD	CV
0	Artificial Soil/S	5	12.937	9.198	17.588	1.7379	3.886	30.04%
100		5	7.0826	2.7600	14.308	1.9253	4.3051	60.78%

Average Total Wt (Dry, mg) Summary

Conc-%	Control Type	Reps	Mean	Minimum	Maximum	SE	SD	CV
0	Artificial Soil/S	5	1.52479	1.11799	2.21497	0.20490	0.45816	30.05%
100		5	0.75164	0.34003	1.44800	0.19003	0.42492	56.53%

CETIS Test Summary

Report Date: 16 Apr-07 10:49 AM
Test Link: 03-8056-3286/B171901psc

% Germination Detail

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

Average Height (mm) Detail

Conc-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Artificial Soil/S	54.8	84.5	58.8	59.5	48.4000
100		52.4000	37	26	26.5	39.5

Average Length (mm) Detail

Conc-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Artificial Soil/S	50	48.5	44.6	53	38.8
100		26.8	34	27	16.3	30

Average AG Wt (Wet, mg) Detail

Conc-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Artificial Soil/S	6.1	10.5800	7.548	9.94751	7.71199
100		8.348	3.98010	1.935	4.32001	3.72998

Average AG Wt (Dry, mg) Detail

Conc-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Artificial Soil/S	0.86799	1.76001	0.95598	1.42252	1.05200
100		0.93599	0.35010	0.20502	0.26251	0.46497

Average Root Wt. (Wet, mg) Detail

Conc-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Artificial Soil/S	3.09800	6.07501	2.72400	7.64001	3.25801
100		5.96001	1.77002	0.82501	1.63498	2.91003

Average Root Wt. (Dry, mg) Detail

Conc-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Artificial Soil/S	0.25000	0.45496	0.26802	0.34250	0.25000
100		0.51201	0.34009	0.13501	0.23749	0.31500

Average Total Wt (Wet, mg) Detail

Conc-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Artificial Soil/S	9.198	16.6550	10.272	17.5875	10.97
100		14.3080	5.75012	2.76001	5.95499	6.64001

Average Total Wt (Dry, mg) Detail

Conc-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Artificial Soil/S	1.11799	2.21497	1.22400	1.76501	1.30200
100		1.44800	0.69019	0.34003	0.50000	0.77997

CETIS Analysis Detail

Plant Bioassay - Chronic — **CH2M Hill**

Sample No:	08-4682-1019	**Code:**	B1719-01	**Client:**	
Sample Date:	15 Nov-06	**Material:**	Soil	**Project:**	
Receive Date:		**Source:**	ELR-Washington Closure Hanford		
Sample Age:	100d 0h	**Station:**			

Comments: J13LP8

Endpoint	Analysis Type	Sample Link	Control Link	Date Analyzed	Version
% Germination	Comparison	03-8056-3286	03-8056-3286	16 Apr-07 10:47 AM	CETISv1.1.2

Method	Alt H	Data Transform	Zeta	NOEL	LOEL	Toxic Units	ChV	PMSD
Equal Variance t Two-Sample	C > T	Angular (Corrected)		100	>100	1	N/A	40.77%

Group Comparisons

Control	vs	Conc-%	Statistic	Critical	P-Value	MSD	Decision(0.05)
Artificial Soil/Sedi		100	1.49915	1.85955	0.0861	0.38259	Non-Significant Effect

ANOVA Table

Source	Sum of Squares	Mean Square	DF	F Statistic	P-Value	Decision(0.05)
Between	0.2378378	0.237838	1	2.25	0.17222	Non-Significant Effect
Error	0.8466027	0.105825	8			
Total	1.08444053	0.3436631	9			

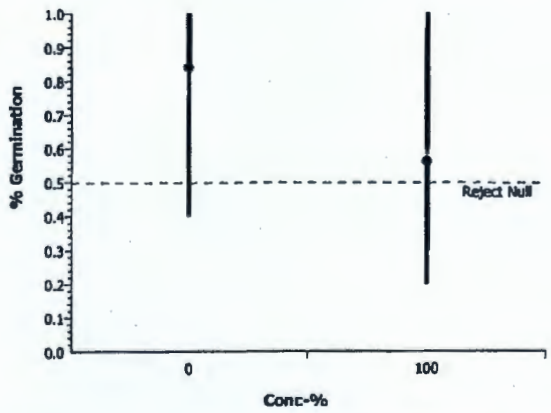
ANOVA Assumptions

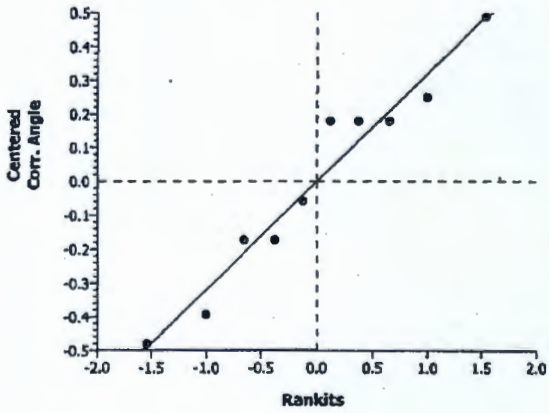
Attribute	Test	Statistic	Critical	P-Value	Decision(0.01)
Variances	Variance Ratio F	1.55369	23.15450	0.67987	Equal Variances
Distribution	Shapiro-Wilk W	0.94804		0.64534	Normal Distribution

Data Summary

			Original Data				Transformed Data			
Conc-%	Control Type	Count	Mean	Minimum	Maximum	SD	Mean	Minimum	Maximum	SD
0	Artificial Soil/S	5	0.84000	0.40000	1.00000	0.26077	1.16554	0.68472	1.34528	0.28789
100		5	0.56000	0.20000	1.00000	0.32863	0.85710	0.46365	1.34528	0.35885

Graphics





CETIS Analysis Detail

Plant Bioassay - Chronic — **CH2M Hill**

Sample No:	08-4682-1019	**Code:**	B1719-01	**Client:**	
Sample Date:	15 Nov-06	**Material:**	Soil	**Project:**	
Receive Date:		**Source:**	ELR-Washington Closure Hanford		
Sample Age:	100d 0h	**Station:**			

Comments: J13LP8

Endpoint	Analysis Type	Sample Link	Control Link	Date Analyzed	Version
Average Height (mm)	Comparison	03-8056-3286	03-8056-3286	16 Apr-07 10:48 AM	CETISv1.1.2

Method	Alt H	Data Transform	Zeta	NOEL	LOEL	Toxic Units	ChV	PMSD
Equal Variance t Two-Sample	C > T	Untransformed		<100	100		N/A	23.81%

Group Comparisons

Control	vs	Conc-%	Statistic	Critical	P-Value	MSD	Decision(0.05)
Artificial Soil/Sedi		100	3.17974	1.85955	0.0065	14.5735	Significant Effect

ANOVA Table

Source	Sum of Squares	Mean Square	DF	F Statistic	P-Value	Decision(0.05)
Between	1552.516	1552.516	1	10.11	0.01300	Significant Effect
Error	1228.408	153.551	8			
Total	2780.92407	1706.0670	9			

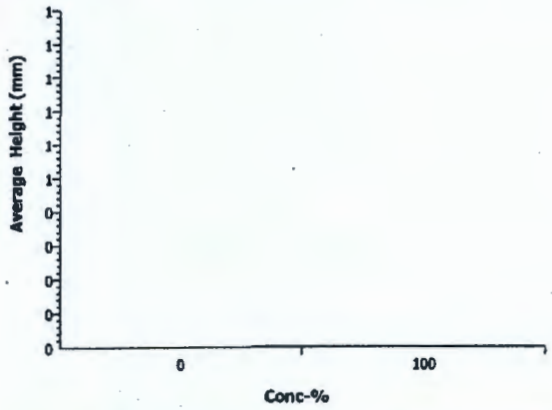
ANOVA Assumptions

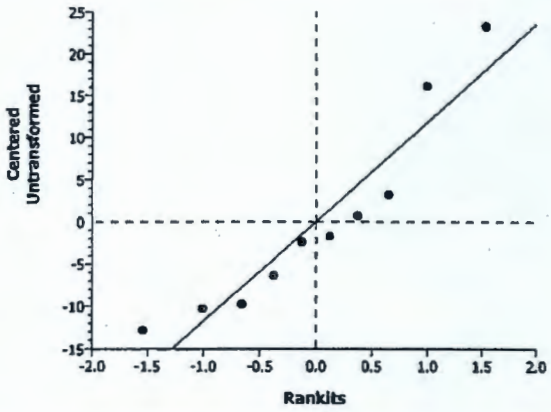
Attribute	Test	Statistic	Critical	P-Value	Decision(0.01)
Variances	Variance Ratio F	1.60218	23.15450	0.65907	Equal Variances
Distribution	Shapiro-Wilk W	0.89107		0.17436	Normal Distribution

Data Summary

			Original Data				Transformed Data			
Conc-%	Control Type	Count	Mean	Minimum	Maximum	SD	Mean	Minimum	Maximum	SD
0	Artificial Soil/S	5	61.2	48.4	84.5	13.751				
100		5	36.280	26	52.4	10.864				

Graphics





CETIS Analysis Detail

Plant Bioassay - Chronic — **CH2M Hill**

Sample No:	08-4682-1019	**Code:**	B1719-01	**Client:**	
Sample Date:	15 Nov-06	**Material:**	Soil	**Project:**	
Receive Date:		**Source:**	ELR-Washington Closure Hanford		
Sample Age:	100d 0h	**Station:**			

Comments: J13LP8

Endpoint	Analysis Type	Sample Link	Control Link	Date Analyzed	Version
Average Length (mm)	Comparison	03-8056-3286	03-8056-3286	16 Apr-07 10:48 AM	CETISv1.1.2

Method	Alt H	Data Transform	Zeta	NOEL	LOEL	Toxic Units	ChV	PMSD
Equal Variance t Two-Sample	C > T	Untransformed		<100	100		N/A	15.14%

Group Comparisons

Control	vs	Conc-%	Statistic	Critical	P-Value	MSD	Decision(0.05)
Artificial Soil/Sedi		100	5.27056	1.85955	0.0004	7.11281	Significant Effect

ANOVA Table

Source	Sum of Squares	Mean Square	DF	F Statistic	P-Value	Decision(0.05)
Between	1016.064	1016.064	1	27.78	0.00075	Significant Effect
Error	292.616	36.577	8			
Total	1308.67999	1052.641	9			

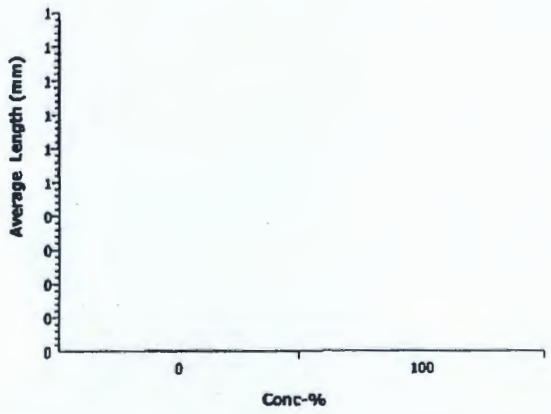
ANOVA Assumptions

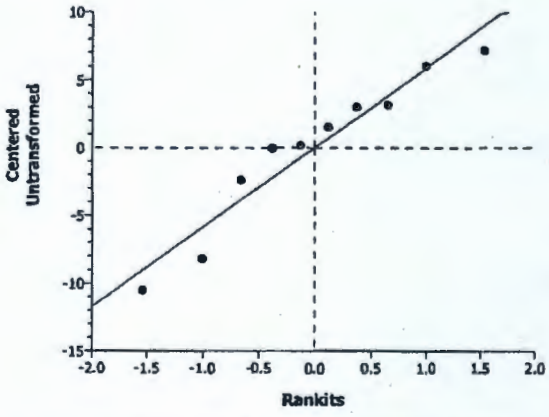
Attribute	Test	Statistic	Critical	P-Value	Decision(0.01)
Variances	Variance Ratio F	1.43344	23.15450	0.73565	Equal Variances
Distribution	Shapiro-Wilk W	0.92420		0.39330	Normal Distribution

Data Summary

			Original Data				Transformed Data			
Conc-%	Control Type	Count	Mean	Minimum	Maximum	SD	Mean	Minimum	Maximum	SD
0	Artificial Soil/S	5	46.98	38.8	53	5.4829				
100		5	26.82	16.3	34	6.5644				

Graphics





CETIS Analysis Detail

Plant Bioassay - Chronic — **CH2M Hill**

Sample No:	08-4682-1019	**Code:**	B1719-01	**Client:**	
Sample Date:	15 Nov-06	**Material:**	Soil	**Project:**	
Receive Date:		**Source:**	ELR-Washington Closure Hanford		
Sample Age:	100d 0h	**Station:**			

Comments: J13LP8

Endpoint	Analysis Type	Sample Link	Control Link	Date Analyzed	Version
Average AG Wt (Wet, mg)	Comparison	03-8056-3286	03-8056-3286	16 Apr-07 10:48 AM	CETISv1.1.2

Method	Alt H	Data Transform	Zeta	NOEL	LOEL	Toxic Units	ChV	PMSD
Equal Variance t Two-Sample	C > T	Untransformed		<100	100		N/A	29.74%

Group Comparisons

Control	vs	Conc-%	Statistic	Critical	P-Value	MSD	Decision(0.05)
Artificial Soil/Sedi		100	2.92168	1.85955	0.0096	2.49169	Significant Effect

ANOVA Table

Source	Sum of Squares	Mean Square	DF	F Statistic	P-Value	Decision(0.05)
Between	38.31582	38.31582	1	8.54	0.01924	Significant Effect
Error	35.90895	4.488619	8			
Total	74.2247734	42.804438	9			

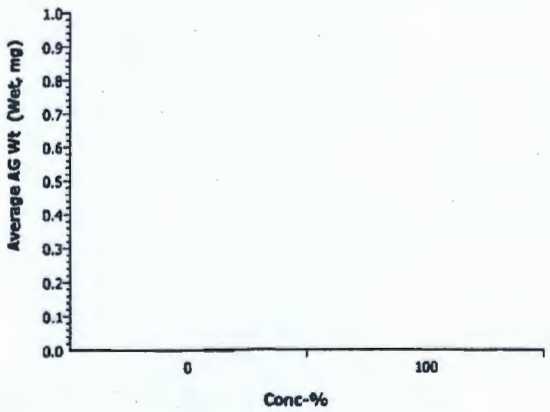
ANOVA Assumptions

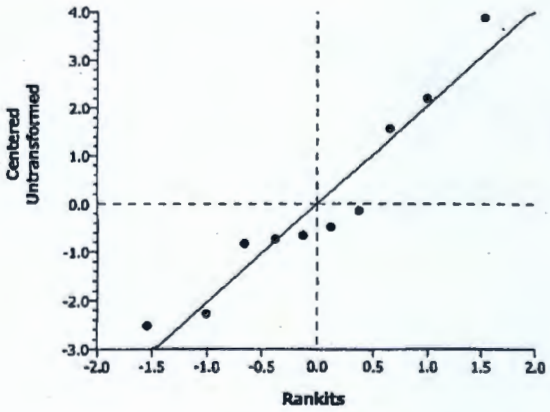
Attribute	Test	Statistic	Critical	P-Value	Decision(0.01)
Variances	Variance Ratio F	1.63378	23.15450	0.64601	Equal Variances
Distribution	Shapiro-Wilk W	0.91982		0.35543	Normal Distribution

Data Summary

			Original Data				Transformed Data			
Conc-%	Control Type	Count	Mean	Minimum	Maximum	SD	Mean	Minimum	Maximum	SD
0	Artificial Soil/S	5	8.3775	6.1	10.580	1.8462				
100		5	4.4626	1.935	8.348	2.3598				

Graphics





CETIS Analysis Detail

Plant Bioassay - Chronic — **CH2M Hill**

Sample No:	08-4682-1019	**Code:**	B1719-01	**Client:**	
Sample Date:	15 Nov-06	**Material:**	Soil	**Project:**	
Receive Date:		**Source:**	ELR-Washington Closure Hanford		
Sample Age:	100d 0h	**Station:**			

Comments: J13LP8

Endpoint	Analysis Type	Sample Link	Control Link	Date Analyzed	Version
Average AG Wt (Dry, mg)	Comparison	03-8056-3286	03-8056-3286	16 Apr-07 10:48 AM	CETISv1.1.2

Method	Alt H	Data Transform	Zeta	NOEL	LOEL	Toxic Units	ChV	PMSD
Equal Variance t Two-Sample	C > T	Untransformed		<100	100		N/A	32.47%

Group Comparisons

Control	vs	Conc-%	Statistic	Critical	P-Value	MSD	Decision(0.05)
Artificial Soil/Sedi		100	3.62945	1.85955	0.0033	0.39348	Significant Effect

ANOVA Table

Source	Sum of Squares	Mean Square	DF	F Statistic	P-Value	Decision(0.05)
Between	1.474501	1.474501	1	13.17	0.00669	Significant Effect
Error	0.8954748	0.111934	8			
Total	2.36997569	1.5864352	9			

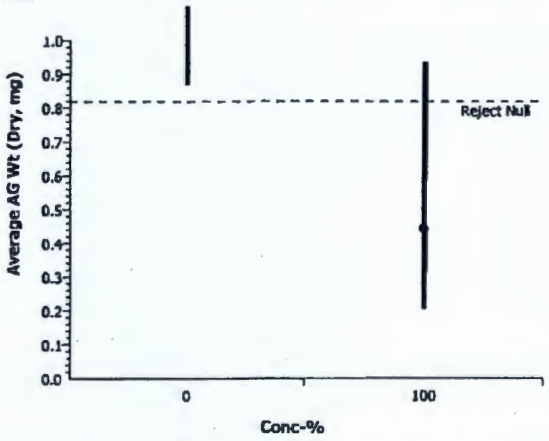
ANOVA Assumptions

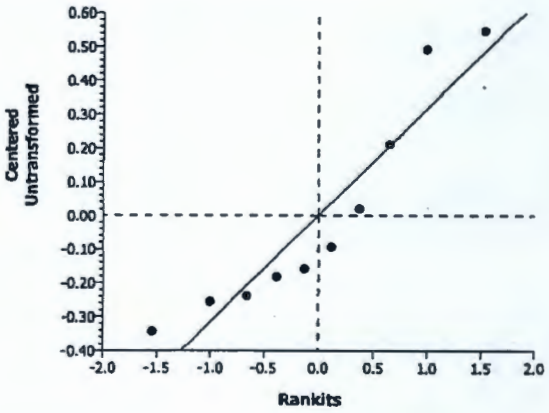
Attribute	Test	Statistic	Critical	P-Value	Decision(0.01)
Variances	Variance Ratio F	1.62327	23.15450	0.65032	Equal Variances
Distribution	Shapiro-Wilk W	0.86812		0.09504	Normal Distribution

Data Summary

			Original Data				Transformed Data			
Conc-%	Control Type	Count	Mean	Minimum	Maximum	SD	Mean	Minimum	Maximum	SD
0	Artificial Soil/S	5	1.21170	0.86799	1.76001	0.37220				
100		5	0.44372	0.20502	0.93599	0.29213				

Graphics





CETIS Analysis Detail

Plant Bioassay - Chronic — **CH2M Hill**

Sample No:	08-4682-1019	**Code:**	B1719-01	**Client:**	
Sample Date:	15 Nov-06	**Material:**	Soil	**Project:**	
Receive Date:		**Source:**	ELR-Washington Closure Hanford		
Sample Age:	100d 0h	**Station:**			

Comments: J13LP8

Endpoint	Analysis Type	Sample Link	Control Link	Date Analyzed	Version
Average Root Wt. (Wet, mg)	Comparison	03-8056-3286	03-8056-3286	16 Apr-07 10:48 AM	CETISv1.1.2

Method	Alt H	Data Transform	Zeta	NOEL	LOEL	Toxic Units	ChV	PMSD
Equal Variance t Two-Sample	C > T	Untransformed		100	>100	1	N/A	54.07%

Group Comparisons

Control	vs	Conc-%	Statistic	Critical	P-Value	MSD	Decision(0.05)
Artificial Soil/Sedi		100	1.46283	1.85955	0.0908	2.46486	Non-Significant Effect

ANOVA Table

Source	Sum of Squares	Mean Square	DF	F Statistic	P-Value	Decision(0.05)
Between	9.399258	9.399258	1	2.14	0.18166	Non-Significant Effect
Error	35.13978	4.392472	8			
Total	44.5390358	13.79173	9			

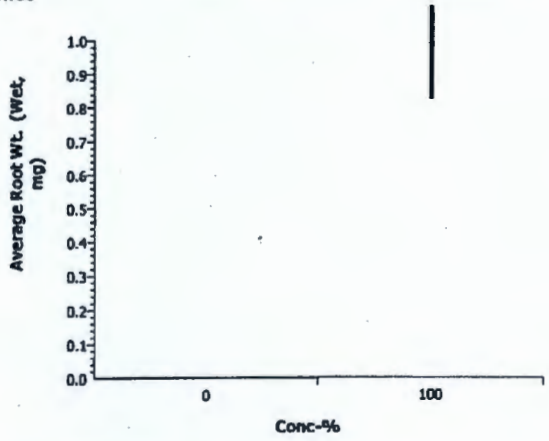
ANOVA Assumptions

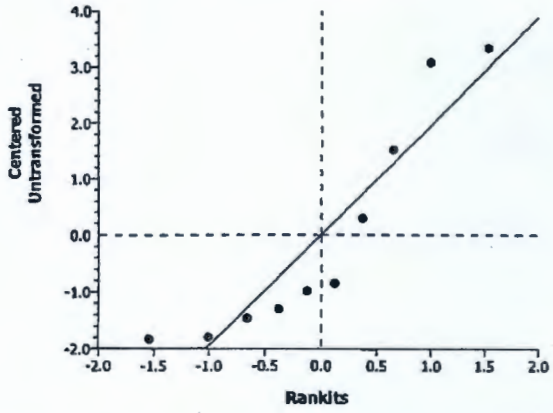
Attribute	Test	Statistic	Critical	P-Value	Decision(0.01)
Variances	Variance Ratio F	1.17523	23.15450	0.87942	Equal Variances
Distribution	Shapiro-Wilk W	0.83350		0.03687	Normal Distribution

Data Summary

			Original Data				Transformed Data			
Conc-%	Control Type	Count	Mean	Minimum	Maximum	SD	Mean	Minimum	Maximum	SD
0	Artificial Soil/S	5	4.55901	2.72400	7.64001	2.17861				
100		5	2.62001	0.82501	5.96001	2.00963				

Graphics





CETIS Analysis Detail

Plant Bioassay - Chronic — **CH2M Hill**

Sample No:	08-4682-1019	**Code:**	B1719-01	**Client:**	
Sample Date:	15 Nov-06	**Material:**	Soil	**Project:**	
Receive Date:		**Source:**	ELR-Washington Closure Hanford		
Sample Age:	100d 0h	**Station:**			

Comments: J13LP8

Endpoint	Analysis Type	Sample Link	Control Link	Date Analyzed	Version
Average Root Wt. (Dry, mg)	Comparison	03-8056-3286	03-8056-3286	16 Apr-07 10:48 AM	CETISv1.1.2

Method	Alt H	Data Transform	Zeta	NOEL	LOEL	Toxic Units	ChV	PMSD
Equal Variance t Two-Sample	C > T	Untransformed		100	>100	1	N/A	43.76%

Group Comparisons

Control	vs	Conc-%	Statistic	Critical	P-Value	MSD	Decision(0.05)
Artificial Soil/Sedi		100	0.07023	1.85955	0.4729	0.13701	Non-Significant Effect

ANOVA Table

Source	Sum of Squares	Mean Square	DF	F Statistic	P-Value	Decision(0.05)
Between	6.694E-05	6.69E-05	1	0.00	0.94574	Non-Significant Effect
Error	0.1085801	0.013573	8			
Total	0.10864702	0.0136394	9			

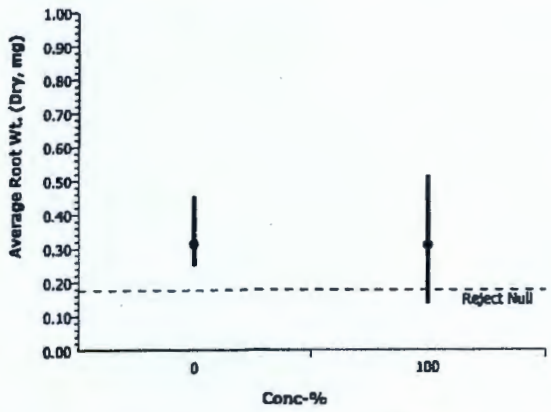
ANOVA Assumptions

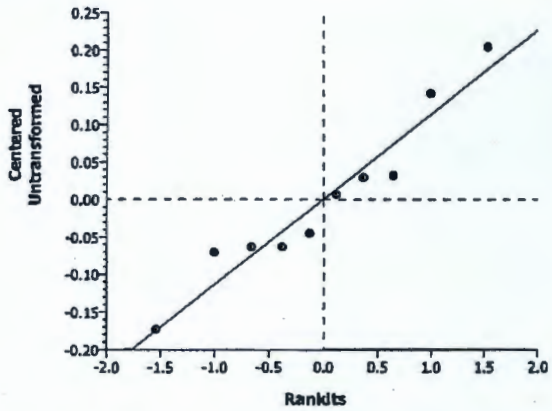
Attribute	Test	Statistic	Critical	P-Value	Decision(0.01)
Variances	Variance Ratio F	2.50450	23.15450	0.39560	Equal Variances
Distribution	Shapiro-Wilk W	0.94307		0.58768	Normal Distribution

Data Summary

			Original Data				Transformed Data			
Conc-%	Control Type	Count	Mean	Minimum	Maximum	SD	Mean	Minimum	Maximum	SD
0	Artificial Soil/S	5	0.31309	0.25000	0.45496	0.08801				
100		5	0.30792	0.13501	0.51201	0.13928				

Graphics





CETIS Analysis Detail

Plant Bioassay - Chronic — **CH2M Hill**

Sample No:	08-4682-1019	**Code:**	B1719-01	**Client:**	
Sample Date:	15 Nov-06	**Material:**	Soil	**Project:**	
Receive Date:		**Source:**	ELR-Washington Closure Hanford		
Sample Age:	100d 0h	**Station:**			

Comments: J13LP8

Endpoint	Analysis Type	Sample Link	Control Link	Date Analyzed	Version
Average Total Wt (Wet, mg)	Comparison	03-8056-3286	03-8056-3286	16 Apr-07 10:48 AM	CETISv1.1.2

Method	Alt H	Data Transform	Zeta	NOEL	LOEL	Toxic Units	ChV	PMSD
Equal Variance t Two-Sample	C > T	Untransformed		<100	100		N/A	37.28%

Group Comparisons

Control	vs	Conc-%	Statistic	Critical	P-Value	MSD	Decision(0.05)
Artificial Soil/Sedi		100	2.25704	1.85955	0.0270	4.82295	Significant Effect

ANOVA Table

Source	Sum of Squares	Mean Square	DF	F Statistic	P-Value	Decision(0.05)
Between	85.6698	85.6698	1	5.09	0.05397	Non-Significant Effect
Error	134.5368	16.8171	8			
Total	220.206604	102.48690	9			

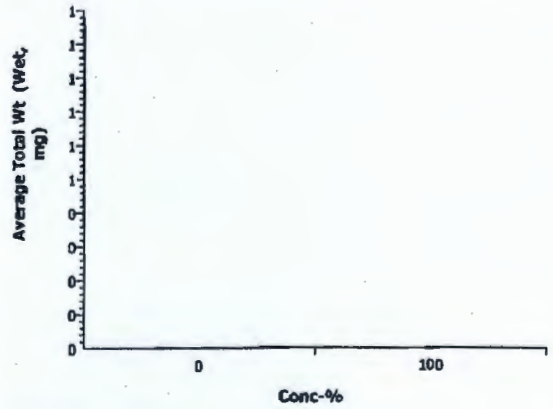
ANOVA Assumptions

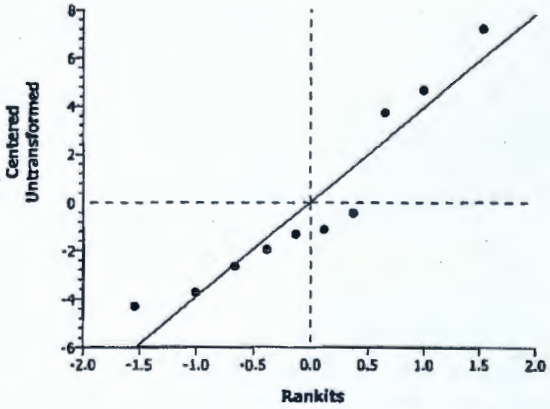
Attribute	Test	Statistic	Critical	P-Value	Decision(0.01)
Variances	Variance Ratio F	1.22733	23.15450	0.84743	Equal Variances
Distribution	Shapiro-Wilk W	0.89101		0.17408	Normal Distribution

Data Summary

			Original Data				Transformed Data			
Conc-%	Control Type	Count	Mean	Minimum	Maximum	SD	Mean	Minimum	Maximum	SD
0	Artificial Soil/S	5	12.937	9.198	17.588	3.886				
100		5	7.0826	2.7600	14.308	4.3051				

Graphics





CETIS Analysis Detail

Plant Bioassay - Chronic — **CH2M Hill**

Sample No:	08-4682-1019	**Code:**	B1719-01	**Client:**	
Sample Date:	15 Nov-06	**Material:**	Soil	**Project:**	
Receive Date:		**Source:**	ELR-Washington Closure Hanford		
Sample Age:	100d 0h	**Station:**			

Comments: J13LP8

Endpoint	Analysis Type	Sample Link	Control Link	Date Analyzed	Version
Average Total Wt (Dry, mg)	Comparison	03-8056-3286	03-8056-3286	16 Apr-07 10:48 AM	CETISv1.1.2

Method	Alt H	Data Transform	Zeta	NOEL	LOEL	Toxic Units	ChV	PMSD
Equal Variance t Two-Sample	C > T	Untransformed		<100	100		N/A	34.08%

Group Comparisons

Control	vs	Conc-%	Statistic	Critical	P-Value	MSD	Decision(0.05)
Artificial Soil/Sedi		100	2.76668	1.85955	0.0122	0.51966	Significant Effect

ANOVA Table

Source	Sum of Squares	Mean Square	DF	F Statistic	P-Value	Decision(0.05)
Between	1.494438	1.494438	1	7.65	0.02442	Significant Effect
Error	1.561886	0.195236	8			
Total	3.05632353	1.6896735	9			

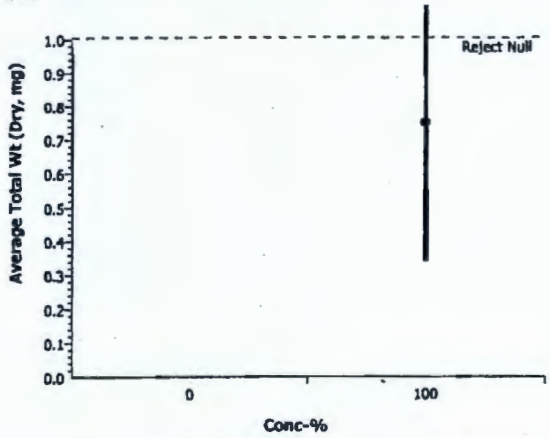
ANOVA Assumptions

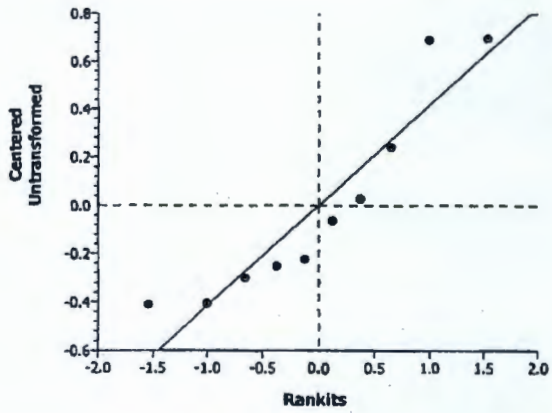
Attribute	Test	Statistic	Critical	P-Value	Decision(0.01)
Variances	Variance Ratio F	1.16255	23.15450	0.88746	Equal Variances
Distribution	Shapiro-Wilk W	0.85166		0.06079	Normal Distribution

Data Summary

			Original Data				Transformed Data			
Conc-%	Control Type	Count	Mean	Minimum	Maximum	SD	Mean	Minimum	Maximum	SD
0	Artificial Soil/S	5	1.52479	1.11799	2.21497	0.45816				
100		5	0.75164	0.34003	1.44800	0.42492				

Graphics





BLUEGRASS GROWTH TEST

Client: Washington Closure Hanford Project Seed ID: 75001 Test Start Date: February 23, 2007

Initials: Day 0 [illegible] Day 12 NJ Day 14 [illegible] Day 16 NJ Day 19 — Day 21 [illegible] Day 23 24 NJ Day 26 NJ Day 28 [illegible] Day 31 NJ Day 33 NJ Day 40 NJ

Bioassay Lab ID: BG 1719-02 Sample No: 513LP7

CONC.	REPLICATE	# seeds germinated: 1st Emergence 12 days after planting	14 days after planting	17 days after planting	19 days after planting	21 days after planting	24 days after planting	7-DAYS POST-EMERGENCE (33 days after planting) Day 26			14-DAYS POST-EMERGENCE (40 days after planting)	pH: INITIAL (@ planting)	FINAL (@ 14 days Post-Emergence)
								26	31				
Control	A	0	0	0		0	1	1	1	1	1	7.0	7.3
	B	0	0	0		0	0	0	0	0	0		
	C	0	0	0		0	1	1	1	1	1		
	D	0	0	0		0	1	1	1	1	1		
	E	0	0	1		1	1	1	2	2	2		

7-Days Post-Emergence: Selectively thin down to 5 Seedlings (leave the 5 tallest seedlings). Describe shoot appearance: Day 28 Day 31

Replicate A: 1 sm G
Replicate B: none
Replicate C: 1 med G
Replicate D: 1 med G
Replicate E: 1 med G, 1 sm G

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

14-Days Post-Emergence: Describe shoot appearance:

Replicate A: 1 sm G
Replicate B: none
Replicate C: 1 med G
Replicate D: 1 lg G
Replicate E: 1 lg G, 1 sm G

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

	1st Seedling	2nd Seedling	3rd Seedling	4th Seedling	5th Seedling
Replicate A	15 mm	mm	mm	mm	mm
Replicate B	~~51~~ NJ mm	mm	mm	mm	mm
Replicate C	51 mm	mm	mm	mm	mm
Replicate D	65 mm	mm	mm	mm	mm
Replicate E	67 mm	17 mm	mm	mm	mm

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

	Tin Tare Wt (mg)	Wet Wt (mg)	Dry Wt (mg)
Replicate A	1276.55	1277.26	1276.67
Replicate B	1288.24	—	—
Replicate C	1286.32	1290.53	1286.97
Replicate D	1300.85	1305.75	1301.65
Replicate E	1287.24	1296.15	1288.46

Describe root appearance:

Replicate A:
Replicate B:
Replicate C:
Replicate D:
Replicate E:

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

	1st Seedling	2nd Seedling	3rd Seedling	4th Seedling	5th Seedling
Replicate A	3 mm	mm	mm	mm	mm
Replicate B	mm	mm	mm	mm	mm
Replicate C	38 mm	mm	mm	mm	mm
Replicate D	26 mm	mm	mm	mm	mm
Replicate E	28 mm	25 mm	mm	mm	mm

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

	Tin Tare Wt (mg)	Wet Wt (mg)	Dry Wt (mg)
Replicate A	1300.93	1301.08	1301.01
Replicate B	1287.71	—	—
Replicate C	1281.77	1286.45	1282.38
Replicate D	1294.20	1301.53	1295.87
Replicate E	1289.80	1305.69	1291.66

Comments:

CETIS Test Summary

Report Date: 16 Apr-07 10:54 AM
Test Link: 04-4492-2437/B171902psc

Plant Bioassay - Chronic — **CH2M Hill**

Test No:	13-6975-7771	**Test Type:**	Plant Chronic	**Duration:**	40d 0h
Start Date:	23 Feb-07	**Protocol:**	ASTM E1963-02 (2002)	**Species:**	Poa sandbergii
Ending Date:	04 Apr-07	**Dil Water:**		**Source:**	
Setup Date:	23 Feb-07 12:00 AM	**Brine:**			

Sample No:	05-5419-8422	**Code:**	B1719-02	**Client:**	
Sample Date:	20 Nov-06	**Material:**	Soil	**Project:**	
Receive Date:		**Source:**	ELR-Washington Closure Hanford		
Sample Age:	95d 0h	**Station:**			

Comments: J13LP7

Comparison Summary

Analysis	Endpoint	NOEL	LOEL	ChV	PMSD	Method
19-3425-3231	% Germination	< 100	100	N/A	28.04%	Equal Variance t Two-Sample
13-3684-1011	Average Height (mm)	100	> 100	N/A	35.88%	Equal Variance t Two-Sample
10-8642-7638	Average Length (mm)	< 100	100	N/A	28.30%	Equal Variance t Two-Sample
14-2003-7806	Average AG Wt (Wet, mg)	< 100	100	N/A	28.54%	Equal Variance t Two-Sample
05-4628-5369	Average AG Wt (Dry, mg)	< 100	100	N/A	35.79%	Equal Variance t Two-Sample
01-2435-8851	Average Root Wt. (Wet, mg	100	> 100	N/A	79.35%	Equal Variance t Two-Sample
07-3957-7491	Average Root Wt. (Dry, mg)	100	> 100	N/A	251.64%	Unequal Variance t Two-Sample
06-6329-1166	Average Total Wt (Wet, mg	100	> 100	N/A	45.18%	Equal Variance t Two-Sample
04-4745-3237	Average Total Wt (Dry, mg)	100	> 100	N/A	58.60%	Equal Variance t Two-Sample

CETIS Test Summary

Report Date: 16 Apr-07 10:54 AM
Test Link: 04-4492-2437/B171902psc

% Germination Summary

Conc-%	Control Type	Reps	Mean	Minimum	Maximum	SE	SD	CV
0	Artificial Soil/S	5	0.84000	0.40000	1.00000	0.11662	0.26077	31.04%
100		5	0.20000	0.00000	0.40000	0.06325	0.14142	70.71%

Average Height (mm) Summary

Conc-%	Control Type	Reps	Mean	Minimum	Maximum	SE	SD	CV
0	Artificial Soil/S	5	61.2	48.400	84.5	6.1496	13.751	22.47%
100		5	43.25	15	65	10.539	21.077	48.73%

Average Length (mm) Summary

Conc-%	Control Type	Reps	Mean	Minimum	Maximum	SE	SD	CV
0	Artificial Soil/S	5	46.98	38.8	53	2.4520	5.4829	11.67%
100		5	23.375	3	38	7.3353	14.671	62.76%

Average AG Wt (Wet, mg) Summary

Conc-%	Control Type	Reps	Mean	Minimum	Maximum	SE	SD	CV
0	Artificial Soil/S	5	8.3775	6.1	10.580	0.8257	1.8462	22.04%
100		5	3.5688	0.71	4.9000	0.9636	1.9272	54.00%

Average AG Wt (Dry, mg) Summary

Conc-%	Control Type	Reps	Mean	Minimum	Maximum	SE	SD	CV
0	Artificial Soil/S	5	1.21170	0.86799	1.76001	0.16645	0.37220	30.72%
100		5	0.54501	0.12000	0.80005	0.14746	0.29492	54.11%

Average Root Wt. (Wet, mg) Summary

Conc-%	Control Type	Reps	Mean	Minimum	Maximum	SE	SD	CV
0	Artificial Soil/S	5	4.55901	2.72400	7.64001	0.97430	2.17861	47.79%
100		5	5.02621	0.14990	7.94495	1.77307	3.54613	70.55%

Average Root Wt. (Dry, mg) Summary

Conc-%	Control Type	Reps	Mean	Minimum	Maximum	SE	SD	CV
0	Artificial Soil/S	5	0.31309	0.25000	0.45496	0.03936	0.08801	28.11%
100		5	0.82249	0.07996	1.67004	0.33247	0.66494	80.84%

Average Total Wt (Wet, mg) Summary

Conc-%	Control Type	Reps	Mean	Minimum	Maximum	SE	SD	CV
0	Artificial Soil/S	5	12.937	9.198	17.588	1.7379	3.886	30.04%
100		5	8.595	0.8599	12.4	2.7020	5.4040	62.87%

Average Total Wt (Dry, mg) Summary

Conc-%	Control Type	Reps	Mean	Minimum	Maximum	SE	SD	CV
0	Artificial Soil/S	5	1.52479	1.11799	2.21497	0.20490	0.45816	30.05%
100		5	1.36751	0.19995	2.47009	0.46728	0.93456	68.34%

CETIS Test Summary

Report Date: 16 Apr-07 10:54 AM
Test Link: 04-4492-2437/B171902psc

% Germination Detail

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

Average Height (mm) Detail

Conc-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Artificial Soil/S	54.8	84.5	58.8	59.5	48.4000
100		15	Missing	51	65	42

Average Length (mm) Detail

Conc-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Artificial Soil/S	50	48.5	44.6	53	38.8
100		3	Missing	38	26	26.5

Average AG Wt (Wet, mg) Detail

Conc-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Artificial Soil/S	6.1	10.5800	7.548	9.94751	7.71199
100		0.70996	Missing	4.21008	4.90002	4.45502

Average AG Wt (Dry, mg) Detail

Conc-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Artificial Soil/S	0.86799	1.76001	0.95598	1.42252	1.05200
100		0.12000	Missing	0.65002	0.80005	0.60999

Average Root Wt. (Wet, mg) Detail

Conc-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Artificial Soil/S	3.09800	6.07501	2.72400	7.64001	3.25801
100		0.14990	Missing	4.67993	7.33008	7.94495

Average Root Wt. (Dry, mg) Detail

Conc-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Artificial Soil/S	0.25000	0.45496	0.26802	0.34250	0.25000
100		0.07996	Missing	0.60999	1.67004	0.92999

Average Total Wt (Wet, mg) Detail

Conc-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Artificial Soil/S	9.198	16.6550	10.272	17.5875	10.97
100		0.85986	Missing	8.89001	12.2301	12.4

Average Total Wt (Dry, mg) Detail

Conc-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Artificial Soil/S	1.11799	2.21497	1.22400	1.76501	1.30200
100		0.19995	Missing	1.26001	2.47009	1.53998

CETIS Analysis Detail

Plant Bioassay - Chronic — **CH2M Hill**

Sample No:	05-5419-8422	**Code:**	B1719-02	**Client:**	
Sample Date:	20 Nov-06	**Material:**	Soil	**Project:**	
Receive Date:		**Source:**	ELR-Washington Closure Hanford		
Sample Age:	95d 0h	**Station:**			

Comments: J13LP7

Endpoint	Analysis Type	Sample Link	Control Link	Date Analyzed	Version
% Germination	Comparison	04-4492-2437	04-4492-2437	16 Apr-07 10:53 AM	CETISv1.1.2

Method	Alt H	Data Transform	Zeta	NOEL	LOEL	Toxic Units	ChV	PMSD
Equal Variance t Two-Sample	C > T	Angular (Corrected)		<100	100		N/A	28.04%

Group Comparisons

Control vs	Conc-%	Statistic	Critical	P-Value	MSD	Decision(0.05)
Artificial Soil/Sedi	100	4.77125	1.85955	0.0007	0.27489	Significant Effect

ANOVA Table

Source	Sum of Squares	Mean Square	DF	F Statistic	P-Value	Decision(0.05)
Between	1.243649	1.243649	1	22.76	0.00141	Significant Effect
Error	0.437043	0.054630	8			
Total	1.68069240	1.2982797	9			

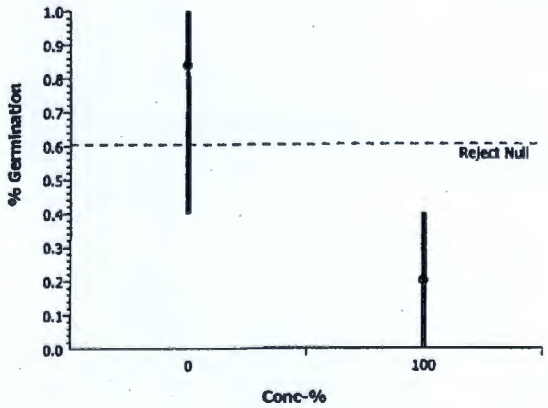
ANOVA Assumptions

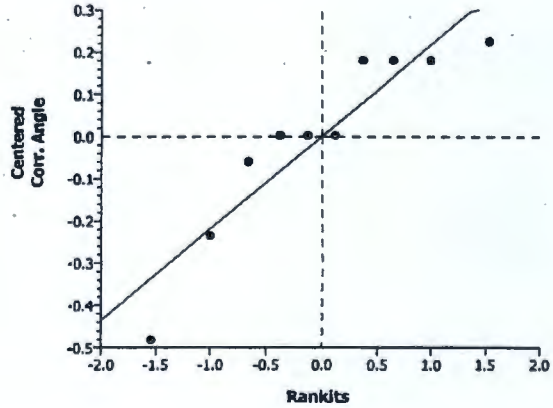
Attribute	Test	Statistic	Critical	P-Value	Decision(0.01)
Variances	Variance Ratio F	3.14171	23.15450	0.29348	Equal Variances
Distribution	Shapiro-Wilk W	0.86172		0.07996	Normal Distribution

Data Summary

			Original Data				Transformed Data			
Conc-%	Control Type	Count	Mean	Minimum	Maximum	SD	Mean	Minimum	Maximum	SD
0	Artificial Soil/S	5	0.84000	0.40000	1.00000	0.26077	1.16554	0.68472	1.34528	0.28789
100		5	0.20000	0.00000	0.40000	0.14142	0.46024	0.22551	0.68472	0.16242

Graphics





CETIS Analysis Detail

Plant Bioassay - Chronic — **CH2M Hill**

Sample No:	05-5419-8422	**Code:**	B1719-02	**Client:**	
Sample Date:	20 Nov-06	**Material:**	Soil	**Project:**	
Receive Date:		**Source:**	ELR-Washington Closure Hanford		
Sample Age:	95d 0h	**Station:**			

Comments: J13LP7

Endpoint	Analysis Type	Sample Link	Control Link	Date Analyzed	Version
Average Height (mm)	Comparison	04-4492-2437	04-4492-2437	16 Apr-07 10:53 AM	CETISv1.1.2

Method	Alt H	Data Transform	Zeta	NOEL	LOEL	Toxic Units	ChV	PMSD
Equal Variance t Two-Sample	C > T	Untransformed		100	>100	-1	N/A	35.88%

Group Comparisons

Control	vs	Conc-%	Statistic	Critical	P-Value	MSD	Decision(0.05)
Artificial Soil/Sedi		100	1.54892	1.89458	0.0827	21.9558	Non-Significant Effect

ANOVA Table

Source	Sum of Squares	Mean Square	DF	F Statistic	P-Value	Decision(0.05)
Between	716.0056	716.0056	1	2.40	0.16533	Non-Significant Effect
Error	2089.09	298.4414	7			
Total	2805.09564	1014.447	8			

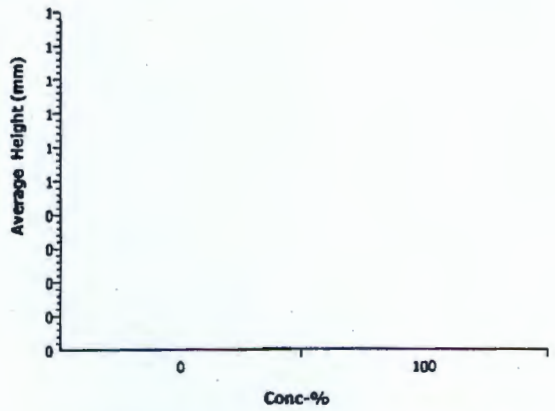
ANOVA Assumptions

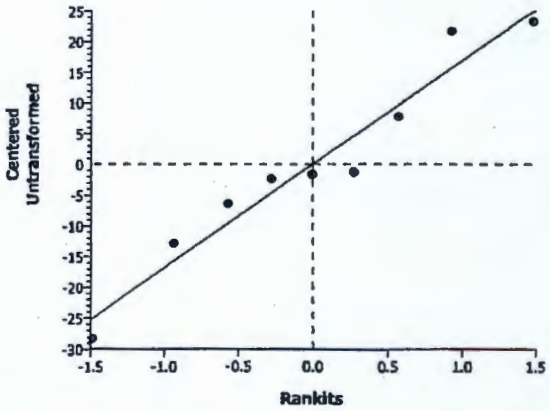
Attribute	Test	Statistic	Critical	P-Value	Decision(0.01)
Variances	Variance Ratio F	2.34947	24.25912	0.42746	Equal Variances
Distribution	Shapiro-Wilk W	0.94633		0.64983	Normal Distribution

Data Summary

			Original Data				Transformed Data			
Conc-%	Control Type	Count	Mean	Minimum	Maximum	SD	Mean	Minimum	Maximum	SD
0	Artificial Soil/S	5	61.2	48.4	84.5	13.751				
100		4	43.25	15	65	21.077				

Graphics





CETIS Analysis Detail

Plant Bioassay - Chronic — **CH2M Hill**

Sample No:	05-5419-8422	**Code:**	B1719-02	**Client:**	
Sample Date:	20 Nov-06	**Material:**	Soil	**Project:**	
Receive Date:		**Source:**	ELR-Washington Closure Hanford		
Sample Age:	95d 0h	**Station:**			

Comments: J13LP7

Endpoint	Analysis Type	Sample Link	Control Link	Date Analyzed	Version
Average Length (mm)	Comparison	04-4492-2437	04-4492-2437	16 Apr-07 10:54 AM	CETISv1.1.2

Method	Alt H	Data Transform	Zeta	NOEL	LOEL	Toxic Units	ChV	PMSD
Equal Variance t Two-Sample	C > T	Untransformed		<100	100		N/A	28.30%

Group Comparisons

Control	vs	Conc-%	Statistic	Critical	P-Value	MSD	Decision(0.05)
Artificial Soil/Sedi		100	3.36396	1.89458	0.0060	13.2943	Significant Effect

ANOVA Table

Source	Sum of Squares	Mean Square	DF	F Statistic	P-Value	Decision(0.05)
Between	1238.213	1238.213	1	11.32	0.01202	Significant Effect
Error	765.9355	109.4194	7			
Total	2004.14893	1347.6327	8			

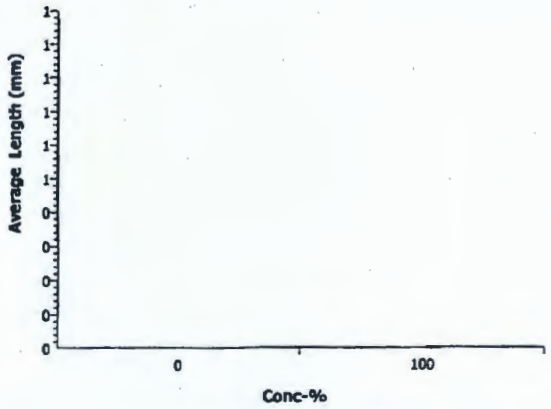
ANOVA Assumptions

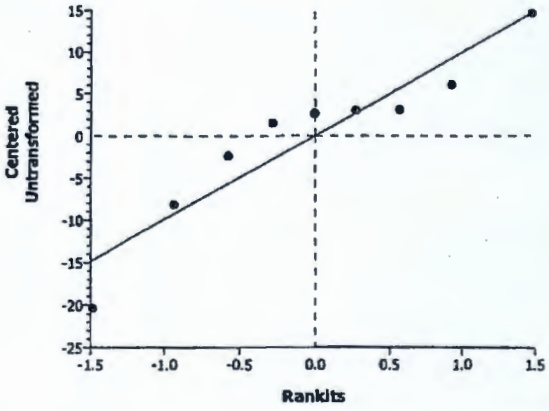
Attribute	Test	Statistic	Critical	P-Value	Decision(0.01)
Variances	Variance Ratio F	7.15951	24.25912	0.08744	Equal Variances
Distribution	Shapiro-Wilk W	0.91282		0.33611	Normal Distribution

Data Summary

			Original Data				Transformed Data			
Conc-%	Control Type	Count	Mean	Minimum	Maximum	SD	Mean	Minimum	Maximum	SD
0	Artificial Soil/S	5	46.98	38.8	53	5.4829				
100		4	23.375	3	38	14.671				

Graphics





CETIS Analysis Detail

Plant Bioassay - Chronic — **CH2M Hill**

Sample No:	05-5419-8422	**Code:**	B1719-02	**Client:**	
Sample Date:	20 Nov-06	**Material:**	Soil	**Project:**	
Receive Date:		**Source:**	ELR-Washington Closure Hanford		
Sample Age:	95d 0h	**Station:**			

Comments: J13LP7

Endpoint	Analysis Type	Sample Link	Control Link	Date Analyzed	Version
Average AG Wt (Wet, mg)	Comparison	04-4492-2437	04-4492-2437	16 Apr-07 10:54 AM	CETISv1.1.2

Method	Alt H	Data Transform	Zeta	NOEL	LOEL	Toxic Units	ChV	PMSD
Equal Variance t Two-Sample	C > T	Untransformed		<100	100		N/A	28.54%

Group Comparisons

Control	vs	Conc-%	Statistic	Critical	P-Value	MSD	Decision(0.05)
Artificial Soil/Sedi		100	3.81031	1.89458	0.0033	2.39102	Significant Effect

ANOVA Table

Source	Sum of Squares	Mean Square	DF	F Statistic	P-Value	Decision(0.05)
Between	51.38643	51.38643	1	14.52	0.00663	Significant Effect
Error	24.77574	3.539392	7			
Total	76.1621761	54.925825	8			

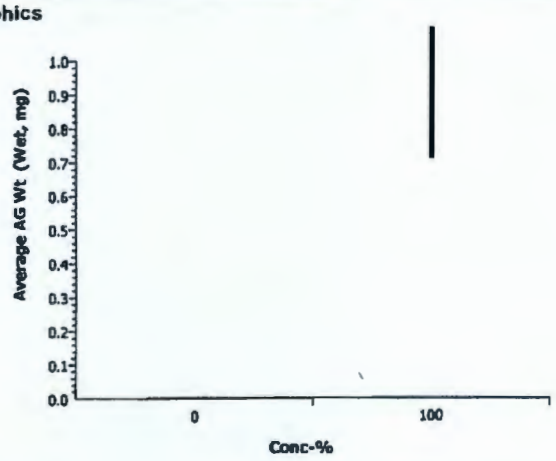
ANOVA Assumptions

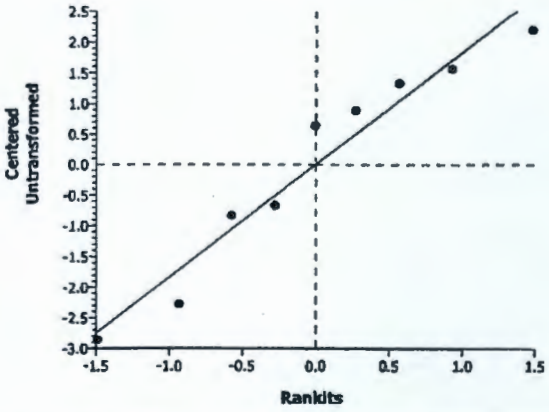
Attribute	Test	Statistic	Critical	P-Value	Decision(0.01)
Variances	Variance Ratio F	1.08960	24.25912	0.89900	Equal Variances
Distribution	Shapiro-Wilk W	0.93106		0.49149	Normal Distribution

Data Summary

			Original Data				Transformed Data			
Conc-%	Control Type	Count	Mean	Minimum	Maximum	SD	Mean	Minimum	Maximum	SD
0	Artificial Soil/S	5	8.3775	6.1	10.580	1.8462				
100		4	3.5688	0.71	4.9000	1.9272				

Graphics





CETIS Analysis Detail

Plant Bioassay - Chronic — **CH2M Hill**

Sample No:	05-5419-8422	**Code:**	B1719-02	**Client:**	
Sample Date:	20 Nov-06	**Material:**	Soil	**Project:**	
Receive Date:		**Source:**	ELR-Washington Closure Hanford		
Sample Age:	95d 0h	**Station:**			

Comments: J13LP7

Endpoint	Analysis Type	Sample Link	Control Link	Date Analyzed	Version
Average AG Wt (Dry, mg)	Comparison	04-4492-2437	04-4492-2437	16 Apr-07 10:54 AM	CETISv1.1.2

Method	Alt H	Data Transform	Zeta	NOEL	LOEL	Toxic Units	ChV	PMSD
Equal Variance t Two-Sample	C > T	Untransformed		<100	100		N/A	35.79%

Group Comparisons

Control	vs	Conc-%	Statistic	Critical	P-Value	MSD	Decision(0.05)
Artificial Soil/Sedi		100	2.91255	1.89458	0.0113	0.43367	Significant Effect

ANOVA Table

Source	Sum of Squares	Mean Square	DF	F Statistic	P-Value	Decision(0.05)
Between	0.9877146	0.987715	1	8.48	0.02258	Significant Effect
Error	0.8150491	0.116436	7			
Total	1.80276364	1.1041502	8			

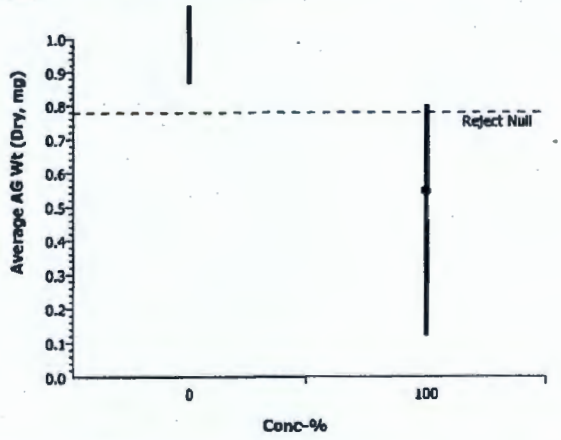
ANOVA Assumptions

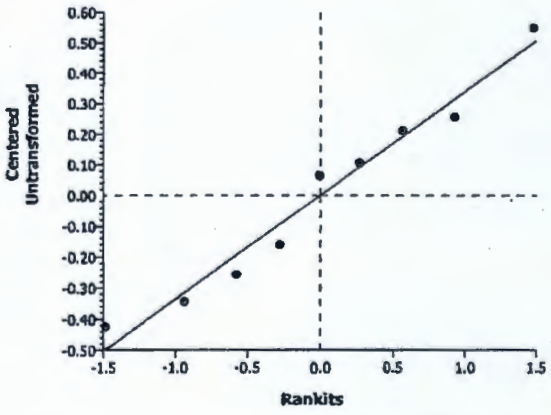
Attribute	Test	Statistic	Critical	P-Value	Decision(0.01)
Variances	Variance Ratio F	1.59270	46.19462	0.73173	Equal Variances
Distribution	Shapiro-Wilk W	0.96041		0.80265	Normal Distribution

Data Summary

			Original Data				Transformed Data			
Conc-%	Control Type	Count	Mean	Minimum	Maximum	SD	Mean	Minimum	Maximum	SD
0	Artificial Soil/S	5	1.21170	0.86799	1.76001	0.37220				
100		4	0.54501	0.12000	0.80005	0.29492				

Graphics





CETIS Analysis Detail

Plant Bioassay - Chronic — **CH2M Hill**

Sample No:	05-5419-8422	**Code:**	B1719-02	**Client:**	
Sample Date:	20 Nov-06	**Material:**	Soil	**Project:**	
Receive Date:		**Source:**	ELR-Washington Closure Hanford		
Sample Age:	95d 0h	**Station:**			

Comments: J13LP7

Endpoint	Analysis Type	Sample Link	Control Link	Date Analyzed	Version
Average Root Wt. (Wet, mg)	Comparison	04-4492-2437	04-4492-2437	16 Apr-07 10:54 AM	CETISv1.1.2

Method	Alt H	Data Transform	Zeta	NOEL	LOEL	Toxic Units	ChV	PMSD
Equal Variance t Two-Sample	C > T	Untransformed		100	>100	1	N/A	79.35%

Group Comparisons

Control	vs	Conc-%	Statistic	Critical	P-Value	MSD	Decision(0.05)
Artificial Soil/Sedi		100	-0.2447	1.89458	0.5931	3.61744	Non-Significant Effect

ANOVA Table

Source	Sum of Squares	Mean Square	DF	F Statistic	P-Value	Decision(0.05)
Between	0.4850745	0.485075	1	0.06	0.81371	Non-Significant Effect
Error	56.7104	8.101485	7			
Total	57.1954704	8.5865598	8			

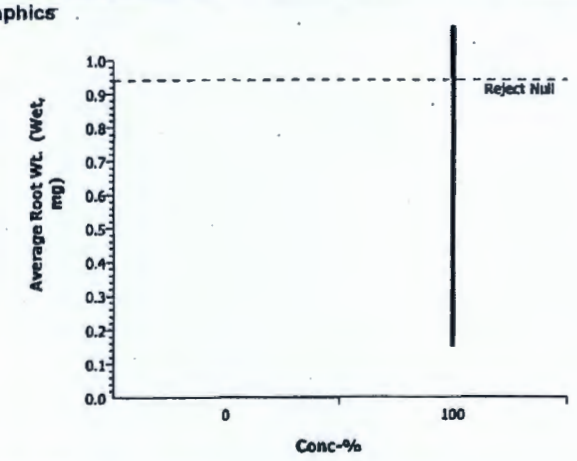
ANOVA Assumptions

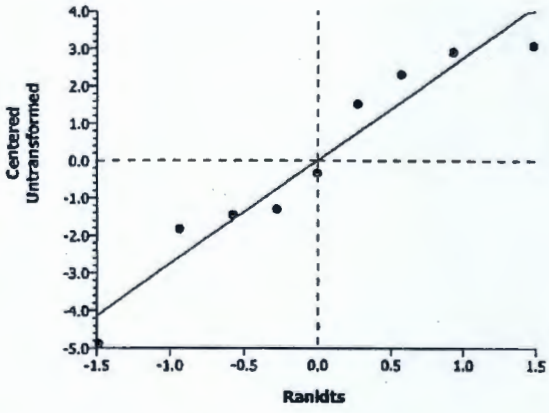
Attribute	Test	Statistic	Critical	P-Value	Decision(0.01)
Variances	Variance Ratio F	2.64943	24.25912	0.36996	Equal Variances
Distribution	Shapiro-Wilk W	0.92424		0.42845	Normal Distribution

Data Summary

			Original Data				Transformed Data			
Conc-%	Control Type	Count	Mean	Minimum	Maximum	SD	Mean	Minimum	Maximum	SD
0	Artificial Soil/S	5	4.55901	2.72400	7.64001	2.17861				
100		4	5.02621	0.14990	7.94495	3.54613				

Graphics





CETIS Analysis Detail

Plant Bioassay - Chronic — **CH2M Hill**

Sample No:	05-5419-8422	**Code:**	B1719-02	**Client:**	
Sample Date:	20 Nov-06	**Material:**	Soil	**Project:**	
Receive Date:		**Source:**	ELR-Washington Closure Hanford		
Sample Age:	95d 0h	**Station:**			

Comments: J13LP7

Endpoint	Analysis Type	Sample Link	Control Link	Date Analyzed	Version
Average Root Wt. (Dry, mg)	Comparison	04-4492-2437	04-4492-2437	16 Apr-07 10:54 AM	CETISv1.1.2

Method	Alt H	Data Transform	Zeta	NOEL	LOEL	Toxic Units	ChV	PMSD
Unequal Variance t Two-Sample	C > T	Untransformed		100	>100	1	N/A	251.64%

Group Comparisons

Control	vs	Conc-%	Statistic	Critical	P-Value	MSD	Decision(0.05)
Artificial Soil/Sedi		100	-1.5216	2.35336	0.8873	0.78788	Non-Significant Effect

ANOVA Table

Source	Sum of Squares	Mean Square	DF	F Statistic	P-Value	Decision(0.05)
Between	0.5766408	0.576641	1	2.97	0.12829	Non-Significant Effect
Error	1.357402	0.193915	7			
Total	1.93404329	0.7705555	8			

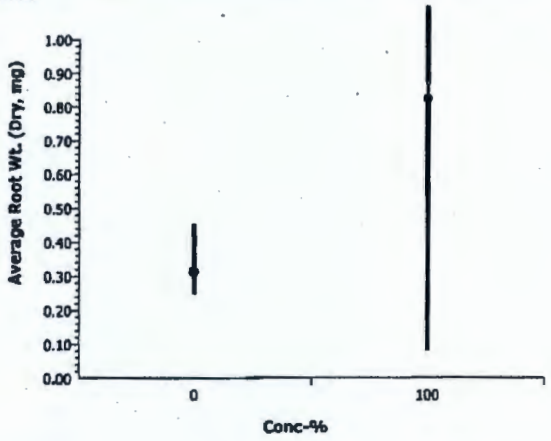
ANOVA Assumptions

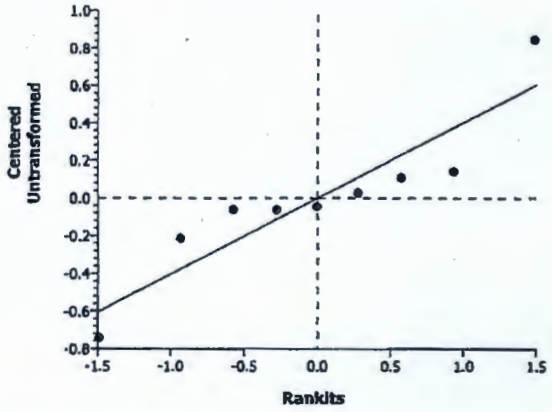
Attribute	Test	Statistic	Critical	P-Value	Decision(0.01)
Variances	Variance Ratio F	57.08147	24.25912	0.00194	Unequal Variances
Distribution	Shapiro-Wilk W	0.88098		0.16079	Normal Distribution

Data Summary

			Original Data				Transformed Data			
Conc-%	Control Type	Count	Mean	Minimum	Maximum	SD	Mean	Minimum	Maximum	SD
0	Artificial Soil/S	5	0.31309	0.25000	0.45496	0.08801				
100		4	0.82249	0.07996	1.67004	0.66494				

Graphics





CETIS Analysis Detail

Plant Bioassay - Chronic | CH2M Hill

Sample No:	05-5419-8422	Code:	B1719-02	Client:	
Sample Date:	20 Nov-06	Material:	Soil	Project:	
Receive Date:		Source:	ELR-Washington Closure Hanford		
Sample Age:	95d 0h	Station:			

Comments: J13LP7

Endpoint	Analysis Type	Sample Link	Control Link	Date Analyzed	Version
Average Total Wt (Wet, mg)	Comparison	04-4492-2437	04-4492-2437	16 Apr-07 10:54 AM	CETISv1.1.2

Method	Alt H	Data Transform	Zeta	NOEL	LOEL	Toxic Units	ChV	PMSD
Equal Variance t Two-Sample	C > T	Untransformed		100	>100	1	N/A	45.18%

Group Comparisons

Control	vs	Conc-%	Statistic	Critical	P-Value	MSD	Decision(0.05)
Artificial Soil/Sedi		100	1.40745	1.89458	0.1011	5.84414	Non-Significant Effect

ANOVA Table

Source	Sum of Squares	Mean Square	DF	F Statistic	P-Value	Decision(0.05)
Between	41.88627	41.88627	1	1.98	0.20211	Non-Significant Effect
Error	148.0137	21.14481	7			
Total	189.89996	63.031086	8			

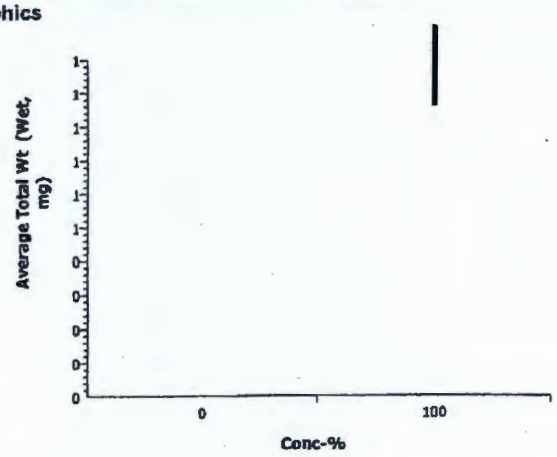
ANOVA Assumptions

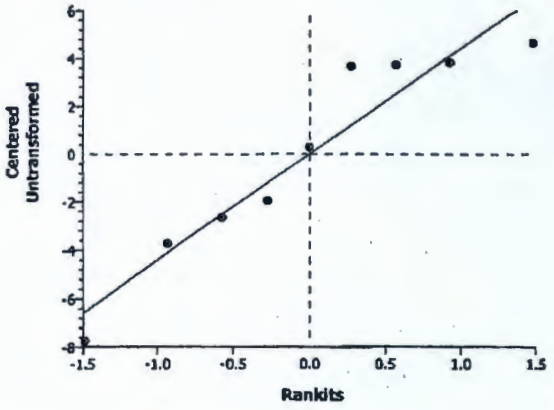
Attribute	Test	Statistic	Critical	P-Value	Decision(0.01)
Variances	Variance Ratio F	1.93394	24.25912	0.53169	Equal Variances
Distribution	Shapiro-Wilk W	0.89897		0.24609	Normal Distribution

Data Summary

			Original Data				Transformed Data			
Conc-%	Control Type	Count	Mean	Minimum	Maximum	SD	Mean	Minimum	Maximum	SD
0	Artificial Soil/S	5	12.937	9.198	17.588	3.886				
100		4	8.595	0.8599	12.4	5.4040				

Graphics





CETIS Analysis Detail

Plant Bioassay - Chronic — **CH2M Hill**

Sample No:	05-5419-8422	**Code:**	B1719-02	**Client:**	
Sample Date:	20 Nov-06	**Material:**	Soil	**Project:**	
Receive Date:		**Source:**	ELR-Washington Closure Hanford		
Sample Age:	95d 0h	**Station:**			

Comments: J13LP7

Endpoint	Analysis Type	Sample Link	Control Link	Date Analyzed	Version
Average Total Wt (Dry, mg)	Comparison	04-4492-2437	04-4492-2437	16 Apr-07 10:54 AM	CETISv1.1.2

Method	Alt H	Data Transform	Zeta	NOEL	LOEL	Toxic Units	ChV	PMSD
Equal Variance t Two-Sample	C > T	Untransformed		100	>100	1	N/A	58.60%

Group Comparisons

Control	vs	Conc-%	Statistic	Critical	P-Value	MSD	Decision(0.05)
Artificial Soil/Sedi		100	0.33351	1.89458	0.3743	0.89351	Non-Significant Effect

ANOVA Table

Source	Sum of Squares	Mean Square	DF	F Statistic	P-Value	Decision(0.05)
Between	0.054976	0.054976	1	0.11	0.74852	Non-Significant Effect
Error	3.459828	0.494261	7			
Total	3.51480389	0.5492371	8			

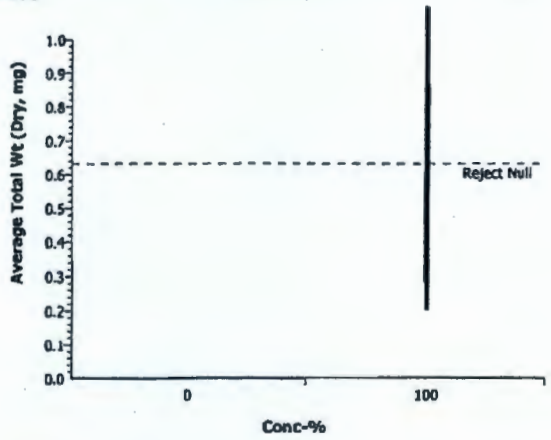
ANOVA Assumptions

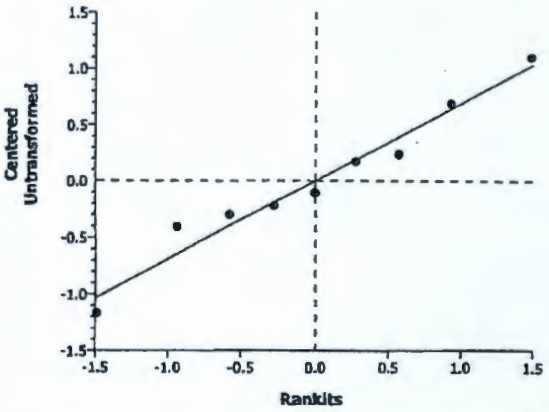
Attribute	Test	Statistic	Critical	P-Value	Decision(0.01)
Variances	Variance Ratio F	4.16079	24.25912	0.20209	Equal Variances
Distribution	Shapiro-Wilk W	0.97524		0.93543	Normal Distribution

Data Summary

			Original Data				Transformed Data			
Conc-%	Control Type	Count	Mean	Minimum	Maximum	SD	Mean	Minimum	Maximum	SD
0	Artificial Soil/S	5	1.52479	1.11799	2.21497	0.45816				
100		4	1.36751	0.19995	2.47009	0.93456				

Graphics





BLUEGRASS GROWTH TEST

Client: Washington Closure Hanford Project Seed ID: PS001 Test Start Date: February 23, 2007

Initials: Day 0 [illegible] Day 12 NJ Day 14 [illegible] Day 18 NJ Day 19 — Day 21 [illegible] Day 24 NJ Day 26 NJ Day 28 [illegible] Day 31 NJ Day 33 NJ Day 40 NJ

Bioassay Lab ID: BG 1719-03 Sample No: J13P00

CONC.	REPLICATE	# seeds germinated: 12 days after planting	14 days after planting	18 Emergence: 16 days after planting	19 days after planting	21 days after planting	24 days after planting	7-DAYS POST-EMERGENCE (33 days after planting) Day 26	28	31		14-DAYS POST-EMERGENCE (40 days after planting)	pH: INITIAL (@ planting)	pH: FINAL (@ 14 days Post-Emergence)
Control	A	0	0	0		0	0	0	1	1	1	1	7.7	7.3
	B	2	3	3		3	4	4	4	4	4	4		
	C	0	0	0		0	0	1	1	1	1	2		
	D	0	0	0		1	1	2	2	2	2	3		
	E	0	0	1		1	1	4	5	6	6	5		

7-Days Post-Emergence: Selectively thin down to 5 Seedlings (leave the 5 tallest seedlings). Describe shoot appearance: Day 33 Day 31

Replicate A: 1 sm G
Replicate B: 1 lg G, 2 med G, 1 sm G
Replicate C: 1 sm G
Replicate D: 2 sm G
Replicate E: 1 lg G, 4 sm G removed 1 sm G

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

14-Days Post-Emergence: Describe shoot appearance:

Replicate A: 1 sm G
Replicate B: 3 lg G 1 sm G
Replicate C: 2 sm G
Replicate D: 3 sm G
Replicate E: 1 lg G, 2 med G 2 sm G

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

	1st Seedling	2nd Seedling	3rd Seedling	4th Seedling	5th Seedling
Replicate A	9 mm	mm	mm	mm	mm
Replicate B	75 mm	11 mm	73 mm	5 mm	mm
Replicate C	25 mm	7 mm	mm	mm	mm
Replicate D	15 mm	22 mm	13 mm	mm	mm
Replicate E	22 mm	15 mm	14 mm	92 mm	30 mm

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

	Tin Tare Wt. (mg)	Wet Wt (mg)	Dry Wt. (mg)
Replicate A	1286.49	1286.85	1286.56
Replicate B	1277.39	1303.51	1280.98
Replicate C	1293.12	1294.92	1293.32
Replicate D	1285.67	1291.53	1286.37
Replicate E	1296.04	1312.20	1298.20

Describe root appearance:

Replicate A
Replicate B
Replicate C
Replicate D
Replicate E

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

	1st Seedling	2nd Seedling	3rd Seedling	4th Seedling	5th Seedling
Replicate A	6 mm	mm	mm	mm	mm
Replicate B	47 mm	12 mm	60 mm	44 mm	mm
Replicate C	2 mm	17 mm	mm	mm	mm
Replicate D	9 mm	16 mm	1 mm	mm	mm
Replicate E	54 mm	11 mm	10 mm	22 mm	9 mm

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

	Tin Tare Wt. (mg)	Wet Wt (mg)	Dry Wt. (mg)
Replicate A	1303.54	1304.23	1303.61
Replicate B	1294.92	1331.51	1297.04
Replicate C	1292.01	1295.05	1292.73
Replicate D	1277.49	1279.12	1277.86
Replicate E	1295.74	1308.96	1297.69

Comments:

CETIS Test Summary

Report Date: 16 Apr-07 10:58 AM
Test Link: 02-2116-3746/B171903psc

Plant Bioassay - Chronic — **CH2M Hill**

Test No:	13-6975-7771	**Test Type:**	Plant Chronic	**Duration:**	40d 0h
Start Date:	23 Feb-07	**Protocol:**	ASTM E1963-02 (2002)	**Species:**	Poa sandbergii
Ending Date:	04 Apr-07	**Dil Water:**		**Source:**	
Setup Date:	23 Feb-07 12:00 AM	**Brine:**			

Sample No:	09-0197-9159	**Code:**	B1719-03	**Client:**	
Sample Date:	27 Nov-06	**Material:**	Soil	**Project:**	
Receive Date:		**Source:**	ELR-Washington Closure Hanford		
Sample Age:	88d 0h	**Station:**			

Comments: J13P00

Comparison Summary

Analysis	Endpoint	NOEL	LOEL	ChV	PMSD	Method
17-0451-0652	% Germination	100	> 100	N/A	39.76%	Equal Variance t Two-Sample
02-9860-2045	Average Height (mm)	< 100	100	N/A	26.30%	Equal Variance t Two-Sample
12-2463-0221	Average Length (mm)	< 100	100	N/A	27.28%	Equal Variance t Two-Sample
07-7592-5261	Average AG Wt (Wet, mg)	< 100	100	N/A	30.52%	Equal Variance t Two-Sample
09-9132-7318	Average AG Wt (Dry, mg)	< 100	100	N/A	34.57%	Equal Variance t Two-Sample
17-8524-8676	Average Root Wt. (Wet, mg	100	> 100	N/A	76.54%	Equal Variance t Two-Sample
04-0477-5179	Average Root Wt. (Dry, mg)	100	> 100	N/A	56.22%	Equal Variance t Two-Sample
08-6226-8690	Average Total Wt (Wet, mg	< 100	100	N/A	45.73%	Equal Variance t Two-Sample
01-0670-3433	Average Total Wt (Dry, mg)	< 100	100	N/A	37.14%	Equal Variance t Two-Sample

CETIS Test Summary

Report Date: 16 Apr-07 10:58 AM
Test Link: 02-2116-3746/B171903psc

% Germination Summary

Conc-%	Control Type	Reps	Mean	Minimum	Maximum	SE	SD	CV
0	Artificial Soil/S	5	0.84000	0.40000	1.00000	0.11662	0.26077	31.04%
100		5	0.60000	0.20000	1.00000	0.14142	0.31623	52.70%

Average Height (mm) Summary

Conc-%	Control Type	Reps	Mean	Minimum	Maximum	SE	SD	CV
0	Artificial Soil/S	5	61.2	48.400	84.5	6.1496	13.751	22.47%
100		5	23.46	9	41	6.0918	13.622	58.06%

Average Length (mm) Summary

Conc-%	Control Type	Reps	Mean	Minimum	Maximum	SE	SD	CV
0	Artificial Soil/S	5	46.98	38.8	53	2.4520	5.4829	11.67%
100		5	17.24	6	40.8	6.4418	14.404	83.55%

Average AG Wt (Wet, mg) Summary

Conc-%	Control Type	Reps	Mean	Minimum	Maximum	SE	SD	CV
0	Artificial Soil/S	5	8.3775	6.1	10.580	0.8257	1.8462	22.04%
100		5	2.5951	0.36	6.53	1.0993	2.4581	94.72%

Average AG Wt (Dry, mg) Summary

Conc-%	Control Type	Reps	Mean	Minimum	Maximum	SE	SD	CV
0	Artificial Soil/S	5	1.21170	0.86799	1.76001	0.16645	0.37220	30.72%
100		5	0.34657	0.07007	0.89749	0.15181	0.33945	97.95%

Average Root Wt. (Wet, mg) Summary

Conc-%	Control Type	Reps	Mean	Minimum	Maximum	SE	SD	CV
0	Artificial Soil/S	5	4.55901	2.72400	7.64001	0.97430	2.17861	47.79%
100		5	2.90896	0.54333	9.14749	1.60373	3.58604	123.28

Average Root Wt. (Dry, mg) Summary

Conc-%	Control Type	Reps	Mean	Minimum	Maximum	SE	SD	CV
0	Artificial Soil/S	5	0.31309	0.25000	0.45496	0.03936	0.08801	28.11%
100		5	0.29425	0.06995	0.53000	0.08609	0.19249	65.42%

Average Total Wt (Wet, mg) Summary

Conc-%	Control Type	Reps	Mean	Minimum	Maximum	SE	SD	CV
0	Artificial Soil/S	5	12.937	9.198	17.588	1.7379	3.886	30.04%
100		5	5.5040	1.0499	15.677	2.6649	5.9589	108.26

Average Total Wt (Dry, mg) Summary

Conc-%	Control Type	Reps	Mean	Minimum	Maximum	SE	SD	CV
0	Artificial Soil/S	5	1.52479	1.11799	2.21497	0.20490	0.45816	30.05%
100		5	0.64082	0.14001	1.42749	0.22530	0.50379	78.62%

CETIS Test Summary

Report Date: 16 Apr-07 10:58 AM
Test Link: 02-2116-3746/B171903psc

% Germination Detail

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

Average Height (mm) Detail

Conc-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Artificial Soil/S	54.8	84.5	58.8	59.5	48.4000
100		9	41	16	16.7000	34.6

Average Length (mm) Detail

Conc-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Artificial Soil/S	50	48.5	44.6	53	38.8
100		6	40.8	9.5	8.7	21.2000

Average AG Wt (Wet, mg) Detail

Conc-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Artificial Soil/S	6.1	10.5800	7.548	9.94751	7.71199
100		0.35999	6.53	0.90002	1.95333	3.23198

Average AG Wt (Dry, mg) Detail

Conc-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Artificial Soil/S	0.86799	1.76001	0.95598	1.42252	1.05200
100		0.07007	0.89749	0.09998	0.23332	0.43198

Average Root Wt. (Wet, mg) Detail

Conc-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Artificial Soil/S	3.09800	6.07501	2.72400	7.64001	3.25801
100		0.68994	9.14749	1.52002	0.54333	2.64399

Average Root Wt. (Dry, mg) Detail

Conc-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Artificial Soil/S	0.25000	0.45496	0.26802	0.34250	0.25000
100		0.06995	0.53000	0.35999	0.12333	0.38801

Average Total Wt (Wet, mg) Detail

Conc-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Artificial Soil/S	9.198	16.6550	10.272	17.5875	10.97
100		1.04993	15.6775	2.42004	2.49666	5.87598

Average Total Wt (Dry, mg) Detail

Conc-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Artificial Soil/S	1.11799	2.21497	1.22400	1.76501	1.30200
100		0.14001	1.42749	0.45996	0.35665	0.82000

CETIS Analysis Detail

Plant Bioassay - Chronic — **CH2M Hill**

Sample No:	09-0197-9159	**Code:**	B1719-03	**Client:**	
Sample Date:	27 Nov-06	**Material:**	Soil	**Project:**	
Receive Date:		**Source:**	ELR-Washington Closure Hanford		
Sample Age:	88d 0h	**Station:**			

Comments: J13P00

Endpoint	Analysis Type	Sample Link	Control Link	Date Analyzed	Version
% Germination	Comparison	02-2116-3746	02-2116-3746	16 Apr-07 10:57 AM	CETISv1.1.2

Method	Alt H	Data Transform	Zeta	NOEL	LOEL	Toxic Units	ChV	PMSD
Equal Variance t Two-Sample	C > T	Angular (Corrected)		100	>100	1	N/A	39.76%

Group Comparisons

Control vs	Conc-%	Statistic	Critical	P-Value	MSD	Decision(0.05)
Artificial Soil/Sedi	100	1.33285	1.85955	0.1096	0.37414	Non-Significant Effect

ANOVA Table

Source	Sum of Squares	Mean Square	DF	F Statistic	P-Value	Decision(0.05)
Between	0.1797855	0.179786	1	1.78	0.21929	Non-Significant Effect
Error	0.8096168	0.101202	8			
Total	0.98940229	0.2809876	9			

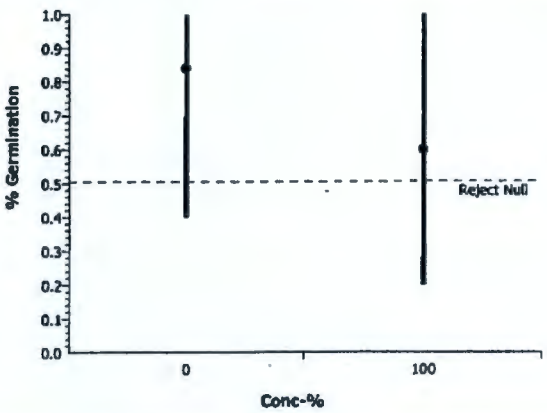
ANOVA Assumptions

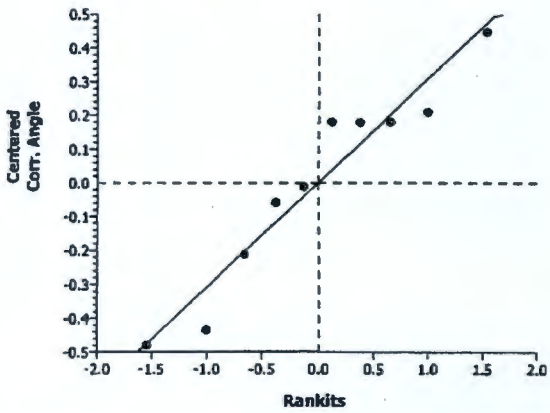
Attribute	Test	Statistic	Critical	P-Value	Decision(0.01)
Variances	Variance Ratio F	1.44213	23.15450	0.73140	Equal Variances
Distribution	Shapiro-Wilk W	0.92530		0.40330	Normal Distribution

Data Summary

			Original Data				Transformed Data			
Conc-%	Control Type	Count	Mean	Minimum	Maximum	SD	Mean	Minimum	Maximum	SD
0	Artificial Soil/S	5	0.84000	0.40000	1.00000	0.26077	1.16554	0.68472	1.34528	0.28789
100		5	0.60000	0.20000	1.00000	0.31623	0.89738	0.46365	1.34528	0.34572

Graphics





CETIS Analysis Detail

Plant Bioassay - Chronic — **CH2M Hill**

Sample No:	09-0197-9159	**Code:**	B1719-03	**Client:**	
Sample Date:	27 Nov-06	**Material:**	Soil	**Project:**	
Receive Date:		**Source:**	ELR-Washington Closure Hanford		
Sample Age:	88d 0h	**Station:**			

Comments: J13P00

Endpoint	Analysis Type	Sample Link	Control Link	Date Analyzed	Version
Average Height (mm)	Comparison	02-2116-3746	02-2116-3746	16 Apr-07 10:57 AM	CETISv1.1.2

Method	Alt H	Data Transform	Zeta	NOEL	LOEL	Toxic Units	ChV	PMSD
Equal Variance t Two-Sample	C > T	Untransformed		<100	100		N/A	26.30%

Group Comparisons

Control	vs	Conc-%	Statistic	Critical	P-Value	MSD	Decision(0.05)
Artificial Soil/Sedi		100	4.35997	1.85955	0.0012	16.0963	Significant Effect

ANOVA Table

Source	Sum of Squares	Mean Square	DF	F Statistic	P-Value	Decision(0.05)
Between	3560.769	3560.769	1	19.01	0.00241	Significant Effect
Error	1498.532	187.3165	8			
Total	5059.30103	3748.0855	9			

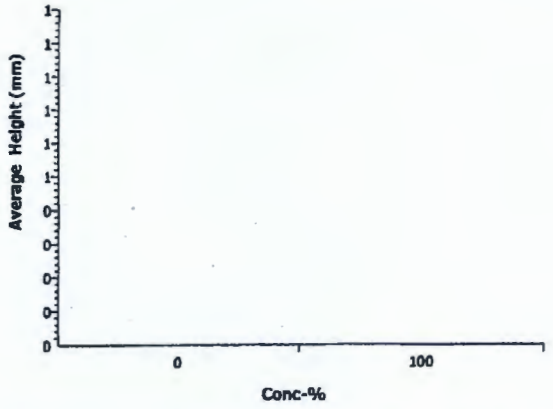
ANOVA Assumptions

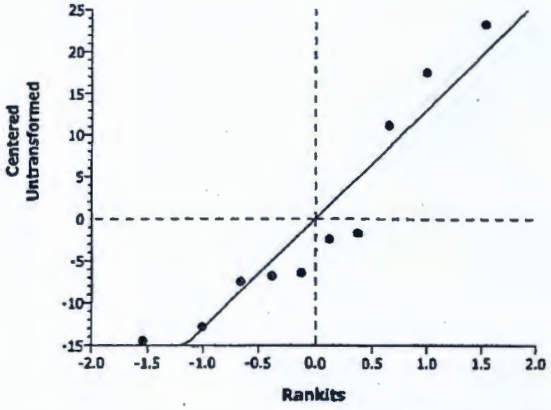
Attribute	Test	Statistic	Critical	P-Value	Decision(0.01)
Variances	Variance Ratio F	1.01906	23.15450	0.98584	Equal Variances
Distribution	Shapiro-Wilk W	0.88480		0.14808	Normal Distribution

Data Summary

			Original Data				Transformed Data			
Conc-%	Control Type	Count	Mean	Minimum	Maximum	SD	Mean	Minimum	Maximum	SD
0	Artificial Soil/S	5	61.2	48.4	84.5	13.751				
100		5	23.46	9	41	13.622				

Graphics





CETIS Analysis Detail

Plant Bioassay - Chronic — **CH2M Hill**

Sample No:	09-0197-9159	**Code:**	B1719-03	**Client:**	
Sample Date:	27 Nov-06	**Material:**	Soil	**Project:**	
Receive Date:		**Source:**	ELR-Washington Closure Hanford		
Sample Age:	88d 0h	**Station:**			

Comments: J13P00

Endpoint	Analysis Type	Sample Link	Control Link	Date Analyzed	Version
Average Length (mm)	Comparison	02-2116-3746	02-2116-3746	16 Apr-07 10:57 AM	CETISv1.1.2

Method	Alt H	Data Transform	Zeta	NOEL	LOEL	Toxic Units	ChV	PMSD
Equal Variance t Two-Sample	C > T	Untransformed		<100	100		N/A	27.28%

Group Comparisons

Control	vs	Conc-%	Statistic	Critical	P-Value	MSD	Decision(0.05)
Artificial Soil/Sedi		100	4.31472	1.85955	0.0013	12.8173	Significant Effect

ANOVA Table

Source	Sum of Squares	Mean Square	DF	F Statistic	P-Value	Decision(0.05)
Between	2211.169	2211.169	1	18.62	0.00256	Significant Effect
Error	950.18	118.7725	8			
Total	3161.34894	2329.9414	9			

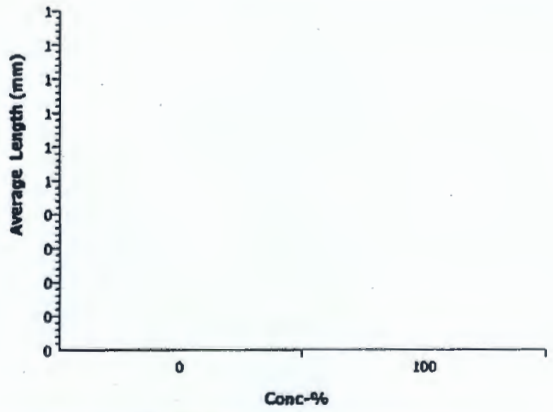
ANOVA Assumptions

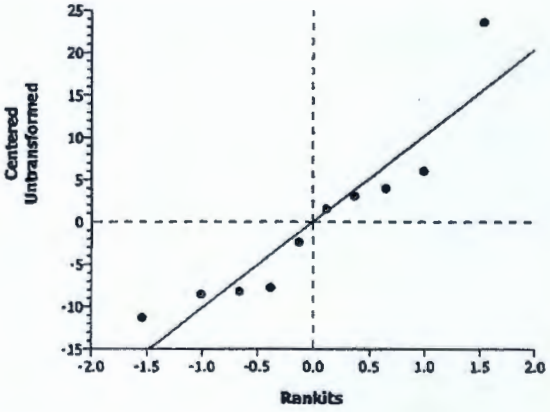
Attribute	Test	Statistic	Critical	P-Value	Decision(0.01)
Variances	Variance Ratio F	6.90183	23.15450	0.08799	Equal Variances
Distribution	Shapiro-Wilk W	0.87504		0.11440	Normal Distribution

Data Summary

			Original Data				Transformed Data			
Conc-%	Control Type	Count	Mean	Minimum	Maximum	SD	Mean	Minimum	Maximum	SD
0	Artificial Soil/S	5	46.98	38.8	53	5.4829				
100		5	17.24	6	40.8	14.404				

Graphics





CETIS Analysis Detail

Plant Bioassay - Chronic — **CH2M Hill**

Sample No:	09-0197-9159	**Code:**	B1719-03	**Client:**	
Sample Date:	27 Nov-06	**Material:**	Soil	**Project:**	
Receive Date:		**Source:**	ELR-Washington Closure Hanford		
Sample Age:	88d 0h	**Station:**			

Comments: J13P00

Endpoint	Analysis Type	Sample Link	Control Link	Date Analyzed	Version
Average AG Wt (Wet, mg)	Comparison	02-2116-3746	02-2116-3746	16 Apr-07 10:58 AM	CETISv1.1.2

Method	Alt H	Data Transform	Zeta	NOEL	LOEL	Toxic Units	ChV	PMSD
Equal Variance t Two-Sample	C > T	Untransformed		<100	100		N/A	30.52%

Group Comparisons

Control	vs	Conc-%	Statistic	Critical	P-Value	MSD	Decision(0.05)
Artificial Soil/Sedi		100	4.20589	1.85955	0.0015	2.55659	Significant Effect

ANOVA Table

Source	Sum of Squares	Mean Square	DF	F Statistic	P-Value	Decision(0.05)
Between	83.59149	83.59149	1	17.69	0.00297	Significant Effect
Error	37.80394	4.725492	8			
Total	121.395428	88.316984	9			

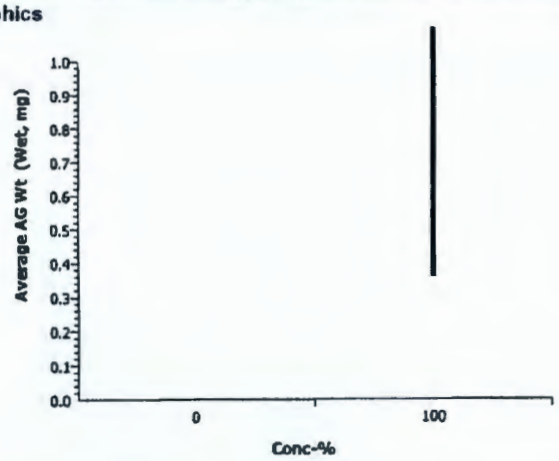
ANOVA Assumptions

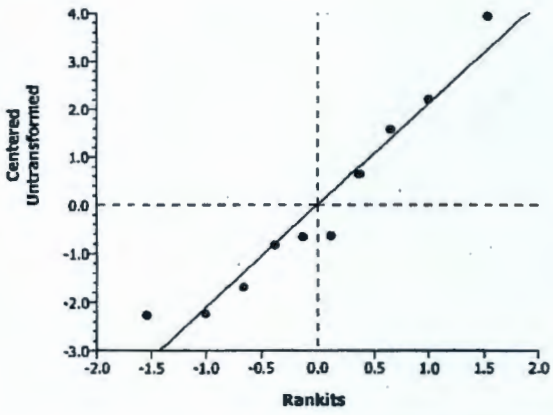
Attribute	Test	Statistic	Critical	P-Value	Decision(0.01)
Variances	Variance Ratio F	1.77277	23.15450	0.59277	Equal Variances
Distribution	Shapiro-Wilk W	0.92233		0.37677	Normal Distribution

Data Summary

			Original Data				Transformed Data			
Conc-%	Control Type	Count	Mean	Minimum	Maximum	SD	Mean	Minimum	Maximum	SD
0	Artificial Soil/S	5	8.3775	6.1	10.580	1.8462				
100		5	2.5951	0.36	6.53	2.4581				

Graphics





CETIS Analysis Detail

Plant Bioassay - Chronic — **CH2M Hill**

Sample No:	09-0197-9159	**Code:**	B1719-03	**Client:**	
Sample Date:	27 Nov-06	**Material:**	Soil	**Project:**	
Receive Date:		**Source:**	ELR-Washington Closure Hanford		
Sample Age:	88d 0h	**Station:**			

Comments: J13P00

Endpoint	Analysis Type	Sample Link	Control Link	Date Analyzed	Version
Average AG Wt (Dry, mg)	Comparison	02-2116-3746	02-2116-3746	16 Apr-07 10:58 AM	CETISv1.1.2

Method	Alt H	Data Transform	Zeta	NOEL	LOEL	Toxic Units	ChV	PMSD
Equal Variance t Two-Sample	C > T	Untransformed		<100	100		N/A	34.57%

Group Comparisons

Control	vs	Conc-%	Statistic	Critical	P-Value	MSD	Decision(0.05)
Artificial Soil/Sedi		100	3.84027	1.85955	0.0025	0.41892	Significant Effect

ANOVA Table

Source	Sum of Squares	Mean Square	DF	F Statistic	P-Value	Decision(0.05)
Between	1.87114	1.87114	1	14.75	0.00495	Significant Effect
Error	1.015015	0.126877	8			
Total	2.88615441	1.9980166	9			

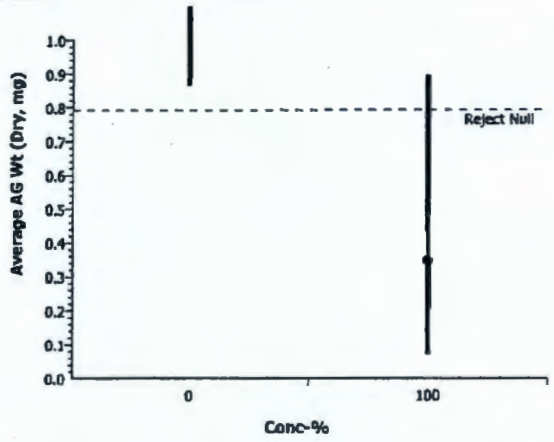
ANOVA Assumptions

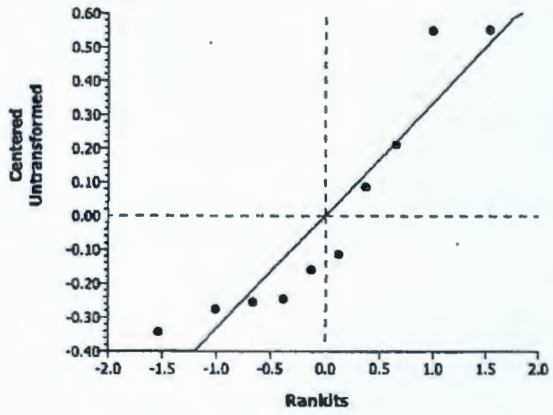
Attribute	Test	Statistic	Critical	P-Value	Decision(0.01)
Variances	Variance Ratio F	1.20225	23.15450	0.86263	Equal Variances
Distribution	Shapiro-Wilk W	0.84704		0.05356	Normal Distribution

Data Summary

			Original Data				Transformed Data			
Conc-%	Control Type	Count	Mean	Minimum	Maximum	SD	Mean	Minimum	Maximum	SD
0	Artificial Soil/S	5	1.21170	0.86799	1.76001	0.37220				
100		5	0.34657	0.07007	0.89749	0.33945				

Graphics





CETIS Analysis Detail

Plant Bioassay - Chronic — **CH2M Hill**

Sample No:	09-0197-9159	**Code:**	B1719-03	**Client:**	
Sample Date:	27 Nov-06	**Material:**	Soil	**Project:**	
Receive Date:		**Source:**	ELR-Washington Closure Hanford		
Sample Age:	88d 0h	**Station:**			

Comments: J13P00

Endpoint	Analysis Type	Sample Link	Control Link	Date Analyzed	Version
Average Root Wt. (Wet, mg)	Comparison	02-2116-3746	02-2116-3746	16 Apr-07 10:58 AM	CETISv1.1.2

Method	Alt H	Data Transform	Zeta	NOEL	LOEL	Toxic Units	ChV	PMSD
Equal Variance t Two-Sample	C > T	Untransformed		100	>100	1	N/A	76.54%

Group Comparisons

Control	vs	Conc-%	Statistic	Critical	P-Value	MSD	Decision(0.05)
Artificial Soil/Sedi		100	0.87933	1.85955	0.2024	3.48942	Non-Significant Effect

ANOVA Table

Source	Sum of Squares	Mean Square	DF	F Statistic	P-Value	Decision(0.05)
Between	6.806663	6.806663	1	0.77	0.40486	Non-Significant Effect
Error	70.42414	8.803018	8			
Total	77.230804	15.609681	9			

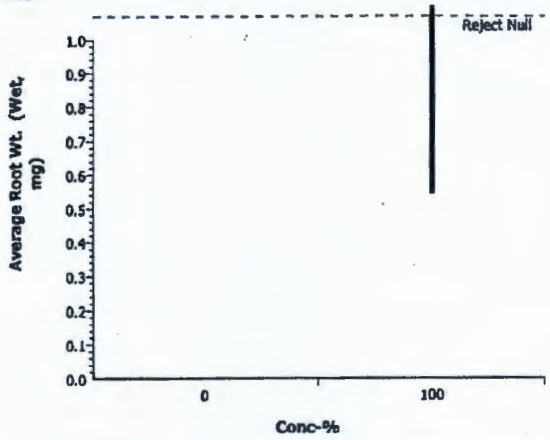
ANOVA Assumptions

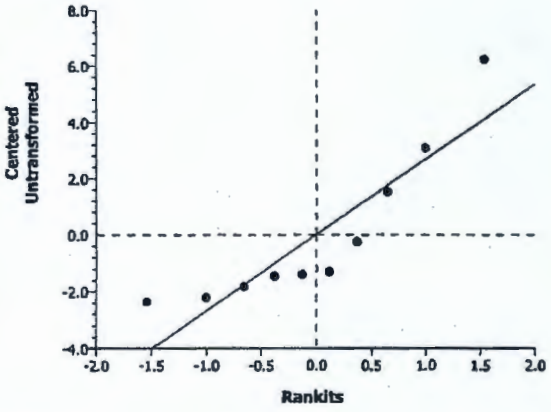
Attribute	Test	Statistic	Critical	P-Value	Decision(0.01)
Variances	Variance Ratio F	2.70941	23.15450	0.35769	Equal Variances
Distribution	Shapiro-Wilk W	0.80911		0.01870	Normal Distribution

Data Summary

			Original Data				Transformed Data			
Conc-%	Control Type	Count	Mean	Minimum	Maximum	SD	Mean	Minimum	Maximum	SD
0	Artificial Soil/S	5	4.55901	2.72400	7.64001	2.17861				
100		5	2.90896	0.54333	9.14749	3.58604				

Graphics





CETIS Analysis Detail

Plant Bioassay - Chronic — **CH2M Hill**

Sample No:	09-0197-9159	**Code:**	B1719-03	**Client:**	
Sample Date:	27 Nov-06	**Material:**	Soil	**Project:**	
Receive Date:		**Source:**	ELR-Washington Closure Hanford		
Sample Age:	88d 0h	**Station:**			

Comments: J13P00

Endpoint	Analysis Type	Sample Link	Control Link	Date Analyzed	Version
Average Root Wt. (Dry, mg)	Comparison	02-2116-3746	02-2116-3746	16 Apr-07 10:58 AM	CETISv1.1.2

Method	Alt H	Data Transform	Zeta	NOEL	LOEL	Toxic Units	ChV	PMSD
Equal Variance t Two-Sample	C > T	Untransformed		100	>100	1	N/A	56.22%

Group Comparisons

Control vs	Conc-%	Statistic	Critical	P-Value	MSD	Decision(0.05)
Artificial Soil/Sedi	100	0.19903	1.85955	0.4236	0.17602	Non-Significant Effect

ANOVA Table

Source	Sum of Squares	Mean Square	DF	F Statistic	P-Value	Decision(0.05)
Between	0.0008873	0.000887	1	0.04	0.84720	Non-Significant Effect
Error	0.1791984	0.0224	8			
Total	0.18008567	0.0232871	9			

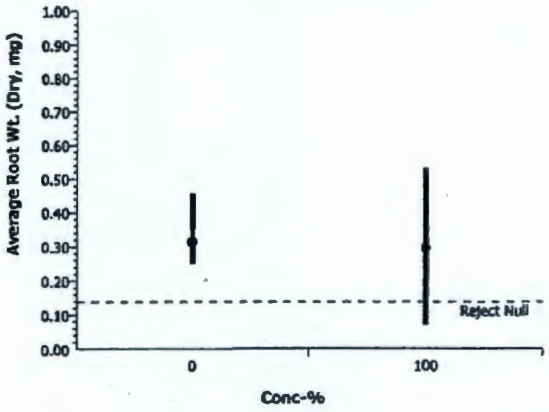
ANOVA Assumptions

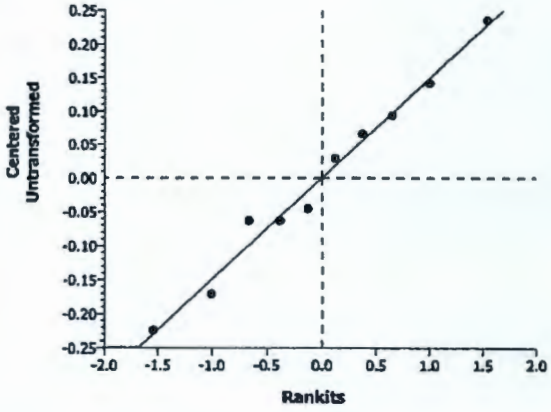
Attribute	Test	Statistic	Critical	P-Value	Decision(0.01)
Variances	Variance Ratio F	4.78375	23.15450	0.15869	Equal Variances
Distribution	Shapiro-Wilk W	0.98092		0.96992	Normal Distribution

Data Summary

			Original Data				Transformed Data			
Conc-%	Control Type	Count	Mean	Minimum	Maximum	SD	Mean	Minimum	Maximum	SD
0	Artificial Soil/S	5	0.31309	0.25000	0.45496	0.08801				
100		5	0.29425	0.06995	0.53000	0.19249				

Graphics





CETIS Analysis Detail

Plant Bioassay - Chronic — **CH2M Hill**

Sample No:	09-0197-9159	**Code:**	B1719-03	**Client:**	
Sample Date:	27 Nov-06	**Material:**	Soil	**Project:**	
Receive Date:		**Source:**	ELR-Washington Closure Hanford		
Sample Age:	88d 0h	**Station:**			

Comments: J13P00

Endpoint	Analysis Type	Sample Link	Control Link	Date Analyzed	Version
Average Total Wt (Wet, mg)	Comparison	02-2116-3746	02-2116-3746	16 Apr-07 10:58 AM	CETISv1.1.2

Method	Alt H	Data Transform	Zeta	NOEL	LOEL	Toxic Units	ChV	PMSD
Equal Variance t Two-Sample	C > T	Untransformed		<100	100		N/A	45.73%

Group Comparisons

Control	vs	Conc-%	Statistic	Critical	P-Value	MSD	Decision(0.05)
Artificial Soil/Sedi		100	2.33618	1.85955	0.0238	5.91609	Significant Effect

ANOVA Table

Source	Sum of Squares	Mean Square	DF	F Statistic	P-Value	Decision(0.05)
Between	138.1047	138.1047	1	5.46	0.04770	Significant Effect
Error	202.4345	25.30431	8			
Total	340.539215	163.40903	9			

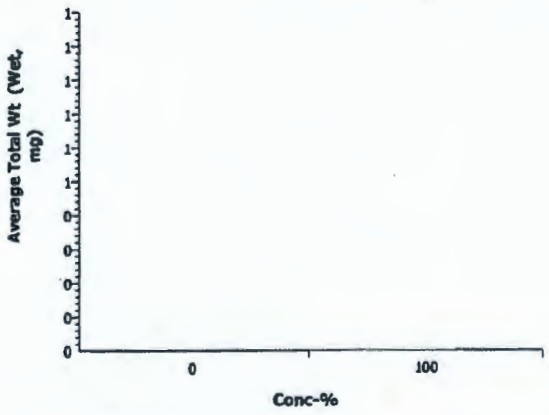
ANOVA Assumptions

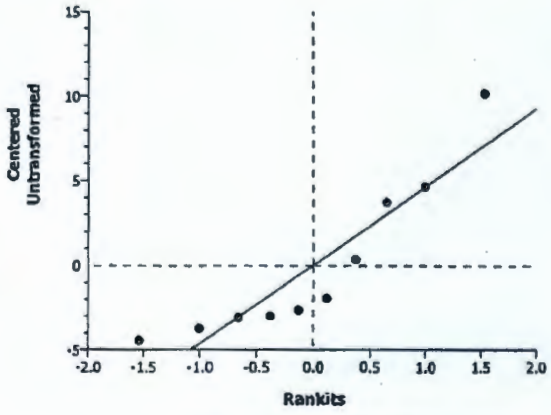
Attribute	Test	Statistic	Critical	P-Value	Decision(0.01)
Variances	Variance Ratio F	2.35142	23.15450	0.42793	Equal Variances
Distribution	Shapiro-Wilk W	0.84166		0.04619	Normal Distribution

Data Summary

			Original Data				Transformed Data			
Conc-%	Control Type	Count	Mean	Minimum	Maximum	SD	Mean	Minimum	Maximum	SD
0	Artificial Soil/S	5	12.937	9.198	17.588	3.886				
100		5	5.5040	1.0499	15.677	5.9589				

Graphics





CETIS Analysis Detail

Plant Bioassay - Chronic — **CH2M Hill**

Sample No:	09-0197-9159	**Code:**	B1719-03	**Client:**	
Sample Date:	27 Nov-06	**Material:**	Soil	**Project:**	
Receive Date:		**Source:**	ELR-Washington Closure Hanford		
Sample Age:	88d 0h	**Station:**			

Comments: J13P00

Endpoint	Analysis Type	Sample Link	Control Link	Date Analyzed	Version
Average Total Wt (Dry, mg)	Comparison	02-2116-3746	02-2116-3746	16 Apr-07 10:58 AM	CETISv1.1.2

Method	Alt H	Data Transform	Zeta	NOEL	LOEL	Toxic Units	ChV	PMSD
Equal Variance t Two-Sample	C > T	Untransformed		<100	100		N/A	37.14%

Group Comparisons

Control	vs	Conc-%	Statistic	Critical	P-Value	MSD	Decision(0.05)
Artificial Soil/Sedi		100	2.90267	1.85955	0.0099	0.56630	Significant Effect

ANOVA Table

Source	Sum of Squares	Mean Square	DF	F Statistic	P-Value	Decision(0.05)
Between	1.953521	1.953521	1	8.43	0.01981	Significant Effect
Error	1.854867	0.231858	8			
Total	3.80838752	2.1853789	9			

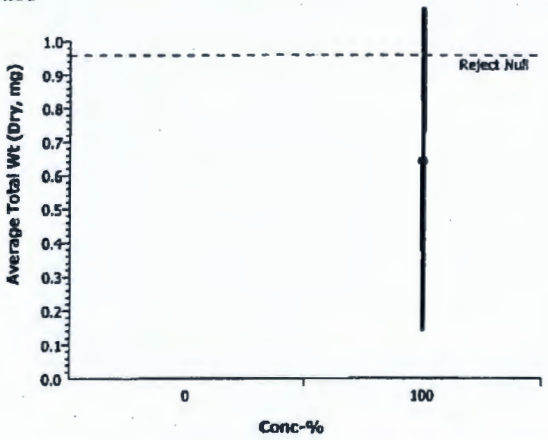
ANOVA Assumptions

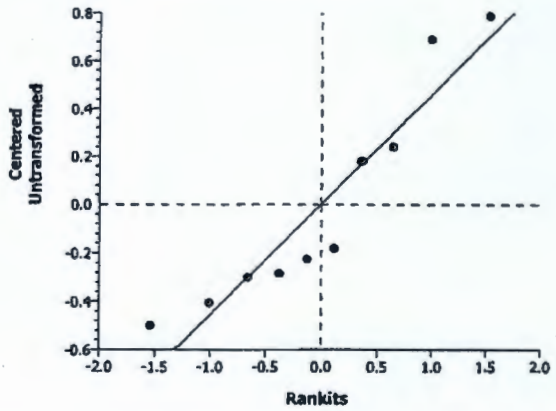
Attribute	Test	Statistic	Critical	P-Value	Decision(0.01)
Variances	Variance Ratio F	1.20911	23.15450	0.85844	Equal Variances
Distribution	Shapiro-Wilk W	0.87511		0.11462	Normal Distribution

Data Summary

			Original Data				Transformed Data			
Conc-%	Control Type	Count	Mean	Minimum	Maximum	SD	Mean	Minimum	Maximum	SD
0	Artificial Soil/S	5	1.52479	1.11799	2.21497	0.45816				
100		5	0.64082	0.14001	1.42749	0.50379				

Graphics





BLUEGRASS GROWTH TEST

Client: Washington Closure Hanford Project Seed ID: PS001 Test Start Date: February 23, 2007

Initials: Day 0 Bm Day 12 NJ Day 14 BO Day 18 NJ Day 19 — Day 21 BO Day 24/25 NJ Day 26 NJ Day 28 Bm Day 31 NJ Day 33 NJ Day 40 NJ

Bioassay Lab ID: BG 1719-04 Sample No: J13N49

CONC.	REPLICATE	# seeds germinated: 12 days after planting	14 days after planting	16 Emergence 17 Bm 18 days after planting	19 days after planting	21 days after planting	24 NJ 23 days after planting	Day 26 7-DAYS POST-EMERGENCE (33 days after planting)	25	31		14-DAYS POST-EMERGENCE (40 days after planting)	pH: INITIAL (@ planting)	FINAL (@ 14 days Post-Emergence)
Control	A	0	0	0		0	0	0	0	0	0	0	6.9	7.3
	B	0	0	0		0	0	NJ 0	0	0	0	0		
	C	0	0	0		0	0	0	0	0	0	0		
	D	0	0	0		1	1	1	1	1	1	1		
	E	0	0	0		0	0	0	0	0	0	0		

Day 28 Day 31

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

Replicate A: none
Replicate B: none
Replicate C: none
Replicate D: 1sm G
Replicate E: none

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

14-Days Post-Emergence: Describe shoot appearance:

Replicate A: none
Replicate B: none
Replicate C: none
Replicate D: 1sm G
Replicate E: none

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

	1st Seedling	2nd Seedling	3rd Seedling	4th Seedling	5th Seedling
Replicate A	mm	mm	mm	mm	mm
Replicate B	mm	mm	mm	mm	mm
Replicate C	mm	mm	mm	mm	mm
Replicate D	15 mm	mm	mm	mm	mm
Replicate E	mm	mm	mm	mm	mm

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

	Tin Tare Wt. (mg)	Wet Wt (mg)	Dry Wt. (mg)
Replicate A	1285.92	—	
Replicate B	1281.73	—	
Replicate C	1294.21	—	
Replicate D	1296.77	1298.~~88~~56 DW	1297.18
Replicate E	1288.08	—	

Describe root appearance:

Replicate A
Replicate B
Replicate C
Replicate D
Replicate E

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

	1st Seedling	2nd Seedling	3rd Seedling	4th Seedling	5th Seedling
Replicate A	mm	mm	mm	mm	mm
Replicate B	mm	mm	mm	mm	mm
Replicate C	mm	mm	mm	mm	mm
Replicate D	9 mm	mm	mm	mm	mm
Replicate E	mm	mm	mm	mm	mm

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

	Tin Tare Wt. (mg)	Wet Wt (mg)	Dry Wt. (mg)
Replicate A	1298.50	—	
Replicate B	1295.87	—	
Replicate C	1280.97	—	
Replicate D	1288.25	1288.31	1288.35
Replicate E	1288.80	—	

Comments:

CETIS Test Summary

Report Date: 16 Apr-07 11:01 AM
Test Link: 17-2228-0893/B171904psc

Plant Bioassay - Chronic — **CH2M Hill**

Test No:	13-6975-7771	**Test Type:**	Plant Chronic	**Duration:**	40d 0h
Start Date:	23 Feb-07	**Protocol:**	ASTM E1963-02 (2002)	**Species:**	Poa sandbergii
Ending Date:	04 Apr-07	**Dil Water:**		**Source:**	
Setup Date:	23 Feb-07 12:00 AM	**Brine:**			

Sample No:	11-5720-4822	**Code:**	B1719-04	**Client:**	
Sample Date:	04 Dec-06	**Material:**	Soil	**Project:**	
Receive Date:		**Source:**	ELR-Washington Closure Hanford		
Sample Age:	81d 0h	**Station:**			

Comments: J13NY9

Comparison Summary

Analysis	Endpoint	NOEL	LOEL	ChV	PMSD	Method
13-3907-8714	% Germination	< 100	100	N/A	25.76%	Wilcoxon Rank Sum Two-Sample
16-2142-2916	Average Height (mm)	< 100	100	N/A	52.47%	Equal Variance t Two-Sample
11-0493-8132	Average Length (mm)	< 100	100	N/A	27.25%	Equal Variance t Two-Sample
10-1648-3939	Average AG Wt (Wet, mg)	< 100	100	N/A	51.47%	Equal Variance t Two-Sample
18-0062-9618	Average AG Wt (Dry, mg)	100	> 100	N/A	71.73%	Equal Variance t Two-Sample
05-9462-3898	Average Root Wt. (Wet, mg	100	> 100	N/A	111.60%	Equal Variance t Two-Sample
15-3556-5649	Average Root Wt. (Dry, mg)	< 100	100	N/A	65.65%	Equal Variance t Two-Sample
13-6635-1274	Average Total Wt (Wet, mg	< 100	100	N/A	70.15%	Equal Variance t Two-Sample
16-9960-9661	Average Total Wt (Dry, mg)	100	> 100	N/A	70.17%	Equal Variance t Two-Sample

CETIS Test Summary

Report Date: 16 Apr-07 11:01 AM
Test Link: 17-2228-0893/B171904psc

% Germination Summary

Conc-%	Control Type	Reps	Mean	Minimum	Maximum	SE	SD	CV
0	Artificial Soil/S	5	0.84000	0.40000	1.00000	0.11662	0.26077	31.04%
100		5	0.04000	0.00000	0.20000	0.04000	0.08944	223.61

Average Height (mm) Summary

Conc-%	Control Type	Reps	Mean	Minimum	Maximum	SE	SD	CV
0	Artificial Soil/S	5	61.2	48.400	84.5	6.1496	13.751	22.47%
100		5	15	15	15			

Average Length (mm) Summary

Conc-%	Control Type	Reps	Mean	Minimum	Maximum	SE	SD	CV
0	Artificial Soil/S	5	46.98	38.8	53	2.4520	5.4829	11.67%
100		5	9	9	9			

Average AG Wt (Wet, mg) Summary

Conc-%	Control Type	Reps	Mean	Minimum	Maximum	SE	SD	CV
0	Artificial Soil/S	5	8.3775	6.1	10.580	0.8257	1.8462	22.04%
100		5	1.7900	1.7900	1.7900			

Average AG Wt (Dry, mg) Summary

Conc-%	Control Type	Reps	Mean	Minimum	Maximum	SE	SD	CV
0	Artificial Soil/S	5	1.21170	0.86799	1.76001	0.16645	0.37220	30.72%
100		5	0.41003	0.41003	0.41003			

Average Root Wt. (Wet, mg) Summary

Conc-%	Control Type	Reps	Mean	Minimum	Maximum	SE	SD	CV
0	Artificial Soil/S	5	4.55901	2.72400	7.64001	0.97430	2.17861	47.79%
100		5	0.12000	0.12000	0.12000			

Average Root Wt. (Dry, mg) Summary

Conc-%	Control Type	Reps	Mean	Minimum	Maximum	SE	SD	CV
0	Artificial Soil/S	5	0.31309	0.25000	0.45496	0.03936	0.08801	28.11%
100		5	0.09998	0.09998	0.09998			

Average Total Wt (Wet, mg) Summary

Conc-%	Control Type	Reps	Mean	Minimum	Maximum	SE	SD	CV
0	Artificial Soil/S	5	12.937	9.198	17.588	1.7379	3.886	30.04%
100		5	1.9100	1.9100	1.9100			

Average Total Wt (Dry, mg) Summary

Conc-%	Control Type	Reps	Mean	Minimum	Maximum	SE	SD	CV
0	Artificial Soil/S	5	1.52479	1.11799	2.21497	0.20490	0.45816	30.05%
100		5	0.51001	0.51001	0.51001			

CETIS Test Summary

Report Date: 16 Apr-07 11:01 AM
Test Link: 17-2228-0893/B171904psc

% Germination Detail

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

Average Height (mm) Detail

Conc-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Artificial Soil/S	54.8	84.5	58.8	59.5	48.4000
100		Missing	Missing	Missing	15	Missing

Average Length (mm) Detail

Conc-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Artificial Soil/S	50	48.5	44.6	53	38.8
100		Missing	Missing	Missing	9	Missing

Average AG Wt (Wet, mg) Detail

Conc-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Artificial Soil/S	6.1	10.5800	7.548	9.94751	7.71199
100		Missing	Missing	Missing	1.79004	Missing

Average AG Wt (Dry, mg) Detail

Conc-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Artificial Soil/S	0.86799	1.76001	0.95598	1.42252	1.05200
100		Missing	Missing	Missing	0.41003	Missing

Average Root Wt. (Wet, mg) Detail

Conc-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Artificial Soil/S	3.09800	6.07501	2.72400	7.64001	3.25801
100		Missing	Missing	Missing	0.12000	Missing

Average Root Wt. (Dry, mg) Detail

Conc-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Artificial Soil/S	0.25000	0.45496	0.26802	0.34250	0.25000
100		Missing	Missing	Missing	0.09998	Missing

Average Total Wt (Wet, mg) Detail

Conc-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Artificial Soil/S	9.198	16.6550	10.272	17.5875	10.97
100		Missing	Missing	Missing	1.91003	Missing

Average Total Wt (Dry, mg) Detail

Conc-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Artificial Soil/S	1.11799	2.21497	1.22400	1.76501	1.30200
100		Missing	Missing	Missing	0.51001	Missing

CETIS Analysis Detail

Plant Bioassay - Chronic — **CH2M Hill**

Sample No:	11-5720-4822	**Code:**	B1719-04	**Client:**	
Sample Date:	04 Dec-06	**Material:**	Soil	**Project:**	
Receive Date:		**Source:**	ELR-Washington Closure Hanford		
Sample Age:	81d 0h	**Station:**			

Comments: J13NY9

Endpoint	Analysis Type	Sample Link	Control Link	Date Analyzed	Version
% Germination	Comparison	17-2228-0893	17-2228-0893	16 Apr-07 11:00 AM	CETISv1.1.2

Method	Alt H	Data Transform	Zeta	NOEL	LOEL	Toxic Units	ChV	PMSD
Wilcoxon Rank Sum Two-Sample	C > T	Rank		<100	100		N/A	25.76%

Group Comparisons

Control	vs	Conc-%	Statistic	Critical	P-Value	Ties	Decision(0.05)
Artificial Soil/Sedi		100	15		0.0040	0	Significant Effect

ANOVA Table

Source	Sum of Squares	Mean Square	DF	F Statistic	P-Value	Decision(0.05)
Between	1.990958	1.990958	1	42.26	0.00019	Significant Effect
Error	0.3768871	0.047111	8			
Total	2.36784527	2.0380691	9			

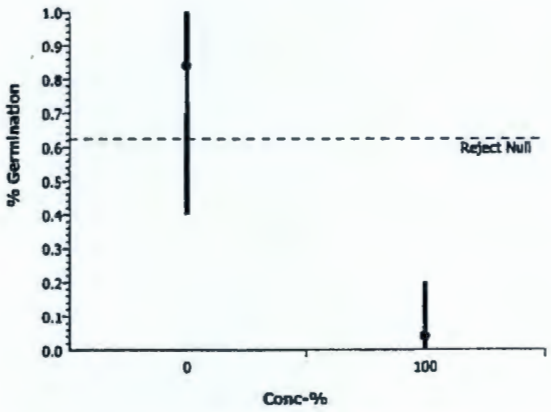
ANOVA Assumptions

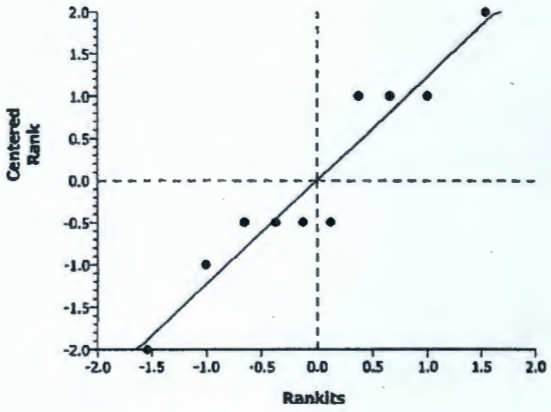
Attribute	Test	Statistic	Critical	P-Value	Decision(0.01)
Variances	Variance Ratio F	7.30764	23.15450	0.07996	Equal Variances
Distribution	Shapiro-Wilk W	0.77413		0.00702	Non-normal Distribution

Data Summary

			Original Data				Transformed Data			
Conc-%	Control Type	Count	Mean	Minimum	Maximum	SD	Mean	Minimum	Maximum	SD
0	Artificial Soil/S	5	0.84000	0.40000	1.00000	0.26077	8.00000	6.00000	9.00000	1.41421
100		5	0.04000	0.00000	0.20000	0.08944	3.00000	2.50000	5.00000	1.11803

Graphics





CETIS Analysis Detail

Plant Bioassay - Chronic — **CH2M Hill**

Sample No:	11-5720-4822	**Code:**	B1719-04	**Client:**	
Sample Date:	04 Dec-06	**Material:**	Soil	**Project:**	
Receive Date:		**Source:**	ELR-Washington Closure Hanford		
Sample Age:	81d 0h	**Station:**			

Comments: J13NY9

Endpoint	Analysis Type	Sample Link	Control Link	Date Analyzed	Version
Average Height (mm)	Comparison	17-2228-0893	17-2228-0893	16 Apr-07 11:00 AM	CETISv1.1.2

Method	Alt H	Data Transform	Zeta	NOEL	LOEL	Toxic Units	ChV	PMSD
Equal Variance t Two-Sample	C > T	Untransformed		<100	100		N/A	52.47%

Group Comparisons

Control vs	Conc-%	Statistic	Critical	P-Value	MSD	Decision(0.05)
Artificial Soil/Sedi	100	3.06706	2.13185	0.0187	32.1126	Significant Effect

ANOVA Table

Source	Sum of Squares	Mean Square	DF	F Statistic	P-Value	Decision(0.05)
Between	1778.7	1778.7	1	9.41	0.03740	Significant Effect
Error	756.34	189.085	4			
Total	2535.03992	1967.7849	5			

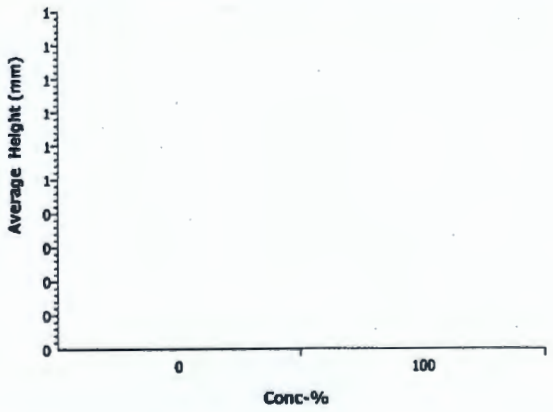
ANOVA Assumptions

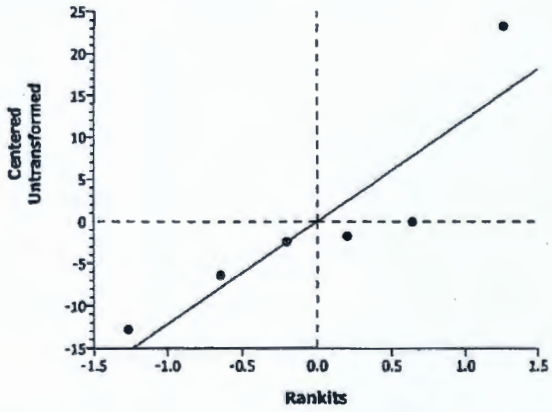
Attribute	Test	Statistic	Critical	P-Value	Decision(0.01)
Distribution	Shapiro-Wilk W	0.83096		0.10951	Normal Distribution

Data Summary

			Original Data				Transformed Data			
Conc-%	Control Type	Count	Mean	Minimum	Maximum	SD	Mean	Minimum	Maximum	SD
0	Artificial Soil/S	5	61.2	48.4	84.5	13.751				
100		1	15	15	15					

Graphics





CETIS Analysis Detail

Plant Bioassay - Chronic — **CH2M HIII**

Sample No:	11-5720-4822	**Code:**	B1719-04	**Client:**	
Sample Date:	04 Dec-06	**Material:**	Soil	**Project:**	
Receive Date:		**Source:**	ELR-Washington Closure Hanford		
Sample Age:	81d 0h	**Station:**			

Comments: J13NY9

Endpoint	Analysis Type	Sample Link	Control Link	Date Analyzed	Version
Average Length (mm)	Comparison	17-2228-0893	17-2228-0893	16 Apr-07 11:00 AM	CETISv1.1.2

Method	Alt H	Data Transform	Zeta	NOEL	LOEL	Toxic Units	ChV	PMSD
Equal Variance t Two-Sample	C > T	Untransformed		<100	100		N/A	27.25%

Group Comparisons

Control	vs	Conc-%	Statistic	Critical	P-Value	MSD	Decision(0.05)
Artificial Soil/Sedi		100	6.32347	2.13185	0.0016	12.8043	Significant Effect

ANOVA Table

Source	Sum of Squares	Mean Square	DF	F Statistic	P-Value	Decision(0.05)
Between	1202.067	1202.067	1	39.99	0.00320	Significant Effect
Error	120.248	30.062	4			
Total	1322.31503	1232.1290	5			

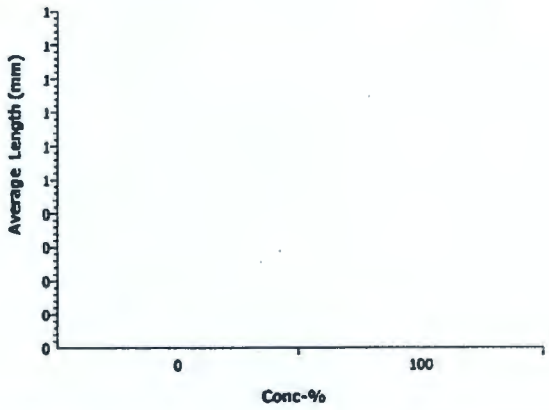
ANOVA Assumptions

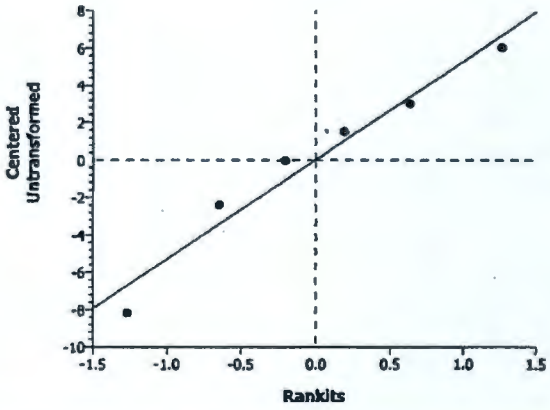
Attribute	Test	Statistic	Critical	P-Value	Decision(0.01)
Distribution	Shapiro-Wilk W	0.96644		0.86772	Normal Distribution

Data Summary

			Original Data				Transformed Data			
Conc-%	Control Type	Count	Mean	Minimum	Maximum	SD	Mean	Minimum	Maximum	SD
0	Artificial Soil/S	5	46.98	38.8	53	5.4829				
100		1	9	9	9					

Graphics





CETIS Analysis Detail

Plant Bioassay - Chronic — **CH2M Hill**

Sample No:	11-5720-4822	**Code:**	B1719-04	**Client:**	
Sample Date:	04 Dec-06	**Material:**	Soil	**Project:**	
Receive Date:		**Source:**	ELR-Washington Closure Hanford		
Sample Age:	81d 0h	**Station:**			

Comments: J13NY9

Endpoint	Analysis Type	Sample Link	Control Link	Date Analyzed	Version
Average AG Wt (Wet, mg)	Comparison	17-2228-0893	17-2228-0893	16 Apr-07 11:00 AM	CETISv1.1.2

Method	Alt H	Data Transform	Zeta	NOEL	LOEL	Toxic Units	ChV	PMSD
Equal Variance t Two-Sample	C > T	Untransformed		<100	100		N/A	51.47%

Group Comparisons

Control	vs	Conc-%	Statistic	Critical	P-Value	MSD	Decision(0.05)
Artificial Soil/Sedi		100	3.25721	2.13185	0.0156	4.3115	Significant Effect

ANOVA Table

Source	Sum of Squares	Mean Square	DF	F Statistic	P-Value	Decision(0.05)
Between	36.16223	36.16223	1	10.61	0.03116	Significant Effect
Error	13.634	3.4085	4			
Total	49.7962275	39.570728	5			

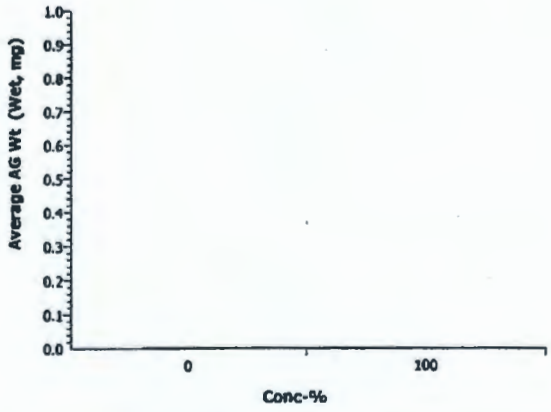
ANOVA Assumptions

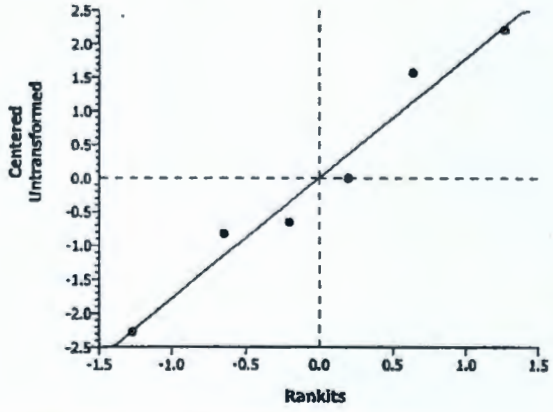
Attribute	Test	Statistic	Critical	P-Value	Decision(0.01)
Distribution	Shapiro-Wilk W	0.95735		0.79911	Normal Distribution

Data Summary

			Original Data				Transformed Data			
Conc-%	Control Type	Count	Mean	Minimum	Maximum	SD	Mean	Minimum	Maximum	SD
0	Artificial Soil/S	5	8.3775	6.1	10.580	1.8462				
100		1	1.7900	1.7900	1.7900					

Graphics





CETIS Analysis Detail

Plant Bioassay - Chronic — **CH2M Hill**

Sample No:	11-5720-4822	**Code:**	B1719-04	**Client:**	
Sample Date:	04 Dec-06	**Material:**	Soil	**Project:**	
Receive Date:		**Source:**	ELR-Washington Closure Hanford		
Sample Age:	81d 0h	**Station:**			

Comments: J13NY9

Endpoint	Analysis Type	Sample Link	Control Link	Date Analyzed	Version
Average AG Wt (Dry, mg)	Comparison	17-2228-0893	17-2228-0893	16 Apr-07 11:00 AM	CETISv1.1.2

Method	Alt H	Data Transform	Zeta	NOEL	LOEL	Toxic Units	ChV	PMSD
Equal Variance t Two-Sample	C > T	Untransformed		100	>100	1	N/A	71.73%

Group Comparisons

Control	vs	Conc-%	Statistic	Critical	P-Value	MSD	Decision(0.05)
Artificial Soil/Sedi		100	1.96622	2.13185	0.0603	0.8692	Non-Significant Effect

ANOVA Table

Source	Sum of Squares	Mean Square	DF	F Statistic	P-Value	Decision(0.05)
Between	0.5355573	0.535557	1	3.87	0.12069	Non-Significant Effect
Error	0.5541168	0.138529	4			
Total	1.08967412	0.6740865	5			

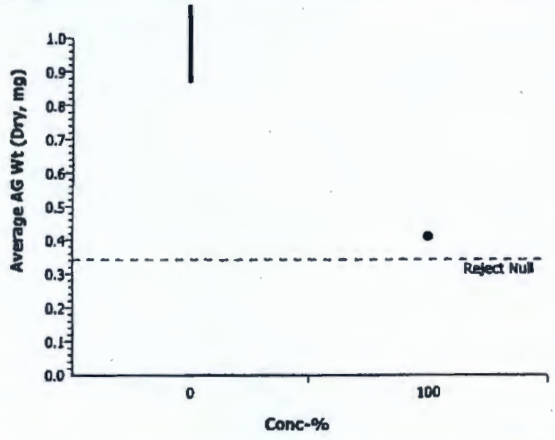
ANOVA Assumptions

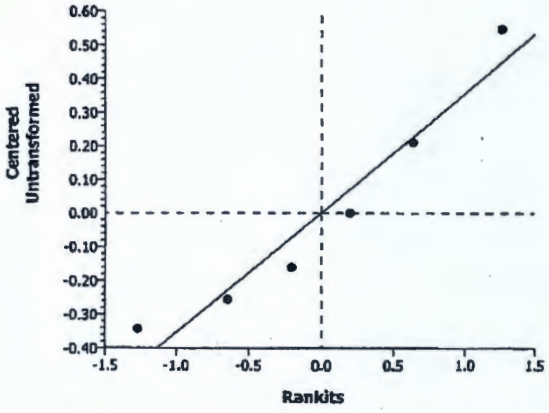
Attribute	Test	Statistic	Critical	P-Value	Decision(0.01)
Distribution	Shapiro-Wilk W	0.93190		0.59485	Normal Distribution

Data Summary

			Original Data				Transformed Data			
Conc-%	Control Type	Count	Mean	Minimum	Maximum	SD	Mean	Minimum	Maximum	SD
0	Artificial Soil/S	5	1.21170	0.86799	1.76001	0.37220				
100		1	0.41003	0.41003	0.41003					

Graphics





CETIS Analysis Detail

Plant Bioassay - Chronic — **CH2M Hill**

Sample No:	11-5720-4822	**Code:**	B1719-04	**Client:**	
Sample Date:	04 Dec-06	**Material:**	Soil	**Project:**	
Receive Date:		**Source:**	ELR-Washington Closure Hanford		
Sample Age:	81d 0h	**Station:**			

Comments: J13NY9

Endpoint	Analysis Type	Sample Link	Control Link	Date Analyzed	Version
Average Root Wt. (Wet, mg)	Comparison	17-2228-0893	17-2228-0893	16 Apr-07 11:00 AM	CETISv1.1.2

Method	Alt H	Data Transform	Zeta	NOEL	LOEL	Toxic Units	ChV	PMSD
Equal Variance t Two-Sample	C > T	Untransformed		100	>100	1	N/A	111.60%

Group Comparisons

Control vs	Conc-%	Statistic	Critical	P-Value	MSD	Decision(0.05)
Artificial Soil/Sedi	100	1.86002	2.13185	0.0682	5.08774	Non-Significant Effect

ANOVA Table

Source	Sum of Squares	Mean Square	DF	F Statistic	P-Value	Decision(0.05)
Between	16.42068	16.42068	1	3.46	0.13640	Non-Significant Effect
Error	18.98528	4.74632	4			
Total	35.4059658	21.167005	5			

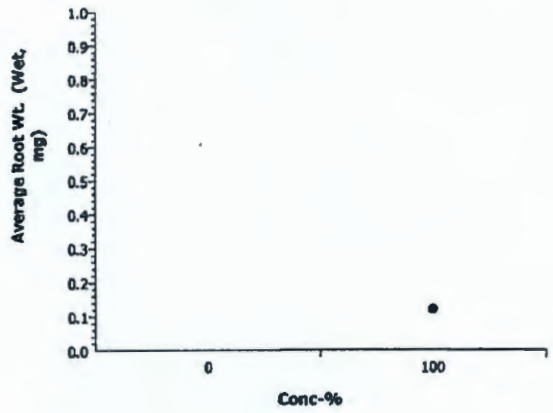
ANOVA Assumptions

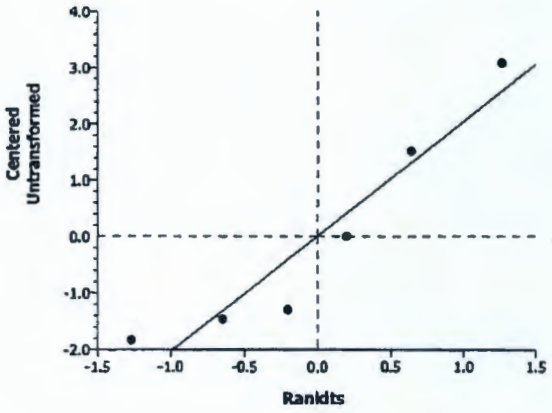
Attribute	Test	Statistic	Critical	P-Value	Decision(0.01)
Distribution	Shapiro-Wilk W	0.89034		0.31995	Normal Distribution

Data Summary

			Original Data				Transformed Data			
Conc-%	Control Type	Count	Mean	Minimum	Maximum	SD	Mean	Minimum	Maximum	SD
0	Artificial Soil/S	5	4.55901	2.72400	7.64001	2.17861				
100		1	0.12000	0.12000	0.12000					

Graphics





CETIS Analysis Detail

Plant Bioassay - Chronic — **CH2M Hill**

Sample No:	11-5720-4822	**Code:**	B1719-04	**Client:**	
Sample Date:	04 Dec-06	**Material:**	Soil	**Project:**	
Receive Date:		**Source:**	ELR-Washington Closure Hanford		
Sample Age:	81d 0h	**Station:**			

Comments: J13NY9

Endpoint	Analysis Type	Sample Link	Control Link	Date Analyzed	Version
Average Root Wt. (Dry, mg)	Comparison	17-2228-0893	17-2228-0893	16 Apr-07 11:00 AM	CETISv1.1.2

Method	Alt H	Data Transform	Zeta	NOEL	LOEL	Toxic Units	ChV	PMSD
Equal Variance t Two-Sample	C > T	Untransformed		<100	100		N/A	65.65%

Group Comparisons

Control	vs	Conc-%	Statistic	Critical	P-Value	MSD	Decision(0.05)
Artificial Soil/Sedi		100	2.21054	2.13185	0.0458	0.20553	Significant Effect

ANOVA Table

Source	Sum of Squares	Mean Square	DF	F Statistic	P-Value	Decision(0.05)
Between	0.0378497	0.03785	1	4.89	0.09157	Non-Significant Effect
Error	0.0309831	0.007746	4			
Total	0.06883279	0.0455955	5			

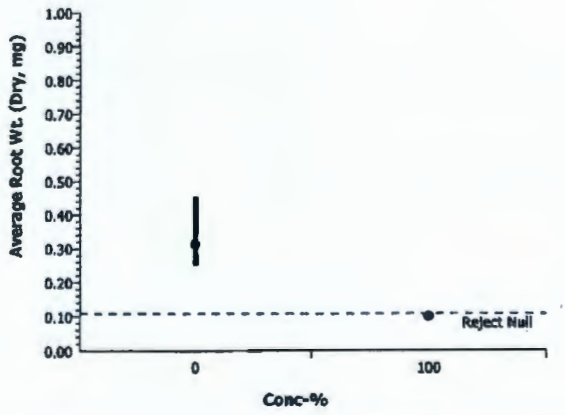
ANOVA Assumptions

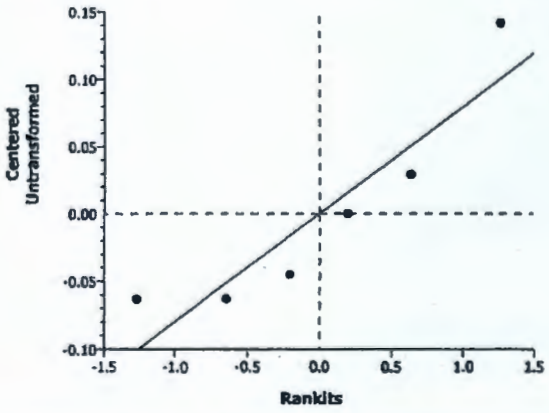
Attribute	Test	Statistic	Critical	P-Value	Decision(0.01)
Distribution	Shapiro-Wilk W	0.84417		0.14109	Normal Distribution

Data Summary

			Original Data				Transformed Data			
Conc-%	Control Type	Count	Mean	Minimum	Maximum	SD	Mean	Minimum	Maximum	SD
0	Artificial Soil/S	5	0.31309	0.25000	0.45496	0.08801				
100		1	0.09998	0.09998	0.09998					

Graphics





CETIS Analysis Detail

Plant Bioassay - Chronic — **CH2M Hill**

Sample No:	11-5720-4822	**Code:**	B1719-04	**Client:**	
Sample Date:	04 Dec-06	**Material:**	Soil	**Project:**	
Receive Date:		**Source:**	ELR-Washington Closure Hanford		
Sample Age:	81d 0h	**Station:**			

Comments: J13NY9

Endpoint	Analysis Type	Sample Link	Control Link	Date Analyzed	Version
Average Total Wt (Wet, mg)	Comparison	17-2228-0893	17-2228-0893	16 Apr-07 11:00 AM	CETISv1.1.2

Method	Alt H	Data Transform	Zeta	NOEL	LOEL	Toxic Units	ChV	PMSD
Equal Variance t Two-Sample	C > T	Untransformed		<100	100		N/A	70.15%

Group Comparisons

Control	vs	Conc-%	Statistic	Critical	P-Value	MSD	Decision(0.05)
Artificial Soil/Sedi		100	2.59029	2.13185	0.0303	9.07495	Significant Effect

ANOVA Table

Source	Sum of Squares	Mean Square	DF	F Statistic	P-Value	Decision(0.05)
Between	101.3193	101.3193	1	6.71	0.06067	Non-Significant Effect
Error	60.4026	15.10065	4			
Total	161.721889	116.41994	5			

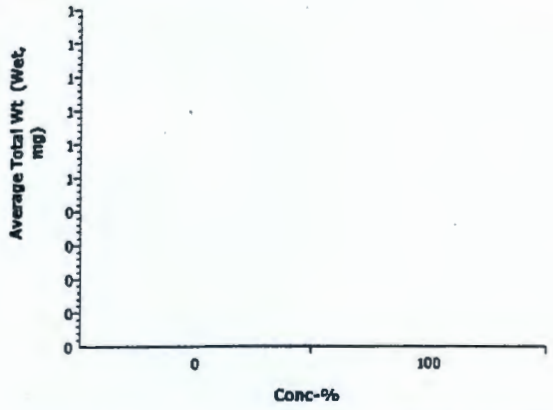
ANOVA Assumptions

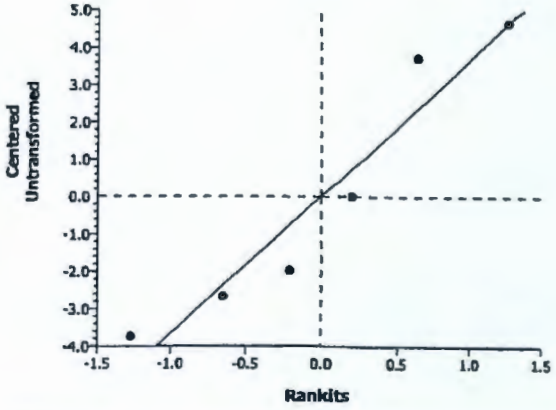
Attribute	Test	Statistic	Critical	P-Value	Decision(0.01)
Distribution	Shapiro-Wilk W	0.89670		0.35482	Normal Distribution

Data Summary

			Original Data				Transformed Data			
Conc-%	Control Type	Count	Mean	Minimum	Maximum	SD	Mean	Minimum	Maximum	SD
0	Artificial Soil/S	5	12.937	9.198	17.588	3.886				
100		1	1.9100	1.9100	1.9100					

Graphics





CETIS Analysis Detail

Plant Bioassay - Chronic — **CH2M Hill**

Sample No:	11-5720-4822	**Code:**	B1719-04	**Client:**	
Sample Date:	04 Dec-06	**Material:**	Soil	**Project:**	
Receive Date:		**Source:**	ELR-Washington Closure Hanford		
Sample Age:	81d 0h	**Station:**			

Comments: J13NY9

Endpoint	Analysis Type	Sample Link	Control Link	Date Analyzed	Version
Average Total Wt (Dry, mg)	Comparison	17-2228-0893	17-2228-0893	16 Apr-07 11:00 AM	CETISv1.1.2

Method	Alt H	Data Transform	Zeta	NOEL	LOEL	Toxic Units	ChV	PMSD
Equal Variance t Two-Sample	C > T	Untransformed		100	>100	1	N/A	70.17%

Group Comparisons

Control	vs	Conc-%	Statistic	Critical	P-Value	MSD	Decision(0.05)
Artificial Soil/Sedi		100	2.02193	2.13185	0.0566	1.06995	Non-Significant Effect

ANOVA Table

Source	Sum of Squares	Mean Square	DF	F Statistic	P-Value	Decision(0.05)
Between	0.8581574	0.858157	1	4.09	0.11325	Non-Significant Effect
Error	0.839644	0.209911	4			
Total	1.69780135	1.0680684	5			

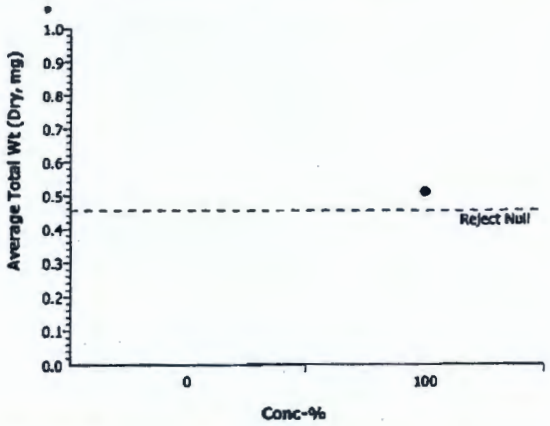
ANOVA Assumptions

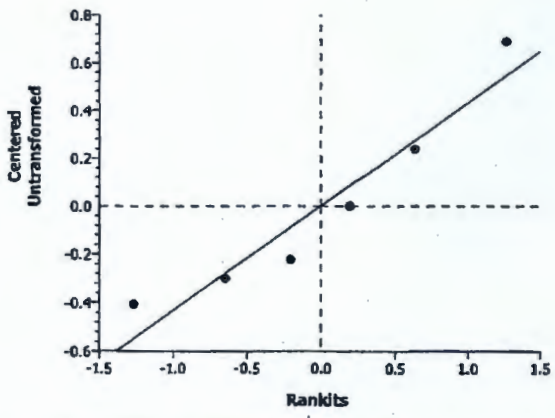
Attribute	Test	Statistic	Critical	P-Value	Decision(0.01)
Distribution	Shapiro-Wilk W	0.91571		0.47503	Normal Distribution

Data Summary

			Original Data				Transformed Data			
Conc-%	Control Type	Count	Mean	Minimum	Maximum	SD	Mean	Minimum	Maximum	SD
0	Artificial Soil/S	5	1.52479	1.11799	2.21497	0.45816				
100		1	0.51001	0.51001	0.51001					

Graphics





BLUEGRASS GROWTH TEST

Client: Washington Closure Hanford Project Seed ID: PS001 Test Start Date: February 23, 2007

Initials: Day 0 Bm Day 12 NJ Day 14 [illegible] Day 18 NJ Day 19 — Day 21 [illegible] Day 24 NJ Day 26 NH Day 28 Bm Day 31 NJ Day 33 NJ Day 40 NJ + Bm

Bioassay Lab ID: BG 1719-05 Sample No: J13 H44

CONC.	REPLICATE	# seeds germinated: 12 days after planting	14 days after planting	16 days after planting (Emergence)	19 days after planting	21 days after planting	24 days after planting	7-DAYS POST-EMERGENCE (33 days after planting) Day 24	28	31	14-DAYS POST-EMERGENCE (40 days after planting)	pH: INITIAL (@ planting)	FINAL (@ 14 days Post-Emergence)
Control	A	0	0	0	(	0	0	1	1	2	2	2	6.8 / 7.3
	B	0	0	1	(	1	3	3	3	3	3	3	
	C	0	0	0	)	1	1	1	2	2	2	2	
	D	2	2	2	)	2	2	3	3	3	3	3	
	E	0	0	0	(	0	1	1	1	1	1	1	

7-Days Post-Emergence: Selectively thin down to 5 Seedlings (leave the 5 tallest seedlings). Describe shoot appearance Day 25 Day 31

Replicate A: 2 Sm G
Replicate B: 1 med G, 2 Sm G
Replicate C: 2 Sm G
Replicate D: 2 med G, 1 Sm G
Replicate E: 1 Sm G

Appearance Code: Good (G) = deep green color with no brown, Brown (B) = brown color noted, # Lg = # of large plants (tallest, 5+ shoots), # Med = # of plants (smaller than large, fewer shoots), # Sm = # small plants (1-3 shoots)

14-Days Post-Emergence: Describe shoot appearance:

Replicate A: 2 med G
Replicate B: 1 lg G, 1 med G 1 sm G
Replicate C: 1 med G, 1 sm G
Replicate D: 1 lg G 1 med G w/4 B tips 1 sm G
Replicate E: 1 sm G

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

	1st Seedling	2nd Seedling	3rd Seedling	4th Seedling	5th Seedling
Replicate A	48 mm	31 mm	mm	mm	mm
Replicate B	74 mm	34 mm	4 mm	mm	mm
Replicate C	51 mm	13 mm	mm	mm	mm
Replicate D	61 mm	46 mm	23 mm	mm	mm
Replicate E	29 mm	mm	mm	mm	mm

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

	Tin Tare Wt. (mg)	Wet Wt (mg)	Dry Wt. (mg)
Replicate A	1291.22	1299.60	1292.11
Replicate B	1287.26	1307.33	1289.40
Replicate C	1288.17	1293.11	1289.35
Replicate D	1295.21	1328.36	1297.93
Replicate E	1302.94	1307.53	1303.53

Describe root appearance:

Replicate A
Replicate B
Replicate C
Replicate D
Replicate E

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

	1st Seedling	2nd Seedling	3rd Seedling	4th Seedling	5th Seedling
Replicate A	25 mm	33 mm	mm	mm	mm
Replicate B	5 mm	79 mm	36 mm	mm	mm
Replicate C	32 mm	13 mm	mm	mm	mm
Replicate D	63 mm	22 mm	41 mm	mm	mm
Replicate E	28 mm	mm	mm	mm	mm

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

	Tin Tare Wt. (mg)	Wet Wt (mg)	Dry Wt. (mg)
Replicate A	1289.77	1291.02	1289.95
Replicate B	1289.34	1302.70	1290.21
Replicate C	1300.66	1300.90	1300.84
Replicate D	1298.45	1351.55	1300.49
Replicate E	1300.67	1302.19	1300.80

Comments:

CETIS Test Summary

Report Date: 16 Apr-07 11:03 AM
Test Link: 16-8663-6257/B171905psc

Plant Bioassay - Chronic — **CH2M Hill**

Test No:	13-6975-7771	**Test Type:**	Plant Chronic	**Duration:**	40d 0h
Start Date:	23 Feb-07	**Protocol:**	ASTM E1963-02 (2002)	**Species:**	Poa sandbergii
Ending Date:	04 Apr-07	**Dil Water:**		**Source:**	
Setup Date:	23 Feb-07 12:00 AM	**Brine:**			

Sample No:	11-9771-9683	**Code:**	B1719-05	**Client:**	
Sample Date:	11 Dec-06	**Material:**	Soil	**Project:**	
Receive Date:		**Source:**	ELR-Washington Closure Hanford		
Sample Age:	74d 0h	**Station:**			

Comments: J13NY4

Comparison Summary

Analysis	Endpoint	NOEL	LOEL	ChV	PMSD	Method
13-3371-7864	% Germination	< 100	100	N/A	28.69%	Equal Variance t Two-Sample
05-0792-3654	Average Height (mm)	< 100	100	N/A	20.25%	Equal Variance t Two-Sample
14-6917-4301	Average Length (mm)	< 100	100	N/A	17.42%	Equal Variance t Two-Sample
13-1659-3037	Average AG Wt (Wet, mg)	100	> 100	N/A	37.52%	Equal Variance t Two-Sample
10-6058-3908	Average AG Wt (Dry, mg)	< 100	100	N/A	28.16%	Equal Variance t Two-Sample
08-4957-9787	Average Root Wt. (Wet, mg	100	> 100	N/A	139.99%	Equal Variance t Two-Sample
13-5105-8292	Average Root Wt. (Dry, mg)	100	> 100	N/A	70.64%	Equal Variance t Two-Sample
05-7321-3821	Average Total Wt (Wet, mg	100	> 100	N/A	72.44%	Equal Variance t Two-Sample
10-5070-4191	Average Total Wt (Dry, mg)	< 100	100	N/A	33.79%	Equal Variance t Two-Sample

CETIS Test Summary

Report Date: 16 Apr-07 11:03 AM
Test Link: 16-8663-6257/B171905psc

% Germination Summary

Conc-%	Control Type	Reps	Mean	Minimum	Maximum	SE	SD	CV
0	Artificial Soil/S	5	0.84000	0.40000	1.00000	0.11662	0.26077	31.04%
100		5	0.44000	0.20000	0.60000	0.07483	0.16733	38.03%

Average Height (mm) Summary

Conc-%	Control Type	Reps	Mean	Minimum	Maximum	SE	SD	CV
0	Artificial Soil/S	5	61.2	48.400	84.5	6.1496	13.751	22.47%
100		5	36.22	29	43.3	2.5689	5.7443	15.86%

Average Length (mm) Summary

Conc-%	Control Type	Reps	Mean	Minimum	Maximum	SE	SD	CV
0	Artificial Soil/S	5	46.98	38.8	53	2.4520	5.4829	11.67%
100		5	32.8	22.5	42	3.6558	8.1747	24.92%

Average AG Wt (Wet, mg) Summary

Conc-%	Control Type	Reps	Mean	Minimum	Maximum	SE	SD	CV
0	Artificial Soil/S	5	8.3775	6.1	10.580	0.8257	1.8462	22.04%
100		5	5.7980	2.47	11.050	1.4748	3.2977	56.88%

Average AG Wt (Dry, mg) Summary

Conc-%	Control Type	Reps	Mean	Minimum	Maximum	SE	SD	CV
0	Artificial Soil/S	5	1.21170	0.86799	1.76001	0.16645	0.37220	30.72%
100		5	0.64902	0.44501	0.90670	0.07717	0.17257	26.59%

Average Root Wt. (Wet, mg) Summary

Conc-%	Control Type	Reps	Mean	Minimum	Maximum	SE	SD	CV
0	Artificial Soil/S	5	4.5590	2.724	7.6400	0.9743	2.1786	47.79%
100		5	4.8837	0.12	17.700	3.2908	7.3585	150.68

Average Root Wt. (Dry, mg) Summary

Conc-%	Control Type	Reps	Mean	Minimum	Maximum	SE	SD	CV
0	Artificial Soil/S	5	0.31309	0.25000	0.45496	0.03936	0.08801	28.11%
100		5	0.25599	0.08997	0.68001	0.11224	0.25097	98.04%

Average Total Wt (Wet, mg) Summary

Conc-%	Control Type	Reps	Mean	Minimum	Maximum	SE	SD	CV
0	Artificial Soil/S	5	12.937	9.198	17.588	1.7379	3.886	30.04%
100		5	10.682	2.59	28.750	4.7301	10.577	99.02%

Average Total Wt (Dry, mg) Summary

Conc-%	Control Type	Reps	Mean	Minimum	Maximum	SE	SD	CV
0	Artificial Soil/S	5	1.52479	1.11799	2.21497	0.20490	0.45816	30.05%
100		5	0.90501	0.53497	1.58671	0.18657	0.41718	46.10%

CETIS Test Summary

Report Date: 16 Apr-07 11:03 AM
Test Link: 16-8663-6257/B171905psc

% Germination Detail

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

Average Height (mm) Detail

Conc-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Artificial Soil/S	54.8	84.5	58.8	59.5	48.4000
100		39.5	37.3	32	43.3	29

Average Length (mm) Detail

Conc-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Artificial Soil/S	50	48.5	44.6	53	38.8
100		31.5	40	22.5	42	28

Average AG Wt (Wet, mg) Detail

Conc-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Artificial Soil/S	6.1	10.5800	7.548	9.94751	7.71199
100		4.19000	6.68998	2.46997	11.0500	4.59009

Average AG Wt (Dry, mg) Detail

Conc-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Artificial Soil/S	0.86799	1.76001	0.95598	1.42252	1.05200
100		0.44501	0.71334	0.58997	0.90670	0.59009

Average Root Wt. (Wet, mg) Detail

Conc-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Artificial Soil/S	3.098	6.07501	2.724	7.64001	3.25801
100		0.625	4.45333	0.12	17.7000	1.5199

Average Root Wt. (Dry, mg) Detail

Conc-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Artificial Soil/S	0.25000	0.45496	0.26802	0.34250	0.25000
100		0.08997	0.29000	0.08997	0.68001	0.13000

Average Total Wt (Wet, mg) Detail

Conc-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Artificial Soil/S	9.198	16.6550	10.272	17.5875	10.97
100		4.81500	11.1433	2.58997	28.7500	6.10999

Average Total Wt (Dry, mg) Detail

Conc-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Artificial Soil/S	1.11799	2.21497	1.22400	1.76501	1.30200
100		0.53497	1.00334	0.67993	1.58671	0.72009

CETIS Analysis Detail

Plant Bioassay - Chronic — **CH2M Hill**

Sample No:	11-9771-9683	**Code:**	B1719-05	**Client:**	
Sample Date:	11 Dec-06	**Material:**	Soil	**Project:**	
Receive Date:		**Source:**	ELR-Washington Closure Hanford		
Sample Age:	74d 0h	**Station:**			

Comments: J13NY4

Endpoint	Analysis Type	Sample Link	Control Link	Date Analyzed	Version
% Germination	Comparison	16-8663-6257	16-8663-6257	16 Apr-07 11:02 AM	CETISv1.1.2

Method	Alt H	Data Transform	Zeta	NOEL	LOEL	Toxic Units	ChV	PMSD
Equal Variance t Two-Sample	C > T	Angular (Corrected)		<100	100		N/A	28.69%

Group Comparisons

Control	vs	Conc-%	Statistic	Critical	P-Value	MSD	Decision(0.05)
Artificial Soil/Sedi		100	2.94735	1.85955	0.0093	0.28044	Significant Effect

ANOVA Table

Source	Sum of Squares	Mean Square	DF	F Statistic	P-Value	Decision(0.05)
Between	0.4939401	0.493940	1	8.69	0.01850	Significant Effect
Error	0.4548845	0.056861	8			
Total	0.94882461	0.5508007	9			

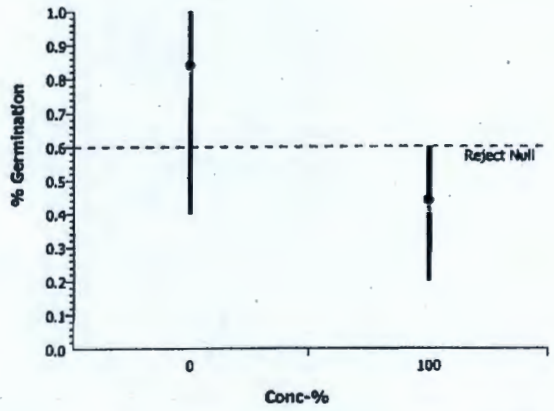
ANOVA Assumptions

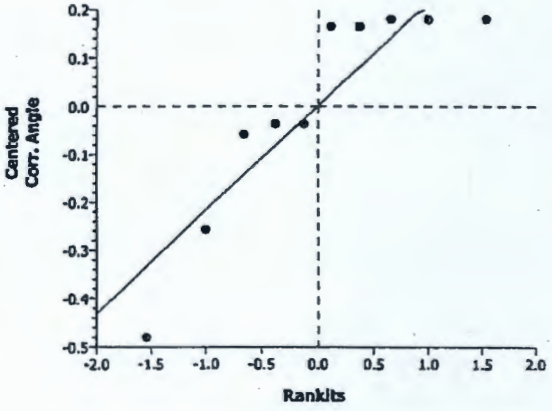
Attribute	Test	Statistic	Critical	P-Value	Decision(0.01)
Variances	Variance Ratio F	2.68734	23.15450	0.36151	Equal Variances
Distribution	Shapiro-Wilk W	0.80898		0.01863	Normal Distribution

Data Summary

			Original Data				Transformed Data			
Conc-%	Control Type	Count	Mean	Minimum	Maximum	SD	Mean	Minimum	Maximum	SD
0	Artificial Soil/S	5	0.84000	0.40000	1.00000	0.26077	1.16554	0.68472	1.34528	0.28789
100		5	0.44000	0.20000	0.60000	0.16733	0.72105	0.46365	0.88608	0.17562

Graphics





CETIS Analysis Detail

Plant Bioassay - Chronic — **CH2M Hill**

Sample No:	11-9771-9683	**Code:**	B1719-05	**Client:**	
Sample Date:	11 Dec-06	**Material:**	Soil	**Project:**	
Receive Date:		**Source:**	ELR-Washington Closure Hanford		
Sample Age:	74d 0h	**Station:**			

Comments: J13NY4

Endpoint	Analysis Type	Sample Link	Control Link	Date Analyzed	Version
Average Height (mm)	Comparison	16-8663-6257	16-8663-6257	16 Apr-07 11:02 AM	CETISv1.1.2

Method	Alt H	Data Transform	Zeta	NOEL	LOEL	Toxic Units	ChV	PMSD
Equal Variance t Two-Sample	C > T	Untransformed		<100	100		N/A	20.25%

Group Comparisons

Control	vs	Conc-%	Statistic	Critical	P-Value	MSD	Decision(0.05)
Artificial Soil/Sedi		100	3.74818	1.85955	0.0028	12.3931	Significant Effect

ANOVA Table

Source	Sum of Squares	Mean Square	DF	F Statistic	P-Value	Decision(0.05)
Between	1560.001	1560.001	1	14.05	0.00564	Significant Effect
Error	888.3279	111.041	8			
Total	2448.32904	1671.0421	9			

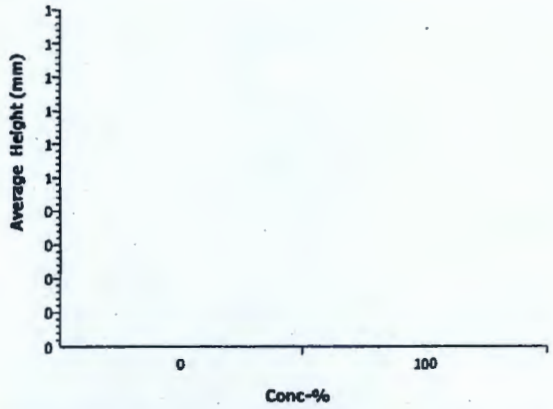
ANOVA Assumptions

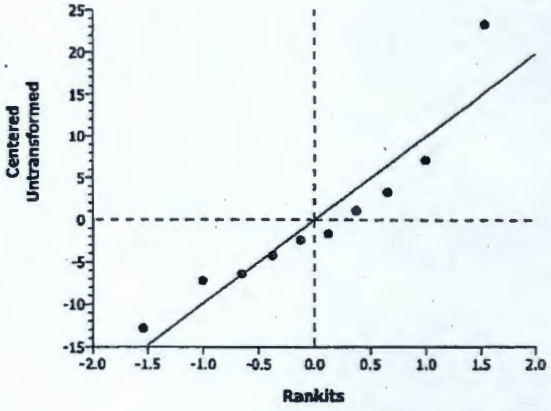
Attribute	Test	Statistic	Critical	P-Value	Decision(0.01)
Variances	Variance Ratio F	5.73037	23.15450	0.11934	Equal Variances
Distribution	Shapiro-Wilk W	0.89325		0.18443	Normal Distribution

Data Summary

			Original Data				Transformed Data			
Conc-%	Control Type	Count	Mean	Minimum	Maximum	SD	Mean	Minimum	Maximum	SD
0	Artificial Soil/S	5	61.2	48.4	84.5	13.751				
100		5	36.22	29	43.3	5.7443				

Graphics





CETIS Analysis Detail

Plant Bioassay - Chronic — **CH2M Hill**

Sample No:	11-9771-9683	**Code:**	B1719-05	**Client:**	
Sample Date:	11 Dec-06	**Material:**	Soil	**Project:**	
Receive Date:		**Source:**	ELR-Washington Closure Hanford		
Sample Age:	74d 0h	**Station:**			

Comments: J13NY4

Endpoint	Analysis Type	Sample Link	Control Link	Date Analyzed	Version
Average Length (mm)	Comparison	16-8663-6257	16-8663-6257	16 Apr-07 11:02 AM	CETISv1.1.2

Method	Alt H	Data Transform	Zeta	NOEL	LOEL	Toxic Units	ChV	PMSD
Equal Variance t Two-Sample	C > T	Untransformed		<100	100		N/A	17.42%

Group Comparisons

Control	vs	Conc-%	Statistic	Critical	P-Value	MSD	Decision(0.05)
Artificial Soil/Sedi		100	3.22128	1.85955	0.0061	8.18569	Significant Effect

ANOVA Table

Source	Sum of Squares	Mean Square	DF	F Statistic	P-Value	Decision(0.05)
Between	502.681	502.681	1	10.38	0.01222	Significant Effect
Error	387.548	48.4435	8			
Total	890.229004	551.12447	9			

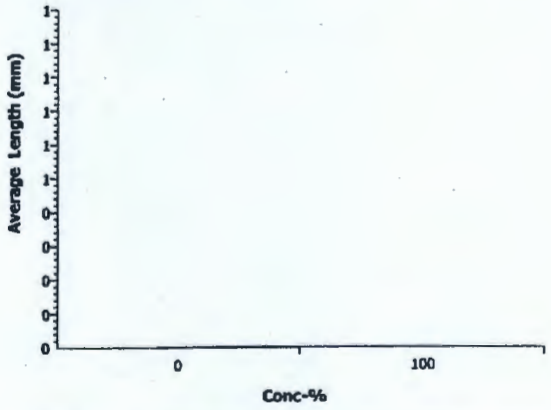
ANOVA Assumptions

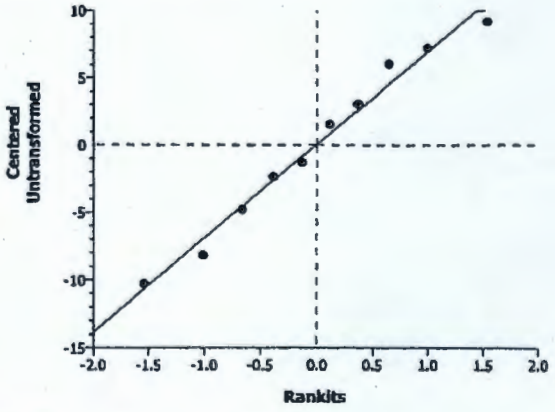
Attribute	Test	Statistic	Critical	P-Value	Decision(0.01)
Variances	Variance Ratio F	2.22291	23.15450	0.45815	Equal Variances
Distribution	Shapiro-Wilk W	0.96537		0.84492	Normal Distribution

Data Summary

			Original Data				Transformed Data			
Conc-%	Control Type	Count	Mean	Minimum	Maximum	SD	Mean	Minimum	Maximum	SD
0	Artificial Soil/S	5	46.98	38.8	53	5.4829				
100		5	32.8	22.5	42	8.1747				

Graphics





000-092-101-1 CETIS™ v1.1.2revl Analyst: Br Approval:_____

CETIS Analysis Detail

Plant Bioassay - Chronic | **CH2M Hill**

Sample No:	11-9771-9683	**Code:**	B1719-05	**Client:**	
Sample Date:	11 Dec-06	**Material:**	Soil	**Project:**	
Receive Date:		**Source:**	ELR-Washington Closure Hanford		
Sample Age:	74d 0h	**Station:**			

Comments: J13NY4

Endpoint	Analysis Type	Sample Link	Control Link	Date Analyzed	Version
Average AG Wt (Wet, mg)	Comparison	16-8663-6257	16-8663-6257	16 Apr-07 11:03 AM	CETISv1.1.2

Method	Alt H	Data Transform	Zeta	NOEL	LOEL	Toxic Units	ChV	PMSD
Equal Variance t Two-Sample	C > T	Untransformed		100	>100	1	N/A	37.52%

Group Comparisons

Control	vs	Conc-%	Statistic	Critical	P-Value	MSD	Decision(0.05)
Artificial Soil/Sedi		100	1.52617	1.85955	0.0827	3.14296	Non-Significant Effect

ANOVA Table

Source	Sum of Squares	Mean Square	DF	F Statistic	P-Value	Decision(0.05)
Between	16.63445	16.63445	1	2.33	0.16548	Non-Significant Effect
Error	57.13371	7.141713	8			
Total	73.7681561	23.776164	9			

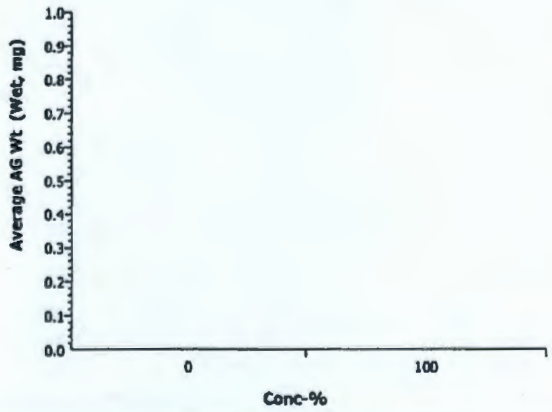
ANOVA Assumptions

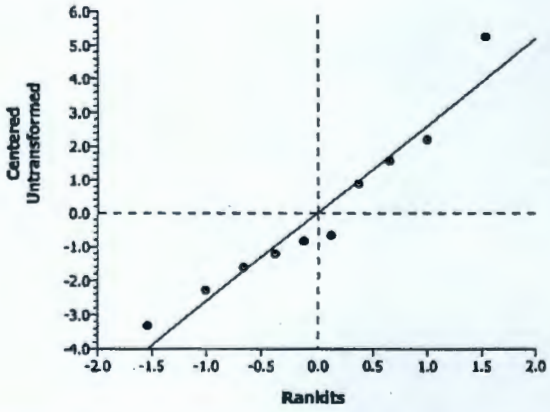
Attribute	Test	Statistic	Critical	P-Value	Decision(0.01)
Variances	Variance Ratio F	3.19053	23.15450	0.28732	Equal Variances
Distribution	Shapiro-Wilk W	0.94347		0.59217	Normal Distribution

Data Summary

			Original Data				Transformed Data			
Conc-%	Control Type	Count	Mean	Minimum	Maximum	SD	Mean	Minimum	Maximum	SD
0	Artificial Soil/S	5	8.3775	6.1	10.580	1.8462				
100		5	5.7980	2.47	11.050	3.2977				

Graphics





CETIS Analysis Detail

Plant Bioassay - Chronic — **CH2M Hill**

Sample No:	11-9771-9683	**Code:**	B1719-05	**Client:**	
Sample Date:	11 Dec-06	**Material:**	Soil	**Project:**	
Receive Date:		**Source:**	ELR-Washington Closure Hanford		
Sample Age:	74d 0h	**Station:**			

Comments: J13NY4

Endpoint	Analysis Type	Sample Link	Control Link	Date Analyzed	Version
Average AG Wt (Dry, mg)	Comparison	16-8663-6257	16-8663-6257	16 Apr-07 11:03 AM	CETISv1.1.2

Method	Alt H	Data Transform	Zeta	NOEL	LOEL	Toxic Units	ChV	PMSD
Equal Variance t Two-Sample	C > T	Untransformed		<100	100		N/A	28.16%

Group Comparisons

Control	vs	Conc-%	Statistic	Critical	P-Value	MSD	Decision(0.05)
Artificial Soil/Sedi		100	3.06687	1.85955	0.0077	0.34117	Significant Effect

ANOVA Table

Source	Sum of Squares	Mean Square	DF	F Statistic	P-Value	Decision(0.05)
Between	0.791525	0.791525	1	9.41	0.01542	Significant Effect
Error	0.6732329	0.084154	8			
Total	1.46475792	0.8756791	9			

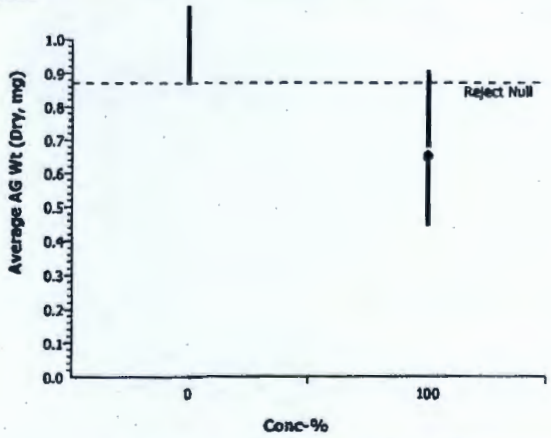
ANOVA Assumptions

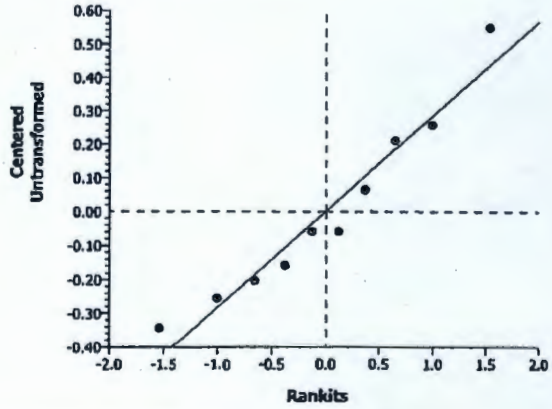
Attribute	Test	Statistic	Critical	P-Value	Decision(0.01)
Variances	Variance Ratio F	4.65190	23.15450	0.16567	Equal Variances
Distribution	Shapiro-Wilk W	0.94372		0.59513	Normal Distribution

Data Summary

			Original Data				Transformed Data			
Conc-%	Control Type	Count	Mean	Minimum	Maximum	SD	Mean	Minimum	Maximum	SD
0	Artificial Soil/S	5	1.21170	0.86799	1.76001	0.37220				
100		5	0.64902	0.44501	0.90670	0.17257				

Graphics





CETIS Analysis Detail

Plant Bioassay - Chronic — **CH2M Hill**

Sample No:	11-9771-9683	**Code:**	B1719-05	**Client:**	
Sample Date:	11 Dec-06	**Material:**	Soil	**Project:**	
Receive Date:		**Source:**	ELR-Washington Closure Hanford		
Sample Age:	74d 0h	**Station:**			

Comments: J13NY4

Endpoint	Analysis Type	Sample Link	Control Link	Date Analyzed	Version
Average Root Wt. (Wet, mg)	Comparison	16-8663-6257	16-8663-6257	16 Apr-07 11:03 AM	CETISv1.1.2

Method	Alt H	Data Transform	Zeta	NOEL	LOEL	Toxic Units	ChV	PMSD
Equal Variance t Two-Sample	C > T	Untransformed		100	>100	1	N/A	139.99%

Group Comparisons

Control	vs	Conc-%	Statistic	Critical	P-Value	MSD	Decision(0.05)
Artificial Soil/Sedi		100	-0.0946	1.85955	0.5365	6.38198	Non-Significant Effect

ANOVA Table

Source	Sum of Squares	Mean Square	DF	F Statistic	P-Value	Decision(0.05)
Between	0.2634852	0.263485	1	0.01	0.92696	Non-Significant Effect
Error	235.5735	29.44668	8			
Total	235.836956	29.710169	9			

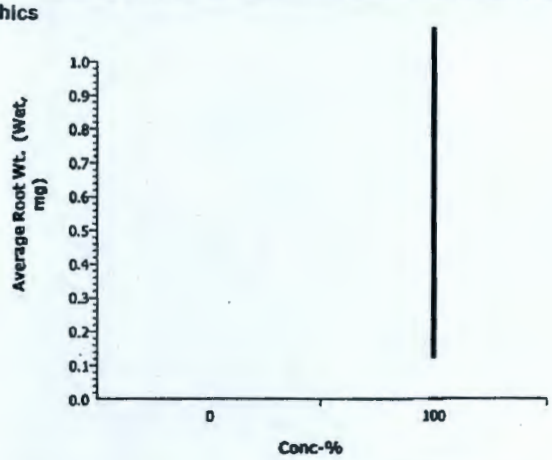
ANOVA Assumptions

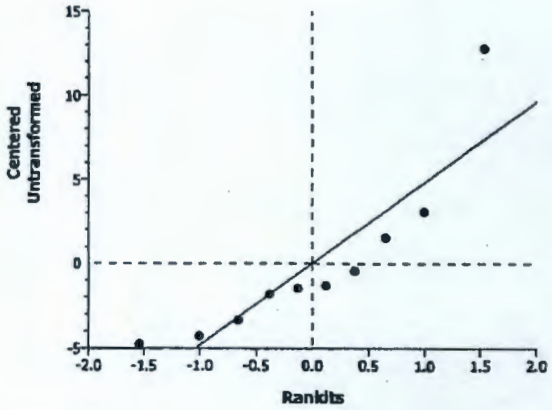
Attribute	Test	Statistic	Critical	P-Value	Decision(0.01)
Variances	Variance Ratio F	11.40822	23.15450	0.03688	Equal Variances
Distribution	Shapiro-Wilk W	0.79968		0.01437	Normal Distribution

Data Summary

			Original Data				Transformed Data			
Conc-%	Control Type	Count	Mean	Minimum	Maximum	SD	Mean	Minimum	Maximum	SD
0	Artificial Soil/S	5	4.55901	2.72400	7.64001	2.17861				
100		5	4.88365	0.12000	17.7000	7.35847				

Graphics





CETIS Analysis Detail

Plant Bioassay - Chronic — **CH2M Hill**

Sample No:	11-9771-9683	**Code:**	B1719-05	**Client:**	
Sample Date:	11 Dec-06	**Material:**	Soil	**Project:**	
Receive Date:		**Source:**	ELR-Washington Closure Hanford		
Sample Age:	74d 0h	**Station:**			

Comments: J13NY4

Endpoint	Analysis Type	Sample Link	Control Link	Date Analyzed	Version
Average Root Wt. (Dry, mg)	Comparison	16-8663-6257	16-8663-6257	16 Apr-07 11:03 AM	CETISv1.1.2

Method	Alt H	Data Transform	Zeta	NOEL	LOEL	Toxic Units	ChV	PMSD
Equal Variance t Two-Sample	C > T	Untransformed		100	>100	1	N/A	70.64%

Group Comparisons

Control	vs	Conc-%	Statistic	Critical	P-Value	MSD	Decision(0.05)
Artificial Soil/Sedi		100	0.48011	1.85955	0.3220	0.22118	Non-Significant Effect

ANOVA Table

Source	Sum of Squares	Mean Square	DF	F Statistic	P-Value	Decision(0.05)
Between	0.0081524	0.008152	1	0.23	0.64400	Non-Significant Effect
Error	0.2829354	0.035367	8			
Total	0.29108787	0.0435194	9			

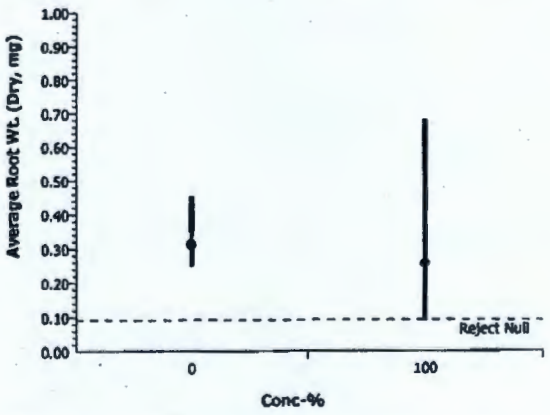
ANOVA Assumptions

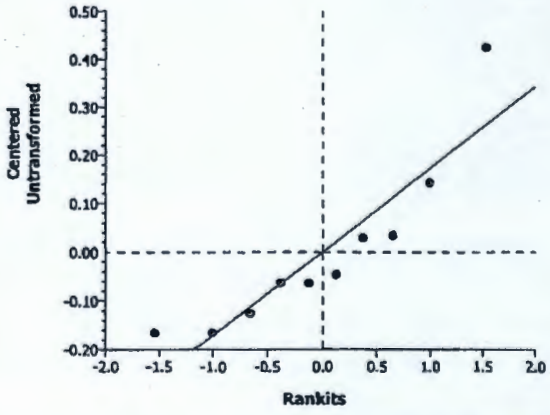
Attribute	Test	Statistic	Critical	P-Value	Decision(0.01)
Variances	Variance Ratio F	8.13194	23.15450	0.06670	Equal Variances
Distribution	Shapiro-Wilk W	0.83542		0.03888	Normal Distribution

Data Summary

			Original Data				Transformed Data			
Conc-%	Control Type	Count	Mean	Minimum	Maximum	SD	Mean	Minimum	Maximum	SD
0	Artificial Soil/S	5	0.31309	0.25000	0.45496	0.08801				
100		5	0.25599	0.08997	0.68001	0.25097				

Graphics





CETIS Analysis Detail

Plant Bioassay - Chronic — **CH2M Hill**

Sample No:	11-9771-9683	**Code:**	B1719-05	**Client:**	
Sample Date:	11 Dec-06	**Material:**	Soil	**Project:**	
Receive Date:		**Source:**	ELR-Washington Closure Hanford		
Sample Age:	74d 0h	**Station:**			

Comments: J13NY4

Endpoint	Analysis Type	Sample Link	Control Link	Date Analyzed	Version
Average Total Wt (Wet, mg)	Comparison	16-8663-6257	16-8663-6257	16 Apr-07 11:03 AM	CETISv1.1.2

Method	Alt H	Data Transform	Zeta	NOEL	LOEL	Toxic Units	ChV	PMSD
Equal Variance t Two-Sample	C > T	Untransformed		100	>100	1	N/A	72.44%

Group Comparisons

Control vs	Conc-%	Statistic	Critical	P-Value	MSD	Decision(0.05)
Artificial Soil/Sedi	100	0.44746	1.85955	0.3332	9.37068	Non-Significant Effect

ANOVA Table

Source	Sum of Squares	Mean Square	DF	F Statistic	P-Value	Decision(0.05)
Between	12.71085	12.71085	1	0.20	0.66641	Non-Significant Effect
Error	507.8755	63.48443	8			
Total	520.586308	76.195282	9			

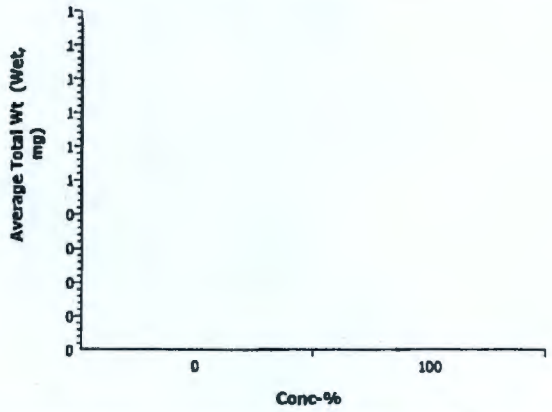
ANOVA Assumptions

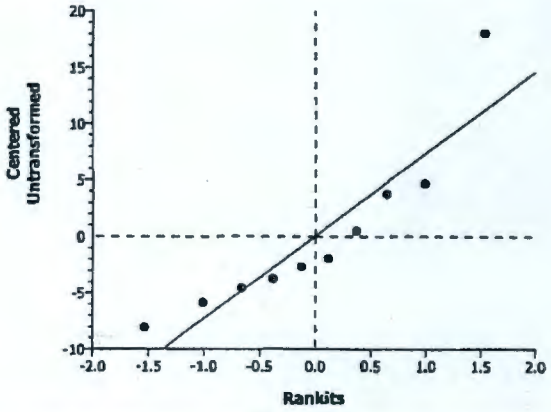
Attribute	Test	Statistic	Critical	P-Value	Decision(0.01)
Variances	Variance Ratio F	7.40817	23.15450	0.07814	Equal Variances
Distribution	Shapiro-Wilk W	0.85097		0.05966	Normal Distribution

Data Summary

			Original Data				Transformed Data			
Conc-%	Control Type	Count	Mean	Minimum	Maximum	SD	Mean	Minimum	Maximum	SD
0	Artificial Soil/S	5	12.937	9.198	17.588	3.886				
100		5	10.682	2.59	28.750	10.577				

Graphics





CETIS Analysis Detail

Plant Bioassay - Chronic — **CH2M Hill**

Sample No:	11-9771-9683	**Code:**	B1719-05	**Client:**	
Sample Date:	11 Dec-06	**Material:**	Soil	**Project:**	
Receive Date:		**Source:**	ELR-Washington Closure Hanford		
Sample Age:	74d 0h	**Station:**			

Comments: J13NY4

Endpoint	Analysis Type	Sample Link	Control Link	Date Analyzed	Version
Average Total Wt (Dry, mg)	Comparison	16-8663-6257	16-8663-6257	16 Apr-07 11:03 AM	CETISv1.1.2

Method	Alt H	Data Transform	Zeta	NOEL	LOEL	Toxic Units	ChV	PMSD
Equal Variance t Two-Sample	C > T	Untransformed		<100	100		N/A	33.79%

Group Comparisons

Control	vs	Conc-%	Statistic	Critical	P-Value	MSD	Decision(0.05)
Artificial Soil/Sedi		100	2.2366	1.85955	0.0279	0.51530	Significant Effect

ANOVA Table

Source	Sum of Squares	Mean Square	DF	F Statistic	P-Value	Decision(0.05)
Between	0.9603366	0.960337	1	5.00	0.05572	Non-Significant Effect
Error	1.53581	0.191976	8			
Total	2.49614626	1.1523128	9			

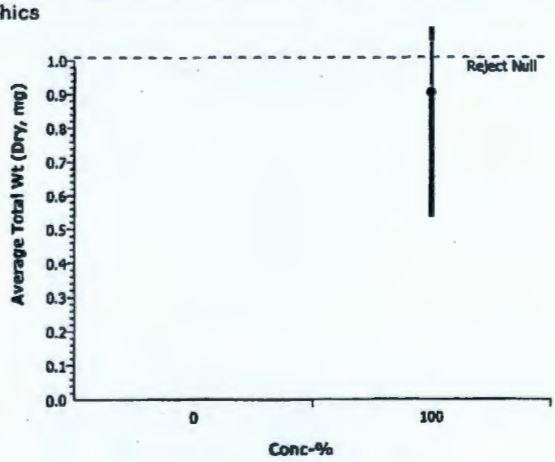
ANOVA Assumptions

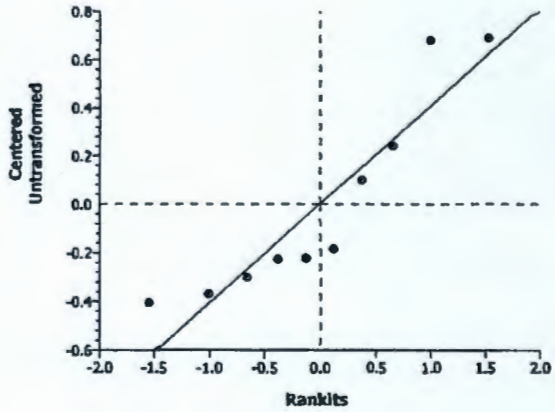
Attribute	Test	Statistic	Critical	P-Value	Decision(0.01)
Variances	Variance Ratio F	1.20610	23.15450	0.86027	Equal Variances
Distribution	Shapiro-Wilk W	0.83515		0.03859	Normal Distribution

Data Summary

			Original Data				Transformed Data			
Conc-%	Control Type	Count	Mean	Minimum	Maximum	SD	Mean	Minimum	Maximum	SD
0	Artificial Soil/S	5	1.52479	1.11799	2.21497	0.45816				
100		5	0.90501	0.53497	1.58671	0.41718				

Graphics





BLUEGRASS GROWTH TEST

Client: Washington Closure Hanford Project Seed ID: PS001 Test Start Date: February 23, 2007

Initials: Day 0 [illegible] Day 12 NJ Day 14 [illegible] Day 16 NJ Day 19 — Day 21 [illegible] Day 34 NJ Day 26 NJ Day ___

Day 33 NJ
Day 40 NJ

Bioassay Lab ID: BG 1719-06 Sample No: J13LP6

CONC.	REPLICATE	# seeds germinated: 12 days after planting	14 days after planting	18 Emergence 16 days after planting	19 days after planting	21 days after planting	24 days after planting	7-DAYS POST-EMERGENCE (33 days after planting)				14-DAYS POST-EMERGENCE (40 days after planting)	pH: INITIAL (@ planting)	pH: FINAL (@ 14 days Post-Emergence)
								Day 26	28	31				
Control	A	0	0	0		0	0	0	0	0	0	0	6.9	7.2
	B	0	0	0		0	0	0	0	0	0	0		
	C	0	0	0		0	0	0	0	0	0	1		
	D	1	1	1		1	2	2	2	2	2	2		
	E	0	0	0		0	0	0	0	0	0	0		

7-Days Post-Emergence: Selectively thin down to 5 Seedlings (leave the 5 tallest seedlings). Describe shoot appearance: Day 28 Day 31

Replicate A: none
Replicate B: none
Replicate C: none
Replicate D: 2 sm G
Replicate E: none

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

14-Days Post-Emergence: Describe shoot appearance:

Replicate A: none
Replicate B: none
Replicate C: 1 sm G
Replicate D: 1 med G 1 sm G
Replicate E: none

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

	1st Seedling	2nd Seedling	3rd Seedling	4th Seedling	5th Seedling
Replicate A	mm	mm	mm	mm	mm
Replicate B	mm	mm	mm	mm	mm
Replicate C	19 mm	mm	mm	mm	mm
Replicate D	46 mm	14 mm	mm	mm	mm
Replicate E	mm	mm	mm	mm	mm

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

	Tin Tare Wt. (mg)	Wet Wt (mg)	Dry Wt. (mg)
Replicate A	1288.78	—	—
Replicate B	1296.11	—	—
Replicate C	1289.09	1290.19	1289.28
Replicate D	1305.84	1316.57	1306.70
Replicate E	1303.92	—	—

Describe root appearance:

Replicate A
Replicate B
Replicate C
Replicate D
Replicate E

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

	1st Seedling	2nd Seedling	3rd Seedling	4th Seedling	5th Seedling
Replicate A	mm	mm	mm	mm	mm
Replicate B	mm	mm	mm	mm	mm
Replicate C	8 mm	mm	mm	mm	mm
Replicate D	34 mm	11 mm	mm	mm	mm
Replicate E	mm	mm	mm	mm	mm

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

	Tin Tare Wt. (mg)	Wet Wt (mg)	Dry Wt. (mg)
Replicate A	1296.15	—	—
Replicate B	1308.08	—	—
Replicate C	1295.73	1296.02	~~1296.00~~
Replicate D	1285.72	1285.94	1286.00
Replicate E	1301.67	—	—

reweighed 4-16-07 [illegible]
1296.00
1285.91

Comments:

CETIS Test Summary

Report Date: 16 Apr-07 2:07 PM
Test Link: 07-0974-9908/B171906psc

Plant Bioassay - Chronic — **CH2M Hill**

Test No:	13-6975-7771	**Test Type:**	Plant Chronic	**Duration:**	40d 0h
Start Date:	23 Feb-07	**Protocol:**	ASTM E1963-02 (2002)	**Species:**	Poa sandbergii
Ending Date:	04 Apr-07	**Dil Water:**		**Source:**	
Setup Date:	23 Feb-07 12:00 AM	**Brine:**			

Sample No:	09-6805-1084	**Code:**	B1719-06	**Client:**	
Sample Date:	11 Dec-06	**Material:**	Soil	**Project:**	
Receive Date:		**Source:**	ELR-Washington Closure Hanford		
Sample Age:	74d 0h	**Station:**			

Comments: J13LP6

Comparison Summary

Analysis	Endpoint	NOEL	LOEL	ChV	PMSD	Method
10-9138-9850	% Germination	< 100	100	N/A	30.34%	Equal Variance t Two-Sample
02-7482-8623	Average Height (mm)	< 100	100	N/A	35.21%	Equal Variance t Two-Sample
15-6869-4875	Average Length (mm)	< 100	100	N/A	24.09%	Equal Variance t Two-Sample
03-6114-9996	Average AG Wt (Wet, mg)	< 100	100	N/A	42.91%	Equal Variance t Two-Sample
13-5528-2503	Average AG Wt (Dry, mg)	< 100	100	N/A	47.51%	Equal Variance t Two-Sample
12-5977-5125	Average Root Wt. (Wet, mg	< 100	100	N/A	72.09%	Equal Variance t Two-Sample
03-2481-4395	Average Root Wt. (Dry, mg)	100	> 100	N/A	51.81%	Equal Variance t Two-Sample
17-5151-0609	Average Total Wt (Wet, mg	< 100	100	N/A	48.32%	Equal Variance t Two-Sample
19-7228-8338	Average Total Wt (Dry, mg)	< 100	100	N/A	45.37%	Equal Variance t Two-Sample

CETIS Test Summary

Report Date: 16 Apr-07 2:07 PM
Test Link: 07-0974-9908/B171906psc

% Germination Summary

Conc-%	Control Type	Reps	Mean	Minimum	Maximum	SE	SD	CV
0	Artificial Soil/S	5	0.84000	0.40000	1.00000	0.11662	0.26077	31.04%
100		5	0.12000	0.00000	0.40000	0.08000	0.17889	149.07

Average Height (mm) Summary

Conc-%	Control Type	Reps	Mean	Minimum	Maximum	SE	SD	CV
0	Artificial Soil/S	5	61.2	48.400	84.5	6.1496	13.751	22.47%
100		5	24.5	19	30	5.5	7.7782	31.75%

Average Length (mm) Summary

Conc-%	Control Type	Reps	Mean	Minimum	Maximum	SE	SD	CV
0	Artificial Soil/S	5	46.98	38.8	53	2.4520	5.4829	11.67%
100		5	15.25	8	22.5	7.25	10.253	67.23%

Average AG Wt (Wet, mg) Summary

Conc-%	Control Type	Reps	Mean	Minimum	Maximum	SE	SD	CV
0	Artificial Soil/S	5	8.3775	6.1	10.580	0.8257	1.8462	22.04%
100		5	3.2325	1.1	5.365	2.1325	3.0158	93.30%

Average AG Wt (Dry, mg) Summary

Conc-%	Control Type	Reps	Mean	Minimum	Maximum	SE	SD	CV
0	Artificial Soil/S	5	1.21170	0.86799	1.76001	0.16645	0.37220	30.72%
100		5	0.31003	0.19006	0.42999	0.11996	0.16966	54.72%

Average Root Wt. (Wet, mg) Summary

Conc-%	Control Type	Reps	Mean	Minimum	Maximum	SE	SD	CV
0	Artificial Soil/S	5	4.55901	2.72400	7.64001	0.97430	2.17861	47.79%
100		5	0.20001	0.10999	0.29004	0.09003	0.12732	63.65%

Average Root Wt. (Dry, mg) Summary

Conc-%	Control Type	Reps	Mean	Minimum	Maximum	SE	SD	CV
0	Artificial Soil/S	5	0.31309	0.25000	0.45496	0.03936	0.08801	28.11%
100		5	0.18253	0.09503	0.27002	0.08749	0.12374	67.79%

Average Total Wt (Wet, mg) Summary

Conc-%	Control Type	Reps	Mean	Minimum	Maximum	SE	SD	CV
0	Artificial Soil/S	5	12.937	9.198	17.588	1.7379	3.886	30.04%
100		5	3.4325	1.3900	5.475	2.0425	2.8885	84.15%

Average Total Wt (Dry, mg) Summary

Conc-%	Control Type	Reps	Mean	Minimum	Maximum	SE	SD	CV
0	Artificial Soil/S	5	1.52479	1.11799	2.21497	0.20490	0.45816	30.05%
100		5	0.49255	0.46008	0.52502	0.03247	0.04592	9.32%

CETIS Test Summary

Report Date: 16 Apr-07 2:07 PM
Test Link: 07-0974-9908/B171906psc

% Germination Detail

Conc-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Artificial Soil/S	1.00000	0.40000	1.00000	0.80000	1.00000
100		0.00000	0.00000	0.20000	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	54.8	84.5	58.8	59.5	48.4000
100		Missing	Missing	19	30	Missing

Average Length (mm) Detail

Conc-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Artificial Soil/S	50	48.5	44.6	53	38.8
100		Missing	Missing	8	22.5	Missing

Average AG Wt (Wet, mg) Detail

Conc-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Artificial Soil/S	6.1	10.5800	7.548	9.94751	7.71199
100		Missing	Missing	1.09998	5.36499	Missing

Average AG Wt (Dry, mg) Detail

Conc-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Artificial Soil/S	0.86799	1.76001	0.95598	1.42252	1.05200
100		Missing	Missing	0.19006	0.42999	Missing

Average Root Wt. (Wet, mg) Detail

Conc-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Artificial Soil/S	3.09800	6.07501	2.72400	7.64001	3.25801
100		Missing	Missing	0.29004	0.10999	Missing

Average Root Wt. (Dry, mg) Detail

Conc-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Artificial Soil/S	0.25000	0.45496	0.26802	0.34250	0.25000
100		Missing	Missing	0.27002	0.09503	Missing

Average Total Wt (Wet, mg) Detail

Conc-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Artificial Soil/S	9.198	16.6550	10.272	17.5875	10.97
100		Missing	Missing	1.39001	5.47498	Missing

Average Total Wt (Dry, mg) Detail

Conc-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Artificial Soil/S	1.11799	2.21497	1.22400	1.76501	1.30200
100		Missing	Missing	0.46008	0.52502	Missing

CETIS Analysis Detail

Plant Bioassay - Chronic — **CH2M Hill**

Sample No:	09-6805-1084	**Code:**	B1719-06	**Client:**	
Sample Date:	11 Dec-06	**Material:**	Soil	**Project:**	
Receive Date:		**Source:**	ELR-Washington Closure Hanford		
Sample Age:	74d 0h	**Station:**			

Comments: J13LP6

Endpoint	Analysis Type	Sample Link	Control Link	Date Analyzed	Version
% Germination	Comparison	07-0974-9908	07-0974-9908	16 Apr-07 2:06 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	30.34%

Group Comparisons

Control	vs	Conc-%	Statistic	Critical	P-Value	MSD	Decision(0.05)
Artificial Soil/Sedi		100	5.0539	1.85955	0.0005	0.29456	Significant Effect

ANOVA Table

Source	Sum of Squares	Mean Square	DF	F Statistic	P-Value	Decision(0.05)
Between	1.602249	1.602249	1	25.54	0.00098	Significant Effect
Error	0.501842	0.062730	8			
Total	2.10409051	1.6649788	9			

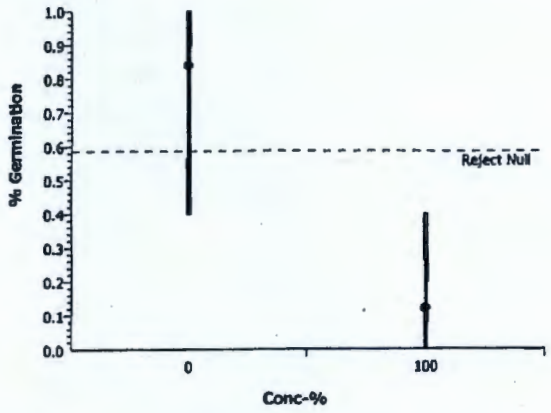
ANOVA Assumptions

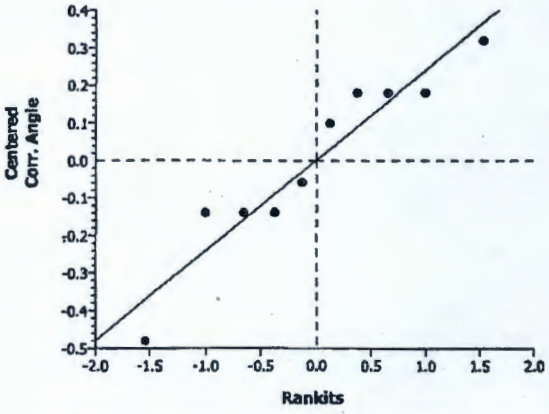
Attribute	Test	Statistic	Critical	P-Value	Decision(0.01)
Variances	Variance Ratio F	1.94644	23.15450	0.53475	Equal Variances
Distribution	Shapiro-Wilk W	0.91658		0.32933	Normal Distribution

Data Summary

			Original Data				Transformed Data			
Conc-%	Control Type	Count	Mean	Minimum	Maximum	SD	Mean	Minimum	Maximum	SD
0	Artificial Soil/S	5	0.84000	0.40000	1.00000	0.26077	1.16554	0.68472	1.34528	0.28789
100		5	0.12000	0.00000	0.40000	0.17889	0.36498	0.22551	0.68472	0.20635

Graphics





CETIS Analysis Detail

Plant Bioassay - Chronic — **CH2M Hill**

Sample No:	09-6805-1084	**Code:**	B1719-06	**Client:**	
Sample Date:	11 Dec-06	**Material:**	Soil	**Project:**	
Receive Date:		**Source:**	ELR-Washington Closure Hanford		
Sample Age:	74d 0h	**Station:**			

Comments: J13LP6

Endpoint	Analysis Type	Sample Link	Control Link	Date Analyzed	Version
Average Height (mm)	Comparison	07-0974-9908	07-0974-9908	16 Apr-07 2:06 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	35.21%

Group Comparisons

Control	vs	Conc-%	Statistic	Critical	P-Value	MSD	Decision(0.05)
Artificial Soil/Sedi		100	3.43189	2.01505	0.0093	21.5486	Significant Effect

ANOVA Table

Source	Sum of Squares	Mean Square	DF	F Statistic	P-Value	Decision(0.05)
Between	1924.129	1924.129	1	11.78	0.01860	Significant Effect
Error	816.84	163.368	5			
Total	2740.96851	2087.4965	6			

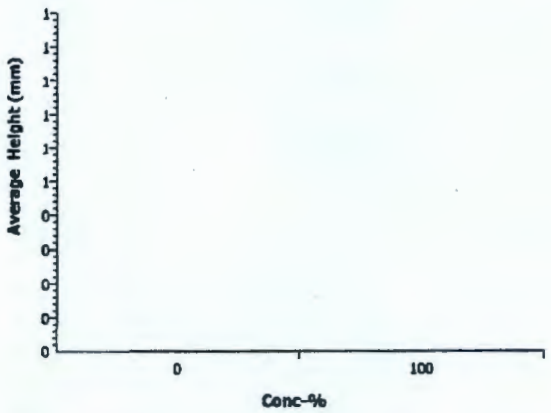
ANOVA Assumptions

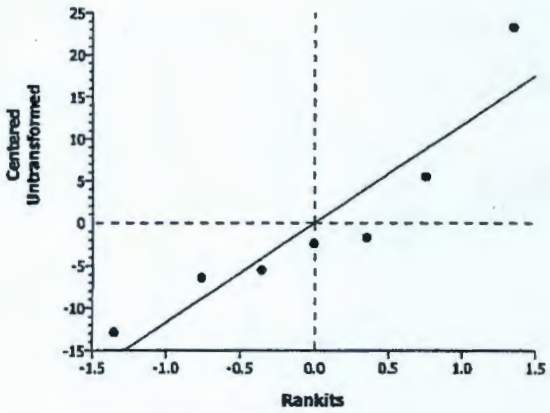
Attribute	Test	Statistic	Critical	P-Value	Decision(0.01)
Variances	Variance Ratio F	3.12537	22499.58000	0.79629	Equal Variances
Distribution	Shapiro-Wilk W	0.86859		0.18041	Normal Distribution

Data Summary

			Original Data				Transformed Data			
Conc-%	Control Type	Count	Mean	Minimum	Maximum	SD	Mean	Minimum	Maximum	SD
0	Artificial Soil/S	5	61.2	48.4	84.5	13.751				
100		2	24.5	19	30	7.7782				

Graphics





CETIS Analysis Detail

Plant Bioassay - Chronic — **CH2M Hill**

Sample No:	09-6805-1084	**Code:**	B1719-06	**Client:**	
Sample Date:	11 Dec-06	**Material:**	Soil	**Project:**	
Receive Date:		**Source:**	ELR-Washington Closure Hanford		
Sample Age:	74d 0h	**Station:**			

Comments: J13LP6

Endpoint	Analysis Type	Sample Link	Control Link	Date Analyzed	Version
Average Length (mm)	Comparison	07-0974-9908	07-0974-9908	16 Apr-07 2:06 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	24.09%

Group Comparisons

Control	vs	Conc-%	Statistic	Critical	P-Value	MSD	Decision(0.05)
Artificial Soil/Sedi		100	5.64879	2.01505	0.0012	11.3188	Significant Effect

ANOVA Table

Source	Sum of Squares	Mean Square	DF	F Statistic	P-Value	Decision(0.05)
Between	1438.276	1438.276	1	31.91	0.00241	Significant Effect
Error	225.373	45.0746	5			
Total	1663.64853	1483.3501	6			

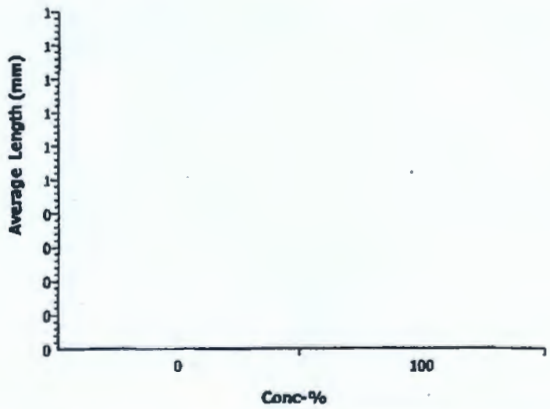
ANOVA Assumptions

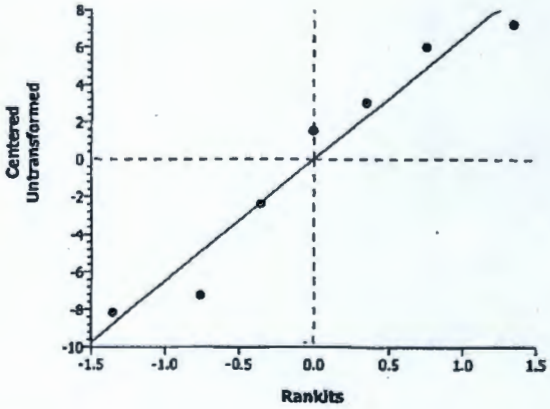
Attribute	Test	Statistic	Critical	P-Value	Decision(0.01)
Variances	Variance Ratio F	3.49694	31.33277	0.26966	Equal Variances
Distribution	Shapiro-Wilk W	0.91978		0.46770	Normal Distribution

Data Summary

			Original Data				Transformed Data			
Conc-%	Control Type	Count	Mean	Minimum	Maximum	SD	Mean	Minimum	Maximum	SD
0	Artificial Soil/S	5	46.98	38.8	53	5.4829				
100		2	15.25	8	22.5	10.253				

Graphics





CETIS Analysis Detail

Plant Bioassay - Chronic — **CH2M Hill**

Sample No:	09-6805-1084	**Code:**	B1719-06	**Client:**	
Sample Date:	11 Dec-06	**Material:**	Soil	**Project:**	
Receive Date:		**Source:**	ELR-Washington Closure Hanford		
Sample Age:	74d 0h	**Station:**			

Comments: J13LP6

Endpoint	Analysis Type	Sample Link	Control Link	Date Analyzed	Version
Average AG Wt. (Wet, mg)	Comparison	07-0974-9908	07-0974-9908	16 Apr-07 2:06 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	42.91%

Group Comparisons

Control	vs	Conc-%	Statistic	Critical	P-Value	MSD	Decision(0.05)
Artificial Soil/Sedi		100	2.88424	2.01505	0.0172	3.59452	Significant Effect

ANOVA Table

Source	Sum of Squares	Mean Square	DF	F Statistic	P-Value	Decision(0.05)
Between	37.81604	37.81604	1	8.32	0.03442	Significant Effect
Error	22.72917	4.545835	5			
Total	60.5452099	42.361871	6			

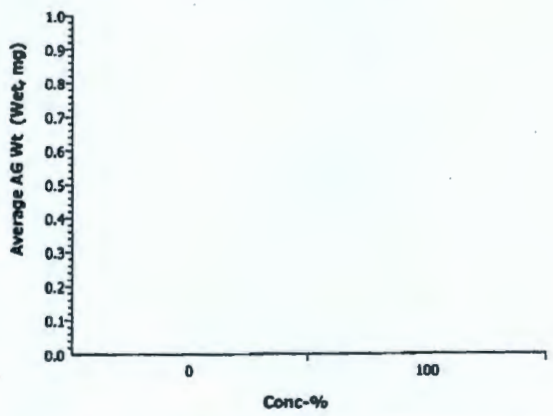
ANOVA Assumptions

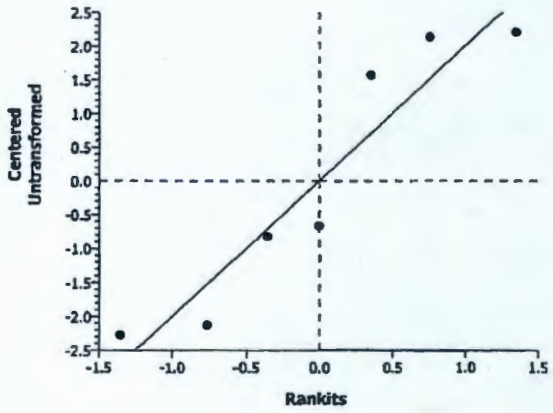
Attribute	Test	Statistic	Critical	P-Value	Decision(0.01)
Variances	Variance Ratio F	2.66838	31.33277	0.35540	Equal Variances
Distribution	Shapiro-Wilk W	0.86052		0.15303	Normal Distribution

Data Summary

			Original Data				Transformed Data			
Conc-%	Control Type	Count	Mean	Minimum	Maximum	SD	Mean	Minimum	Maximum	SD
0	Artificial Soil/S	5	8.3775	6.1	10.580	1.8462				
100		2	3.2325	1.1	5.365	3.0158				

Graphics





CETIS Analysis Detail

Plant Bioassay - Chronic — **CH2M Hill**

Sample No:	09-6805-1084	**Code:**	B1719-06	**Client:**	
Sample Date:	11 Dec-06	**Material:**	Soil	**Project:**	
Receive Date:		**Source:**	ELR-Washington Closure Hanford		
Sample Age:	74d 0h	**Station:**			

Comments: J13LP6

Endpoint	Analysis Type	Sample Link	Control Link	Date Analyzed	Version
Average AG Wt (Dry, mg)	Comparison	07-0974-9908	07-0974-9908	16 Apr-07 2:06 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	47.51%

Group Comparisons

Control	vs	Conc-%	Statistic	Critical	P-Value	MSD	Decision(0.05)
Artificial Soil/Sedi		100	3.15637	2.01505	0.0126	0.57563	Significant Effect

ANOVA Table

Source	Sum of Squares	Mean Square	DF	F Statistic	P-Value	Decision(0.05)
Between	1.161447	1.161447	1	9.96	0.02520	Significant Effect
Error	0.5828997	0.11658	5			
Total	1.74434692	1.2780271	6			

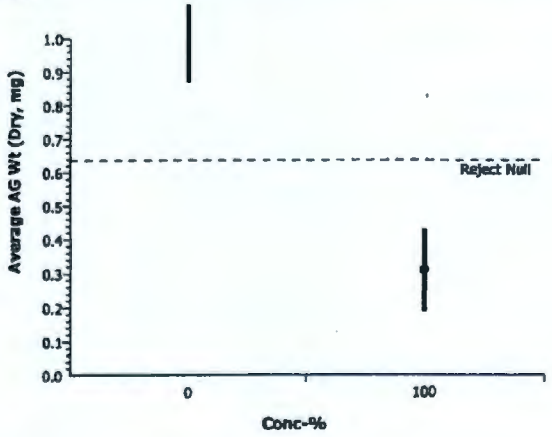
ANOVA Assumptions

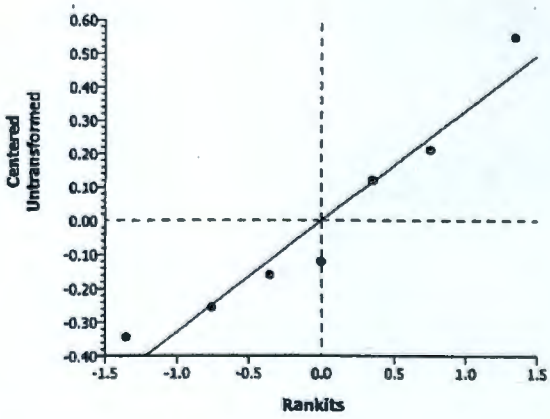
Attribute	Test	Statistic	Critical	P-Value	Decision(0.01)
Variances	Variance Ratio F	4.81288	22499.58000	0.65567	Equal Variances
Distribution	Shapiro-Wilk W	0.93098		0.55924	Normal Distribution

Data Summary

			Original Data				Transformed Data			
Conc-%	Control Type	Count	Mean	Minimum	Maximum	SD	Mean	Minimum	Maximum	SD
0	Artificial Soil/S	5	1.21170	0.86799	1.76001	0.37220				
100		2	0.31003	0.19006	0.42999	0.16966				

Graphics





CETIS Analysis Detail

Plant Bioassay - Chronic — **CH2M Hill**

Sample No:	09-6805-1084	**Code:**	B1719-06	**Client:**	
Sample Date:	11 Dec-06	**Material:**	Soil	**Project:**	
Receive Date:		**Source:**	ELR-Washington Closure Hanford		
Sample Age:	74d 0h	**Station:**			

Comments: J13LP6

Endpoint	Analysis Type	Sample Link	Control Link	Date Analyzed	Version
Average Root Wt. (Wet, mg)	Comparison	07-0974-9908	07-0974-9908	16 Apr-07 2:06 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	72.09%

Group Comparisons

Control	vs	Conc-%	Statistic	Critical	P-Value	MSD	Decision(0.05)
Artificial Soil/Sedi		100	2.67257	2.01505	0.0221	3.28657	Significant Effect

ANOVA Table

Source	Sum of Squares	Mean Square	DF	F Statistic	P-Value	Decision(0.05)
Between	27.14404	27.14404	1	7.14	0.04421	Significant Effect
Error	19.00149	3.800298	5			
Total	46.1455326	30.944341	6			

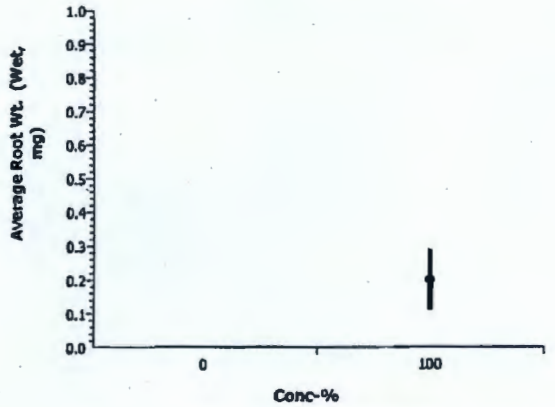
ANOVA Assumptions

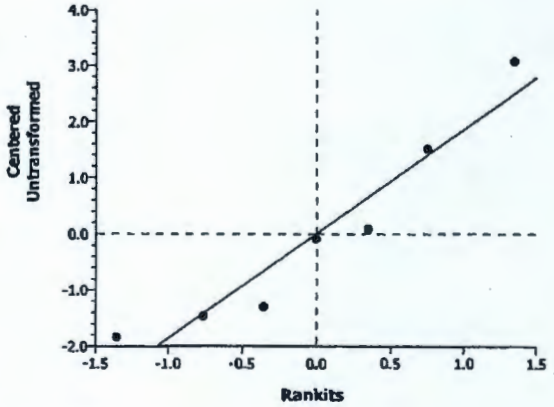
Attribute	Test	Statistic	Critical	P-Value	Decision(0.01)
Variances	Variance Ratio F	292.80800	22499.58000	0.08760	Equal Variances
Distribution	Shapiro-Wilk W	0.91145		0.40604	Normal Distribution

Data Summary

			Original Data				Transformed Data			
Conc-%	Control Type	Count	Mean	Minimum	Maximum	SD	Mean	Minimum	Maximum	SD
0	Artificial Soil/S	5	4.55901	2.72400	7.64001	2.17861				
100		2	0.20001	0.10999	0.29004	0.12732				

Graphics





CETIS Analysis Detail

Plant Bioassay - Chronic — **CH2M Hill**

Sample No:	09-6805-1084	**Code:**	B1719-06	**Client:**	
Sample Date:	11 Dec-06	**Material:**	Soil	**Project:**	
Receive Date:		**Source:**	ELR-Washington Closure Hanford		
Sample Age:	74d 0h	**Station:**			

Comments: J13LP6

Endpoint	Analysis Type	Sample Link	Control Link	Date Analyzed	Version
Average Root Wt. (Dry, mg)	Comparison	07-0974-9908	07-0974-9908	16 Apr-07 2:06 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	51.81%

Group Comparisons

Control	vs	Conc-%	Statistic	Critical	P-Value	MSD	Decision(0.05)
Artificial Soil/Sedi		100	1.62187	2.01505	0.0829	0.16222	Non-Significant Effect

ANOVA Table

Source	Sum of Squares	Mean Square	DF	F Statistic	P-Value	Decision(0.05)
Between	0.0243546	0.024355	1	2.63	0.16576	Non-Significant Effect
Error	0.0462934	0.009259	5			
Total	0.07064804	0.0336133	6			

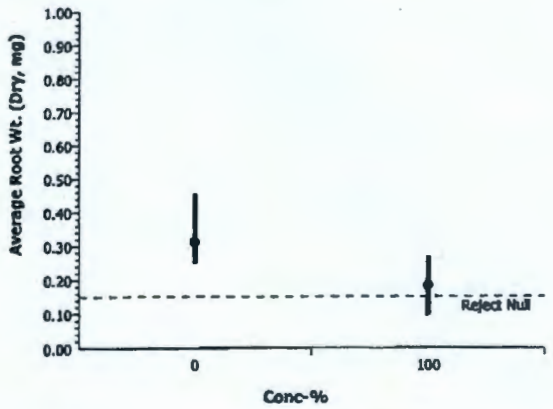
ANOVA Assumptions

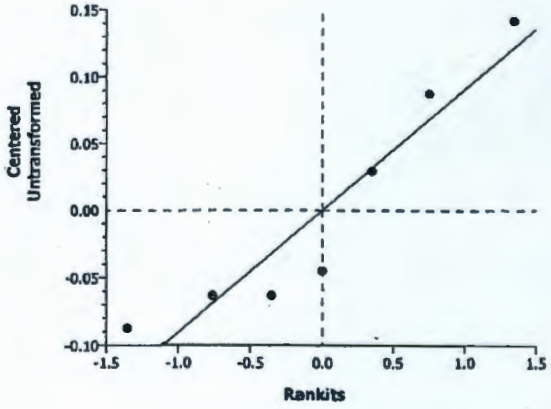
Attribute	Test	Statistic	Critical	P-Value	Decision(0.01)
Variances	Variance Ratio F	1.97661	31.33277	0.46494	Equal Variances
Distribution	Shapiro-Wilk W	0.87792		0.21737	Normal Distribution

Data Summary

			Original Data				Transformed Data			
Conc-%	Control Type	Count	Mean	Minimum	Maximum	SD	Mean	Minimum	Maximum	SD
0	Artificial Soil/S	5	0.31309	0.25000	0.45496	0.08801				
100		2	0.18253	0.09503	0.27002	0.12374				

Graphics





CETIS Analysis Detail

Plant Bioassay - Chronic — **CH2M Hill**

Sample No:	09-6805-1084	**Code:**	B1719-06	**Client:**	
Sample Date:	11 Dec-06	**Material:**	Soil	**Project:**	
Receive Date:		**Source:**	ELR-Washington Closure Hanford		
Sample Age:	74d 0h	**Station:**			

Comments: J13LP6

Endpoint	Analysis Type	Sample Link	Control Link	Date Analyzed	Version
Average Total Wt (Wet, mg)	Comparison	07-0974-9908	07-0974-9908	16 Apr-07 2:07 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	48.32%

Group Comparisons

Control	vs	Conc-%	Statistic	Critical	P-Value	MSD	Decision(0.05)
Artificial Soil/Sedi		100	3.06351	2.01505	0.0140	6.25134	Significant Effect

ANOVA Table

Source	Sum of Squares	Mean Square	DF	F Statistic	P-Value	Decision(0.05)
Between	129.0375	129.0375	1	9.39	0.02799	Significant Effect
Error	68.74606	13.74921	5			
Total	197.783592	142.78675	6			

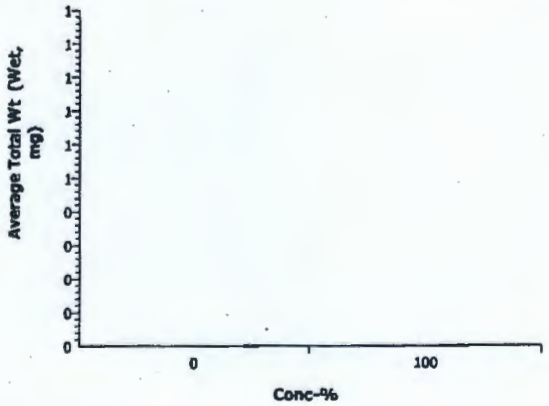
ANOVA Assumptions

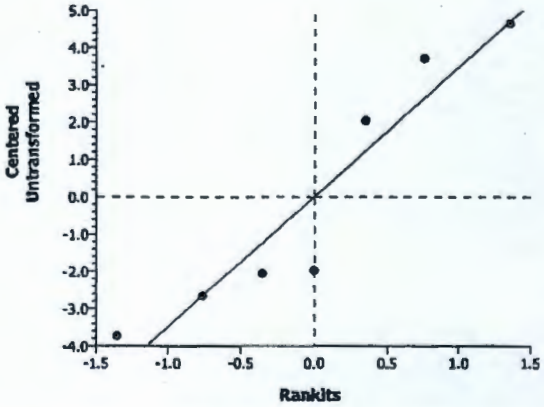
Attribute	Test	Statistic	Critical	P-Value	Decision(0.01)
Variances	Variance Ratio F	1.80988	22499.58000	1.00285	Equal Variances
Distribution	Shapiro-Wilk W	0.87104		0.18956	Normal Distribution

Data Summary

			Original Data				Transformed Data			
Conc-%	Control Type	Count	Mean	Minimum	Maximum	SD	Mean	Minimum	Maximum	SD
0	Artificial Soil/S	5	12.937	9.198	17.588	3.886				
100		2	3.4325	1.3900	5.475	2.8885				

Graphics





CETIS Analysis Detail

Plant Bioassay - Chronic — **CH2M Hill**

Sample No:	09-6805-1084	**Code:**	B1719-06	**Client:**	
Sample Date:	11 Dec-06	**Material:**	Soil	**Project:**	
Receive Date:		**Source:**	ELR-Washington Closure Hanford		
Sample Age:	74d 0h	**Station:**			

Comments: J13LP6

Endpoint	Analysis Type	Sample Link	Control Link	Date Analyzed	Version
Average Total Wt (Dry, mg)	Comparison	07-0974-9908	07-0974-9908	16 Apr-07 2:07 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	45.37%

Group Comparisons

Control	vs	Conc-%	Statistic	Critical	P-Value	MSD	Decision(0.05)
Artificial Soil/Sedi		100	3.00694	2.01505	0.0149	0.69174	Significant Effect

ANOVA Table

Source	Sum of Squares	Mean Square	DF	F Statistic	P-Value	Decision(0.05)
Between	1.522174	1.522174	1	9.04	0.02986	Significant Effect
Error	0.8417526	0.168351	5			
Total	2.36392677	1.6905247	6			

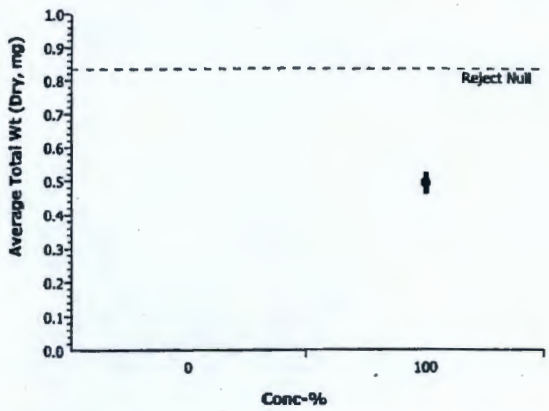
ANOVA Assumptions

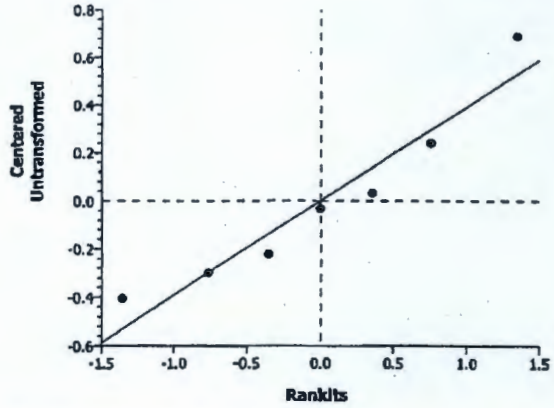
Attribute	Test	Statistic	Critical	P-Value	Decision(0.01)
Variances	Variance Ratio F	99.54554	22499.58000	0.15003	Equal Variances
Distribution	Shapiro-Wilk W	0.92731		0.52823	Normal Distribution

Data Summary

			Original Data				Transformed Data			
Conc-%	Control Type	Count	Mean	Minimum	Maximum	SD	Mean	Minimum	Maximum	SD
0	Artificial Soil/S	5	1.52479	1.11799	2.21497	0.45816				
100		2	0.49255	0.46008	0.52502	0.04592				

Graphics





BLUEGRASS GROWTH TEST

Client: Washington Closure Hanford Project Seed ID: PS001 Test Start Date: February 23, 2007

Initials: Day 0 [illegible] Day 12 NJ Day 14 [illegible] Day 18 NJ Day 19 — Day 21 [illegible] Day 24 NJ Day 26 NJ Day 28 [illegible] Day 31 NJ Day 33 NJ Day 40 NJ

Bioassay Lab ID: BG 1719-07 Sample No: J13NY6

CONC.	REPLICATE	# seeds germinated: 12 days after planting	14 days after planting	18 Emergence 17 days after planting	19 days after planting	21 days after planting	24 NJ 23 days after planting	7-DAYS POST-EMERGENCE (33 days after planting) Day 26: 28	31			14-DAYS POST-EMERGENCE (40 days after planting)	pH: INITIAL (@ planting)	FINAL (@ 14 days Post-Emergence)
Control	A	0	0	0		0	0	0	1	2	2	2	7.0	7.3
	B	0	0	0		0	1	2	2	3	3	3		
	C	0	2	2		2	2	2	2	3	3	3		
	D	0	0	0		0	0	0	0	0	0	1		
	E	0	0	0		0	1	1	1	2	2	2		

7-Days Post-Emergence: Selectively thin down to 5 Seedlings (leave the 5 tallest seedlings). Describe shoot appearance: Day 28 Day 31

Replicate A: 2 Sm G
Replicate B: 3 Sm G
Replicate C: 2 Med G, 1 Sm G
Replicate D: none
Replicate E: 2 Sm G

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

14-Days Post-Emergence: Describe shoot appearance:

Replicate A: 1 Lg G, 1 Sm G w/B tip
Replicate B: 3 Sm G
Replicate C: 1 Lg G, 1 Med G, 1 Sm G
Replicate D: 1 Sm G
Replicate E: 2 Sm G

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

	1st Seedling	2nd Seedling	3rd Seedling	4th Seedling	5th Seedling
Replicate A	26 mm	6 mm	mm	mm	mm
Replicate B	24 mm	17 mm	29 mm	mm	mm
Replicate C	74 mm	49 mm	39 mm	mm	mm
Replicate D	12 mm	mm	mm	mm	mm
Replicate E	27 mm	24 mm	mm	mm	mm

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

	Tin Tare Wt. (mg)	Wet Wt (mg)	Dry Wt. (mg)
Replicate A	1304.66	1307.04	1305.01
Replicate B	1297.52	1302.15	1298.03
Replicate C	1290.42	1307.80	1292.37
Replicate D	1301.56	1302.16	1301.63
Replicate E	1297.82	1300.58	1298.16

Describe root appearance:

Replicate A:
Replicate B:
Replicate C:
Replicate D:
Replicate E:

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

	1st Seedling	2nd Seedling	3rd Seedling	4th Seedling	5th Seedling
Replicate A	Dry 11 mm	9 mm	mm	mm	mm
Replicate B	9 mm	5 mm	34 mm	mm	mm
Replicate C	41 mm	24 mm	45 mm	mm	mm
Replicate D	11 mm	mm	mm	mm	mm
Replicate E	9 mm	7 mm	mm	mm	mm

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

	Tin Tare Wt. (mg)	Wet Wt (mg)	Dry Wt. (mg)	
Replicate A	1276.28	1277.04	~~1286.38~~	1276.44
Replicate B	1290.76	1292.05	1290.86	
Replicate C	1288.48	1291.84	1288.95	
Replicate D	1284.43	1284.50	~~1284.55~~ Dry weighed BN 4-16-07	1284.46
Replicate E	1291.62	1295.48	1291.81	

Comments:

CETIS Test Summary

Report Date: 16 Apr-07 2:14 PM
Test Link: 05-3150-6425/B171907psc

Plant Bioassay - Chronic — **CH2M Hill**

Test No:	13-6975-7771	**Test Type:**	Plant Chronic	**Duration:**	40d 0h
Start Date:	23 Feb-07	**Protocol:**	ASTM E1963-02 (2002)	**Species:**	Poa sandbergii
Ending Date:	04 Apr-07	**Dil Water:**		**Source:**	
Setup Date:	23 Feb-07 12:00 AM	**Brine:**			

Sample No:	10-3299-6115	**Code:**	B1719-07	**Client:**	
Sample Date:	18 Dec-06	**Material:**	Soil	**Project:**	
Receive Date:		**Source:**	ELR-Washington Closure Hanford		
Sample Age:	67d 0h	**Station:**			

Comments: J13NY6

Comparison Summary

Analysis	Endpoint	NOEL	LOEL	ChV	PMSD	Method
13-1823-4355	% Germination	< 100	100	N/A	28.69%	Equal Variance t Two-Sample
14-9759-9387	Average Height (mm)	< 100	100	N/A	29.17%	Equal Variance t Two-Sample
07-6648-8353	Average Length (mm)	< 100	100	N/A	22.96%	Equal Variance t Two-Sample
06-9935-7445	Average AG Wt (Wet, mg)	< 100	100	N/A	27.70%	Equal Variance t Two-Sample
13-8359-9584	Average AG Wt (Dry, mg)	< 100	100	N/A	29.94%	Equal Variance t Two-Sample
10-7114-3592	Average Root Wt. (Wet, mg	< 100	100	N/A	42.00%	Equal Variance t Two-Sample
14-8921-0489	Average Root Wt. (Dry, mg)	< 100	100	N/A	27.14%	Equal Variance t Two-Sample
16-0202-6236	Average Total Wt (Wet, mg	< 100	100	N/A	29.50%	Equal Variance t Two-Sample
13-0944-2192	Average Total Wt (Dry, mg)	< 100	100	N/A	29.13%	Equal Variance t Two-Sample

CETIS Test Summary

Report Date: 16 Apr-07 2:14 PM
Test Link: 05-3150-6425/B171907psc

% Germination Summary

Conc-%	Control Type	Reps	Mean	Minimum	Maximum	SE	SD	CV
0	Artificial Soil/S	5	0.84000	0.40000	1.00000	0.11662	0.26077	31.04%
100		5	0.44000	0.20000	0.60000	0.07483	0.16733	38.03%

Average Height (mm) Summary

Conc-%	Control Type	Reps	Mean	Minimum	Maximum	SE	SD	CV
0	Artificial Soil/S	5	61.2	48.400	84.5	6.1496	13.751	22.47%
100		5	26.16	12	54	7.3736	16.488	63.03%

Average Length (mm) Summary

Conc-%	Control Type	Reps	Mean	Minimum	Maximum	SE	SD	CV
0	Artificial Soil/S	5	46.98	38.8	53	2.4520	5.4829	11.67%
100		5	16.340	8	36.700	5.2579	11.757	71.95%

Average AG Wt (Wet, mg) Summary

Conc-%	Control Type	Reps	Mean	Minimum	Maximum	SE	SD	CV
0	Artificial Soil/S	5	8.3775	6.1	10.580	0.8257	1.8462	22.04%
100		5	2.1033	0.61	5.7933	0.9359	2.0927	99.49%

Average AG Wt (Dry, mg) Summary

Conc-%	Control Type	Reps	Mean	Minimum	Maximum	SE	SD	CV
0	Artificial Soil/S	5	1.21170	0.86799	1.76001	0.16645	0.37220	30.72%
100		5	0.24899	0.07996	0.64998	0.10181	0.22766	91.43%

Average Root Wt. (Wet, mg) Summary

Conc-%	Control Type	Reps	Mean	Minimum	Maximum	SE	SD	CV
0	Artificial Soil/S	5	4.55901	2.72400	7.64001	0.97430	2.17861	47.79%
100		5	0.78599	0.06995	1.92999	0.33351	0.74575	94.88%

Average Root Wt. (Dry, mg) Summary

Conc-%	Control Type	Reps	Mean	Minimum	Maximum	SE	SD	CV
0	Artificial Soil/S	5	0.31309	0.25000	0.45496	0.03936	0.08801	28.11%
100		5	0.07898	0.02991	0.15666	0.02322	0.05192	65.75%

Average Total Wt (Wet, mg) Summary

Conc-%	Control Type	Reps	Mean	Minimum	Maximum	SE	SD	CV
0	Artificial Soil/S	5	12.937	9.198	17.588	1.7379	3.886	30.04%
100		5	2.8893	0.6799	6.9133	1.0916	2.4408	84.48%

Average Total Wt (Dry, mg) Summary

Conc-%	Control Type	Reps	Mean	Minimum	Maximum	SE	SD	CV
0	Artificial Soil/S	5	1.52479	1.11799	2.21497	0.20490	0.45816	30.05%
100		5	0.32797	0.10986	0.80664	0.12278	0.27455	83.71%

CETIS Test Summary

Report Date: 16 Apr-07 2:14 PM
Test Link: 05-3150-6425/B171907psc

% Germination Detail

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

Average Height (mm) Detail

Conc-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Artificial Soil/S	54.8	84.5	58.8	59.5	48.4000
100		16	23.3	54	12	25.5

Average Length (mm) Detail

Conc-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Artificial Soil/S	50	48.5	44.6	53	38.8
100		10	16	36.7000	11	8

Average AG Wt (Wet, mg) Detail

Conc-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Artificial Soil/S	6.1	10.5800	7.548	9.94751	7.71199
100		1.19000	1.54333	5.79333	0.60999	1.38000

Average AG Wt (Dry, mg) Detail

Conc-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Artificial Soil/S	0.86799	1.76001	0.95598	1.42252	1.05200
100		0.17499	0.17000	0.64998	0.07996	0.17004

Average Root Wt. (Wet, mg) Detail

Conc-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Artificial Soil/S	3.09800	6.07501	2.72400	7.64001	3.25801
100		0.38000	0.43001	1.12000	0.06995	1.92999

Average Root Wt. (Dry, mg) Detail

Conc-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Artificial Soil/S	0.25000	0.45496	0.26802	0.34250	0.25000
100		0.07996	0.03333	0.15666	0.02991	0.09503

Average Total Wt (Wet, mg) Detail

Conc-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Artificial Soil/S	9.198	16.6550	10.272	17.5875	10.97
100		1.57001	1.97335	6.91333	0.67993	3.31

Average Total Wt (Dry, mg) Detail

Conc-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Artificial Soil/S	1.11799	2.21497	1.22400	1.76501	1.30200
100		0.25494	0.20333	0.80664	0.10986	0.26508

CETIS Analysis Detail

Plant Bioassay - Chronic — **CH2M Hill**

Sample No:	10-3299-6115	**Code:**	B1719-07	**Client:**	
Sample Date:	18 Dec-06	**Material:**	Soil	**Project:**	
Receive Date:		**Source:**	ELR-Washington Closure Hanford		
Sample Age:	67d 0h	**Station:**			

Comments: J13NY6

Endpoint	Analysis Type	Sample Link	Control Link	Date Analyzed	Version
% Germination	Comparison	05-3150-6425	05-3150-6425	16 Apr-07 2:12 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	28.69%

Group Comparisons

Control	vs	Conc-%	Statistic	Critical	P-Value	MSD	Decision(0.05)
Artificial Soil/Sedi		100	2.94735	1.85955	0.0093	0.28044	Significant Effect

ANOVA Table

Source	Sum of Squares	Mean Square	DF	F Statistic	P-Value	Decision(0.05)
Between	0.4939401	0.493940	1	8.69	0.01850	Significant Effect
Error	0.4548845	0.056861	8			
Total	0.94882461	0.5508007	9			

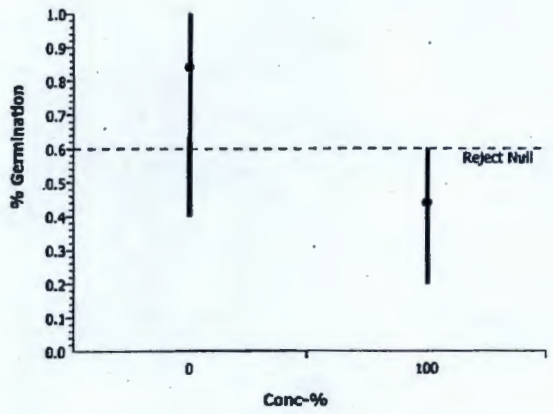
ANOVA Assumptions

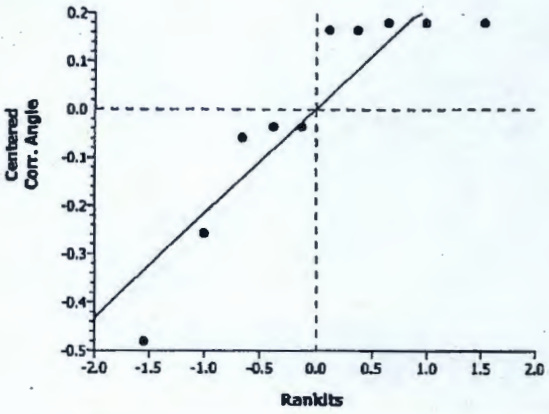
Attribute	Test	Statistic	Critical	P-Value	Decision(0.01)
Variances	Variance Ratio F	2.68734	23.15450	0.36151	Equal Variances
Distribution	Shapiro-Wilk W	0.80898		0.01863	Normal Distribution

Data Summary

			Original Data				Transformed Data			
Conc-%	Control Type	Count	Mean	Minimum	Maximum	SD	Mean	Minimum	Maximum	SD
0	Artificial Soil/S	5	0.84000	0.40000	1.00000	0.26077	1.16554	0.68472	1.34528	0.28789
100		5	0.44000	0.20000	0.60000	0.16733	0.72105	0.46365	0.88608	0.17562

Graphics





CETIS Analysis Detail

Plant Bioassay - Chronic — **CH2M Hill**

Sample No:	10-3299-6115	**Code:**	B1719-07	**Client:**	
Sample Date:	18 Dec-06	**Material:**	Soil	**Project:**	
Receive Date:		**Source:**	ELR-Washington Closure Hanford		
Sample Age:	67d 0h	**Station:**			

Comments: J13NY6

Endpoint	Analysis Type	Sample Link	Control Link	Date Analyzed	Version
Average Height (mm)	Comparison	05-3150-6425	05-3150-6425	16 Apr-07 2:12 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	29.17%

Group Comparisons

Control	vs	Conc-%	Statistic	Critical	P-Value	MSD	Decision(0.05)
Artificial Soil/Sedi		100	3.64945	1.85955	0.0032	17.8543	Significant Effect

ANOVA Table

Source	Sum of Squares	Mean Square	DF	F Statistic	P-Value	Decision(0.05)
Between	3069.504	3069.504	1	13.32	0.00650	Significant Effect
Error	1843.752	230.469	8			
Total	4913.25586	3299.9729	9			

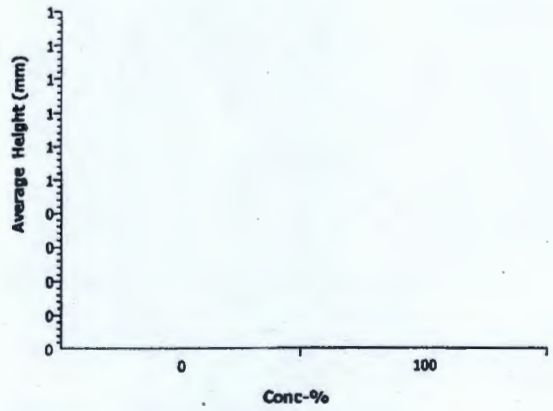
ANOVA Assumptions

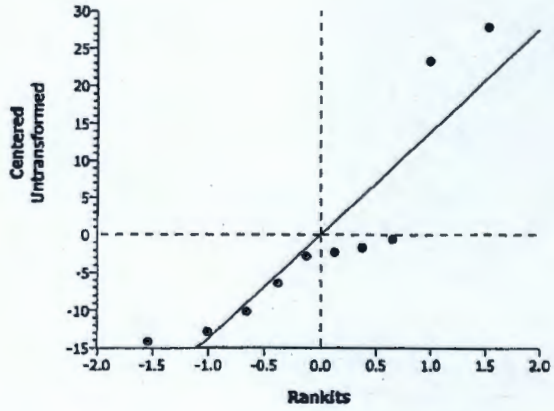
Attribute	Test	Statistic	Critical	P-Value	Decision(0.01)
Variances	Variance Ratio F	1.43773	23.15450	0.73355	Equal Variances
Distribution	Shapiro-Wilk W	0.80827		0.01827	Normal Distribution

Data Summary

			Original Data				Transformed Data			
Conc-%	Control Type	Count	Mean	Minimum	Maximum	SD	Mean	Minimum	Maximum	SD
0	Artificial Soil/S	5	61.2	48.4	84.5	13.751				
100		5	26.16	12	54	16.488				

Graphics





CETIS Analysis Detail

Plant Bioassay - Chronic — **CH2M Hill**

Sample No:	10-3299-6115	**Code:**	B1719-07	**Client:**	
Sample Date:	18 Dec-06	**Material:**	Soil	**Project:**	
Receive Date:		**Source:**	ELR-Washington Closure Hanford		
Sample Age:	67d 0h	**Station:**			

Comments: J13NY6

Endpoint	Analysis Type	Sample Link	Control Link	Date Analyzed	Version
Average Length (mm)	Comparison	05-3150-6425	05-3150-6425	16 Apr-07 2:12 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	22.96%

Group Comparisons

Control	vs	Conc-%	Statistic	Critical	P-Value	MSD	Decision(0.05)
Artificial Soil/Sedi		100	5.28135	1.85955	0.0004	10.7883	Significant Effect

ANOVA Table

Source	Sum of Squares	Mean Square	DF	F Statistic	P-Value	Decision(0.05)
Between	2347.024	2347.024	1	27.89	0.00074	Significant Effect
Error	673.16	84.145	8			
Total	3020.18396	2431.1689	9			

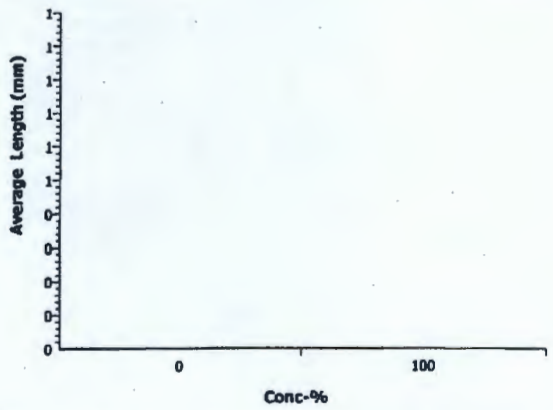
ANOVA Assumptions

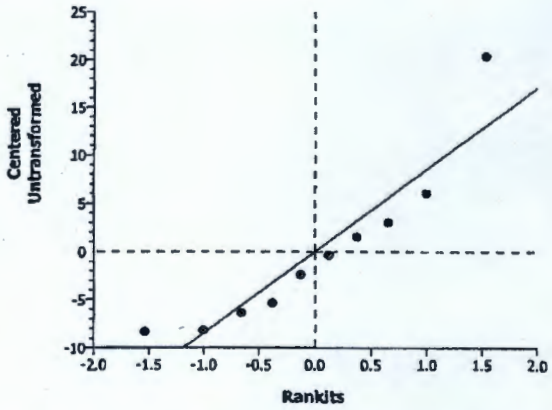
Attribute	Test	Statistic	Critical	P-Value	Decision(0.01)
Variances	Variance Ratio F	4.59810	23.15450	0.16866	Equal Variances
Distribution	Shapiro-Wilk W	0.86048		0.07731	Normal Distribution

Data Summary

			Original Data				Transformed Data			
Conc-%	Control Type	Count	Mean	Minimum	Maximum	SD	Mean	Minimum	Maximum	SD
0	Artificial Soil/S	5	46.98	38.8	53	5.4829				
100		5	16.340	8	36.7	11.757				

Graphics





CETIS Analysis Detail

Plant Bioassay - Chronic — **CH2M Hill**

Sample No:	10-3299-6115	**Code:**	B1719-07	**Client:**	
Sample Date:	18 Dec-06	**Material:**	Soil	**Project:**	
Receive Date:		**Source:**	ELR-Washington Closure Hanford		
Sample Age:	67d 0h	**Station:**			

Comments: J13NY6

Endpoint	Analysis Type	Sample Link	Control Link	Date Analyzed	Version
Average AG Wt (Wet, mg)	Comparison	05-3150-6425	05-3150-6425	16 Apr-07 2:12 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	27.70%

Group Comparisons

Control	vs	Conc-%	Statistic	Critical	P-Value	MSD	Decision(0.05)
Artificial Soil/Sedi		100	5.02729	1.85955	0.0005	2.32076	Significant Effect

ANOVA Table

Source	Sum of Squares	Mean Square	DF	F Statistic	P-Value	Decision(0.05)
Between	98.41302	98.41302	1	25.27	0.00102	Significant Effect
Error	31.15117	3.893897	8			
Total	129.564192	102.30691	9			

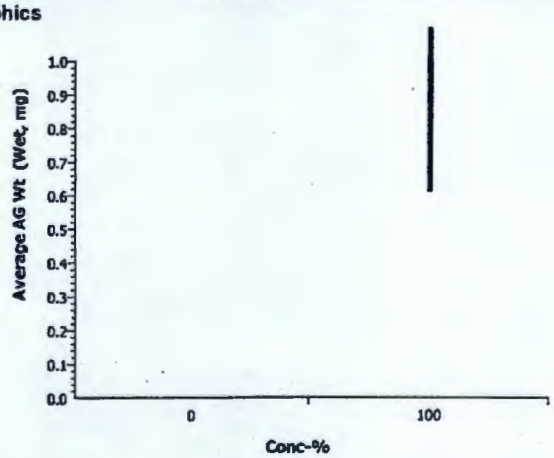
ANOVA Assumptions

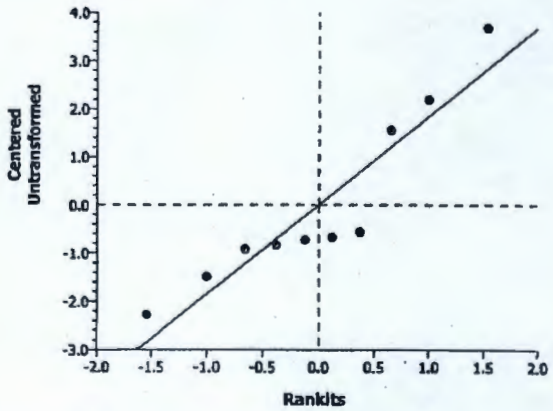
Attribute	Test	Statistic	Critical	P-Value	Decision(0.01)
Variances	Variance Ratio F	1.28482	23.15450	0.81398	Equal Variances
Distribution	Shapiro-Wilk W	0.87043		0.10111	Normal Distribution

Data Summary

			Original Data				Transformed Data			
Conc-%	Control Type	Count	Mean	Minimum	Maximum	SD	Mean	Minimum	Maximum	SD
0	Artificial Soil/S	5	8.3775	6.1	10.580	1.8462				
100		5	2.1033	0.61	5.7933	2.0927				

Graphics





CETIS Analysis Detail

Plant Bioassay - Chronic — **CH2M Hill**

Sample No:	10-3299-6115	**Code:**	B1719-07	**Client:**	
Sample Date:	18 Dec-06	**Material:**	Soil	**Project:**	
Receive Date:		**Source:**	ELR-Washington Closure Hanford		
Sample Age:	67d 0h	**Station:**			

Comments: J13NY6

Endpoint	Analysis Type	Sample Link	Control Link	Date Analyzed	Version
Average AG Wt (Dry, mg)	Comparison	05-3150-6425	05-3150-6425	16 Apr-07 2:13 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	29.94%

Group Comparisons

Control	vs	Conc-%	Statistic	Critical	P-Value	MSD	Decision(0.05)
Artificial Soil/Sedi		100	4.93393	1.85955	0.0006	0.36283	Significant Effect

ANOVA Table

Source	Sum of Squares	Mean Square	DF	F Statistic	P-Value	Decision(0.05)
Between	2.317005	2.317005	1	24.34	0.00114	Significant Effect
Error	0.7614329	0.095179	8			
Total	3.07843757	2.4121838	9			

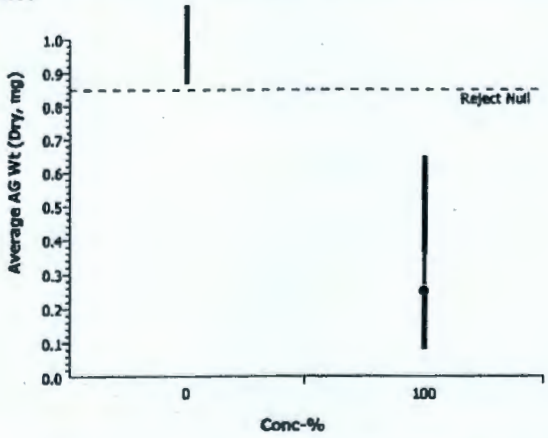
ANOVA Assumptions

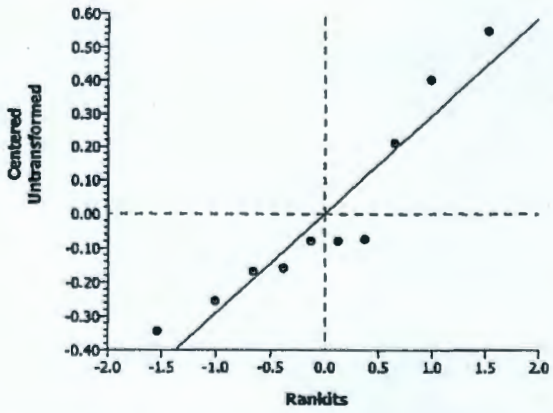
Attribute	Test	Statistic	Critical	P-Value	Decision(0.01)
Variances	Variance Ratio F	2.67281	23.15450	0.36405	Equal Variances
Distribution	Shapiro-Wilk W	0.88252		0.13948	Normal Distribution

Data Summary

			Original Data				Transformed Data			
Conc-%	Control Type	Count	Mean	Minimum	Maximum	SD	Mean	Minimum	Maximum	SD
0	Artificial Soil/S	5	1.21170	0.86799	1.76001	0.37220				
100		5	0.24899	0.07996	0.64998	0.22766				

Graphics





CETIS Analysis Detail

Plant Bioassay - Chronic — **CH2M Hill**

Sample No:	10-3299-6115	**Code:**	B1719-07	**Client:**	
Sample Date:	18 Dec-06	**Material:**	Soil	**Project:**	
Receive Date:		**Source:**	ELR-Washington Closure Hanford		
Sample Age:	67d 0h	**Station:**			

Comments: J13NY6

Endpoint	Analysis Type	Sample Link	Control Link	Date Analyzed	Version
Average Root Wt. (Wet, mg)	Comparison	05-3150-6425	05-3150-6425	16 Apr-07 2:14 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	42.00%

Group Comparisons

Control	vs	Conc-%	Statistic	Critical	P-Value	MSD	Decision(0.05)
Artificial Soil/Sedi		100	3.66383	1.85955	0.0032	1.91497	Significant Effect

ANOVA Table

Source	Sum of Squares	Mean Square	DF	F Statistic	P-Value	Decision(0.05)
Between	35.58912	35.58912	1	13.42	0.00637	Significant Effect
Error	21.20984	2.651231	8			
Total	56.7989674	38.240353	9			

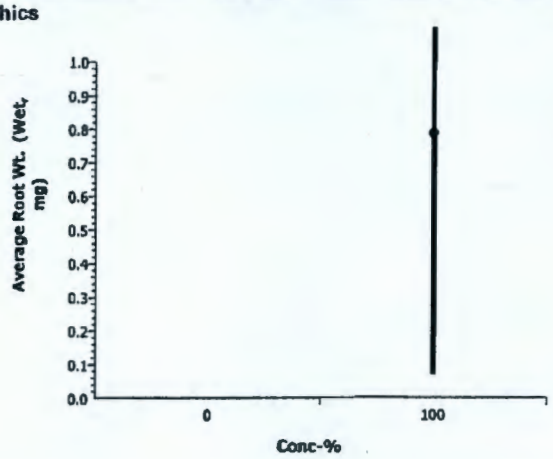
ANOVA Assumptions

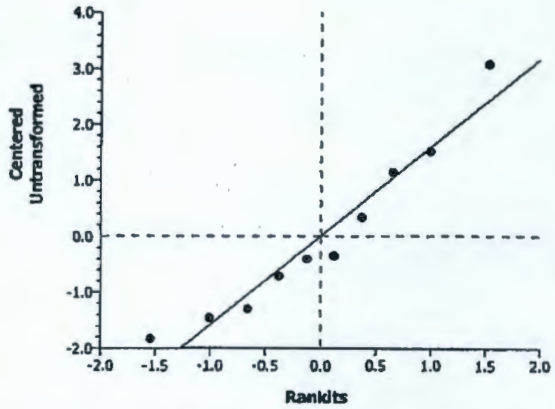
Attribute	Test	Statistic	Critical	P-Value	Decision(0.01)
Variances	Variance Ratio F	8.53438	23.15450	0.06139	Equal Variances
Distribution	Shapiro-Wilk W	0.93565		0.50566	Normal Distribution

Data Summary

			Original Data				Transformed Data			
Conc-%	Control Type	Count	Mean	Minimum	Maximum	SD	Mean	Minimum	Maximum	SD
0	Artificial Soil/S	5	4.55901	2.72400	7.64001	2.17861				
100		5	0.78599	0.06995	1.92999	0.74575				

Graphics





CETIS Analysis Detail

Plant Bioassay - Chronic — **CH2M Hill**

Sample No:	10-3299-6115	**Code:**	B1719-07	**Client:**	
Sample Date:	18 Dec-06	**Material:**	Soil	**Project:**	
Receive Date:		**Source:**	ELR-Washington Closure Hanford		
Sample Age:	67d 0h	**Station:**			

Comments: J13NY6

Endpoint	Analysis Type	Sample Link	Control Link	Date Analyzed	Version
Average Root Wt. (Dry, mg)	Comparison	05-3150-6425	05-3150-6425	16 Apr-07 2:14 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	27.14%

Group Comparisons

Control	vs	Conc-%	Statistic	Critical	P-Value	MSD	Decision(0.05)
Artificial Soil/Sedi		100	5.12307	1.85955	0.0005	0.08498	Significant Effect

ANOVA Table

Source	Sum of Squares	Mean Square	DF	F Statistic	P-Value	Decision(0.05)
Between	0.1370293	0.137029	1	26.25	0.00090	Significant Effect
Error	0.0417679	0.005221	8			
Total	0.17879722	0.1422503	9			

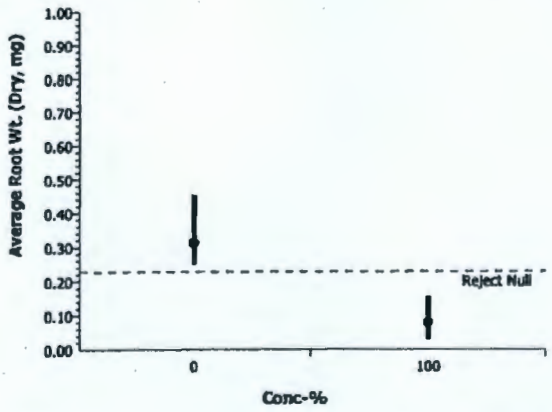
ANOVA Assumptions

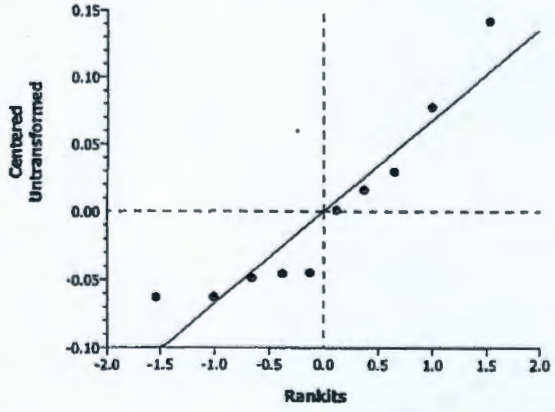
Attribute	Test	Statistic	Critical	P-Value	Decision(0.01)
Variances	Variance Ratio F	2.87284	23.15450	0.33117	Equal Variances
Distribution	Shapiro-Wilk W	0.86559		0.08877	Normal Distribution

Data Summary

			Original Data				Transformed Data			
Conc-%	Control Type	Count	Mean	Minimum	Maximum	SD	Mean	Minimum	Maximum	SD
0	Artificial Soil/S	5	0.31309	0.25000	0.45496	0.08801				
100		5	0.07898	0.02991	0.15666	0.05192				

Graphics





CETIS Analysis Detail

Plant Bioassay - Chronic — **CH2M Hill**

Sample No:	10-3299-6115	**Code:**	B1719-07	**Client:**	
Sample Date:	18 Dec-06	**Material:**	Soil	**Project:**	
Receive Date:		**Source:**	ELR-Washington Closure Hanford		
Sample Age:	67d 0h	**Station:**			

Comments: J13NY6

Endpoint	Analysis Type	Sample Link	Control Link	Date Analyzed	Version
Average Total Wt (Wet, mg)	Comparison	05-3150-6425	05-3150-6425	16 Apr-07 2:14 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	29.50%

Group Comparisons

Control	vs	Conc-%	Statistic	Critical	P-Value	MSD	Decision(0.05)
Artificial Soil/Sedi		100	4.89573	1.85955	0.0006	3.81623	Significant Effect

ANOVA Table

Source	Sum of Squares	Mean Square	DF	F Statistic	P-Value	Decision(0.05)
Between	252.3649	252.3649	1	23.97	0.00120	Significant Effect
Error	84.23322	10.52915	8			
Total	336.598083	262.89402	9			

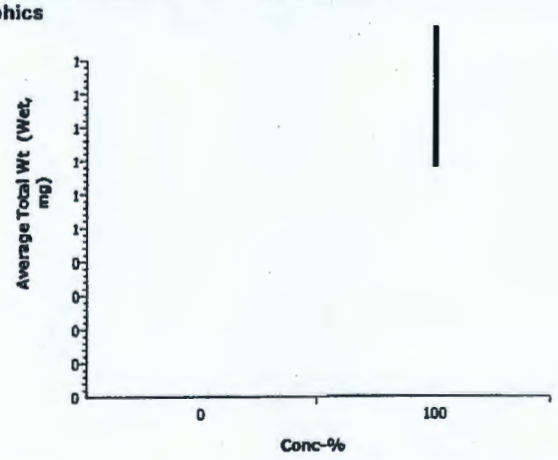
ANOVA Assumptions

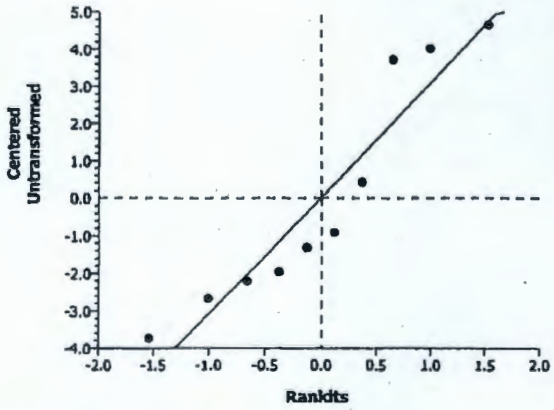
Attribute	Test	Statistic	Critical	P-Value	Decision(0.01)
Variances	Variance Ratio F	2.53466	23.15450	0.38966	Equal Variances
Distribution	Shapiro-Wilk W	0.87670		0.11957	Normal Distribution

Data Summary

			Original Data				Transformed Data			
Conc-%	Control Type	Count	Mean	Minimum	Maximum	SD	Mean	Minimum	Maximum	SD
0	Artificial Soil/S	5	12.937	9.198	17.588	3.886				
100		5	2.8893	0.6799	6.9133	2.4408				

Graphics





CETIS Analysis Detail

Plant Bioassay - Chronic — **CH2M Hill**

Sample No:	10-3299-6115	**Code:**	B1719-07	**Client:**	
Sample Date:	18 Dec-06	**Material:**	Soil	**Project:**	
Receive Date:		**Source:**	ELR-Washington Closure Hanford		
Sample Age:	67d 0h	**Station:**			

Comments: J13NY6

Endpoint	Analysis Type	Sample Link	Control Link	Date Analyzed	Version
Average Total Wt (Dry, mg)	Comparison	05-3150-6425	05-3150-6425	16 Apr-07 2:14 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	29.13%

Group Comparisons

Control	vs	Conc-%	Statistic	Critical	P-Value	MSD	Decision(0.05)
Artificial Soil/Sedi		100	5.01039	1.85955	0.0005	0.44419	Significant Effect

ANOVA Table

Source	Sum of Squares	Mean Square	DF	F Statistic	P-Value	Decision(0.05)
Between	3.580972	3.580972	1	25.10	0.00104	Significant Effect
Error	1.141164	0.142646	8			
Total	4.7221365	3.7236179	9			

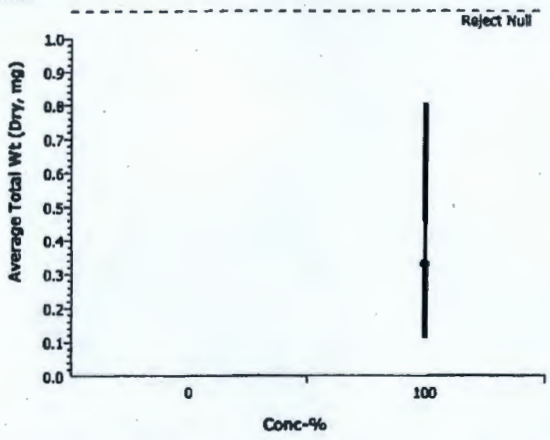
ANOVA Assumptions

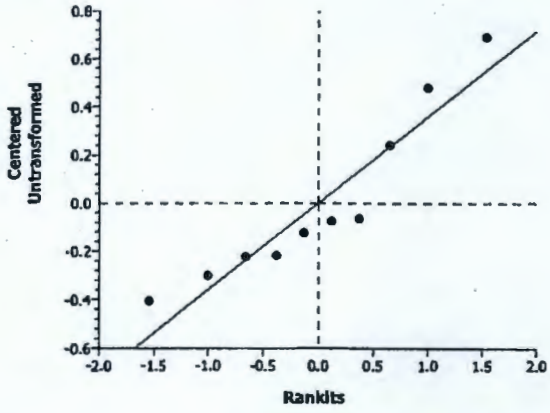
Attribute	Test	Statistic	Critical	P-Value	Decision(0.01)
Variances	Variance Ratio F	2.78470	23.15450	0.34509	Equal Variances
Distribution	Shapiro-Wilk W	0.88710		0.15725	Normal Distribution

Data Summary

			Original Data				Transformed Data			
Conc-%	Control Type	Count	Mean	Minimum	Maximum	SD	Mean	Minimum	Maximum	SD
0	Artificial Soil/S	5	1.52479	1.11799	2.21497	0.45816				
100		5	0.32797	0.10986	0.80664	0.27455				

Graphics





BLUEGRASS GROWTH TEST

Client: Washington Closure Hanford Project Seed ID: PS001 Test Start Date: February 23, 2007

Initials: Day 0 BM Day 12 NJ Day 14 [illegible] Day 18 NJ Day 19 — Day 21 [illegible] Day 24/25 NJ Day 26 NJ Day 28 BM Day 31 NJ Day 33 NJ Day 40 NJ

Bioassay Lab ID: BG 1719-08 Sample No: J13LP9

CONC.	REPLICATE	# seeds germinated: 12 days after planting	14 days after planting	15/17 Emergence 18 days after planting	19 days after planting	21 days after planting	24/25 days after planting	Day 26 7-DAYS POST-EMERGENCE (33 days after planting) 28	31		14-DAYS POST-EMERGENCE (40 days after planting)	pH: INITIAL (@ planting)	FINAL (@ 14 days Post-Emergence)
Control	A	0	0	0		0	0	0	1	1	1	6.5	6.8
	B	0	0	0		0	0	0	0	2	2		
	C	0	0	0		0	0	0	0	0	1 Ø NJ 2		
	D	0	0	0		0	1	1	1	1	1 2		
	E	0	0	0		0	0	0	0	0	0		

7-Days Post-Emergence: Selectively thin down to 5 Seedlings (leave the 5 tallest seedlings). Describe shoot appearance: Day 28 Day 31

Replicate A: 1 sm G
Replicate B: 2 sm G
Replicate C: 1 sm G
Replicate D: 1 med G
Replicate E: none

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

14-Days Post-Emergence: Describe shoot appearance:

Replicate A: 1 sm G
Replicate B: 2 sm G
Replicate C: 2 sm G
Replicate D: 1 med G | sm G
Replicate E:

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

	1st Seedling	2nd Seedling	3rd Seedling	4th Seedling	5th Seedling
Replicate A	8 mm	mm	mm	mm	mm
Replicate B	10 mm	21 mm	mm	mm	mm
Replicate C	14 mm	10 mm	mm	mm	mm
Replicate D	52 mm	17 mm	mm	mm	mm
Replicate E	mm	mm	mm	mm	mm

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

	Tin Tare Wt. (mg)	Wet Wt (mg)	Dry Wt. (mg)
Replicate A	1285.23	1285.64	1285.32
Replicate B	1289.80	1291.33	1289.99
Replicate C	1294.69	1296.39	1295.03
Replicate D	1286.44	1291.59	1287.17
Replicate E	1289.35	—	—

Describe root appearance:

Replicate A:
Replicate B:
Replicate C:
Replicate D:
Replicate E:

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

	1st Seedling	2nd Seedling	3rd Seedling	4th Seedling	5th Seedling
Replicate A	10 mm	mm	mm	mm	mm
Replicate B	14 mm	18 mm	mm	mm	mm
Replicate C	24 mm	11 mm	mm	mm	mm
Replicate D	45 mm	4 mm	mm	mm	mm
Replicate E	mm	mm	mm	mm	mm

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

	Tin Tare Wt. (mg)	Wet Wt (mg)	Dry Wt. (mg)
Replicate A	1287.71	1287.73	~~1287.78~~ → reweighed BM 4-16-07 1287.72
Replicate B	1289.76	1289.79	~~1289.81~~ → reweighed BM 4-16-07 1289.78
Replicate C	1280.53	1280.71	1280.66
Replicate D	1292.95	1293.65	1293.03
Replicate E	1304.73	—	—

Comments:

CETIS Test Summary

Report Date: 16 Apr-07 2:17 PM
Test Link: 02-6211-8869/B171908psc

Plant Bioassay - Chronic — **CH2M HILL**

Test No:	13-6975-7771	**Test Type:**	Plant Chronic	**Duration:**	40d 0h
Start Date:	23 Feb-07	**Protocol:**	ASTM E1963-02 (2002)	**Species:**	Poa sandbergii
Ending Date:	04 Apr-07	**Dil Water:**		**Source:**	
Setup Date:	23 Feb-07 12:00 AM	**Brine:**			

Sample No:	02-6014-8186	**Code:**	B1719-08	**Client:**	
Sample Date:	19 Dec-06	**Material:**	Soil	**Project:**	
Receive Date:		**Source:**	ELR-Washington Closure Hanford		
Sample Age:	66d 0h	**Station:**			

Comments: J13LP9

Comparison Summary

Analysis	Endpoint	NOEL	LOEL	ChV	PMSD	Method
18-7050-0430	% Germination	< 100	100	N/A	30.23%	Wilcoxon Rank Sum Two-Sample
09-5532-5735	Average Height (mm)	< 100	100	N/A	26.85%	Equal Variance t Two-Sample
13-6740-9878	Average Length (mm)	< 100	100	N/A	15.40%	Equal Variance t Two-Sample
00-7202-9803	Average AG Wt (Wet, mg)	< 100	100	N/A	23.26%	Equal Variance t Two-Sample
16-9218-6241	Average AG Wt (Dry, mg)	< 100	100	N/A	30.80%	Equal Variance t Two-Sample
05-4993-4172	Average Root Wt. (Wet, mg	< 100	100	N/A	45.71%	Unequal Variance t Two-Sample
14-6236-9718	Average Root Wt. (Dry, mg)	< 100	100	N/A	27.91%	Equal Variance t Two-Sample
10-6001-8148	Average Total Wt (Wet, mg	< 100	100	N/A	29.75%	Equal Variance t Two-Sample
02-6400-5911	Average Total Wt (Dry, mg)	< 100	100	N/A	29.91%	Equal Variance t Two-Sample

CETIS Test Summary

Report Date: 16 Apr-07 2:17 PM
Test Link: 02-6211-8869/B171908psc

% Germination Summary

Conc-%	Control Type	Reps	Mean	Minimum	Maximum	SE	SD	CV
0	Artificial Soil/S	5	0.84000	0.40000	1.00000	0.11662	0.26077	31.04%
100		5	0.28000	0.00000	0.40000	0.08000	0.17889	63.89%

Average Height (mm) Summary

Conc-%	Control Type	Reps	Mean	Minimum	Maximum	SE	SD	CV
0	Artificial Soil/S	5	61.2	48.400	84.5	6.1496	13.751	22.47%
100		5	17.5	8	34.5	5.8701	11.740	67.09%

Average Length (mm) Summary

Conc-%	Control Type	Reps	Mean	Minimum	Maximum	SE	SD	CV
0	Artificial Soil/S	5	46.98	38.8	53	2.4520	5.4829	11.67%
100		5	17	10	24.5	2.9791	5.9582	35.05%

Average AG Wt (Wet, mg) Summary

Conc-%	Control Type	Reps	Mean	Minimum	Maximum	SE	SD	CV
0	Artificial Soil/S	5	8.3775	6.1	10.580	0.8257	1.8462	22.04%
100		5	1.1500	0.4100	2.5750	0.4845	0.9689	84.25%

Average AG Wt (Dry, mg) Summary

Conc-%	Control Type	Reps	Mean	Minimum	Maximum	SE	SD	CV
0	Artificial Soil/S	5	1.21170	0.86799	1.76001	0.16645	0.37220	30.72%
100		5	0.18001	0.08997	0.36505	0.06434	0.12868	71.49%

Average Root Wt. (Wet, mg) Summary

Conc-%	Control Type	Reps	Mean	Minimum	Maximum	SE	SD	CV
0	Artificial Soil/S	5	4.55901	2.72400	7.64001	0.97430	2.17861	47.79%
100		5	0.11876	0.01501	0.35004	0.07897	0.15794	132.99

Average Root Wt. (Dry, mg) Summary

Conc-%	Control Type	Reps	Mean	Minimum	Maximum	SE	SD	CV
0	Artificial Soil/S	5	0.31309	0.25000	0.45496	0.03936	0.08801	28.11%
100		5	0.03127	0.01001	0.06500	0.01329	0.02658	85.00%

Average Total Wt (Wet, mg) Summary

Conc-%	Control Type	Reps	Mean	Minimum	Maximum	SE	SD	CV
0	Artificial Soil/S	5	12.937	9.198	17.588	1.7379	3.886	30.04%
100		5	1.2688	0.4301	2.9250	0.5623	1.1245	88.63%

Average Total Wt (Dry, mg) Summary

Conc-%	Control Type	Reps	Mean	Minimum	Maximum	SE	SD	CV
0	Artificial Soil/S	5	1.52479	1.11799	2.21497	0.20490	0.45816	30.05%
100		5	0.21127	0.09998	0.40509	0.07177	0.14355	67.94%

CETIS Test Summary

Report Date: 16 Apr-07 2:17 PM
Test Link: 02-6211-8869/B171908psc

% Germination Detail

Conc-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Artificial Soil/S	1.00000	0.40000	1.00000	0.80000	1.00000
100		0.20000	0.40000	0.40000	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	54.8	84.5	58.8	59.5	48.4000
100		8	15.5	12	34.5	Missing

Average Length (mm) Detail

Conc-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Artificial Soil/S	50	48.5	44.6	53	38.8
100		10	16	17.5	24.5	Missing

Average AG Wt (Wet, mg) Detail

Conc-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Artificial Soil/S	6.1	10.5800	7.548	9.94751	7.71199
100		0.41003	0.76495	0.85004	2.57501	Missing

Average AG Wt (Dry, mg) Detail

Conc-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Artificial Soil/S	0.86799	1.76001	0.95598	1.42252	1.05200
100		0.08997	0.09497	0.17004	0.36505	Missing

Average Root Wt. (Wet, mg) Detail

Conc-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Artificial Soil/S	3.09800	6.07501	2.72400	7.64001	3.25801
100		0.02002	0.01501	0.08997	0.35004	Missing

Average Root Wt. (Dry, mg) Detail

Conc-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Artificial Soil/S	0.25000	0.45496	0.26802	0.34250	0.25000
100		0.01001	0.01001	0.06500	0.04004	Missing

Average Total Wt (Wet, mg) Detail

Conc-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Artificial Soil/S	9.198	16.6550	10.272	17.5875	10.97
100		0.43005	0.77997	0.94000	2.92505	Missing

Average Total Wt (Dry, mg) Detail

Conc-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Artificial Soil/S	1.11799	2.21497	1.22400	1.76501	1.30200
100		0.09998	0.10498	0.23505	0.40509	Missing

CETIS Analysis Detail

Plant Bioassay - Chronic — **CH2M Hill**

Sample No:	02-6014-8186	**Code:**	B1719-08	**Client:**	
Sample Date:	19 Dec-06	**Material:**	Soil	**Project:**	
Receive Date:		**Source:**	ELR-Washington Closure Hanford		
Sample Age:	66d 0h	**Station:**			

Comments: J13LP9

Endpoint	Analysis Type	Sample Link	Control Link	Date Analyzed	Version
% Germination	Comparison	02-6211-8869	02-6211-8869	16 Apr-07 2:16 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		N/A	30.23%

Group Comparisons

Control	vs	Conc-%	Statistic	Critical	P-Value	Ties	Decision(0.05)
Artificial Soil/Sedi		100	16.5		0.0079	1	Significant Effect

ANOVA Table

Source	Sum of Squares	Mean Square	DF	F Statistic	P-Value	Decision(0.05)
Between	0.9513512	0.951351	1	15.26	0.00450	Significant Effect
Error	0.4987079	0.062338	8			
Total	1.45005906	1.0136897	9			

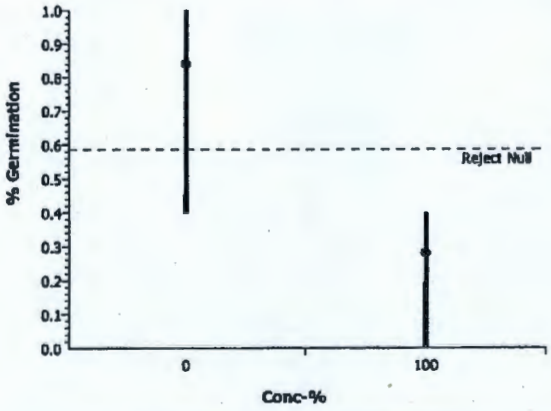
ANOVA Assumptions

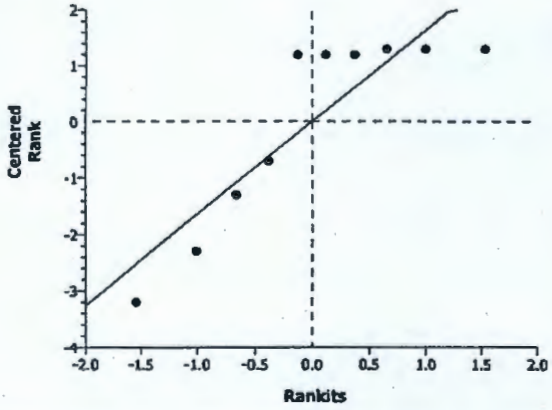
Attribute	Test	Statistic	Critical	P-Value	Decision(0.01)
Variances	Variance Ratio F	1.98293	23.15450	0.52361	Equal Variances
Distribution	Shapiro-Wilk W	0.78337		0.00910	Non-normal Distribution

Data Summary

			Original Data				Transformed Data			
Conc-%	Control Type	Count	Mean	Minimum	Maximum	SD	Mean	Minimum	Maximum	SD
0	Artificial Soil/S	5	0.84000	0.40000	1.00000	0.26077	7.70000	4.50000	9.00000	1.98746
100		5	0.28000	0.00000	0.40000	0.17889	3.30000	1.00000	4.50000	1.68077

Graphics





CETIS Analysis Detail

Plant Bioassay - Chronic — **CH2M HILL**

Sample No:	02-6014-8186	**Code:**	B1719-08	**Client:**	
Sample Date:	19 Dec-06	**Material:**	Soil	**Project:**	
Receive Date:		**Source:**	ELR-Washington Closure Hanford		
Sample Age:	66d 0h	**Station:**			

Comments: J13LP9

Endpoint	Analysis Type	Sample Link	Control Link	Date Analyzed	Version
Average Height (mm)	Comparison	02-6211-8869	02-6211-8869	16 Apr-07 2:16 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	26.85%

Group Comparisons

Control	vs	Conc-%	Statistic	Critical	P-Value	MSD	Decision(0.05)
Artificial Soil/Sedi		100	5.03919	1.89458	0.0007	16.4298	Significant Effect

ANOVA Table

Source	Sum of Squares	Mean Square	DF	F Statistic	P-Value	Decision(0.05)
Between	4243.755	4243.755	1	25.39	0.00150	Significant Effect
Error	1169.84	167.12	7			
Total	5413.59534	4410.8754	8			

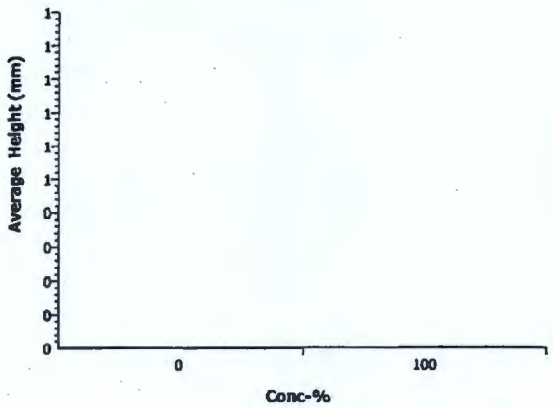
ANOVA Assumptions

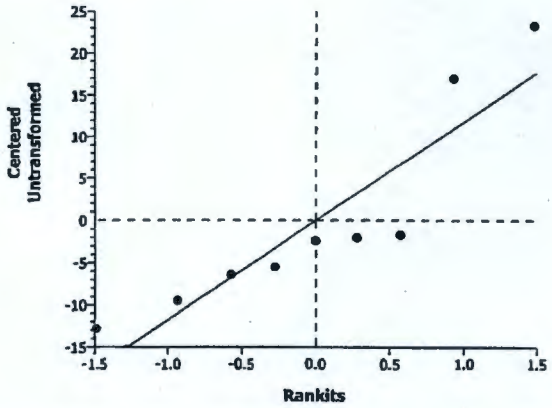
Attribute	Test	Statistic	Critical	P-Value	Decision(0.01)
Variances	Variance Ratio F	1.37184	46.19462	0.82790	Equal Variances
Distribution	Shapiro-Wilk W	0.82725		0.04159	Normal Distribution

Data Summary

			Original Data				Transformed Data			
Conc-%	Control Type	Count	Mean	Minimum	Maximum	SD	Mean	Minimum	Maximum	SD
0	Artificial Soil/S	5	61.2	48.4	84.5	13.751				
100		4	17.5	8	34.5	11.740				

Graphics





CETIS Analysis Detail

Plant Bioassay - Chronic — **CH2M Hill**

Sample No:	02-6014-8186	**Code:**	B1719-08	**Client:**	
Sample Date:	19 Dec-06	**Material:**	Soil	**Project:**	
Receive Date:		**Source:**	ELR-Washington Closure Hanford		
Sample Age:	66d 0h	**Station:**			

Comments: J13LP9

Endpoint	Analysis Type	Sample Link	Control Link	Date Analyzed	Version
Average Length (mm)	Comparison	02-6211-8869	02-6211-8869	16 Apr-07 2:16 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	15.40%

Group Comparisons

Control	vs	Conc-%	Statistic	Critical	P-Value	MSD	Decision(0.05)
Artificial Soil/Sedi		100	7.85240	1.89458	0.0001	7.23339	Significant Effect

ANOVA Table

Source	Sum of Squares	Mean Square	DF	F Statistic	P-Value	Decision(0.05)
Between	1997.334	1997.334	1	61.66	0.00010	Significant Effect
Error	226.748	32.39257	7			
Total	2224.08212	2029.7267	8			

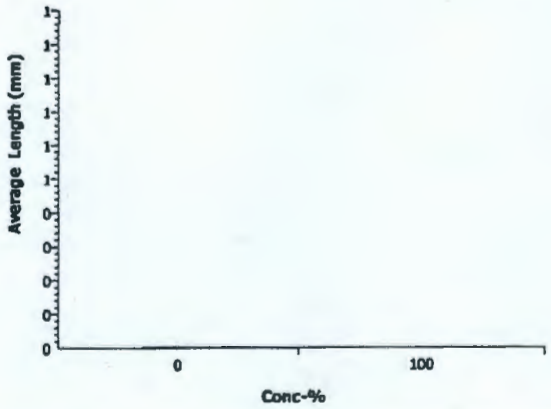
ANOVA Assumptions

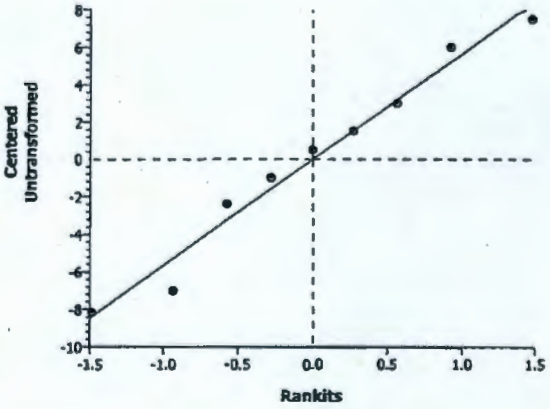
Attribute	Test	Statistic	Critical	P-Value	Decision(0.01)
Variances	Variance Ratio F	1.18089	24.25912	0.84411	Equal Variances
Distribution	Shapiro-Wilk W	0.96108		0.80954	Normal Distribution

Data Summary

			Original Data				Transformed Data			
Conc-%	Control Type	Count	Mean	Minimum	Maximum	SD	Mean	Minimum	Maximum	SD
0	Artificial Soil/S	5	46.98	38.8	53	5.4829				
100		4	17	10	24.5	5.9582				

Graphics





CETIS Analysis Detail

Plant Bioassay - Chronic — **CH2M Hill**

Sample No:	02-6014-8186	**Code:**	B1719-08	**Client:**	
Sample Date:	19 Dec-06	**Material:**	Soil	**Project:**	
Receive Date:		**Source:**	ELR-Washington Closure Hanford		
Sample Age:	66d 0h	**Station:**			

Comments: J13LP9

Endpoint	Analysis Type	Sample Link	Control Link	Date Analyzed	Version
Average AG Wt (Wet, mg)	Comparison	02-6211-8869	02-6211-8869	16 Apr-07 2:16 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	23.26%

Group Comparisons

Control	vs	Conc-%	Statistic	Critical	P-Value	MSD	Decision(0.05)
Artificial Soil/Sedi		100	7.02816	1.89458	0.0001	1.94831	Significant Effect

ANOVA Table

Source	Sum of Squares	Mean Square	DF	F Statistic	P-Value	Decision(0.05)
Between	116.0815	116.0815	1	49.40	0.00021	Significant Effect
Error	16.45045	2.350064	7			
Total	132.531914	118.43153	8			

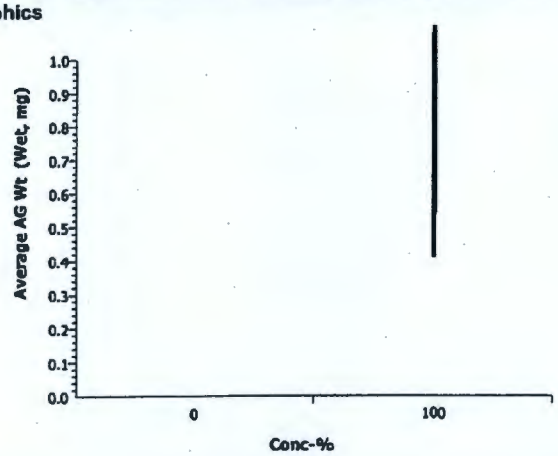
ANOVA Assumptions

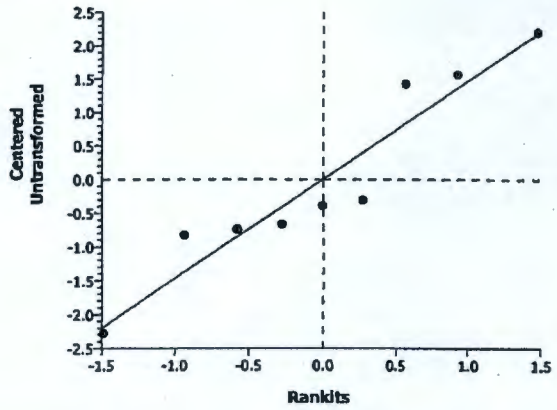
Attribute	Test	Statistic	Critical	P-Value	Decision(0.01)
Variances	Variance Ratio F	3.63064	46.19462	0.31782	Equal Variances
Distribution	Shapiro-Wilk W	0.91472		0.35035	Normal Distribution

Data Summary

			Original Data				Transformed Data			
Conc-%	Control Type	Count	Mean	Minimum	Maximum	SD	Mean	Minimum	Maximum	SD
0	Artificial Soil/S	5	8.3775	6.1	10.580	1.8462				
100		4	1.1500	0.4100	2.5750	0.9689				

Graphics





CETIS Analysis Detail

Plant Bioassay - Chronic — **CH2M Hill**

Sample No:	02-6014-8186	**Code:**	B1719-08	**Client:**	
Sample Date:	19 Dec-06	**Material:**	Soil	**Project:**	
Receive Date:		**Source:**	ELR-Washington Closure Hanford		
Sample Age:	66d 0h	**Station:**			

Comments: J13LP9

Endpoint	Analysis Type	Sample Link	Control Link	Date Analyzed	Version
Average AG Wt (Dry, mg)	Comparison	02-6211-8869	02-6211-8869	16 Apr-07 2:16 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	30.80%

Group Comparisons

Control vs	Conc-%	Statistic	Critical	P-Value	MSD	Decision(0.05)
Artificial Soil/Sedi	100	5.23658	1.89458	0.0006	0.37326	Significant Effect

ANOVA Table

Source	Sum of Squares	Mean Square	DF	F Statistic	P-Value	Decision(0.05)
Between	2.36531	2.36531	1	27.42	0.00120	Significant Effect
Error	0.603796	0.086257	7			
Total	2.96910572	2.4515663	8			

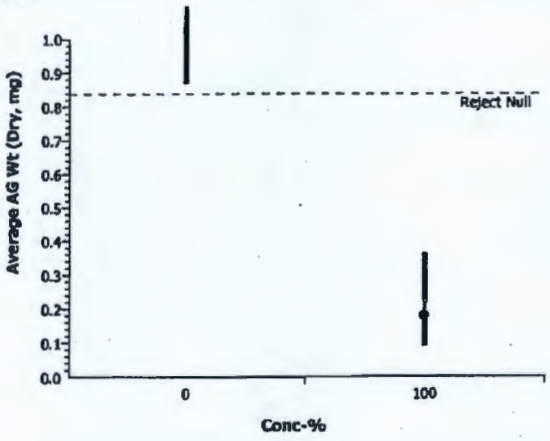
ANOVA Assumptions

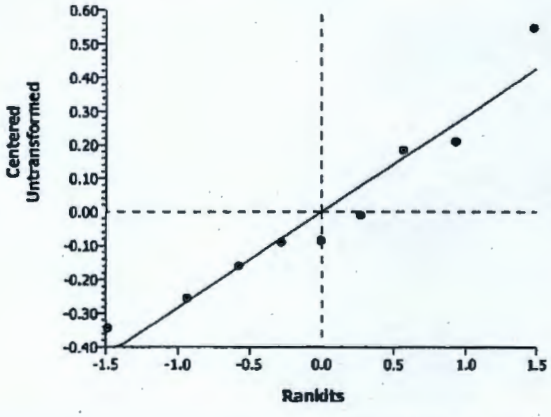
Attribute	Test	Statistic	Critical	P-Value	Decision(0.01)
Variances	Variance Ratio F	8.36542	46.19462	0.11218	Equal Variances
Distribution	Shapiro-Wilk W	0.93737		0.55454	Normal Distribution

Data Summary

			Original Data				Transformed Data			
Conc-%	Control Type	Count	Mean	Minimum	Maximum	SD	Mean	Minimum	Maximum	SD
0	Artificial Soil/S	5	1.21170	0.86799	1.76001	0.37220				
100		4	0.18001	0.08997	0.36505	0.12868				

Graphics





CETIS Analysis Detail

Plant Bioassay - Chronic — **CH2M Hill**

Sample No:	02-6014-8186	**Code:**	B1719-08	**Client:**	
Sample Date:	19 Dec-06	**Material:**	Soil	**Project:**	
Receive Date:		**Source:**	ELR-Washington Closure Hanford		
Sample Age:	66d 0h	**Station:**			

Comments: J13LP9

Endpoint	Analysis Type	Sample Link	Control Link	Date Analyzed	Version
Average Root Wt. (Wet, mg)	Comparison	02-6211-8869	02-6211-8869	16 Apr-07 2:16 PM	CETISv1.1.2

Method	Alt H	Data Transform	Zeta	NOEL	LOEL	Toxic Units	ChV	PMSD
Unequal Variance t Two-Sample	C > T	Untransformed		<100	100		N/A	45.71%

Group Comparisons

Control	vs	Conc-%	Statistic	Critical	P-Value	MSD	Decision(0.05)
Artificial Soil/Sedi		100	4.54247	2.13185	0.0052	2.08387	Significant Effect

ANOVA Table

Source	Sum of Squares	Mean Square	DF	F Statistic	P-Value	Decision(0.05)
Between	43.81288	43.81288	1	16.09	0.00512	Significant Effect
Error	19.06011	2.722873	7			
Total	62.8729877	46.535751	8			

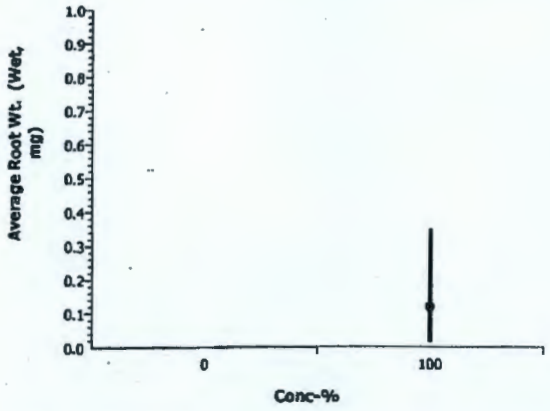
ANOVA Assumptions

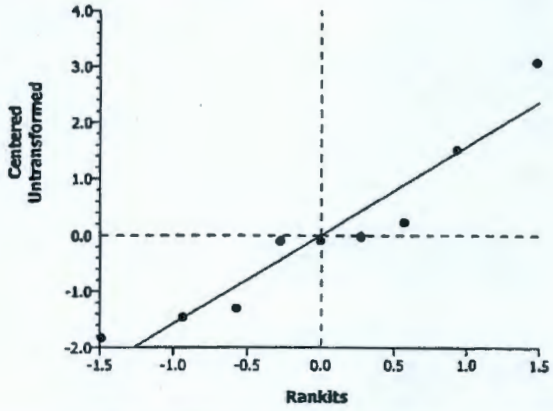
Attribute	Test	Statistic	Critical	P-Value	Decision(0.01)
Variances	Variance Ratio F	190.28220	46.19462	0.00123	Unequal Variances
Distribution	Shapiro-Wilk W	0.91234		0.33259	Normal Distribution

Data Summary

			Original Data				Transformed Data			
Conc-%	Control Type	Count	Mean	Minimum	Maximum	SD	Mean	Minimum	Maximum	SD
0	Artificial Soil/S	5	4.55901	2.72400	7.64001	2.17861				
100		4	0.11876	0.01501	0.35004	0.15794				

Graphics





CETIS Analysis Detail

Plant Bioassay - Chronic — **CH2M Hill**

Sample No:	02-6014-8186	**Code:**	B1719-08	**Client:**	
Sample Date:	19 Dec-06	**Material:**	Soil	**Project:**	
Receive Date:		**Source:**	ELR-Washington Closure Hanford		
Sample Age:	66d 0h	**Station:**			

Comments: J13LP9

Endpoint	Analysis Type	Sample Link	Control Link	Date Analyzed	Version
Average Root Wt. (Dry, mg)	Comparison	02-6211-8869	02-6211-8869	16 Apr-07 2:16 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	27.91%

Group Comparisons

Control	vs	Conc-%	Statistic	Critical	P-Value	MSD	Decision(0.05)
Artificial Soil/Sedi		100	6.10946	1.89458	0.0002	0.0874	Significant Effect

ANOVA Table

Source	Sum of Squares	Mean Square	DF	F Statistic	P-Value	Decision(0.05)
Between	0.176506	0.176506	1	37.33	0.00049	Significant Effect
Error	0.0331018	0.004729	7			
Total	0.20960787	0.1812349	8			

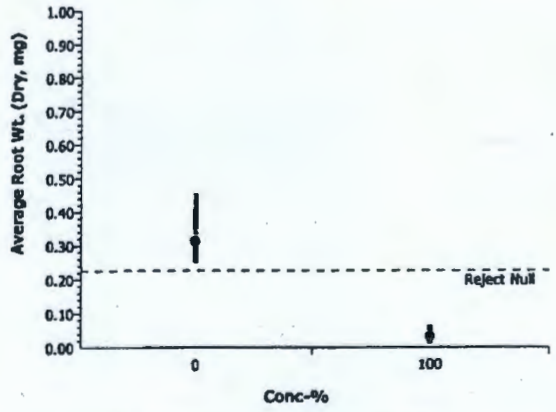
ANOVA Assumptions

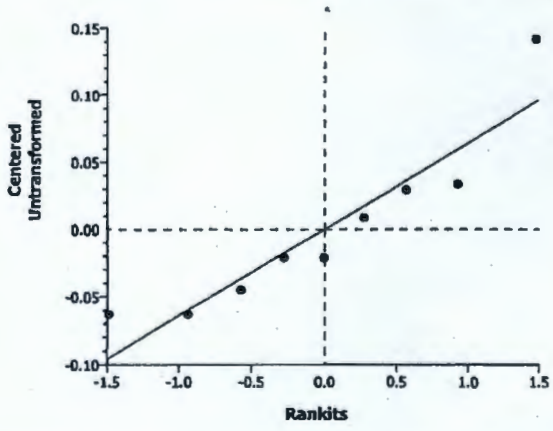
Attribute	Test	Statistic	Critical	P-Value	Decision(0.01)
Variances	Variance Ratio F	10.96736	46.19462	0.07786	Equal Variances
Distribution	Shapiro-Wilk W	0.86964		0.12187	Normal Distribution

Data Summary

			Original Data				Transformed Data			
Conc-%	Control Type	Count	Mean	Minimum	Maximum	SD	Mean	Minimum	Maximum	SD
0	Artificial Soil/S	5	0.31309	0.25000	0.45496	0.08801				
100		4	0.03127	0.01001	0.06500	0.02658				

Graphics





CETIS Analysis Detail

Plant Bioassay - Chronic — **CH2M Hill**

Sample No:	02-6014-8186	**Code:**	B1719-08	**Client:**	
Sample Date:	19 Dec-06	**Material:**	Soil	**Project:**	
Receive Date:		**Source:**	ELR-Washington Closure Hanford		
Sample Age:	66d 0h	**Station:**			

Comments: J13LP9

Endpoint	Analysis Type	Sample Link	Control Link	Date Analyzed	Version
Average Total Wt (Wet, mg)	Comparison	02-6211-8869	02-6211-8869	16 Apr-07 2:16 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	29.75%

Group Comparisons

Control vs	Conc-%	Statistic	Critical	P-Value	MSD	Decision(0.05)
Artificial Soil/Sedi	100	5.74347	1.89458	0.0004	3.8488	Significant Effect

ANOVA Table

Source	Sum of Squares	Mean Square	DF	F Statistic	P-Value	Decision(0.05)
Between	302.5248	302.5248	1	32.99	0.00070	Significant Effect
Error	64.19632	9.170902	7			
Total	366.721130	311.69571	8			

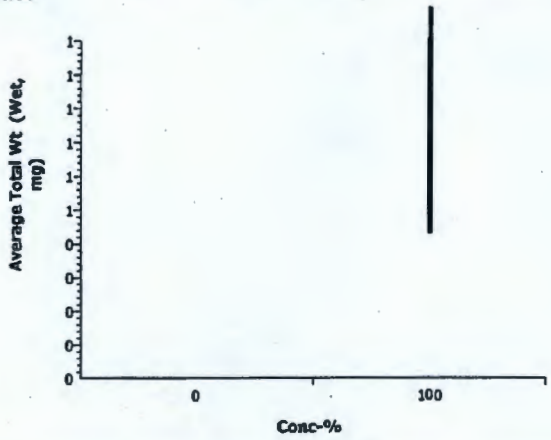
ANOVA Assumptions

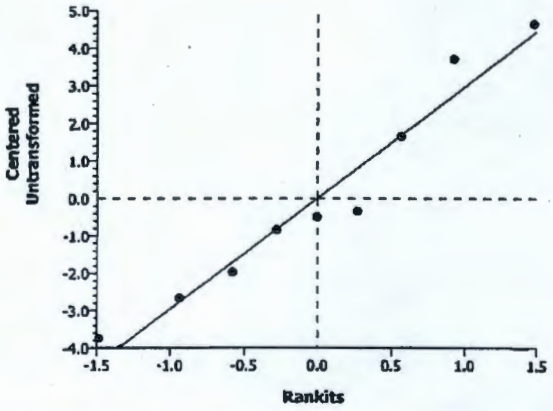
Attribute	Test	Statistic	Critical	P-Value	Decision(0.01)
Variances	Variance Ratio F	11.94130	46.19462	0.06928	Equal Variances
Distribution	Shapiro-Wilk W	0.94164		0.59921	Normal Distribution

Data Summary

			Original Data				Transformed Data			
Conc-%	Control Type	Count	Mean	Minimum	Maximum	SD	Mean	Minimum	Maximum	SD
0	Artificial Soil/S	5	12.937	9.198	17.588	3.886				
100		4	1.2688	0.4301	2.9250	1.1245				

Graphics





CETIS Analysis Detail

Plant Bioassay - Chronic — **CH2M Hill**

Sample No:	02-6014-8186	**Code:**	B1719-08	**Client:**	
Sample Date:	19 Dec-06	**Material:**	Soil	**Project:**	
Receive Date:		**Source:**	ELR-Washington Closure Hanford		
Sample Age:	66d 0h	**Station:**			

Comments: J13LP9

Endpoint	Analysis Type	Sample Link	Control Link	Date Analyzed	Version
Average Total Wt (Dry, mg)	Comparison	02-6211-8869	02-6211-8869	16 Apr-07 2:16 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	29.91%

Group Comparisons

Control	vs	Conc-%	Statistic	Critical	P-Value	MSD	Decision(0.05)
Artificial Soil/Sedi		100	5.45641	1.89458	0.0005	0.45608	Significant Effect

ANOVA Table

Source	Sum of Squares	Mean Square	DF	F Statistic	P-Value	Decision(0.05)
Between	3.834087	3.834087	1	29.77	0.00095	Significant Effect
Error	0.9014595	0.12878	7			
Total	4.73554689	3.9628673	8			

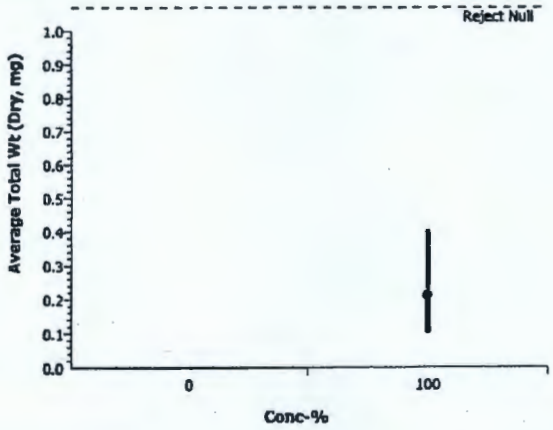
ANOVA Assumptions

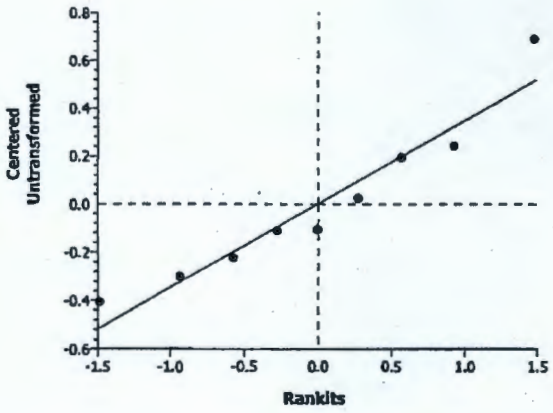
Attribute	Test	Statistic	Critical	P-Value	Decision(0.01)
Variances	Variance Ratio F	10.18729	46.19462	0.08609	Equal Variances
Distribution	Shapiro-Wilk W	0.93198		0.50044	Normal Distribution

Data Summary

			Original Data				Transformed Data			
Conc-%	Control Type	Count	Mean	Minimum	Maximum	SD	Mean	Minimum	Maximum	SD
0	Artificial Soil/S	5	1.52479	1.11799	2.21497	0.45816				
100		4	0.21127	0.09998	0.40509	0.14355				

Graphics





BLUEGRASS GROWTH TEST

Client: Washington Closure Hanford Project Seed ID: PS001 Test Start Date: February 23, 2007

Initials: Day 0 [illegible] Day 12 NJ Day 14 [illegible] Day 18 NJ Day 19 — Day 21 [illegible] Day 24 NJ Day 26 NJ Day 28 [illegible] Day 31 NJ Day 33 NJ Day 40 NJ

Bioassay Lab ID: BG 1719-09 Sample No: 013 N45

CONC.	REPLICATE	# seeds germinated: 12 days after planting	14 days after planting	16 days after planting	19 days after planting	21 days after planting	24 days after planting	7-DAYS POST-EMERGENCE (33 days after planting)				14-DAYS POST-EMERGENCE (40 days after planting)	pH: INITIAL (@ planting)	pH: FINAL (@ 14 days Post-Emergence)
		Emergence						Day 26		28	31			
Control	A	0	0	0		0	0	0	0	0	0	0	7.3	7.5
	B	1	1	1		1	1	1	1	1	1	1		
	C	0	0	0		0	0	0	0	0	0	0		
	D	0	0	0		0	0	0	0	0	0	0		
	E	0	0	0		0	0	0	0	0	0	0		

7-Days Post-Emergence: Selectively thin down to 5 Seedlings (leave the 5 tallest seedlings). Describe shoot appearance: Day 28 Day 31

Replicate A: none
Replicate B: 1 med G
Replicate C: none
Replicate D: none
Replicate E: none

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

14-Days Post-Emergence: Describe shoot appearance:

Replicate A: none
Replicate B: 1 med G
Replicate C: none
Replicate D: none
Replicate E: none

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

	1st Seedling	2nd Seedling	3rd Seedling	4th Seedling	5th Seedling
Replicate A	mm	mm	mm	mm	mm
Replicate B	46 mm	mm	mm	mm	mm
Replicate C	mm	mm	mm	mm	mm
Replicate D	mm	mm	mm	mm	mm
Replicate E	mm	mm	mm	mm	mm

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

	Tin Tare Wt. (mg)	Wet Wt (mg)	Dry Wt. (mg)
Replicate A	1289.21	—	—
Replicate B	1288.80	1295.13	1289.98
Replicate C	1286.52	—	—
Replicate D	1287.49	—	—
Replicate E	1291.75	—	—

Describe root appearance:

Replicate A
Replicate B
Replicate C
Replicate D
Replicate E

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

	1st Seedling	2nd Seedling	3rd Seedling	4th Seedling	5th Seedling
Replicate A	mm	mm	mm	mm	mm
Replicate B	24 mm	mm	mm	mm	mm
Replicate C	mm	mm	mm	mm	mm
Replicate D	mm	mm	mm	mm	mm
Replicate E	mm	mm	mm	mm	mm

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

	Tin Tare Wt. (mg)	Wet Wt (mg)	Dry Wt. (mg)
Replicate A	1293.56	—	—
Replicate B	1289.50	1291.92	1290.00
Replicate C	1286.50	—	—
Replicate D	1289.90	—	—
Replicate E	1286.60	—	—

Comments:

CETIS Test Summary

Report Date: 16 Apr-07 11:06 AM
Test Link: 15-6793-3774/B171909psc

Plant Bioassay - Chronic — **CH2M HILL**

Test No:	13-6975-7771	**Test Type:**	Plant Chronic	**Duration:**	40d 0h
Start Date:	23 Feb-07	**Protocol:**	ASTM E1963-02 (2002)	**Species:**	Poa sandbergii
Ending Date:	04 Apr-07	**Dil Water:**		**Source:**	
Setup Date:	23 Feb-07 12:00 AM	**Brine:**			

Sample No:	14-3788-3215	**Code:**	B1719-09	**Client:**	
Sample Date:	19 Dec-06	**Material:**	Soil	**Project:**	
Receive Date:		**Source:**	ELR-Washington Closure Hanford		
Sample Age:	66d 0h	**Station:**			

Comments: J13NY5

Comparison Summary

Analysis	Endpoint	NOEL	LOEL	ChV	PMSD	Method
15-3764-4184	% Germination	< 100	100	N/A	25.76%	Wilcoxon Rank Sum Two-Sample
08-6902-2880	Average Height (mm)	100	> 100	N/A	52.47%	Equal Variance t Two-Sample
02-0805-6741	Average Length (mm)	< 100	100	N/A	27.25%	Equal Variance t Two-Sample
17-1295-7372	Average AG Wt (Wet, mg)	100	> 100	N/A	51.47%	Equal Variance t Two-Sample
08-4055-0609	Average AG Wt (Dry, mg)	100	> 100	N/A	71.73%	Equal Variance t Two-Sample
17-4482-5720	Average Root Wt. (Wet, mg	100	> 100	N/A	111.60%	Equal Variance t Two-Sample
04-8306-9259	Average Root Wt. (Dry, mg)	100	> 100	N/A	65.65%	Equal Variance t Two-Sample
06-4061-6716	Average Total Wt (Wet, mg	100	> 100	N/A	70.15%	Equal Variance t Two-Sample
17-5481-9799	Average Total Wt (Dry, mg)	100	> 100	N/A	70.17%	Equal Variance t Two-Sample

CETIS Test Summary

Report Date: 16 Apr-07 11:06 AM
Test Link: 15-6793-3774/B171909psc

% Germination Summary

Conc-%	Control Type	Reps	Mean	Minimum	Maximum	SE	SD	CV
0	Artificial Soil/S	5	0.84000	0.40000	1.00000	0.11662	0.26077	31.04%
100		5	0.04000	0.00000	0.20000	0.04000	0.08944	223.61

Average Height (mm) Summary

Conc-%	Control Type	Reps	Mean	Minimum	Maximum	SE	SD	CV
0	Artificial Soil/S	5	61.2	48.400	84.5	6.1496	13.751	22.47%
100		5	46	46	46			

Average Length (mm) Summary

Conc-%	Control Type	Reps	Mean	Minimum	Maximum	SE	SD	CV
0	Artificial Soil/S	5	46.98	38.8	53	2.4520	5.4829	11.67%
100		5	24	24	24			

Average AG Wt (Wet, mg) Summary

Conc-%	Control Type	Reps	Mean	Minimum	Maximum	SE	SD	CV
0	Artificial Soil/S	5	8.3775	6.1	10.580	0.8257	1.8462	22.04%
100		5	6.33	6.33	6.33			

Average AG Wt (Dry, mg) Summary

Conc-%	Control Type	Reps	Mean	Minimum	Maximum	SE	SD	CV
0	Artificial Soil/S	5	1.21170	0.86799	1.76001	0.16645	0.37220	30.72%
100		5	1.17993	1.17993	1.17993			

Average Root Wt. (Wet, mg) Summary

Conc-%	Control Type	Reps	Mean	Minimum	Maximum	SE	SD	CV
0	Artificial Soil/S	5	4.55901	2.72400	7.64001	0.97430	2.17861	47.79%
100		5	2.42004	2.42004	2.42004			

Average Root Wt. (Dry, mg) Summary

Conc-%	Control Type	Reps	Mean	Minimum	Maximum	SE	SD	CV
0	Artificial Soil/S	5	0.31309	0.25000	0.45496	0.03936	0.08801	28.11%
100		5	0.50000	0.50000	0.50000			

Average Total Wt (Wet, mg) Summary

Conc-%	Control Type	Reps	Mean	Minimum	Maximum	SE	SD	CV
0	Artificial Soil/S	5	12.937	9.198	17.588	1.7379	3.886	30.04%
100		5	8.75	8.75	8.75			

Average Total Wt (Dry, mg) Summary

Conc-%	Control Type	Reps	Mean	Minimum	Maximum	SE	SD	CV
0	Artificial Soil/S	5	1.52479	1.11799	2.21497	0.20490	0.45816	30.05%
100		5	1.67993	1.67993	1.67993			

CETIS Test Summary

Report Date: 16 Apr-07 11:06 AM
Test Link: 15-6793-3774/B171909psc

% Germination Detail

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

Average Height (mm) Detail

Conc-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Artificial Soil/S	54.8	84.5	58.8	59.5	48.4000
100		Missing	46	Missing	Missing	Missing

Average Length (mm) Detail

Conc-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Artificial Soil/S	50	48.5	44.6	53	38.8
100		Missing	24	Missing	Missing	Missing

Average AG Wt (Wet, mg) Detail

Conc-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Artificial Soil/S	6.1	10.5800	7.548	9.94751	7.71199
100		Missing	6.32996	Missing	Missing	Missing

Average AG Wt (Dry, mg) Detail

Conc-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Artificial Soil/S	0.86799	1.76001	0.95598	1.42252	1.05200
100		Missing	1.17993	Missing	Missing	Missing

Average Root Wt. (Wet, mg) Detail

Conc-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Artificial Soil/S	3.09800	6.07501	2.72400	7.64001	3.25801
100		Missing	2.42004	Missing	Missing	Missing

Average Root Wt. (Dry, mg) Detail

Conc-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Artificial Soil/S	0.25000	0.45496	0.26802	0.34250	0.25000
100		Missing	0.50000	Missing	Missing	Missing

Average Total Wt (Wet, mg) Detail

Conc-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Artificial Soil/S	9.198	16.6550	10.272	17.5875	10.97
100		Missing	8.75	Missing	Missing	Missing

Average Total Wt (Dry, mg) Detail

Conc-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Artificial Soil/S	1.11799	2.21497	1.22400	1.76501	1.30200
100		Missing	1.67993	Missing	Missing	Missing

CETIS Analysis Detail

Plant Bioassay - Chronic — **CH2M Hill**

Sample No:	14-3788-3215	**Code:**	B1719-09	**Client:**	
Sample Date:	19 Dec-06	**Material:**	Soil	**Project:**	
Receive Date:		**Source:**	ELR-Washington Closure Hanford		
Sample Age:	66d 0h	**Station:**			

Comments: J13NY5

Endpoint	Analysis Type	Sample Link	Control Link	Date Analyzed	Version
% Germination	Comparison	15-6793-3774	15-6793-3774	16 Apr-07 11:06 AM	CETISv1.1.2

Method	Alt H	Data Transform	Zeta	NOEL	LOEL	Toxic Units	ChV	PMSD
Wilcoxon Rank Sum Two-Sample	C > T	Rank		<100	100		N/A	25.76%

Group Comparisons

Control	vs	Conc-%	Statistic	Critical	P-Value	Ties	Decision(0.05)
Artificial Soil/Sedi		100	15		0.0040	0	Significant Effect

ANOVA Table

Source	Sum of Squares	Mean Square	DF	F Statistic	P-Value	Decision(0.05)
Between	1.990958	1.990958	1	42.26	0.00019	Significant Effect
Error	0.3768871	0.047111	8			
Total	2.36784527	2.0380691	9			

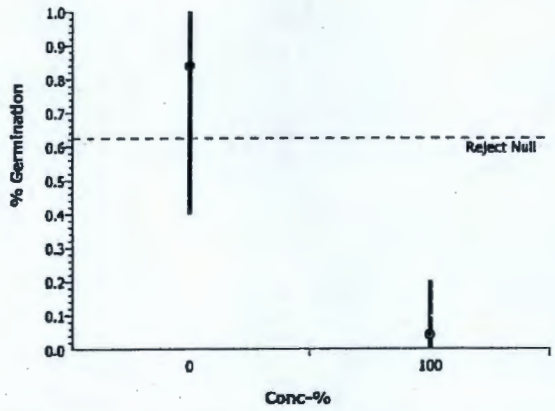
ANOVA Assumptions

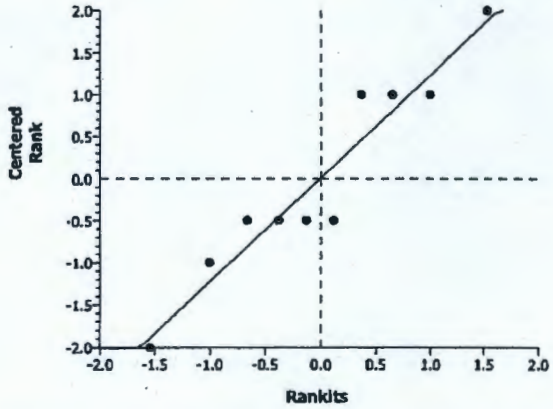
Attribute	Test	Statistic	Critical	P-Value	Decision(0.01)
Variances	Variance Ratio F	7.30764	23.15450	0.07996	Equal Variances
Distribution	Shapiro-Wilk W	0.77413		0.00702	Non-normal Distribution

Data Summary

			Original Data				Transformed Data			
Conc-%	Control Type	Count	Mean	Minimum	Maximum	SD	Mean	Minimum	Maximum	SD
0	Artificial Soil/S	5	0.84000	0.40000	1.00000	0.26077	8.00000	6.00000	9.00000	1.41421
100		5	0.04000	0.00000	0.20000	0.08944	3.00000	2.50000	5.00000	1.11803

Graphics





CETIS Analysis Detail

Plant Bioassay - Chronic — **CH2M Hill**

Sample No:	14-3788-3215	**Code:**	B1719-09	**Client:**	
Sample Date:	19 Dec-06	**Material:**	Soil	**Project:**	
Receive Date:		**Source:**	ELR-Washington Closure Hanford		
Sample Age:	66d 0h	**Station:**			

Comments: J13NY5

Endpoint	Analysis Type	Sample Link	Control Link	Date Analyzed	Version
Average Height (mm)	Comparison	15-6793-3774	15-6793-3774	16 Apr-07 11:06 AM	CETISv1.1.2

Method	Alt H	Data Transform	Zeta	NOEL	LOEL	Toxic Units	ChV	PMSD
Equal Variance t Two-Sample	C > T	Untransformed		100	>100	1	N/A	52.47%

Group Comparisons

Control	vs	Conc-%	Statistic	Critical	P-Value	MSD	Decision(0.05)
Artificial Soil/Sedi		100	1.00908	2.13185	0.1850	32.1126	Non-Significant Effect

ANOVA Table

Source	Sum of Squares	Mean Square	DF	F Statistic	P-Value	Decision(0.05)
Between	192.5333	192.5333	1	1.02	0.37002	Non-Significant Effect
Error	756.34	189.085	4			
Total	948.873306	381.61833	5			

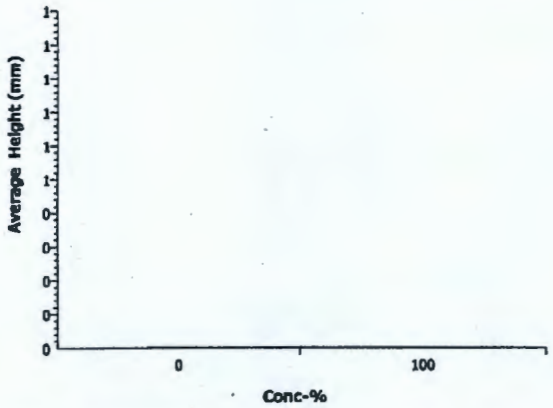
ANOVA Assumptions

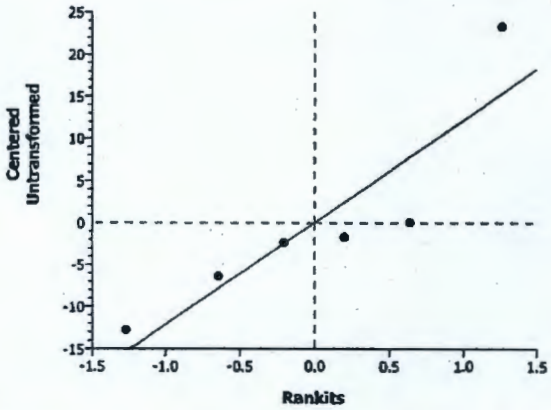
Attribute	Test	Statistic	Critical	P-Value	Decision(0.01)
Distribution	Shapiro-Wilk W	0.83096		0.10951	Normal Distribution

Data Summary

			Original Data				Transformed Data			
Conc-%	Control Type	Count	Mean	Minimum	Maximum	SD	Mean	Minimum	Maximum	SD
0	Artificial Soil/S	5	61.2	48.4	84.5	13.751				
100		1	46	46	46					

Graphics





CETIS Analysis Detail

Plant Bioassay - Chronic — **CH2M Hill**

Sample No:	14-3788-3215	**Code:**	B1719-09	**Client:**	
Sample Date:	19 Dec-06	**Material:**	Soil	**Project:**	
Receive Date:		**Source:**	ELR-Washington Closure Hanford		
Sample Age:	66d 0h	**Station:**			

Comments: J13NY5

Endpoint	Analysis Type	Sample Link	Control Link	Date Analyzed	Version
Average Length (mm)	Comparison	15-6793-3774	15-6793-3774	16 Apr-07 11:06 AM	CETISv1.1.2

Method	Alt H	Data Transform	Zeta	NOEL	LOEL	Toxic Units	ChV	PMSD
Equal Variance t Two-Sample	C > T	Untransformed		<100	100		N/A	27.25%

Group Comparisons

Control vs	Conc-%	Statistic	Critical	P-Value	MSD	Decision(0.05)
Artificial Soil/Sedi	100	3.82605	2.13185	0.0093	12.8043	Significant Effect

ANOVA Table

Source	Sum of Squares	Mean Square	DF	F Statistic	P-Value	Decision(0.05)
Between	440.067	440.067	1	14.64	0.01868	Significant Effect
Error	120.248	30.062	4			
Total	560.315002	470.12899	5			

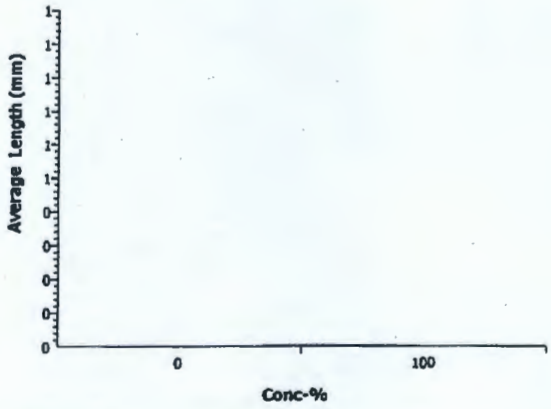
ANOVA Assumptions

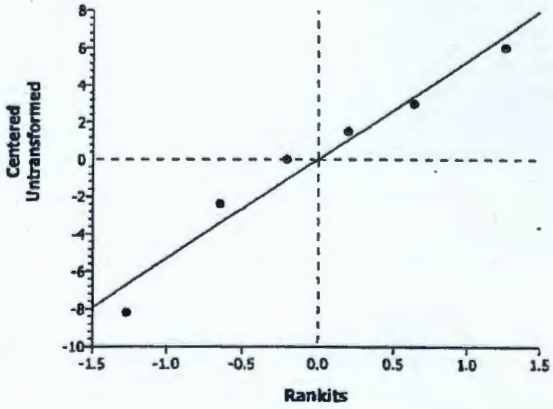
Attribute	Test	Statistic	Critical	P-Value	Decision(0.01)
Distribution	Shapiro-Wilk W	0.96644		0.86772	Normal Distribution

Data Summary

			Original Data				Transformed Data			
Conc-%	Control Type	Count	Mean	Minimum	Maximum	SD	Mean	Minimum	Maximum	SD
0	Artificial Soil/S	5	46.98	38.8	53	5.4829				
100		1	24	24	24					

Graphics





CETIS Analysis Detail

Plant Bioassay - Chronic — **CH2M Hill**

Sample No:	14-3788-3215	**Code:**	B1719-09	**Client:**	
Sample Date:	19 Dec-06	**Material:**	Soil	**Project:**	
Receive Date:		**Source:**	ELR-Washington Closure Hanford		
Sample Age:	66d 0h	**Station:**			

Comments: J13NY5

Endpoint	Analysis Type	Sample Link	Control Link	Date Analyzed	Version
Average AG Wt (Wet, mg)	Comparison	15-6793-3774	15-6793-3774	16 Apr-07 11:06 AM	CETISv1.1.2

Method	Alt H	Data Transform	Zeta	NOEL	LOEL	Toxic Units	ChV	PMSD
Equal Variance t Two-Sample	C > T	Untransformed		100	>100	1	N/A	51.47%

Group Comparisons

Control	vs	Conc-%	Statistic	Critical	P-Value	MSD	Decision(0.05)
Artificial Soil/Sedi		100	1.01242	2.13185	0.1843	4.3115	Non-Significant Effect

ANOVA Table

Source	Sum of Squares	Mean Square	DF	F Statistic	P-Value	Decision(0.05)
Between	3.493705	3.493705	1	1.02	0.36860	Non-Significant Effect
Error	13.634	3.4085	4			
Total	17.1277051	6.9022052	5			

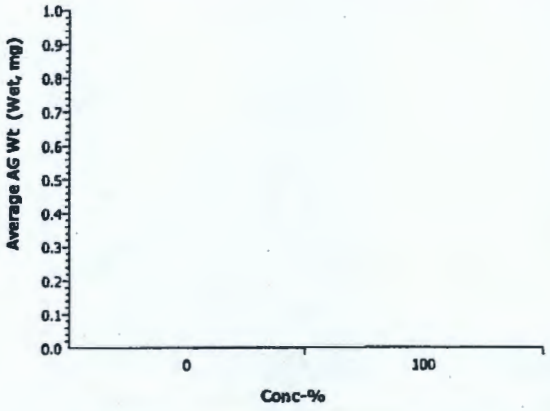
ANOVA Assumptions

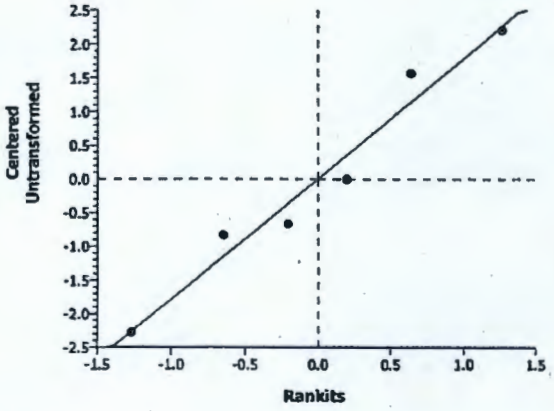
Attribute	Test	Statistic	Critical	P-Value	Decision(0.01)
Distribution	Shapiro-Wilk W	0.95735		0.79911	Normal Distribution

Data Summary

			Original Data				Transformed Data			
Conc-%	Control Type	Count	Mean	Minimum	Maximum	SD	Mean	Minimum	Maximum	SD
0	Artificial Soil/S	5	8.3775	6.1	10.580	1.8462				
100		1	6.33	6.33	6.33					

Graphics





CETIS Analysis Detail

Plant Bioassay - Chronic — **CH2M Hill**

Sample No:	14-3788-3215	**Code:**	B1719-09	**Client:**	
Sample Date:	19 Dec-06	**Material:**	Soil	**Project:**	
Receive Date:		**Source:**	ELR-Washington Closure Hanford		
Sample Age:	66d 0h	**Station:**			

Comments: J13NY5

Endpoint	Analysis Type	Sample Link	Control Link	Date Analyzed	Version
Average AG Wt (Dry, mg)	Comparison	15-6793-3774	15-6793-3774	16 Apr-07 11:06 AM	CETISv1.1.2

Method	Alt H	Data Transform	Zeta	NOEL	LOEL	Toxic Units	ChV	PMSD
Equal Variance t Two-Sample	C > T	Untransformed		100	>100	1	N/A	71.73%

Group Comparisons

Control	vs	Conc-%	Statistic	Critical	P-Value	MSD	Decision(0.05)
Artificial Soil/Sedi		100	0.07792	2.13185	0.4708	0.8692	Non-Significant Effect

ANOVA Table

Source	Sum of Squares	Mean Square	DF	F Statistic	P-Value	Decision(0.05)
Between	0.0008410	0.000841	1	0.01	0.94164	Non-Significant Effect
Error	0.5541168	0.138529	4			
Total	0.55495783	0.1393702	5			

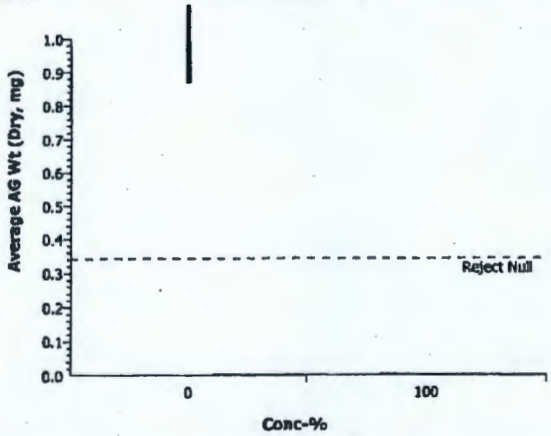
ANOVA Assumptions

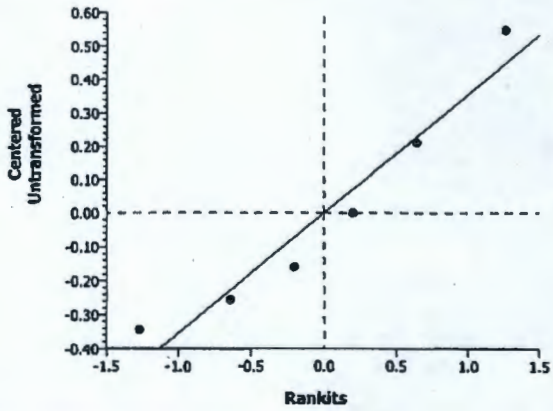
Attribute	Test	Statistic	Critical	P-Value	Decision(0.01)
Distribution	Shapiro-Wilk W	0.93190		0.59485	Normal Distribution

Data Summary

			Original Data				Transformed Data			
Conc-%	Control Type	Count	Mean	Minimum	Maximum	SD	Mean	Minimum	Maximum	SD
0	Artificial Soil/S	5	1.21170	0.86799	1.76001	0.37220				
100		1	1.17993	1.17993	1.17993					

Graphics





CETIS Analysis Detail

Plant Bioassay - Chronic — **CH2M Hill**

Sample No:	14-3788-3215	**Code:**	B1719-09	**Client:**	
Sample Date:	19 Dec-06	**Material:**	Soil	**Project:**	
Receive Date:		**Source:**	ELR-Washington Closure Hanford		
Sample Age:	66d 0h	**Station:**			

Comments: J13NY5

Endpoint	Analysis Type	Sample Link	Control Link	Date Analyzed	Version
Average Root Wt. (Wet, mg)	Comparison	15-6793-3774	15-6793-3774	16 Apr-07 11:06 AM	CETISv1.1.2

Method	Alt H	Data Transform	Zeta	NOEL	LOEL	Toxic Units	ChV	PMSD
Equal Variance t Two-Sample	C > T	Untransformed		100	>100	1	N/A	111.60%

Group Comparisons

Control	vs	Conc-%	Statistic	Critical	P-Value	MSD	Decision(0.05)
Artificial Soil/Sedi		100	0.89626	2.13185	0.2104	5.08774	Non-Significant Effect

ANOVA Table

Source	Sum of Squares	Mean Square	DF	F Statistic	P-Value	Decision(0.05)
Between	3.812634	3.812634	1	0.80	0.42078	Non-Significant Effect
Error	18.98528	4.74632	4			
Total	22.7979145	8.5589538	5			

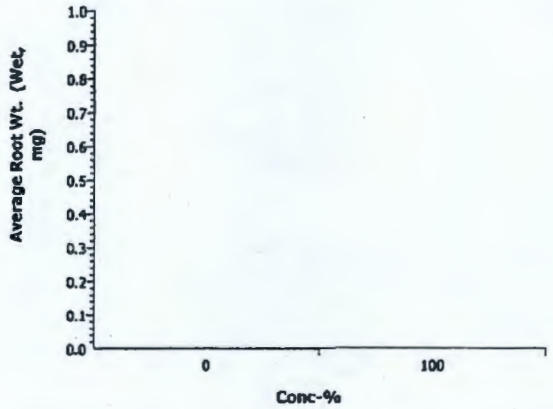
ANOVA Assumptions

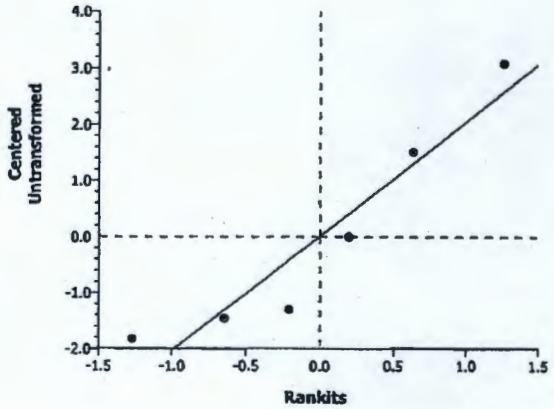
Attribute	Test	Statistic	Critical	P-Value	Decision(0.01)
Distribution	Shapiro-Wilk W	0.89034		0.31995	Normal Distribution

Data Summary

			Original Data				Transformed Data			
Conc-%	Control Type	Count	Mean	Minimum	Maximum	SD	Mean	Minimum	Maximum	SD
0	Artificial Soil/S	5	4.55901	2.72400	7.64001	2.17861				
100		1	2.42004	2.42004	2.42004					

Graphics





CETIS Analysis Detail

Plant Bioassay - Chronic — **CH2M Hill**

Sample No:	14-3788-3215	**Code:**	B1719-09	**Client:**	
Sample Date:	19 Dec-06	**Material:**	Soil	**Project:**	
Receive Date:		**Source:**	ELR-Washington Closure Hanford		
Sample Age:	66d 0h	**Station:**			

Comments: J13NY5

Endpoint	Analysis Type	Sample Link	Control Link	Date Analyzed	Version
Average Root Wt. (Dry, mg)	Comparison	15-6793-3774	15-6793-3774	16 Apr-07 11:06 AM	CETISv1.1.2

Method	Alt H	Data Transform	Zeta	NOEL	LOEL	Toxic Units	ChV	PMSD
Equal Variance t Two-Sample	C > T	Untransformed	-	100	>100	1	N/A	65.65%

Group Comparisons

Control	vs	Conc-%	Statistic	Critical	P-Value	MSD	Decision(0.05)
Artificial Soil/Sedi		100	-1.9386	2.13185	0.9377	0.20553	Non-Significant Effect

ANOVA Table

Source	Sum of Squares	Mean Square	DF	F Statistic	P-Value	Decision(0.05)
Between	0.0291114	0.029111	1	3.76	0.12457	Non-Significant Effect
Error	0.0309831	0.007746	4			
Total	0.06009446	0.0368572	5			

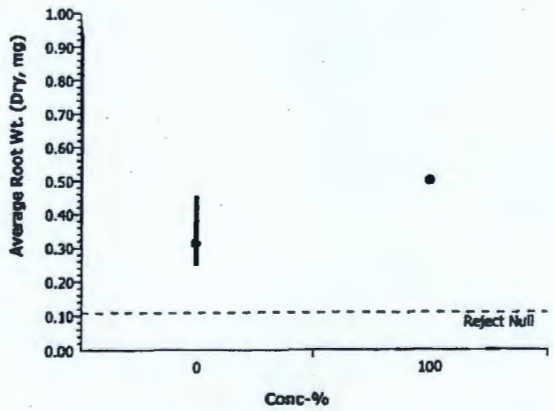
ANOVA Assumptions

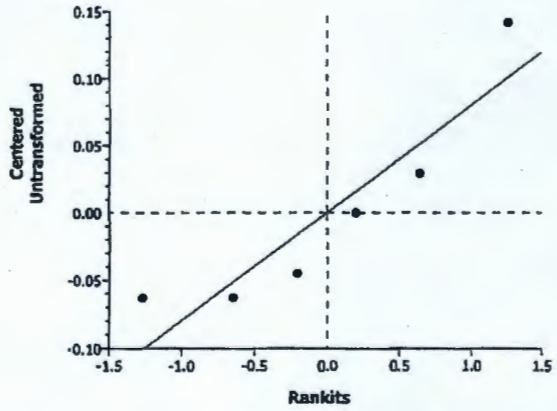
Attribute	Test	Statistic	Critical	P-Value	Decision(0.01)
Distribution	Shapiro-Wilk W	0.84417		0.14109	Normal Distribution

Data Summary

			Original Data				Transformed Data			
Conc-%	Control Type	Count	Mean	Minimum	Maximum	SD	Mean	Minimum	Maximum	SD
0	Artificial Soil/S	5	0.31309	0.25000	0.45496	0.08801				
100		1	0.50000	0.50000	0.50000					

Graphics





CETIS Analysis Detail

Plant Bioassay - Chronic — **CH2M Hill**

Sample No:	14-3788-3215	**Code:**	B1719-09	**Client:**	
Sample Date:	19 Dec-06	**Material:**	Soil	**Project:**	
Receive Date:		**Source:**	ELR-Washington Closure Hanford		
Sample Age:	66d 0h	**Station:**			

Comments: J13NY5

Endpoint	Analysis Type	Sample Link	Control Link	Date Analyzed	Version
Average Total Wt (Wet, mg)	Comparison	15-6793-3774	15-6793-3774	16 Apr-07 11:06 AM	CETISv1.1.2

Method	Alt H	Data Transform	Zeta	NOEL	LOEL	Toxic Units	ChV	PMSD
Equal Variance t Two-Sample	C > T	Untransformed		100	>100	1	N/A	70.15%

Group Comparisons

Control	vs	Conc-%	Statistic	Critical	P-Value	MSD	Decision(0.05)
Artificial Soil/Sedi		100	0.98348	2.13185	0.1905	9.07495	Non-Significant Effect

ANOVA Table

Source	Sum of Squares	Mean Square	DF	F Statistic	P-Value	Decision(0.05)
Between	14.60571	14.60571	1	0.97	0.38105	Non-Significant Effect
Error	60.4026	15.10065	4			
Total	75.0083132	29.706364	5			

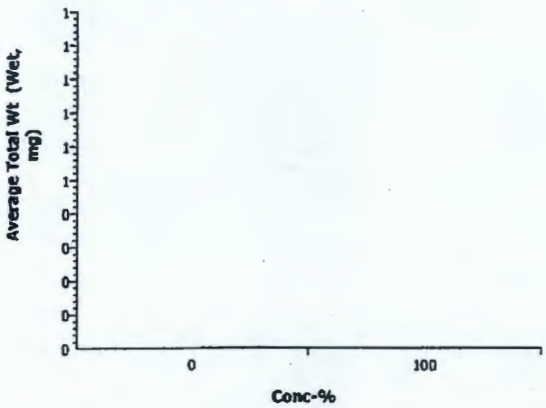
ANOVA Assumptions

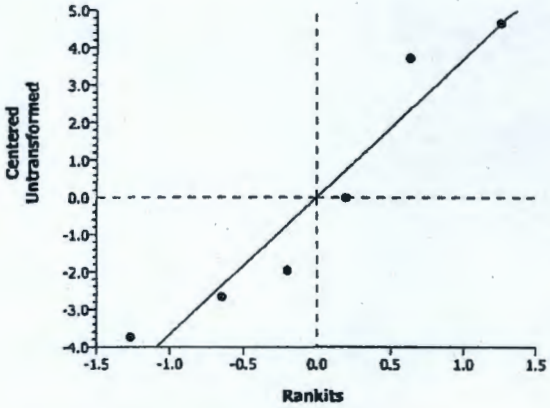
Attribute	Test	Statistic	Critical	P-Value	Decision(0.01)
Distribution	Shapiro-Wilk W	0.89670		0.35482	Normal Distribution

Data Summary

			Original Data				Transformed Data			
Conc-%	Control Type	Count	Mean	Minimum	Maximum	SD	Mean	Minimum	Maximum	SD
0	Artificial Soil/S	5	12.937	9.198	17.588	3.886				
100		1	8.75	8.75	8.75					

Graphics





CETIS Analysis Detail

Plant Bioassay - Chronic — **CH2M Hill**

Sample No:	14-3788-3215	**Code:**	B1719-09	**Client:**	
Sample Date:	19 Dec-06	**Material:**	Soil	**Project:**	
Receive Date:		**Source:**	ELR-Washington Closure Hanford		
Sample Age:	66d 0h	**Station:**			

Comments: J13NY5

Endpoint	Analysis Type	Sample Link	Control Link	Date Analyzed	Version
Average Total Wt (Dry, mg)	Comparison	15-6793-3774	15-6793-3774	16 Apr-07 11:06 AM	CETISv1.1.2

Method	Alt H	Data Transform	Zeta	NOEL	LOEL	Toxic Units	ChV	PMSD
Equal Variance t Two-Sample	C > T	Untransformed		100	>100	1	N/A	70.17%

Group Comparisons

Control	vs	Conc-%	Statistic	Critical	P-Value	MSD	Decision(0.05)
Artificial Soil/Sedi		100	-0.3091	2.13185	0.6137	1.06995	Non-Significant Effect

ANOVA Table

Source	Sum of Squares	Mean Square	DF	F Statistic	P-Value	Decision(0.05)
Between	0.0200562	0.020056	1	0.10	0.77267	Non-Significant Effect
Error	0.839644	0.209911	4			
Total	0.85970012	0.2299672	5			

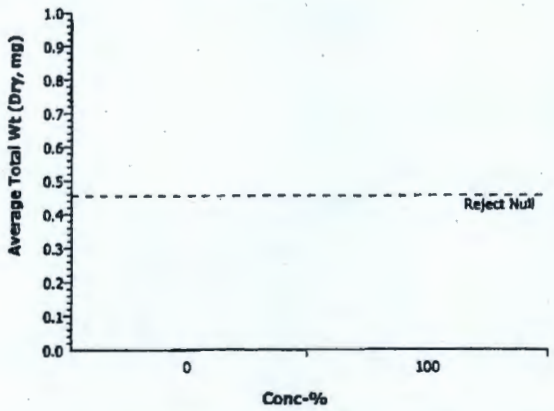
ANOVA Assumptions

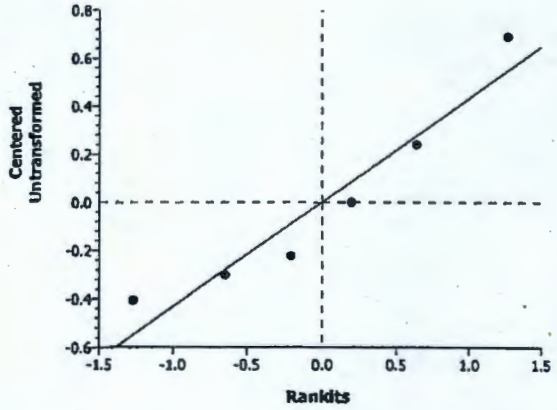
Attribute	Test	Statistic	Critical	P-Value	Decision(0.01)
Distribution	Shapiro-Wilk W	0.91571		0.47503	Normal Distribution

Data Summary

			Original Data				Transformed Data			
Conc-%	Control Type	Count	Mean	Minimum	Maximum	SD	Mean	Minimum	Maximum	SD
0	Artificial Soil/S	5	1.52479	1.11799	2.21497	0.45816				
100		1	1.67993	1.67993	1.67993					

Graphics





BLUEGRASS GROWTH TEST

Client: Washington Closure Hanford Project Seed ID: PS001 Test Start Date: February 23, 2007

Initials: Day 0 Br Day 12 NJ Day 14 [illegible] Day 18 NJ Day 19 — Day 21 [illegible] Day 24 NJ Day 26 NJ Day 28 Br Day 31 NJ Day 33 NJ Day 40 NJ

Bioassay Lab ID: BG 179-10 Sample No: J13NY7

CONC.	REPLICATE	# seeds germinated: 12 days after planting	14 days after planting	18 Emergence: 17 days after planting	19 days after planting	21 days after planting	24 days after planting	7-DAYS POST-EMERGENCE (33 days after planting) Day 26	25	31		14-DAYS POST-EMERGENCE (40 days after planting)	pH: INITIAL (@ planting)	FINAL (@ 14 days Post-Emergence)
Control	A	0	0	0		0	0	0	0	0	0	0	7.0	7.4
	B	0	0	0		0	0	0	0	0	0	0		
	C	1	1	1		1	1	1	1	1	1	1		
	D	1	1	1		1	1	1	2	2	2	2		
	E	0	0	0		0	0	0	0	0	0	0		

7-Days Post-Emergence: Selectively thin down to 5 Seedlings (leave the 5 tallest seedlings). Describe shoot appearance: DH 25 Day 31

Replicate A: none

Replicate B: none

Replicate C: 1 med G

Replicate D: ~~1 7 sm G~~ 2sm G 1sm B - looks dead - shoot height is 19mm, root length = NJ

Replicate E: none

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

14-Days Post-Emergence: Describe shoot appearance:

Replicate A: none

Replicate B: none

Replicate C: 1 med G

Replicate D: 1sm G ~~1 B G~~ 1sm B - looks dead - shoot height = 19mm, root length = 56

Replicate E: none

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

	1st Seedling	2nd Seedling	3rd Seedling	4th Seedling	5th Seedling
Replicate A	mm	mm	mm	mm	mm
Replicate B	mm	mm	mm	mm	mm
Replicate C	57 mm	mm	mm	mm	mm
Replicate D	35 mm	19 mm	dead looking shoot mm	mm	mm
Replicate E	mm	mm	mm	mm	mm

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

	Tin Tare Wt. (mg)	Wet Wt (mg)	Dry Wt. (mg)
Replicate A	1290.75		
Replicate B	1287.09		
Replicate C	1295.63	1309.04	1297.65
Replicate D	1286.71	1290.22	1287.42
Replicate E	1305.54		

Describe root appearance:

Replicate A

Replicate B

Replicate C

Replicate D

Replicate E

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

	1st Seedling	2nd Seedling	3rd Seedling	4th Seedling	5th Seedling
Replicate A	mm	mm	mm	mm	mm
Replicate B	mm	mm	mm	mm	mm
Replicate C	48 mm	mm	mm	mm	mm
Replicate D	24 mm	56 mm	mm	mm	mm
Replicate E	mm	mm	mm	mm	mm

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

	Tin Tare Wt. (mg)	Wet Wt (mg)	Dry Wt. (mg)
Replicate A	1292.76		
Replicate B	1286.11		
Replicate C	1291.84	1323.54	1293.21
Replicate D	1284.86	1286.77	1285.45
Replicate E	1283.83		

Comments:

CETIS Test Summary

Report Date: 16 Apr-07 11:28 AM
Test Link: 17-4853-3510/B171910psc

Plant Bioassay - Chronic — **CH2M Hill**

Test No:	13-6975-7771	**Test Type:**	Plant Chronic	**Duration:**	40d 0h
Start Date:	23 Feb-07	**Protocol:**	ASTM E1963-02 (2002)	**Species:**	Poa sandbergii
Ending Date:	04 Apr-07	**Dil Water:**		**Source:**	
Setup Date:	23 Feb-07 12:00 AM	**Brine:**			

Sample No:	11-7908-9637	**Code:**	B1719-10	**Client:**	
Sample Date:	26 Dec-06	**Material:**	Soil	**Project:**	
Receive Date:		**Source:**	ELR-Washington Closure Hanford		
Sample Age:	59d 0h	**Station:**			

Comments: J13NY7

Comparison Summary

Analysis	Endpoint	NOEL	LOEL	ChV	PMSD	Method
17-6754-0356	% Germination	< 100	100	N/A	30.34%	Equal Variance t Two-Sample
11-0439-6439	Average Height (mm)	100	> 100	N/A	42.79%	Equal Variance t Two-Sample
06-4091-2675	Average Length (mm)	100	> 100	N/A	19.80%	Equal Variance t Two-Sample
04-7181-5827	Average AG Wt (Wet, mg)	100	> 100	N/A	81.28%	Equal Variance t Two-Sample
06-1383-7008	Average AG Wt (Dry, mg)	100	> 100	N/A	86.67%	Equal Variance t Two-Sample
05-4656-0970	Average Root Wt. (Wet, mg	100	> 100	N/A	2133.21%	Unequal Variance t Two-Sample
05-5536-5428	Average Root Wt. (Dry, mg)	100	> 100	N/A	1096.82%	Unequal Variance t Two-Sample
09-8067-7719	Average Total Wt (Wet, mg	100	> 100	N/A	1038.15%	Unequal Variance t Two-Sample
07-1846-4959	Average Total Wt (Dry, mg)	100	> 100	N/A	106.29%	Equal Variance t Two-Sample

CETIS Test Summary

Report Date: 16 Apr-07 11:28 AM
Test Link: 17-4853-3510/B171910psc

% Germination Summary

Conc-%	Control Type	Reps	Mean	Minimum	Maximum	SE	SD	CV
0	Artificial Soil/S	5	0.84000	0.40000	1.00000	0.11662	0.26077	31.04%
100		5	0.12000	0.00000	0.40000	0.08000	0.17889	149.07

Average Height (mm) Summary

Conc-%	Control Type	Reps	Mean	Minimum	Maximum	SE	SD	CV
0	Artificial Soil/S	5	61.2	48.400	84.5	6.1496	13.751	22.47%
100		5	42	27	57	15	21.213	50.51%

Average Length (mm) Summary

Conc-%	Control Type	Reps	Mean	Minimum	Maximum	SE	SD	CV
0	Artificial Soil/S	5	46.98	38.8	53	2.4520	5.4829	11.67%
100		5	44	40	48	4	5.6569	12.86%

Average AG Wt (Wet, mg) Summary

Conc-%	Control Type	Reps	Mean	Minimum	Maximum	SE	SD	CV
0	Artificial Soil/S	5	8.3775	6.1	10.580	0.8257	1.8462	22.04%
100		5	7.5825	1.7550	13.410	5.8275	8.2414	108.69

Average AG Wt (Dry, mg) Summary

Conc-%	Control Type	Reps	Mean	Minimum	Maximum	SE	SD	CV
0	Artificial Soil/S	5	1.21170	0.86799	1.76001	0.16645	0.37220	30.72%
100		5	1.18753	0.35504	2.02002	0.83249	1.17732	99.14%

Average Root Wt. (Wet, mg) Summary

Conc-%	Control Type	Reps	Mean	Minimum	Maximum	SE	SD	CV
0	Artificial Soil/S	5	4.5590	2.724	7.6400	0.9743	2.1786	47.79%
100		5	16.328	0.9550	31.700	15.373	21.740	133.15

Average Root Wt. (Dry, mg) Summary

Conc-%	Control Type	Reps	Mean	Minimum	Maximum	SE	SD	CV
0	Artificial Soil/S	5	0.31309	0.25000	0.45496	0.03936	0.08801	28.11%
100		5	0.82751	0.28503	1.37000	0.54248	0.76718	92.71%

Average Total Wt (Wet, mg) Summary

Conc-%	Control Type	Reps	Mean	Minimum	Maximum	SE	SD	CV
0	Artificial Soil/S	5	12.937	9.198	17.588	1.7379	3.886	30.04%
100		5	23.910	2.7100	45.110	21.200	29.981	125.39

Average Total Wt (Dry, mg) Summary

Conc-%	Control Type	Reps	Mean	Minimum	Maximum	SE	SD	CV
0	Artificial Soil/S	5	1.52479	1.11799	2.21497	0.20490	0.45816	30.05%
100		5	2.01505	0.64008	3.39001	1.37497	1.94450	96.50%

CETIS Test Summary

Report Date: 16 Apr-07 11:28 AM
Test Link: 17-4853-3510/B171910psc

% Germination Detail

Conc-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Artificial Soil/S	1.00000	0.40000	1.00000	0.80000	1.00000
100		0.00000	0.00000	0.20000	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	54.8	84.5	58.8	59.5	48.4000
100		Missing	Missing	57	27	Missing

Average Length (mm) Detail

Conc-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Artificial Soil/S	50	48.5	44.6	53	38.8
100		Missing	Missing	48	40	Missing

Average AG Wt (Wet, mg) Detail

Conc-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Artificial Soil/S	6.1	10.5800	7.548	9.94751	7.71199
100		Missing	Missing	13.4100	1.75500	Missing

Average AG Wt (Dry, mg) Detail

Conc-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Artificial Soil/S	0.86799	1.76001	0.95598	1.42252	1.05200
100		Missing	Missing	2.02002	0.35504	Missing

Average Root Wt. (Wet, mg) Detail

Conc-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Artificial Soil/S	3.098	6.07501	2.724	7.64001	3.25801
100		Missing	Missing	31.7001	0.95502	Missing

Average Root Wt. (Dry, mg) Detail

Conc-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Artificial Soil/S	0.25000	0.45496	0.26802	0.34250	0.25000
100		Missing	Missing	1.37000	0.28503	Missing

Average Total Wt (Wet, mg) Detail

Conc-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Artificial Soil/S	9.198	16.6550	10.272	17.5875	10.97
100		Missing	Missing	45.1101	2.71002	Missing

Average Total Wt (Dry, mg) Detail

Conc-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Artificial Soil/S	1.11799	2.21497	1.22400	1.76501	1.30200
100		Missing	Missing	3.39001	0.64008	Missing

CETIS Analysis Detail

Plant Bioassay - Chronic — **CH2M Hill**

Sample No:	11-7908-9637	**Code:**	B1719-10	**Client:**	
Sample Date:	26 Dec-06	**Material:**	Soil	**Project:**	
Receive Date:		**Source:**	ELR-Washington Closure Hanford		
Sample Age:	59d 0h	**Station:**			

Comments: J13NY7

Endpoint	Analysis Type	Sample Link	Control Link	Date Analyzed	Version
% Germination	Comparison	17-4853-3510	17-4853-3510	16 Apr-07 11:28 AM	CETISv1.1.2

Method	Alt H	Data Transform	Zeta	NOEL	LOEL	Toxic Units	ChV	PMSD
Equal Variance t Two-Sample	C > T	Angular (Corrected)		<100	100		N/A	30.34%

Group Comparisons

Control	vs	Conc-%	Statistic	Critical	P-Value	MSD	Decision(0.05)
Artificial Soil/Sedi		100	5.0539	1.85955	0.0005	0.29456	Significant Effect

ANOVA Table

Source	Sum of Squares	Mean Square	DF	F Statistic	P-Value	Decision(0.05)
Between	1.602249	1.602249	1	25.54	0.00098	Significant Effect
Error	0.501842	0.062730	8			
Total	2.10409051	1.6649788	9			

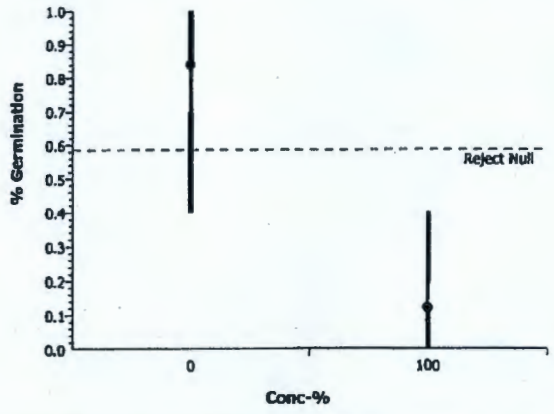
ANOVA Assumptions

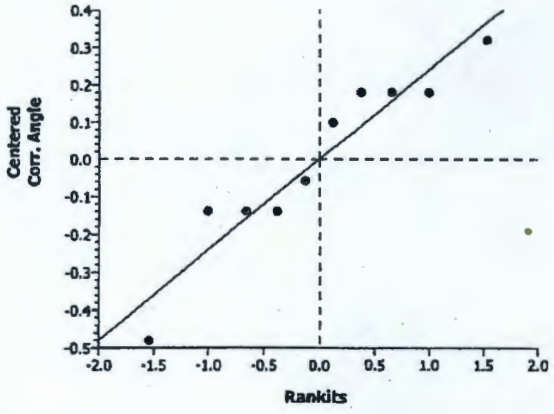
Attribute	Test	Statistic	Critical	P-Value	Decision(0.01)
Variances	Variance Ratio F	1.94644	23.15450	0.53475	Equal Variances
Distribution	Shapiro-Wilk W	0.91658		0.32933	Normal Distribution

Data Summary

			Original Data				Transformed Data			
Conc-%	Control Type	Count	Mean	Minimum	Maximum	SD	Mean	Minimum	Maximum	SD
0	Artificial Soil/S	5	0.84000	0.40000	1.00000	0.26077	1.16554	0.68472	1.34528	0.28789
100		5	0.12000	0.00000	0.40000	0.17889	0.36498	0.22551	0.68472	0.20635

Graphics





CETIS Analysis Detail

Plant Bioassay - Chronic — **CH2M Hill**

Sample No:	11-7908-9637	**Code:**	B1719-10	**Client:**	
Sample Date:	26 Dec-06	**Material:**	Soil	**Project:**	
Receive Date:		**Source:**	ELR-Washington Closure Hanford		
Sample Age:	59d 0h	**Station:**			

Comments: J13NY7

Endpoint	Analysis Type	Sample Link	Control Link	Date Analyzed	Version
Average Height (mm)	Comparison	17-4853-3510	17-4853-3510	16 Apr-07 11:28 AM	CETISv1.1.2

Method	Alt H	Data Transform	Zeta	NOEL	LOEL	Toxic Units	ChV	PMSD
Equal Variance t Two-Sample	C > T	Untransformed		100	>100	1	N/A	42.79%

Group Comparisons

Control vs	Conc-%	Statistic	Critical	P-Value	MSD	Decision(0.05)
Artificial Soil/Sedi	100	1.47741	2.01505	0.0998	26.1869	Non-Significant Effect

ANOVA Table

Source	Sum of Squares	Mean Square	DF	F Statistic	P-Value	Decision(0.05)
Between	526.6286	526.6286	1	2.18	0.19961	Non-Significant Effect
Error	1206.34	241.268	5			
Total	1732.96857	767.89659	6			

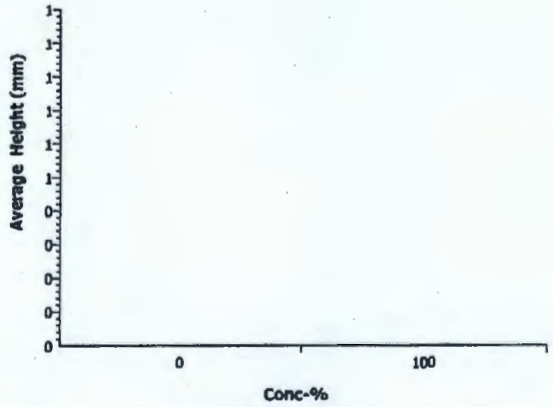
ANOVA Assumptions

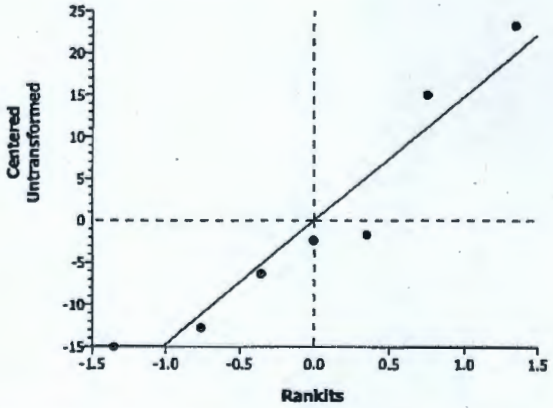
Attribute	Test	Statistic	Critical	P-Value	Decision(0.01)
Variances	Variance Ratio F	2.37988	31.33277	0.39555	Equal Variances
Distribution	Shapiro-Wilk W	0.90012		0.33171	Normal Distribution

Data Summary

			Original Data				Transformed Data			
Conc-%	Control Type	Count	Mean	Minimum	Maximum	SD	Mean	Minimum	Maximum	SD
0	Artificial Soil/S	5	61.2	48.4	84.5	13.751				
100		2	42	27	57	21.213				

Graphics





CETIS Analysis Detail

Plant Bioassay - Chronic — **CH2M Hill**

Sample No:	11-7908-9637	**Code:**	B1719-10	**Client:**	
Sample Date:	26 Dec-06	**Material:**	Soil	**Project:**	
Receive Date:		**Source:**	ELR-Washington Closure Hanford		
Sample Age:	59d 0h	**Station:**			

Comments: J13NY7

Endpoint	Analysis Type	Sample Link	Control Link	Date Analyzed	Version
Average Length (mm)	Comparison	17-4853-3510	17-4853-3510	16 Apr-07 11:28 AM	CETISv1.1.2

Method	Alt H	Data Transform	Zeta	NOEL	LOEL	Toxic Units	ChV	PMSD
Equal Variance t Two-Sample	C > T	Untransformed		100	>100	1	N/A	19.80%

Group Comparisons

Control	vs	Conc-%	Statistic	Critical	P-Value	MSD	Decision(0.05)
Artificial Soil/Sedi		100	0.64547	2.01505	0.2735	9.30305	Non-Significant Effect

ANOVA Table

Source	Sum of Squares	Mean Square	DF	F Statistic	P-Value	Decision(0.05)
Between	12.68628	12.68628	1	0.42	0.54707	Non-Significant Effect
Error	152.248	30.4496	5			
Total	164.934299	43.135886	6			

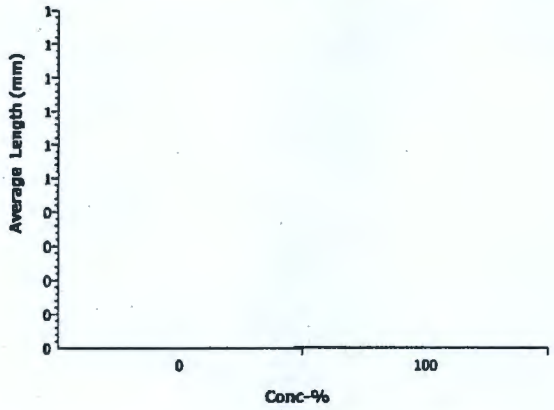
ANOVA Assumptions

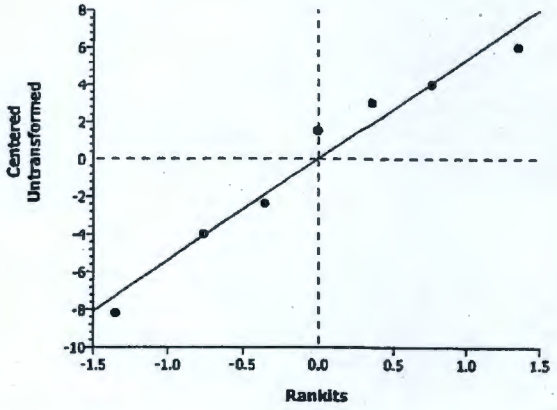
Attribute	Test	Statistic	Critical	P-Value	Decision(0.01)
Variances	Variance Ratio F	1.06447	31.33277	0.72099	Equal Variances
Distribution	Shapiro-Wilk W	0.95125		0.74106	Normal Distribution

Data Summary

			Original Data				Transformed Data			
Conc-%	Control Type	Count	Mean	Minimum	Maximum	SD	Mean	Minimum	Maximum	SD
0	Artificial Soil/S	5	46.98	38.8	53	5.4829				
100		2	44	40	48	5.6569				

Graphics





CETIS Analysis Detail

Plant Bioassay - Chronic — **CH2M Hill**

Sample No:	11-7908-9637	**Code:**	B1719-10	**Client:**	
Sample Date:	26 Dec-06	**Material:**	Soil	**Project:**	
Receive Date:		**Source:**	ELR-Washington Closure Hanford		
Sample Age:	59d 0h	**Station:**			

Comments: J13NY7

Endpoint	Analysis Type	Sample Link	Control Link	Date Analyzed	Version
Average AG Wt (Wet, mg)	Comparison	17-4853-3510	17-4853-3510	16 Apr-07 11:28 AM	CETISv1.1.2

Method	Alt H	Data Transform	Zeta	NOEL	LOEL	Toxic Units	ChV	PMSD
Equal Variance t Two-Sample	C > T	Untransformed		100	>100	1	N/A	81.28%

Group Comparisons

Control	vs	Conc-%	Statistic	Critical	P-Value	MSD	Decision(0.05)
Artificial Soil/Sedi		100	0.23527	2.01505	0.4117	6.80882	Non-Significant Effect

ANOVA Table

Source	Sum of Squares	Mean Square	DF	F Statistic	P-Value	Decision(0.05)
Between	0.902854	0.902854	1	0.06	0.82333	Non-Significant Effect
Error	81.55386	16.31077	5			
Total	82.4567099	17.213624	6			

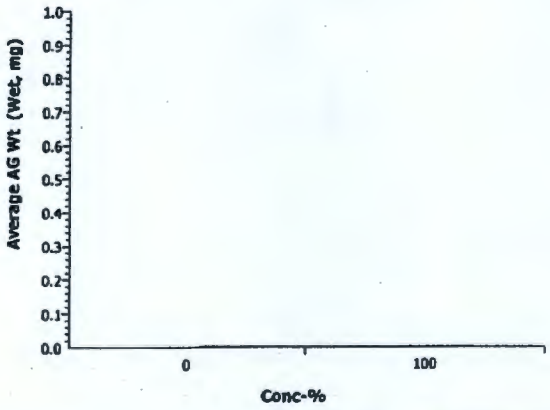
ANOVA Assumptions

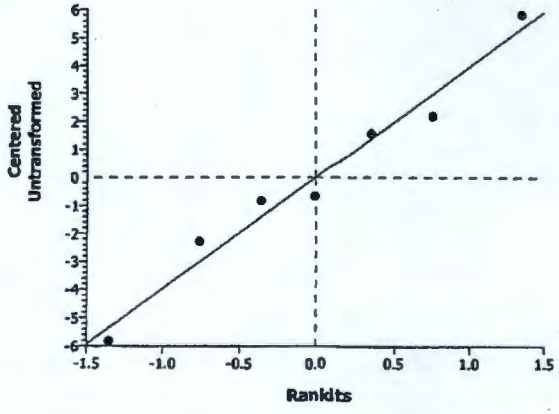
Attribute	Test	Statistic	Critical	P-Value	Decision(0.01)
Variances	Variance Ratio F	19.92661	31.33277	0.02225	Equal Variances
Distribution	Shapiro-Wilk W	0.98407		0.97690	Normal Distribution

Data Summary

			Original Data				Transformed Data			
Conc-%	Control Type	Count	Mean	Minimum	Maximum	SD	Mean	Minimum	Maximum	SD
0	Artificial Soil/S	5	8.3775	6.1	10.580	1.8462				
100		2	7.5825	1.7550	13.410	8.2413				

Graphics





CETIS Analysis Detail

Plant Bioassay - Chronic — **CH2M Hill**

Sample No:	11-7908-9637	**Code:**	B1719-10	**Client:**	
Sample Date:	26 Dec-06	**Material:**	Soil	**Project:**	
Receive Date:		**Source:**	ELR-Washington Closure Hanford		
Sample Age:	59d 0h	**Station:**			

Comments: J13NY7

Endpoint	Analysis Type	Sample Link	Control Link	Date Analyzed	Version
Average AG Wt (Dry, mg)	Comparison	17-4853-3510	17-4853-3510	16 Apr-07 11:28 AM	CETISv1.1.2

Method	Alt H	Data Transform	Zeta	NOEL	LOEL	Toxic Units	ChV	PMSD
Equal Variance t Two-Sample	C > T	Untransformed		100	>100	1	N/A	86.67%

Group Comparisons

Control	vs	Conc-%	Statistic	Critical	P-Value	MSD	Decision(0.05)
Artificial Soil/Sedi		100	0.04638	2.01505	0.4824	1.0502	Non-Significant Effect

ANOVA Table

Source	Sum of Squares	Mean Square	DF	F Statistic	P-Value	Decision(0.05)
Between	0.0008346	0.000835	1	0.00	0.96481	Non-Significant Effect
Error	1.940193	0.388039	5			
Total	1.94102725	0.3888731	6			

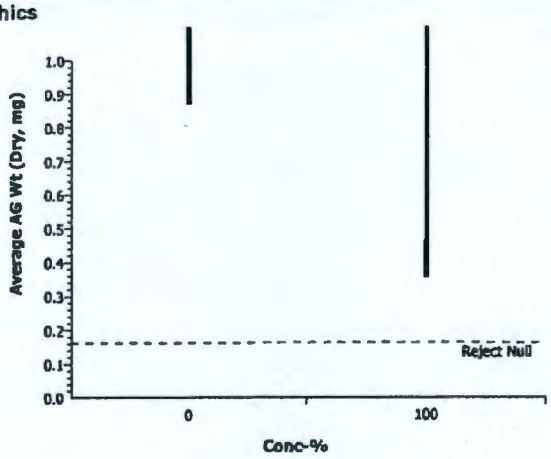
ANOVA Assumptions

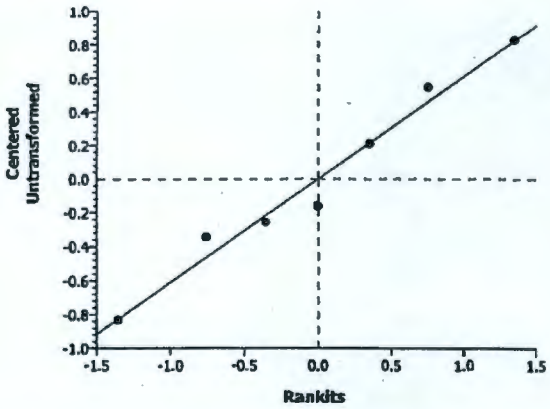
Attribute	Test	Statistic	Critical	P-Value	Decision(0.01)
Variances	Variance Ratio F	10.00566	31.33277	0.06816	Equal Variances
Distribution	Shapiro-Wilk W	0.97247		0.91563	Normal Distribution

Data Summary

			Original Data				Transformed Data			
Conc-%	Control Type	Count	Mean	Minimum	Maximum	SD	Mean	Minimum	Maximum	SD
0	Artificial Soil/S	5	1.21170	0.86799	1.76001	0.37220				
100		2	1.18753	0.35504	2.02002	1.17732				

Graphics





CETIS Analysis Detail

Plant Bioassay - Chronic — **CH2M Hill**

Sample No:	11-7908-9637	**Code:**	B1719-10	**Client:**	
Sample Date:	26 Dec-06	**Material:**	Soil	**Project:**	
Receive Date:		**Source:**	ELR-Washington Closure Hanford		
Sample Age:	59d 0h	**Station:**			

Comments: J13NY7

Endpoint	Analysis Type	Sample Link	Control Link	Date Analyzed	Version
Average Root Wt. (Wet, mg)	Comparison	17-4853-3510	17-4853-3510	16 Apr-07 11:28 AM	CETISv1.1.2

Method	Alt H	Data Transform	Zeta	NOEL	LOEL	Toxic Units	ChV	PMSD
Unequal Variance t Two-Sample	C > T	Untransformed		100	>100	1	N/A	2133.21%

Group Comparisons

Control	vs	Conc-%	Statistic	Critical	P-Value	MSD	Decision(0.05)
Artificial Soil/Sedi		100	-0.7640	6.31375	0.7077	97.2531	Non-Significant Effect

ANOVA Table

Source	Sum of Squares	Mean Square	DF	F Statistic	P-Value	Decision(0.05)
Between	197.855	197.855	1	2.01	0.21524	Non-Significant Effect
Error	491.6145	98.32291	5			
Total	689.469543	296.17792	6			

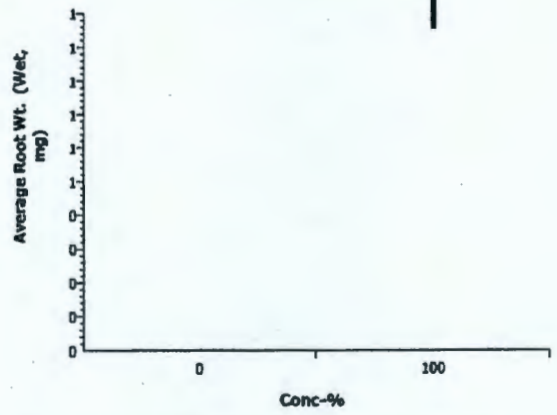
ANOVA Assumptions

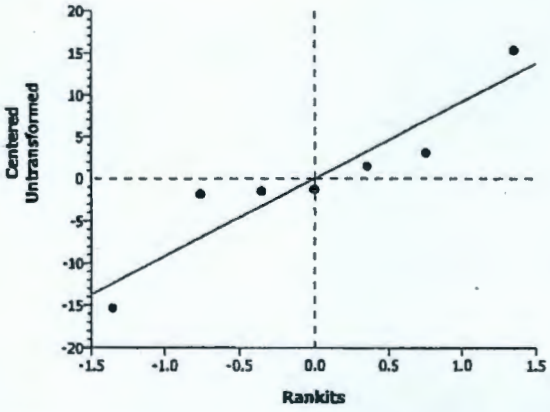
Attribute	Test	Statistic	Critical	P-Value	Decision(0.01)
Variances	Variance Ratio F	99.57804	31.33277	0.00113	Unequal Variances
Distribution	Shapiro-Wilk W	0.90280		0.34825	Normal Distribution

Data Summary

			Original Data				Transformed Data			
Conc-%	Control Type	Count	Mean	Minimum	Maximum	SD	Mean	Minimum	Maximum	SD
0	Artificial Soil/S	5	4.55901	2.72400	7.64001	2.17861				
100		2	16.3275	0.95502	31.7000	21.7400				

Graphics





CETIS Analysis Detail

Plant Bioassay - Chronic — **CH2M Hill**

Sample No:	11-7908-9637	**Code:**	B1719-10	**Client:**	
Sample Date:	26 Dec-06	**Material:**	Soil	**Project:**	
Receive Date:		**Source:**	ELR-Washington Closure Hanford		
Sample Age:	59d 0h	**Station:**			

Comments: J13NY7

Endpoint	Analysis Type	Sample Link	Control Link	Date Analyzed	Version
Average Root Wt. (Dry, mg)	Comparison	17-4853-3510	17-4853-3510	16 Apr-07 11:28 AM	CETISv1.1.2

Method	Alt H	Data Transform	Zeta	NOEL	LOEL	Toxic Units	ChV	PMSD
Unequal Variance t Two-Sample	C > T	Untransformed		100	>100	1	N/A	1096.82%

Group Comparisons

Control	vs	Conc-%	Statistic	Critical	P-Value	MSD	Decision(0.05)
Artificial Soil/Sedi		100	-0.9458	6.31375	0.7411	3.43409	Non-Significant Effect

ANOVA Table

Source	Sum of Squares	Mean Square	DF	F Statistic	P-Value	Decision(0.05)
Between	0.3780401	0.378040	1	3.05	0.14112	Non-Significant Effect
Error	0.6195532	0.123911	5			
Total	0.99759334	0.5019508	6			

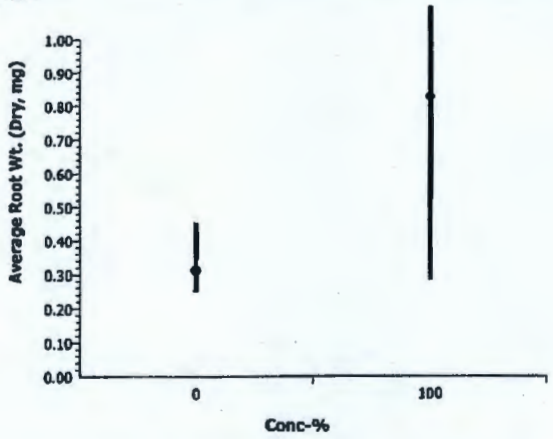
ANOVA Assumptions

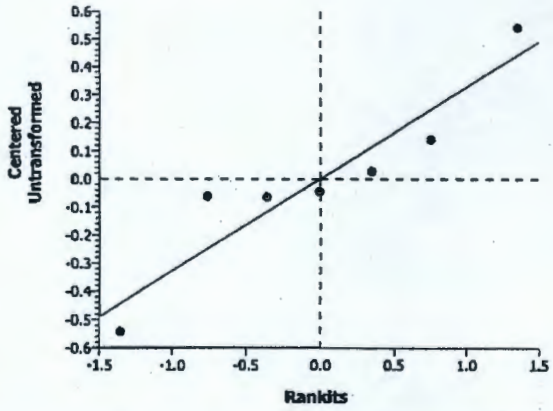
Attribute	Test	Statistic	Critical	P-Value	Decision(0.01)
Variances	Variance Ratio F	75.98602	31.33277	0.00191	Unequal Variances
Distribution	Shapiro-Wilk W	0.91083		0.40168	Normal Distribution

Data Summary

			Original Data				Transformed Data			
Conc-%	Control Type	Count	Mean	Minimum	Maximum	SD	Mean	Minimum	Maximum	SD
0	Artificial Soil/S	5	0.31309	0.25000	0.45496	0.08801				
100		2	0.82751	0.28503	1.37000	0.76718				

Graphics





CETIS Analysis Detail

Plant Bioassay - Chronic — **CH2M Hill**

Sample No:	11-7908-9637	**Code:**	B1719-10	**Client:**	
Sample Date:	26 Dec-06	**Material:**	Soil	**Project:**	
Receive Date:		**Source:**	ELR-Washington Closure Hanford		
Sample Age:	59d 0h	**Station:**			

Comments: J13NY7

Endpoint	Analysis Type	Sample Link	Control Link	Date Analyzed	Version
Average Total Wt (Wet, mg)	Comparison	17-4853-3510	17-4853-3510	16 Apr-07 11:28 AM	CETISv1.1.2

Method	Alt H	Data Transform	Zeta	NOEL	LOEL	Toxic Units	ChV	PMSD
Unequal Variance t Two-Sample	C > T	Untransformed		100	>100	1	N/A	1038.15%

Group Comparisons

Control	vs	Conc-%	Statistic	Critical	P-Value	MSD	Decision(0.05)
Artificial Soil/Sedi		100	-0.5159	6.31375	0.6516	134.301	Non-Significant Effect

ANOVA Table

Source	Sum of Squares	Mean Square	DF	F Statistic	P-Value	Decision(0.05)
Between	172.027	172.027	1	0.90	0.38717	Non-Significant Effect
Error	959.2862	191.8572	5			
Total	1131.31323	363.88428	6			

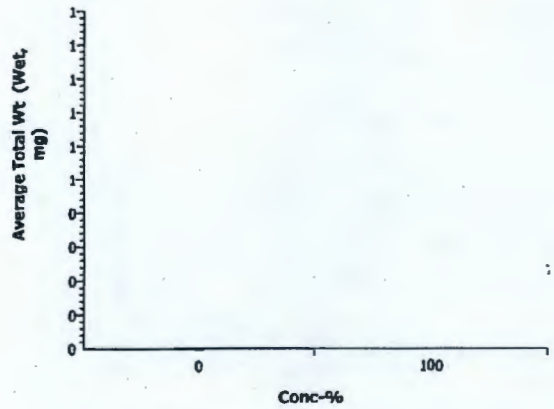
ANOVA Assumptions

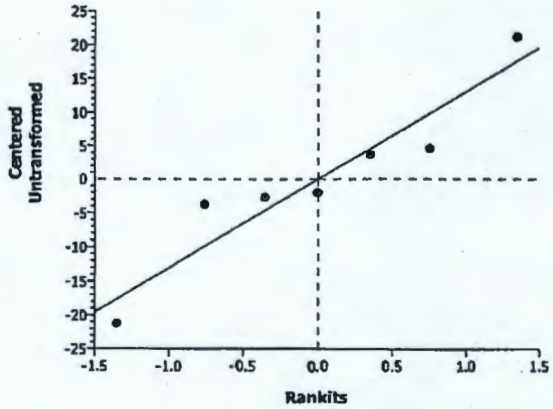
Attribute	Test	Statistic	Critical	P-Value	Decision(0.01)
Variances	Variance Ratio F	59.52616	31.33277	0.00304	Unequal Variances
Distribution	Shapiro-Wilk W	0.92963		0.54779	Normal Distribution

Data Summary

			Original Data				Transformed Data			
Conc-%	Control Type	Count	Mean	Minimum	Maximum	SD	Mean	Minimum	Maximum	SD
0	Artificial Soil/S	5	12.937	9.198	17.588	3.886				
100		2	23.910	2.7100	45.110	29.981				

Graphics





CETIS Analysis Detail

Plant Bioassay - Chronic — CH2M Hill

Sample No:	11-7908-9637	**Code:**	B1719-10	**Client:**	
Sample Date:	26 Dec-06	**Material:**	Soil	**Project:**	
Receive Date:		**Source:**	ELR-Washington Closure Hanford		
Sample Age:	59d 0h	**Station:**			

Comments: J13NY7

Endpoint	Analysis Type	Sample Link	Control Link	Date Analyzed	Version
Average Total Wt (Dry, mg)	Comparison	17-4853-3510	17-4853-3510	16 Apr-07 11:28 AM	CETISv1.1.2

Method	Alt H	Data Transform	Zeta	NOEL	LOEL	Toxic Units	ChV	PMSD
Equal Variance t Two-Sample	C > T	Untransformed		100	>100	1	N/A	106.29%

Group Comparisons

Control	vs	Conc-%	Statistic	Critical	P-Value	MSD	Decision(0.05)
Artificial Soil/Sedi		100	-0.6095	2.01505	0.7156	1.62071	Non-Significant Effect

ANOVA Table

Source	Sum of Squares	Mean Square	DF	F Statistic	P-Value	Decision(0.05)
Between	0.3433504	0.343350	1	0.37	0.56880	Non-Significant Effect
Error	4.620726	0.924145	5			
Total	4.96407655	1.2674957	6			

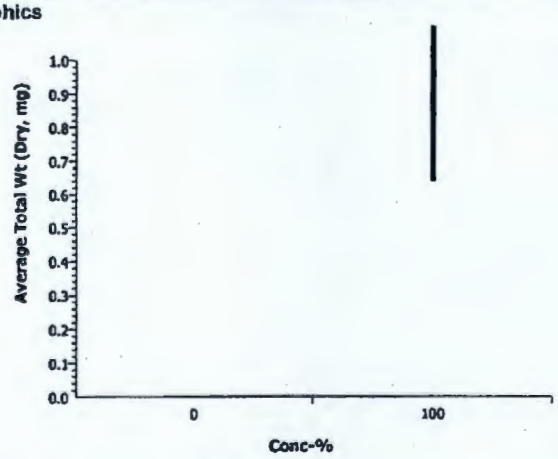
ANOVA Assumptions

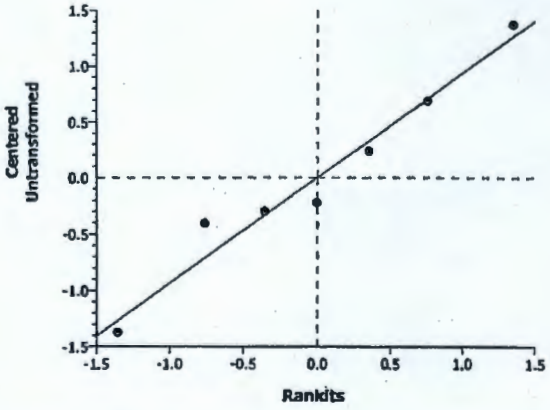
Attribute	Test	Statistic	Critical	P-Value	Decision(0.01)
Variances	Variance Ratio F	18.01279	31.33277	0.02644	Equal Variances
Distribution	Shapiro-Wilk W	0.97474		0.93032	Normal Distribution

Data Summary

			Original Data				Transformed Data			
Conc-%	Control Type	Count	Mean	Minimum	Maximum	SD	Mean	Minimum	Maximum	SD
0	Artificial Soil/S	5	1.52479	1.11799	2.21497	0.45816				
100		2	2.01505	0.64008	3.39001	1.94450				

Graphics





BLUEGRASS GROWTH TEST

Client: Washington Closure Hanford Project Seed ID: B001 Test Start Date: February 23, 2007

Initials: Day 0 BM Day 12 NJ Day 14 [illegible] Day 16 NJ Day 19 — Day 21 [illegible] Day 24 NJ Day 26 NJ Day 28 BM Day 31 NJ Day 33 NJ Day 40 NJ

Bioassay Lab ID: BG 1719-11 Sample No: J13H48

CONC.	REPLICATE	# seeds germinated: 12 days after planting	14 days after planting	16 days after planting (18 Emergence)	18 days after planting	21 days after planting	24 days after planting	7-DAYS POST-EMERGENCE (33 days after planting) Day 24	28	31		14-DAYS POST-EMERGENCE (40 days after planting)	pH: INITIAL (@ planting)	FINAL (@ 14 days Post-Emergence)
Control	A	0	0	0		0	0	1	1	1	1	1	7.0	7.4
	B	0	0	1		1	3	3	3	3	4	5		
	C	0	0	0		0	0	1	2	2	2	3		
	D	0	0	1		1	1	1	2	2	2	3		
	E	0	0	1		1	1	1	1	2	3	4		

7-Days Post-Emergence: Selectively thin down to 5 Seedlings (leave the 5 tallest seedlings). Describe shoot appearance: Day 28 Day 31

Replicate A: 1 sm G
Replicate B: 2 med G, 2 sm G
Replicate C: 1 med G, 1 sm G
Replicate D: 2 sm G
Replicate E: 1 med G, 2 sm G

Appearance Code: Good (G) = deep green color with no brown. Brown (B) = brown color noted. # Lg = # of large plants (tallest, 5+ shoots). # Med = # of plants (smaller than large, fewer shoots). # Sm = # small plants (1-3 shoots)

14-Days Post-Emergence: Describe shoot appearance:

Replicate A: 1 med G
Replicate B: 2 med G 3 sm G
Replicate C: 3 med G
Replicate D: 3 sm G
Replicate E: 1 med G, 2 sm G, 1 sm B

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

	1st Seedling	2nd Seedling	3rd Seedling	4th Seedling	5th Seedling
Replicate A	44 mm	mm	mm	mm	mm
Replicate B	40 mm	48 mm	10 mm	18 mm	17 mm
Replicate C	30 mm	36 mm	52 mm	mm	mm
Replicate D	23 mm	10 mm	31 mm	mm	mm
Replicate E	44 mm	19 mm	4 mm	7 mm	mm

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

	Tin Tare Wt (mg)	Wet Wt (mg)	Dry Wt (mg)
Replicate A	1283.82	1287.02	1284.20
Replicate B	1291.65	1305.13	1293.58
Replicate C	1286.87	1295.15	1287.83
Replicate D	1287.07	1293.75	1287.73
Replicate E	1283.51	~~1291.41~~ 1290.74	1284.39

Describe root appearance:

Replicate A:
Replicate B:
Replicate C:
Replicate D:
Replicate E:

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

	1st Seedling	2nd Seedling	3rd Seedling	4th Seedling	5th Seedling
Replicate A	41 mm	mm	mm	mm	mm
Replicate B	11 mm	23 mm	20 mm	12 mm	46 mm
Replicate C	37 mm	45 mm	22 mm	mm	mm
Replicate D	13 mm	18 mm	26 mm	mm	mm
Replicate E	43 mm	12 mm	3 mm	5 mm	mm

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

	Tin Tare Wt (mg)	Wet Wt (mg)	Dry Wt (mg)
Replicate A	1284.69	1285.23	1284.81
Replicate B	1286.07	1292.18	1286.76
Replicate C	1282.29	1286.14	1282.71
Replicate D	1286.18	1287.44	1286.34
Replicate E	1284.25	1288.47	1285.10

Comments:

CETIS Test Summary

Report Date: 17 Apr-07 3:55 PM
Test Link: 12-1793-1318/B171911psc

Plant Bioassay - Chronic — **CH2M Hill**

Test No:	13-6975-7771	**Test Type:**	Plant Chronic	**Duration:**	40d 0h
Start Date:	23 Feb-07	**Protocol:**	ASTM E1963-02 (2002)	**Species:**	Poa sandbergii
Ending Date:	04 Apr-07	**Dil Water:**		**Source:**	
Setup Date:	23 Feb-07 12:00 AM	**Brine:**			

Sample No:	02-1316-9759	**Code:**	B1719-11	**Client:**	
Sample Date:	16 Jan-07	**Material:**	Soil	**Project:**	
Receive Date:		**Source:**	ELR-Washington Closure Hanford		
Sample Age:	38d 0h	**Station:**			

Comments: J13NY8

Comparison Summary

Analysis	Endpoint	NOEL	LOEL	ChV	PMSD	Method
03-3021-2260	% Germination	100	> 100	N/A	38.27%	Equal Variance t Two-Sample
07-2037-3283	Average Height (mm)	< 100	100	N/A	24.10%	Equal Variance t Two-Sample
08-8837-9982	Average Length (mm)	< 100	100	N/A	21.41%	Equal Variance t Two-Sample
10-2762-1224	Average AG Wt (Wet, mg)	< 100	100	N/A	19.08%	Equal Variance t Two-Sample
09-9623-0742	Average AG Wt (Dry, mg)	< 100	100	N/A	26.16%	Equal Variance t Two-Sample
03-8494-0471	Average Root Wt. (Wet, mg	< 100	100	N/A	40.40%	Equal Variance t Two-Sample
14-4744-5516	Average Root Wt. (Dry, mg)	< 100	100	N/A	27.82%	Equal Variance t Two-Sample
08-2040-0349	Average Total Wt (Wet, mg	< 100	100	N/A	25.32%	Equal Variance t Two-Sample
16-8909-1353	Average Total Wt (Dry, mg)	< 100	100	N/A	25.56%	Equal Variance t Two-Sample

CETIS Test Summary

Report Date: 17 Apr-07 3:55 PM
Test Link: 12-1793-1318/B171911psc

% Germination Summary

Conc-%	Control Type	Reps	Mean	Minimum	Maximum	SE	SD	CV
0	Artificial Soil/S	5	0.84000	0.40000	1.00000	0.11662	0.26077	31.04%
100		5	0.64000	0.20000	1.00000	0.13266	0.29665	46.35%

Average Height (mm) Summary

Conc-%	Control Type	Reps	Mean	Minimum	Maximum	SE	SD	CV
0	Artificial Soil/S	5	61.2	48.400	84.5	6.1496	13.751	22.47%
100		5	29.94	18.5	44	5.0099	11.202	37.42%

Average Length (mm) Summary

Conc-%	Control Type	Reps	Mean	Minimum	Maximum	SE	SD	CV
0	Artificial Soil/S	5	46.98	38.8	53	2.4520	5.4829	11.67%
100		5	26.580	15.800	41	4.8219	10.782	40.56%

Average AG Wt (Wet, mg) Summary

Conc-%	Control Type	Reps	Mean	Minimum	Maximum	SE	SD	CV
0	Artificial Soil/S	5	8.3775	6.1	10.580	0.8257	1.8462	22.04%
100		5	2.5381	1.8075	3.2001	0.2391	0.5346	21.06%

Average AG Wt (Dry, mg) Summary

Conc-%	Control Type	Reps	Mean	Minimum	Maximum	SE	SD	CV
0	Artificial Soil/S	5	1.21170	0.86799	1.76001	0.16645	0.37220	30.72%
100		5	0.30520	0.22000	0.38599	0.03664	0.08194	26.85%

Average Root Wt. (Wet, mg) Summary

Conc-%	Control Type	Reps	Mean	Minimum	Maximum	SE	SD	CV
0	Artificial Soil/S	5	4.55901	2.72400	7.64001	0.97430	2.17861	47.79%
100		5	0.90407	0.41996	1.28333	0.17813	0.39830	44.06%

Average Root Wt. (Dry, mg) Summary

Conc-%	Control Type	Reps	Mean	Minimum	Maximum	SE	SD	CV
0	Artificial Soil/S	5	0.31309	0.25000	0.45496	0.03936	0.08801	28.11%
100		5	0.13278	0.05330	0.21249	0.02541	0.05681	42.79%

Average Total Wt (Wet, mg) Summary

Conc-%	Control Type	Reps	Mean	Minimum	Maximum	SE	SD	CV
0	Artificial Soil/S	5	12.937	9.198	17.588	1.7379	3.886	30.04%
100		5	3.4421	2.6466	4.0433	0.2868	0.6414	18.63%

Average Total Wt (Dry, mg) Summary

Conc-%	Control Type	Reps	Mean	Minimum	Maximum	SE	SD	CV
0	Artificial Soil/S	5	1.52479	1.11799	2.21497	0.20490	0.45816	30.05%
100		5	0.43798	0.27332	0.52400	0.04410	0.09860	22.51%

CETIS Test Summary

Report Date: 17 Apr-07 3:55 PM
Test Link: 12-1793-1318/B171911psc

% Germination Detail

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

Average Height (mm) Detail

Conc-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Artificial Soil/S	54.8	84.5	58.8	59.5	48.4000
100		44	26.6000	39.3	21.3	18.5

Average Length (mm) Detail

Conc-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Artificial Soil/S	50	48.5	44.6	53	38.8
100		41	22.4	34.7000	19	15.8000

Average AG Wt (Wet, mg) Detail

Conc-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Artificial Soil/S	6.1	10.5800	7.548	9.94751	7.71199
100		3.20007	2.696	2.76001	2.22668	1.8075

Average AG Wt (Dry, mg) Detail

Conc-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Artificial Soil/S	0.86799	1.76001	0.95598	1.42252	1.05200
100		0.38000	0.38599	0.31999	0.22001	0.22000

Average Root Wt. (Wet, mg) Detail

Conc-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Artificial Soil/S	3.09800	6.07501	2.72400	7.64001	3.25801
100		0.54004	1.22202	1.28333	0.41996	1.05499

Average Root Wt. (Dry, mg) Detail

Conc-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Artificial Soil/S	0.25000	0.45496	0.26802	0.34250	0.25000
100		0.12012	0.13801	0.13997	0.05330	0.21249

Average Total Wt (Wet, mg) Detail

Conc-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Artificial Soil/S	9.198	16.6550	10.272	17.5875	10.97
100		3.74011	3.91802	4.04333	2.64665	2.86249

Average Total Wt (Dry, mg) Detail

Conc-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Artificial Soil/S	1.11799	2.21497	1.22400	1.76501	1.30200
100		0.50012	0.52400	0.45996	0.27332	0.43250

CETIS Analysis Detail

Plant Bioassay - Chronic — **CH2M Hill**

Sample No:	02-1316-9759	**Code:**	B1719-11	**Client:**	
Sample Date:	16 Jan-07	**Material:**	Soil	**Project:**	
Receive Date:		**Source:**	ELR-Washington Closure Hanford		
Sample Age:	38d 0h	**Station:**			

Comments: J13NY8

Endpoint	Analysis Type	Sample Link	Control Link	Date Analyzed	Version
% Germination	Comparison	12-1793-1318	12-1793-1318	16 Apr-07 11:31 AM	CETISv1.1.2

Method	Alt H	Data Transform	Zeta	NOEL	LOEL	Toxic Units	ChV	PMSD
Equal Variance t Two-Sample	C > T	Angular (Corrected)		100	>100	1	N/A	38.27%

Group Comparisons

Control	vs	Conc-%	Statistic	Critical	P-Value	MSD	Decision(0.05)
Artificial Soil/Sedi		100	1.17185	1.85955	0.1375	0.36164	Non-Significant Effect

ANOVA Table

Source	Sum of Squares	Mean Square	DF	F Statistic	P-Value	Decision(0.05)
Between	0.1298422	0.129842	1	1.37	0.27497	Non-Significant Effect
Error	0.7564129	0.094552	8			
Total	0.88625512	0.2243938	9			

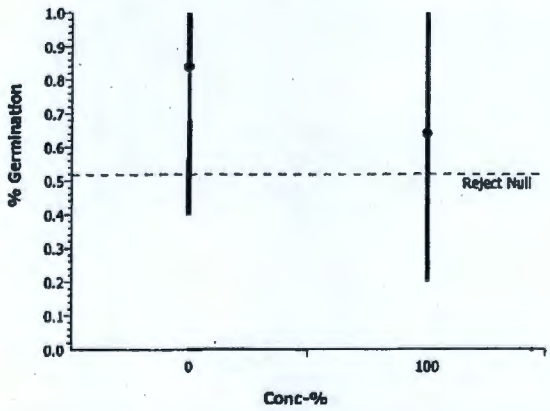
ANOVA Assumptions

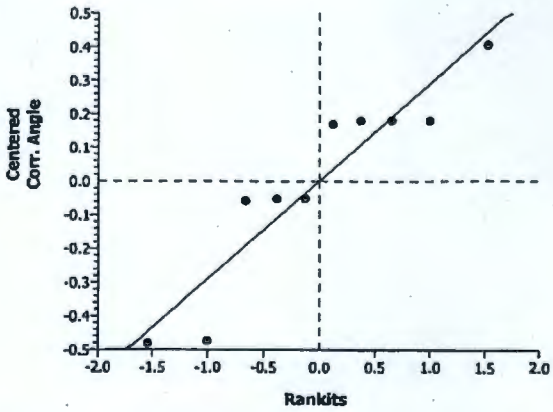
Attribute	Test	Statistic	Critical	P-Value	Decision(0.01)
Variances	Variance Ratio F	1.28165	23.15450	0.81578	Equal Variances
Distribution	Shapiro-Wilk W	0.87402		0.11132	Normal Distribution

Data Summary

			Original Data				Transformed Data			
Conc-%	Control Type	Count	Mean	Minimum	Maximum	SD	Mean	Minimum	Maximum	SD
0	Artificial Soil/S	5	0.84000	0.40000	1.00000	0.26077	1.16554	0.68472	1.34528	0.28789
100		5	0.64000	0.20000	1.00000	0.29665	0.93765	0.46365	1.34528	0.32592

Graphics





CETIS Analysis Detail

Plant Bioassay - Chronic — **CH2M Hill**

Sample No:	02-1316-9759	**Code:**	B1719-11	**Client:**	
Sample Date:	16 Jan-07	**Material:**	Soil	**Project:**	
Receive Date:		**Source:**	ELR-Washington Closure Hanford		
Sample Age:	38d 0h	**Station:**			

Comments: J13NY8

Endpoint	Analysis Type	Sample Link	Control Link	Date Analyzed	Version
Average Height (mm)	Comparison	12-1793-1318	12-1793-1318	17 Apr-07 3:54 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	24.10%

Group Comparisons

Control	vs	Conc-%	Statistic	Critical	P-Value	MSD	Decision(0.05)
Artificial Soil/Sedi		100	3.94103	1.85955	0.0021	14.7498	Significant Effect

ANOVA Table

Source	Sum of Squares	Mean Square	DF	F Statistic	P-Value	Decision(0.05)
Between	2442.969	2442.969	1	15.53	0.00429	Significant Effect
Error	1258.312	157.289	8			
Total	3701.28101	2600.258	9			

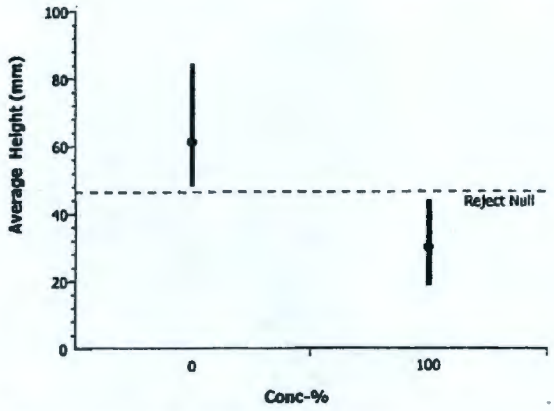
ANOVA Assumptions

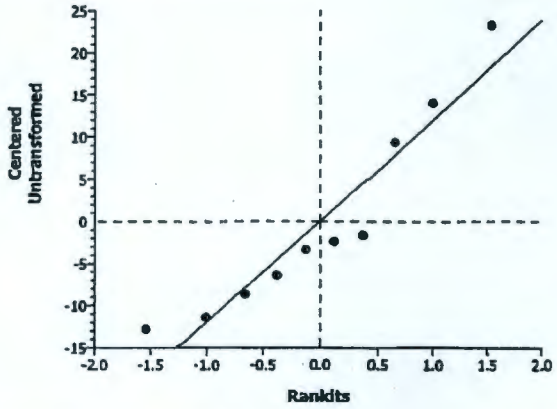
Attribute	Test	Statistic	Critical	P-Value	Decision(0.01)
Variances	Variance Ratio F	1.50674	23.15450	0.70091	Equal Variances
Distribution	Shapiro-Wilk W	0.89576		0.19668	Normal Distribution

Data Summary

			Original Data				Transformed Data			
Conc-%	Control Type	Count	Mean	Minimum	Maximum	SD	Mean	Minimum	Maximum	SD
0	Artificial Soil/S	5	61.2	48.4	84.5	13.751				
100		5	29.94	18.5	44	11.202				

Graphics





000-092-101-1 CETIS™ v1.1.2revl Analyst: BV Approval:_____

CETIS Analysis Detail

Plant Bioassay - Chronic — **CH2M Hill**

Sample No:	02-1316-9759	**Code:**	B1719-11	**Client:**	
Sample Date:	16 Jan-07	**Material:**	Soil	**Project:**	
Receive Date:		**Source:**	ELR-Washington Closure Hanford		
Sample Age:	38d 0h	**Station:**			

Comments: J13NY8

Endpoint	Analysis Type	Sample Link	Control Link	Date Analyzed	Version
Average Length (mm)	Comparison	12-1793-1318	12-1793-1318	16 Apr-07 11:31 AM	CETISv1.1.2

Method	Alt H	Data Transform	Zeta	NOEL	LOEL	Toxic Units	ChV	PMSD
Equal Variance t Two-Sample	C > T	Untransformed		<100	100		N/A	21.41%

Group Comparisons

Control	vs	Conc-%	Statistic	Critical	P-Value	MSD	Decision(0.05)
Artificial Soil/Sedi		100	3.77114	1.85955	0.0027	10.0592	Significant Effect

ANOVA Table

Source	Sum of Squares	Mean Square	DF	F Statistic	P-Value	Decision(0.05)
Between	1040.4	1040.4	1	14.22	0.00546	Significant Effect
Error	585.256	73.15701	8			
Total	1625.65594	1113.5569	9			

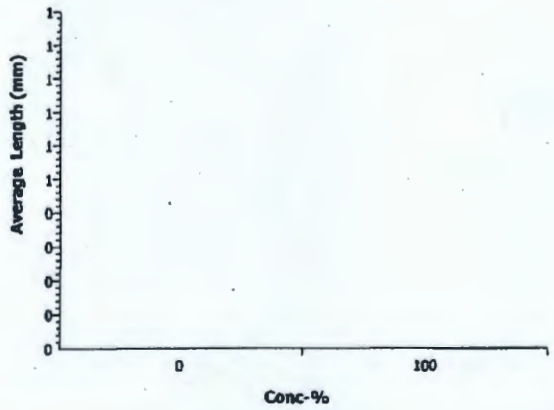
ANOVA Assumptions

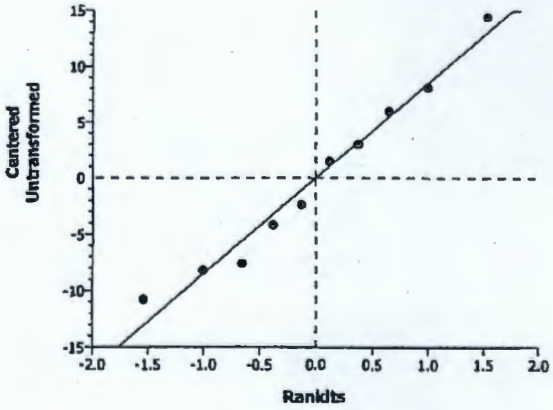
Attribute	Test	Statistic	Critical	P-Value	Decision(0.01)
Variances	Variance Ratio F	3.86707	23.15450	0.21859	Equal Variances
Distribution	Shapiro-Wilk W	0.96585		0.84994	Normal Distribution

Data Summary

			Original Data				Transformed Data			
Conc-%	Control Type	Count	Mean	Minimum	Maximum	SD	Mean	Minimum	Maximum	SD
0	Artificial Soil/S	5	46.98	38.8	53	5.4829				
100		5	26.580	15.8	41	10.782				

Graphics





CETIS Analysis Detail

Plant Bioassay - Chronic — **CH2M HILL**

Sample No:	02-1316-9759	**Code:**	B1719-11	**Client:**	
Sample Date:	16 Jan-07	**Material:**	Soil	**Project:**	
Receive Date:		**Source:**	ELR-Washington Closure Hanford		
Sample Age:	38d 0h	**Station:**			

Comments: J13NY8

Endpoint	Analysis Type	Sample Link	Control Link	Date Analyzed	Version
Average AG Wt (Wet, mg)	Comparison	12-1793-1318	12-1793-1318	16 Apr-07 11:31 AM	CETISv1.1.2

Method	Alt H	Data Transform	Zeta	NOEL	LOEL	Toxic Units	ChV	PMSD
Equal Variance t Two-Sample	C > T	Untransformed		<100	100		N/A	19.08%

Group Comparisons

Control	vs	Conc-%	Statistic	Critical	P-Value	MSD	Decision(0.05)
Artificial Soil/Sedi		100	6.79347	1.85955	0.0001	1.59841	Significant Effect

ANOVA Table

Source	Sum of Squares	Mean Square	DF	F Statistic	P-Value	Decision(0.05)
Between	85.24796	85.24796	1	46.15	0.00014	Significant Effect
Error	14.77715	1.847143	8			
Total	100.025109	87.095106	9			

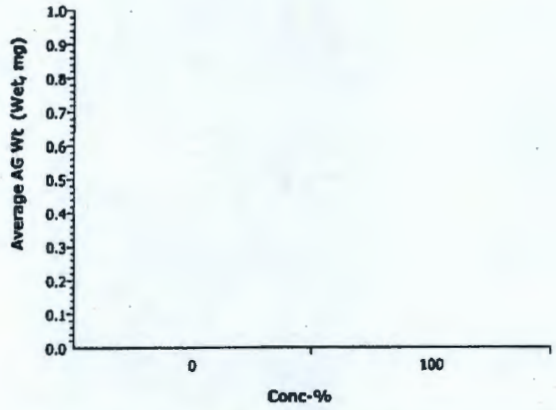
ANOVA Assumptions

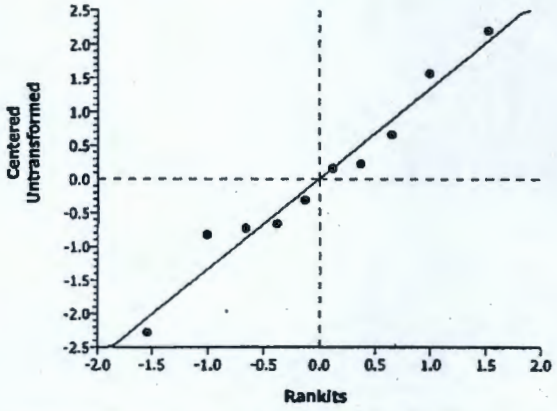
Attribute	Test	Statistic	Critical	P-Value	Decision(0.01)
Variances	Variance Ratio F	11.92673	23.15450	0.03405	Equal Variances
Distribution	Shapiro-Wilk W	0.96995		0.89037	Normal Distribution

Data Summary

			Original Data				Transformed Data			
Conc-%	Control Type	Count	Mean	Minimum	Maximum	SD	Mean	Minimum	Maximum	SD
0	Artificial Soil/S	5	8.3775	6.1	10.580	1.8462				
100		5	2.5381	1.8075	3.2001	0.5346				

Graphics





CETIS Analysis Detail

Plant Bioassay - Chronic — **CH2M Hill**

Sample No:	02-1316-9759	**Code:**	B1719-11	**Client:**	
Sample Date:	16 Jan-07	**Material:**	Soil	**Project:**	
Receive Date:		**Source:**	ELR-Washington Closure Hanford		
Sample Age:	38d 0h	**Station:**			

Comments: J13NY8

Endpoint	Analysis Type	Sample Link	Control Link	Date Analyzed	Version
Average AG Wt (Dry, mg)	Comparison	12-1793-1318	12-1793-1318	16 Apr-07 11:31 AM	CETISv1.1.2

Method	Alt H	Data Transform	Zeta	NOEL	LOEL	Toxic Units	ChV	PMSD
Equal Variance t Two-Sample	C > T	Untransformed		<100	100		N/A	26.16%

Group Comparisons

Control	vs	Conc-%	Statistic	Critical	P-Value	MSD	Decision(0.05)
Artificial Soil/Sedi		100	5.31870	1.85955	0.0004	0.31694	Significant Effect

ANOVA Table

Source	Sum of Squares	Mean Square	DF	F Statistic	P-Value	Decision(0.05)
Between	2.054366	2.054366	1	28.29	0.00071	Significant Effect
Error	0.5809736	0.072622	8			
Total	2.63533944	2.1269876	9			

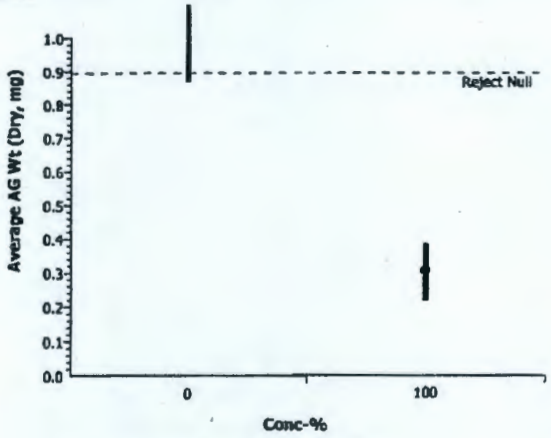
ANOVA Assumptions

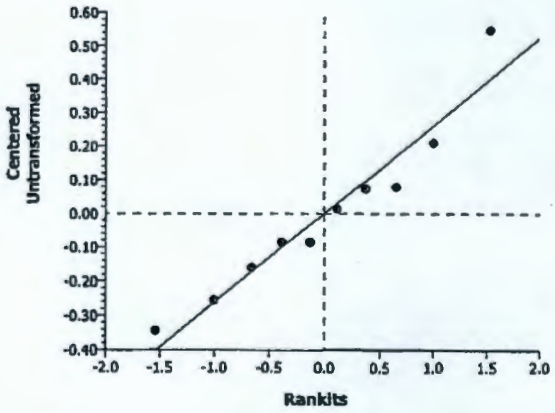
Attribute	Test	Statistic	Critical	P-Value	Decision(0.01)
Variances	Variance Ratio F	20.63228	23.15450	0.01243	Equal Variances
Distribution	Shapiro-Wilk W	0.94368		0.59466	Normal Distribution

Data Summary

			Original Data				Transformed Data			
Conc-%	Control Type	Count	Mean	Minimum	Maximum	SD	Mean	Minimum	Maximum	SD
0	Artificial Soil/S	5	1.21170	0.86799	1.76001	0.37220				
100		5	0.30520	0.22000	0.38599	0.08194				

Graphics





CETIS Analysis Detail

Plant Bioassay - Chronic — **CH2M Hill**

Sample No:	02-1316-9759	**Code:**	B1719-11	**Client:**	
Sample Date:	16 Jan-07	**Material:**	Soil	**Project:**	
Receive Date:		**Source:**	ELR-Washington Closure Hanford		
Sample Age:	38d 0h	**Station:**			

Comments: J13NY8

Endpoint	Analysis Type	Sample Link	Control Link	Date Analyzed	Version
Average Root Wt. (Wet, mg)	Comparison	12-1793-1318	12-1793-1318	16 Apr-07 11:31 AM	CETISv1.1.2

Method	Alt H	Data Transform	Zeta	NOEL	LOEL	Toxic Units	ChV	PMSD
Equal Variance t Two-Sample	C > T	Untransformed		<100	100		N/A	40.40%

Group Comparisons

Control	vs	Conc-%	Statistic	Critical	P-Value	MSD	Decision(0.05)
Artificial Soil/Sedi		100	3.69018	1.85955	0.0031	1.84179	Significant Effect

ANOVA Table

Source	Sum of Squares	Mean Square	DF	F Statistic	P-Value	Decision(0.05)
Between	33.39643	33.39643	1	13.62	0.00613	Significant Effect
Error	19.61986	2.452483	8			
Total	53.0162945	35.848914	9			

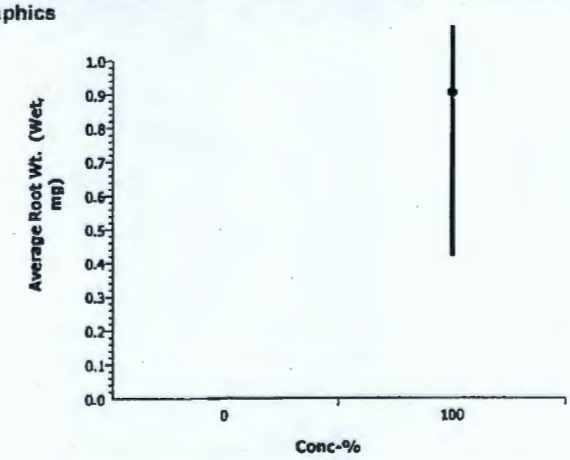
ANOVA Assumptions

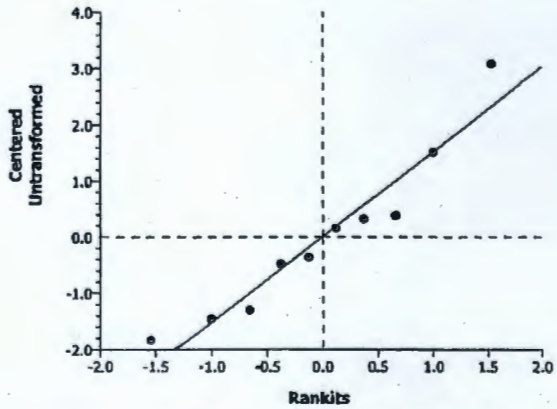
Attribute	Test	Statistic	Critical	P-Value	Decision(0.01)
Variances	Variance Ratio F	29.91769	23.15450	0.00614	Unequal Variances
Distribution	Shapiro-Wilk W	0.93324		0.48053	Normal Distribution

Data Summary

			Original Data				Transformed Data			
Conc-%	Control Type	Count	Mean	Minimum	Maximum	SD	Mean	Minimum	Maximum	SD
0	Artificial Soil/S	5	4.55901	2.72400	7.64001	2.17861				
100		5	0.90407	0.41996	1.28333	0.39830				

Graphics





CETIS Analysis Detail

Plant Bioassay - Chronic — CH2M Hill

Sample No:	02-1316-9759	**Code:**	B1719-11	**Client:**	
Sample Date:	16 Jan-07	**Material:**	Soil	**Project:**	
Receive Date:		**Source:**	ELR-Washington Closure Hanford		
Sample Age:	38d 0h	**Station:**			

Comments: J13NY8

Endpoint	Analysis Type	Sample Link	Control Link	Date Analyzed	Version
Average Root Wt. (Dry, mg)	Comparison	12-1793-1318	12-1793-1318	16 Apr-07 11:31 AM	CETISv1.1.2

Method	Alt H	Data Transform	Zeta	NOEL	LOEL	Toxic Units	ChV	PMSD
Equal Variance t Two-Sample	C > T	Untransformed		<100	100		N/A	27.82%

Group Comparisons

Control	vs	Conc-%	Statistic	Critical	P-Value	MSD	Decision(0.05)
Artificial Soil/Sedi		100	3.84898	1.85955	0.0024	0.08711	Significant Effect

ANOVA Table

Source	Sum of Squares	Mean Square	DF	F Statistic	P-Value	Decision(0.05)
Between	0.081283	0.081283	1	14.81	0.00488	Significant Effect
Error	0.0438933	0.005487	8			
Total	0.12517625	0.0867696	9			

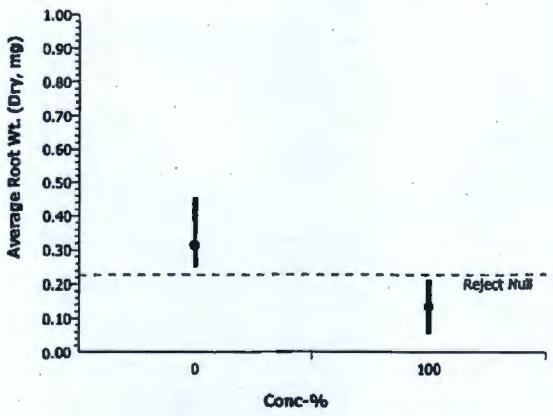
ANOVA Assumptions

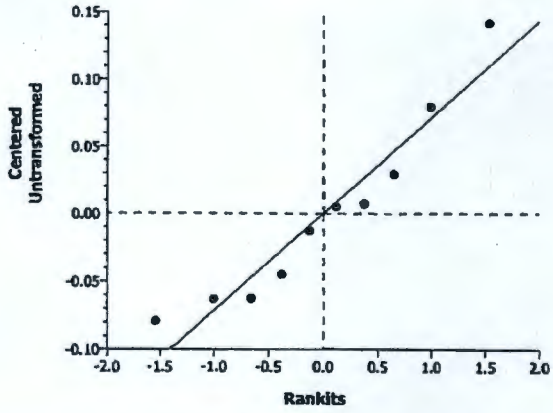
Attribute	Test	Statistic	Critical	P-Value	Decision(0.01)
Variances	Variance Ratio F	2.39989	23.15450	0.41728	Equal Variances
Distribution	Shapiro-Wilk W	0.91977		0.35504	Normal Distribution

Data Summary

			Original Data				Transformed Data			
Conc-%	Control Type	Count	Mean	Minimum	Maximum	SD	Mean	Minimum	Maximum	SD
0	Artificial Soil/S	5	0.31309	0.25000	0.45496	0.08801				
100		5	0.13278	0.05330	0.21249	0.05681				

Graphics





CETIS Analysis Detail

Plant Bioassay - Chronic — **CH2M Hill**

Sample No:	02-1316-9759	**Code:**	B1719-11	**Client:**	
Sample Date:	16 Jan-07	**Material:**	Soil	**Project:**	
Receive Date:		**Source:**	ELR-Washington Closure Hanford		
Sample Age:	38d 0h	**Station:**			

Comments: J13NY8

Endpoint	Analysis Type	Sample Link	Control Link	Date Analyzed	Version
Average Total Wt (Wet, mg)	Comparison	12-1793-1318	12-1793-1318	16 Apr-07 11:31 AM	CETISv1.1.2

Method	Alt H	Data Transform	Zeta	NOEL	LOEL	Toxic Units	ChV	PMSD
Equal Variance t Two-Sample	C > T	Untransformed		<100	100		N/A	25.32%

Group Comparisons

Control	vs	Conc-%	Statistic	Critical	P-Value	MSD	Decision(0.05)
Artificial Soil/Sedi		100	5.39036	1.85955	0.0003	3.27534	Significant Effect

ANOVA Table

Source	Sum of Squares	Mean Square	DF	F Statistic	P-Value	Decision(0.05)
Between	225.3586	225.3586	1	29.06	0.00065	Significant Effect
Error	62.04809	7.756011	8			
Total	287.406639	233.11456	9			

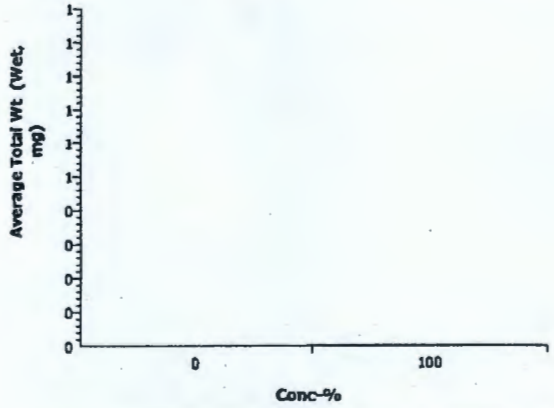
ANOVA Assumptions

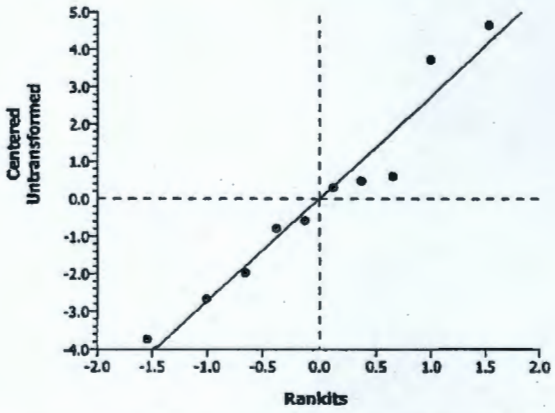
Attribute	Test	Statistic	Critical	P-Value	Decision(0.01)
Variances	Variance Ratio F	36.70802	23.15450	0.00415	Unequal Variances
Distribution	Shapiro-Wilk W	0.94434		0.60224	Normal Distribution

Data Summary

			Original Data				Transformed Data			
Conc-%	Control Type	Count	Mean	Minimum	Maximum	SD	Mean	Minimum	Maximum	SD
0	Artificial Soil/S	5	12.937	9.198	17.588	3.886				
100		5	3.4421	2.6466	4.0433	0.6414				

Graphics





CETIS Analysis Detail

Plant Bioassay - Chronic — **CH2M Hill**

Sample No:	02-1316-9759	**Code:**	B1719-11	**Client:**	
Sample Date:	16 Jan-07	**Material:**	Soil	**Project:**	
Receive Date:		**Source:**	ELR-Washington Closure Hanford		
Sample Age:	38d 0h	**Station:**			

Comments: J13NY8

Endpoint	Analysis Type	Sample Link	Control Link	Date Analyzed	Version
Average Total Wt (Dry, mg)	Comparison	12-1793-1318	12-1793-1318	16 Apr-07 11:31 AM	CETISv1.1.2

Method	Alt H	Data Transform	Zeta	NOEL	LOEL	Toxic Units	ChV	PMSD
Equal Variance t Two-Sample	C > T	Untransformed		<100	100		N/A	25.56%

Group Comparisons

Control	vs	Conc-%	Statistic	Critical	P-Value	MSD	Decision(0.05)
Artificial Soil/Sedi		100	5.18552	1.85955	0.0004	0.38974	Significant Effect

ANOVA Table

Source	Sum of Squares	Mean Square	DF	F Statistic	P-Value	Decision(0.05)
Between	2.952925	2.952925	1	26.89	0.00084	Significant Effect
Error	0.8785325	0.109817	8			
Total	3.83145726	3.0627413	9			

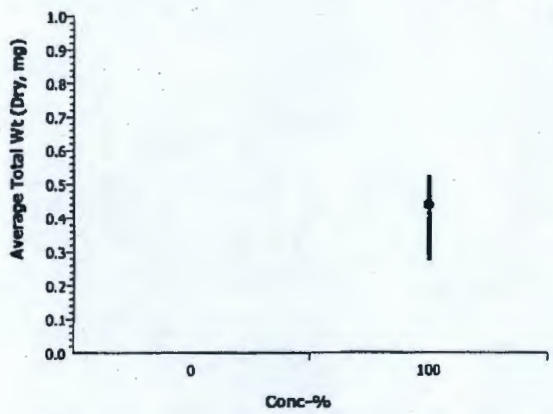
ANOVA Assumptions

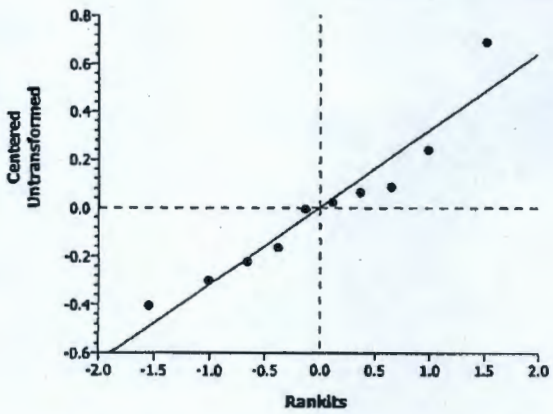
Attribute	Test	Statistic	Critical	P-Value	Decision(0.01)
Variances	Variance Ratio F	21.59102	23.15450	0.01141	Equal Variances
Distribution	Shapiro-Wilk W	0.92706		0.41964	Normal Distribution

Data Summary

			Original Data				Transformed Data			
Conc-%	Control Type	Count	Mean	Minimum	Maximum	SD	Mean	Minimum	Maximum	SD
0	Artificial Soil/S	5	1.52479	1.11799	2.21497	0.45816				
100		5	0.43798	0.27332	0.52400	0.09860				

Graphics





APPENDIX B

CHAIN OF CUSTODY

F2944

Washington Closure Hanford	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST	RC-080-4	Page 1 of 1

Collector B. Tiller / J. QUEEN	Company Contact Joan Kessner	Telephone No. 375-4688	Project Coordinator KESSNER, JH
Price Code 8N	Data Turnaround 45 Days	Air Quality ☐	
Project Designation RCBRA-Inter-Areas Shoreline Assessment - Incremental Soi	Sampling Location Riparian Site 2j, White Bluffs Slough		SAF No. RC-080
Ice Chest No.	Field Logbook No. EL-1611	COA BESBEA6520	Method of Shipment GROUND TRANSPORT
Shipped To CH2MHill - Corvallis	Offsite Property No.		Bill of Lading/Air Bill No.

POSSIBLE SAMPLE HAZARDS/REMARKS

Special Handling and/or Storage

Preservation	None	None									
Type of Container	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										
J13LP8	SOIL	11-15-06	11:58	X	X								

CHAIN OF POSSESSION	Date/Time	Sign/Print Names: Received By/Stored In	Date/Time
Relinquished By/Removed From: Elizabeth M Topp	12:05 11-15-06	Received By/Stored In: Nancy Hubbard	11-15-06 12:35
Relinquished By/Removed From	Date/Time	Received By/Stored In	Date/Time
Relinquished By/Removed From	Date/Time	Received By/Stored In	Date/Time
Relinquished By/Removed From	Date/Time	Received By/Stored In	Date/Time
Relinquished By/Removed From	Date/Time	Received By/Stored In	Date/Time
Relinquished By/Removed From	Date/Time	Received By/Stored In	Date/Time

SPECIAL INSTRUCTIONS

(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

31719-01

Matrix *
SeSeal
SEeSediment
SOeSolid
SleSludge
WeWater
OeOil
AeAir
DSeDrum Solids
DLeDrum Liquids
TeTissue
WIeWipe
LeLiquid
VeVegetation
XeOther

LABORATORY SECTION	Received By	Title	Date/Time
	Brett Mikey		11-16-06 0850
FINAL SAMPLE DISPOSITION	Disposal Method	Disposed By	Date/Time

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

F2972

Washington Closure Hanford	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST	RC-080-3	Page 1 of 1

Collector B. Tiller	Company Contact Joan Kessner	Telephone No. 375-4688	Project Coordinator KESSNER, JH	Price Code 8N	Data Turnaround 45 Days
Project Designation RCBRA-Inter-Areas Shoreline Assessment - Incremental Soi	Sampling Location Riparian Site 2f, Island 4		SAF No. RC-080	Air Quality ☐	
Ice Chest No.	Field Logbook No. EL-1611	COA BESBEA6520	Method of Shipment GROUND TRANSPORT 23 4°C		
Shipped To CH2MHill - Corvallis	Offsite Property No.		Bill of Lading/Air Bill No.		

POSSIBLE SAMPLE HAZARDS/REMARKS

Special Handling and/or Storage

Preservation	None	None										
Type of Container	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												
J13LP7 / SOIL / 11-20-06 / 11:55	X	X										-1

CHAIN OF POSSESSION	Sign/Print Names		
Relinquished By/Removed From Elizabeth M. Tiffany	Date/Time 11-20-06 12:10	Received By/Stored In Darcy Hubbard CH2MHILL	Date/Time 11-20-06 12:10
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

B1719-02

Matrix *
SoSoil
SESediment
SDSolid
SlSludge
WaWater
OiOil
AiAir
DSDrum Solids
DLDrum Liquids
TiTissue
WiWipe
LiLiquid
VeVegetation
XOther

LABORATORY SECTION	Received By [signature]	Title	Date/Time 11-20-06 1300
FINAL SAMPLE DISPOSITION	Disposal Method	Disposed By	Date/Time

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

F 2992

Washington Closure Hanford	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST	RC-080-33	Page 1 of 1

Collector J. Queen	Company Contact Joan Kessner	Telephone No. 375-4688	Project Coordinator KESSNER, JH	Price Code 8N	Data Turnaround 45 Days
Project Designation RCBRA-Inter-Areas Shoreline Assessment - Incremental Soi	Sampling Location RCBRA Bev Ref 2		SAF No. RC-080	Air Quality ☐	
Ice Chest No.	Field Logbook No. EL-1611	COA BESBEA6520	Method of Shipment Ground Transport		
Shipped To CH2MHill - Corvallis	Offsite Property No.		Bill of Lading/Air Bill No.		

POSSIBLE SAMPLE HAZARDS/REMARKS

Special Handling and/or Storage

Preservation	None	None									
Type of Container	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										
J13P00	SOIL	11-27-06	11:57	X	X								-1

CHAIN OF POSSESSION	Sign/Print Names		
Relinquished By/Removed From	Date/Time 12:00	Received By/Stored In	Date/Time
Elizabeth M. Tisdale	11-27-06	Nancy Hubbard	11-27-06 12:00
Relinquished By/Removed From	Date/Time	Received By/Stored In	Date/Time
Nancy Hubbard	11-27-06 13:05		
Relinquished By/Removed From	Date/Time	Received By/Stored In	Date/Time
Relinquished By/Removed From	Date/Time	Received By/Stored In	Date/Time
Relinquished By/Removed From	Date/Time	Received By/Stored In	Date/Time
Relinquished By/Removed From	Date/Time	Received By/Stored In	Date/Time

SPECIAL INSTRUCTIONS

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

(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

B1719-03

Matrix *

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

LABORATORY SECTION	Received By [illegible]	Title Assoc Sci	Date/Time 11-27-06 1320
FINAL SAMPLE DISPOSITION	Disposal Method	Disposed By	Date/Time

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

F 3044

Washington Closure Hanford	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST	RC-080-32	Page 1 of 1

Collector J. Queen	Company Contact Joan Kessner	Telephone No. 375-4688	Project Coordinator KESSNER, JH
Project Designation RCBRA-Inter-Areas Shoreline Assessment - Incremental Soi	Sampling Location RCBRA Bev Ref 1		SAF No. RC-080
Ice Chest No.	Field Logbook No. EL-1611	COA BESBEA6520	Method of Shipment Ground Transport
Shipped To CH2MHill - Corvallis	Offsite Property No.		Bill of Lading/Air Bill No.

Price Code 8N

Air Quality ☐

Data Turnaround 45 Days

POSSIBLE SAMPLE HAZARDS/REMARKS

Special Handling and/or Storage

Preservation	None	None									
Type of Container	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										
J13NY9	SOIL	12-4-06	12:00	X	X								

CHAIN OF POSSESSION		Sign/Print Names	
Relinquished By/Removed From CH2M	Date/Time 12:06 12-4-06	Received By/Stored In Kathy McKinley	Date/Time 12/4/06 1225
Relinquished By/Removed From	Date/Time	Received By/Stored In	Date/Time
Relinquished By/Removed From	Date/Time	Received By/Stored In	Date/Time
Relinquished By/Removed From	Date/Time	Received By/Stored In	Date/Time
Relinquished By/Removed From	Date/Time	Received By/Stored In	Date/Time
Relinquished By/Removed From	Date/Time	Received By/Stored In	Date/Time

SPECIAL INSTRUCTIONS

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

(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

8/19-04

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 Assoc. Sci	Date/Time 12-8-06
FINAL SAMPLE DISPOSITION	Disposal Method	Disposed By	Date/Time

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

F3098

Washington Closure Hanford	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST	RC-080-27	Page 1 of 1

Collector J. Queen	Company Contact Joan Kessner	Telephone No. 375-4688	Project Coordinator KESSNER, JH
Project Designation RCBRA-Inter-Areas Shoreline Assessment - Incremental Soi	Sampling Location RCBRA 2a Rip		SAF No. RC-080
Ice Chest No.	Field Logbook No. EL-1611	COA BESBEA6520	Method of Shipment Ground Transport
Shipped To CH2MHill - Corvallis	Offsite Property No.		Bill of Lading/Air Bill No.

Price Code 8N

Air Quality ☐

Data Turnaround 45 Days

POSSIBLE SAMPLE HAZARDS/REMARKS

Special Handling and/or Storage

Preservation	None	None									
Type of Container	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										
J13NY4	SOIL	12-11-06	12:20	X	X								-1

CHAIN OF POSSESSION	Date/Time	Sign/Print Names	Date/Time
Relinquished By/Removed From Chzcltti	12:30	Received By/Stored In	
Relinquished By/Removed From Elizabeth N Tapp	12-11-06	Received By/Stored In Dawn Hubbard	12-11-06 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

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

(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

B1719-05

Matrix *

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

LABORATORY SECTION	Received By	Title Assoc. Sci	Date/Time 12-11-06 1635
FINAL SAMPLE DISPOSITION	Disposal Method	Disposed By	Date/Time

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

F3102

Washington Closure Hanford	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST	RC-080-2	Page 1 of 1

Collector B. Tiller	Company Contact Joan Kessner	Telephone No. 375-4688	Project Coordinator KESSNER, JH	Price Code 8N	Data Turnaround 45 Days
Project Designation RCBRA-Inter-Areas Shoreline Assessment - Incremental Soi	Sampling Location Riparian Site 2c, 100-K		SAF No. RC-080	Air Quality ☐	
Ice Chest No.	Field Logbook No. EL-1611	COA BESBEA6520	Method of Shipment ~~GROUND TRANSPORT~~ JM2 11-30-06 Oak Harbor Freight		
Shipped To CH2MHill - Corvallis	Offsite Property No.		Bill of Lading/Air Bill No. See OSPC		

POSSIBLE SAMPLE HAZARDS/REMARKS

Special Handling and/or Storage

Preservation	None	None										
Type of Container	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									
J13LP6	SOIL	12-11-06	17:49	X	X							-1

CHAIN OF POSSESSION		Sign/Print Names	
Relinquished By/Removed From Elizabeth M Tepps	Date/Time 9:15 12-12-06	Received By/Stored In Darcy Hubbard	Date/Time 12-12-06 09:15
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
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

B1719-06

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

LABORATORY SECTION	Received By [signature]	Title Assoc. Sci	Date/Time 12/13/06 5:30
FINAL SAMPLE DISPOSITION	Disposal Method	Disposed By	Date/Time

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

F.3174

Washington Closure Hanford	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST	RC-080-29	Page 1 of 1

Collector J. Queen	Company Contact Joan Kessner	Telephone No. 375-4688	Project Coordinator KESSNER, JH
Project Designation RCBRA-Inter-Areas Shoreline Assessment - Incremental Soi	Sampling Location RCBRA 3b Rip		SAF No. RC-080
Ice Chest No.	Field Logbook No. EL-1611	COA BESBEA6520	Method of Shipment Ground Transport
Shipped To CH2MHill - Corvallis	Offsite Property No.		Bill of Lading/Air Bill No.

Price Code 8N

Air Quality ☐

Data Turnaround 45 Days

POSSIBLE SAMPLE HAZARDS/REMARKS

Special Handling and/or Storage

Preservation	None	None									
Type of Container	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										
J13NY6	SOIL	12-~~18~~-06 19 ST	1400	X	X								-1

CHAIN OF POSSESSION	Sign/Print Names		
Relinquished By/Removed From CH2MHill Date/Time 1500 Elizabeth M. Topp 12-19-06	Received By/Stored In CH2MHill Nancy Hubbard	Date/Time 12/19/06 1500	
Relinquished By/Removed From	Date/Time	Received By/Stored In	Date/Time
Relinquished By/Removed From	Date/Time	Received By/Stored In	Date/Time
Relinquished By/Removed From	Date/Time	Received By/Stored In	Date/Time
Relinquished By/Removed From	Date/Time	Received By/Stored In	Date/Time
Relinquished By/Removed From	Date/Time	Received By/Stored In	Date/Time

SPECIAL INSTRUCTIONS

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

(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

3179-07

Matrix *

SoSoil
SDSediment
SOSolid
SlSludge
WaWater
OiOil
AirAir
DSDrum Solids
DLDrum Liquids
TuTissue
WiWipe
LiLiquid
VeVegetation
OtOther

LABORATORY SECTION	Received By	Title S Assoc. Sci	Date/Time 12-20-06
FINAL SAMPLE DISPOSITION	Disposal Method	Disposed By	Date/Time

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

F 3175

Washington Closure Hanford	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST	RC-080-5	Page 1 of 1

Collector B. Tiller	Company Contact Joan Kessner	Telephone No. 375-4688	Project Coordinator KESSNER, JH	Price Code 8N	Data Turnaround 45 Days
Project Designation RCBRA-Inter-Areas Shoreline Assessment - Incremental Soi	Sampling Location Riparian Site 21, 100 F Slough North		SAF No. RC-080	Air Quality ☐	
Ice Chest No.	Field Logbook No. EL-1611	COA BESBEA6520	Method of Shipment GROUND TRANSPORT		
Shipped To CH2MHill - Corvallis	Offsite Property No.		Bill of Lading/Air Bill No.		

POSSIBLE SAMPLE HAZARDS/REMARKS

Special Handling and/or Storage

Preservation	None	None									
Type of Container	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										
J13LP9	SOIL	12-19-06	1700	X	X								—1

CHAIN OF POSSESSION		Sign/Print Names	
Relinquished By/Removed From	Date/Time 8:00	Received By/Stored In	Date/Time
Elizabeth W Tipton	12-20-06	KMCKinley	12/20/06 8:00
Relinquished By/Removed From	Date/Time	Received By/Stored In	Date/Time
Relinquished By/Removed From	Date/Time	Received By/Stored In	Date/Time
Relinquished By/Removed From	Date/Time	Received By/Stored In	Date/Time
Relinquished By/Removed From	Date/Time	Received By/Stored In	Date/Time
Relinquished By/Removed From	Date/Time	Received By/Stored In	Date/Time

SPECIAL INSTRUCTIONS

(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

31719-08

Matrix *
Sa=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 Assoc. Sci	Date/Time 12-20-06
FINAL SAMPLE DISPOSITION	Disposal Method	Disposed By	Date/Time

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

F 3176

Washington Closure Hanford	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST	RC-080-28	Page 1 of 1

Collector J. Queen	Company Contact Joan Kessner	Telephone No. 375-4688	Project Coordinator KESSNER, JH
Project Designation RCBRA-Inter-Areas Shoreline Assessment - Incremental Soi	Sampling Location RCBRA R Ref 14		SAF No. RC-080
Ice Chest No.	Field Logbook No. EL-1611	COA BESBEA6520	Method of Shipment Ground Transport
Shipped To CH2MHill - Corvallis	Offsite Property No.		Bill of Lading/Air Bill No.

Price Code 8N

Air Quality ☐

Data Turnaround 45 Days

POSSIBLE SAMPLE HAZARDS/REMARKS

Special Handling and/or Storage

Preservation	None	None										
Type of Container	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									
J13NY5	SOIL	12-19-06	1911	X	X							

CHAIN OF POSSESSION		Sign/Print Names	
Relinquished By/Removed From	Date/Time 12-20-06	Received By/Stored In Kathy McKay	Date/Time 12/20/06
Relinquished By/Removed From	Date/Time	Received By/Stored In	Date/Time
Relinquished By/Removed From	Date/Time	Received By/Stored In	Date/Time
Relinquished By/Removed From	Date/Time	Received By/Stored In	Date/Time
Relinquished By/Removed From	Date/Time	Received By/Stored In	Date/Time
Relinquished By/Removed From	Date/Time	Received By/Stored In	Date/Time

SPECIAL INSTRUCTIONS

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

(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

B1T9-09

Matrix *
SeSoil
SEaSediment
SOaSolid
SlaSludge
WaWater
OaOil
AaAir
DSaDrum Solids
DLaDrum Liquids
TaTissue
WiaWipe
LaLiquid
VaVegetation
XaOther

LABORATORY SECTION	Received By	Title Assoc. Sci	Date/Time 12-20-06
FINAL SAMPLE DISPOSITION	Disposal Method	Disposed By	Date/Time

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

F 3193

Washington Closure Hanford	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST	RC-080-30	Page 1 of 1

Collector J. Queen	Company Contact Joan Kessner	Telephone No. 375-4688	Project Coordinator KESSNER, JH
Price Code 8N	Data Turnaround 45 Days	Air Quality ☐	
Project Designation RCBRA-Inter-Areas Shoreline Assessment - Incremental Soi	Sampling Location RCBRA 4a Rip		SAF No. RC-080
Ice Chest No.	Field Logbook No. EL-1611	COA BESBEA6520	Method of Shipment Ground Transport
Shipped To CH2MHill - Corvallis	Offsite Property No.		Bill of Lading/Air Bill No.

POSSIBLE SAMPLE HAZARDS/REMARKS

Special Handling and/or Storage

Preservation	None	None									
Type of Container	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										
J13NY7	SOIL	12-26-06	1300	X	X								-1

CHAIN OF POSSESSION		Sign/Print Names	
Relinquished By/Removed From Yolanda M Espy	Date/Time 12-26-06 1310	Received By/Stored In Kathy McKinley	Date/Time 12/26/06 1313
Relinquished By/Removed From	Date/Time	Received By/Stored In	Date/Time
Relinquished By/Removed From	Date/Time	Received By/Stored In	Date/Time
Relinquished By/Removed From	Date/Time	Received By/Stored In	Date/Time
Relinquished By/Removed From	Date/Time	Received By/Stored In	Date/Time
Relinquished By/Removed From	Date/Time	Received By/Stored In	Date/Time

SPECIAL INSTRUCTIONS

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

(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

B1719-10

Matrix *
Se=Soil
SE=Sediment
SO=Solid
Sl=Sludge
W = Water
O=Oil
A=Air
DS=Drum Solids
DL=Drum Liquids
Te=Tissue
Wi=Wipe
Li=Liquid
Ve=Vegetation
X=Other

LABORATORY SECTION	Received By [signature]	Title Asst. Sci	Date/Time 12-27-06
FINAL SAMPLE DISPOSITION	Disposal Method	Disposed By	Date/Time

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

G1067

Washington Closure Hanford	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST	RC-080-31	Page 1 of 1

Collector J. Queen	Company Contact Joan Kessner · Telephone No. 375-4688	Project Coordinator KESSNER, JH	Price Code 8N Air Quality ☐
Data Turnaround 45 Days			
Project Designation RCBRA-Inter-Areas Shoreline Assessment - Incremental Soi	Sampling Location RCBRA 5c Rip	SAF No. RC-080	
Ice Chest No.	Field Logbook No. EL-1611 · COA BESBEA6520	Method of Shipment Ground Transport	
Shipped To CH2MHill - Corvallis	Offsite Property No.	Bill of Lading/Air Bill No.	

POSSIBLE SAMPLE HAZARDS/REMARKS

Special Handling and/or Storage

Preservation	None	None										
Type of Container	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									
J13NY8	SOIL	1-16-07	14:00	X	X							

CHAIN OF POSSESSION	Date/Time	Sign/Print Names: Received By/Stored In	Date/Time
Relinquished By/Removed From: Ashley Wille	1425	CH2M Hill ASL	
Relinquished By/Removed From: [illegible]	1/16/07	Nancy Halbard	01/16/07 14:47
Relinquished By/Removed From	Date/Time	Received By/Stored In	Date/Time
Relinquished By/Removed From	Date/Time	Received By/Stored In	Date/Time
Relinquished By/Removed From	Date/Time	Received By/Stored In	Date/Time
Relinquished By/Removed From	Date/Time	Received By/Stored In	Date/Time

SPECIAL INSTRUCTIONS

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

(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

B1719-11

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

LABORATORY SECTION	Received By: [signature]	Title: Asst. Sci	Date/Time: 1/19/07 0820
FINAL SAMPLE DISPOSITION	Disposal Method	Disposed By	Date/Time

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