



CH2M HILL
Applied Sciences Laboratory
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Tel 541.752.4271
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May 25, 2006

ELR Consulting
2328 S. Garfield Street
Kennewick, WA 99337

RE: Laboratory Report for ELR Consulting
Applied Sciences Laboratory Reference No. F1564

Dear Emmett Richards:

On April 20, 2006, CH2M HILL Applied Sciences Laboratory received one sample with a request for analysis of selected parameters. All analyses were performed by CH2M HILL unless otherwise indicated below.

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

CH2M HILL Applied Sciences Laboratory appreciates your business and looks forward to serving your analytical needs again. If you should have any questions concerning the data, or if you need additional information, please call Mark Bos at (541) 758-0235, extension 3135.

Sincerely,

Mark Bos
Analytical Manager

Enclosures

CLIENT SAMPLE CROSS-REFERENCE

CH2M HILL Applied Sciences Laboratory Reference No. F1564

Sample ID	Client Sample ID	Date Collected	Time Collected
F156401	J11K28	04/19/2006	16:00

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CH2M HILL Laboratory Reference No. F1564

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Applied Sciences Laboratory

Organic CLP and CLP Like Data Qualifiers

- U The analyte was analyzed for, but not detected above the reported sample quantitation limit.
- J The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample.
- UJ The analyte was not detected above the reported sample quantitation limit. However, the reported quantitation limit is approximate and may or may not represent the actual limit of quantitation necessary to accurately and precisely measure the analyte in the sample.
- N The analysis indicates the presence of an analyte for which there is presumptive evidence to make a "tentative identification".
- NJ The analysis indicates the presence of an analyte that has been "tentatively identified" and the associated numerical value represents its approximate concentration.
- P The primary and confirmation analyte result recoveries do not match.
- E The analyte was positively identified; the associated numerical value exceeded the instrument calibration range.
- R The sample results are rejected due to serious deficiencies in the ability to analyze the sample and meet quality control criteria. The presence or absence of the analyte cannot be verified.

Inorganic CLP and CLP Like Data Qualifiers

- U The analyte was analyzed for, but not detected above the reported sample quantitation limit.
- B The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample.
- UJ The analyte was not detected above the reported sample quantitation limit. However, the reported quantitation limit is approximate and may or may not represent the actual limit of quantitation necessary to accurately and precisely measure the analyte in the sample.
- E The analyte was positively identified; the associated numerical value exceeded the instrument calibration range.
- N The matrix spike/matrix spike duplicate recovery for the analyte is outside of acceptance criteria—qualifier is applied to the native sample only.
- R The sample results are rejected due to serious deficiencies in the ability to analyze the sample and meet quality control criteria. The presence or absence of the analyte cannot be verified.

**AMMONIA
METHOD EPA 350.3**

**CASE NARRATIVE
AMMONIA**

Analytical Method: EPA 350.3

Batch No.: F1564

Lab Name: CH2M HILL Applied Sciences Lab

Contract #: 920842.OTC

Project Name: ELR Consulting

Prime Contractor.: _____

I. Holding Times:

All acceptance criteria were met.

II. Analysis:

A. Calibration:

All acceptance criteria were met.

B. Blanks:

All acceptance criteria were met.

C. Matrix Spike/Matrix Spike Duplicate(MS/MSD)

All analyses were performed in accordance with standard operating procedures.

D. Laboratory Control Spike(LCS)

All acceptance criteria were met.

E. Duplicate Sample(s):

All analyses were performed in accordance with standard operating procedures.

F. Analytical Exceptions:

None.

III. Sampling Equipment:

None.

IV. Documentation Exceptions:

None

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

Reported by: *Deborah W. Tapp*

Date: 5-24-06

Reviewed by: *Joseph A. Hardy*

Date: 5/25/06

**SAMPLE DATA
SUMMARY**

**QC DATA
SUMMARY**

ANIONS BY METHOD EPA300.0A

CASE NARRATIVE
ANIONS

Analytical Method: EPA300.0

Batch No.: F1564

Lab Name: CH2M HILL Applied Sciences Lab

Contract #: 920842.OTC

Base/Command: ELR Consulting

Prime Contractor.: _____

I. Holding Times:

All acceptance criteria were met.

II. Analysis:

A. Calibration:

All acceptance criteria were met.

B. Blanks:

All acceptance criteria were met.

C. Matrix Spike/Matrix Spike Duplicate Sample(s):

Samples were analyzed in accordance with SOP.

D. Laboratory Control Spike(LCS)

All acceptance criteria were met.

E. Analytical Exception:

None.

F. Other:

None.

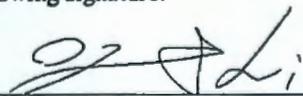
III. Sampling Equipment:

None.

IV. Documentation Exceptions:

None

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

Reported by: 

Date: 5/18/06

Reviewed by: 

Date: 5/19/06

**SAMPLE DATA
SUMMARY**

QC DATA SUMMARY

**PERCENT MOISTURE
ASTM D2216**

**PARTICLE SIZE
METHOD 422**

Hanford

Particle Size

500.0 g sample used

Weight retained is the weight of material ON each sieve

ANALYST: KRM 04/28/2006

Lab	I.D.	Client I.D.	Sieve #	Sieve Size (um)	Sieve Size (mm)	Weight Retained (g)	Weight Retained (%)	Cumulative Coarser (%)	Cumulative Finer (%)
F156401		J11K28	8	2362	2.362	0.00	0.00	0.00	100.00
			16	1180	1.180	9.20	1.85	1.85	98.15
			30	600	0.600	58.10	11.68	13.52	86.48
			50	500	0.500	162.80	32.72	46.24	53.76
			100	147	0.147	133.60	26.85	73.09	26.91
			200	75	0.075	112.20	22.55	95.64	4.36
			pan			21.70	4.36	100.00	0.00
			total			497.6			

pH
METHOD SW9045C

**TKN
METHOD EPA 351.4**

CASE NARRATIVE
TKN

Analytical Method: EPA 351.4

Batch No.: F1564

Lab Name: CH2M HILL Applied Sciences Lab

Contract #: 920842.OTC

Project Name: ELR Consulting

Prime Contractor.: _____

I. Holding Times:

All acceptance criteria were met.

II. Analysis:

A. Calibration:

All acceptance criteria were met.

B. Blanks:

All acceptance criteria were met.

C. Matrix Spike/Matrix Spike Duplicate(MS/MSD)

All analyses were performed in accordance with standard operating procedures.

D. Laboratory Control Spike(LCS)

All acceptance criteria were met.

E. Duplicate Sample(s):

All analyses were performed in accordance with standard operating procedures.

F. Analytical Exceptions:

None.

III. Sampling Equipment:

None.

IV. Documentation Exeptions:

None

V. I certify that this data package is in compliance with the terms and conditions agreed to by the elient 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: *Galeth U. Tapp*

Date: 5-24-06

Reviewed by: *Joseph A. Handy*

Date: 5/25/06

**SAMPLE DATA
SUMMARY**

**QC DATA
SUMMARY**

**TOTAL ORGANIC CARBON
BY ASTM E777**

CASE NARRATIVE
TOC SOILS

Analytical Method: ASTM E-777

Batch No.: F1564

Lab Name: CH2M HILL Applied Sciences Lab

Contract #: 920842.OTC

Project Name: ELR Consulting

Prime Contractor.: _____

I. Holding Times:

All acceptance criteria were met.

II. Analysis:

A. Calibration:

All acceptance criteria were met.

B. Blanks:

All acceptance criteria were met.

C. Matrix Spike/Matrix Spike Duplicate(MS/MSD)

All analyses were performed in accordance with standard operating procedures.

D. Laboratory Control Spike(LCS)

All acceptance criteria were met.

E. Duplicate Sample(s):

All analyses were performed in accordance with standard operating procedures.

F. Analytical Exceptions:

All acceptance criteria were met.

III. Sampling Equipment:

None.

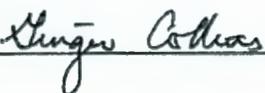
IV. Documentation Exceptions:

None

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

Reported by: 

Date: 4-25-06

Reviewed by: 

Date: 4/26/06

SAMPLE DATA SUMMARY

QC SUMMARY

CHAIN OF CUSTODY/SHIPPING DOCUMENTS

F1504-01

Washington Closure Hanford		CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST				RC-051-216		Page 1 of 1	
Collector STANKOVICH, M.		Company Contact JOAN KESSNER		Telephone No. 375-4688		Project Coordinator KESSNER, JH		Price Code 8L Data Turnaround 45 Days	
Project Designation 100 & 300 Area Component of the RCBRA - Incremental So		Sampling Location 600-132/600-190		SAF No. RC-051		Air Quality <input type="checkbox"/>			
Ice Chest No.		Field Logbook No. EL-1596-1		COA BESRAS6520		Method of Shipment GROUND TRANSPORT			
Shipped To CH2MHILL		Offsite Property No. A060151		Bill of Lading/Air Bill No. SEE OSPC					
POSSIBLE SAMPLE HAZARDS/REMARKS NONE				Preservation	None	None			
Special Handling and/or Storage Use page 3 for original material to Corvallis for MIS preparation and aliquoting, page 1 for radioanalytical fractions to Eberline, & page 2 for chemical analytical fractions to Lionville.				Type of Container	G/P	P/G			
				No. of Container(s)	1	1			
				Volume	1000g	4000g			
SAMPLE ANALYSIS				See item (1) in Special Instructions.	Soil Plant Toxicity ASTM E1963; Soil Nemode Toxicity ASTM E2172				
Sample No.	Matrix *	Sample Date	Sample Time						
J11K28	SOIL	4-19-06	16:00	1	1				
CHAIN OF POSSESSION				Sign/Print Names		SPECIAL INSTRUCTIONS			
Relinquished By/Removed From		Date/Time		Received By/Stored In		Date/Time		These marks indicate that unless lined out, analytes to be included with Strontium-89,90 -- Total Sr analysis fraction. ~ These marks indicate that this is a non-analysis used to properly format COC form. Contact Joan Kessner for any questions. (1) Particle Size (Dry Sieve) - D422; Moisture Content - D2216; TOC - 9060; pH (Soil) - 9045; Nitrogen by Kjeldahl - 351.2; Ammonia - 350.3; IC Anions - 300.0; Percent Solids	
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			
LABORATORY SECTION		Received By		Title		Date/Time		Matrix * S=Soil SS=Soilmen SO=Solid SL=Sediment W=Water O=Oil A=Air DS=Drum Solids DL=Drum Liquids T=Traces W=Wipe L=Liquid V=Vegetation X=Other	
FINAL SAMPLE DISPOSITION		Disposal Method		Disposed By		Date/Time			



Sample Receipt Record

Batch Number: F1564

Date received: 4-20-06

Client/Project ELR Consulting

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

Observation	YES	NO
Radiological Screening for AFCEE		X
Were custody seals intact and on the outside of the cooler?		HD
If yes, Where? Front Rear Lt Side Rt Side		
Type of packing material: Ice Blue Ice Bubble wrap		HD
Was the Chain of Custody inside the cooler?		HD
Was the Chain of Custody properly filled out?	X	
Were the sample containers in good condition?	X	
Containers supplied by ASL?	X	
Any sample with < 1/2 holding time remaining? If so contact LPM		X
Was there ice in the cooler? Enter temp. <u>21.2 C</u>		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)
1							N/A (soils/urpres)
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

Shirley D. Hubbard 4/24/06 10:22
Date/Time

Date/Time

ExpectedV	Units	Dilution	MDL	RL	LabQualifir	Surrogate	Comments	ParVal	Unc	Recovery	LowerCont	UpperCont	Basis	ConcQual	MDLAdjusi	RLAdjuste	SampleDe	LeachMett	LeachDate	LeachTime	LeachLot	AnalysisLo	CalRefID
	MG/KG	1	28.6	81.8		N							D	=	28.6	81.8	J11K28	NONE				SB1-0425	101405S1
	MG/KG	1	0.988	3.7	B	N							D	J	0.988	3.7	J11K28	NONE				042006NH	042006NH3
	MG/KG	1	47.3	173	B	N							D	J	47.3	173	J11K28	NONE				050506KN	050506TKN
	MG/KG	1	0.098	0.807	B	N							D	J	0.098	0.807	J11K28	NONE				042806Q3	300A-013006
	MG/KG	1	0.0876	0.807	U	N							D	U	0.0876	0.807	J11K28	NONE				042806Q3	300A-013006
	MG/KG	1	0.0757	0.807		N							D	=	0.0757	0.807	J11K28	NONE				042806Q3	300A-013006
	MG/KG	1	0.0724	0.807	B	N							D	J	0.0724	0.807	J11K28	NONE				042806Q3	300A-013006
	MG/KG	1	0.13	0.807		N							D	=	0.13	0.807	J11K28	NONE				042806Q3	300A-013006
	PERCENT	1	0			N							D	=			J11K28	NONE				042006MC	NONE
	PERCENT	1	0	0		N							D	=	0	0	J11K28	NONE				042006MC	NONE
	PH UNITS	1	0	0		N							D	=	0	0	J11K28	NONE				042406PH	NONE
20	MG/KG	1	0.534	2		N				108	75	125	D	=	0.534	2		NONE				042006NH	042006NH3
8840	MG/KG	1	56.5	162		N				103	75	125	D	=	56.5	162		NONE				SB1-0425	101405S1
50	MG/KG	1	0.121	1		N				104	90	110	D	=	0.121	1		NONE				042806Q3	300A-013006
50	MG/KG	1	0.109	1		N				103	90	110	D	=	0.109	1		NONE				042806Q3	300A-013006
50	MG/KG	1	0.161	1		N				103	90	110	D	=	0.161	1		NONE				042806Q3	300A-013006
1420	MG/KG	2	54.5	200		N				108	75	125	D	=	54.5	200		NONE				050506KN	050506TKN
11.3	MG/KG	1	0.0898	1		N				104	90	110	D	=	0.0898	1		NONE				042806Q3	300A-013006
71.9	MG/KG	1	0.0939	1		N				101	90	110	D	=	0.0939	1		NONE				042806Q3	300A-013006
0	MG/KG	1	0.534	2	B	N							D	J	0.534	2		NONE				042006NH	042006NH3
0	MG/KG	1	35	100	U	N							D	U	35	100		NONE				SB1-0425	101405S1
0	MG/KG	1	0.121	1	B	N							D	J	0.121	1		NONE				042806Q3	300A-013006
0	MG/KG	1	0.109	1	U	N							D	U	0.109	1		NONE				042806Q3	300A-013006
0	MG/KG	1	0.0939	1	U	N							D	U	0.0939	1		NONE				042806Q3	300A-013006
0	MG/KG	1	0.0898	1	U	N							D	U	0.0898	1		NONE				042806Q3	300A-013006
0	MG/KG	1	0.161	1	B	N							D	J	0.161	1		NONE				042806Q3	300A-013006
0	MG/KG	1	27.3	100	B	N							D	J	27.3	100		NONE				050506KN	050506TKN

Version	Co	LabName	SDG	FieldID	NativeID	QAQCTyp	LRTYPE	Matrix	LabSampl	AnalysisM	Extraction	SampleDa	SampleTin	ReceiveDa	ExtractDat	ExtractTim	AnalysisDe	AnalysisTi	PercentSo	LabLotClt	CAS	ParamID	Analyte	Result	
4.00	EPAC	CHMC	F1564	J11K28	J11K28	N		SOIL	F156401	ASTM E77	NONE	4/19/2006	16:00	4/20/2006			4/25/2006	14:37	99.64		TOC	TOC	Total Orga	1880	
4.00	EPAC	CHMC	F1564	J11K28	J11K28	N		SOIL	F156401	E350.3	METHOD	4/19/2006	16:00	4/20/2006	4/20/2006	13:28	4/20/2006	13:28	99.64	SB1-0420	7664-41-7	NH3N	Ammonia-I	2.36	
4.00	EPAC	CHMC	F1564	J11K28	J11K28	N		SOIL	F156401	E351.4	METHOD	4/19/2006	16:00	4/20/2006	5/5/2006	11:36	5/5/2006	11:36	99.64	SB1-0505	7727-37-9	KN	Total Kjeld	108	
4.00	EPAC	CHMC	F1564	J11K28	J11K28	N		SOIL	F156401	E300.0A	METHOD	4/19/2006	16:00	4/20/2006	4/28/2006	12:39	4/28/2006	12:39	99.64	SB1-0428	16887-00-I	CL	Chloride	0.283	
4.00	EPAC	CHMC	F1564	J11K28	J11K28	N		SOIL	F156401	E300.0A	METHOD	4/19/2006	16:00	4/20/2006	4/28/2006	12:39	4/28/2006	12:39	99.64	SB1-0428	16984-48-I	F	Fluoride	0.807	
4.00	EPAC	CHMC	F1564	J11K28	J11K28	N		SOIL	F156401	E300.0A	METHOD	4/19/2006	16:00	4/20/2006	4/28/2006	12:39	4/28/2006	12:39	99.64	SB1-0428	14797-55-I	NO3N	Nitrate-N	0.818	
4.00	EPAC	CHMC	F1564	J11K28	J11K28	N		SOIL	F156401	E300.0A	METHOD	4/19/2006	16:00	4/20/2006	4/28/2006	12:39	4/28/2006	12:39	99.64	SB1-0428	14797-65-I	NO2N	Nitrite-N	0.462	
4.00	EPAC	CHMC	F1564	J11K28	J11K28	N		SOIL	F156401	E300.0A	METHOD	4/19/2006	16:00	4/20/2006	4/28/2006	12:39	4/28/2006	12:39	99.64	SB1-0428	14808-79-I	SO4	Sulfate	1.26	
4.00	EPAC	CHMC	F1564	J11K28	J11K28	N		SOIL	F156401	E160.1	NONE	4/19/2006	16:00	4/20/2006			4/20/2006	12:59	99.64		MOISTURI	MOIST	Moisture	0.361	
4.00	EPAC	CHMC	F1564	J11K28	J11K28	N		SOIL	F156401	ASTM D22	NONE	4/19/2006	16:00	4/20/2006			4/20/2006	12:59	99.64		MOISTURI	MOIST	Moisture	0.361	
4.00	EPAC	CHMC	F1564	J11K28	J11K28	N		SOIL	F156401	SW9045C	METHOD	4/19/2006	16:00	4/20/2006	4/24/2006	14:12	4/24/2006	14:12	99.64	SB1-0424		pH	PH	pH	8.17
4.00	EPAC	CHMC	F1564	BS1S0420	BS1S0420	BS		SOIL	BS1S0420	E350.3	METHOD				4/20/2006	11:19	4/20/2006	11:19	100	SB1-0420	7664-41-7	NH3N	Ammonia-I	21.6	
4.00	EPAC	CHMC	F1564	BS1S0425	BS1S0425	BS		SOIL	BS1S0425	ASTM E77	NONE						4/25/2006	11:11	100		TOC	TOC	Total Orga	9120	
4.00	EPAC	CHMC	F1564	BS1S0428	BS1S0428	BS		SOIL	BS1S0428	E300.0A	METHOD				4/28/2006	10:57	4/28/2006	10:57	100	SB1-0428	16887-00-I	CL	Chloride	52	
4.00	EPAC	CHMC	F1564	BS1S0428	BS1S0428	BS		SOIL	BS1S0428	E300.0A	METHOD				4/28/2006	10:57	4/28/2006	10:57	100	SB1-0428	16984-48-I	F	Fluoride	51.5	
4.00	EPAC	CHMC	F1564	BS1S0428	BS1S0428	BS		SOIL	BS1S0428	E300.0A	METHOD				4/28/2006	10:57	4/28/2006	10:57	100	SB1-0428	14808-79-I	SO4	Sulfate	51.6	
4.00	EPAC	CHMC	F1564	BS1S0505	BS1S0505	BS		SOIL	BS1S0505	E351.4	METHOD				5/5/2006	11:29	5/5/2006	11:29	100	SB1-0505	7727-37-9	KN	Total Kjeld	1530	
4.00	EPAC	CHMC	F1564	BS2S0428	BS2S0428	BS		SOIL	BS2S0428	E300.0A	METHOD				4/28/2006	11:16	4/28/2006	11:16	100	SB1-0428	14797-65-I	NO2N	Nitrite-N	11.8	
4.00	EPAC	CHMC	F1564	BS3S0428	BS3S0428	BS		SOIL	BS3S0428	E300.0A	METHOD				4/28/2006	11:26	4/28/2006	11:26	100	SB1-0428	14797-55-I	NO3N	Nitrate-N	72.9	
4.00	EPAC	CHMC	F1564	SB1-0420	SB1-0420	LB		SOIL	SB1-0420	E350.3	METHOD				4/20/2006	11:22	4/20/2006	11:22	100	SB1-0420	7664-41-7	NH3N	Ammonia-I	1.64	
4.00	EPAC	CHMC	F1564	SB1-0425	SB1-0425	LB		SOIL	SB1-0425	ASTM E77	NONE						4/25/2006	11:21	100		TOC	TOC	Total Orga	100	
4.00	EPAC	CHMC	F1564	SB1-0428	SB1-0428	LB		SOIL	SB1-0428	E300.0A	METHOD				4/28/2006	11:36	4/28/2006	11:36	100	SB1-0428	16887-00-I	CL	Chloride	0.21	
4.00	EPAC	CHMC	F1564	SB1-0428	SB1-0428	LB		SOIL	SB1-0428	E300.0A	METHOD				4/28/2006	11:36	4/28/2006	11:36	100	SB1-0428	16984-48-I	F	Fluoride	1	
4.00	EPAC	CHMC	F1564	SB1-0428	SB1-0428	LB		SOIL	SB1-0428	E300.0A	METHOD				4/28/2006	11:36	4/28/2006	11:36	100	SB1-0428	14797-55-I	NO3N	Nitrate-N	1	
4.00	EPAC	CHMC	F1564	SB1-0428	SB1-0428	LB		SOIL	SB1-0428	E300.0A	METHOD				4/28/2006	11:36	4/28/2006	11:36	100	SB1-0428	14797-65-I	NO2N	Nitrite-N	1	
4.00	EPAC	CHMC	F1564	SB1-0428	SB1-0428	LB		SOIL	SB1-0428	E300.0A	METHOD				4/28/2006	11:36	4/28/2006	11:36	100	SB1-0428	14808-79-I	SO4	Sulfate	0.38	
4.00	EPAC	CHMC	F1564	SB1-0505	SB1-0505	LB		SOIL	SB1-0505	E351.4	METHOD				5/5/2006	11:29	5/5/2006	11:29	100	SB1-0505	7727-37-9	KN	Total Kjeld	61.3	



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

Prepared for

ELR CONSULTING, INC.
WASHINGTON CLOSURE HANFORD

Prepared by

CH2M HILL
2300 NW Walnut Boulevard
Corvallis, Oregon 97330

June 12, 2006
Lab I.D. Nos. BG1575-01 thru 11
SDG Number BG1575

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APPENDIX A. RAW DATA SHEETS

APPENDIX B. CHAIN OF CUSTODY

INTRODUCTION

CH2M HILL conducted chronic screening bioassay tests using the Sandberg bluegrass (*Poa sandbergii*) on soil samples provided by the ELR Consulting for Washington Closure Hanford, Richland, Washington. The tests were conducted from April 26 through May 31, 2006.

METHODS AND MATERIALS

TEST METHODS

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

TEST ORGANISMS

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

CONTROL SOIL

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

HYDRATION WATER

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

TEST CONCENTRATIONS

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

SAMPLE COLLECTION

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

SAMPLE CROSS-REFERENCE TABLE

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

Table 1				
Sample Cross-Reference				
Client ID	Sample Date	Sample Location	Bluegrass test SDG	Analytical Lab SDG
J11JB4	04/05/2006	100-H RIPARIAN #1	BG1575-01	F1493
J11JB5	04/09/2006	100-D RIPARIAN #2	BG1575-02	F1508
J11JH6	04/10/2006	100-H RIAPRIAN #9	BG1575-03	F1514
J11JJ0	04/11/2006	UPPER RIPARIAN #16	BG1575-04	F1518
J11JH9	04/12/2006	UPPER RIPARIAN #14	BG1575-05	F1522
J11JB6	04/17/2006	300-A RIPARIAN #6	BG1575-06	F1548
J11K34	04/18/2006	600--139	BG1575-07	F1556
J11K28	04/19/2006	600-132/600-190	BG1575-08	F1564
J11K61	04/24/2006	628-1	BG1575-09	F1586
J11K40	04/24/2006	600--204	BG1575-10	F1588
J11JX6	04/25/2006	300-49	BG1575-11	F1600

SAMPLE PREPARATION

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

TEST INITIATION

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

TEST MONITORING

According to information provided by the seed supplier, germination should take place between 14 and 28 days. The number of seeds in each test chamber that germinated was recorded on days 14, 16, 19, 21, and 23. Germination was determined to have occurred on day 21.

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

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

TEST TERMINATION

Tests were terminated 14 days post germination (day 35 after planting). The number of seedlings, shoot appearance and height (tallest shoot of each plant), and root appearance and length (longest recovered root of each plant) was recorded.

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

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

DATA ANALYSIS

For each test chamber, the following endpoints were calculated:

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

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

RESULTS AND DISCUSSION

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

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

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

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

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

The results for sample J11JH9 indicated no statistically significant reduction when compared to the laboratory control.

The results for sample J11JB6 indicated no statistically significant reduction when compared to the laboratory control.

The results for sample J11JK34 indicated a statistically significant reduction in average above ground shoot mass (wet), average above ground shoot mass (dry), average root mass (wet), average root mass (dry), average total mass (shoots + roots, wet), and average total mass (shoots + roots, dry) when compared to the laboratory control.

The results for sample J11JK28 indicated a statistically significant reduction in 14 day germination, average 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 samples J11K61, J11K40, and J11JX6 indicated no statistically significant reduction when compared to the laboratory control.

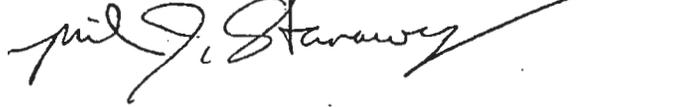
Table 2: Bluegrass Chronic Test Results for Washington Closure Hanford

E, statistically significant difference from lab control by use of Equal Variance t Two-Sample Test. ; W, statistically significant difference from lab control by use of Wilcoxon Rank Sum Two-Sample Test.
 ns indicates a non statistically significant result; ^s, indicates statistically significant at alpha (p) = 0.05; --, indicates no statistical test performed.

Lab ID: Sample Number:	Bluegrass 14 day Germination Endpoint (%)	Significantly different compared to Lab Control?	Bluegrass Average Stem Height (mm)	Significantly different compared to Lab Control?	Bluegrass Average Root Length (mm)	Significantly different compared to Lab Control?	Average Above Ground Shoot Mass (Wet) (mg)	Significantly different compared to Lab Control?	Average Above Ground Shoot Mass (Dry) (mg)	Significantly different compared to Lab Control?	Average Root Mass (Wet) (mg)	Significantly different compared to Lab Control?	Average Root Mass (Dry) (mg)	Significantly different compared to Lab Control?	Average Total Mass (Shoots + Roots) (Wet) (mg)	Significantly different compared to Lab Control?	Average Total Mass (Shoots + Roots) (Dry) (mg)	Significantly different compared to Lab Control?
Tests Initiated on April 26, 2006																		
Laboratory Control	88	--	21.7	--	26.2	--	34.2	--	8.05	--	36.2	--	1.54	--	70.4	--	7.59	--
BG1575-01 J11J84	84	ns	17.8	ns	18.8	E ^s	27.0	ns	4.22	ns	29.2	ns	0.87	ns	58.2	ns	5.00	E ^s
BG1575-02 J11J85	92	ns	16.8	ns	13.8	E ^s	30.4	ns	4.80	ns	29.2	ns	1.88	ns	59.6	ns	6.88	ns
BG1575-03 J11J48	92	ns	16.7	ns	17.4	E ^s	27.2	ns	4.53	ns	38.3	ns	1.79	ns	65.5	ns	6.31	ns
BG1575-04 J11JJ0	96	ns	12.8	E ^s	15.0	W ^s	25.8	ns	3.55	E ^s	33.0	ns	1.82	ns	58.8	ns	5.47	ns
BG1575-05 J11J19	78	ns	19.1	ns	19.1	ns	28.4	ns	4.72	ns	48.5	ns	2.15	ns	74.9	ns	6.88	ns
BG1575-06 J11J86	80	ns	21.5	ns	18.0	ns	35.5	ns	5.04	ns	45.4	ns	1.81	ns	60.9	ns	6.85	ns
BG1575-07 J11K34	72	ns	27.8	ns	25.9	ns	16.8	E ^s	2.94	E ^s	14.4	E ^s	0.50	E ^s	31.2	E ^s	3.44	E ^s
BG1575-08 J11K28	44	E ^s	43.1	ns	41.8	ns	13.3	E ^s	2.83	E ^s	9.1	E ^s	0.70	E ^s	22.4	E ^s	3.33	E ^s
BG1575-09 J11K61	80	ns	27.9	ns	25.5	ns	34.4	ns	5.76	ns	39.1	ns	1.24	ns	73.5	ns	6.99	ns
BG1575-10 J11K40	80	ns	22.8	ns	21.3	ns	36.7	ns	6.31	ns	34.7	ns	1.87	ns	71.4	ns	6.98	ns
BG1575-11 J11JX8	68	ns	34.0	ns	42.9	ns	27.1	ns	4.84	ns	36.7	ns	1.80	ns	63.8	ns	6.44	ns

CERTIFICATION STATEMENT

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

A handwritten signature in black ink, appearing to read "Paul J. Starawey". The signature is written in a cursive style with a long, sweeping underline that extends to the right.

**APPENDIX A
RAW DATA SHEETS**

BLUEGRASS GROWTH TEST

Client: Washington Closure Hanford Project

Test Start Date: 4-26-06

Initials:

Day 0 10/3/06 Day 12 _____ Day 14 NJ Day 16 NJ Day 18 (P) Day 21 NJ Day 23 NJ Day 28 (P) Day 35 31

Sample ID: Lab Control (70% 70 grade silica sand, 20% clay, 10% peat)												
CONC.	REPLICATE	# seeds germinated							pH			
		Emergence							7-DAYS POST-EMERGENCE (28 days after planting)	14-DAYS POST-EMERGENCE (35 days after planting)	INITIAL (at planting)	FINAL (at 14 days Post-Emergence)
		12 days after planting	14 days after planting	16 days after planting	19 days after planting	21 days after planting	23 days after planting	25 days after planting				
Control	A		6	6	7	8	8	5	5	6.2	7.5	
	B		5	5	5	5	5	5	5			
	C		4	4	4	4	4	4	2L, 2 dead			
	D		5	6	6	6	6	5	5			
	E		7	7	8	8	8	5	5			

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

Replicate A: 2lg G, 3sm mdG Removed 3sm G - w/ 1 B tip
 Replicate B: 4lg G, 1 mdG
 Replicate C: 1lg G, 1sm G, 2sm B
 Replicate D: 3lg G, 2 mdG Removed 1sm B
 Replicate E: 5lg G Removed 2lg G + 1 mdG

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

14-Days Post-Emergence: Describe shoot appearance:

Replicate A: 1 md G, 4 mb w/ 1 B shoot.
 Replicate B: 1 Lg w/ 1 B shoot, 2 med G, 2 med w/ 1 B shoot.
 Replicate C: 1 Lg w/ 1 B shoot, 1 med G, 2 Sm dead - removed
 Replicate D: 2 md G, 2 md w/ 1 B shoot.
 Replicate E: 2 Lg G, 2 Lg G w/ 1 B shoot each.

Measure Shoot Height:

Individual height of each seedling (above ground)	1st Seedling	2nd Seedling	3rd Seedling	4th Seedling	5th Seedling
Replicate A	31 mm	70 mm	70 mm	100 mm	72 mm
Replicate B	120 mm	85 mm	75 mm	85 mm	90 mm
Replicate C	45 mm	89 mm			
Replicate D	102 mm	93 mm	80 mm	81 mm	98 mm
Replicate E	110 mm	128 mm	146 mm	95 mm	98 mm

Measure Shoot Weight:

Total mass of all seedlings (above ground)	Tin Tare Wt. (mg)	Wet Wt. (mg)	Dry Wt. (mg)
Replicate A	995.35	1147.4	1018.02
Replicate B	1245.74	1411.6	1278.86
Replicate C	1257.58	1297.5	1265.85
Replicate D	1252.12	1423.3	1283.56
Replicate E	1237.76	1503.8	1283.56
			1281.17

Describe root appearance:

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

Measure Root Length:

Individual length of the longest root from each seedling	1st Seedling	2nd Seedling	3rd Seedling	4th Seedling	5th Seedling
Replicate A	136 mm	97 mm	121 mm	82 mm	78 mm
Replicate B	153 mm	76 mm	120 mm	110 mm	113 mm
Replicate C	134 mm	31 mm			
Replicate D	113 mm	112 mm	108 mm	105 mm	122 mm
Replicate E	149 mm	120 mm	94 mm	128 mm	109 mm

Measure Root Weight:

Total mass of all roots from all seedlings	Tin Tare Wt. (mg)	Wet Wt. (mg)	Dry Wt. (mg)
Replicate A	979.16	1145.8	985.50
Replicate B	1246.64	1451.3	1255.08
Replicate C	1246.62	1273.8	1248.49
Replicate D	1239.77	1381.3	1245.32
Replicate E	1250.73	1515.7	1263.82

Comments:

BLUEGRASS GROWTH TEST

Client: Washington Closure Hanford Project

Test Start Date: 11-26-06 DW

Initials: (Signature) Day 0 (Signature) Day 12 _____ Day 14 NJ Day 16 NJ Day 19 TP Day 21 NO Day 23 NJ Day 25 NJ Day 27 (Signature)

Bloassay Lab ID: BG 1575-01		Sample No: J11JB4								pH	
CONC.	REPLICATE	# seeds germinated							INITIAL (@ planting)	FINAL (@ 14 days Post-Emergence)	
		Emergence					7-DAYS POST-EMERGENCE (28 days after planting)	14-DAYS POST-EMERGENCE (35 days after planting)			
		12 days after planting	14 days after planting	16 days after planting	18 days after planting	21 days after planting	23 days after planting				
Control	A		3	3	4	4	4	4	4	6.2	7.3
	B		2	2	3	3	3	3	3		
	C		2	3	4	6	6	5	5		
	D		1	2	3	4	4	4	4		
	E		2	3	4	4	5	5	5		

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

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

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

14-Days Post-Emergence: Describe shoot appearance:

Replicate A: 1 md G, 3 md w/ B tips
 Replicate B: 2 lg G, 1 sm G
 Replicate C: 2 lg G, 1 md G, 2 sm G
 Replicate D: 2 md G, 2 sm G
 Replicate E: 1 md G, 1 md w/ 1 B shoot, 3 sm G

Measure Shoot Height:

Individual height of each seedling (above ground)

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

Measure Shoot Weight:

Total mass of all seedlings (above ground)

992.17

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

Describe root appearance:

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

Measure Root Length:

Individual length of the longest root from each seedling

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

Measure Root Weight:

Total mass of all roots from all seedlings

1001.15

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

Comments:

Report Date: 05 Jun-06 11:54 AM
 Test Link: 01-5490-7432/B157501psc

CETIS Test Summary

Plant Chronic test		CH2M Hill				
Test No: 15-9699-0343	Test Type: Plant Chronic test	Duration: N/A				
Start Date: 26 Apr-06	Protocol: ASTM E1963-02 (2002)	Species: Poa sandbergii				
Ending Date:	Dil Water:	Source:				
Setup Date: 26 Apr-06	Brine:					
Sample No: 16-5207-3918	Code: B1574-01	Client:				
Sample Date: 07 Apr-06	Material: Soil	Project:				
Receive Date:	Source: Hanford					
Sample Age: 19d 0h	Station:					
Comments: J11JB4						
Comparison Summary						
Analysis	Endpoint	NOEL	LOEL	ChV	PMSD	Method
00-4445-8819	% Germination	100	> 100	N/A	28.11%	Wilcoxon Rank Sum Two-Sample
05-4687-7944	AG Average Dry Wt.	100	> 100	N/A	38.17%	Equal Variance t Two-Sample
09-9360-9499	AG Average Height	100	> 100	N/A	41.18%	Equal Variance t Two-Sample
03-4688-6730	AG Average Wet Wt.	100	> 100	N/A	36.98%	Equal Variance t Two-Sample
03-4734-7130	Root Average Dry Wt.	100	> 100	N/A	62.26%	Equal Variance t Two-Sample
19-4429-6604	Root Average Length	< 100	100	N/A	34.73%	Equal Variance t Two-Sample
20-1135-4620	Root Average Wet Wt.	100	> 100	N/A	49.20%	Equal Variance t Two-Sample
10-7667-2564	Total Average Biomass Dry	< 100	100	N/A	32.75%	Equal Variance t Two-Sample
11-2543-1866	Total Average Biomass Wet	100	> 100	N/A	42.48%	Equal Variance t Two-Sample

Report Date:

05 Jun-06 11:54 AM

Test Link:

01-5490-7432/B157501psc

CETIS Test Summary

% Germination Summary								
Conc-%	Control Type	Reps	Mean	Minimum	Maximum	SE	SD	CV
0	Artificial Soil/S	5	0.88000	0.40000	1.00000	0.12000	0.26833	30.49%
100		5	0.84000	0.60000	1.00000	0.07483	0.16733	19.92%
AG Average Dry Wt. Summary								
Conc-%	Control Type	Reps	Mean	Minimum	Maximum	SE	SD	CV
0	Artificial Soil/S	5	6.05361	4.14001	8.68201	0.81424	1.82070	30.08%
100		5	4.32376	1.96750	7.57001	0.93855	2.09867	48.54%
AG Average Height Summary								
Conc-%	Control Type	Reps	Mean	Minimum	Maximum	SE	SD	CV
0	Artificial Soil/S	5	21.74	15.8	33.5	3.1641	7.0752	32.54%
100		5	17.767	9.8	30.333	3.6288	8.1143	45.67%
AG Average Wet Wt. Summary								
Conc-%	Control Type	Reps	Mean	Minimum	Maximum	SE	SD	CV
0	Artificial Soil/S	5	34.197	19.960	53.208	5.3829	12.036	35.20%
100		5	27.049	13.257	37.482	4.156	9.2931	34.36%
Root Average Dry Wt. Summary								
Conc-%	Control Type	Reps	Mean	Minimum	Maximum	SE	SD	CV
0	Artificial Soil/S	5	1.53579	0.93500	2.67798	0.31159	0.69673	45.37%
100		5	0.67341	-0.8425	1.60002	0.40906	0.91468	135.83
Root Average Length Summary								
Conc-%	Control Type	Reps	Mean	Minimum	Maximum	SE	SD	CV
0	Artificial Soil/S	5	26.16	20.6	41	3.7499	8.385	32.05%
100		5	16.813	10.4	27.667	3.1328	7.0052	41.66%
Root Average Wet Wt. Summary								
Conc-%	Control Type	Reps	Mean	Minimum	Maximum	SE	SD	CV
0	Artificial Soil/S	5	36.242	13.590	65.054	8.4756	18.952	52.29%
100		5	29.183	14.135	38.110	4.4846	10.028	34.36%
Total Average Biomass Dry Wt. Summary								
Conc-%	Control Type	Reps	Mean	Minimum	Maximum	SE	SD	CV
0	Artificial Soil/S	5	7.5894	5.0750	11.36	1.1021	2.4644	32.47%
100		5	4.9972	2.615	6.7275	0.7566	1.6917	33.85%
Total Average Biomass Wet Wt. Summary								
Conc-%	Control Type	Reps	Mean	Minimum	Maximum	SE	SD	CV
0	Artificial Soil/S	5	70.439	33.550	118.26	13.727	30.694	43.58%
100		5	56.231	27.392	74.545	8.3953	18.772	33.38%

CETIS Test Summary

% Germination Detail						
Conc-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Artificial Soil/S	1.00000	1.00000	0.40000	1.00000	1.00000
100		0.80000	0.60000	1.00000	0.80000	1.00000
AG Average Dry Wt. Detail						
Conc-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Artificial Soil/S	4.53401	6.62400	4.14001	6.28801	8.68201
100		7.57001	4.93331	3.70000	1.96750	3.44800
AG Average Height Detail						
Conc-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Artificial Soil/S	15.8	18.2	33.5	18.2	23
100		21	30.3333	13.2	14.5	9.8
AG Average Wet Wt. Detail						
Conc-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Artificial Soil/S	30.4100	33.172	19.9600	34.2360	53.2080
100		37.4825	33.06	23.888	13.2575	27.5560
Root Average Dry Wt. Detail						
Conc-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Artificial Soil/S	1.26801	1.68799	0.93500	1.10999	2.67798
100		-0.84250	1.60002	0.97402	0.64749	0.98801
Root Average Length Detail						
Conc-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Artificial Soil/S	20.6	22.8	41	22.4	24
100		19.75	27.6667	14	12.25	10.4
Root Average Wet Wt. Detail						
Conc-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Artificial Soil/S	33.3280	40.9320	13.5900	28.3060	65.054
100		37.0625	38.1100	32.3320	14.135	24.274
Total Average Biomass Dry Wt. Detail						
Conc-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Artificial Soil/S	5.80201	8.31199	5.07501	7.398	11.36
100		6.72751	6.53333	4.67402	2.61499	4.43601
Total Average Biomass Wet Wt. Detail						
Conc-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Artificial Soil/S	63.7380	74.1040	33.5500	62.5420	118.262
100		74.5450	71.1700	56.22	27.3925	51.8300

CETIS Analysis Detail

Plant Chronic test CH2M Hill

Endpoint	Analysis Type	Sample Link	Control Link	Date Analyzed	Version
% Germination	Comparison	01-5490-7432	01-5490-7432	05 Jun-06 11:54 AM	CETISv1.1.2

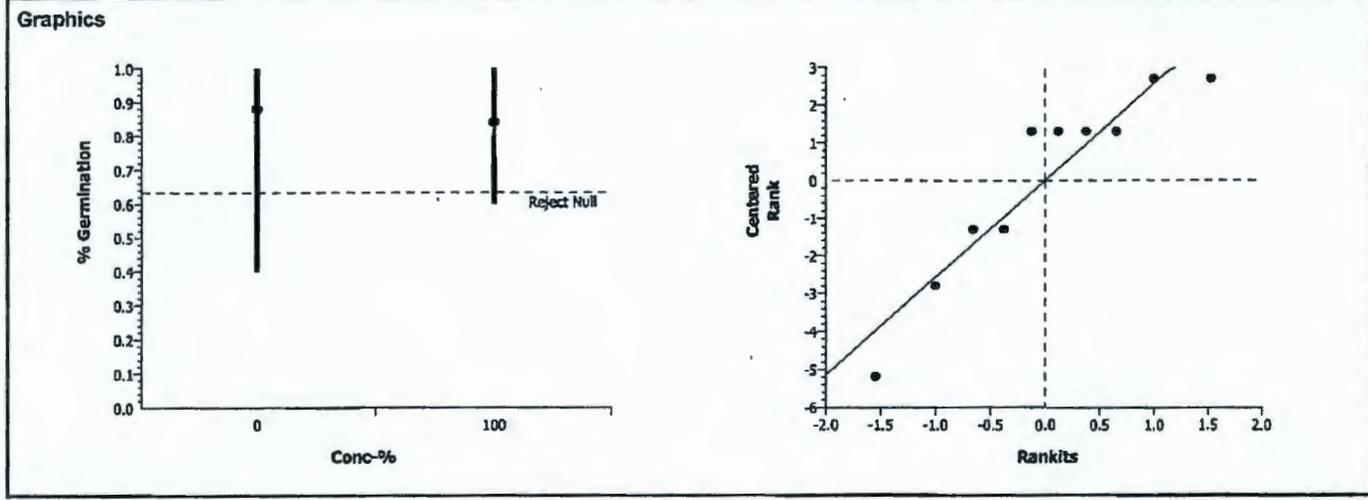
Method	Alt H	Data Transform	Zeta	NOEL	LOEL	Toxic Units	ChV	PMSD
Wilcoxon Rank Sum Two-Sample	C > T	Rank		100	>100	1	N/A	28.11%

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

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

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

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



CETIS Analysis Detail

Plant Chronic test	CH2M HILL
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Endpoint	Analysis Type	Sample Link	Control Link	Date Analyzed	Version
AG Average Dry Wt.	Comparison	01-5490-7432	01-5490-7432	05 Jun-06 11:54 AM	CETISv1.1.2

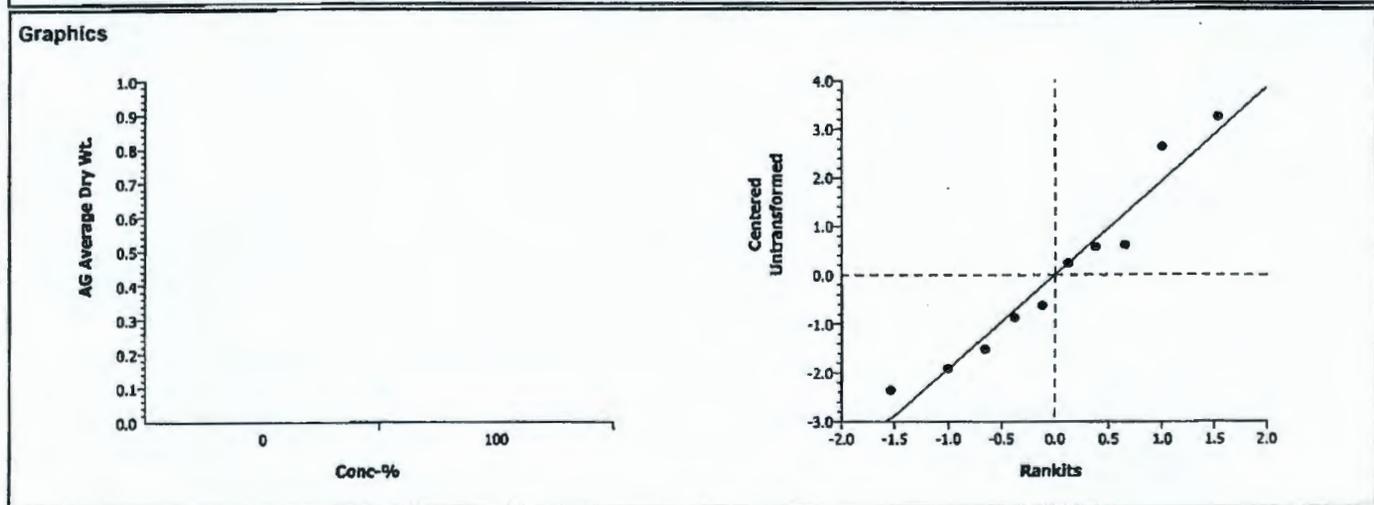
Method	Alt H	Data Transform	Zeta	NOEL	LOEL	Toxic Units	ChV	PMSD
Equal Variance t Two-Sample	C > T	Untransformed		100	>100	1	N/A	38.17%

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

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

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

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



CETIS Analysis Detail

Plant Chronic test						CH2M Hill
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Endpoint	Analysis Type	Sample Link	Control Link	Date Analyzed	Version
AG Average Height	Comparison	01-5490-7432	01-5490-7432	05 Jun-06 11:54 AM	CETISv1.1.2

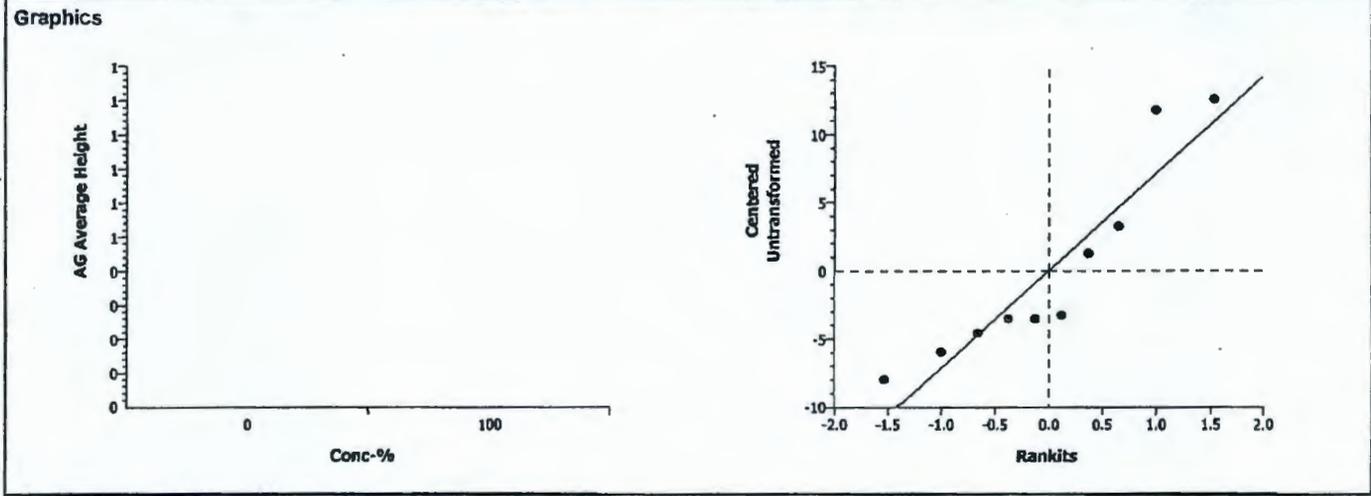
Method	Alt H	Data Transform	Zeta	NOEL	LOEL	Toxic Units	ChV	PMSD
Equal Variance t Two-Sample	C > T	Untransformed		100	>100	1	N/A	41.18%

Group Comparisons							
Control	vs	Conc-%	Statistic	Critical	P-Value	MSD	Decision(0.05)
Artificial Soil/Sedi		100	0.82527	1.85955	0.2166	8.95292	Non-Significant Effect

ANOVA Table						
Source	Sum of Squares	Mean Square	DF	F Statistic	P-Value	Decision(0.05)
Between	39.46844	39.46844	1	0.68	0.43313	Non-Significant Effect
Error	463.6009	57.95011	8			
Total	503.069336	97.418556	9			

ANOVA Assumptions					
Attribute	Test	Statistic	Critical	P-Value	Decision(0.01)
Variances	Variance Ratio F	1.31532	23.15450	0.79698	Equal Variances
Distribution	Shapiro-Wilk W	0.85209		0.06150	Normal Distribution

Data Summary			Original Data				Transformed Data			
Conc-%	Control Type	Count	Mean	Minimum	Maximum	SD	Mean	Minimum	Maximum	SD
0	Artificial Soil/S	5	21.740	15.8	33.5	7.0752				
100		5	17.767	9.8	30.333	8.1143				



CETIS Analysis Detail

Comparisons: Page 4 of 9
 Report Date: 05 Jun-06 11:54 AM
 Analysis: 03-4688-6730/B157501psc

Plant Chronic test	CH2M Hill
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Endpoint	Analysis Type	Sample Link	Control Link	Date Analyzed	Version
AG Average Wet Wt.	Comparison	01-5490-7432	01-5490-7432	05 Jun-06 11:54 AM	CETISv1.1.2

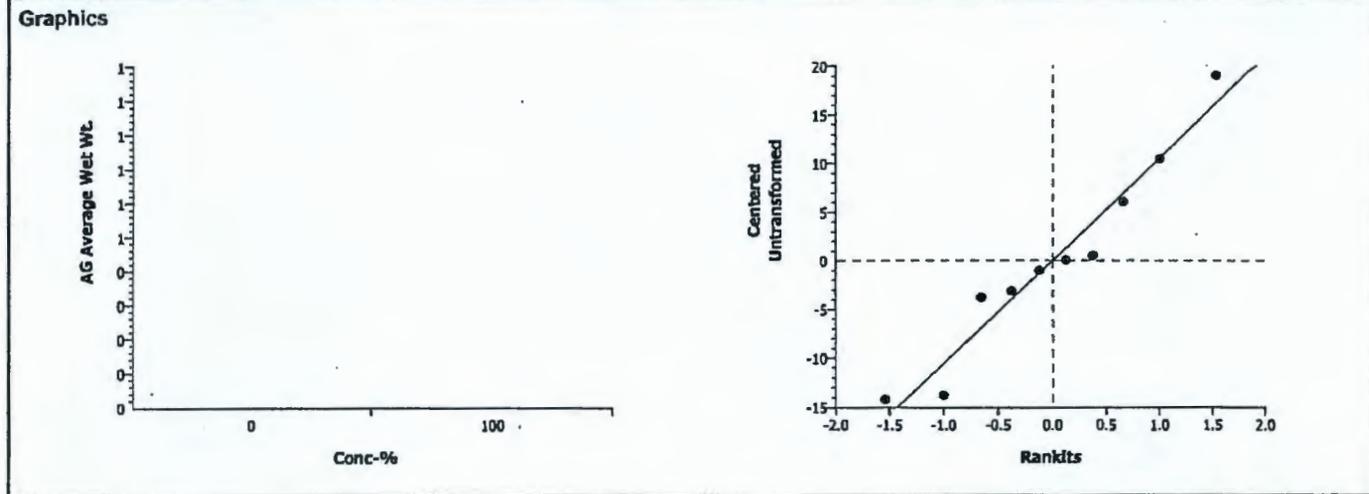
Method	Alt H	Data Transform	Zeta	NOEL	LOEL	Toxic Units	CHV	PMSD
Equal Variance t Two-Sample	C > T	Untransformed		100	>100	1	N/A	36.98%

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

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

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

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



CETIS Analysis Detail

Plant Chronic test CH2M Hill

Endpoint	Analysis Type	Sample Link	Control Link	Date Analyzed	Version
Root Average Dry Wt.	Comparison	01-5490-7432	01-5490-7432	05 Jun-06 11:54 AM	CETISv1.1.2

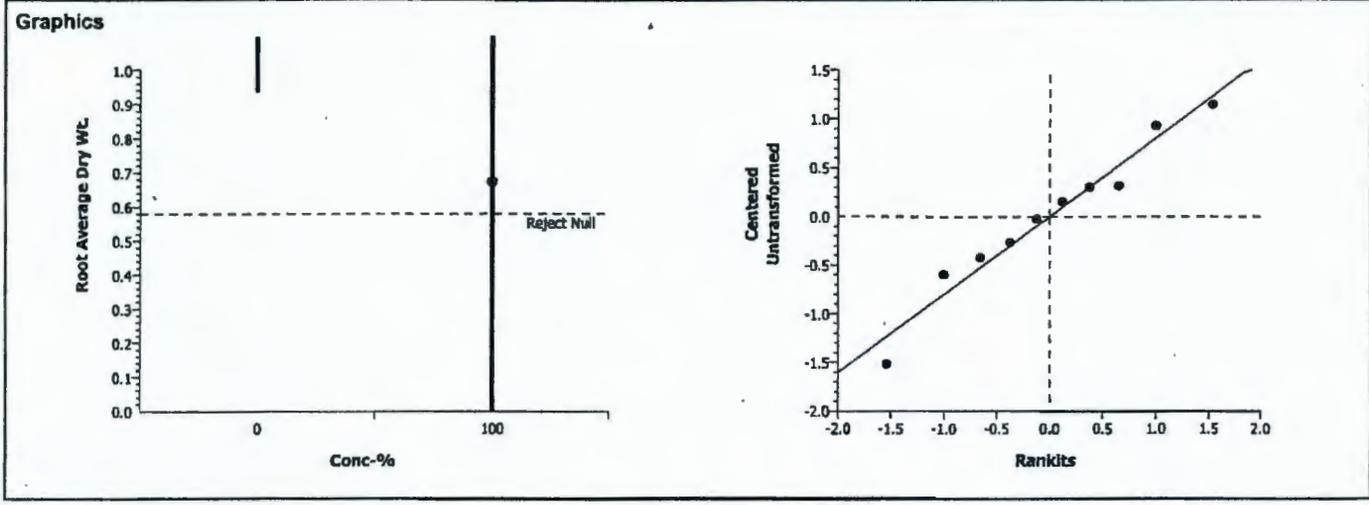
Method	Alt H	Data Transform	Zeta	NOEL	LOEL	Toxic Units	ChV	PMSD
Equal Variance t Two-Sample	C > T	Untransformed		100	>100	1	N/A	62.26%

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

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

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

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



CETIS Analysis Detail

Plant Chronic test	CH2M Hill
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Endpoint	Analysis Type	Sample Link	Control Link	Date Analyzed	Version
Root Average Length	Comparison	01-5490-7432	01-5490-7432	05 Jun-06 11:54 AM	CETISv1.1.2

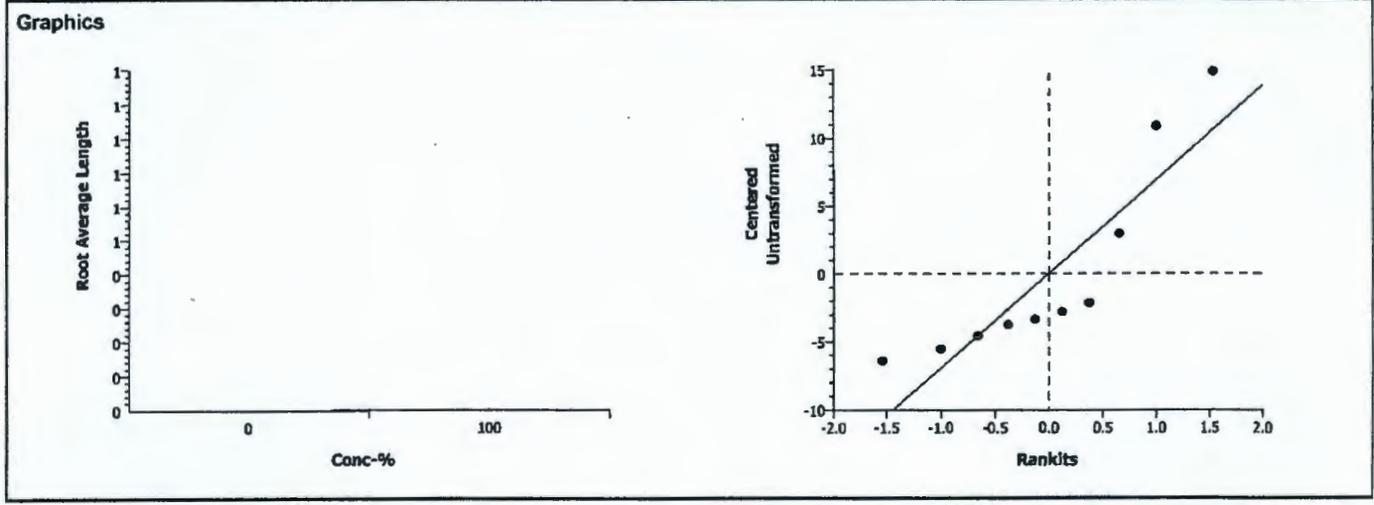
Method	Alt H	Data Transform	Zeta	NOEL	LOEL	Toxic Units	ChV	PMSD
Equal Variance t Two-Sample	C > T	Untransformed		<100	100		N/A	34.73%

Group Comparisons							
Control	vs	Conc-%	Statistic	Critical	P-Value	MSD	Decision(0.05)
Artificial Soil/Sedi		100	1.91283	1.85955	0.0461	9.08633	Significant Effect

ANOVA Table						
Source	Sum of Squares	Mean Square	DF	F Statistic	P-Value	Decision(0.05)
Between	218.4005	218.4005	1	3.66	0.09213	Non-Significant Effect
Error	477.5206	59.69007	8			
Total	695.921021	278.09052	9			

ANOVA Assumptions					
Attribute	Test	Statistic	Critical	P-Value	Decision(0.01)
Variances	Variance Ratio F	1.43275	23.15450	0.73599	Equal Variances
Distribution	Shapiro-Wilk W	0.78969		0.01086	Normal Distribution

Data Summary		Original Data					Transformed Data			
Conc-%	Control Type	Count	Mean	Minimum	Maximum	SD	Mean	Minimum	Maximum	SD
0	Artificial Soil/S	5	26.16	20.6	41	8.385				
100		5	16.813	10.4	27.667	7.0052				



CETIS Analysis Detail

Plant Chronic test	CH2M Hill
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Endpoint	Analysis Type	Sample Link	Control Link	Date Analyzed	Version
Root Average Wet Wt.	Comparison	01-5490-7432	01-5490-7432	05 Jun-06 11:54 AM	CETISv1.1.2

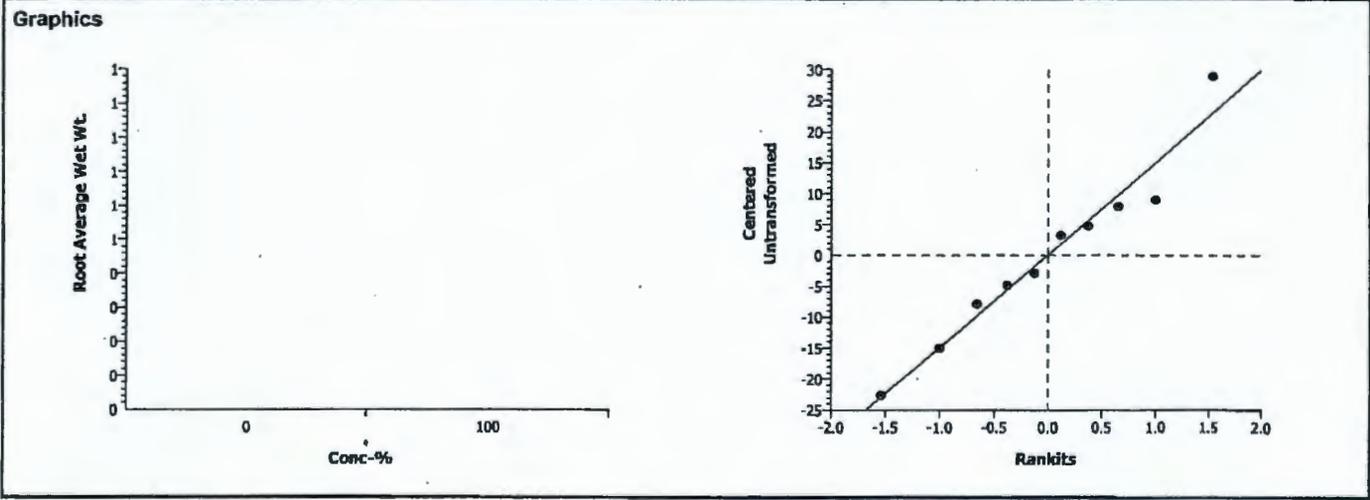
Method	Alt H	Data Transform	Zeta	NOEL	LOEL	Toxic Units	ChV	PMSD
Equal Variance t Two-Sample	C > T	Untransformed		100	>100	1	N/A	49.20%

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

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

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

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



CETIS Analysis Detail

Plant Chronic test	CH2M Hill
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Endpoint	Analysis Type	Sample Link	Control Link	Date Analyzed	Version
Total Average Biomass Dry Wt.	Comparison	01-5490-7432	01-5490-7432	05 Jun-06 11:54 AM	CETISv1.1.2

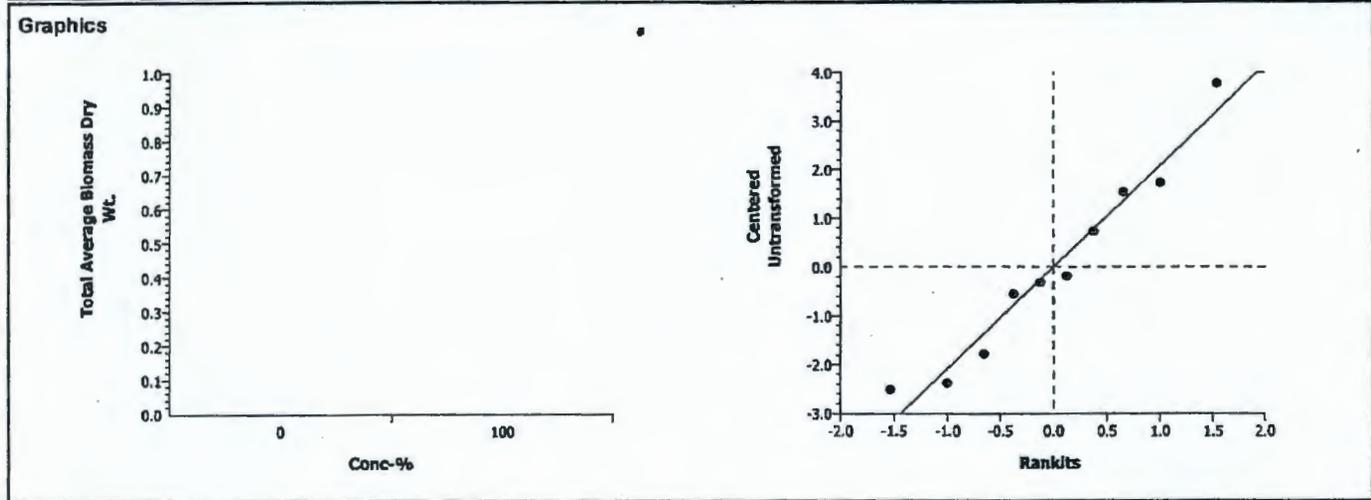
Method	Alt H	Data Transform	Zeta	NOEL	LOEL	Toxic Units	ChV	PMSD
Equal Variance t Two-Sample	C > T	Untransformed		<100	100		N/A	32.75%

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

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

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

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



CETIS Analysis Detail

Plant Chronic test CH2M Hill

Endpoint	Analysis Type	Sample Link	Control Link	Date Analyzed	Version
Total Average Biomass Wet Wt.	Comparison	01-5490-7432	01-5490-7432	05 Jun-06 11:54 AM	CETISv1.1.2

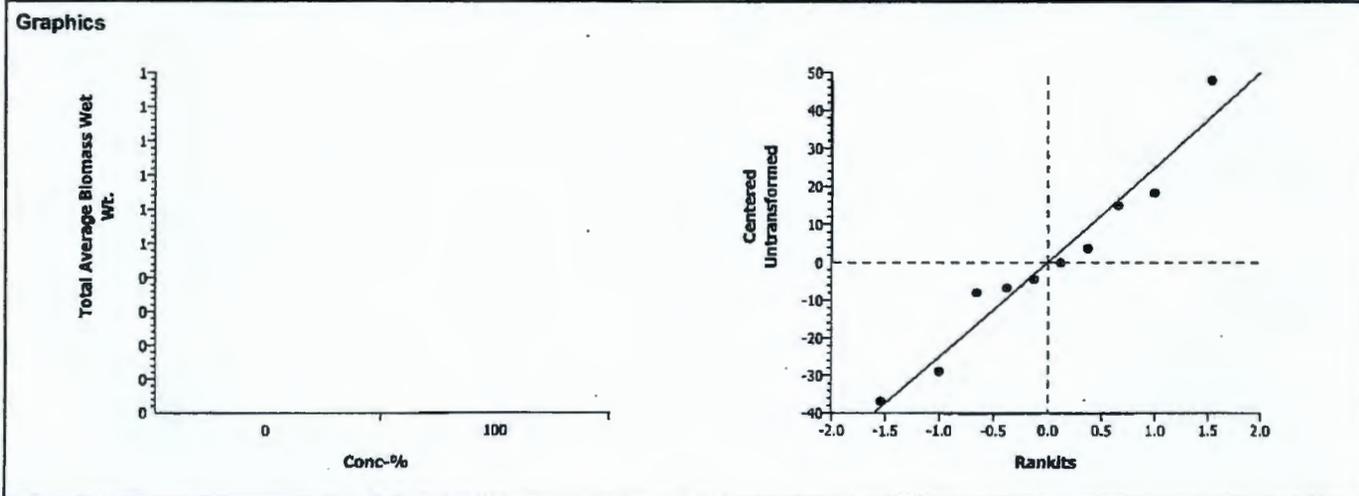
Method	Alt H	Data Transform	Zeta	NOEL	LOEL	Toxic Units	ChV	PMSD
Equal Variance t Two-Sample	C > T	Untransformed		100	>100	1	N/A	42.48%

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

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

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

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



BLUEGRASS GROWTH TEST

Client: Washington Closure Hanford Project

Test Start Date: 4-26-04

Day 0 14 Day 12 _____ Day 14 NT Day 16 NT Day 18 TP Day 21 NJ Day 23 NT Day 28 TP Day 35 NT

		Bioassay Lab ID: 8G 1575-02							Sample No: J113B5		
CONC.	REPLICATE	# seeds germinated							pH		
		12 days after planting	14 days after planting	16 days after planting	19 days after planting	21 days after planting	23 days after planting	7-DAYS POST-EMERGENCE (28 days after planting)	14-DAYS POST-EMERGENCE (35 days after planting)	INITIAL (@ planting)	FINAL (@ 14 days Post-Emergence)
Control	A		0	7	7	7	7	7 → 5	5	6.4	7.2
	B		2	3	5	5	5	5 → 5	5		
	C		1	1	2	2	4	4 → 4	4		
	D		3	4	4	5	6	6 → 5	5		
	E		NT 3	3	4	4	4	4	4		

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

Replicate A: 5 Lg (G) + med (G) w/ removed: 1 med (G) w/ 1 B shoot, 1 Small (G)
 Replicate B: 2 Lg (G) w/ B tips, 3 med (G)
 Replicate C: 3 Lg (G) w/ B tips, 1 med (G) 3 Sm (G), 1 med (G) w/ B tips
 Replicate D: 1 Lg (G), 4 Sm. 1 w/ B shoot. removed: 1 Sm (G)
 Replicate E: 3 Lg (G) w/ B tips, 1 med (G)

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

14-Days Post-Emergence: Describe shoot appearance:

Replicate A: 5 Lg (G)
 Replicate B: 2 Lg (G), 3 med (G)
 Replicate C: 1 med (G), 1 med w/ B tips, 2 Sm (G)
 Replicate D: 1 med (G), 4 med (G), 1 Sm (G) - 1 large plant (non-bluegrass, removed)
 Replicate E: 3 Lg w/ B tips, 1 med (G)

Measure Shoot Height:

Individual height of each seedling (above ground)

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

Measure Shoot Weight:

Total mass of all seedlings (above ground)

	Tin Tare WL (mg)	Wet WL (mg)	Dry WL (mg)
Replicate A	1002.78	1242.2	1042.12
Replicate B	1243.18	1405.9	1269.41
Replicate C	1250.91	1308.8	1260.20
Replicate D	1254.41	1236.8	1258.58
Replicate E	1247.05	1449.9	1277.97

Describe root appearance:

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

Measure Root Length:

Individual length of the longest root from each seedling

	1st Seedling	2nd Seedling	3rd Seedling	4th Seedling	5th Seedling
Replicate A	93 mm	84 mm	63 mm	70 mm	73 mm
Replicate B	114 mm	64 mm	96 mm	53 mm	67 mm
Replicate C	39 mm	47 mm	36 mm	71 mm	mm
Replicate D	30 mm	38 mm	31 mm	46 mm	34 mm
Replicate E	95 mm	56 mm	66 mm	94 mm	mm

Measure Root Weight:

Total mass of all roots from all seedlings

	Tin Tare WL (mg)	Wet WL (mg)	Dry WL (mg)
Replicate A	999.21	1244.1	1016.41
Replicate B	1244.66	1385.4	1255.35
Replicate C	1260.50	137.0	1264.27
Replicate D	1255.49	1287.0	1257.40
Replicate E	1254.57	1448.3	1264.16

Comments:

CETIS Test Summary

Report Date: 05 Jun-06 1:08 PM
 Test Link: 08-9288-3730/B157502psc

Plant Chronic test		CH2M HILL				
Test No:	12-3841-4549	Test Type:	Plant Chronic test	Duration:	N/A	
Start Date:	26 Apr-06	Protocol:	ASTM E1963-02 (2002)	Species:	Poa sandbergii	
Ending Date:		Dil Water:		Source:		
Setup Date:	26 Apr-06	Brine:				
Sample No:	04-4665-3490	Code:	B1574-02	Client:		
Sample Date:	10 Apr-06	Material:	Soil	Project:		
Receive Date:		Source:	Hanford			
Sample Age:	16d 0h	Station:				
Comments:	J11JB5					
Comparison Summary						
Analysis	Endpoint	NOEL	LOEL	ChV	PMSD	Method
10-6433-8072	% Germination	100	> 100	N/A	25.39%	Wilcoxon Rank Sum Two-Sample
09-0109-2012	AG Average Dry Wt.	100	> 100	N/A	50.12%	Equal Variance t Two-Sample
02-4303-2633	AG Average Height	100	> 100	N/A	38.08%	Equal Variance t Two-Sample
04-5906-2559	AG Average Wet Wt.	100	> 100	N/A	56.09%	Equal Variance t Two-Sample
03-3028-7706	Root Average Dry Wt.	100	> 100	N/A	75.69%	Equal Variance t Two-Sample
13-1608-2134	Root Average Length	< 100	100	N/A	30.35%	Equal Variance t Two-Sample
10-3116-6838	Root Average Wet Wt.	100	> 100	N/A	62.32%	Equal Variance t Two-Sample
08-8542-3021	Total Average Biomass Dry	100	> 100	N/A	54.62%	Equal Variance t Two-Sample
11-4607-5895	Total Average Biomass Wet	100	> 100	N/A	58.66%	Equal Variance t Two-Sample

Report Date:

05 Jun-06 1:08 PM

Test Link:

08-9288-3730/B157502psc

CETIS Test Summary

% Germination Summary								
Conc-%	Control Type	Reps	Mean	Minimum	Maximum	SE	SD	CV
0	Artificial Soil/S	5	0.88000	0.40000	1.00000	0.12000	0.26833	30.49%
100		5	0.92000	0.80000	1.00000	0.04899	0.10954	11.91%
AG Average Dry Wt. Summary								
Conc-%	Control Type	Reps	Mean	Minimum	Maximum	SE	SD	CV
0	Artificial Soil/S	5	6.05361	4.14001	8.68201	0.81424	1.82070	30.08%
100		5	4.80309	0.83398	7.86799	1.41403	3.16186	65.83%
AG Average Height Summary								
Conc-%	Control Type	Reps	Mean	Minimum	Maximum	SE	SD	CV
0	Artificial Soil/S	5	21.74	15.8	33.5	3.1641	7.0752	32.54%
100		5	16.83	8	26.75	3.1311	7.0014	41.60%
AG Average Wet Wt. Summary								
Conc-%	Control Type	Reps	Mean	Minimum	Maximum	SE	SD	CV
0	Artificial Soil/S	5	34.197	19.960	53.208	5.3829	12.036	35.20%
100		5	30.418	6.4780	50.712	8.8001	19.678	64.69%
Root Average Dry Wt. Summary								
Conc-%	Control Type	Reps	Mean	Minimum	Maximum	SE	SD	CV
0	Artificial Soil/S	5	1.53579	0.93500	2.67798	0.31159	0.69673	45.37%
100		5	1.85700	0.38201	3.43999	0.54189	1.21170	65.25%
Root Average Length Summary								
Conc-%	Control Type	Reps	Mean	Minimum	Maximum	SE	SD	CV
0	Artificial Soil/S	5	26.16	20.6	41	3.7499	8.385	32.05%
100		5	13.82	7.2	19.5	2.0407	4.5631	33.02%
Root Average Wet Wt. Summary								
Conc-%	Control Type	Reps	Mean	Minimum	Maximum	SE	SD	CV
0	Artificial Soil/S	5	36.242	13.590	65.054	8.4756	18.952	52.29%
100		5	29.197	6.3020	48.978	8.6998	19.453	66.63%
Total Average Biomass Dry Wt. Summary								
Conc-%	Control Type	Reps	Mean	Minimum	Maximum	SE	SD	CV
0	Artificial Soil/S	5	7.5894	5.0750	11.36	1.1021	2.4644	32.47%
100		5	6.6601	1.216	11.308	1.9379	4.3333	65.06%
Total Average Biomass Wet Wt. Summary								
Conc-%	Control Type	Reps	Mean	Minimum	Maximum	SE	SD	CV
0	Artificial Soil/S	5	70.439	33.550	118.26	13.727	30.694	43.58%
100		5	59.615	12.780	99.145	17.474	39.073	65.54%

Report Date:

05 Jun-06 1:08 PM

Test Link:

08-9288-3730/B157502psc

CETIS Test Summary

% Germination Detail						
Conc-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Artificial Soil/S	1.00000	1.00000	0.40000	1.00000	1.00000
100		1.00000	1.00000	0.80000	1.00000	0.80000
AG Average Dry Wt. Detail						
Conc-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Artificial Soil/S	4.53401	6.62400	4.14001	6.28801	8.68201
100		7.86799	5.24600	2.33749	0.83398	7.72998
AG Average Height Detail						
Conc-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Artificial Soil/S	15.8	18.2	33.5	18.2	23
100		19	17.4	13	8	26.75
AG Average Wet Wt. Detail						
Conc-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Artificial Soil/S	30.4100	33.172	19.9600	34.2360	53.2080
100		47.884	32.544	14.4725	6.47800	50.7125
Root Average Dry Wt. Detail						
Conc-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Artificial Soil/S	1.26801	1.68799	0.93500	1.10999	2.67798
100		3.43999	2.13799	0.94250	0.38201	2.38251
Root Average Length Detail						
Conc-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Artificial Soil/S	20.6	22.8	41	22.4	24
100		15.4	15	12	7.2	19.5
Root Average Wet Wt. Detail						
Conc-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Artificial Soil/S	33.3280	40.9320	13.5900	28.3060	65.054
100		48.978	28.148	14.125	6.30200	48.4325
Total Average Biomass Dry Wt. Detail						
Conc-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Artificial Soil/S	5.80201	8.31199	5.07501	7.398	11.36
100		11.308	7.38398	3.28	1.21599	10.1125
Total Average Biomass Wet Wt. Detail						
Conc-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Artificial Soil/S	63.7380	74.1040	33.5500	62.5420	118.262
100		96.862	60.692	28.5975	12.7800	99.1450

CETIS Analysis Detail

Plant Chronic test						CH2M Hill
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Endpoint	Analysis Type	Sample Link	Control Link	Date Analyzed	Version
% Germination	Comparison	08-9288-3730	08-9288-3730	05 Jun-06 1:07 PM	CETISv1.1.2

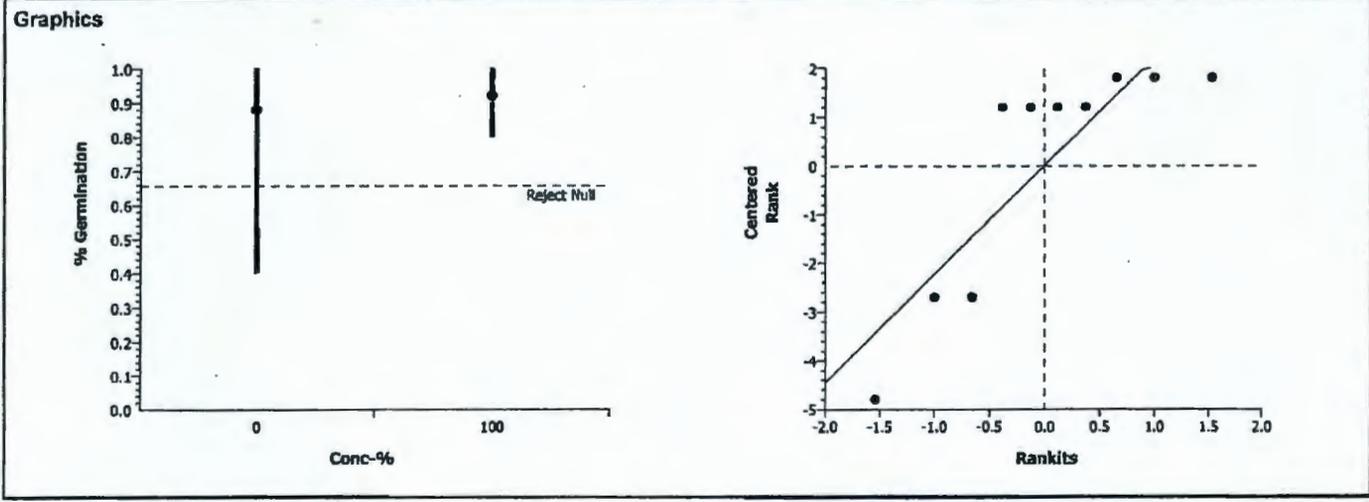
Method	Alt H	Data Transform	Zeta	NOEL	LOEL	Toxic Units	ChV	PMSD
Wilcoxon Rank Sum Two-Sample	C > T	Rank		100	>100	1	N/A	25.39%

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

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

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

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



CETIS Analysis Detail

Plant Chronic test CH2M Hill

Endpoint	Analysis Type	Sample Link	Control Link	Date Analyzed	Version
AG Average Dry Wt.	Comparison	08-9288-3730	08-9288-3730	05 Jun-06 1:07 PM	CETISv1.1.2

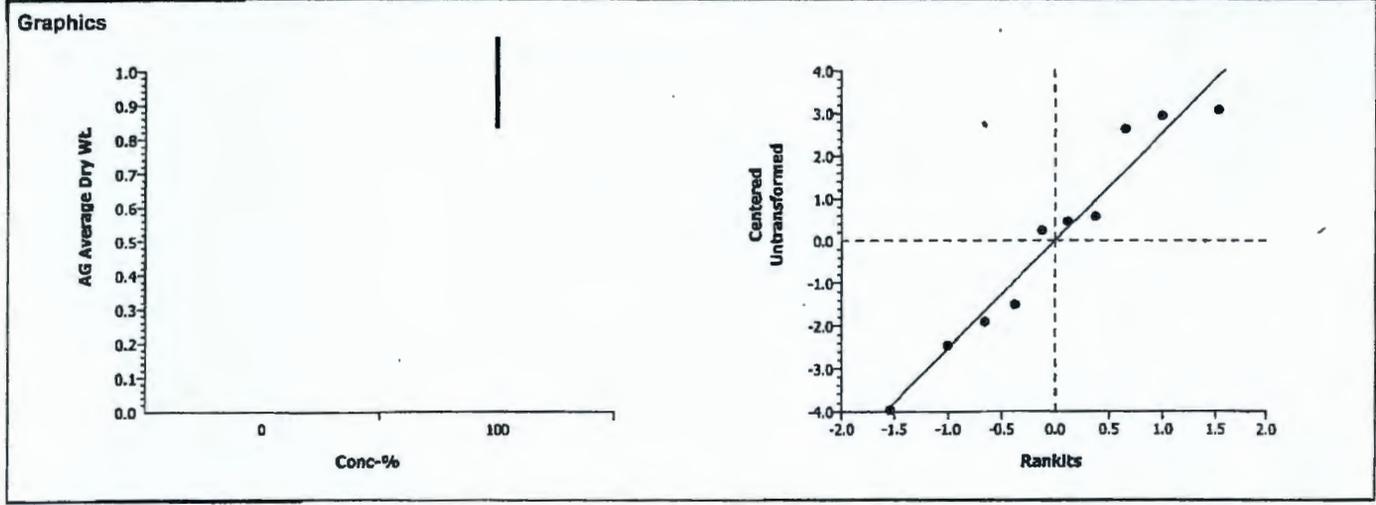
Method	Alt H	Data Transform	Zeta	NOEL	LOEL	Toxic Units	ChV	PMSD
Equal Variance t Two-Sample	C > T	Untransformed		100	>100	1	N/A	50.12%

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

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

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

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



CETIS Analysis Detail

Comparisons: Page 3 of 9
 Report Date: 05 Jun-06 1:08 PM
 Analysis: 02-4303-2633/B157502psc

Plant Chronic test	CH2M Hill
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Endpoint	Analysis Type	Sample Link	Control Link	Date Analyzed	Version
AG Average Height	Comparison	08-9288-3730	08-9288-3730	05 Jun-06 1:07 PM	CETISv1.1.2

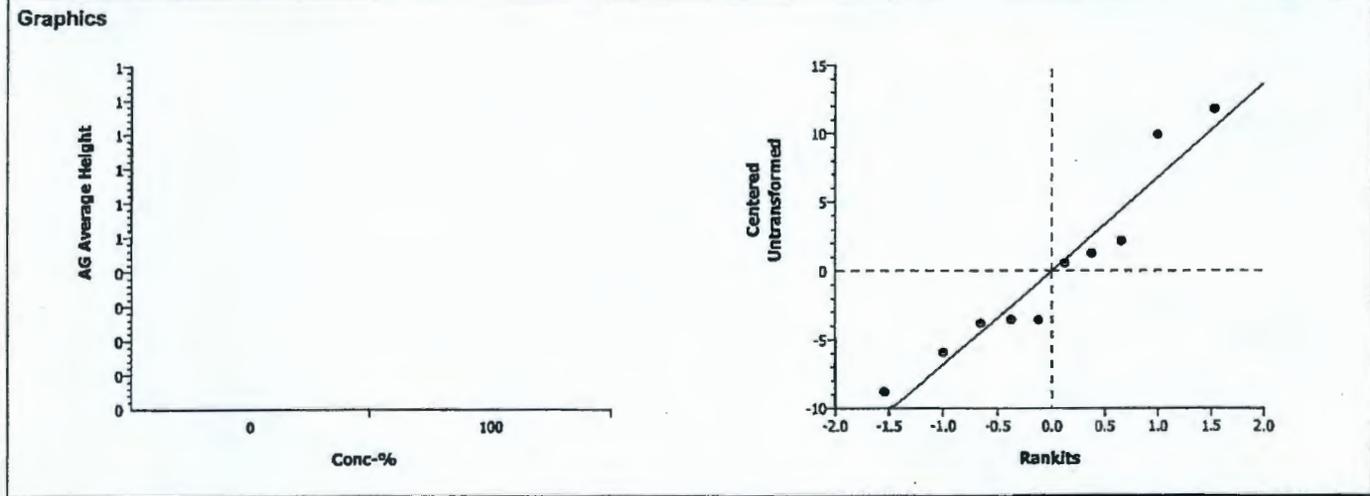
Method	Alt H	Data Transform	Zeta	NOEL	LOEL	Toxic Units	ChV	PMSD
Equal Variance t Two-Sample	C > T	Untransformed		100	>100	1	N/A	38.08%

Group Comparisons							
Control	vs	Conc-%	Statistic	Critical	P-Value	MSD	Decision(0.05)
Artificial Soil/Sedi		100	1.10301	1.85955	0.1510	8.27770	Non-Significant Effect

ANOVA Table						
Source	Sum of Squares	Mean Square	DF	F Statistic	P-Value	Decision(0.05)
Between	60.27025	60.27025	1	1.22	0.30210	Non-Significant Effect
Error	396.31	49.53875	8			
Total	456.580246	109.809	9			

ANOVA Assumptions					
Attribute	Test	Statistic	Critical	P-Value	Decision(0.01)
Variances	Variance Ratio F	1.02119	23.15450	0.98428	Equal Variances
Distribution	Shapiro-Wilk W	0.91768		0.33798	Normal Distribution

Data Summary		Original Data					Transformed Data			
Conc-%	Control Type	Count	Mean	Minimum	Maximum	SD	Mean	Minimum	Maximum	SD
0	Artificial Soil/S	5	21.740	15.8	33.5	7.0752				
100		5	16.83	8	26.75	7.0014				



CETIS Analysis Detail

Comparisons: Page 4 of 9
 Report Date: 05 Jun-06 1:08 PM
 Analysis: 04-5906-2559/B157502psc

Plant Chronic test	CH2M HILL
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Endpoint	Analysis Type	Sample Link	Control Link	Date Analyzed	Version
AG Average Wet Wt.	Comparison	08-9288-3730	08-9288-3730	05 Jun-06 1:08 PM	CETISv1.1.2

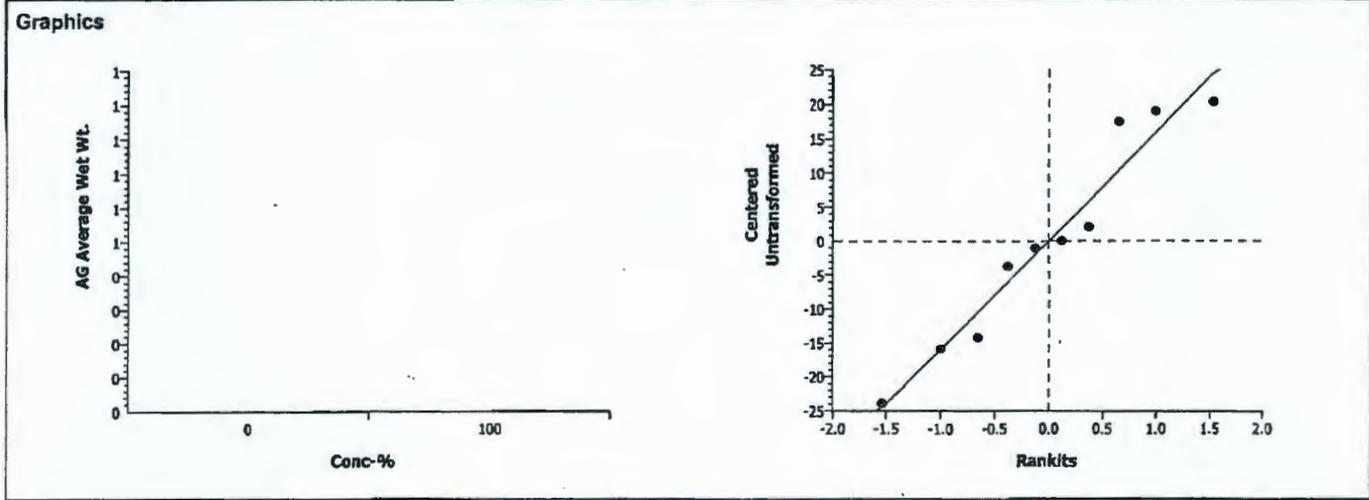
Method	Alt H	Data Transform	Zeta	NOEL	LOEL	Toxic Units	ChV	PMSD
Equal Variance t Two-Sample	C > T	Untransformed		100	>100	1	N/A	56.09%

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

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

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

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



CETIS Analysis Detail

Plant Chronic test	CH2M Hill
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Endpoint	Analysis Type	Sample Link	Control Link	Date Analyzed	Version
Root Average Dry Wt.	Comparison	08-9288-3730	08-9288-3730	05 Jun-06 1:08 PM	CETISv1.1.2

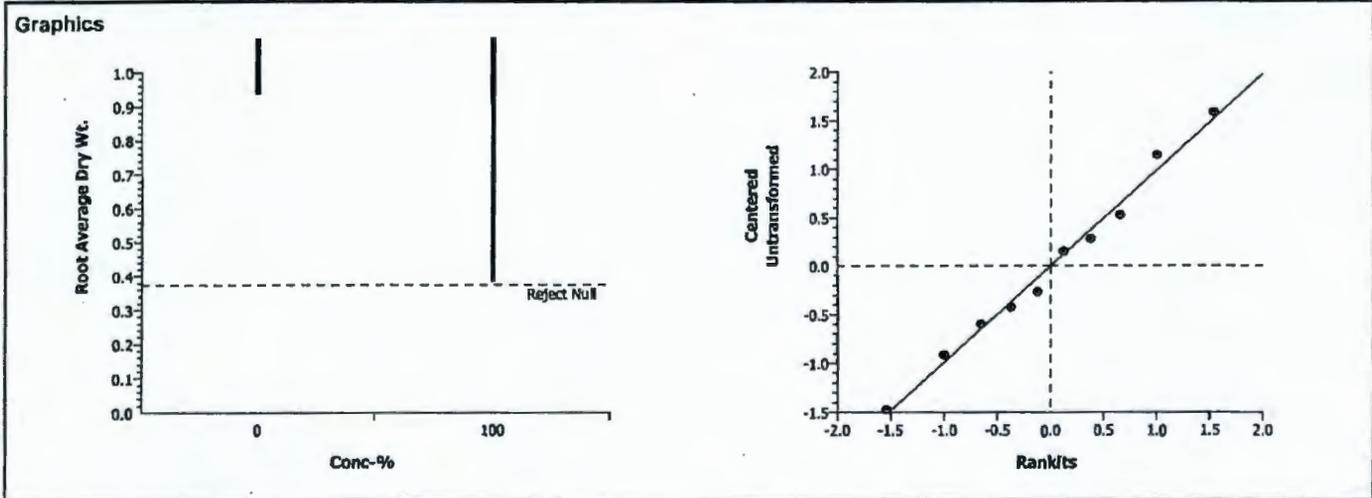
Method	Alt H	Data Transform	Zeta	NOEL	LOEL	Toxic Units	ChV	PMSD
Equal Variance t Two-Sample	C > T	Untransformed		100	>100	1	N/A	75.69%

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

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

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

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



CETIS Analysis Detail

Plant Chronic test CH2M HILL

Endpoint	Analysis Type	Sample Link	Control Link	Date Analyzed	Version
Root Average Length	Comparison	08-9288-3730	08-9288-3730	05 Jun-06 1:08 PM	CETISv1.1.2

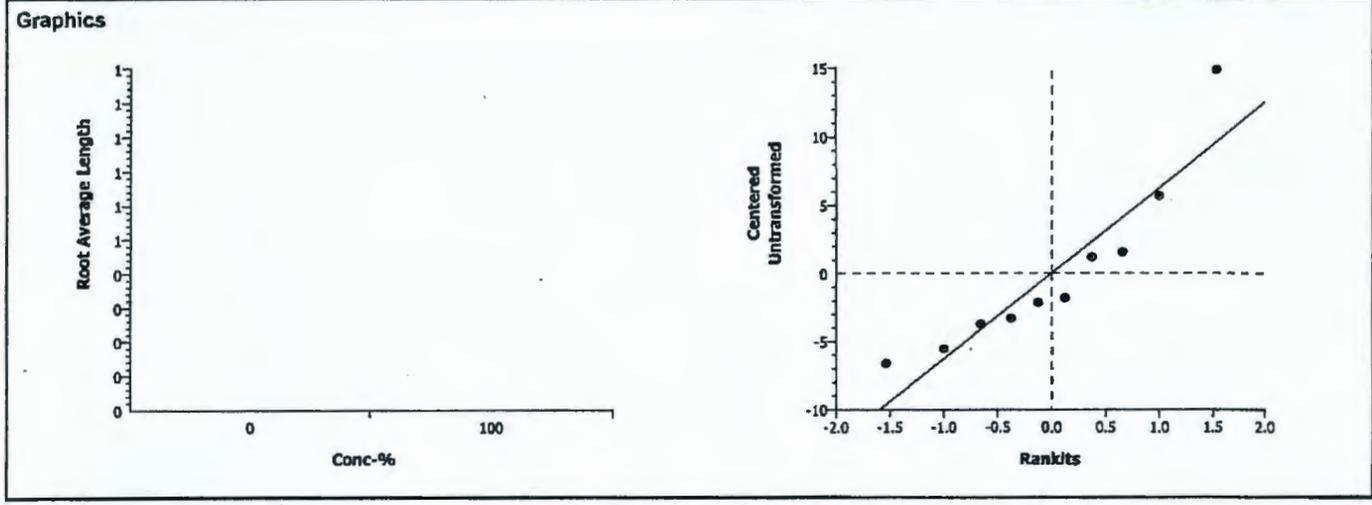
Method	Alt H	Data Transform	Zeta	NOEL	LOEL	Toxic Units	ChV	PMSD
Equal Variance t Two-Sample	C > T	Untransformed		<100	100		N/A	30.35%

Group Comparisons							
Control	vs	Conc-%	Statistic	Critical	P-Value	MSD	Decision(0.05)
Artificial Soil/Sedi		100	2.89048	1.85955	0.0101	7.93877	Significant Effect

ANOVA Table						
Source	Sum of Squares	Mean Square	DF	F Statistic	P-Value	Decision(0.05)
Between	380.689	380.689	1	8.35	0.02018	Significant Effect
Error	364.52	45.565	8			
Total	745.208984	426.25399	9			

ANOVA Assumptions					
Attribute	Test	Statistic	Critical	P-Value	Decision(0.01)
Variances	Variance Ratio F	3.37662	23.15450	0.26552	Equal Variances
Distribution	Shapiro-Wilk W	0.86191		0.08038	Normal Distribution

Data Summary		Original Data					Transformed Data			
Conc-%	Control Type	Count	Mean	Minimum	Maximum	SD	Mean	Minimum	Maximum	SD
0	Artificial Soil/S	5	26.16	20.6	41	8.385				
100		5	13.82	7.2	19.5	4.5631				



CETIS Analysis Detail

Plant Chronic test						GH2M HIII
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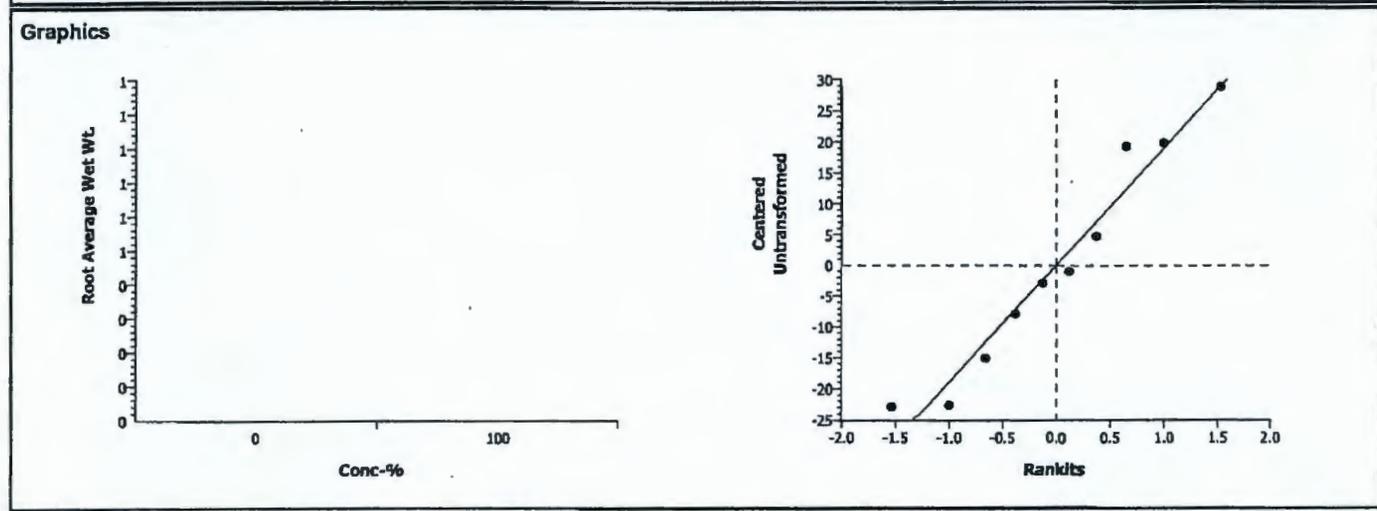
Endpoint	Analysis Type	Sample Link	Control Link	Date Analyzed	Version			
Root Average Wet Wt.	Comparison	08-9288-3730	08-9288-3730	05 Jun-06 1:08 PM	CETISv1.1.2			
Method	Alt H	Data Transform	Zeta	NOEL	LOEL	Toxic Units	ChV	PMSD
Equal Variance t Two-Sample	C > T	Untransformed		100	>100	1	N/A	62.32%

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

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

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

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



CETIS Analysis Detail

Plant Chronic test	CH2M HILL
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Endpoint	Analysis Type	Sample Link	Control Link	Date Analyzed	Version
Total Average Biomass Dry Wt.	Comparison	08-9288-3730	08-9288-3730	05 Jun-06 1:08 PM	CETISv1.1.2

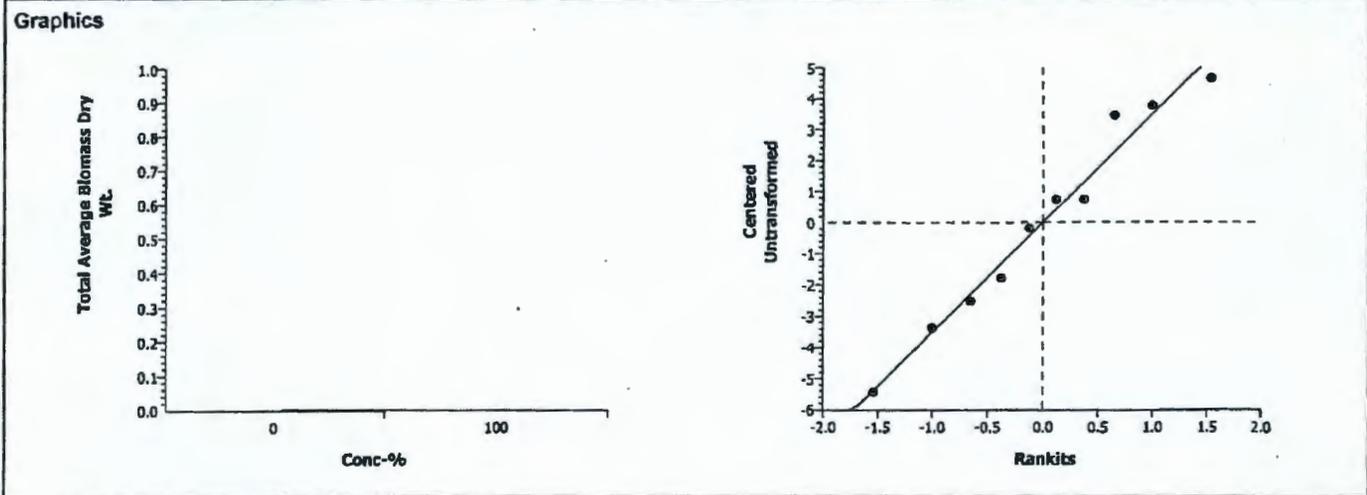
Method	Alt H	Data Transform	Zeta	NOEL	LOEL	Toxic Units	ChV	PMSD
Equal Variance t Two-Sample	C > T	Untransformed		100	>100	1	N/A	54.62%

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

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

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

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



CETIS Analysis Detail

Plant Chronic test CH2M Hill

Endpoint	Analysis Type	Sample Link	Control Link	Date Analyzed	Version
Total Average Biomass Wet Wt.	Comparison	08-9288-3730	08-9288-3730	05 Jun-06 1:08 PM	CETISv1.1.2

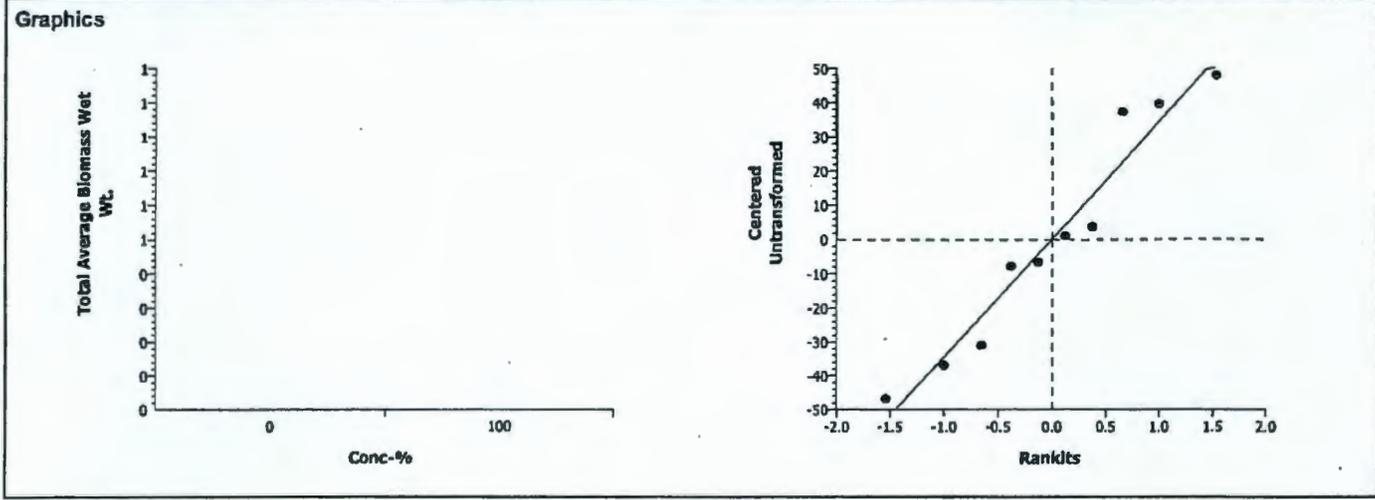
Method	Alt H	Data Transform	Zeta	NOEL	LOEL	Toxic Units	ChV	PMSD
Equal Variance t Two-Sample	C > T	Untransformed		100	>100	1	N/A	58.66%

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

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

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

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



F1548-1

Washington Closure Hanford		CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST			RC-051-67	Page 1 of 1
Collector STANKOVICH, M.	Company Contact JOAN KESSNER	Telephone No. 375-4688	Project Coordinator KESSNER, JH		Price Code 8L	Data Turnaround 45 Days
Project Designation 100 & 300 Area Component of the RCBRA - Incremental So		Sampling Location 300-A RIPARIAN #6		SAF No. RC-051	Air Quality <input type="checkbox"/>	
Ice Chest No.	Field Logbook No. EL-1596	COA BESRAS6520	Method of Shipment GROUND TRANSPORT			
Shipped To CH2MHILL		Offsite Property No. A060151		Bill of Lading/Air Bill No.		

POSSIBLE SAMPLE HAZARDS/REMARKS NONE Special Handling and/or Storage Use page 3 for original material to Corvallis for MIS preparation and aliquoting, page 1 for radioanalytical fractions to Eberline, & page 2 for chemical analytical fractions to Lionville.	Preservation	None	None								
	Type of Container	G/P	P/G								
	No. of Container(s)	1	1								
	Volume	1000g	4000g								

SAMPLE ANALYSIS				See item (1) in Special Instructions.	Soil Plant Toxicity ASTM E1963; Soil Nematode Toxicity ASTM E2172							
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Sample No.	Matrix *	Sample Date	Sample Time									
J11JB6	SOIL	4-17-06	1530	1	1							

CHAIN OF POSSESSION		Sign/Print Names		SPECIAL INSTRUCTIONS				Matrix *
Relinquished By/Removed From	Date/Time	Received By/Stored In	Date/Time	Those marks indicate that unless lined out, analytes to be included with Strontium-89,90 -- Total Sr analysis fraction. ~ These marks indicate that this is a non-analysis used to properly format COC form. Contact Joan Kessner for any questions. (1) Particle Size (Dry Sieve) - D422; Moisture Content - D2216; TOC - 9060; pH (Soil) - 9045; Nitrogen by Kjeldahl - 351.2; Ammonia - 350.3; IC Anions - 300.0; Resonant Solids				S=Soil SE=Soil/Elem SO=Solid Sl=Sludge W=Water O=Oil A=Air DS=Dryn Solid DL=Dryn Liquid T=Tissue Wl=Wipe L=Liquid V=Vegetation X=Other
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 <i>E. Ozolska</i> Date/Time: 4-18-06		Received By/Stored In <i>Joan Kessner</i> Date/Time: 4-18-06		BH 1580-24 05				

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

BLUEGRASS GROWTH TEST

Client: Washington Closure Hanford Project

Test Start Date: 4-26-06

Initial (P) Day 0 (P) Day 12 (P) Day 14 NT Day 16 NJ Day 19 (P) Day 21 NJ Day 23 NT Day 28 (P) Day 35 B

Bioassay Lab ID: BG 1575-03		Sample No: J11JH6								pH	
CONC.	REPLICATE	# seeds germinated						7-DAYS POST-EMERGENCE (100 days after planting)	14-DAYS POST-EMERGENCE (135 days after planting)	INITIAL (at planting)	FINAL (at 14 days Post-Emergence)
		12 days after planting	14 days after planting	16 days after planting	19 days after planting	21 days after planting	23 days after planting				
Control	A		2	3	4	4	4	5 → 5	4 live, 1 dead	6.4	7.2
	B		4	6	7	7	7	7 → 5	5		
	C		4	4	5	6	6	6 → 5	5		
	D		5	6	6	7	10	10 → 5	4*		
	E		4	5	4	4	4	7 → 5	5		

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

Replicate A	2 Lg (G) one w/B tip, 2 med. (G) 1 sm (G)	
Replicate B	3 Lg (G), 1 med w/1 B shoot, 1 sm (G)	removed: 2 sm (G)
Replicate C	2 Lg (G) one w/B tip, 3 med one w/B tip	removed: 1 sm (G)
Replicate D	3 Lg (G), 1 med (G), 1 sm (G)	removed: 5 sm (G)
Replicate E	1 Lg (G), 3 med (G), 2 w/B tip, 1 sm (G)	removed 2 sm (G)

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

14-Days Post-Emergence: Describe shoot appearance:

Replicate A	2 med G, 2 med w/1 B shoot each, dead plant removed	- 1 broad leaf removed
Replicate B	3 Lg G, 1 med G, 1 med w/1 B shoot	- 1 broad leaf removed
Replicate C	3 med G, 2 sm G	- 1 broad leaf removed
Replicate D	2 Lg G, 1 Lg w/B tip, 1 med G	- 1 Lg non-bluegrass grass removed
Replicate E	2 Lg G, 1 med G, 1 med w/1 B shoot, 1 sm G	

Measure Shoot Height

Individual height of each seedling (above ground)	1st Seedling	2nd Seedling	3rd Seedling	4th Seedling	5th Seedling
Replicate A	80 mm	83 mm	97 mm	52 mm	
Replicate B	102 mm	78 mm	55 mm	89 mm	100 mm
Replicate C	63 mm	70 mm	64 mm	37 mm	34 mm
Replicate D	81 mm	100 mm	121 mm	34 mm	
Replicate E	94 mm	42 mm	76 mm	134 mm	34 mm

Measure Shoot Weight

Total mass of all seedlings (above ground)	Tin Tare Wt (mg)	Wet Wt (mg)	Dry Wt (mg)
Replicate A	998.59	1105.4	1015.30
Replicate B	1246.32	1400.3	1272.13
Replicate C	1248.99	1322.1	1265.16
Replicate D	1248.60	1418.8	1275.82
Replicate E	1245.70	1352.6	1262.01

Describe root appearance:

Replicate A	
Replicate B	
Replicate C	
Replicate D	
Replicate E	

Measure Root Length:

Individual length of the longest root from each seedling	1st Seedling	2nd Seedling	3rd Seedling	4th Seedling	5th Seedling
Replicate A	98 mm	47 mm	89 mm	105 mm	
Replicate B	77 mm	52 mm	122 mm	113 mm	89 mm
Replicate C	58 mm	60 mm	88 mm	78 mm	35 mm
Replicate D	108 mm	49 mm	114 mm	71 mm	
Replicate E	84 mm	130 mm	81 mm	53 mm	40 mm

Measure Root Weight:

Total mass of all roots from all seedlings	Tin Tare Wt (mg)	Wet Wt (mg)	Dry Wt (mg)
Replicate A	971.15	1133.9	977.71
Replicate B	1243.44	1447.3	1254.41
Replicate C	1243.10	1328.2	1249.44
Replicate D	1248.17	1482.0	1257.76
Replicate E	1247.31	1419.1	1254.46

Comments:

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

* Rep D @ Day 35 had 4 bluegrass + 1 Lg non bluegrass, w/10 germinated, reduce "stuntant" to 4/100% (removed)

CETIS Test Summary

Report Date: 05 Jun-06 1:11 PM

Test Link: 17-8681-9524/B157503psc

Plant Chronic test		CH2M Hill				
Test No:	05-8591-7312	Test Type:	Plant Chronic test	Duration:	N/A	
Start Date:	26 Apr-06	Protocol:	ASTM E1963-02 (2002)	Species:	Poa sandbergii	
Ending Date:		Dil Water:		Source:		
Setup Date:	26 Apr-06	Brine:				
Sample No:	07-1539-2463	Code:	B1574-03	Client:		
Sample Date:	11 Apr-06	Material:	Soil	Project:		
Receive Date:		Source:	Hanford			
Sample Age:	15d 0h	Station:				
Comments:	J11JH6					
Comparison Summary						
Analysis	Endpoint	NOEL	LOEL	ChV	PMSD	Method
06-5828-5538	% Germination	100	> 100	N/A	25.39%	Wilcoxon Rank Sum Two-Sample
07-7490-4773	AG Average Dry Wt.	100	> 100	N/A	32.40%	Equal Variance t Two-Sample
01-4877-6460	AG Average Height	100	> 100	N/A	31.05%	Equal Variance t Two-Sample
12-0817-2449	AG Average Wet Wt.	100	> 100	N/A	38.84%	Equal Variance t Two-Sample
16-8309-1826	Root Average Dry Wt.	100	> 100	N/A	46.09%	Equal Variance t Two-Sample
01-7072-4958	Root Average Length	< 100	100	N/A	28.84%	Equal Variance t Two-Sample
06-4871-2664	Root Average Wet Wt.	100	> 100	N/A	55.30%	Equal Variance t Two-Sample
07-1631-4873	Total Average Biomass Dry	100	> 100	N/A	34.60%	Equal Variance t Two-Sample
04-8179-8176	Total Average Biomass Wet	100	> 100	N/A	46.90%	Equal Variance t Two-Sample

CETIS Test Summary

Report Date:

05 Jun-06 1:11 PM

Test Link:

17-8681-9524/B157503psc

% Germination Summary								
Conc-%	Control Type	Reps	Mean	Minimum	Maximum	SE	SD	CV
0	Artificial Soil/S	5	0.88000	0.40000	1.00000	0.12000	0.26833	30.49%
100		5	0.92000	0.80000	1.00000	0.04899	0.10954	11.91%
AG Average Dry Wt. Summary								
Conc-%	Control Type	Reps	Mean	Minimum	Maximum	SE	SD	CV
0	Artificial Soil/S	5	6.05361	4.14001	8.68201	0.81424	1.82070	30.08%
100		5	4.52810	3.23401	6.80499	0.67032	1.49889	33.10%
AG Average Height Summary								
Conc-%	Control Type	Reps	Mean	Minimum	Maximum	SE	SD	CV
0	Artificial Soil/S	5	21.74	15.8	33.5	3.1641	7.0752	32.54%
100		5	16.66	10.8	21	1.7803	3.981	23.90%
AG Average Wet Wt. Summary								
Conc-%	Control Type	Reps	Mean	Minimum	Maximum	SE	SD	CV
0	Artificial Soil/S	5	34.197	19.960	53.208	5.3829	12.036	35.20%
100		5	27.210	14.622	42.550	4.6951	10.499	38.58%
Root Average Dry Wt. Summary								
Conc-%	Control Type	Reps	Mean	Minimum	Maximum	SE	SD	CV
0	Artificial Soil/S	5	1.53579	0.93500	2.67798	0.31159	0.69673	45.37%
100		5	1.78590	1.26799	2.39749	0.21872	0.48908	27.39%
Root Average Length Summary								
Conc-%	Control Type	Reps	Mean	Minimum	Maximum	SE	SD	CV
0	Artificial Soil/S	5	26.16	20.6	41	3.7499	8.385	32.05%
100		5	17.39	12.6	21.5	1.5478	3.4609	19.90%
Root Average Wet Wt. Summary								
Conc-%	Control Type	Reps	Mean	Minimum	Maximum	SE	SD	CV
0	Artificial Soil/S	5	36.242	13.590	65.054	8.4756	18.952	52.29%
100		5	38.259	17.02	58.457	6.6577	14.887	38.91%
Total Average Biomass Dry Wt. Summary								
Conc-%	Control Type	Reps	Mean	Minimum	Maximum	SE	SD	CV
0	Artificial Soil/S	5	7.5894	5.0750	11.36	1.1021	2.4644	32.47%
100		5	6.314	4.5020	9.2025	0.8829	1.9742	31.27%
Total Average Biomass Wet Wt. Summary								
Conc-%	Control Type	Reps	Mean	Minimum	Maximum	SE	SD	CV
0	Artificial Soil/S	5	70.439	33.550	118.26	13.727	30.694	43.58%
100		5	65.469	31.642	101.01	11.276	25.213	38.51%

Report Date:

05 Jun-06 1:11 PM

Test Link:

17-8681-9524/B157503psc

CETIS Test Summary

% Germination Detail						
Conc-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Artificial Soil/S	1.00000	1.00000	0.40000	1.00000	1.00000
100		0.80000	1.00000	1.00000	0.80000	1.00000
AG Average Dry Wt. Detail						
Conc-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Artificial Soil/S	4.53401	6.62400	4.14001	6.28801	8.68201
100		4.17749	5.16201	3.23401	6.80499	3.26201
AG Average Height Detail						
Conc-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Artificial Soil/S	15.8	18.2	33.5	18.2	23
100		19.5	16.8	10.8	21	15.2
AG Average Wet Wt. Detail						
Conc-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Artificial Soil/S	30.4100	33.172	19.9600	34.2360	53.2080
100		26.7025	30.7960	14.622	42.5500	21.3800
Root Average Dry Wt. Detail						
Conc-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Artificial Soil/S	1.26801	1.68799	0.93500	1.10999	2.67798
100		1.64000	2.19402	1.26799	2.39749	1.42998
Root Average Length Detail						
Conc-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Artificial Soil/S	20.6	22.8	41	22.4	24
100		19.25	18.2	12.6	21.5	15.4
Root Average Wet Wt. Detail						
Conc-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Artificial Soil/S	33.3280	40.9320	13.5900	28.3060	65.054
100		40.6875	40.7720	17.02	58.4575	34.358
Total Average Biomass Dry Wt. Detail						
Conc-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Artificial Soil/S	5.80201	8.31199	5.07501	7.398	11.36
100		5.81749	7.35603	4.50200	9.20248	4.69199
Total Average Biomass Wet Wt. Detail						
Conc-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Artificial Soil/S	63.7380	74.1040	33.5500	62.5420	118.262
100		67.39	71.5680	31.642	101.008	55.738

CETIS Analysis Detail

Plant Chronic test	CH2M Hill
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Endpoint	Analysis Type	Sample Link	Control Link	Date Analyzed	Version
% Germination	Comparison	17-8681-9524	17-8681-9524	05 Jun-06 1:11 PM	CETISv1.1.2

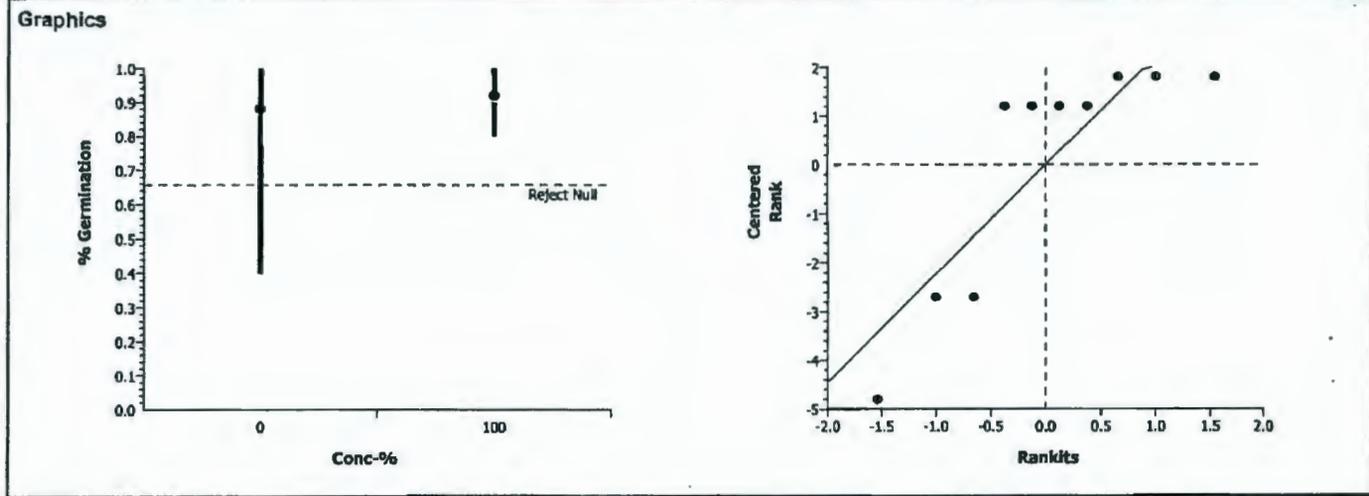
Method	Alt H	Data Transform	Zeta	NOEL	LOEL	Toxic Units	ChV	PMSD
Wilcoxon Rank Sum Two-Sample	C > T	Rank		100	>100	1	N/A	25.39%

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

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

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

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



CETIS Analysis Detail

Comparisons: Page 2 of 9
 Report Date: 05 Jun-06 1:11 PM
 Analysis: 07-7490-4773/B157503psc

Plant Chronic test	CH2M Hill
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Endpoint	Analysis Type	Sample Link	Control Link	Date Analyzed	Version
AG Average Dry Wt.	Comparison	17-8681-9524	17-8681-9524	05 Jun-06 1:11 PM	CETISv1.1.2

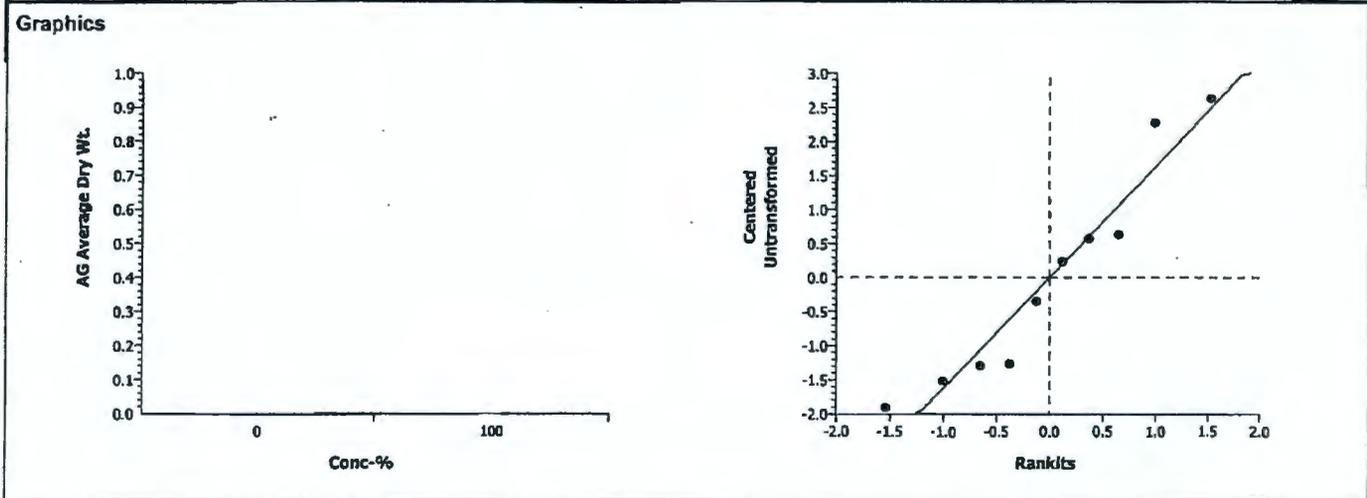
Method	Alt H	Data Transform	Zeta	NOEL	LOEL	Toxic Units	ChV	PMSD
Equal Variance t Two-Sample	C > T	Untransformed		100	>100	1	N/A	32.40%

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

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

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

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



CETIS Analysis Detail

Plant Chronic test	CH2M Hill
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Endpoint	Analysis Type	Sample Link	Control Link	Date Analyzed	Version
AG Average Height	Comparison	17-8681-9524	17-8681-9524	05 Jun-06 1:11 PM	CETISv1.1.2

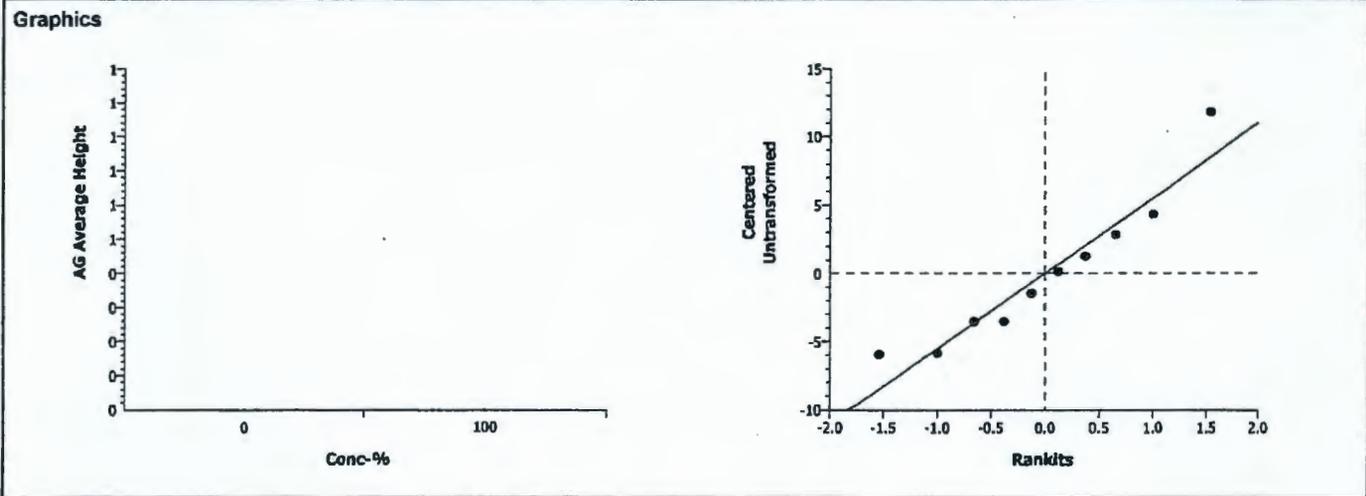
Method	A/t H	Data Transform	Zeta	NOEL	LOEL	Toxic Units	ChV	PMSD
Equal Variance t Two-Sample	C > T	Untransformed		100	>100	1	N/A	31.05%

Group Comparisons							
Control	vs	Conc-%	Statistic	Critical	P-Value	MSD	Decision(0.05)
Artificial Soil/Sedi		100	1.39922	1.85955	0.0997	6.75126	Non-Significant Effect

ANOVA Table						
Source	Sum of Squares	Mean Square	DF	F Statistic	P-Value	Decision(0.05)
Between	64.516	64.516	1	1.96	0.19930	Non-Significant Effect
Error	263.624	32.953	8			
Total	328.139992	97.468998	9			

ANOVA Assumptions					
Attribute	Test	Statistic	Critical	P-Value	Decision(0.01)
Variances	Variance Ratio F	3.15863	23.15450	0.29132	Equal Variances
Distribution	Shapiro-Wilk W	0.91502		0.31731	Normal Distribution

Data Summary		Original Data					Transformed Data			
Conc-%	Control Type	Count	Mean	Minimum	Maximum	SD	Mean	Minimum	Maximum	SD
0	Artificial Soil/S	5	21.740	15.8	33.5	7.0752				
100		5	16.66	10.8	21	3.981				



CETIS Analysis Detail

Comparisons: Page 4 of 9
 Report Date: 05 Jun-06 1:11 PM
 Analysis: 12-0817-2449/B157503psc

Plant Chronic test	CH2M Hill
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Endpoint	Analysis Type	Sample Link	Control Link	Date Analyzed	Version
AG Average Wet Wt.	Comparison	17-8681-9524	17-8681-9524	05 Jun-06 1:11 PM	CETISv1.1.2

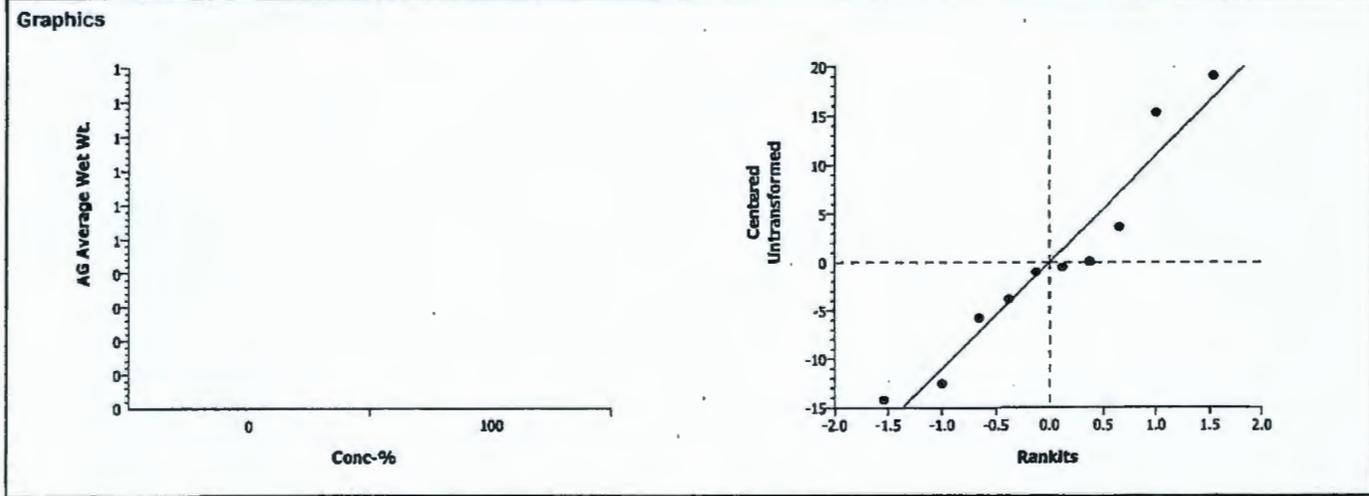
Method	Alt H	Data Transform	Zeta	NOEL	LOEL	Toxic Units	ChV	PMSD
Equal Variance t Two-Sample	C > T	Untransformed		100	>100	1	N/A	38.84%

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

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

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

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



CETIS Analysis Detail

Plant Chronic test						CH2M Hill
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Endpoint	Analysis Type	Sample Link	Control Link	Date Analyzed	Version
Root Average Dry Wt.	Comparison	17-8681-9524	17-8681-9524	05 Jun-06 1:11 PM	CETISv1.1.2

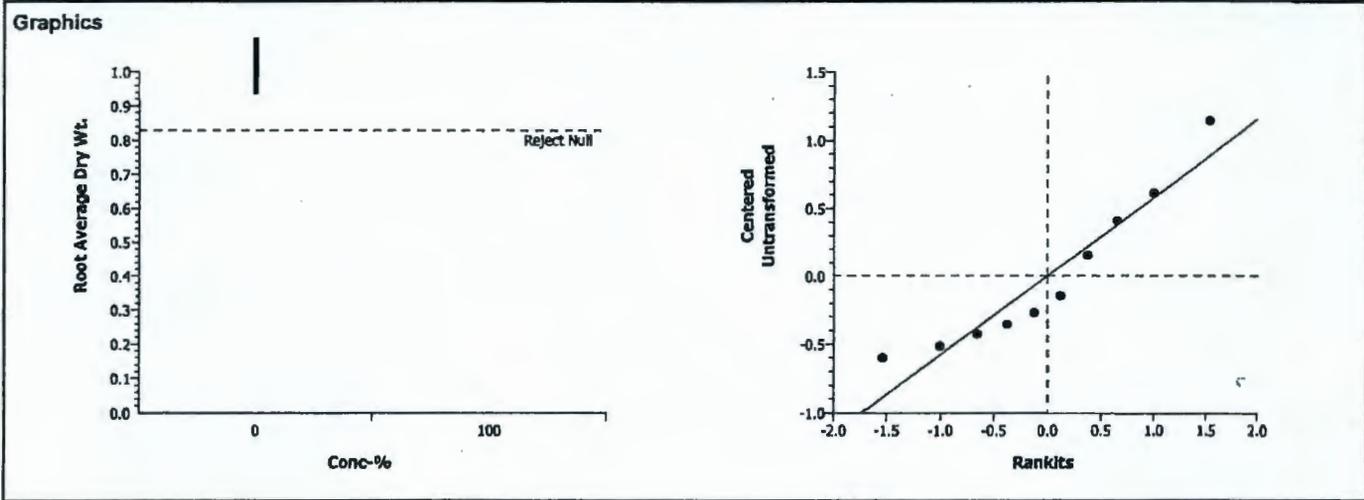
Method	Alt H	Data Transform	Zeta	NOEL	LOEL	Toxic Units	ChV	PMSD
Equal Variance t Two-Sample	C > T	Untransformed		100	>100	1	N/A	46.09%

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

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

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

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



CETIS Analysis Detail

Comparisons: Page 6 of 9
 Report Date: 05 Jun-06 1:11 PM
 Analysis: 01-7072-4958/B157503psc

Plant Chronic test	CH2M Hill
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Endpoint	Analysis Type	Sample Link	Control Link	Date Analyzed	Version
Root Average Length	Comparison	17-8681-9524	17-8681-9524	05 Jun-06 1:11 PM	CETISv1.1.2

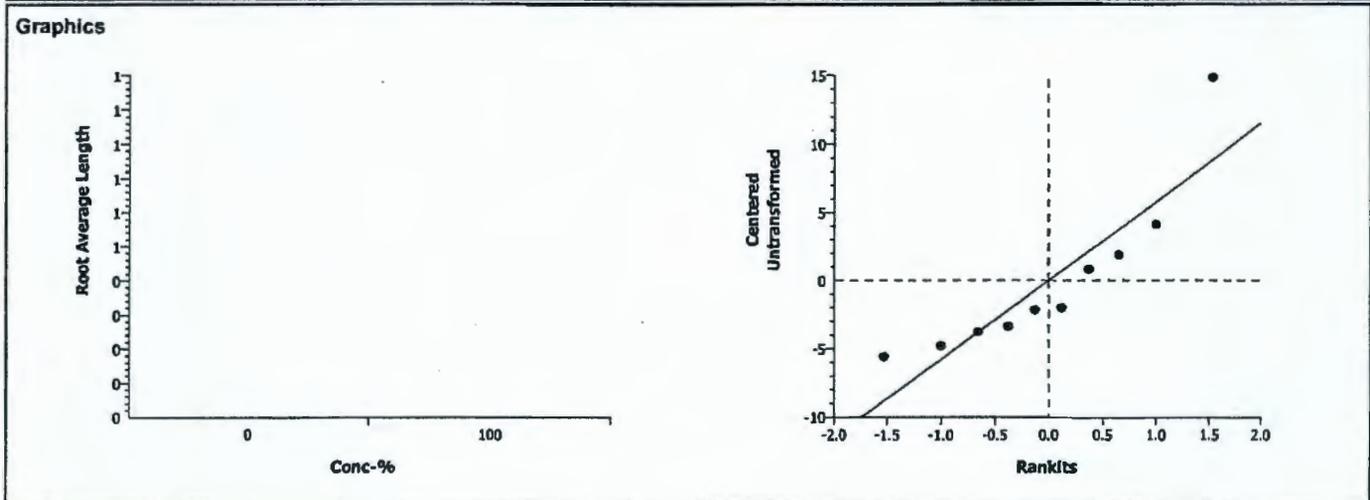
Method	Ajt H	Data Transform	Zeta	NOEL	LOEL	Toxic Units	ChV	PMSD
Equal Variance t Two-Sample	C > T	Untransformed		<100	100		N/A	28.84%

Group Comparisons							
Control	vs	Conc-%	Statistic	Critical	P-Value	MSD	Decision(0.05)
Artificial Soil/Sedi		100	2.16183	1.85955	0.0313	7.54372	Significant Effect

ANOVA Table						
Source	Sum of Squares	Mean Square	DF	F Statistic	P-Value	Decision(0.05)
Between	192.2823	192.2823	1	4.67	0.06261	Non-Significant Effect
Error	329.144	41.143	8			
Total	521.42627	233.42526	9			

ANOVA Assumptions					
Attribute	Test	Statistic	Critical	P-Value	Decision(0.01)
Variances	Variance Ratio F	5.86976	23.15450	0.11480	Equal Variances
Distribution	Shapiro-Wilk W	0.81268		0.02067	Normal Distribution

Data Summary		Original Data					Transformed Data			
Conc-%	Control Type	Count	Mean	Minimum	Maximum	SD	Mean	Minimum	Maximum	SD
0	Artificial Soil/S	5	26.16	20.6	41	8.385				
100		5	17.390	12.6	21.5	3.4609				



CETIS Analysis Detail

Comparisons: Page 7 of 9

Report Date: 05 Jun-06 1:11 PM

Analysis: 06-4871-2664/B157503psc

Plant Chronic test	CH2M HILL
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Endpoint	Analysis Type	Sample Link	Control Link	Date Analyzed	Version
Root Average Wet Wt.	Comparison	17-8681-9524	17-8681-9524	05 Jun-06 1:11 PM	CETISv1.1.2

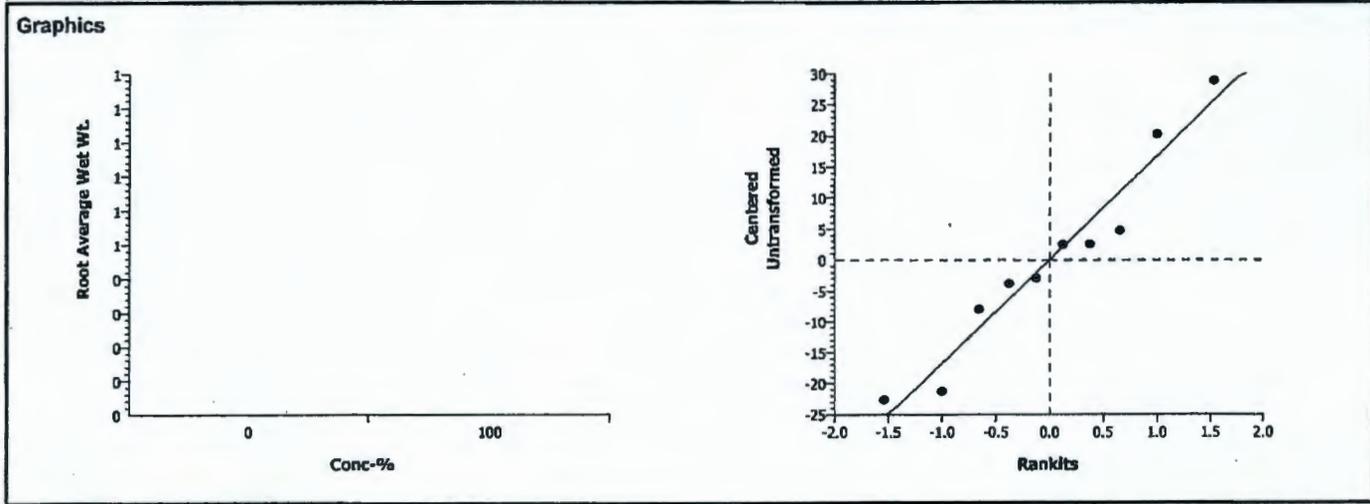
Method	Alt H	Data Transform	Zeta	NOEL	LOEL	Toxic Units	ChV	PMSD
Equal Variance t Two-Sample	C > T	Untransformed		100	>100	1	N/A	55.30%

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

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

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

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



CETIS Analysis Detail

Comparisons: Page 8 of 9
 Report Date: 05 Jun-06 1:11 PM
 Analysis: 07-1631-4873/B157503psc

Plant Chronic test	CH2M HILL
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Endpoint	Analysis Type	Sample Link	Control Link	Date Analyzed	Version
Total Average Biomass Dry Wt.	Comparison	17-8681-9524	17-8681-9524	05 Jun-06 1:11 PM	CETISv1.1.2

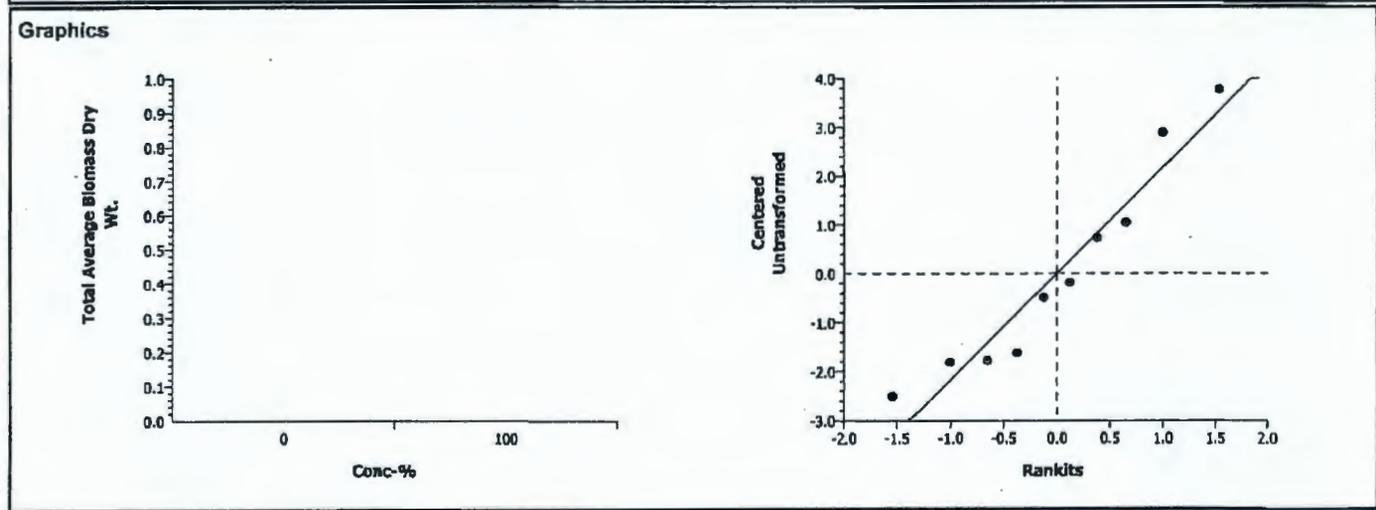
Method	Alt H	Data Transform	Zeta	NOEL	LOEL	Toxic Units	ChV	PMSD
Equal Variance t Two-Sample	C > T	Untransformed		100	>100	1	N/A	34.60%

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

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

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

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



CETIS Analysis Detail

Comparisons: Page 9 of 9
 Report Date: 05 Jun-06 1:11 PM
 Analysis: 04-8179-8176/B157503psc

Plant Chronic test	CH2M HILL
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Endpoint	Analysis Type	Sample Link	Control Link	Date Analyzed	Version
Total Average Biomass Wet Wt.	Comparison	17-8681-9524	17-8681-9524	05 Jun-06 1:11 PM	CETISv1.1.2

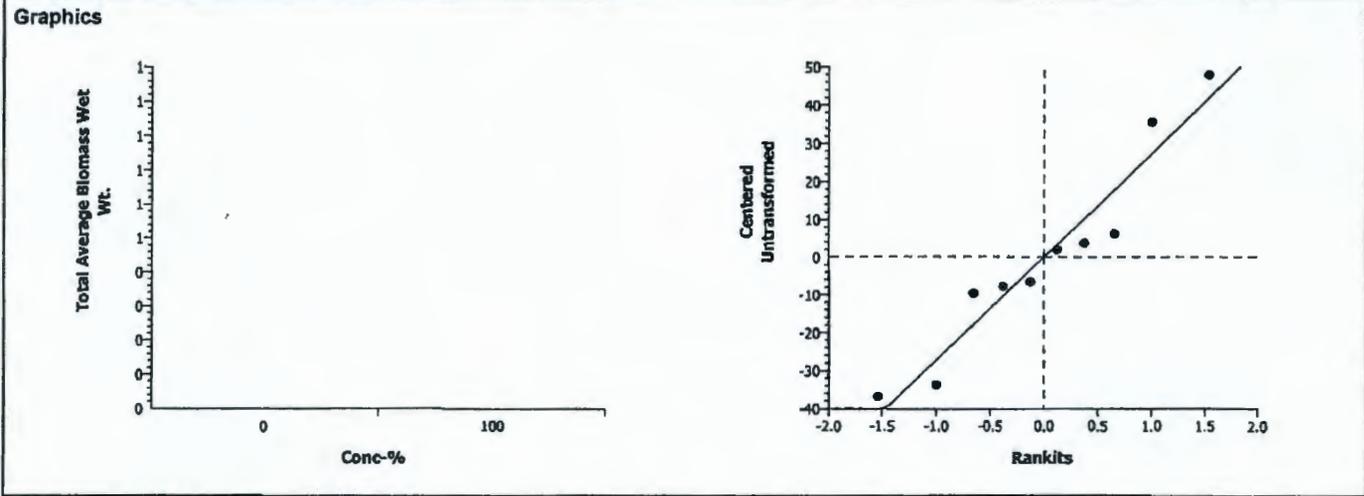
Method	Alt H	Data Transform	Zeta	NOEL	LOEL	Toxic Units	ChV	PMSD
Equal Variance t Two-Sample	C > T	Untransformed		100	>100	1	N/A	46.90%

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

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

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

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



BLUEGRASS GROWTH TEST

Client: Washington Closure Hanford Project

Test Start Date: 4-26-06

Day 0 10 Day 12 Day 14 NT Day 16 NT Day 19 TP Day 21 NT Day 23 Day 28 TP Day 35

Bloassay Lab ID: BG 1575-64		Sample No: J11J10								pH	
CONC.	REPLICATE	# seeds germinated							INITIAL (@ planting)	FINAL (@ 14 days Post-Emergence)	
		12 days after planting	14 days after planting	16 days after planting	19 days after planting	21 days after planting	23 days after planting	7-DAYS POST-EMERGENCE (28 days after planting)			14-DAYS POST-EMERGENCE (35 days after planting)
Control	A		5	5	5	6	6	6 → 5	5	6.4	7.4
	B		6	6	6	8	8	9 → 5	5		
	C		3	3	3	4	4	4 → 4	4		
	D		4	4	5	5	5	5 → 5	5		
	E		5	6	6	6	7	8 → 5	5		

7-Days Post-Emergence: Selectively thin down to 5 Seedlings (leave the 3 tallest seedlings). Describe shoot appearance:

Replicate A: 2 Lg (G), 3 med (G) removed: 1 med (G)
 Replicate B: 1 Lg (G), 4 med (G) 1 w/B shoot removed: 4 sm (G)
 Replicate C: 1 Lg (G), 3 sm (G)
 Replicate D: 2 med (G) 1 w/B shoot, 3 sm (G)
 Replicate E: 4 Lg (G), 1 med (G) removed: 3 sm (G)

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

14-Days Post-Emergence: Describe shoot appearance:

Replicate A: 3 Lg G, 2 med G or 2 Lg G, 3 med G
 Replicate B: 1 Lg G, 3 med G, 1 med w/B shoot.
 Replicate C: 1 med G, 3 sm G - 1 broad leaf plant removed
 Replicate D: 2 med each w/B shoot, 3 sm G
 Replicate E: 2 Lg G, 1 Lg G w/B shoot, 2 med G

Measure Shoot Height:

Individual height of each seedling (above ground)

	1st Seedling	2nd Seedling	3rd Seedling	4th Seedling	5th Seedling
Replicate A	110 mm	93 mm	87 mm	90 mm	86 mm
Replicate B	75 mm	60 mm	95 mm	56 mm	67 mm
Replicate C	20 mm	25 mm	20 mm	20 mm	mm
Replicate D	64 mm	73 mm	44 mm	14 mm	12 mm
Replicate E	93 mm	51 mm	96 mm	86 mm	85 mm

Measure Shoot Weight:

Total mass of all seedlings (above ground)

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

Describe root appearance:

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

Measure Root Length:

Individual length of the longest root from each seedling

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

Measure Root Weight:

Total mass of all roots from all seedlings

	Tin Tare WL (mg)	Wet WL (mg)	Dry WL (mg)
Replicate A	991.97	1189.5	1004.04
Replicate B	1248.55	1423.0	1259.01
Replicate C	1247.77	1355.4	1254.43
Replicate D	1242.68	1341.9	1247.85
Replicate E	1248.67	1467.4	1260.92

Comments:

CETIS Test Summary

Report Date: 05 Jun-06 1:14 PM
 Test Link: 04-5125-2759/B157504psc

Plant Chronic test		CH2M Hill				
Test No:	12-2793-2721	Test Type:	Plant Chronic test	Duration:	N/A	
Start Date:	26 Apr-06	Protocol:	ASTM E1963-02 (2002)	Species:	Poa sandbergii	
Ending Date:		Dil Water:		Source:		
Setup Date:	26 Apr-06	Brine:				
Sample No:	07-9940-6935	Code:	B1574-04	Client:		
Sample Date:	12 Apr-06	Material:	Soil	Project:		
Receive Date:		Source:	Hanford			
Sample Age:	14d 0h	Station:				
Comments:	J11JJ0					
Comparison Summary						
Analysis	Endpoint	NOEL	LOEL	ChV	PMSD	Method
10-5756-3320	% Germination	100	> 100	N/A	24.60%	Wilcoxon Rank Sum Two-Sample
09-1303-6568	AG Average Dry Wt.	< 100	100	N/A	31.32%	Equal Variance t Two-Sample
09-1597-6154	AG Average Height	< 100	100	N/A	30.81%	Equal Variance t Two-Sample
08-5645-7970	AG Average Wet Wt.	100	> 100	N/A	35.96%	Equal Variance t Two-Sample
02-8216-7256	Root Average Dry Wt.	100	> 100	N/A	49.22%	Equal Variance t Two-Sample
16-4287-8059	Root Average Length	< 100	100	N/A	27.48%	Wilcoxon Rank Sum Two-Sample
11-1905-9625	Root Average Wet Wt.	100	> 100	N/A	48.78%	Equal Variance t Two-Sample
08-3287-6257	Total Average Biomass Dry	100	> 100	N/A	34.45%	Equal Variance t Two-Sample
14-0645-1947	Total Average Biomass Wet	100	> 100	N/A	41.74%	Equal Variance t Two-Sample

CETIS Test Summary

Report Date:

05 Jun-06 1:14 PM

Test Link:

04-5125-2759/B157504psc

% Germination Summary								
Conc-%	Control Type	Reps	Mean	Minimum	Maximum	SE	SD	CV
0	Artificial Soil/S	5	0.88000	0.40000	1.00000	0.12000	0.26833	30.49%
100		5	0.96000	0.80000	1.00000	0.04000	0.08944	9.32%
AG Average Dry Wt. Summary								
Conc-%	Control Type	Reps	Mean	Minimum	Maximum	SE	SD	CV
0	Artificial Soil/S	5	6.05361	4.14001	8.68201	0.81424	1.82070	30.08%
100		5	3.54850	1.60601	4.92400	0.61356	1.37195	38.66%
AG Average Height Summary								
Conc-%	Control Type	Reps	Mean	Minimum	Maximum	SE	SD	CV
0	Artificial Soil/S	5	21.74	15.8	33.5	3.1641	7.0752	32.54%
100		5	12.8	8.4	16.6	1.7205	3.8471	30.06%
AG Average Wet Wt. Summary								
Conc-%	Control Type	Reps	Mean	Minimum	Maximum	SE	SD	CV
0	Artificial Soil/S	5	34.197	19.960	53.208	5.3829	12.036	35.20%
100		5	25.792	10.95	32.794	3.8419	8.5908	33.31%
Root Average Dry Wt. Summary								
Conc-%	Control Type	Reps	Mean	Minimum	Maximum	SE	SD	CV
0	Artificial Soil/S	5	1.53579	0.93500	2.67798	0.31159	0.69673	45.37%
100		5	1.92300	1.03398	2.41400	0.26113	0.58389	30.36%
Root Average Length Summary								
Conc-%	Control Type	Reps	Mean	Minimum	Maximum	SE	SD	CV
0	Artificial Soil/S	5	26.16	20.6	41	3.7499	8.385	32.05%
100		5	15.01	11.4	16.6	0.9413	2.1049	14.02%
Root Average Wet Wt. Summary								
Conc-%	Control Type	Reps	Mean	Minimum	Maximum	SE	SD	CV
0	Artificial Soil/S	5	36.242	13.590	65.054	8.4756	18.952	52.29%
100		5	32.967	19.824	43.706	4.3084	9.6338	29.22%
Total Average Biomass Dry Wt. Summary								
Conc-%	Control Type	Reps	Mean	Minimum	Maximum	SE	SD	CV
0	Artificial Soil/S	5	7.5894	5.0750	11.36	1.1021	2.4644	32.47%
100		5	5.4715	2.64	7.338	0.8730	1.9522	35.68%
Total Average Biomass Wet Wt. Summary								
Conc-%	Control Type	Reps	Mean	Minimum	Maximum	SE	SD	CV
0	Artificial Soil/S	5	70.439	33.550	118.26	13.727	30.694	43.58%
100		5	58.759	30.774	73.196	7.8485	17.55	29.87%

Report Date:

05 Jun-06 1:14 PM

Test Link:

04-5125-2759/B157504psc

CETIS Test Summary

% Germination Detail						
Conc-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Artificial Soil/S	1.00000	1.00000	0.40000	1.00000	1.00000
100		1.00000	1.00000	0.80000	1.00000	1.00000
AG Average Dry Wt. Detail						
Conc-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Artificial Soil/S	4.53401	6.62400	4.14001	6.28801	8.68201
100		4.92400	3.92000	2.72250	1.60601	4.56999
AG Average Height Detail						
Conc-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Artificial Soil/S	15.8	18.2	33.5	18.2	23
100		15.8	14.2	9	8.4	16.6
AG Average Wet Wt. Detail						
Conc-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Artificial Soil/S	30.4100	33.172	19.9600	34.2360	53.2080
100		32.794	29.212	26.515	10.95	29.49
Root Average Dry Wt. Detail						
Conc-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Artificial Soil/S	1.26801	1.68799	0.93500	1.10999	2.67798
100		2.41400	2.09199	1.66501	1.03398	2.41001
Root Average Length Detail						
Conc-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Artificial Soil/S	20.6	22.8	41	22.4	24
100		16.6	15.8	16.25	11.4	15
Root Average Wet Wt. Detail						
Conc-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Artificial Soil/S	33.3280	40.9320	13.5900	28.3060	65.054
100		39.5060	34.89	26.9075	19.824	43.7060
Total Average Biomass Dry Wt. Detail						
Conc-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Artificial Soil/S	5.80201	8.31199	5.07501	7.398	11.36
100		7.33799	6.01199	4.38751	2.63999	6.98000
Total Average Biomass Wet Wt. Detail						
Conc-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Artificial Soil/S	63.7380	74.1040	33.5500	62.5420	118.262
100		72.3000	64.102	53.4225	30.774	73.196

CETIS Analysis Detail

Plant Chronic test	CH2M Hill
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Endpoint	Analysis Type	Sample Link	Control Link	Date Analyzed	Version
% Germination	Comparison	04-5125-2759	04-5125-2759	05 Jun-06 1:14 PM	CETISv1.1.2

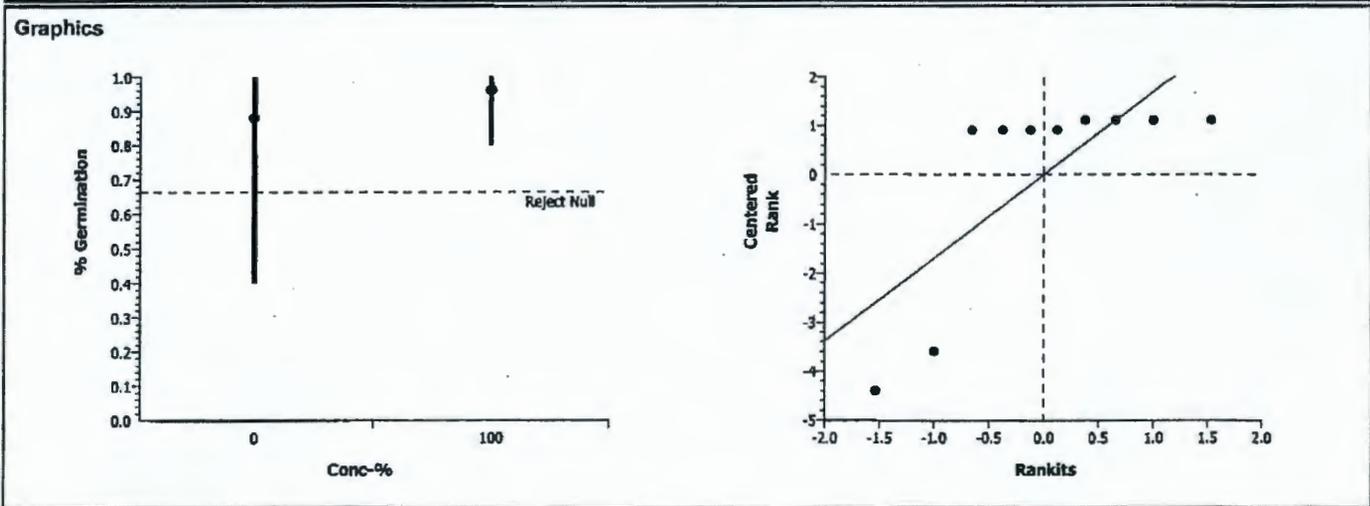
Method	Alt H	Data Transform	Zeta	NOEL	LOEL	Toxic Units	ChV	PMSD
Wilcoxon Rank Sum Two-Sample	C > T	Rank		100	>100	1	N/A	24.60%

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

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

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

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



CETIS Analysis Detail

Plant Chronic test CH2M HILL

Endpoint	Analysis Type	Sample Link	Control Link	Date Analyzed	Version
AG Average Dry Wt.	Comparison	04-5125-2759	04-5125-2759	05 Jun-06 1:14 PM	CETISv1.1.2

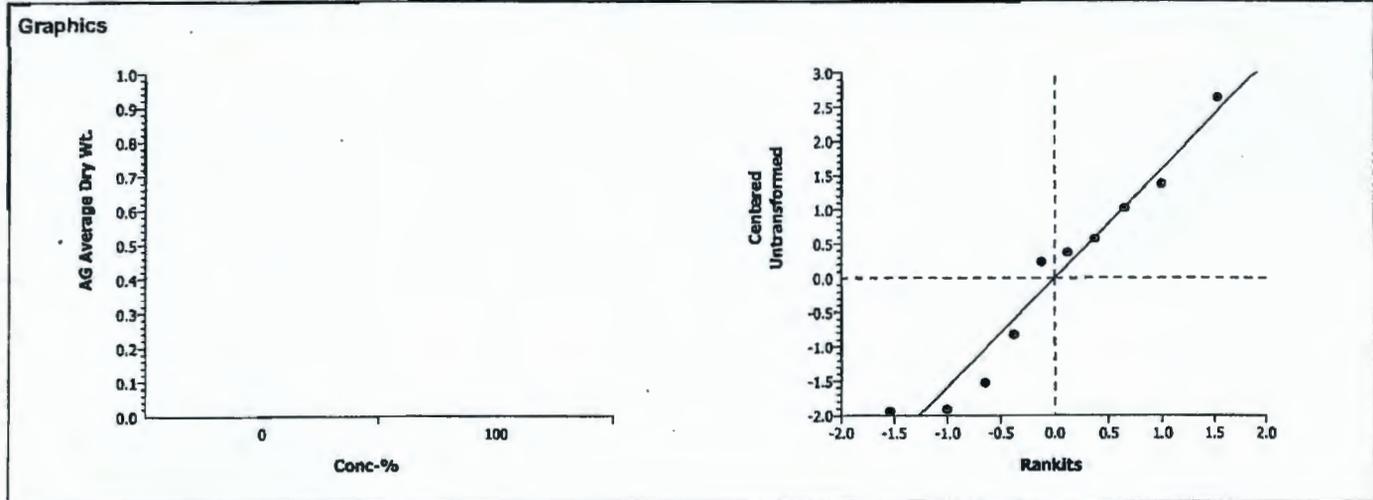
Method	Alt H	Data Transform	Zeta	NOEL	LOEL	Toxic Units	ChV	PMSD
Equal Variance t Two-Sample	C > T	Untransformed		<100	100		N/A	31.32%

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

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

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

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



CETIS Analysis Detail

Comparisons: Page 3 of 9
 Report Date: 05 Jun-06 1:14 PM
 Analysis: 09-1597-6154/B157504psc

Plant Chronic test						CH2M Hill
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Endpoint	Analysis Type	Sample Link	Control Link	Date Analyzed	Version
AG Average Height	Comparison	04-5125-2759	04-5125-2759	05 Jun-06 1:14 PM	CETISv1.1.2

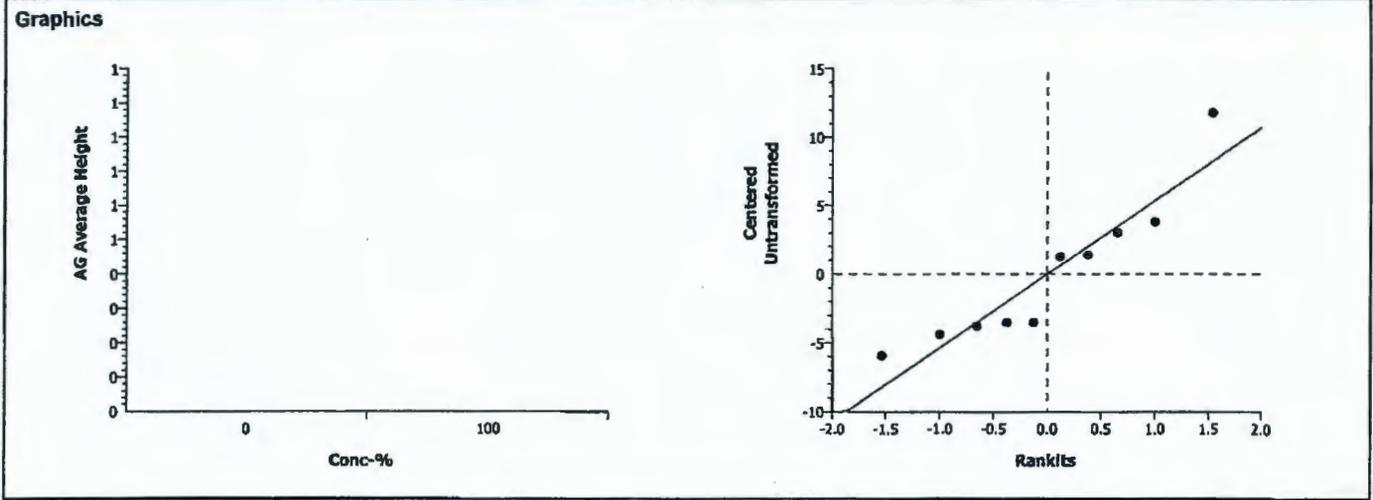
Method	Alt H	Data Transform	Zeta	NOEL	LOEL	Toxic Units	ChV	PMSD
Equal Variance t Two-Sample	C > T	Untransformed		<100	100		N/A	30.81%

Group Comparisons							
Control	vs	Conc-%	Statistic	Critical	P-Value	MSD	Decision(0.05)
Artificial Soil/Sedi		100	2.48222	1.85955	0.0190	6.69737	Significant Effect

ANOVA Table						
Source	Sum of Squares	Mean Square	DF	F Statistic	P-Value	Decision(0.05)
Between	199.809	199.809	1	6.16	0.03798	Significant Effect
Error	259.432	32.429	8			
Total	459.241013	232.23801	9			

ANOVA Assumptions					
Attribute	Test	Statistic	Critical	P-Value	Decision(0.01)
Variances	Variance Ratio F	3.38230	23.15450	0.26490	Equal Variances
Distribution	Shapiro-Wilk W	0.87992		0.13021	Normal Distribution

Data Summary		Original Data					Transformed Data			
Conc-%	Control Type	Count	Mean	Minimum	Maximum	SD	Mean	Minimum	Maximum	SD
0	Artificial Soil/S	5	21.740	15.8	33.5	7.0752				
100		5	12.8	8.4	16.6	3.8471				



CETIS Analysis Detail

Plant Chronic test	CH2M HILL
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Endpoint	Analysis Type	Sample Link	Control Link	Date Analyzed	Version
AG Average Wet Wt.	Comparison	04-5125-2759	04-5125-2759	05 Jun-06 1:14 PM	CETISv1.1.2

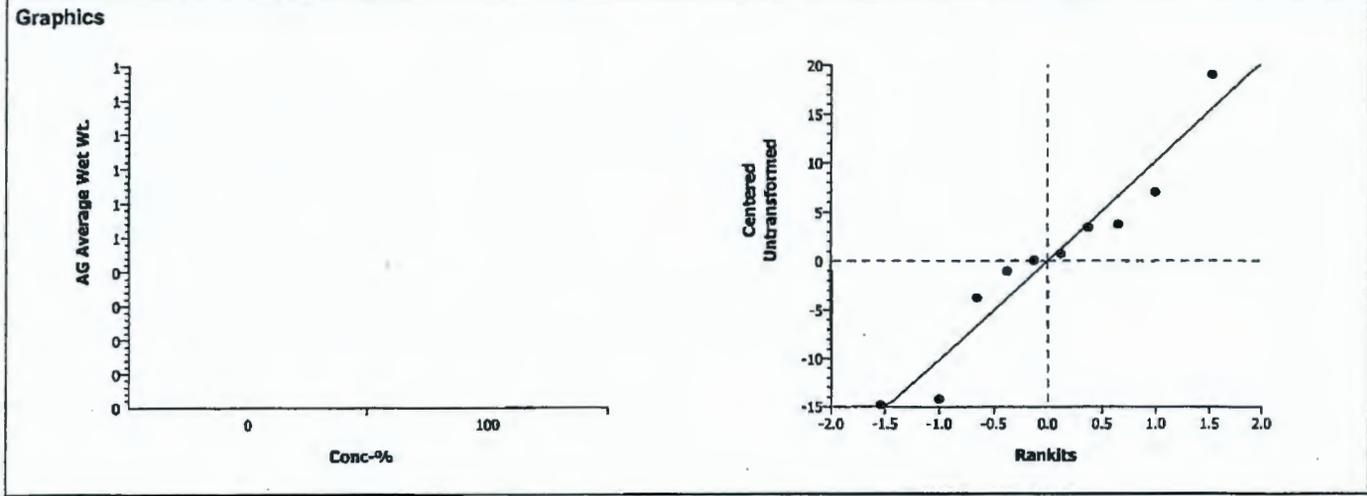
Method	Alt H	Data Transform	Zeta	NOEL	LOEL	Toxic Units	ChV	PMSD
Equal Variance t Two-Sample	C > T	Untransformed		100	>100	1	N/A	35.96%

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

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

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

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



CETIS Analysis Detail

Plant Chronic test	CH2M Hill
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Endpoint	Analysis Type	Sample Link	Control Link	Date Analyzed	Version
Root Average Dry Wt.	Comparison	04-5125-2759	04-5125-2759	05 Jun-06 1:14 PM	CETISv1.1.2

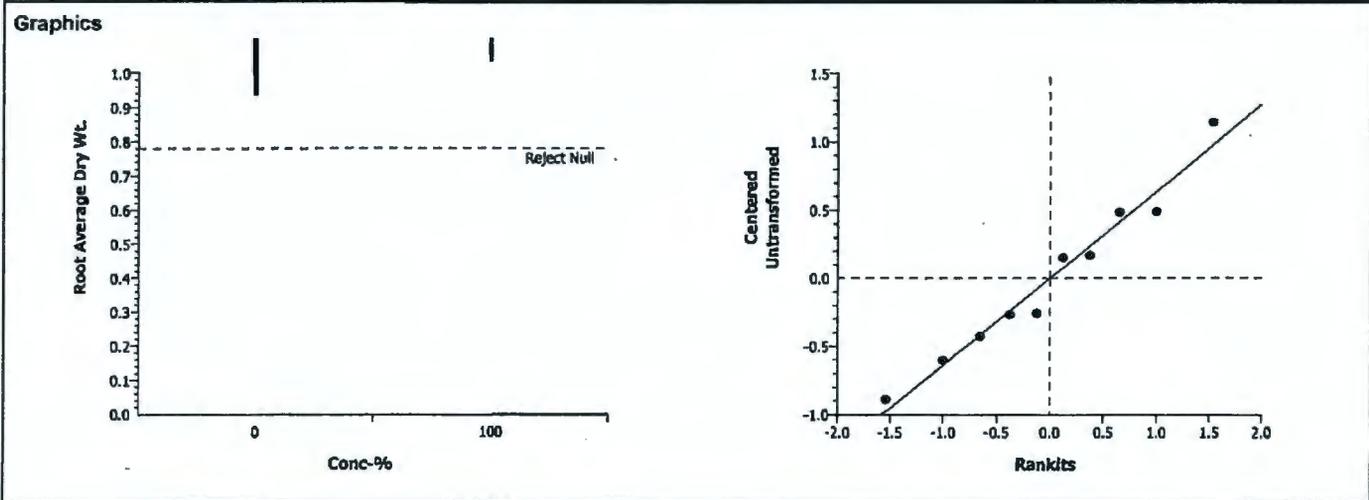
Method	Alt H	Data Transform	Zeta	NOEL	LOEL	Toxic Units	ChV	PMSD
Equal Variance t Two-Sample	C > T	Untransformed		100	>100	1	N/A	49.22%

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

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

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

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



CETIS Analysis Detail

Comparisons: Page 6 of 9
 Report Date: 05 Jun-06 1:14 PM
 Analysis: 16-4287-8059/B157504psc

Plant Chronic test	CH2M Hill
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Endpoint	Analysis Type	Sample Link	Control Link	Date Analyzed	Version
Root Average Length	Comparison	04-5125-2759	04-5125-2759	05 Jun-06 1:14 PM	CETISv1.1.2

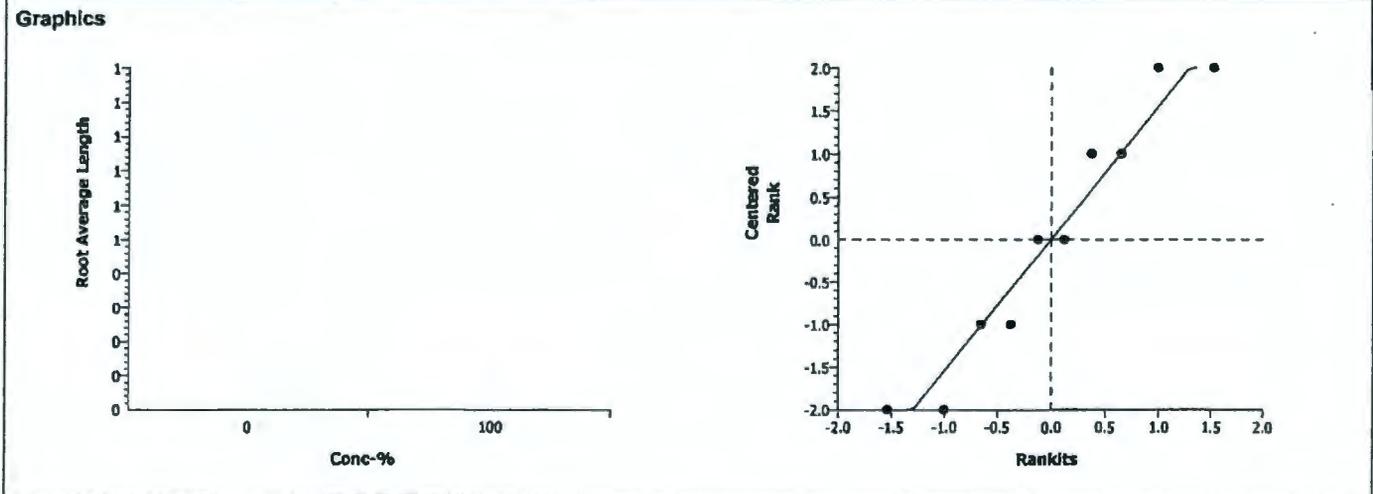
Method	Alt H	Data Transform	Zeta	NOEL	LOEL	Toxic Units	ChV	PMSD
Wilcoxon Rank Sum Two-Sample	C > T	Rank		<100	100		N/A	27.48%

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	310.8062	310.8062	1	8.32	0.02039	Significant Effect
Error	298.954	37.36925	8			
Total	609.760254	348.1755	9			

ANOVA Assumptions					
Attribute	Test	Statistic	Critical	P-Value	Decision(0.01)
Variances	Variance Ratio F	15.86909	23.15450	0.02025	Equal Variances
Distribution	Shapiro-Wilk W	0.76261		0.00508	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	26.16	20.6	41	8.385	8.00000	6.00000	10.00000	1.58114
100		5	15.010	11.4	16.6	2.1049	3.00000	1.00000	5.00000	1.58114



CETIS Analysis Detail

Comparisons: Page 7 of 9
 Report Date: 05 Jun-06 1:14 PM
 Analysis: 11-1905-9625/B157504psc

Plant Chronic test	CH2M Hill
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Endpoint	Analysis Type	Sample Link	Control Link	Date Analyzed	Version
Root Average Wet Wt.	Comparison	04-5125-2759	04-5125-2759	05 Jun-06 1:14 PM	CETISv1.1.2

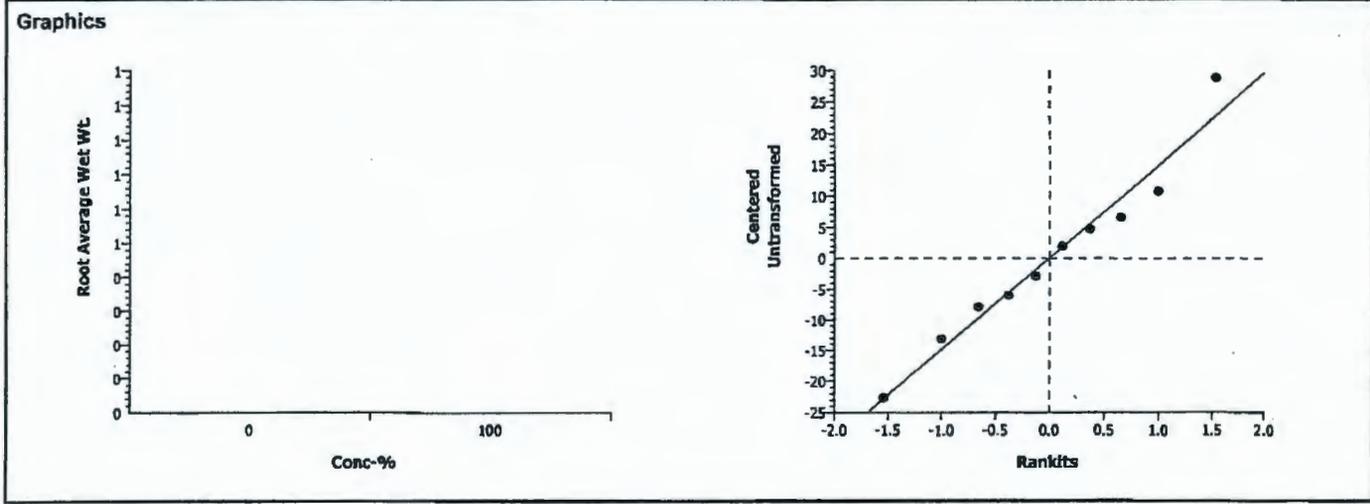
Method	Alt H	Data Transform	Zeta	NOEL	LOEL	Toxic Units	ChV	PMSD
Equal Variance t Two-Sample	C > T	Untransformed		100	>100	1	N/A	48.78%

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

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

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

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



CETIS Analysis Detail

Plant Chronic test CH2M Hill

Endpoint	Analysis Type	Sample Link	Control Link	Date Analyzed	Version
Total Average Biomass Dry Wt.	Comparison	04-5125-2759	04-5125-2759	05 Jun-06 1:14 PM	CETISv1.1.2

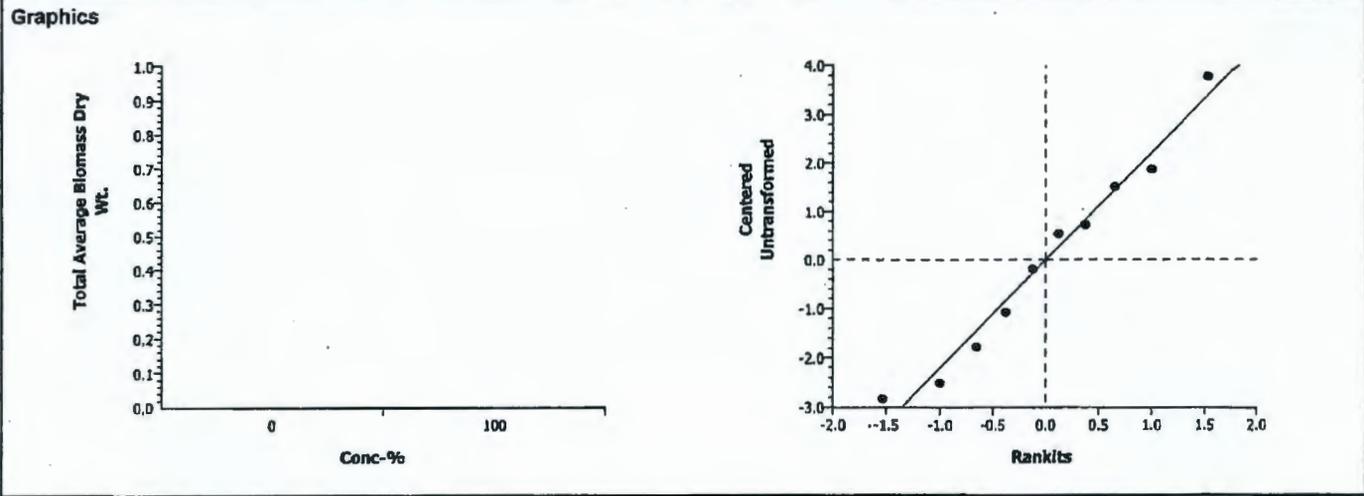
Method	Alt H	Data Transform	Zeta	NOEL	LOEL	Toxic Units	ChV	PMSD
Equal Variance t Two-Sample	C > T	Untransformed		100	>100	1	N/A	34.45%

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

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

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

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



CETIS Analysis Detail

Comparisons: Page 9 of 9
 Report Date: 05 Jun-06 1:14 PM
 Analysis: 14-0645-1947/B157504psc

Plant Chronic test	CH2M Hill
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Endpoint	Analysis Type	Sample Link	Control Link	Date Analyzed	Version
Total Average Biomass Wet Wt.	Comparison	04-5125-2759	04-5125-2759	05 Jun-06 1:14 PM	CETISv1.1.2

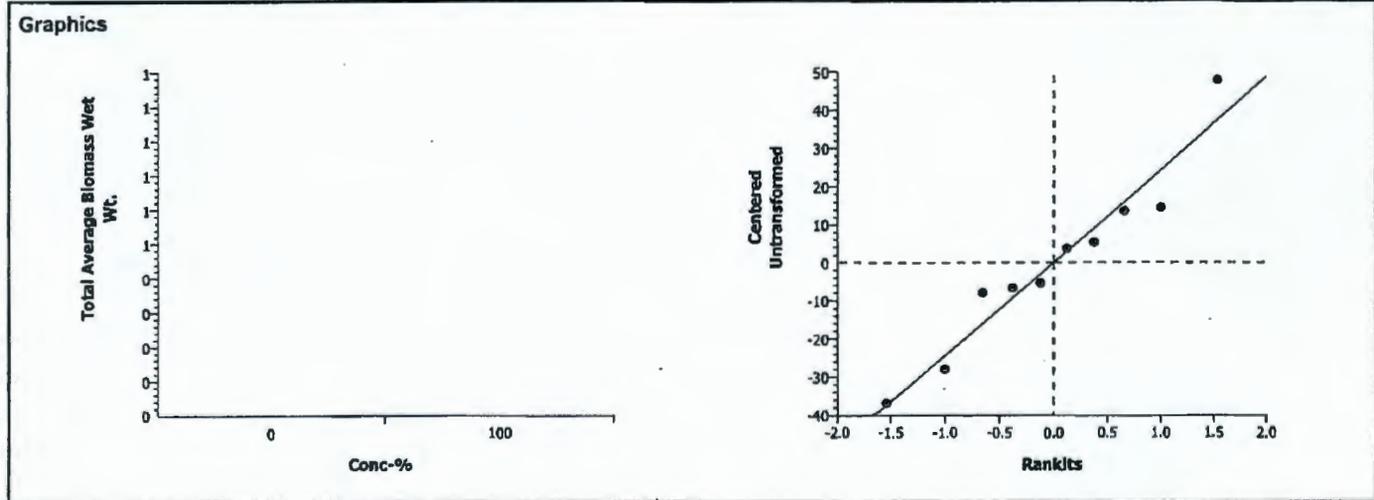
Method	Alt H	Data Transform	Zeta	NOEL	LOEL	Toxic Units	ChV	PMSD
Equal Variance t Two-Sample	C > T	Untransformed		100	>100	1	N/A	41.74%

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

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

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

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



BLUEGRASS GROWTH TEST

Client: Washington Closure Hanford Project

Test Start Date: 4/26-06

Day 0 98 Day 12 _____ Day 14 NT Day 16 NJ Day 19 TP Day 21 NJ Day 23 NJ Day 28 NJ Day 35 Bn

		Bioassay Lab ID: BG 1575- 05							Sample No: J11519		
CONC.	REPLICATE	# seeds germinated							pH		
		12 days after planting	14 days after planting	16 days after planting	19 days after planting	21 days after planting	23 days after planting	7-DAYS POST-EMERGENCE (28 days after planting)	14-DAYS POST-EMERGENCE (35 days after planting)	INITIAL (at planting)	FINAL (at 14 days Post-Emergence)
Control	A		5	5	5	5	4	4	4	6.4	7.1
	B		4	5	6	7	7	5	5		
	C		2	3	3	3	4	4	4		
	D		2	2	2	2	2	3	3		
	E		4	4	4	4	4	4	3 live, 1 dead		

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

Replicate A: 2 lg G, 2 med G
 Replicate B: 4 med G, 1 sm G. Removed 2 sm G w/ 1 B tip
 Replicate C: 1 lg G w/ 1 B tip, 2 med G, 1 sm G
 Replicate D: 1 lg G, 1 med G, 1 sm G
 Replicate E: 1 lg G, 2 med G, 1 sm G

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

14-Days Post-Emergence: Describe shoot appearance:

Replicate A: 1 lg G, 3 med G
 Replicate B: 3 lg G, 2 med G
 Replicate C: 3 lg G, 1 sm G
 Replicate D: 1 lg G, 1 med G w/ 1 B shoot, 1 sm G
 Replicate E: 3 lg G, * removed: 1 sm dead

Measure Shoot Height:

	1st Seedling	2nd Seedling	3rd Seedling	4th Seedling	5th Seedling
Replicate A	84 mm	112 mm	55 mm	74 mm	mm
Replicate B	87 mm	83 mm	52 mm	46 mm	32 mm
Replicate C	74 mm	86 mm	51 mm	33 mm	mm
Replicate D	74 mm	51 mm	15 mm	mm	mm
Replicate E	102 mm	92 mm	78 mm	mm	mm

Measure Shoot Weight:

	Tin Tara WL (mg)	Wet WL (mg)	Dry WL (mg)
Replicate A	1029.66	1177.0	1054.19
Replicate B	1253.67	1363.3	1272.95
Replicate C	1250.91	1332.8	1264.48
Replicate D	1248.54	1308.5	1258.21
Replicate E	1243.07	1367.0	1264.01

Describe root appearance:

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

Measure Root Length:

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

Measure Root Weight:

	Tin Tara WL (mg)	Wet WL (mg)	Dry WL (mg)
Replicate A	981.54	1272.9	991.00
Replicate B	1253.38	1422.8	1265.06
Replicate C	1256.41	1434.9	1263.26
Replicate D	1247.10	1320.6	1251.39
Replicate E	1252.35	1422.1	1260.99

Comments:

CETIS Test Summary

Report Date:

05 Jun-06 1:18 PM

Test Link:

06-6514-0864/B157505psc

Plant Chronic test		CH2M HILL				
Test No:	02-4058-2635	Test Type:	Plant Chronic test	Duration:	N/A	
Start Date:	26 Apr-06	Protocol:	ASTM E1963-02 (2002)	Species:	Poa sandbergii	
Ending Date:		Dil Water:		Source:		
Setup Date:	26 Apr-06	Brine:				
Sample No:	06-5440-2928	Code:	B1574-05	Client:		
Sample Date:	13 Apr-06	Material:	Soil	Project:		
Receive Date:		Source:	Hanford			
Sample Age:	13d 0h	Station:				
Comments:	J11JH9					
Comparison Summary						
Analysis	Endpoint	NOEL	LOEL	ChV	PMSD	Method
06-8216-4886	% Germination	100	> 100	N/A	28.01%	Equal Variance t Two-Sample
15-5199-1116	AG Average Dry Wt.	100	> 100	N/A	34.42%	Equal Variance t Two-Sample
02-0355-8196	AG Average Height	100	> 100	N/A	38.89%	Equal Variance t Two-Sample
01-0958-4685	AG Average Wet Wt.	100	> 100	N/A	37.90%	Equal Variance t Two-Sample
02-1587-6349	Root Average Dry Wt.	100	> 100	N/A	48.94%	Equal Variance t Two-Sample
01-6861-2988	Root Average Length	100	> 100	N/A	35.10%	Equal Variance t Two-Sample
10-6003-1182	Root Average Wet Wt.	100	> 100	N/A	61.56%	Equal Variance t Two-Sample
15-0450-1637	Total Average Biomass Dry	100	> 100	N/A	36.49%	Equal Variance t Two-Sample
03-0746-0004	Total Average Biomass Wet	100	> 100	N/A	48.91%	Equal Variance t Two-Sample

Report Date:

05 Jun-06 1:18 PM

CETIS Test Summary

Test Link:

06-6514-0864/B157505psc

% Germination Summary								
Conc-%	Control Type	Reps	Mean	Minimum	Maximum	SE	SD	CV
0	Artificial Soil/S	5	0.88000	0.40000	1.60000	0.12000	0.26833	30.49%
100		5	0.76000	0.60000	1.00000	0.07483	0.16733	22.02%
AG Average Dry Wt. Summary								
Conc-%	Control Type	Reps	Mean	Minimum	Maximum	SE	SD	CV
0	Artificial Soil/S	5	6.05361	4.14001	8.68201	0.81424	1.82070	30.08%
100		5	4.71685	3.22331	6.98002	0.76979	1.72131	36.49%
AG Average Height Summary								
Conc-%	Control Type	Reps	Mean	Minimum	Maximum	SE	SD	CV
0	Artificial Soil/S	5	21.74	15.8	33.5	3.1641	7.0752	32.54%
100		5	19.1	12	30.333	3.2644	7.2995	38.22%
AG Average Wet Wt. Summary								
Conc-%	Control Type	Reps	Mean	Minimum	Maximum	SE	SD	CV
0	Artificial Soil/S	5	34.197	19.960	53.208	5.3829	12.036	35.20%
100		5	28.406	19.987	41.310	4.4262	9.8973	34.84%
Root Average Dry Wt. Summary								
Conc-%	Control Type	Reps	Mean	Minimum	Maximum	SE	SD	CV
0	Artificial Soil/S	5	1.53579	0.93500	2.67798	0.31159	0.69673	45.37%
100		5	2.14590	1.43001	2.88000	0.25746	0.57570	26.83%
Root Average Length Summary								
Conc-%	Control Type	Reps	Mean	Minimum	Maximum	SE	SD	CV
0	Artificial Soil/S	5	26.16	20.6	41	3.7499	8.385	32.05%
100		5	19.083	12	30.667	3.2124	7.1831	37.64%
Root Average Wet Wt. Summary								
Conc-%	Control Type	Reps	Mean	Minimum	Maximum	SE	SD	CV
0	Artificial Soil/S	5	36.242	13.590	65.054	8.4756	18.952	52.29%
100		5	46.486	24.5	72.840	8.4916	18.988	40.85%
Total Average Biomass Dry Wt. Summary								
Conc-%	Control Type	Reps	Mean	Minimum	Maximum	SE	SD	CV
0	Artificial Soil/S	5	7.5894	5.0750	11.36	1.1021	2.4644	32.47%
100		5	6.8628	4.6533	9.8600	1.0017	2.2399	32.64%
Total Average Biomass Wet Wt. Summary								
Conc-%	Control Type	Reps	Mean	Minimum	Maximum	SE	SD	CV
0	Artificial Soil/S	5	70.439	33.550	118.26	13.727	30.694	43.58%
100		5	74.892	44.487	109.68	12.443	27.823	37.15%

CETIS Test Summary

Report Date:

05 Jun-06 1:18 PM

Test Link:

06-6514-0864/B157505psc

% Germination Detail						
Conc-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Artificial Soil/S	1.00000	1.00000	0.40000	1.00000	1.00000
100		0.80000	1.00000	0.80000	0.60000	0.60000
AG Average Dry Wt. Detail						
Conc-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Artificial Soil/S	4.53401	6.62400	4.14001	6.28801	8.68201
100		6.13248	3.85598	3.39249	3.22331	6.98002
AG Average Height Detail						
Conc-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Artificial Soil/S	15.8	18.2	33.5	18.2	23
100		22.25	12	15.25	15.6667	30.3333
AG Average Wet Wt. Detail						
Conc-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Artificial Soil/S	30.4100	33.172	19.9600	34.2360	53.2080
100		36.835	21.9260	21.9725	19.9867	41.3100
Root Average Dry Wt. Detail						
Conc-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Artificial Soil/S	1.26801	1.68799	0.93500	1.10999	2.67798
100		2.36501	2.34199	1.71249	1.43001	2.88000
Root Average Length Detail						
Conc-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Artificial Soil/S	20.6	22.8	41	22.4	24
100		20.5	12	17.25	15	30.6667
Root Average Wet Wt. Detail						
Conc-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Artificial Soil/S	33.3280	40.9320	13.5900	28.3060	65.054
100		72.8400	33.8840	44.6225	24.5	56.5833
Total Average Biomass Dry Wt. Detail						
Conc-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Artificial Soil/S	5.80201	8.31199	5.07501	7.398	11.36
100		8.49748	6.19797	5.10498	4.65332	9.86003
Total Average Biomass Wet Wt. Detail						
Conc-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Artificial Soil/S	63.7380	74.1040	33.5500	62.5420	118.262
100		109.675	55.8100	66.5950	44.4867	97.8933

CETIS Analysis Detail

Plant Chronic test CH2M Hill

Endpoint	Analysis Type	Sample Link	Control Link	Date Analyzed	Version
% Germination	Comparison	06-6514-0864	06-6514-0864	05 Jun-06 1:17 PM	CETISv1.1.2

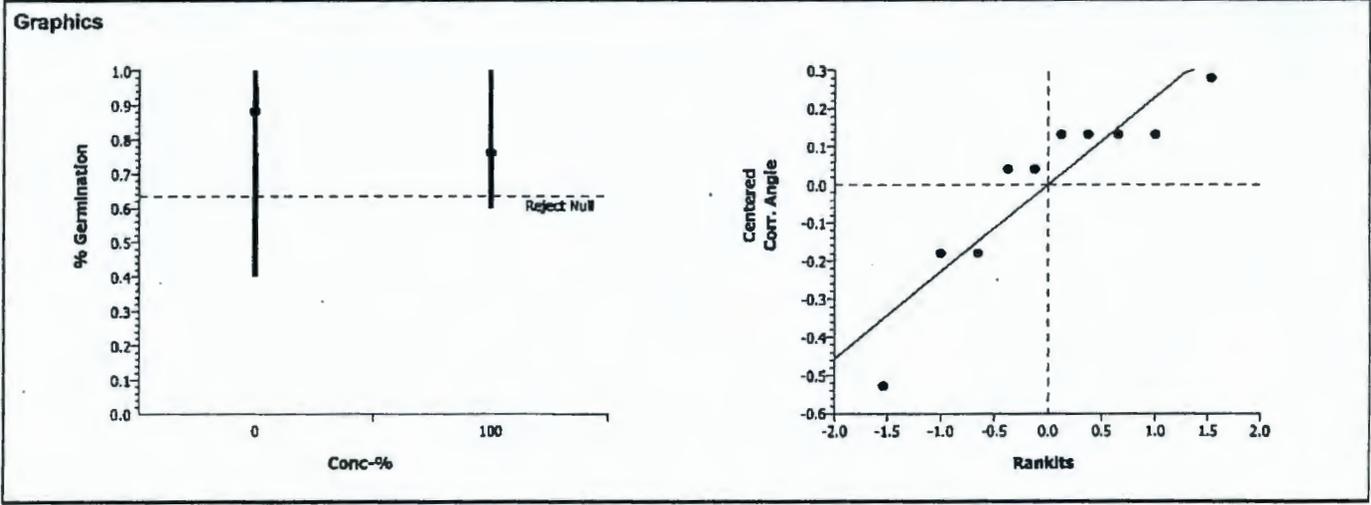
Method	Alt H	Data Transform	Zeta	NOEL	LOEL	Toxic Units	ChV	PMSD
Equal Variance t Two-Sample	C > T	Angular (Corrected)		100	>100	1	N/A	28.01%

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

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

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

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



CETIS Analysis Detail

Plant Chronic test CH2M HILL

Endpoint	Analysis Type	Sample Link	Control Link	Date Analyzed	Version
AG Average Dry Wt.	Comparison	06-6514-0864	06-6514-0864	05 Jun-06 1:17 PM	CETISv1.1.2

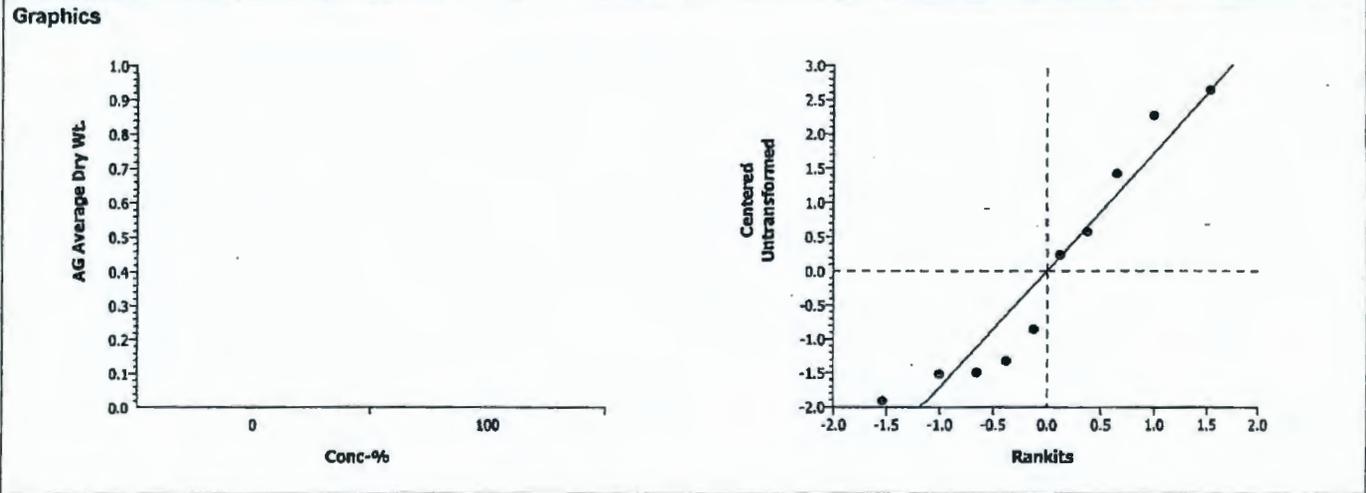
Method	Alt H	Data Transform	Zeta	NOEL	LOEL	Toxic Units	ChV	PMSD
Equal Variance t Two-Sample	C > T	Untransformed		100	>100	1	N/A	34.42%

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

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

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

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



CETIS Analysis Detail

Plant Chronic test						CH2M Hill
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Endpoint	Analysis Type	Sample Link	Control Link	Date Analyzed	Version
AG Average Height	Comparison	06-6514-0864	06-6514-0864	05 Jun-06 1:17 PM	CETISv1.1.2

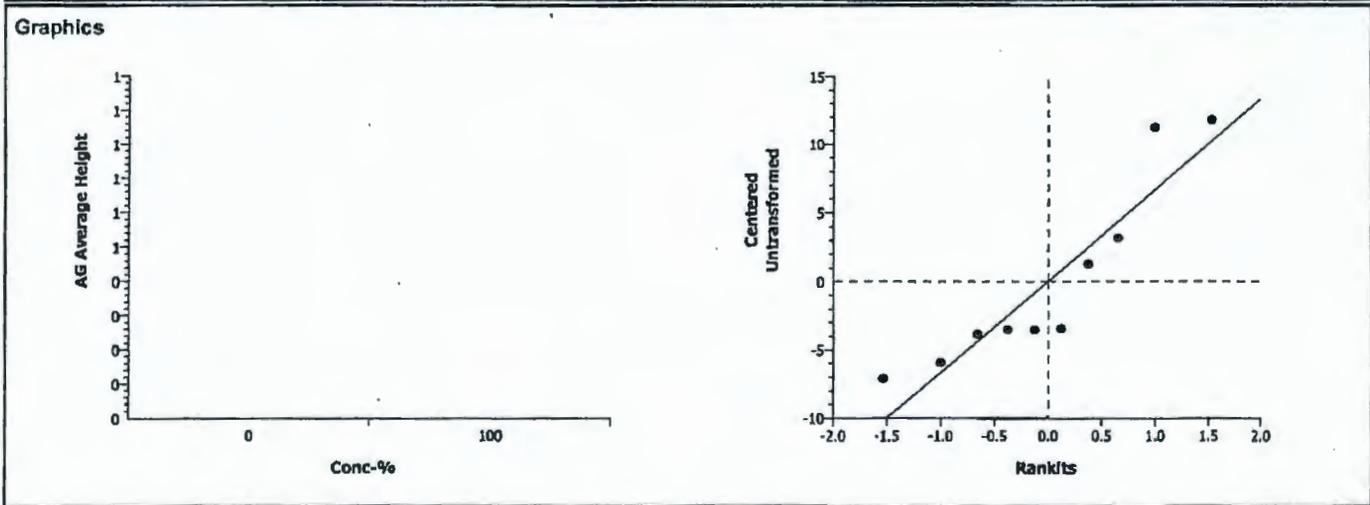
Method	Alt H	Data Transform	Zeta	NOEL	LOEL	Toxic Units	ChV	PMSD
Equal Variance t Two-Sample	C > T	Untransformed		100	>100	1	N/A	38.89%

Group Comparisons							
Control	vs	Conc-%	Statistic	Critical	P-Value	MSD	Decision(0.05)
Artificial Soil/Sedi		100	0.58070	1.85955	0.2887	8.45392	Non-Significant Effect

ANOVA Table						
Source	Sum of Squares	Mean Square	DF	F Statistic	P-Value	Decision(0.05)
Between	17.424	17.424	1	0.34	0.57743	Non-Significant Effect
Error	413.3625	51.67032	8			
Total	430.786549	69.094318	9			

ANOVA Assumptions					
Attribute	Test	Statistic	Critical	P-Value	Decision(0.01)
Variances	Variance Ratio F	1.06442	23.15450	0.95321	Equal Variances
Distribution	Shapiro-Wilk W	0.83369		0.03707	Normal Distribution

Data Summary		Original Data					Transformed Data			
Conc-%	Control Type	Count	Mean	Minimum	Maximum	SD	Mean	Minimum	Maximum	SD
0	Artificial Soil/S	5	21.740	15.8	33.5	7.0752				
100		5	19.100	12	30.333	7.2995				



CETIS Analysis Detail

Plant Chronic test	CH2M Hill
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Endpoint	Analysis Type	Sample Link	Control Link	Date Analyzed	Version
AG Average Wet Wt.	Comparison	06-6514-0864	06-6514-0864	05 Jun-06 1:17 PM	CETISv1.1.2

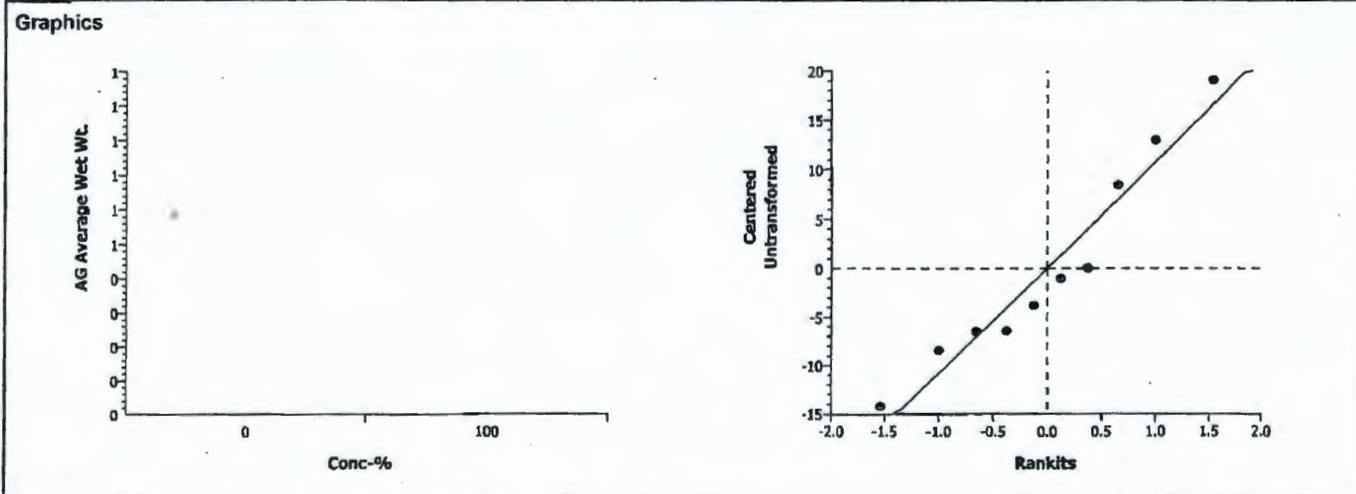
Method	Alt H	Data Transform	Zeta	NOEL	LOEL	Toxic Units	ChV	PMSD
Equal Variance t Two-Sample	C > T	Untransformed		100	>100	1	N/A	37.90%

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

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

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

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



CETIS Analysis Detail

Plant Chronic test CH2M Hill

Endpoint	Analysis Type	Sample Link	Control Link	Date Analyzed	Version
Root Average Dry Wt.	Comparison	06-6514-0864	06-6514-0864	05 Jun-06 1:18 PM	CETISv1.1.2

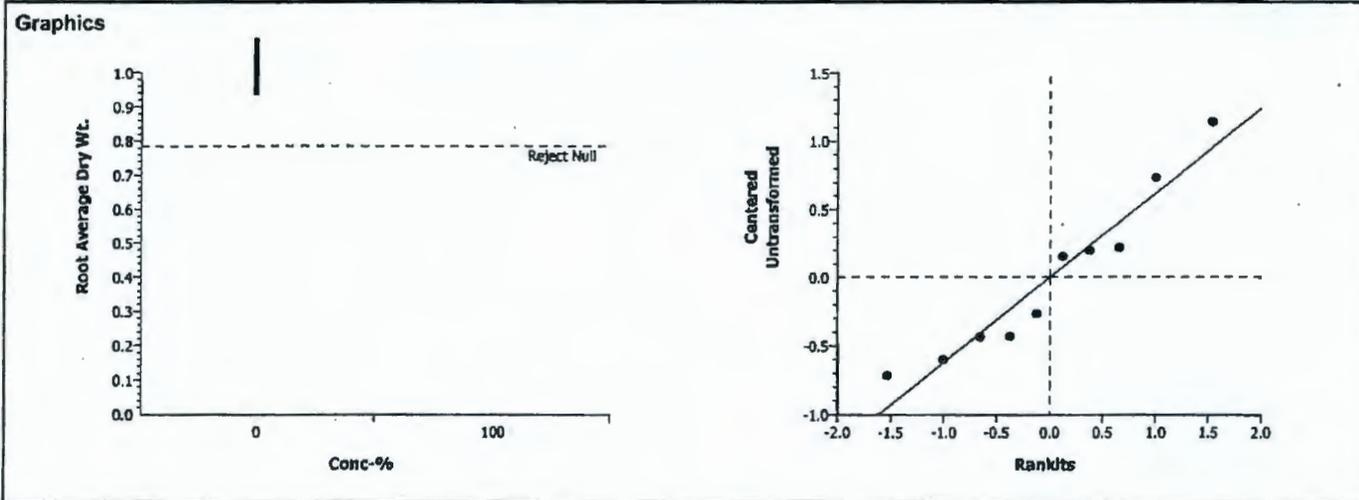
Method	Alt H	Data Transform	Zeta	NOEL	LOEL	Toxic Units	ChV	PMSD
Equal Variance t Two-Sample	C > T	Untransformed		100	>100	1	N/A	48.94%

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

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

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

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



CETIS Analysis Detail

Plant Chronic test	CH2M Hill
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Endpoint	Analysis Type	Sample Link	Control Link	Date Analyzed	Version
Root Average Length	Comparison	06-6514-0864	06-6514-0864	05 Jun-06 1:18 PM	CETISv1.1.2

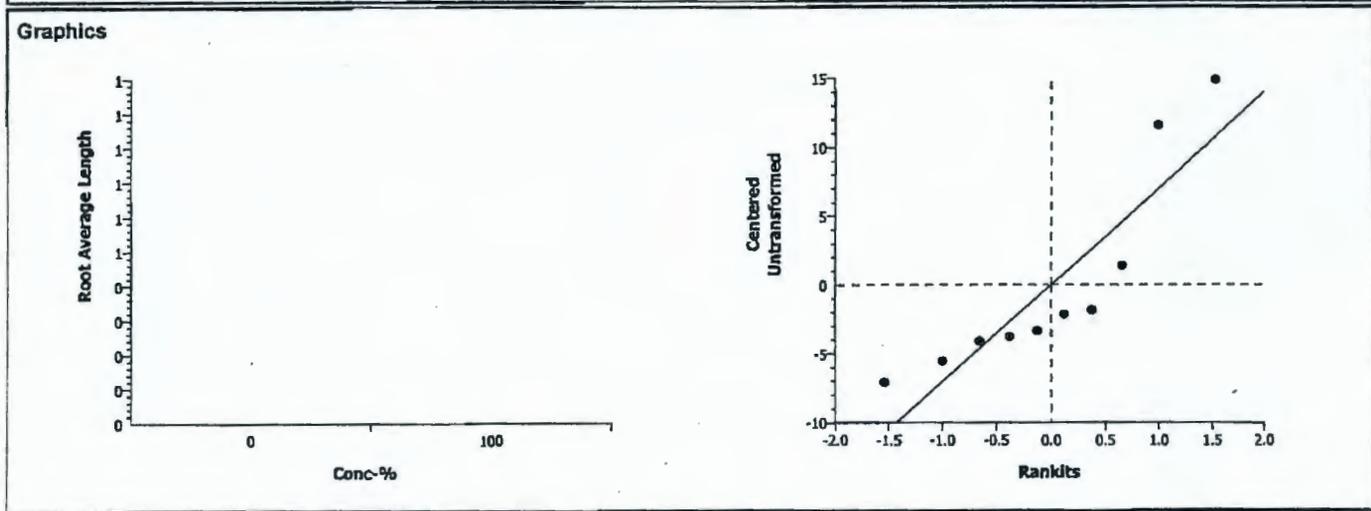
Method	Alt H	Data Transform	Zeta	NOEL	LOEL	Toxic Units	ChV	PMSD
Equal Variance t Two-Sample	C > T	Untransformed		100	>100	1	N/A	35.10%

Group Comparisons							
Control	vs	Conc-%	Statistic	Critical	P-Value	MSD	Decision(0.05)
Artificial Soil/Sedi		100	1.43319	1.85955	0.0949	9.18192	Non-Significant Effect

ANOVA Table							
Source	Sum of Squares	Mean Square	DF	F Statistic	P-Value	Decision(0.05)	
Between	125.198	125.198	1	2.05	0.18970	Non-Significant Effect	
Error	487.6209	60.95261	8				
Total	612.818909	186.15064	9				

ANOVA Assumptions						
Attribute	Test	Statistic	Critical	P-Value	Decision(0.01)	
Variances	Variance Ratio F	1.36263	23.15450	0.77158	Equal Variances	
Distribution	Shapiro-Wilk W	0.79435		0.01238	Normal Distribution	

Data Summary			Original Data				Transformed Data			
Conc-%	Control Type	Count	Mean	Minimum	Maximum	SD	Mean	Minimum	Maximum	SD
0	Artificial Soil/S	5	26.16	20.6	41	8.385				
100		5	19.083	12	30.667	7.1831				



CETIS Analysis Detail

Plant Chronic test CH2M HILL

Endpoint	Analysis Type	Sample Link	Control Link	Date Analyzed	Version
Root Average Wet Wt.	Comparison	06-6514-0864	06-6514-0864	05 Jun-06 1:18 PM	CETISv1.1.2

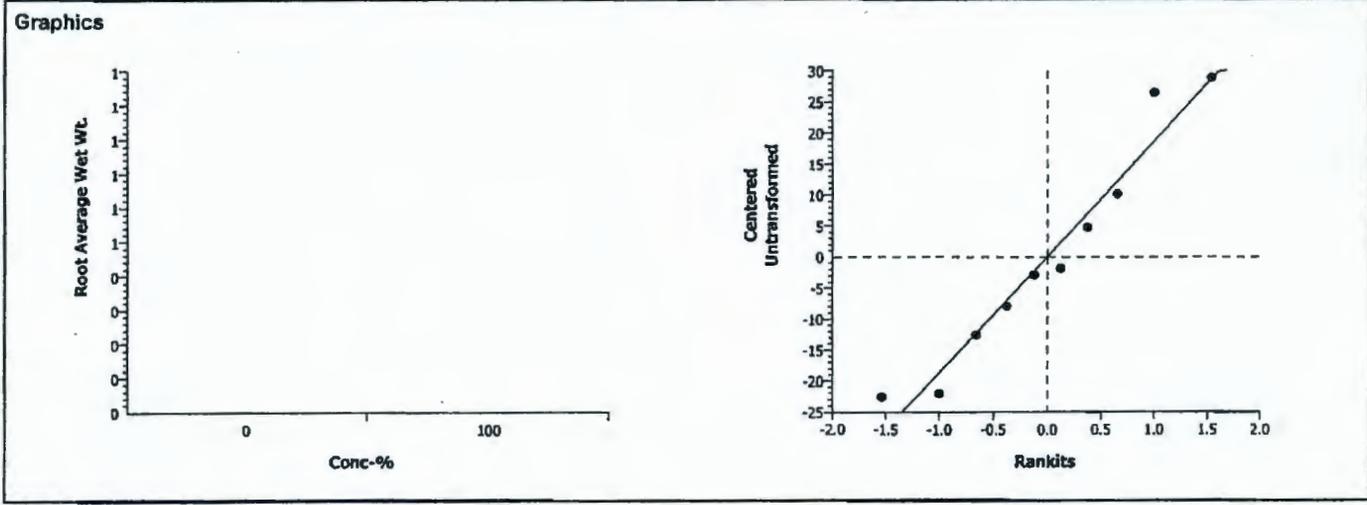
Method	Alt H	Data Transform	Zeta	NOEL	LOEL	Toxic Units	ChV	PMSD
Equal Variance t Two-Sample	C > T	Untransformed		100	>100	1	N/A	61.56%

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

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

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

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



CETIS Analysis Detail

Plant Chronic test	CH2M Hill
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Endpoint	Analysis Type	Sample Link	Control Link	Date Analyzed	Version
Total Average Biomass Dry Wt.	Comparison	06-6514-0864	06-6514-0864	05 Jun-06 1:18 PM	CETISv1.1.2

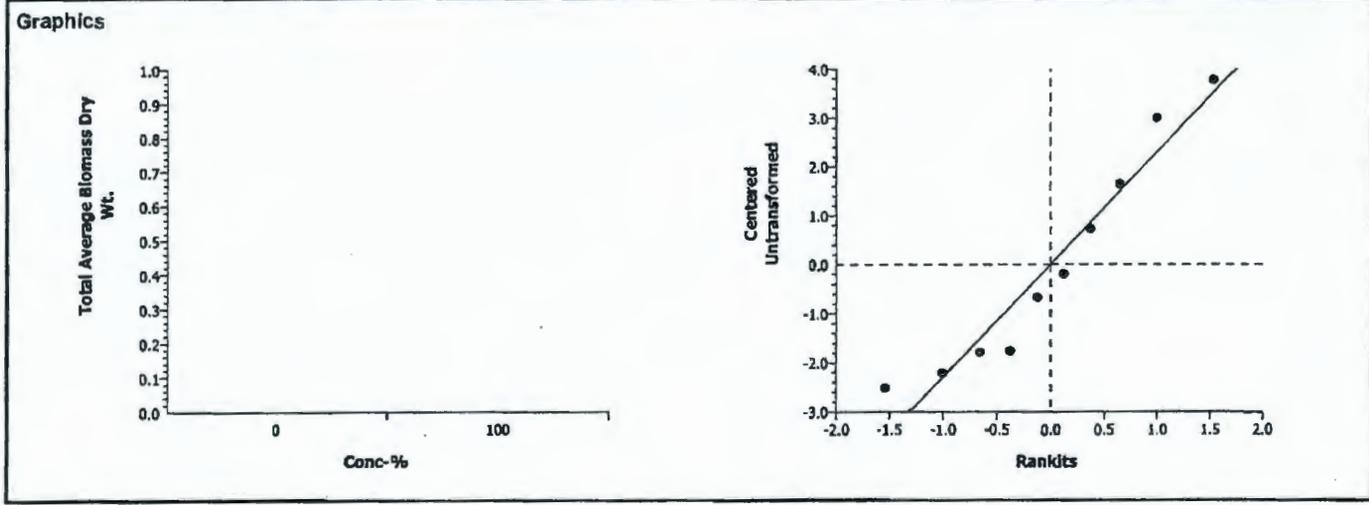
Method	Alt H	Data Transform	Zeta	NOEL	LOEL	Toxic Units	ChV	PMSD
Equal Variance t Two-Sample	C > T	Untransformed		100	>100	1	N/A	36.49%

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

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

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

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



CETIS Analysis Detail

Plant Chronic test CH2M Hill

Endpoint	Analysis Type	Sample Link	Control Link	Date Analyzed	Version
Total Average Biomass Wet Wt.	Comparison	06-6514-0864	06-6514-0864	05 Jun-06 1:18 PM	CETISv1.1.2

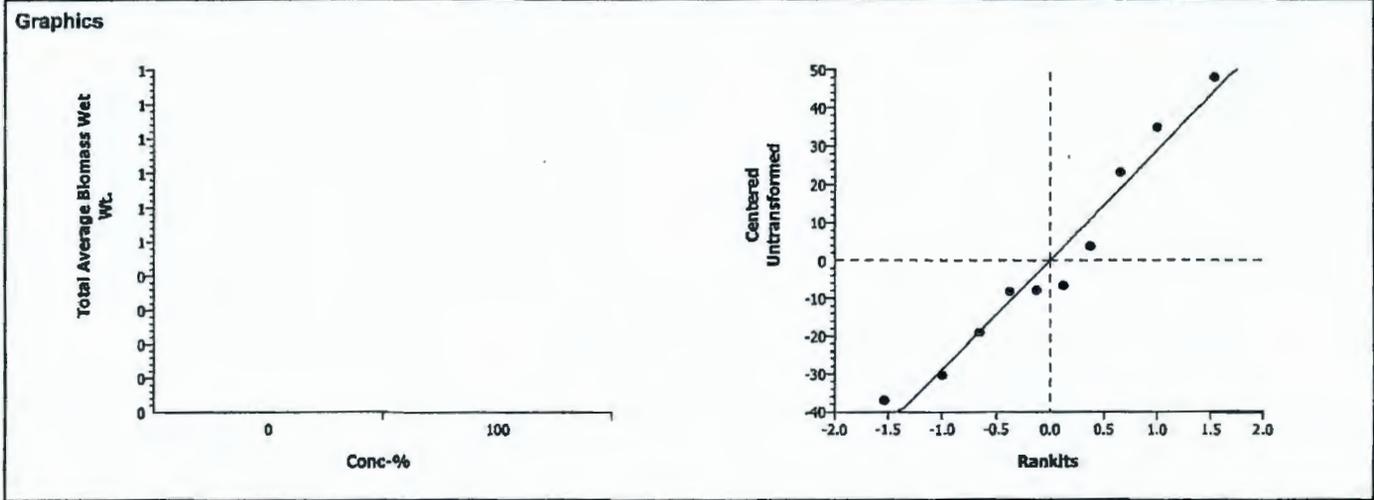
Method	Alt H	Data Transform	Zeta	NOEL	LOEL	Toxic Units	ChV	PMSD
Equal Variance t Two-Sample	C > T	Untransformed		100	>100	1	N/A	48.91%

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

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

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

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



BLUEGRASS GROWTH TEST

Client: Washington Closure Hanford Project

Test Start Date: 4-26-06

Initials: JD Day 12 _____ Day 14 NJ Day 16 NJ Day 18 JP Day 21 NJ Day 23 NJ Day 28 JP Day 35 DW

		Biocassay Lab ID: BG 1575-06							Sample No: J113B6		pH	
CONC.	REPLICATE	# seeds germinated							INITIAL (@ planting)	FINAL (@ 14 days Post-Emergence)		
		12 days after planting	14 days after planting	16 days after planting	19 days after planting	21 days after planting	23 days after planting	7-DAYS POST-EMERGENCE (28 days after planting)			14-DAYS POST-EMERGENCE (35 days after planting)	
Control	A		3	3	3	4	4	5 → 5	5	6.6	7.2	
	B		1	1	1	2	2	2 → 2	2			
	C		5	5	5	5	6	6 → 5	5			
	D		5	5	6	6	6	7 → 5	5			
	E		1	1	3	3	3	3 → 3	3			

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

Replicate A	1 Lg (G) w/ B tip, 2 med (G), 2 sm (G)
Replicate B	1 Lg (G), 1 med (G)
Replicate C	4 Lg (G) w/ B tips, 1 sm (G) removed 1 sm (B)
Replicate D	3 Lg (G) w/ B tip, 2 sm (G) removed 2 sm (G)
Replicate E	1 Lg (G) 2 med (G)

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

14-Days Post-Emergence: Describe shoot appearance:

Replicate A	3 Lg G, 1 Sm G, 1 Sm w/ B tip
Replicate B	1 Lg w/ B tip, 1 med G
Replicate C	3 Lg G, 1 Lg w/ B tip, 1 Sm G
Replicate D	2 med G w/ B tip, 1 med G, 2 Sm G
Replicate E	1 Lg w/ 1 R shoot, 2 med G

Measure Shoot Height:

Individual height of each seedling (above ground)

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

Measure Shoot Weight:

Total mass of all seedlings (above ground)

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

Describe root appearance:

*1410.88 2.N.

Replicate A	_____
Replicate B	_____
Replicate C	_____
Replicate D	_____
Replicate E	_____

Measure Root Length:

Individual length of the longest root from each seedling

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

Measure Root Weight:

Total mass of all roots from all seedlings

	Tin Tare Wt (mg)	Wet Wt (mg)	Dry Wt (mg)
Replicate A	1031.27	1118.90	1036.29
Replicate B	1249.32	1390.79	1254.73
Replicate C	1247.27	1476.07	1258.19
Replicate D	1246.96	1475.40	1254.32
Replicate E	1245.62	1388.22	1256.64

Comments:

CETIS Test Summary

Report Date: 05 Jun-06 1:22 PM
 Test Link: 11-9487-2971/B157506psc

Plant Chronic test		CH2M HILL				
Test No:	14-2250-1820	Test Type:	Plant Chronic test	Duration:	N/A	
Start Date:	26 Apr-06	Protocol:	ASTM E1963-02 (2002)	Species:	Poa sandbergii	
Ending Date:		Dil Water:		Source:		
Setup Date:	26 Apr-06	Brine:				
Sample No:	16-8873-9688	Code:	B1580-05	Client:		
Sample Date:	19 Apr-06	Material:	Soil	Project:		
Receive Date:		Source:	Hanford			
Sample Age:	7d 0h	Station:				
Comments:	J11JB6					
Comparison Summary						
Analysis	Endpoint	NOEL	LOEL	ChV	PMSD	Method
13-4204-6882	% Germination	100	> 100	N/A	35.39%	Wilcoxon Rank Sum Two-Sample
12-6190-9985	AG Average Dry Wt.	100	> 100	N/A	32.97%	Equal Variance t Two-Sample
08-4113-2537	AG Average Height	100	> 100	N/A	62.81%	Equal Variance t Two-Sample
00-3825-1023	AG Average Wet Wt.	100	> 100	N/A	40.52%	Equal Variance t Two-Sample
06-9369-2244	Root Average Dry Wt.	100	> 100	N/A	51.83%	Equal Variance t Two-Sample
10-4581-7262	Root Average Length	100	> 100	N/A	43.66%	Equal Variance t Two-Sample
11-1246-0300	Root Average Wet Wt.	100	> 100	N/A	61.36%	Equal Variance t Two-Sample
10-5356-5497	Total Average Biomass Dry	100	> 100	N/A	35.67%	Equal Variance t Two-Sample
03-4810-9124	Total Average Biomass Wet	100	> 100	N/A	50.41%	Equal Variance t Two-Sample

Report Date:

05 Jun-06 1:22 PM

Test Link:

11-9487-2971/B157506psc

CETIS Test Summary

% Germination Summary								
Conc-%	Control Type	Reps	Mean	Minimum	Maximum	SE	SD	CV
0	Artificial Soil/S	5	0.88000	0.40000	1.00000	0.12000	0.26833	30.49%
100		5	0.80000	0.40000	1.00000	0.12649	0.28284	35.36%
AG Average Dry Wt. Summary								
Conc-%	Control Type	Reps	Mean	Minimum	Maximum	SE	SD	CV
0	Artificial Soil/S	5	6.05361	4.14001	8.68201	0.81424	1.82070	30.08%
100		5	5.04346	2.78999	6.63000	0.69949	1.56411	31.01%
AG Average Height Summary								
Conc-%	Control Type	Reps	Mean	Minimum	Maximum	SE	SD	CV
0	Artificial Soil/S	5	21.74	15.8	33.5	3.1641	7.0752	32.54%
100		5	21.48	9.4	44	6.6262	14.817	68.98%
AG Average Wet Wt. Summary								
Conc-%	Control Type	Reps	Mean	Minimum	Maximum	SE	SD	CV
0	Artificial Soil/S	5	34.197	19.960	53.208	5.3829	12.036	35.20%
100		5	35.481	16.674	45.235	5.1521	11.521	32.47%
Root Average Dry Wt. Summary								
Conc-%	Control Type	Reps	Mean	Minimum	Maximum	SE	SD	CV
0	Artificial Soil/S	5	1.53579	0.93500	2.67798	0.31159	0.69673	45.37%
100		5	1.80767	1.00400	2.70502	0.29355	0.65640	36.31%
Root Average Length Summary								
Conc-%	Control Type	Reps	Mean	Minimum	Maximum	SE	SD	CV
0	Artificial Soil/S	5	26.16	20.6	41	3.7499	8.385	32.05%
100		5	18.027	7.8	35	4.8646	10.878	60.34%
Root Average Wet Wt. Summary								
Conc-%	Control Type	Reps	Mean	Minimum	Maximum	SE	SD	CV
0	Artificial Soil/S	5	36.242	13.590	65.054	8.4756	18.952	52.29%
100		5	45.449	17.526	70.740	8.4374	18.867	41.51%
Total Average Biomass Dry Wt. Summary								
Conc-%	Control Type	Reps	Mean	Minimum	Maximum	SE	SD	CV
0	Artificial Soil/S	5	7.5894	5.0750	11.36	1.1021	2.4644	32.47%
100		5	6.8511	3.794	9.3350	0.9509	2.1264	31.04%
Total Average Biomass Wet Wt. Summary								
Conc-%	Control Type	Reps	Mean	Minimum	Maximum	SE	SD	CV
0	Artificial Soil/S	5	70.439	33.550	118.26	13.727	30.694	43.58%
100		5	80.930	34.200	115.98	13.273	29.678	36.67%

Report Date: 05 Jun-06 1:22 PM
 Test Link: 11-9487-2971/B157506psc

CETIS Test Summary

% Germination Detail						
Conc-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Artificial Soil/S	1.00000	1.00000	0.40000	1.00000	1.00000
100		1.00000	0.40000	1.00000	1.00000	0.60000
AG Average Dry Wt. Detail						
Conc-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Artificial Soil/S	4.53401	6.62400	4.14001	6.28801	8.68201
100		2.78999	6.63000	5.05999	4.37400	6.36332
AG Average Height Detail						
Conc-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Artificial Soil/S	15.8	18.2	33.5	18.2	23
100		9.4	44	14.4	10.6	29
AG Average Wet Wt. Detail						
Conc-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Artificial Soil/S	30.4100	33.172	19.9600	34.2360	53.2080
100		16.674	45.235	32.47	41.836	41.19
Root Average Dry Wt. Detail						
Conc-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Artificial Soil/S	1.26801	1.68799	0.93500	1.10999	2.67798
100		1.00400	2.70502	2.18398	1.47200	1.67334
Root Average Length Detail						
Conc-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Artificial Soil/S	20.6	22.8	41	22.4	24
100		7.8	35	13.2	11.8	22.3333
Root Average Wet Wt. Detail						
Conc-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Artificial Soil/S	33.3280	40.9320	13.5900	28.3060	65.054
100		17.5260	70.7401	45.766	45.6880	47.5267
Total Average Biomass Dry Wt. Detail						
Conc-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Artificial Soil/S	5.80201	8.31199	5.07501	7.398	11.36
100		3.79399	9.33502	7.24397	5.846	8.03666
Total Average Biomass Wet Wt. Detail						
Conc-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Artificial Soil/S	63.7380	74.1040	33.5500	62.5420	118.262
100		34.2000	115.975	78.236	87.5240	88.7166

CETIS Analysis Detail

Plant Chronic test	CH2M Hill
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Endpoint	Analysis Type	Sample Link	Control Link	Date Analyzed	Version
% Germination	Comparison	11-9487-2971	11-9487-2971	05 Jun-06 1:21 PM	CETISv1.1.2

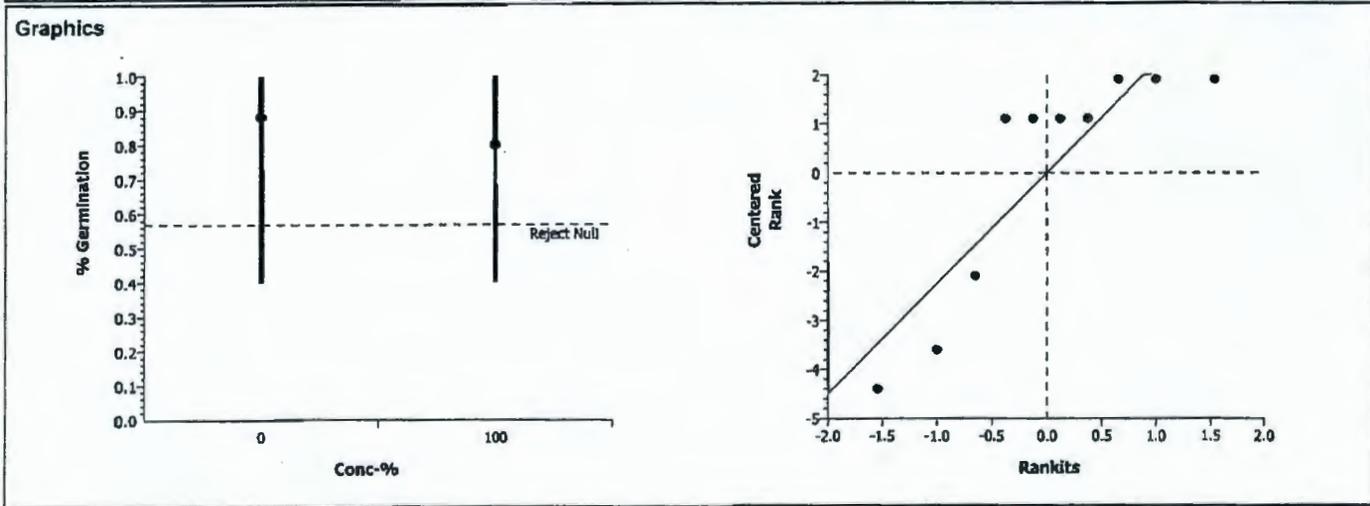
Method	Alt H	Data Transform	Zeta	NOEL	LOEL	Toxic Units	ChV	PMSD
Wilcoxon Rank Sum Two-Sample	C > T	Rank		100	>100	1	N/A	35.39%

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

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

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

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



CETIS Analysis Detail

Comparisons: Page 2 of 9
 Report Date: 05 Jun-06 1:22 PM
 Analysis: 12-6190-9985/B157506psc

Plant Chronic test	CH2M Hill
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Endpoint	Analysis Type	Sample Link	Control Link	Date Analyzed	Version
AG Average Dry Wt.	Comparison	11-9487-2971	11-9487-2971	05 Jun-06 1:21 PM	CETISv1.1.2

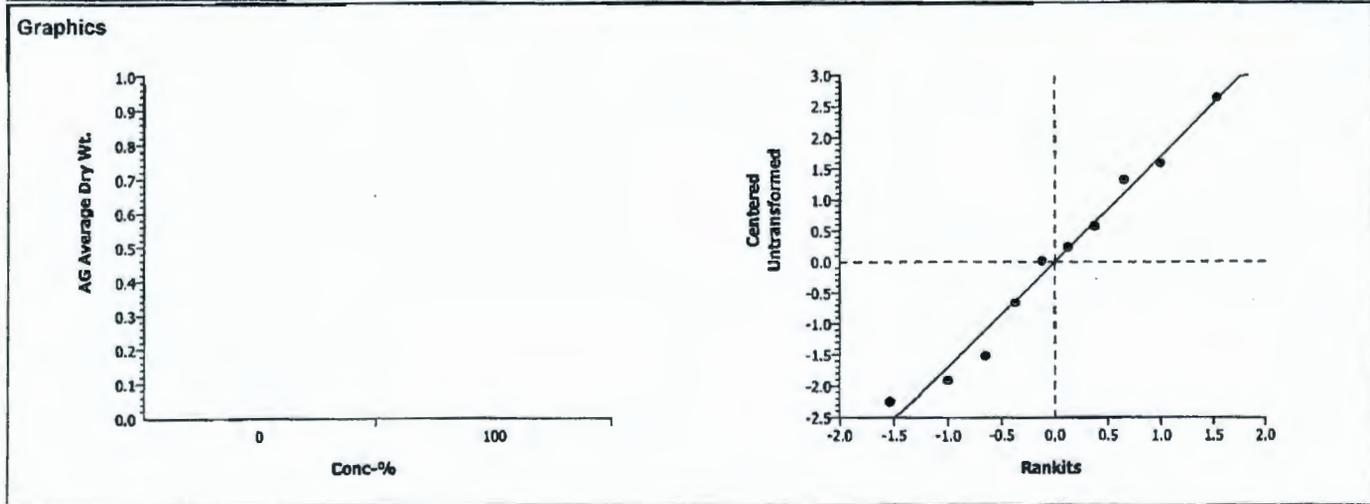
Method	Alt H	Data Transform	Zeta	NOEL	LOEL	Toxic Units	CHV	PMSD
Equal Variance t Two-Sample	C > T	Untransformed		100	>100	1	N/A	32.97%

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

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

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

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



CETIS Analysis Detail

Plant Chronic test CH2M Hill

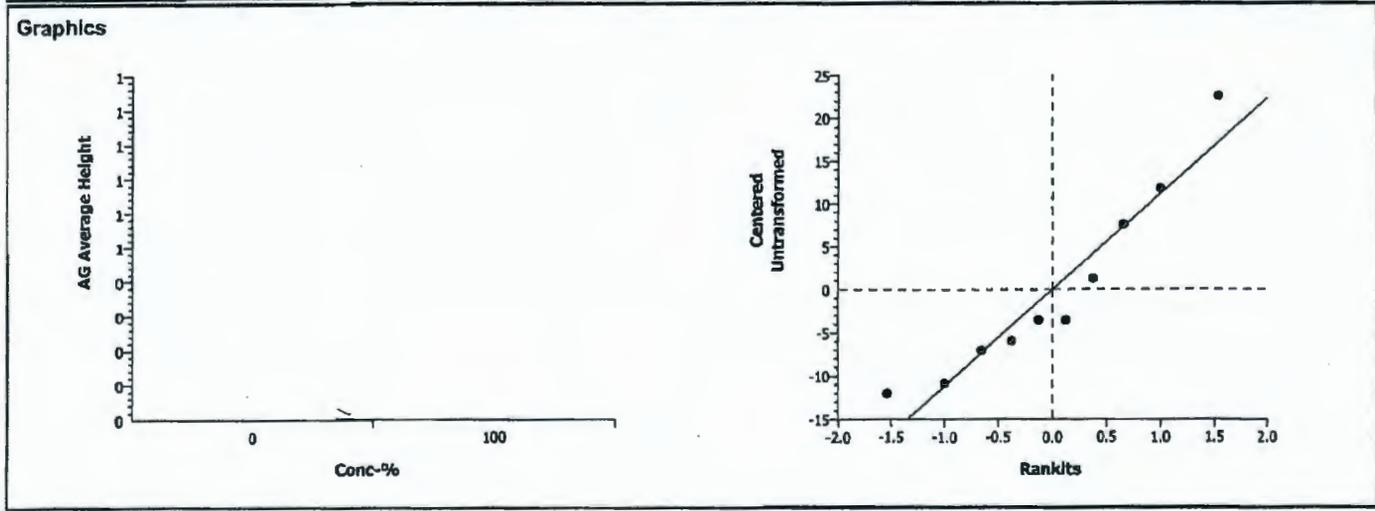
Endpoint	Analysis Type	Sample Link	Control Link	Date Analyzed	Version			
AG Average Height	Comparison	11-9487-2971	11-9487-2971	05 Jun-06 1:21 PM	CETISv1.1.2			
Method	Alt H	Data Transform	Zeta	NOEL	LOEL	Toxic Units	ChV	PMSD
Equal Variance t Two-Sample	C > T	Untransformed		100	>100	1	N/A	62.81%

Group Comparisons							
Control	vs	Conc-%	Statistic	Critical	P-Value	MSD	Decision(0.05)
Artificial Soil/Sedi		100	0.03541	1.85955	0.4863	13.6545	Non-Significant Effect

ANOVA Table						
Source	Sum of Squares	Mean Square	DF	F Statistic	P-Value	Decision(0.05)
Between	0.169	0.169	1	0.00	0.97262	Non-Significant Effect
Error	1078.36	134.795	8			
Total	1078.52899	134.964	9			

ANOVA Assumptions					
Attribute	Test	Statistic	Critical	P-Value	Decision(0.01)
Variances	Variance Ratio F	4.38555	23.15450	0.18126	Equal Variances
Distribution	Shapiro-Wilk W	0.90920		0.27552	Normal Distribution

Data Summary			Original Data				Transformed Data			
Conc-%	Control Type	Count	Mean	Minimum	Maximum	SD	Mean	Minimum	Maximum	SD
0	Artificial Soil/S	5	21.740	15.8	33.5	7.0752				
100		5	21.48	9.4	44	14.817				



CETIS Analysis Detail

Plant Chronic test	CH2M Hill
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Endpoint	Analysis Type	Sample Link	Control Link	Date Analyzed	Version
AG Average Wet Wt.	Comparison	11-9487-2971	11-9487-2971	05 Jun-06 1:21 PM	CETISv1.1.2

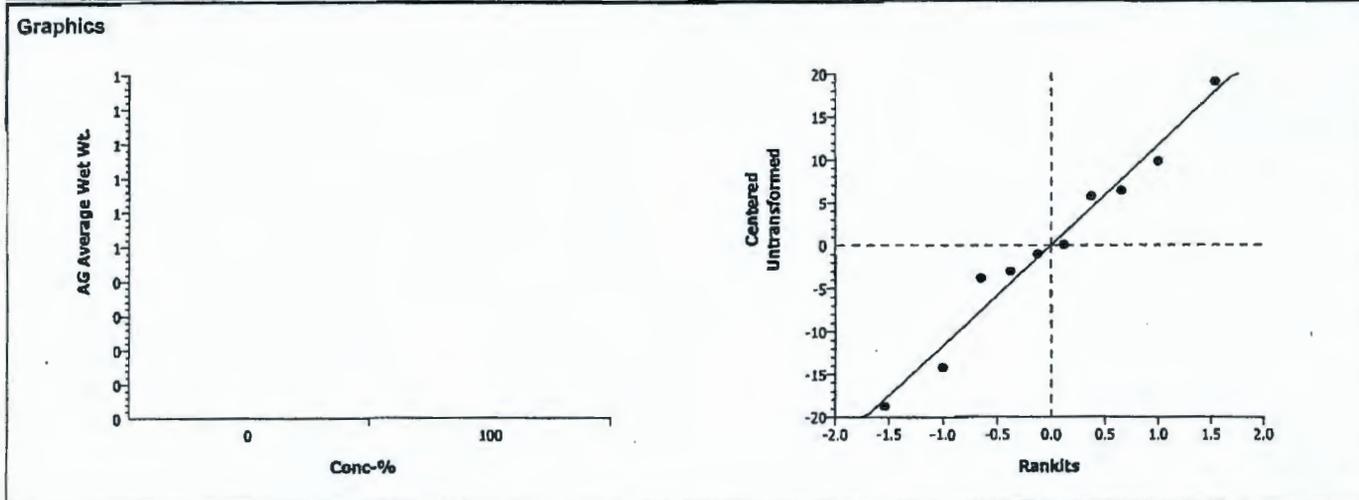
Method	Alt H	Data Transform	Zeta	NOEL	LOEL	Toxic Units	ChV	PMSD
Equal Variance t Two-Sample	C > T	Untransformed		100	>100	1	N/A	40.52%

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

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

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

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



CETIS Analysis Detail

Plant Chronic test CH2M HILL

Endpoint	Analysis Type	Sample Link	Control Link	Date Analyzed	Version
Root Average Dry Wt.	Comparison	11-9487-2971	11-9487-2971	05 Jun-06 1:21 PM	CETISv1.1.2

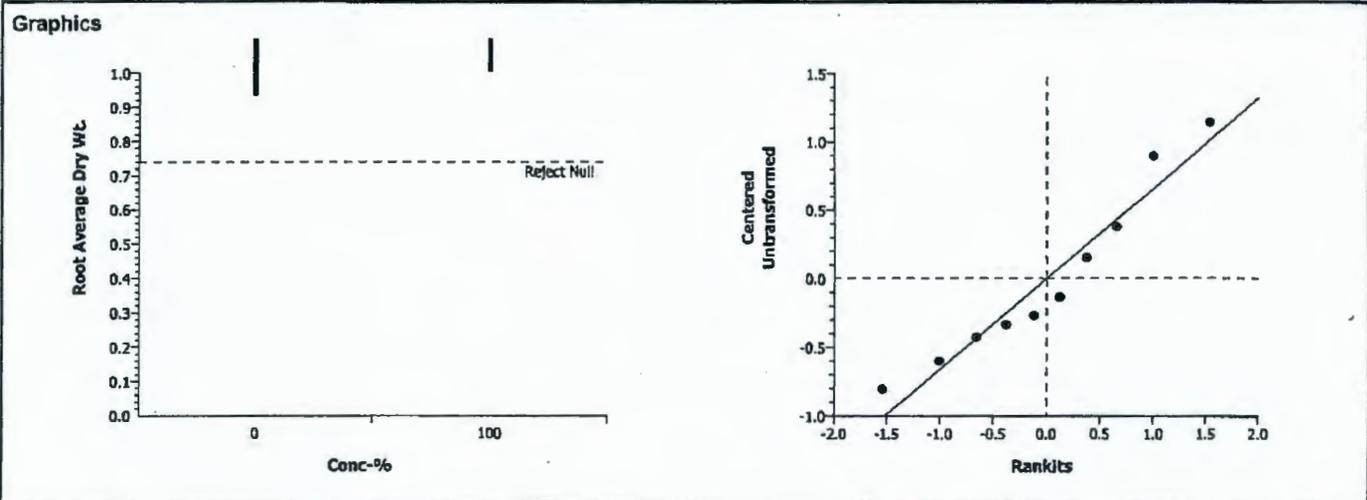
Method	Alt H	Data Transform	Zeta	NOEL	LOEL	Toxic Units	ChV	PMSD
Equal Variance t Two-Sample	C > T	Untransformed		100	>100	1	N/A	51.83%

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

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

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

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



CETIS Analysis Detail

Plant Chronic test						CH2M Hill
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Endpoint	Analysis Type	Sample Link	Control Link	Date Analyzed	Version
Root Average Length	Comparison	11-9487-2971	11-9487-2971	05 Jun-06 1:21 PM	CETISv1.1.2

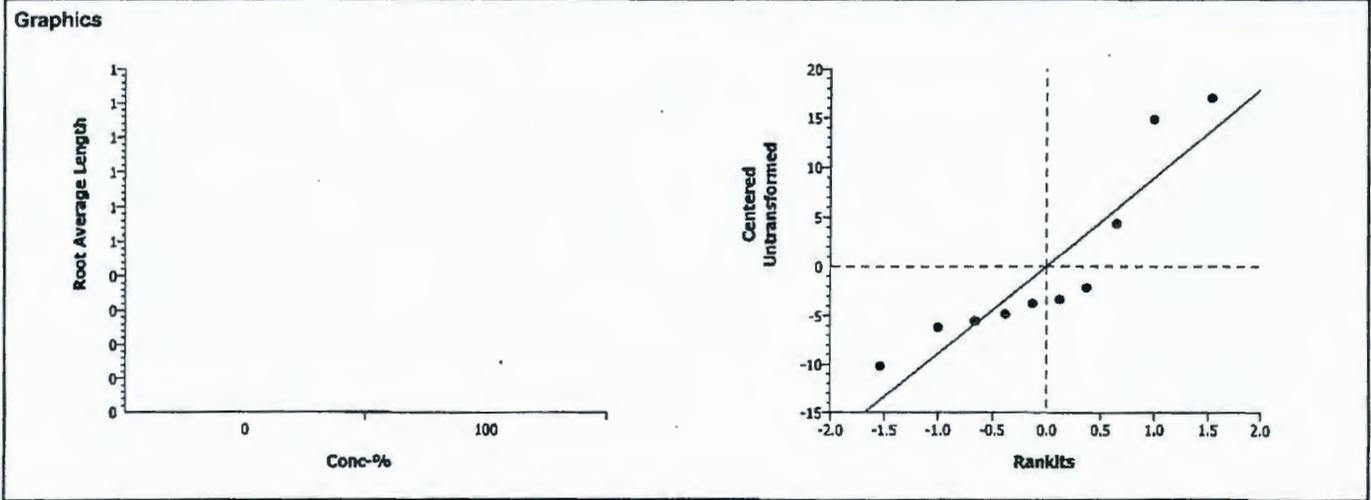
Method	Alt H	Data Transform	Zeta	NOEL	LOEL	Toxic Units	ChV	PMSD
Equal Variance t Two-Sample	C > T	Untransformed		100	>100	1	N/A	43.66%

Group Comparisons							
Control	vs	Conc-%	Statistic	Critical	P-Value	MSD	Decision(0.05)
Artificial Soil/Sedi		100	1.32418	1.85955	0.1110	11.4217	Non-Significant Effect

ANOVA Table						
Source	Sum of Squares	Mean Square	DF	F Statistic	P-Value	Decision(0.05)
Between	165.3778	165.3778	1	1.75	0.22202	Non-Significant Effect
Error	754.5262	94.31578	8			
Total	919.904022	259.69356	9			

ANOVA Assumptions					
Attribute	Test	Statistic	Critical	P-Value	Decision(0.01)
Variances	Variance Ratio F	1.68293	23.15450	0.62643	Equal Variances
Distribution	Shapiro-Wilk W	0.82792		0.03158	Normal Distribution

Data Summary		Original Data					Transformed Data			
Conc-%	Control Type	Count	Mean	Minimum	Maximum	SD	Mean	Minimum	Maximum	SD
0	Artificial Soil/S	5	26.16	20.6	41	8.385				
100		5	18.027	7.8	35	10.878				



CETIS Analysis Detail

Plant Chronic test	CH2M Hill
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Endpoint	Analysis Type	Sample Link	Control Link	Date Analyzed	Version
Root Average Wet Wt.	Comparison	11-9487-2971	11-9487-2971	05 Jun-06 1:22 PM	CETISv1.1.2

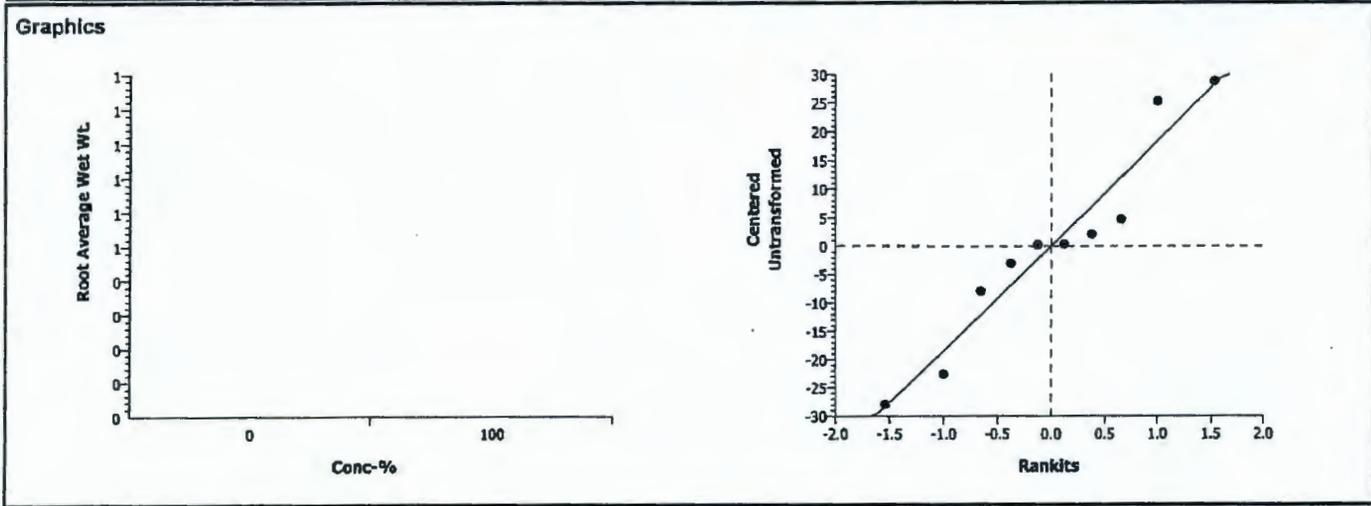
Method	Ajt H	Data Transform	Zeta	NOEL	LOEL	Toxic Units	ChV	PMSD
Equal Variance t Two-Sample	C > T	Untransformed		100	>100	1	N/A	61.36%

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

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

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

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



CETIS Analysis Detail

Plant Chronic test	CH2M Hill
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Endpoint	Analysis Type	Sample Link	Control Link	Date Analyzed	Version
Total Average Biomass Dry Wt.	Comparison	11-9487-2971	11-9487-2971	05 Jun-06 1:22 PM	CETISv1.1.2

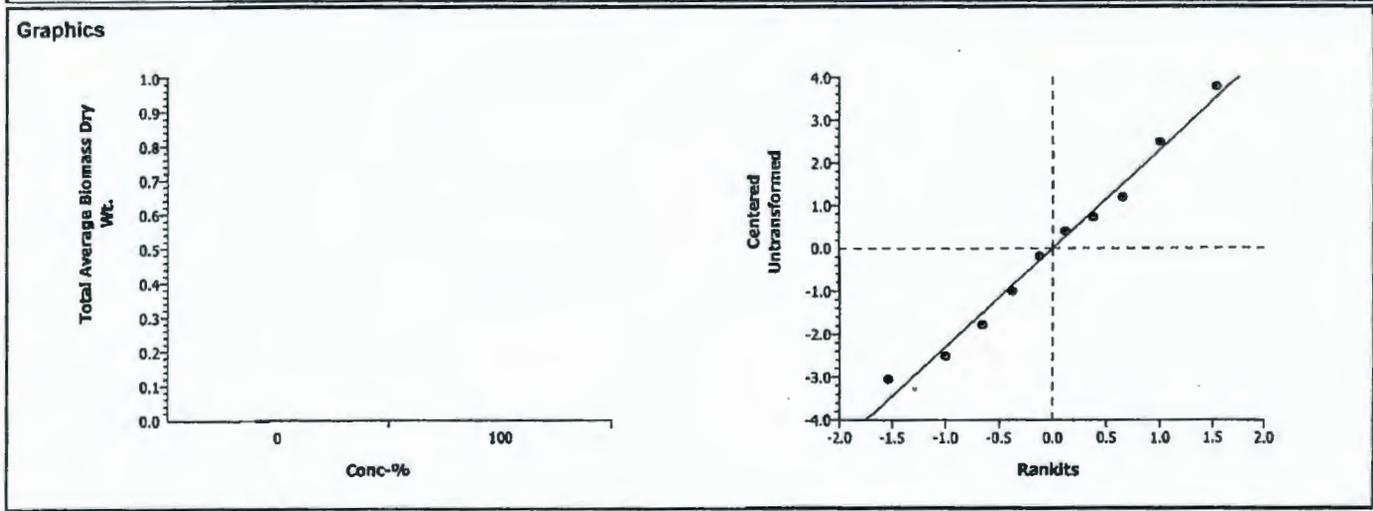
Method	Alt H	Data Transform	Zeta	NOEL	LOEL	Toxic Units	ChV	PMSD
Equal Variance t Two-Sample	C > T	Untransformed		100	>100	1	N/A	35.67%

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

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

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

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



CETIS Analysis Detail

Plant Chronic test	CH2M HILL
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Endpoint	Analysis Type	Sample Link	Control Link	Date Analyzed	Version
Total Average Biomass Wet Wt.	Comparison	11-9487-2971	11-9487-2971	05 Jun-06 1:22 PM	CETISv1.1.2

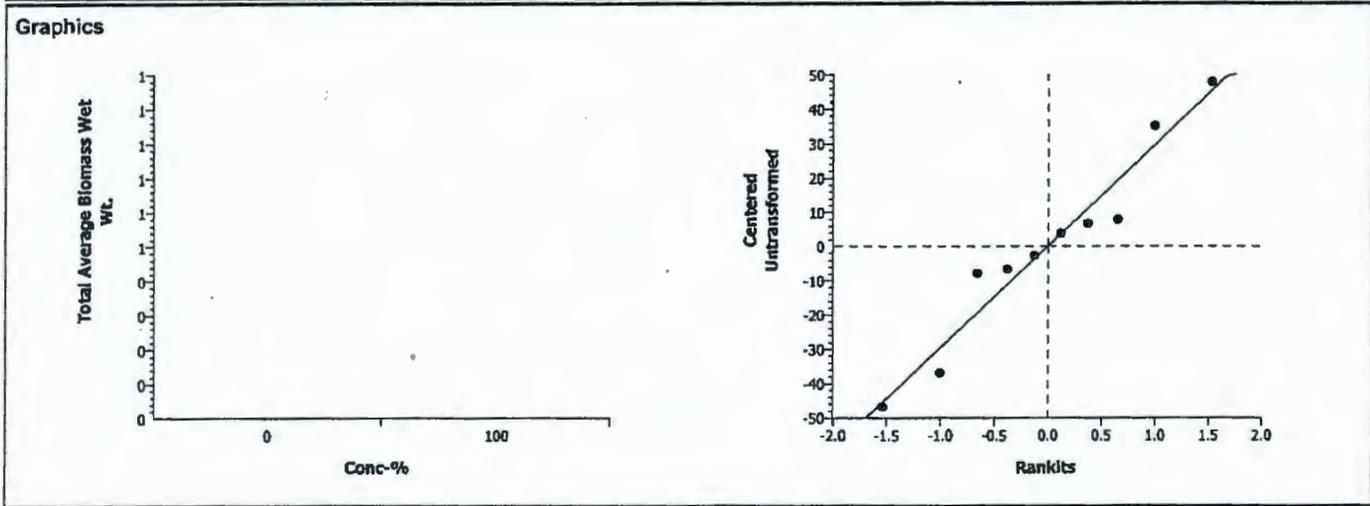
Method	Alt H	Data Transform	Zeta	NOEL	LOEL	Toxic Units	ChV	PMSD
Equal Variance t Two-Sample	C > T	Untransformed		100	>100	1	N/A	50.41%

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

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

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

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



BLUEGRASS GROWTH TEST

Client: Washington Closure Hanford Project

Test Start Date: 4-26-06

DW

Initials:

Day 0 DL Day 12 _____ Day 14 NJ Day 16 NJ Day 18 RP Day 21 NJ Day 23 NJ Day 25 NJ Day 27 NJ

		Bioassay Lab ID: BG 1575-07						Sample No: J11K34		pH		
CONC.	REPLICATE	# seeds germinated						7-DAYS POST-EMERGENCE (28 days after planting)	14-DAYS POST-EMERGENCE (35 days after planting)	INITIAL (@ planting)	FINAL (@ 14 days Post-Emergence)	
		12 days after planting	14 days after planting	18 days after planting	19 days after planting	21 days after planting	23 days after planting					
Control	A		5	5	5	5	5	5	5	46, 1 dead	7.9	7.2
	B		2	2	2	2	2	2	2	12, 1 dead		
	C		5	6	6	6	7	5	5	46, 1 dead		
	D		4	4	4	5	5	5	5	46, 1 dead		
	E		6	6	6	6	6	5	5	5		

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

Replicate A: 1 Lg G, 3 md G, 1 sm B
 Replicate B: 2 md G, one Brown tip
 Replicate C: 3 Lg G, 3 md G - one brown tip Removed 1 md w/ brown tip
 Replicate D: 3 Lg G, 1 sm G
 Replicate E: 3 md G, 2 sm 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: 4 med w/ B shoots, 1 sm dead removed
 Replicate B: 1 med w/ 1 B shoot removed: 1 med dead
 Replicate C: 2 med G, 2 med w/ B shoots removed: 1 med dead
 Replicate D: 3 med w/ B shoots, 1 sm G removed: 1 sm dead
 Replicate E: 2 med G, 2 med w/ B shoots, 1 sm w/ B shoots

Measure Shoot Height:

Individual height of each seedling (above ground)

	1st Seedling	2nd Seedling	3rd Seedling	4th Seedling	5th Seedling
Replicate A	89 mm	97 mm	59 mm	73 mm	mm
Replicate B	79 mm	mm	mm	mm	mm
Replicate C	57 mm	49 mm	75 mm	51 mm	mm
Replicate D	73 mm	65 mm	67 mm	65 mm	mm
Replicate E	74 mm	53 mm	31 mm	107 mm	40 mm

Measure Shoot Weight:

Total mass of all seedlings (above ground)

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

Describe root appearance:

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

Measure Root Length:

Individual length of the longest root from each seedling

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

Measure Root Weight:

Total mass of all roots from all seedlings

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

Comments:

Report Date: 05 Jun-06 1:25 PM

Test Link: 09-5159-5769/B157507psc

CETIS Test Summary

Plant Chronic test		CH2M Hill				
Test No: 07-3847-0882	Test Type: Plant Chronic test	Duration: N/A				
Start Date: 26 Apr-06	Protocol: ASTM E1963-02 (2002)	Species: Poa sandbergii				
Ending Date:	Dil Water:	Source:				
Setup Date: 26 Apr-06	Brine:					
Sample No: 03-3122-0322	Code: B1580-01	Client:				
Sample Date: 19 Apr-06	Material: Soil	Project:				
Receive Date:	Source: Hanford					
Sample Age: 7d 0h	Station:					
Comments: J11K34						
Comparison Summary						
Analysis	Endpoint	NOEL	LOEL	ChV	PMSD	Method
03-9507-6141	% Germination	100	> 100	N/A	36.50%	Wilcoxon Rank Sum Two-Sample
14-0796-9768	AG Average Dry Wt.	< 100	100	N/A	27.85%	Equal Variance t Two-Sample
05-2666-0517	AG Average Height	100	> 100	N/A	113.14%	Wilcoxon Rank Sum Two-Sample
14-3835-9054	AG Average Wet Wt.	< 100	100	N/A	32.17%	Equal Variance t Two-Sample
16-9157-3921	Root Average Dry Wt.	< 100	100	N/A	38.24%	Equal Variance t Two-Sample
02-5876-5296	Root Average Length	100	> 100	N/A	80.25%	Wilcoxon Rank Sum Two-Sample
13-5844-4558	Root Average Wet Wt.	< 100	100	N/A	44.63%	Equal Variance t Two-Sample
11-9926-3875	Total Average Biomass Dry	< 100	100	N/A	29.16%	Equal Variance t Two-Sample
01-1473-8406	Total Average Biomass Wet	< 100	100	N/A	37.55%	Equal Variance t Two-Sample

CETIS Test Summary

Report Date:

05 Jun-06 1:25 PM

Test Link:

09-5159-5769/B157507psc

% Germination Summary								
Conc-%	Control Type	Reps	Mean	Minimum	Maximum	SE	SD	CV
0	Artificial Soil/S	5	0.88000	0.40000	1.00000	0.12000	0.26833	30.49%
100		5	0.72000	0.20000	1.00000	0.13565	0.30332	42.13%
AG Average Dry Wt. Summary								
Conc-%	Control Type	Reps	Mean	Minimum	Maximum	SE	SD	CV
0	Artificial Soil/S	5	6.05361	4.14001	8.68201	0.81424	1.82070	30.08%
100		5	2.93889	1.69199	4.09250	0.39859	0.89127	30.33%
AG Average Height Summary								
Conc-%	Control Type	Reps	Mean	Minimum	Maximum	SE	SD	CV
0	Artificial Soil/S	5	21.74	15.8	33.5	3.1641	7.0752	32.54%
100		5	27.83	12.4	79	12.843	28.719	103.19
AG Average Wet Wt. Summary								
Conc-%	Control Type	Reps	Mean	Minimum	Maximum	SE	SD	CV
0	Artificial Soil/S	5	34.197	19.960	53.208	5.3829	12.036	35.20%
100		5	16.836	9.4580	23.470	2.4524	5.4838	32.57%
Root Average Dry Wt. Summary								
Conc-%	Control Type	Reps	Mean	Minimum	Maximum	SE	SD	CV
0	Artificial Soil/S	5	1.53579	0.93500	2.67798	0.31159	0.69673	45.37%
100		5	0.49710	0.32800	0.64500	0.05172	0.11565	23.27%
Root Average Length Summary								
Conc-%	Control Type	Reps	Mean	Minimum	Maximum	SE	SD	CV
0	Artificial Soil/S	5	26.16	20.6	41	3.7499	8.385	32.05%
100		5	25.9	10	68	10.649	23.812	91.94%
Root Average Wet Wt. Summary								
Conc-%	Control Type	Reps	Mean	Minimum	Maximum	SE	SD	CV
0	Artificial Soil/S	5	36.242	13.590	65.054	8.4756	18.952	52.29%
100		5	14.37	8.2760	20.337	1.9531	4.3672	30.39%
Total Average Biomass Dry Wt. Summary								
Conc-%	Control Type	Reps	Mean	Minimum	Maximum	SE	SD	CV
0	Artificial Soil/S	5	7.5894	5.0750	11.36	1.1021	2.4644	32.47%
100		5	3.436	2.02	4.7375	0.4490	1.0040	29.22%
Total Average Biomass Wet Wt. Summary								
Conc-%	Control Type	Reps	Mean	Minimum	Maximum	SE	SD	CV
0	Artificial Soil/S	5	70.439	33.550	118.26	13.727	30.694	43.58%
100		5	31.206	17.734	38.463	3.7207	8.3198	26.66%

Report Date:

05 Jun-06 1:25 PM

Test Link:

09-5159-5769/B157507psc

CETIS Test Summary

% Germination Detail						
Conc-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Artificial Soil/S	1.00000	1.00000	0.40000	1.00000	1.00000
100		0.80000	0.20000	0.80000	0.80000	1.00000
AG Average Dry Wt. Detail						
Conc-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Artificial Soil/S	4.53401	6.62400	4.14001	6.28801	8.68201
100		4.09250	2.95996	2.59500	3.35501	1.69199
AG Average Height Detail						
Conc-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Artificial Soil/S	15.8	18.2	33.5	18.2	23
100		19.25	79	14.5	14	12.4
AG Average Wet Wt. Detail						
Conc-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Artificial Soil/S	30.4100	33.172	19.9600	34.2360	53.2080
100		23.4700	20.5399	13.9875	16.7250	9.45801
Root Average Dry Wt. Detail						
Conc-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Artificial Soil/S	1.26801	1.68799	0.93500	1.10999	2.67798
100		0.64500	0.46997	0.49750	0.54501	0.32800
Root Average Length Detail						
Conc-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Artificial Soil/S	20.6	22.8	41	22.4	24
100		16.75	68	20	14.75	10
Root Average Wet Wt. Detail						
Conc-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Artificial Soil/S	33.3280	40.9320	13.5900	28.3060	65.054
100		14.9925	12.8900	15.3525	20.3375	8.27600
Total Average Biomass Dry Wt. Detail						
Conc-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Artificial Soil/S	5.80201	8.31199	5.07501	7.398	11.36
100		4.73750	3.42993	3.0925	3.90002	2.02
Total Average Biomass Wet Wt. Detail						
Conc-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Artificial Soil/S	63.7380	74.1040	33.5500	62.5420	118.262
100		38.4625	33.4299	29.3400	37.0625	17.7340

CETIS Analysis Detail

Comparisons: Page 1 of 9

Report Date: 05 Jun-06 1:25 PM

Analysis: 03-9507-6141/B157507psc

Plant Chronic test						CH2M HILL
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Endpoint	Analysis Type	Sample Link	Control Link	Date Analyzed	Version
% Germination	Comparison	09-5159-5769	09-5159-5769	05 Jun-06 1:24 PM	CETISv1.1.2

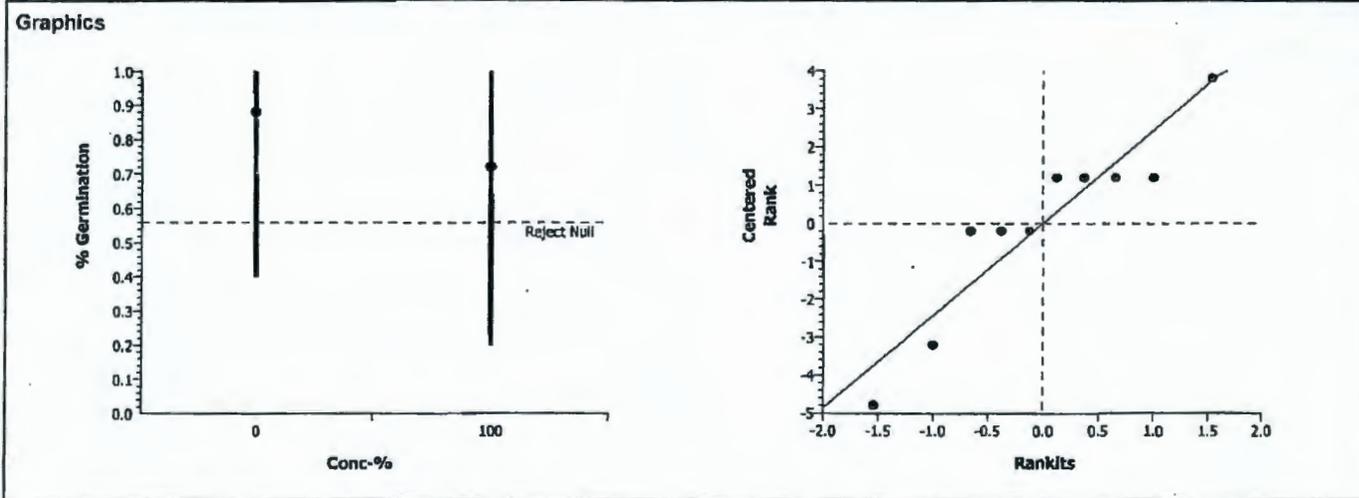
Method	Alt H	Data Transform	Zeta	NOEL	LOEL	Toxic Units	ChV	PMSD
Wilcoxon Rank Sum Two-Sample	C > T	Rank		100	>100	1	N/A	36.50%

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

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

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

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



CETIS Analysis Detail

Plant Chronic test	CH2M Hill
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Endpoint	Analysis Type	Sample Link	Control Link	Date Analyzed	Version
AG Average Dry Wt.	Comparison	09-5159-5769	09-5159-5769	05 Jun-06 1:24 PM	CETISv1.1.2

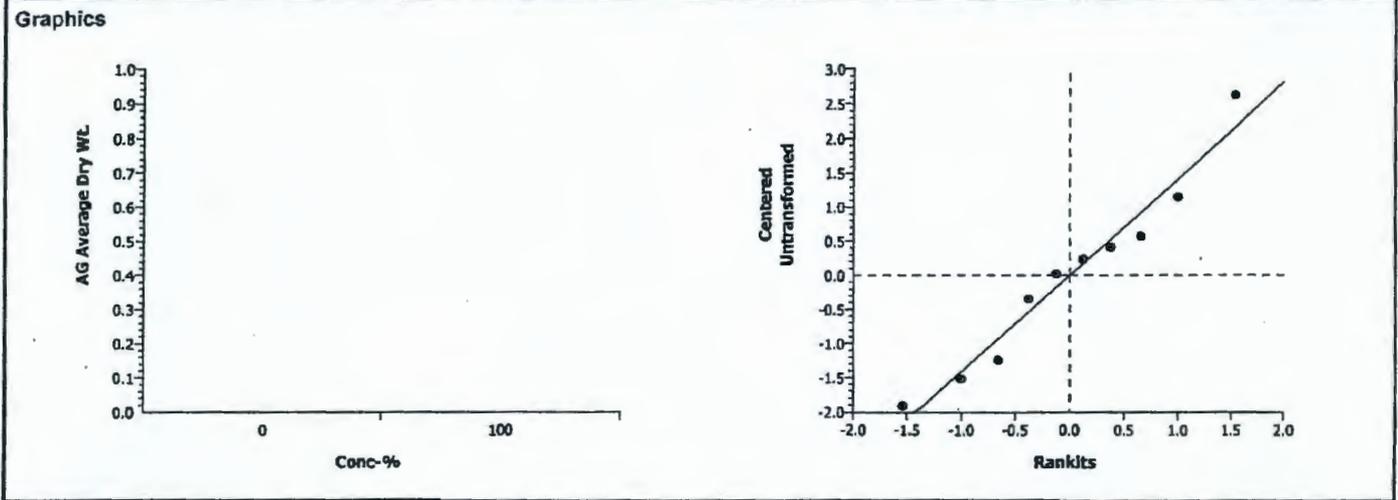
Method	Alt H	Data Transform	Zeta	NOEL	LOEL	Toxic Units	ChV	PMSD
Equal Variance t Two-Sample	C > T	Untransformed		<100	100		N/A	27.85%

Group Comparisons							
Control	vs	Conc-%	Statistic	Critical	P-Value	MSD	Decision(0.05)
Artificial Soil/Sedi		100	3.43573	1.85955	0.0044	1.68580	Significant Effect

ANOVA Table						
Source	Sum of Squares	Mean Square	DF	F Statistic	P-Value	Decision(0.05)
Between	24.25363	24.25363	1	11.80	0.00888	Significant Effect
Error	16.43722	2.054652	8			
Total	40.6908531	26.308286	9			

ANOVA Assumptions					
Attribute	Test	Statistic	Critical	P-Value	Decision(0.01)
Variances	Variance Ratio F	4.17312	23.15450	0.19531	Equal Variances
Distribution	Shapiro-Wilk W	0.96206		0.80903	Normal Distribution

Data Summary		Original Data					Transformed Data			
Conc-%	Control Type	Count	Mean	Minimum	Maximum	SD	Mean	Minimum	Maximum	SD
0	Artificial Soil/S	5	6.05361	4.14001	8.68201	1.82070				
100		5	2.93889	1.69199	4.09250	0.89127				



CETIS Analysis Detail

Plant Chronic test	CH2M HILL
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Endpoint	Analysis Type	Sample Link	Control Link	Date Analyzed	Version
AG Average Height	Comparison	09-5159-5769	09-5159-5769	05 Jun-06 1:24 PM	CETISv1.1.2

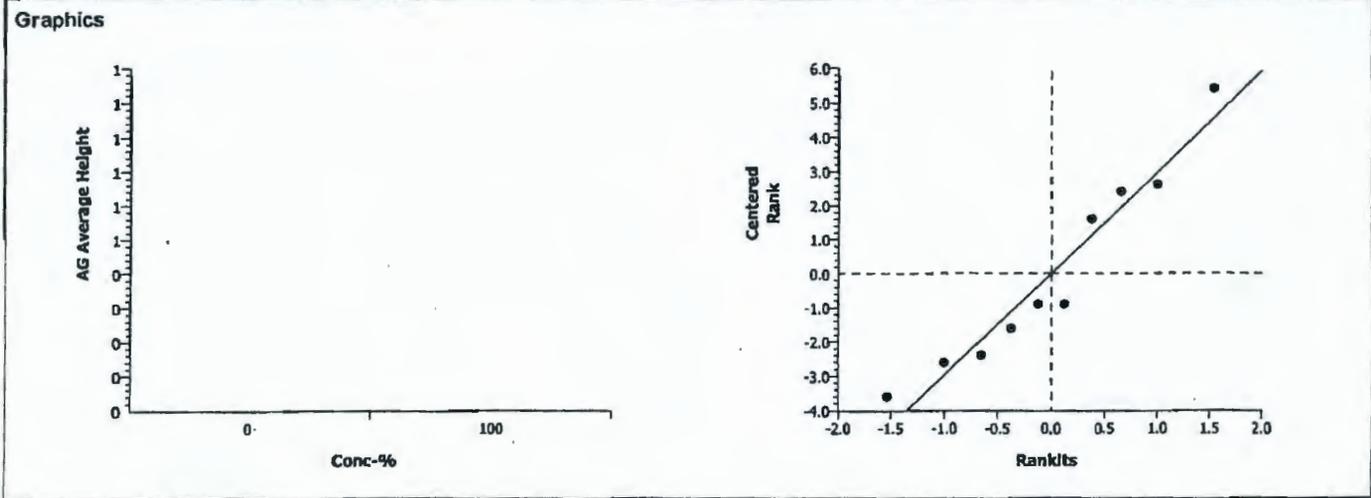
Method	Alt H	Data Transform	Zeta	NOEL	LOEL	Toxic Units	ChV	PMSD
Wilcoxon Rank Sum Two-Sample	C > T	Rank		100	>100	1	N/A	113.14%

Group Comparisons							
Control	vs	Conc-%	Statistic	Critical	P-Value	Ties	Decision(0.05)
Artificial Soil/Sedi		100	23		0.2103	0	Non-Significant Effect

ANOVA Table						
Source	Sum of Squares	Mean Square	DF	F Statistic	P-Value	Decision(0.05)
Between	92.72025	92.72025	1	0.21	0.65748	Non-Significant Effect
Error	3499.26	437.4075	8			
Total	3591.98026	530.12775	9			

ANOVA Assumptions					
Attribute	Test	Statistic	Critical	P-Value	Decision(0.01)
Variances	Variance Ratio F	16.47603	23.15450	0.01890	Equal Variances
Distribution	Shapiro-Wilk W	0.72794		0.00192	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	21.740	15.8	33.5	7.0752	6.40000	4.00000	9.00000	2.04328
100		5	27.83	12.4	79	28.719	4.60000	1.00000	10.0000	3.78153



CETIS Analysis Detail

Plant Chronic test						CH2M Hill
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Endpoint	Analysis Type	Sample Link	Control Link	Date Analyzed	Version
Root Average Dry Wt.	Comparison	09-5159-5769	09-5159-5769	05 Jun-06 1:24 PM	CETISv1.1.2

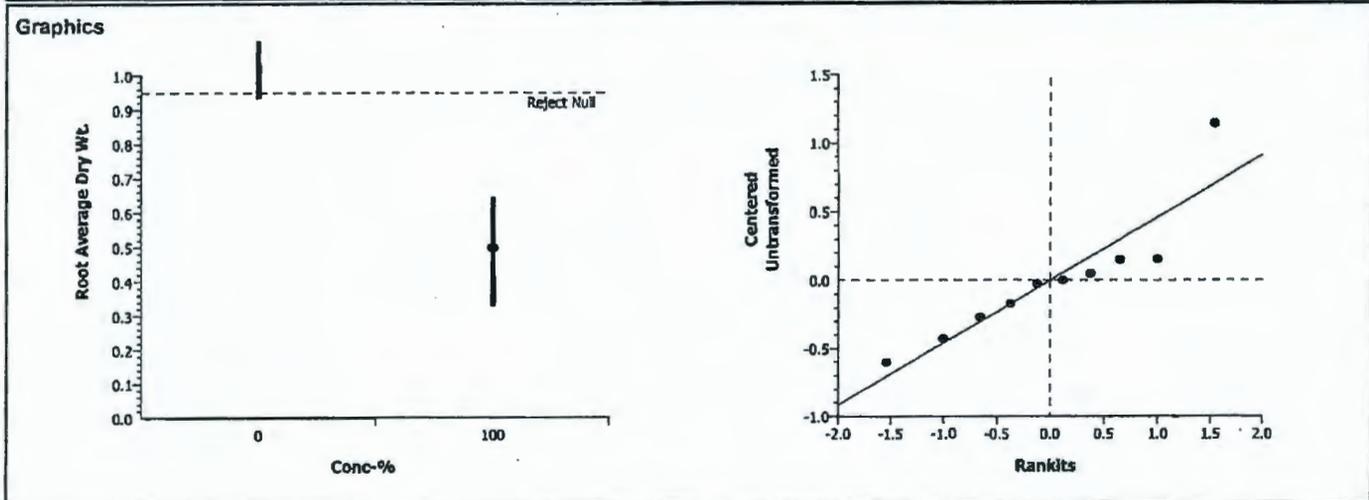
Method	Alt H	Data Transform	Zeta	NOEL	LOEL	Toxic Units	ChV	PMSD
Equal Variance t Two-Sample	C > T	Untransformed		<100	100		N/A	38.24%

Group Comparisons							
Control	vs	Conc-%	Statistic	Critical	P-Value	MSD	Decision(0.05)
Artificial Soil/Sedi		100	3.28856	1.85955	0.0055	0.58734	Significant Effect

ANOVA Table						
Source	Sum of Squares	Mean Square	DF	F Statistic	P-Value	Decision(0.05)
Between	2.697209	2.697209	1	10.81	0.01105	Significant Effect
Error	1.99523	0.249404	8			
Total	4.6924392	2.9466129	9			

ANOVA Assumptions					
Attribute	Test	Statistic	Critical	P-Value	Decision(0.01)
Variances	Variance Ratio F	36.29308	23.15450	0.00424	Unequal Variances
Distribution	Shapiro-Wilk W	0.85613		0.06869	Normal Distribution

Data Summary			Original Data				Transformed Data			
Conc-%	Control Type	Count	Mean	Minimum	Maximum	SD	Mean	Minimum	Maximum	SD
0	Artificial Soil/S	5	1.53579	0.93500	2.67798	0.69673				
100		5	0.49710	0.32800	0.64500	0.11565				



CETIS Analysis Detail

Plant Chronic test CH2M Hill

Endpoint	Analysis Type	Sample Link	Control Link	Date Analyzed	Version
Root Average Length	Comparison	09-5159-5769	09-5159-5769	05 Jun-06 1:24 PM	CETISv1.1.2

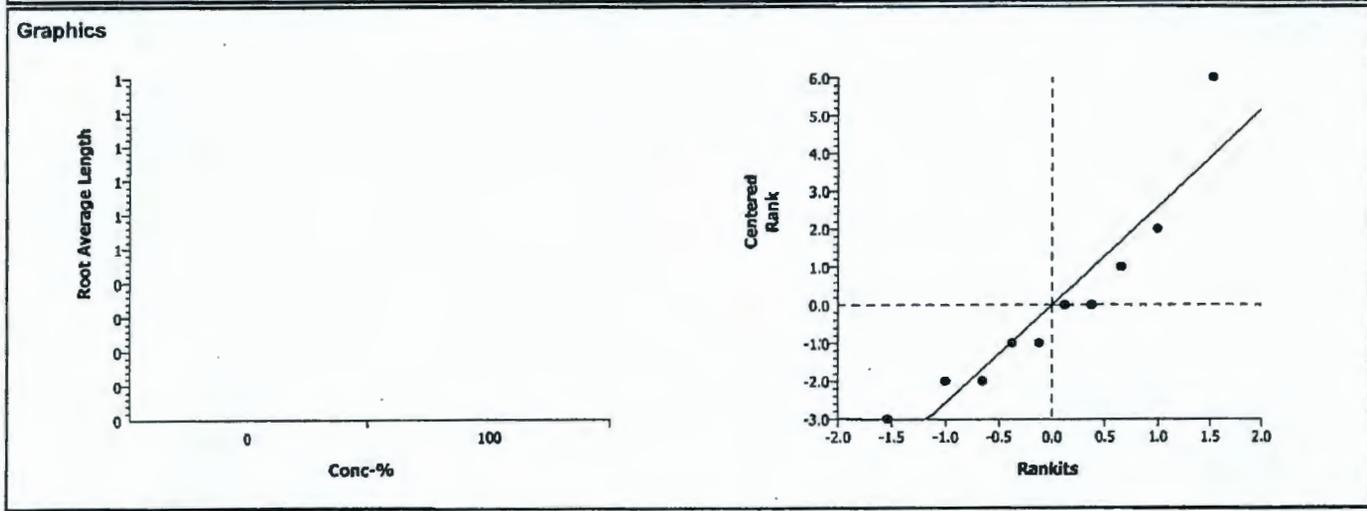
Method	Alt H	Data Transform	Zeta	NOEL	LOEL	Toxic Units	ChV	PMSD
Wilcoxon Rank Sum Two-Sample	C > T	Rank		100	>100	1	N/A	80.25%

Group Comparisons							
Control	vs	Conc-%	Statistic	Critical	P-Value	Ties	Decision(0.05)
Artificial Soil/Sedi		100	20		0.0754	0	Non-Significant Effect

ANOVA Table						
Source	Sum of Squares	Mean Square	DF	F Statistic	P-Value	Decision(0.05)
Between	0.169	0.169	1	0.00	0.98219	Non-Significant Effect
Error	2549.307	318.6634	8			
Total	2549.47588	318.83236	9			

ANOVA Assumptions						
Attribute	Test	Statistic	Critical	P-Value	Decision(0.01)	
Variances	Variance Ratio F	8.06478	23.15450	0.06765	Equal Variances	
Distribution	Shapiro-Wilk W	0.74937		0.00351	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	26.16	20.6	41	8.385	7.00000	5.00000	9.00000	1.58114
100		5	25.9	10	68	23.812	4.00000	1.00000	10.0000	3.53553



CETIS Analysis Detail

Plant Chronic test CH2M Hill

Endpoint	Analysis Type	Sample Link	Control Link	Date Analyzed	Version
Root Average Wet Wt.	Comparison	09-5159-5769	09-5159-5769	05 Jun-06 1:24 PM	CETISv1.1.2

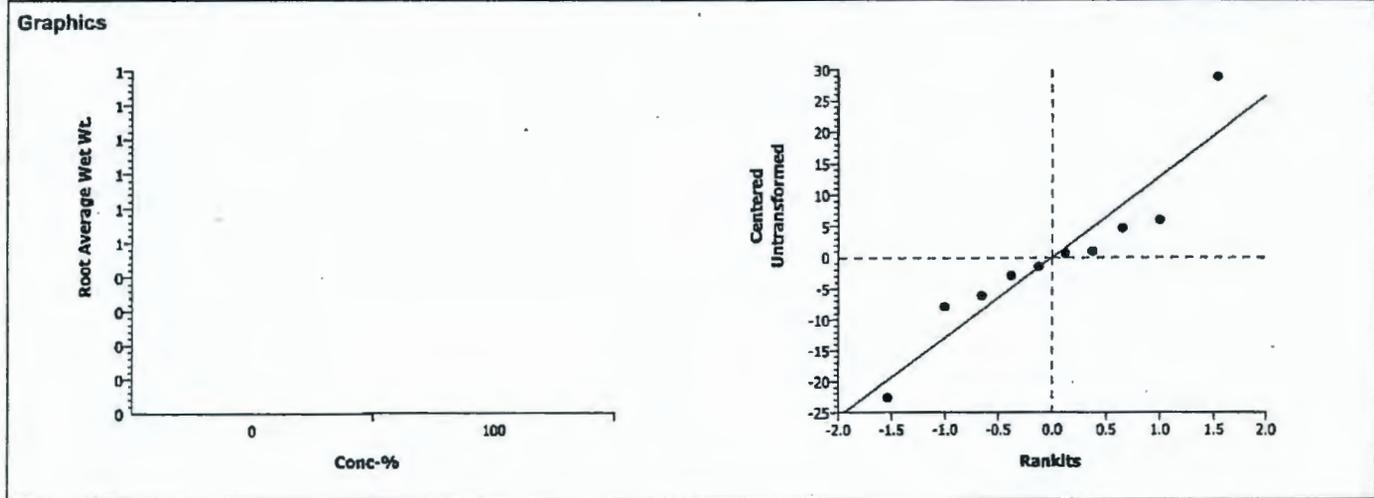
Method	Alt H	Data Transform	Zeta	NOEL	LOEL	Toxic Units	ChV	PMSD
Equal Variance t Two-Sample	C > T	Untransformed		<100	100		N/A	44.63%

Group Comparisons							
Control	vs	Conc-%	Statistic	Critical	P-Value	MSD	Decision(0.05)
Artificial Soil/Sedi		100	2.51472	1.85955	0.0181	16.1738	Significant Effect

ANOVA Table						
Source	Sum of Squares	Mean Square	DF	F Statistic	P-Value	Decision(0.05)
Between	1195.994	1195.994	1	6.32	0.03610	Significant Effect
Error	1513	189.1251	8			
Total	2708.99438	1385.119	9			

ANOVA Assumptions					
Attribute	Test	Statistic	Critical	P-Value	Decision(0.01)
Variances	Variance Ratio F	18.83196	23.15450	0.01474	Equal Variances
Distribution	Shapiro-Wilk W	0.90354		0.23952	Normal Distribution

Data Summary		Original Data					Transformed Data			
Conc-%	Control Type	Count	Mean	Minimum	Maximum	SD	Mean	Minimum	Maximum	SD
0	Artificial Soil/S	5	36.242	13.590	65.054	18.952				
100		5	14.37	8.2760	20.337	4.3672				



CETIS Analysis Detail

Plant Chronic test						CH2M Hill
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Endpoint	Analysis Type	Sample Link	Control Link	Date Analyzed	Version
Total Average Biomass Dry Wt.	Comparison	09-5159-5769	09-5159-5769	05 Jun-06 1:25 PM	CETISv1.1.2

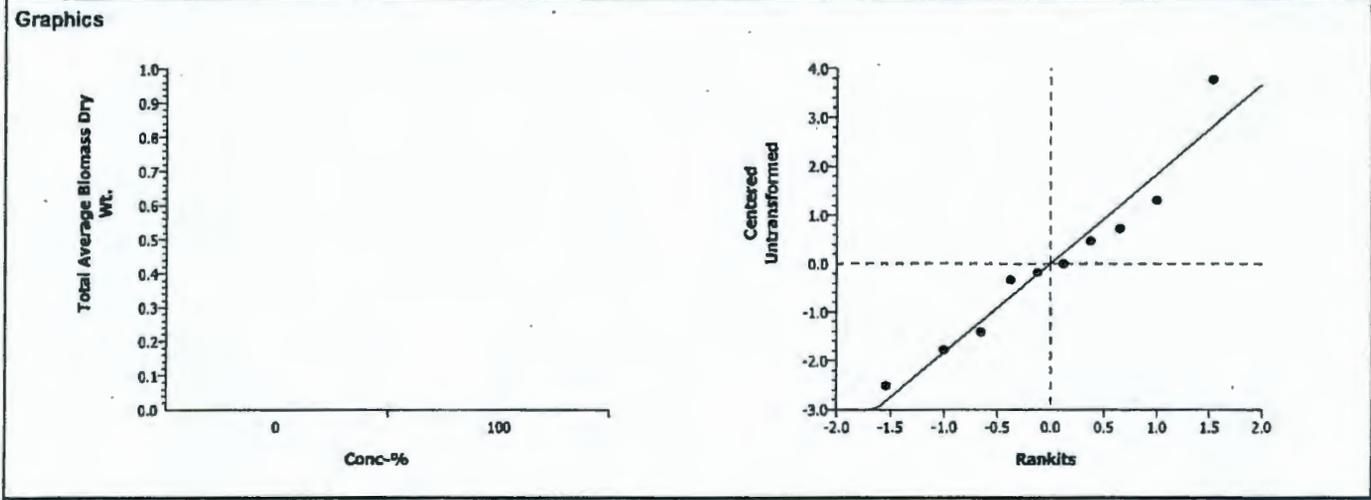
Method	Alt H	Data Transform	Zeta	NOEL	LOEL	Toxic Units	ChV	PMSD
Equal Variance t Two-Sample	C > T	Untransformed		<100	100		N/A	29.16%

Group Comparisons							
Control	vs	Conc-%	Statistic	Critical	P-Value	MSD	Decision(0.05)
Artificial Soil/Sedi		100	3.49006	1.85955	0.0041	2.21299	Significant Effect

ANOVA Table							
Source	Sum of Squares	Mean Square	DF	F Statistic	P-Value	Decision(0.05)	
Between	43.12701	43.12701	1	12.18	0.00820	Significant Effect	
Error	28.3253	3.540663	8				
Total	71.4523125	46.667673	9				

ANOVA Assumptions						
Attribute	Test	Statistic	Critical	P-Value	Decision(0.01)	
Variances	Varlance Ratio F	6.02455	23.15450	0.11005	Equal Variances	
Distribution	Shapiro-Wilk W	0.94983		0.66648	Normal Distribution	

Data Summary		Original Data					Transformed Data			
Conc-%	Control Type	Count	Mean	Minimum	Maximum	SD	Mean	Minimum	Maximum	SD
0	Artificial Soil/S	5	7.5894	5.0750	11.36	2.4644				
100		5	3.436	2.02	4.7375	1.0040				



CETIS Analysis Detail

Plant Chronic test CH2M Hill

Endpoint	Analysis Type	Sample Link	Control Link	Date Analyzed	Version
Total Average Biomass Wet Wt.	Comparison	09-5159-5769	09-5159-5769	05 Jun-06 1:25 PM	CETISv1.1.2

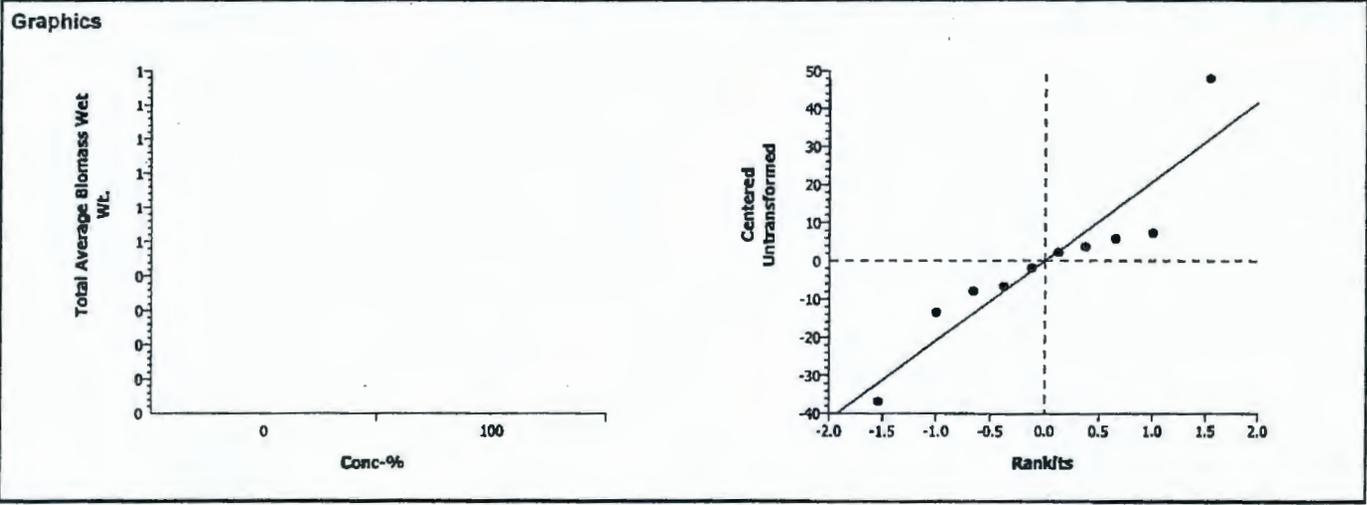
Method	Alt H	Data Transform	Zeta	NOEL	LOEL	Toxic Units	ChV	PMSD
Equal Variance t Two-Sample	C > T	Untransformed		<100	100		N/A	37.55%

Group Comparisons							
Control	vs	Conc-%	Statistic	Critical	P-Value	MSD	Decision(0.05)
Artificial Soil/Sedi		100	2.75861	1.85955	0.0124	26.4468	Significant Effect

ANOVA Table						
Source	Sum of Squares	Mean Square	DF	F Statistic	P-Value	Decision(0.05)
Between	3848.153	3848.153	1	7.61	0.02473	Significant Effect
Error	4045.408	505.676	8			
Total	7893.56152	4353.8293	9			

ANOVA Assumptions						
Attribute	Test	Statistic	Critical	P-Value	Decision(0.01)	
Variances	Variance Ratio F	13.61081	23.15450	0.02682	Equal Variances	
Distribution	Shapiro-Wilk W	0.88411		0.14541	Normal Distribution	

Data Summary		Original Data					Transformed Data			
Conc-%	Control Type	Count	Mean	Minimum	Maximum	SD	Mean	Minimum	Maximum	SD
0	Artificial Soil/S	5	70.439	33.550	118.26	30.694				
100		5	31.206	17.734	38.463	8.3198				



BLUEGRASS GROWTH TEST

Client: Washington Closure Hanford Project

Test Start Date: 4-26-06

Day 12 Day 14 NJ Day 16 NJ Day 19 TP Day 21 NJ Day 23 NJ Day 28 NJ Day 35 Bm

		Bioassay Lab ID: BG 1575-08							Sample No: J1K28		
CONC.	REPLICATE	# seeds germinated							pH		
		12 days after planting	14 days after planting	16 days after planting	18 days after planting	21 days after planting	23 days after planting	7-DAYS POST-EMERGENCE (28 days after planting)	14-DAYS POST-EMERGENCE (35 days after planting)	INITIAL (@ planting)	FINAL (@ 14 days Post-Emergence)
Control	A		0	0	1	1	1	1	1	7.6	7.4
	B		2	3	3	3	3	3	3		
	C		0	0	1	1	1	1	1		
	D		5	5	6	6	6	5	5		
	E		0	1	1	1	1	1	1		

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

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

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

14-Days Post-Emergence: Describe shoot appearance:

Replicate A: 1 md G
 Replicate B: 2 md G, 1 md w/ 3 B shoots
 Replicate C: 1 md G
 Replicate D: 1 lg w 2 B shoots, 4 med w/ B shoots
 Replicate E: 1 md G

Measure Shoot Height:

Individual height of each seedling (above ground)

	1st Seedling	2nd Seedling	3rd Seedling	4th Seedling	5th Seedling
Replicate A	65 mm				
Replicate B	72 mm	53 mm	62 mm		
Replicate C	54 mm				
Replicate D	91 mm	91 mm	63 mm	66 mm	78 mm
Replicate E	60 mm				

Measure Shoot Weight:

Total mass of all seedlings (above ground)

	Tin Tare WL (mg)	Wet WL (mg)	Dry WL (mg)
Replicate A	1046.42	1054.2	1048.53
Replicate B	1248.24	1289.3	1256.82
Replicate C	1251.57	1260.0	1252.72
Replicate D	1245.92	1356.7	1270.28
Replicate E	1256.67	1265.9	1258.83

Describe root appearance:

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

Measure Root Length:

Individual length of the longest root from each seedling

	1st Seedling	2nd Seedling	3rd Seedling	4th Seedling	5th Seedling
Replicate A	53 mm				
Replicate B	64 mm	95 mm	48 mm		
Replicate C	45 mm				
Replicate D	73 mm	72 mm	70 mm	49 mm	54 mm
Replicate E	80 mm				

Measure Root Weight:

Total mass of all roots from all seedlings

	Tin Tare WL (mg)	Wet WL (mg)	Dry WL (mg)
Replicate A	1025.38	1033.4	1025.87
Replicate B	1249.64	1280.4	1253.32
Replicate C	1248.09	1253.7	1248.21
Replicate D	1251.25	1324.2	1255.78
Replicate E	1247.86	1254.8	1248.49

Comments:

CETIS Test Summary

 Report Date: 05 Jun-06 1:30 PM
 Test Link: 05-5309-6055/B157508psc

Plant Chronic test		CH2M HILL				
Test No: 06-9020-4589	Test Type: Plant Chronic test	Duration: N/A				
Start Date: 26 Apr-06	Protocol: ASTM E1963-02 (2002)	Species: Poa sandbergii				
Ending Date:	Dil Water:	Source:				
Setup Date: 26 Apr-06	Brine:					
Sample No: 01-3222-3250	Code: B1580-02	Client:				
Sample Date: 20 Apr-06	Material: Soil	Project:				
Receive Date:	Source: Hanford					
Sample Age: 6d 0h	Station:					
Comments: J11K28						
Comparison Summary						
Analysis	Endpoint	NOEL	LOEL	ChV	PMSD	Method
12-7638-8337	% Germination	< 100	100	N/A	40.98%	Equal Variance t Two-Sample
04-9562-1591	AG Average Dry Wt.	< 100	100	N/A	31.49%	Equal Variance t Two-Sample
03-0128-0469	AG Average Height	100	> 100	N/A	92.60%	Equal Variance t Two-Sample
08-1251-3733	AG Average Wet Wt.	< 100	100	N/A	32.14%	Equal Variance t Two-Sample
11-2920-5317	Root Average Dry Wt.	< 100	100	N/A	44.60%	Equal Variance t Two-Sample
02-1274-6226	Root Average Length	100	> 100	N/A	91.52%	Equal Variance t Two-Sample
11-2893-3543	Root Average Wet Wt.	< 100	100	N/A	44.25%	Equal Variance t Two-Sample
08-7132-3386	Total Average Biomass Dry	< 100	100	N/A	33.12%	Equal Variance t Two-Sample
09-9247-1083	Total Average Biomass Wet	< 100	100	N/A	37.76%	Equal Variance t Two-Sample

Report Date:

05 Jun-06 1:30 PM

Test Link:

05-5309-6055/B157508psc

CETIS Test Summary

% Germination Summary								
Conc-%	Control Type	Reps	Mean	Minimum	Maximum	SE	SD	CV
0	Artificial Soil/S	5	0.88000	0.40000	1.00000	0.12000	0.26833	30.49%
100		5	0.44000	0.20000	1.00000	0.16000	0.35777	81.31%
AG Average Dry Wt. Summary								
Conc-%	Control Type	Reps	Mean	Minimum	Maximum	SE	SD	CV
0	Artificial Soil/S	5	6.05361	4.14001	8.68201	0.81424	1.82070	30.08%
100		5	2.63038	1.15002	4.87200	0.62294	1.39294	52.96%
AG Average Height Summary								
Conc-%	Control Type	Reps	Mean	Minimum	Maximum	SE	SD	CV
0	Artificial Soil/S	5	21.74	15.8	33.5	3.1641	7.0752	32.54%
100		5	43.053	15.8	65	10.353	23.149	53.77%
AG Average Wet Wt. Summary								
Conc-%	Control Type	Reps	Mean	Minimum	Maximum	SE	SD	CV
0	Artificial Soil/S	5	34.197	19.960	53.208	5.3829	12.036	35.20%
100		5	13.257	8.4301	22.156	2.4405	5.4571	41.17%
Root Average Dry Wt. Summary								
Conc-%	Control Type	Reps	Mean	Minimum	Maximum	SE	SD	CV
0	Artificial Soil/S	5	1.53579	0.93500	2.67798	0.31159	0.69673	45.37%
100		5	0.69933	0.12000	1.22664	0.19643	0.43922	62.81%
Root Average Length Summary								
Conc-%	Control Type	Reps	Mean	Minimum	Maximum	SE	SD	CV
0	Artificial Soil/S	5	26.16	20.6	41	3.7499	8.385	32.05%
100		5	41.627	12.8	80	12.317	27.543	66.17%
Root Average Wet Wt. Summary								
Conc-%	Control Type	Reps	Mean	Minimum	Maximum	SE	SD	CV
0	Artificial Soil/S	5	36.242	13.590	65.054	8.4756	18.952	52.29%
100		5	9.1075	5.61	14.714	1.5947	3.5658	39.15%
Total Average Biomass Dry Wt. Summary								
Conc-%	Control Type	Reps	Mean	Minimum	Maximum	SE	SD	CV
0	Artificial Soil/S	5	7.5894	5.0750	11.36	1.1021	2.4644	32.47%
100		5	3.3297	1.2700	5.9020	0.7828	1.7504	52.57%
Total Average Biomass Wet Wt. Summary								
Conc-%	Control Type	Reps	Mean	Minimum	Maximum	SE	SD	CV
0	Artificial Soil/S	5	70.439	33.550	118.26	13.727	30.694	43.58%
100		5	22.364	14.040	36.87	4.0187	8.9862	40.18%

Report Date:

05 Jun-06 1:30 PM

Test Link:

05-5309-6055/B157508psc

CETIS Test Summary

% Germination Detail						
Conc-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Artificial Soil/S	1.00000	1.00000	0.40000	1.00000	1.00000
100		0.20000	0.60000	0.20000	1.00000	0.20000
AG Average Dry Wt. Detail						
Conc-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Artificial Soil/S	4.53401	6.62400	4.14001	6.28801	8.68201
100		2.10999	2.85999	1.15002	4.87200	2.15991
AG Average Height Detail						
Conc-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Artificial Soil/S	15.8	18.2	33.5	18.2	23
100		65	20.6667	54	15.6	60
AG Average Wet Wt. Detail						
Conc-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Artificial Soil/S	30.4100	33.172	19.9600	34.2360	53.2080
100		12.7799	13.6867	8.43005	22.156	9.22998
Root Average Dry Wt. Detail						
Conc-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Artificial Soil/S	1.26801	1.68799	0.93500	1.10999	2.67798
100		0.48999	1.22664	0.12000	1.03000	0.63000
Root Average Length Detail						
Conc-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Artificial Soil/S	20.6	22.8	41	22.4	24
100		53	17.3333	45	12.8	80
Root Average Wet Wt. Detail						
Conc-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Artificial Soil/S	33.3280	40.9320	13.5900	28.3060	65.054
100		8.02002	10.2533	5.60999	14.714	6.94006
Total Average Biomass Dry Wt. Detail						
Conc-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Artificial Soil/S	5.80201	8.31199	5.07501	7.398	11.36
100		2.59998	4.08663	1.27002	5.90200	2.78992
Total Average Biomass Wet Wt. Detail						
Conc-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Artificial Soil/S	63.7380	74.1040	33.5500	62.5420	118.262
100		20.7999	23.9400	14.0400	36.87	16.1700

CETIS Analysis Detail

Plant Chronic test	CH2M Hill
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Endpoint	Analysis Type	Sample Link	Control Link	Date Analyzed	Version
% Germination	Comparison	05-5309-6055	05-5309-6055	05 Jun-06 1:29 PM	CETISv1.1.2

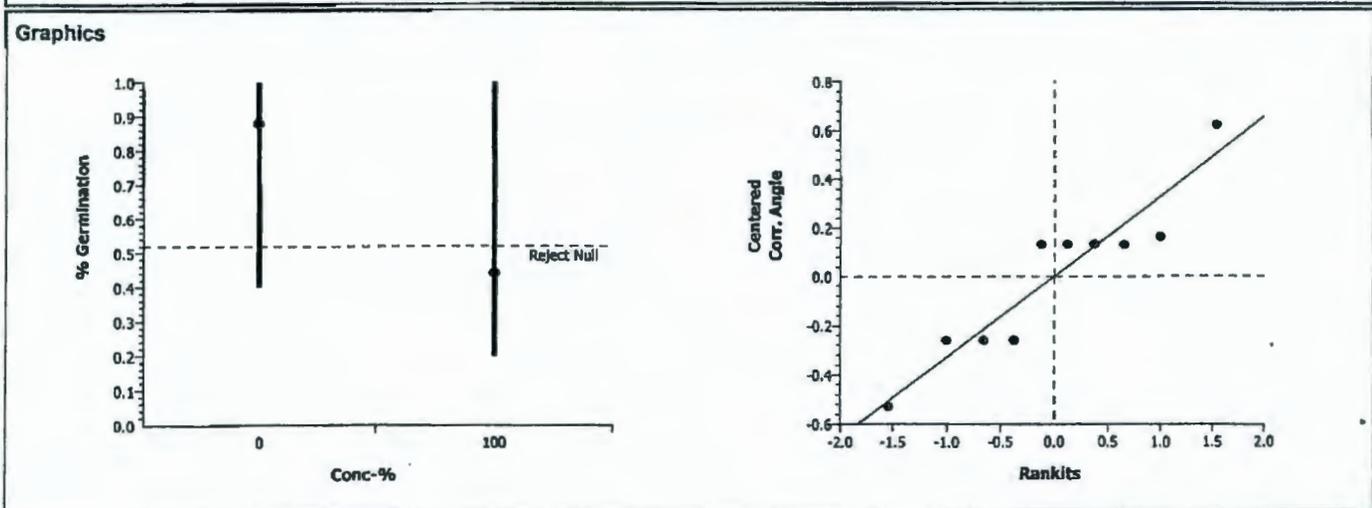
Method	Alt H	Data Transform	Zeta	NOEL	LOEL	Toxic Units	ChV	PMSD
Equal Variance t Two-Sample	C > T	Angular (Corrected)		<100	100		N/A	40.98%

Group Comparisons							
Control	vs	Conc-%	Statistic	Critical	P-Value	MSD	Decision(0.05)
Artificial Soil/Sedi		100	2.22522	1.85955	0.0284	0.4084	Significant Effect

ANOVA Table						
Source	Sum of Squares	Mean Square	DF	F Statistic	P-Value	Decision(0.05)
Between	0.5970927	0.597093	1	4.95	0.05672	Non-Significant Effect
Error	0.964686	0.120586	8			
Total	1.56177872	0.7176784	9			

ANOVA Assumptions						
Attribute	Test	Statistic	Critical	P-Value	Decision(0.01)	
Variances	Variance Ratio F	1.76355	23.15450	0.59611	Equal Variances	
Distribution	Shapiro-Wilk W	0.89809		0.20874	Normal Distribution	

Data Summary		Original Data					Transformed Data			
Conc-%	Control Type	Count	Mean	Minimum	Maximum	SD	Mean	Minimum	Maximum	SD
0	Artificial Soil/S	5	0.88000	0.40000	1.00000	0.26833	1.21317	0.68472	1.34528	0.29541
100		5	0.44000	0.20000	1.00000	0.35777	0.72446	0.46365	1.34528	0.39230



CETIS Analysis Detail

Plant Chronic test CH2M Hill

Endpoint	Analysis Type	Sample Link	Control Link	Date Analyzed	Version
AG Average Dry Wt.	Comparison	05-5309-6055	05-5309-6055	05 Jun-06 1:29 PM	CETISv1.1.2

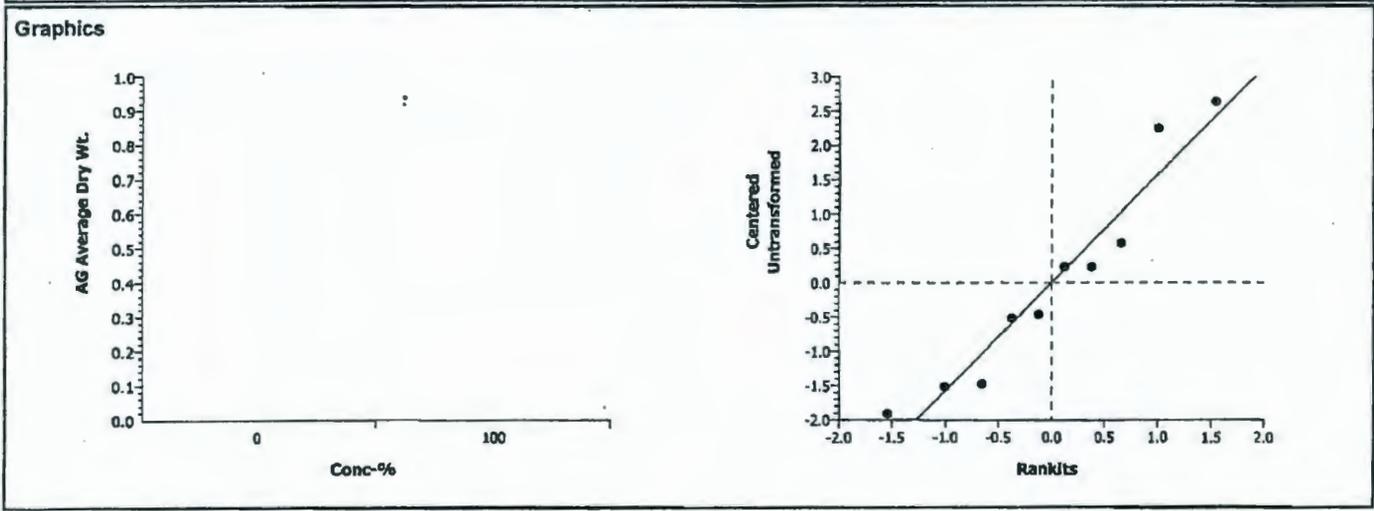
Method	Alt H	Data Transform	Zeta	NOEL	LOEL	Toxic Units	ChV	PMSD
Equal Variance t Two-Sample	C > T	Untransformed		<100	100		N/A	31.49%

Group Comparisons							
Control	vs	Conc-%	Statistic	Critical	P-Value	MSD	Decision(0.05)
Artificial Soil/Sedi		100	3.33906	1.85955	0.0051	1.90642	Significant Effect

ANOVA Table						
Source	Sum of Squares	Mean Square	DF	F Statistic	P-Value	Decision(0.05)
Between	29.29622	29.29622	1	11.15	0.01025	Significant Effect
Error	21.02096	2.62762	8			
Total	50.3171787	31.923839	9			

ANOVA Assumptions					
Attribute	Test	Statistic	Critical	P-Value	Decision(0.01)
Variances	Variance Ratio F	1.70848	23.15450	0.61658	Equal Variances
Distribution	Shapiro-Wilk W	0.92243		0.37770	Normal Distribution

Data Summary		Original Data					Transformed Data			
Conc-%	Control Type	Count	Mean	Minimum	Maximum	SD	Mean	Minimum	Maximum	SD
0	Artificial Soil/S	5	6.05361	4.14001	8.68201	1.82070				
100		5	2.63038	1.15002	4.87200	1.39294				



CETIS Analysis Detail

Plant Chronic test						CH2M Hill
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Endpoint	Analysis Type	Sample Link	Control Link	Date Analyzed	Version
AG Average Height	Comparison	05-5309-6055	05-5309-6055	05 Jun-06 1:29 PM	CETISv1.1.2

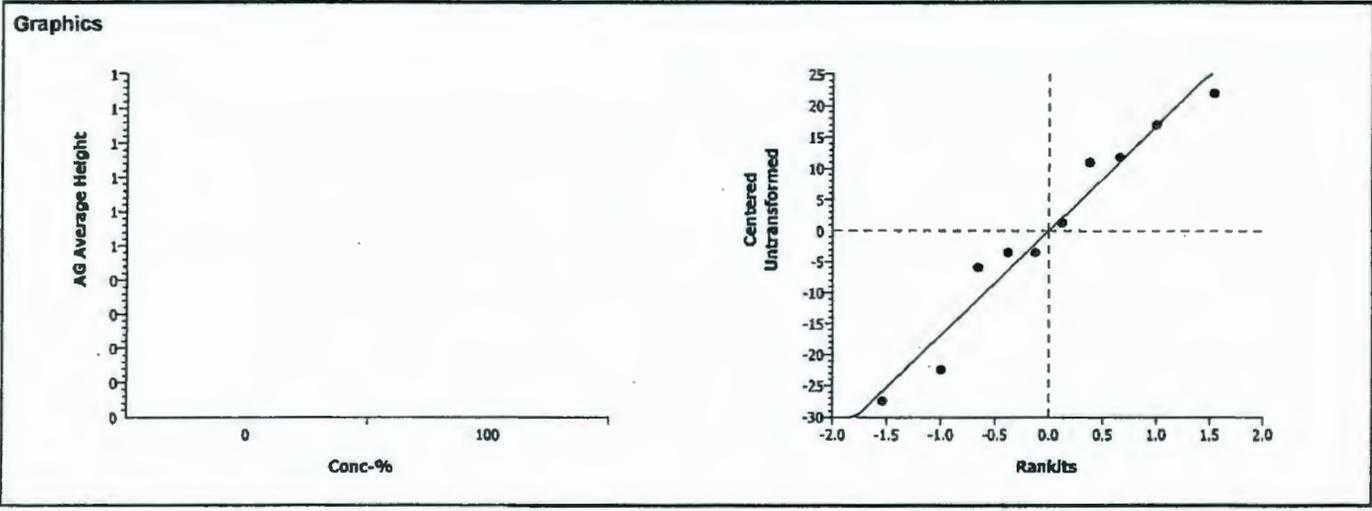
Method	Alt H	Data Transform	Zeta	NOEL	LOEL	Toxic Units	ChV	PMSD
Equal Variance t Two-Sample	C > T	Untransformed		100	>100	1	N/A	92.60%

Group Comparisons							
Control	vs	Conc-%	Statistic	Critical	P-Value	MSD	Decision(0.05)
Artificial Soil/Sedi		100	-1.9688	1.85955	0.9578	20.1302	Non-Significant Effect

ANOVA Table						
Source	Sum of Squares	Mean Square	DF	F Statistic	P-Value	Decision(0.05)
Between	1135.645	1135.645	1	3.88	0.08450	Non-Significant Effect
Error	2343.756	292.9695	8			
Total	3479.40100	1428.6148	9			

ANOVA Assumptions						
Attribute	Test	Statistic	Critical	P-Value	Decision(0.01)	
Variances	Variance Ratio F	10.70520	23.15450	0.04130	Equal Variances	
Distribution	Shapiro-Wilk W	0.94436		0.60246	Normal Distribution	

Data Summary										
Conc-%	Control Type	Count	Original Data				Transformed Data			
			Mean	Minimum	Maximum	SD	Mean	Minimum	Maximum	SD
0	Artificial Soil/S	5	21.740	15.8	33.5	7.0752				
100		5	43.053	15.6	65	23.149				



CETIS Analysis Detail

Plant Chronic test	CH2M Hill
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Endpoint	Analysis Type	Sample Link	Control Link	Date Analyzed	Version
AG Average Wet Wt.	Comparison	05-5309-6055	05-5309-6055	05 Jun-06 1:30 PM	CETISv1.1.2

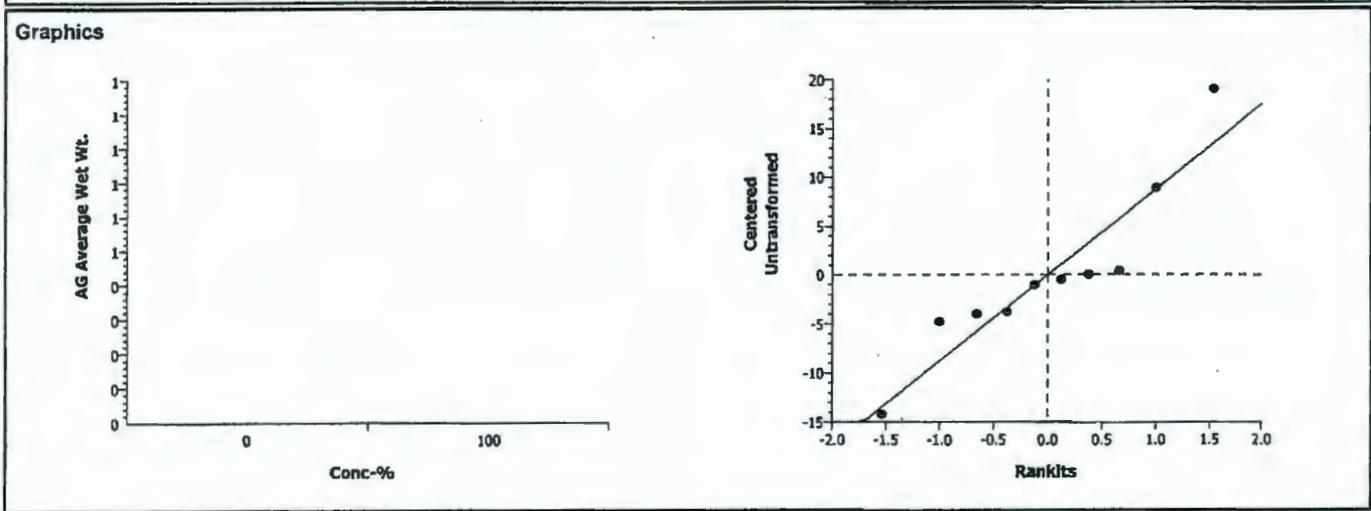
Method	Alt H	Data Transform	Zeta	NOEL	LOEL	Toxic Units	ChV	PMSD
Equal Variance t Two-Sample	C > T	Untransformed		<100	100		N/A	32.14%

Group Comparisons							
Control	vs	Conc-%	Statistic	Critical	P-Value	MSD	Decision(0.05)
Artificial Soil/Sedl		100	3.54311	1.85955	0.0038	10.9904	Significant Effect

ANOVA Table						
Source	Sum of Squares	Mean Square	DF	F Statistic	P-Value	Decision(0.05)
Between	1096.281	1096.281	1	12.55	0.00759	Significant Effect
Error	698.6238	87.32798	8			
Total	1794.90485	1183.609	9			

ANOVA Assumptions						
Attribute	Test	Statistic	Critical	P-Value	Decision(0.01)	
Variances	Variance Ratio F	4.86485	23.15450	0.15461	Equal Variances	
Distribution	Shapiro-Wilk W	0.89729		0.20454	Normal Distribution	

Data Summary			Original Data				Transformed Data			
Conc-%	Control Type	Count	Mean	Minimum	Maximum	SD	Mean	Minimum	Maximum	SD
0	Artificial Soil/S	5	34.197	19.960	53.208	12.036				
100		5	13.257	8.4301	22.156	5.4571				



CETIS Analysis Detail

Plant Chronic test CH2M HILL

Endpoint	Analysis Type	Sample Link	Control Link	Date Analyzed	Version
Root Average Dry Wt.	Comparison	05-5309-6055	05-5309-6055	05 Jun-06 1:30 PM	CETISv1.1.2

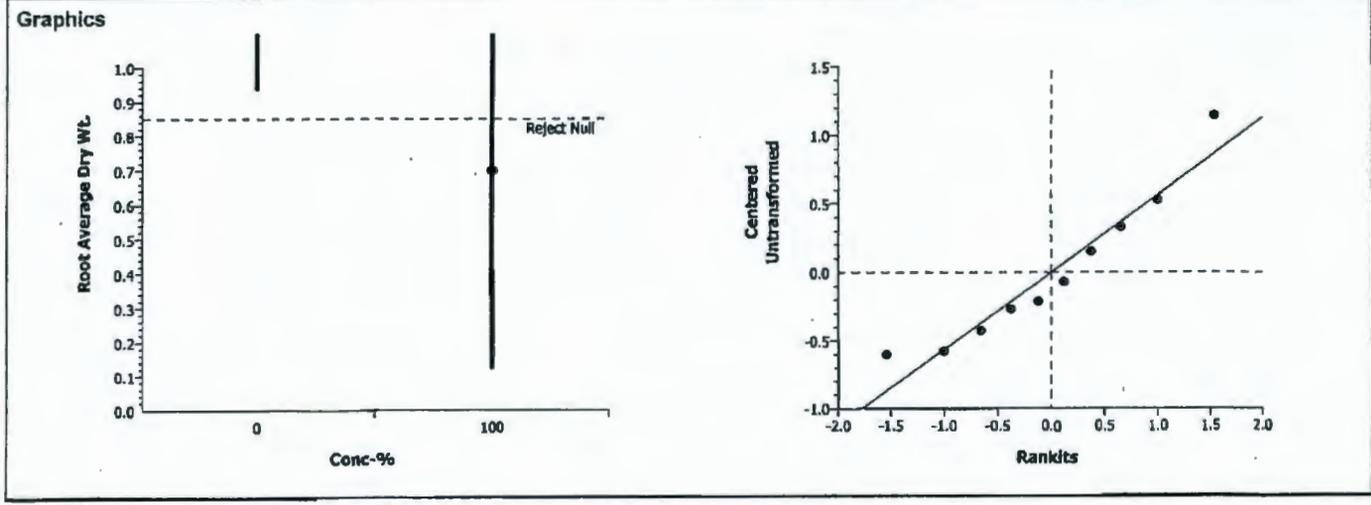
Method	Alt H	Data Transform	Zeta	NOEL	LOEL	Toxic Units	ChV	PMSD
Equal Variance t Two-Sample	C > T	Untransformed		<100	100		N/A	44.60%

Group Comparisons							
Control	vs	Conc-%	Statistic	Critical	P-Value	MSD	Decision(0.05)
Artificial Soil/Sedi		100	2.27094	1.85955	0.0264	0.68493	Significant Effect

ANOVA Table						
Source	Sum of Squares	Mean Square	DF	F Statistic	P-Value	Decision(0.05)
Between	1.749177	1.749177	1	5.16	0.05281	Non-Significant Effect
Error	2.713392	0.339174	8			
Total	4.46256924	2.0883508	9			

ANOVA Assumptions					
Attribute	Test	Statistic	Critical	P-Value	Decision(0.01)
Variances	Variance Ratio F	2.51629	23.15450	0.39326	Equal Variances
Distribution	Shapiro-Wilk W	0.92395		0.39107	Normal Distribution

Data Summary		Original Data					Transformed Data			
Conc-%	Control Type	Count	Mean	Minimum	Maximum	SD	Mean	Minimum	Maximum	SD
0	Artificial Soil/S	5	1.53579	0.93500	2.67798	0.69673				
100		5	0.69933	0.12000	1.22664	0.43922				



CETIS Analysis Detail

Plant Chronic test CH2M Hill

Endpoint	Analysis Type	Sample Link	Control Link	Date Analyzed	Version
Root Average Length	Comparison	05-5309-6055	05-5309-6055	05 Jun-06 1:30 PM	CETISv1.1.2

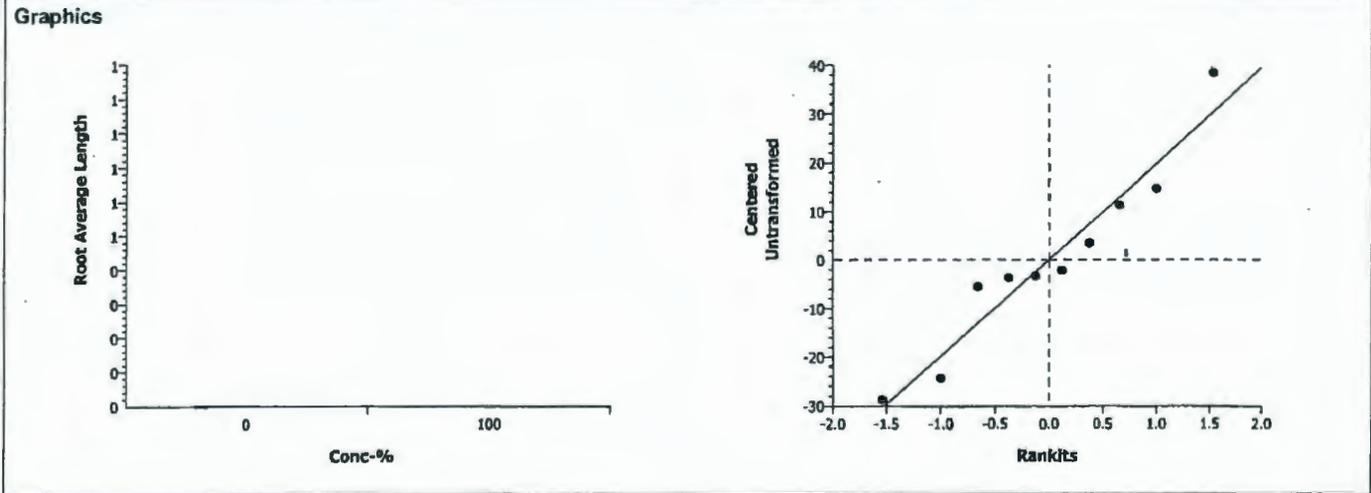
Method	Alt H	Data Transform	Zeta	NOEL	LOEL	Toxic Units	ChV	PMSD
Equal Variance t Two-Sample	C > T	Untransformed		100	>100	1	N/A	91.52%

Group Comparisons							
Control	vs	Conc-%	Statistic	Critical	P-Value	MSD	Decision(0.05)
Artificial Soil/Sedi		100	-1.2012	1.85955	0.8680	23.9428	Non-Significant Effect

ANOVA Table						
Source	Sum of Squares	Mean Square	DF	F Statistic	P-Value	Decision(0.05)
Between	598.0444	598.0444	1	1.44	0.26401	Non-Significant Effect
Error	3315.62	414.4525	8			
Total	3913.66406	1012.4969	9			

ANOVA Assumptions					
Attribute	Test	Statistic	Critical	P-Value	Decision(0.01)
Variances	Variance Ratio F	10.78962	23.15450	0.04073	Equal Variances
Distribution	Shapiro-Wilk W	0.94518		0.61199	Normal Distribution

Data Summary		Original Data					Transformed Data			
Conc-%	Control Type	Count	Mean	Minimum	Maximum	SD	Mean	Minimum	Maximum	SD
0	Artificial Soil/S	5	26.16	20.6	41	8.385				
100		5	41.627	12.8	80	27.543				



CETIS Analysis Detail

Plant Chronic test	CH2M HILL
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Endpoint	Analysis Type	Sample Link	Control Link	Date Analyzed	Version
Root Average Wet Wt.	Comparison	05-5309-6055	05-5309-6055	05 Jun-06 1:30 PM	CETISv1.1.2

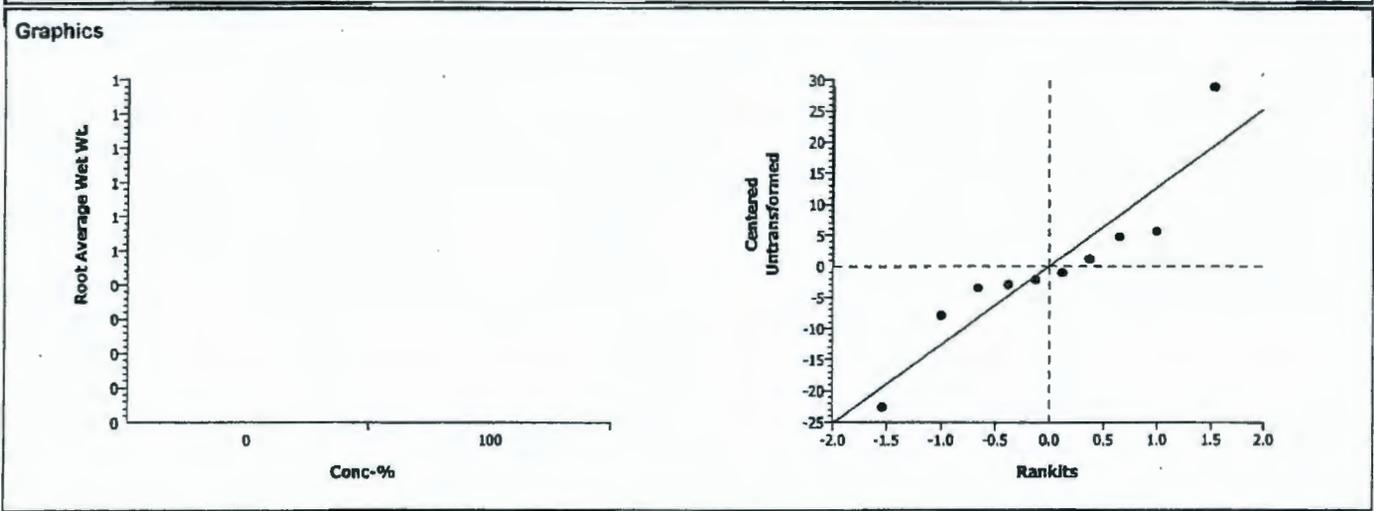
Method	Alt H	Data Transform	Zeta	NOEL	LOEL	Toxic Units	ChV	PMSD
Equal Variance t Two-Sample	C > T	Untransformed		<100	100		N/A	44.25%

Group Comparisons							
Control	vs	Conc-%	Statistic	Critical	P-Value	MSD	Decision(0.05)
Artificial Soil/Sedi		100	3.14629	1.85955	0.0068	16.0373	Significant Effect

ANOVA Table						
Source	Sum of Squares	Mean Square	DF	F Statistic	P-Value	Decision(0.05)
Between	1840.706	1840.706	1	9.90	0.01367	Significant Effect
Error	1487.568	185.946	8			
Total	3328.27454	2026.6524	9			

ANOVA Assumptions						
Attribute	Test	Statistic	Critical	P-Value	Decision(0.01)	
Variances	Variance Ratio F	28.24906	23.15450	0.00685	Unequal Variances	
Distribution	Shapiro-Wilk W	0.88470		0.14770	Normal Distribution	

Data Summary			Original Data				Transformed Data			
Conc-%	Control Type	Count	Mean	Minimum	Maximum	SD	Mean	Minimum	Maximum	SD
0	Artificial Soil/S	5	36.242	13.590	65.054	18.952				
100		5	9.1075	5.61	14.714	3.5658				



CETIS Analysis Detail

Plant Chronic test	CH2M HILL
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Endpoint	Analysis Type	Sample Link	Control Link	Date Analyzed	Version
Total Average Biomass Dry Wt.	Comparison	05-5309-6055	05-5309-6055	05 Jun-06 1:30 PM	CETISv1.1.2

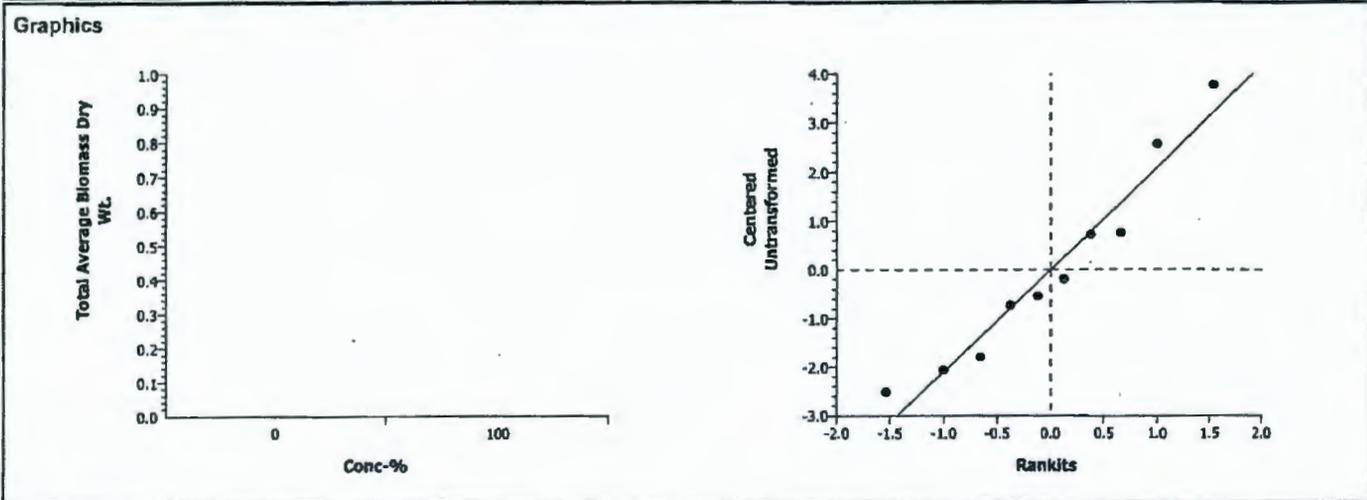
Method	Alt H	Data Transform	Zeta	NOEL	LOEL	Toxic Units	ChV	PMSD
Equal Variance t Two-Sample	C > T	Untransformed		<100	100		N/A	33.12%

Group Comparisons							
Control	vs	Conc-%	Statistic	Critical	P-Value	MSD	Decision(0.05)
Artificial Soil/Sedi		100	3.15106	1.85955	0.0068	2.51379	Significant Effect

ANOVA Table						
Source	Sum of Squares	Mean Square	DF	F Statistic	P-Value	Decision(0.05)
Between	45.36241	45.36241	1	9.93	0.01358	Significant Effect
Error	36.5488	4.5686	8			
Total	81.9112129	49.931012	9			

ANOVA Assumptions					
Attribute	Test	Statistic	Critical	P-Value	Decision(0.01)
Variances	Variance Ratio F	1.98216	23.15450	0.52384	Equal Variances
Distribution	Shapiro-Wilk W	0.94188		0.57406	Normal Distribution

Data Summary		Original Data					Transformed Data			
Conc-%	Control Type	Count	Mean	Minimum	Maximum	SD	Mean	Minimum	Maximum	SD
0	Artificial Soil/S	5	7.5894	5.0750	11.36	2.4644				
100		5	3.3297	1.2700	5.9020	1.7504				



CETIS Analysis Detail

Plant Chronic test CH2M Hill

Endpoint	Analysis Type	Sample Link	Control Link	Date Analyzed	Version
Total Average Biomass Wet Wt.	Comparison	05-5309-6055	05-5309-6055	05 Jun-06 1:30 PM	CETISv1.1.2

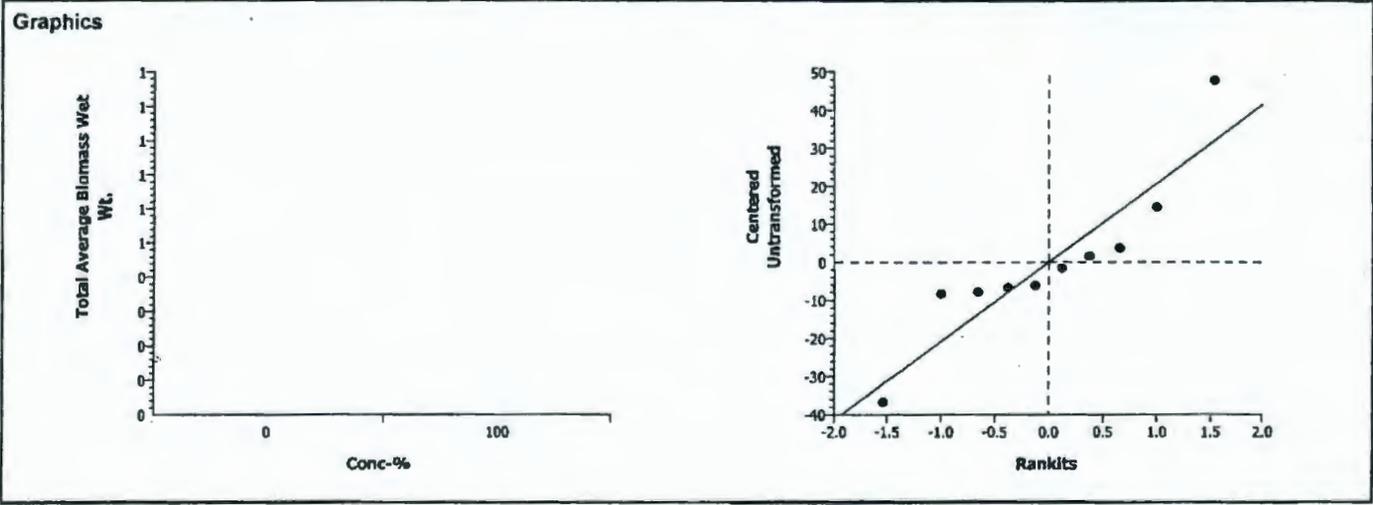
Method	Alt H	Data Transform	Zeta	NOEL	LOEL	Toxic Units	ChV	PMSD
Equal Variance t Two-Sample	C > T	Untransformed		<100	100		N/A	37.76%

Group Comparisons							
Control	vs	Conc-%	Statistic	Critical	P-Value	MSD	Decision(0.05)
Artificial Soil/Sedi		100	3.36119	1.85955	0.0050	26.5972	Significant Effect

ANOVA Table							
Source	Sum of Squares	Mean Square	DF	F Statistic	P-Value	Decision(0.05)	
Between	5778.066	5778.066	1	11.30	0.00991	Significant Effect	
Error	4091.537	511.4421	8				
Total	9869.60303	6289.5081	9				

ANOVA Assumptions						
Attribute	Test	Statistic	Critical	P-Value	Decision(0.01)	
Variances	Variance Ratio F	11.66703	23.15450	0.03543	Equal Variances	
Distribution	Shapiro-Wilk W	0.87375		0.11052	Normal Distribution	

Data Summary		Original Data					Transformed Data			
Conc-%	Control Type	Count	Mean	Minimum	Maximum	SD	Mean	Minimum	Maximum	SD
0	Artificial Soil/S	5	70.439	33.550	118.26	30.694				
100		5	22.364	14.040	36.87	8.9862				



BLUEGRASS GROWTH TEST

Client: Washington Closure Hanford Project

Test Start Date: 4-26-04

DW

Initial: (12) Day 12 NJ Day 14 NJ Day 16 NJ Day 18 (18) Day 21 NJ Day 23 NJ Day 25 (18) Day 28 (18) Day 30 Brown

		Biocassay Lab ID: BG 1575-09							Sample No: J11K61		pH	
CONC.	REPLICATE	# seeds germinated							INITIAL (@ planting)	FINAL (@ 14 days Post-Emergence)		
		12 days after planting	14 days after planting	16 days after planting	18 days after planting	21 days after planting	23 days after planting	7-DAYS POST-EMERGENCE (28 days after planting)			14-DAYS POST-EMERGENCE (32 days after planting)	
Control	A		3	3	5	5	6	6→5	5	7.6	7.5	
	B		5	5	5	5	5	5→5	5			
	C		2	3	3	3	3	3→3	3			
	D		4	5	5	5	5	5→5	5			
	E		1	1	2	2	2	2→2	2			

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

Replicate A: 2Lg (G) w/B tip, 3 med w/B tips removed, 1 sm (G)
 Replicate B: 2Lg (G) w/B shoots, 3 med w/B tip
 Replicate C: 1Lg (G), 1 med w/B tip, 1 sm (G)
 Replicate D: 3Lg (G) w/B tips, 2 med (G)
 Replicate E: 2 med w/B tips

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

14-Days Post-Emergence: Describe shoot appearance:

Replicate A: 3Lg each w 1 B shoot, 1 md w/D shoot, 1 md G
 Replicate B: 3Lg w/B shoots, 2 md G
 Replicate C: 1 md w/1 B shoot, 2 md w/B tips
 Replicate D: 1Lg G, 3 md G, 1 md w/2 B shoots
 Replicate E: 1Lg G, 1Lg w/B tip (141 mm plant w/only 3 shoots)

Measure Shoot Height:

Individual height of each seedling (above ground)

	1st Seedling	2nd Seedling	3rd Seedling	4th Seedling	5th Seedling
Replicate A	80 mm	95 mm	102 mm	96 mm	72 mm
Replicate B	91 mm	101 mm	84 mm	111 mm	132 mm
Replicate C	84 mm	54 mm	75 mm	mm	mm
Replicate D	81 mm	69 mm	82 mm	107 mm	66 mm
Replicate E	141 mm	102 mm	mm	mm	mm

Measure Shoot Weight:

Total mass of all seedlings (above ground)

	Tin Tare WL (mg)	Wet WL (mg)	Dry WL (mg)
Replicate A	1029.31	1210.46	1059.05
Replicate B	1249.78	1443.66	1284.26
Replicate C	1251.19	1325.90	1266.45
Replicate D	1250.36	1433.61	1281.67
Replicate E	1255.70	1328.16	1266.78

Describe root appearance:

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

Measure Root Length:

Individual length of the longest root from each seedling

	1st Seedling	2nd Seedling	3rd Seedling	4th Seedling	5th Seedling
Replicate A	126 mm	77 mm	64 mm	96 mm	122 mm
Replicate B	81 mm	69 mm	94 mm	116 mm	86 mm
Replicate C	76 mm	96 mm	62 mm	mm	mm
Replicate D	80 mm	80 mm	111 mm	76 mm	87 mm
Replicate E	97 mm	92 mm	mm	mm	mm

Measure Root Weight:

Total mass of all roots from all seedlings

	Tin Tare WL (mg)	Wet WL (mg)	Dry WL (mg)
Replicate A	988.24	1170.22	994.99
Replicate B	1242.04	1497.40	1251.83
Replicate C	1260.94	1344.10	1262.86
Replicate D	1245.99	1434.96	1251.49
Replicate E	1247.50	1332.49	1249.84

Comments:

Report Date:

05 Jun-06 1:33 PM

Test Link:

12-6213-8664/B157509psc

CETIS Test Summary

Plant Chronic test							CH2M Hill
Test No:	05-1092-0741	Test Type:	Plant Chronic test	Duration:	N/A		
Start Date:	26 Apr-06	Protocol:	ASTM E1963-02 (2002)	Species:	Poa sandbergii		
Ending Date:		Dil Water:		Source:			
Setup Date:	26 Apr-06	Brine:					
Sample No:	12-9621-5455	Code:	B1580-03	Client:			
Sample Date:	24 Apr-06	Material:	Soil	Project:			
Receive Date:		Source:	Hanford				
Sample Age:	48h	Station:					
Comments:	J11K61						
Comparison Summary							
Analysis	Endpoint	NOEL	LOEL	ChV	PMSD	Method	
14-8041-1875	% Germination	100	> 100	N/A	35.39%	Wilcoxon Rank Sum Two-Sample	
11-1678-1078	AG Average Dry Wt.	100	> 100	N/A	28.89%	Equal Variance t Two-Sample	
11-6113-4855	AG Average Height	100	> 100	N/A	76.58%	Wilcoxon Rank Sum Two-Sample	
07-7608-3768	AG Average Wet Wt.	100	> 100	N/A	32.64%	Equal Variance t Two-Sample	
09-0861-8211	Root Average Dry Wt.	100	> 100	N/A	45.74%	Equal Variance t Two-Sample	
06-3523-9609	Root Average Length	100	> 100	N/A	47.84%	Wilcoxon Rank Sum Two-Sample	
17-2541-9082	Root Average Wet Wt.	100	> 100	N/A	47.72%	Equal Variance t Two-Sample	
15-6049-7422	Total Average Biomass Dry	100	> 100	N/A	31.57%	Equal Variance t Two-Sample	
04-7528-9509	Total Average Biomass Wet	100	> 100	N/A	39.79%	Equal Variance t Two-Sample	

Report Date:

05 Jun-08 1:33 PM

Test Link:

12-6213-8664/B157509psc

CETIS Test Summary

% Germination Summary								
Conc-%	Control Type	Reps	Mean	Minimum	Maximum	SE	SD	CV
0	Artificial Soil/S	5	0.88000	0.40000	1.00000	0.12000	0.26833	30.49%
100		5	0.80000	0.40000	1.00000	0.12649	0.28284	35.36%
AG Average Dry Wt. Summary								
Conc-%	Control Type	Reps	Mean	Minimum	Maximum	SE	SD	CV
0	Artificial Soil/S	5	6.05361	4.14001	8.68201	0.81424	1.82070	30.08%
100		5	5.74654	4.08667	6.89600	0.47039	1.05183	18.30%
AG Average Height Summary								
Conc-%	Control Type	Reps	Mean	Minimum	Maximum	SE	SD	CV
0	Artificial Soil/S	5	21.74	15.8	33.5	3.1641	7.0752	32.54%
100		5	27.893	16.2	61	8.3751	18.727	67.14%
AG Average Wet Wt. Summary								
Conc-%	Control Type	Reps	Mean	Minimum	Maximum	SE	SD	CV
0	Artificial Soil/S	5	34.197	19.960	53.208	5.3829	12.036	35.20%
100		5	34.365	23.903	38.784	2.6575	5.9424	17.29%
Root Average Dry Wt. Summary								
Conc-%	Control Type	Reps	Mean	Minimum	Maximum	SE	SD	CV
0	Artificial Soil/S	5	1.53579	0.93500	2.67798	0.31159	0.69673	45.37%
100		5	1.24360	0.64001	1.95798	0.21354	0.47750	38.40%
Root Average Length Summary								
Conc-%	Control Type	Reps	Mean	Minimum	Maximum	SE	SD	CV
0	Artificial Soil/S	5	26.16	20.6	41	3.7499	8.385	32.05%
100		5	25.52	17.4	47	5.5884	12.496	48.97%
Root Average Wet Wt. Summary								
Conc-%	Control Type	Reps	Mean	Minimum	Maximum	SE	SD	CV
0	Artificial Soil/S	5	36.242	13.590	65.054	8.4756	18.952	52.29%
100		5	39.097	27.720	51.072	3.8302	8.5646	21.91%
Total Average Biomass Dry Wt. Summary								
Conc-%	Control Type	Reps	Mean	Minimum	Maximum	SE	SD	CV
0	Artificial Soil/S	5	7.5894	5.0750	11.36	1.1021	2.4644	32.47%
100		5	6.9901	4.7267	8.854	0.6674	1.4924	21.35%
Total Average Biomass Wet Wt. Summary								
Conc-%	Control Type	Reps	Mean	Minimum	Maximum	SE	SD	CV
0	Artificial Soil/S	5	70.439	33.550	118.26	13.727	30.694	43.58%
100		5	73.462	51.623	89.856	6.2262	13.922	18.95%

Report Date:

05 Jun-06 1:33 PM

Test Link:

12-6213-8664/B157509psc

CETIS Test Summary

% Germination Detail						
Conc-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Artificial Soil/S	1.00000	1.00000	0.40000	1.00000	1.00000
100		1.00000	1.00000	0.60000	1.00000	0.40000
AG Average Dry Wt. Detail						
Conc-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Artificial Soil/S	4.53401	6.62400	4.14001	6.28801	8.68201
100		5.94800	6.89600	4.08667	6.26201	5.54004
AG Average Height Detail						
Conc-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Artificial Soil/S	15.8	18.2	33.5	18.2	23
100		17.8	20.8	23.6667	16.2	61
AG Average Wet Wt. Detail						
Conc-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Artificial Soil/S	30.4100	33.172	19.9600	34.2360	53.2080
100		36.238	38.784	23.9034	36.648	36.25
Root Average Dry Wt. Detail						
Conc-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Artificial Soil/S	1.26801	1.68799	0.93500	1.10999	2.67798
100		1.35000	1.95798	0.64001	1.10000	1.16998
Root Average Length Detail						
Conc-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Artificial Soil/S	20.6	22.8	41	22.4	24
100		19.4	17.8	26	17.4	47
Root Average Wet Wt. Detail						
Conc-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Artificial Soil/S	33.3280	40.9320	13.5900	28.3060	65.054
100		36.392	51.072	27.7200	37.8020	42.5
Total Average Biomass Dry Wt. Detail						
Conc-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Artificial Soil/S	5.80201	8.31199	5.07501	7.398	11.36
100		7.298	8.85398	4.72668	7.36201	6.71002
Total Average Biomass Wet Wt. Detail						
Conc-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Artificial Soil/S	63.7380	74.1040	33.5500	62.5420	118.262
100		72.63	89.856	51.6234	74.45	78.75

CETIS Analysis Detail

Plant Chronic test CH2M Hill

Endpoint	Analysis Type	Sample Link	Control Link	Date Analyzed	Version
% Germination	Comparison	12-6213-8664	12-6213-8664	05 Jun-06 1:33 PM	CETISv1.1.2

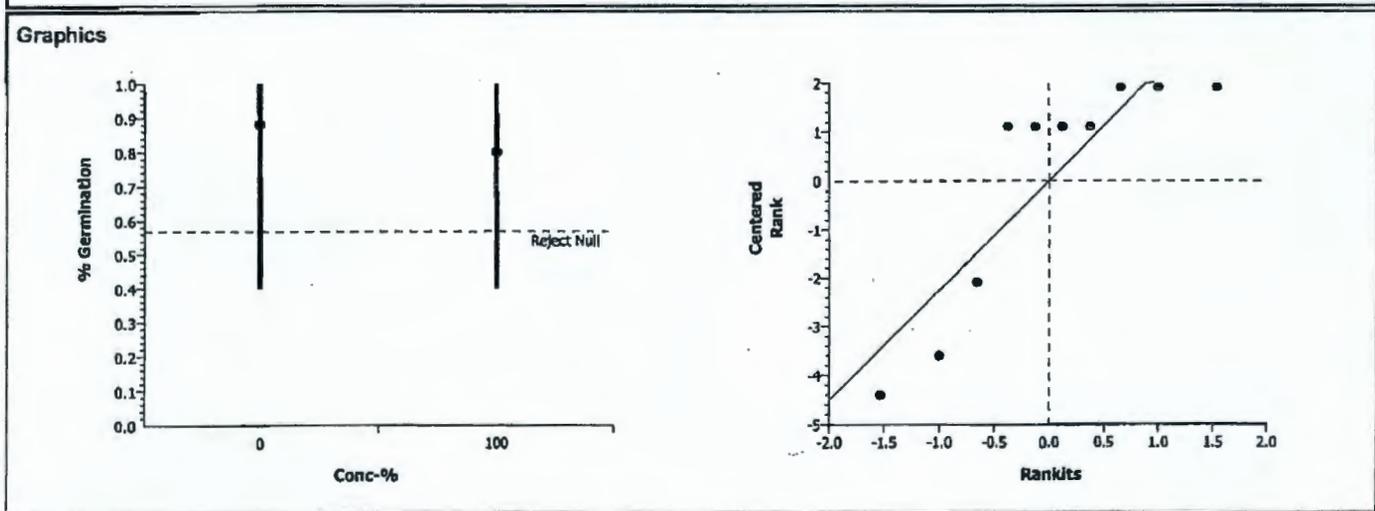
Method	Alt H	Data Transform	Zeta	NOEL	LOEL	Toxic Units	ChV	PMSD
Wilcoxon Rank Sum Two-Sample	C > T	Rank		100	>100	1	N/A	35.39%

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

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

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

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



CETIS Analysis Detail

Plant Chronic test	CH2M Hill
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Endpoint	Analysis Type	Sample Link	Control Link	Date Analyzed	Version
AG Average Dry Wt.	Comparison	12-6213-8664	12-6213-8664	05 Jun-06 1:33 PM	CETISv1.1.2

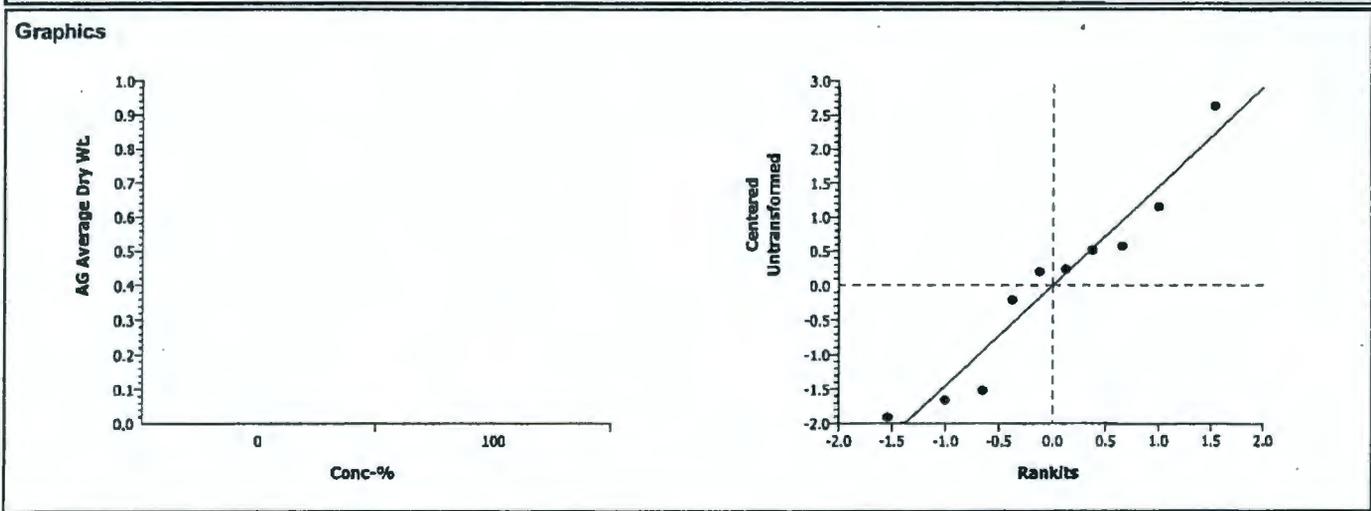
Method	Alt H	Data Transform	Zeta	NOEL	LOEL	Toxic Units	ChV	PMSD
Equal Variance t Two-Sample	C > T	Untransformed		100	>100	1	N/A	28.89%

Group Comparisons							
Control	vs	Conc-%	Statistic	Critical	P-Value	MSD	Decision(0.05)
Artificial Soil/Sedi		100	0.32654	1.85955	0.3762	1.74863	Non-Significant Effect

ANOVA Table						
Source	Sum of Squares	Mean Square	DF	F Statistic	P-Value	Decision(0.05)
Between	0.235723	0.235723	1	0.11	0.75239	Non-Significant Effect
Error	17.68515	2.210644	8			
Total	17.9208732	2.4463668	9			

ANOVA Assumptions					
Attribute	Test	Statistic	Critical	P-Value	Decision(0.01)
Variances	Variance Ratio F	2.99632	23.15450	0.31302	Equal Variances
Distribution	Shapiro-Wilk W	0.93571		0.50637	Normal Distribution

Data Summary			Original Data				Transformed Data			
Conc-%	Control Type	Count	Mean	Minimum	Maximum	SD	Mean	Minimum	Maximum	SD
0	Artificial Soil/S	5	6.05361	4.14001	8.68201	1.82070				
100		5	5.74654	4.08667	6.89600	1.05183				



CETIS Analysis Detail

Plant Chronic test	CH2M Hill
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Endpoint	Analysis Type	Sample Link	Control Link	Date Analyzed	Version
AG Average Height	Comparison	12-6213-8664	12-6213-8664	05 Jun-06 1:33 PM	CETISv1.1.2

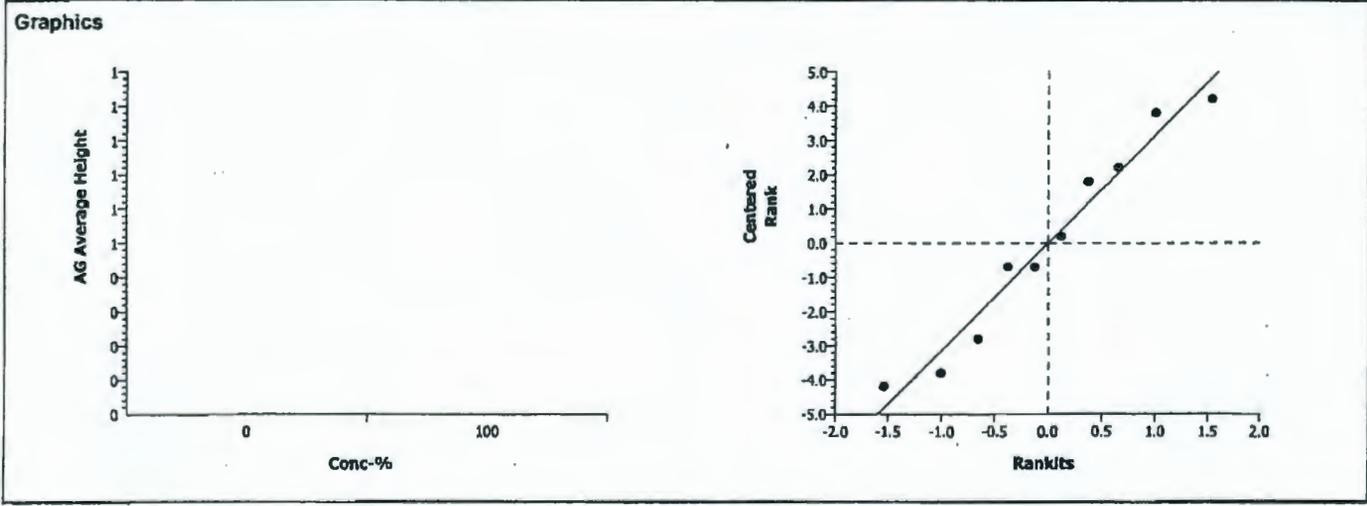
Method	Alt H	Data Transform	Zeta	NOEL	LOEL	Toxic Units	ChV	PMSD
Wilcoxon Rank Sum Two-Sample	C > T	Rank		100	>100	1	N/A	76.58%

Group Comparisons							
Control	vs	Conc-%	Statistic	Critical	P-Value	Ties	Decision(0.05)
Artificial Soil/Sedi		100	29		0.5794	0	Non-Significant Effect

ANOVA Table						
Source	Sum of Squares	Mean Square	DF	F Statistic	P-Value	Decision(0.05)
Between	94.65878	94.65878	1	0.47	0.51132	Non-Significant Effect
Error	1603.073	200.3841	8			
Total	1697.73165	295.04288	9			

ANOVA Assumptions					
Attribute	Test	Statistic	Critical	P-Value	Decision(0.01)
Variances	Variance Ratio F	7.00608	23.15450	0.08581	Equal Variances
Distribution	Shapiro-Wilk W	0.76434		0.00534	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	21.740	15.8	33.5	7.0752	5.20000	1.00000	9.00000	3.01247
100		5	27.893	16.2	61	18.727	5.80000	2.00000	10.0000	3.34664



CETIS Analysis Detail

Plant Chronic test	CH2M Hill
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Endpoint	Analysis Type	Sample Link	Control Link	Date Analyzed	Version
AG Average Wet Wt.	Comparison	12-6213-8664	12-6213-8664	05 Jun-06 1:33 PM	CETISv1.1.2

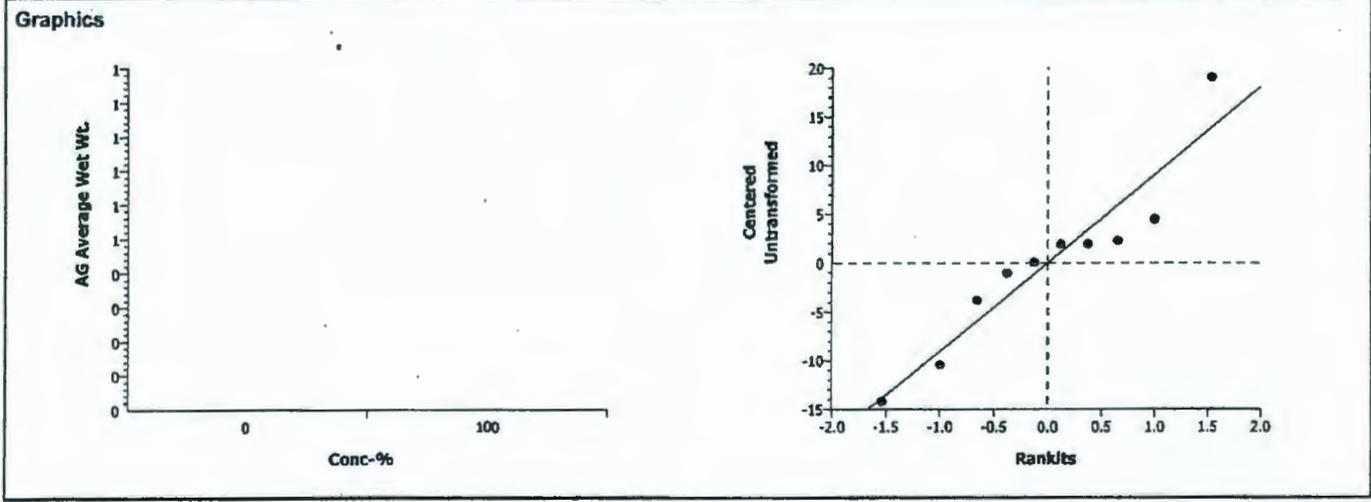
Method	Alt H	Data Transform	Zeta	NOEL	LOEL	Toxic Units	ChV	PMSD
Equal Variance t Two-Sample	C > T	Untransformed		100	>100	1	N/A	32.64%

Group Comparisons							
Control	vs	Conc-%	Statistic	Critical	P-Value	MSD	Decision(0.05)
Artificial Soil/Sedi		100	-0.0279	1.85955	0.5108	11.1631	Non-Significant Effect

ANOVA Table						
Source	Sum of Squares	Mean Square	DF	F Statistic	P-Value	Decision(0.05)
Between	0.0701045	0.070104	1	0.00	0.97843	Non-Significant Effect
Error	720.7501	90.09377	8			
Total	720.820227	90.16387	9			

ANOVA Assumptions					
Attribute	Test	Statistic	Critical	P-Value	Decision(0.01)
Variances	Variance Ratio F	4.10277	23.15450	0.20032	Equal Variances
Distribution	Shapiro-Wilk W	0.91656		0.32912	Normal Distribution

Data Summary			Original Data				Transformed Data			
Conc-%	Control Type	Count	Mean	Minimum	Maximum	SD	Mean	Minimum	Maximum	SD
0	Artificial Soil/S	5	34.197	19.960	53.208	12.036				
100		5	34.365	23.903	38.784	5.9424				



CETIS Analysis Detail

Plant Chronic test CH2M Hill

Endpoint	Analysis Type	Sample Link	Control Link	Date Analyzed	Version
Root Average Dry Wt.	Comparison	12-6213-8664	12-6213-8664	05 Jun-06 1:33 PM	CETISv1.1.2

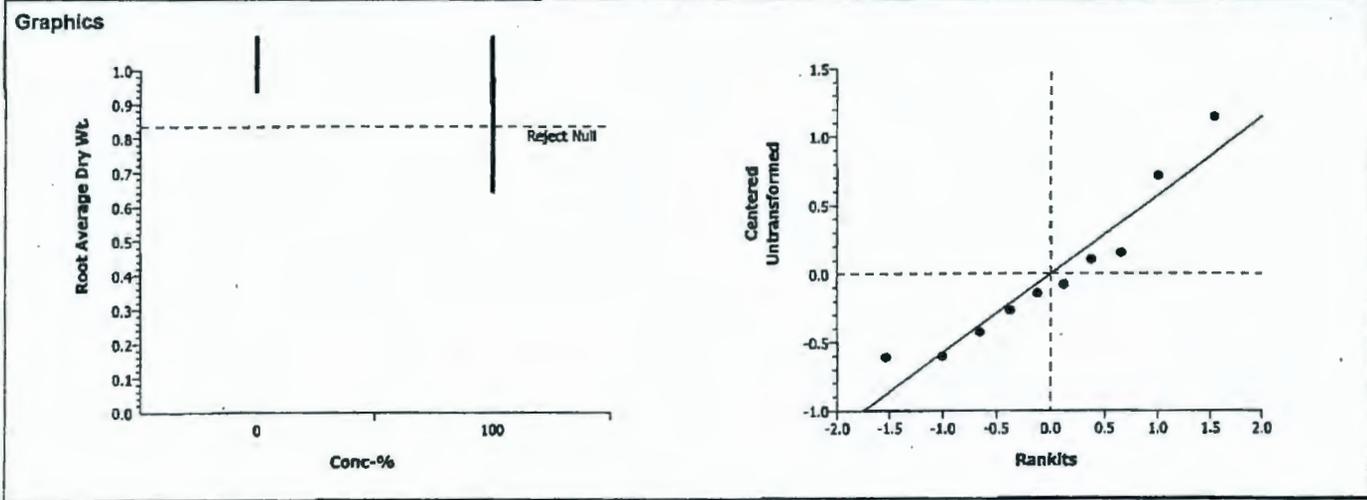
Method	Alt H	Data Transform	Zeta	NOEL	LOEL	Toxic Units	ChV	PMSD
Equal Variance t Two-Sample	C > T	Untransformed		100	>100	1	N/A	45.74%

Group Comparisons							
Control	vs	Conc-%	Statistic	Critical	P-Value	MSD	Decision(0.05)
Artificial Soil/Sedi		100	0.77353	1.85955	0.2307	0.70243	Non-Significant Effect

ANOVA Table						
Source	Sum of Squares	Mean Square	DF	F Statistic	P-Value	Decision(0.05)
Between	0.2134445	0.213445	1	0.60	0.46145	Non-Significant Effect
Error	2.853749	0.356719	8			
Total	3.06719357	0.5701632	9			

ANOVA Assumptions						
Attribute	Test	Statistic	Critical	P-Value	Decision(0.01)	
Variances	Variance Ratio F	2.12904	23.15450	0.48225	Equal Variances	
Distribution	Shapiro-Wilk W	0.90479		0.24709	Normal Distribution	

Data Summary		Original Data					Transformed Data			
Conc-%	Control Type	Count	Mean	Minimum	Maximum	SD	Mean	Minimum	Maximum	SD
0	Artificial Soil/S	5	1.53579	0.93500	2.67798	0.69673				
100		5	1.24360	0.64001	1.95798	0.47750				



CETIS Analysis Detail

Plant Chronic test	CH2M Hill
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Endpoint	Analysis Type	Sample Link	Control Link	Date Analyzed	Version
Root Average Length	Comparison	12-6213-8664	12-6213-8664	05 Jun-06 1:33 PM	CETISv1.1.2

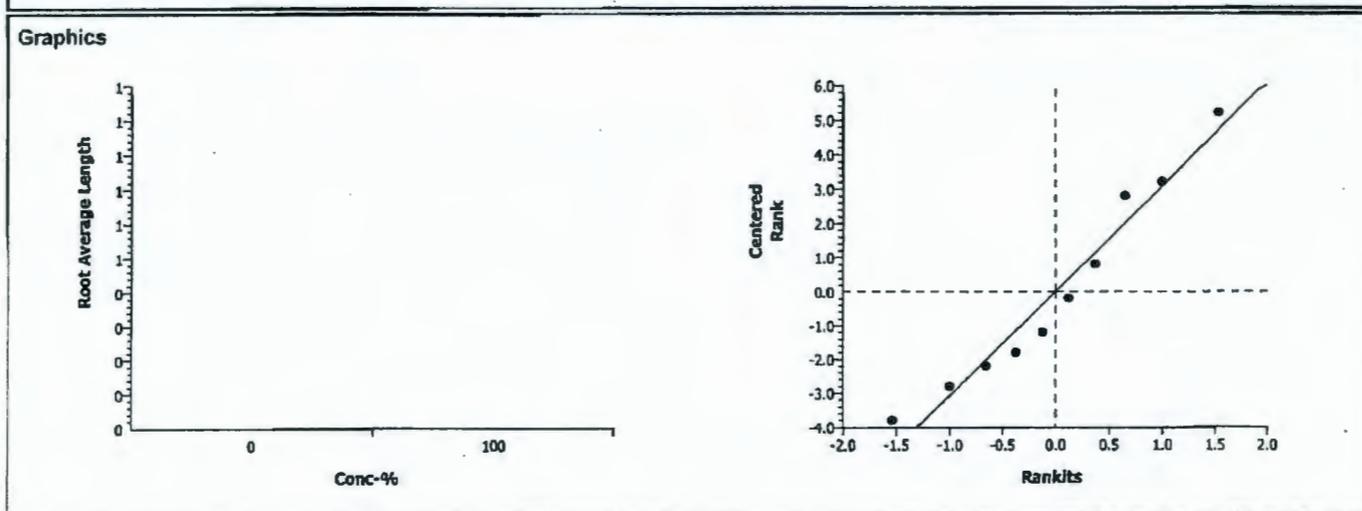
Method	Alt H	Data Transform	Zeta	NOEL	LOEL	Toxic Units	ChV	PMSD
Wilcoxon Rank Sum Two-Sample	C > T	Rank		100	>100	1	N/A	47.84%

Group Comparisons							
Control	vs	Conc-%	Statistic	Critical	P-Value	Ties	Decision(0.05)
Artificial Soil/Sedi		100	24		0.2738	0	Non-Significant Effect

ANOVA Table						
Source	Sum of Squares	Mean Square	DF	F Statistic	P-Value	Decision(0.05)
Between	1.024	1.024	1	0.01	0.92658	Non-Significant Effect
Error	905.84	113.23	8			
Total	906.864027	114.25400	9			

ANOVA Assumptions					
Attribute	Test	Statistic	Critical	P-Value	Decision(0.01)
Variances	Variance Ratio F	2.22097	23.15450	0.45863	Equal Variances
Distribution	Shapiro-Wilk W	0.76079		0.00483	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	26.16	20.6	41	8.385	6.20000	4.00000	9.00000	1.92354
100		5	25.52	17.4	47	12.496	4.80000	1.00000	10.00000	3.96232



CETIS Analysis Detail

Plant Chronic test CH2M Hill

Endpoint	Analysis Type	Sample Link	Control Link	Date Analyzed	Version
Root Average Wet Wt.	Comparison	12-6213-8664	12-6213-8664	05 Jun-06 1:33 PM	CETISv1.1.2

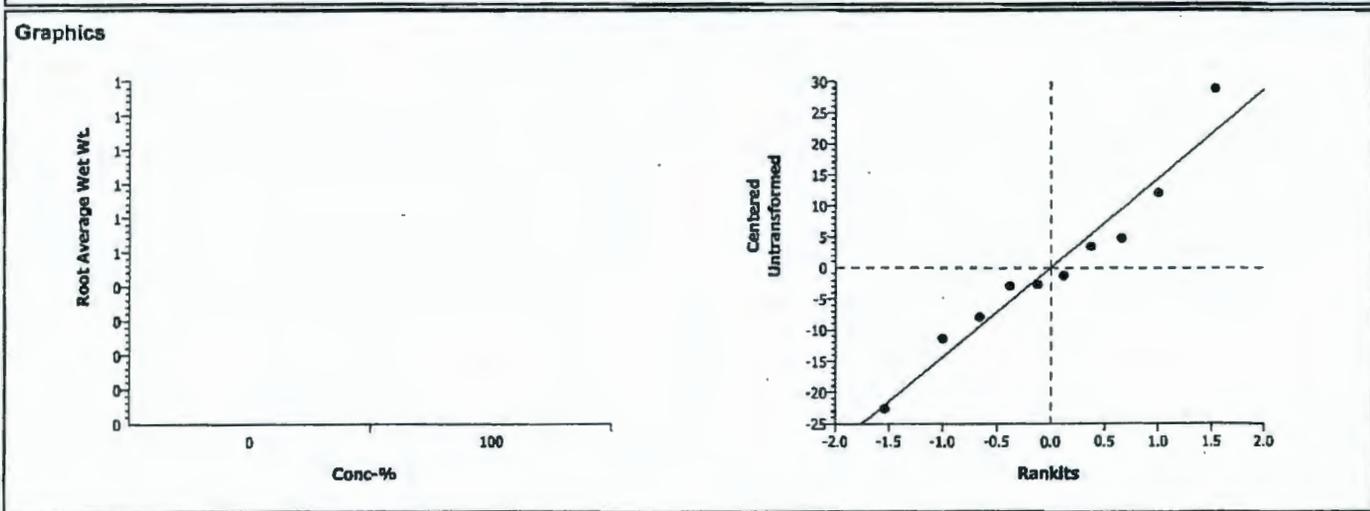
Method	Alt H	Data Transform	Zeta	NOEL	LOEL	Toxic Units	ChV	PMSD
Equal Variance t Two-Sample	C > T	Untransformed		100	>100	1	N/A	47.72%

Group Comparisons							
Control	vs	Conc-%	Statistic	Critical	P-Value	MSD	Decision(0.05)
Artificial Soil/Sedl		100	-0.307	1.85955	0.6167	17.2954	Non-Significant Effect

ANOVA Table						
Source	Sum of Squares	Mean Square	DF	F Statistic	P-Value	Decision(0.05)
Between	20.38033	20.38033	1	0.09	0.76670	Non-Significant Effect
Error	1730.12	216.2651	8			
Total	1750.50082	236.64539	9			

ANOVA Assumptions					
Attribute	Test	Statistic	Critical	P-Value	Decision(0.01)
Variances	Variance Ratio F	4.89658	23.15450	0.15305	Equal Variances
Distribution	Shapiro-Wilk W	0.95962		0.78153	Normal Distribution

Data Summary		Original Data					Transformed Data			
Conc-%	Control Type	Count	Mean	Minimum	Maximum	SD	Mean	Minimum	Maximum	SD
0	Artificial Soil/S	5	36.242	13.590	65.054	18.952				
100		5	39.097	27.720	51.072	8.5646				



CETIS Analysis Detail

Comparisons: Page 8 of 9
 Report Date: 05 Jun-06 1:33 PM
 Analysis: 15-6049-7422/B157509psc

Plant Chronic test CH2M Hill

Endpoint	Analysis Type	Sample Link	Control Link	Date Analyzed	Version
Total Average Biomass Dry Wt.	Comparison	12-6213-8664	12-6213-8664	05 Jun-06 1:33 PM	CETISv1.1.2

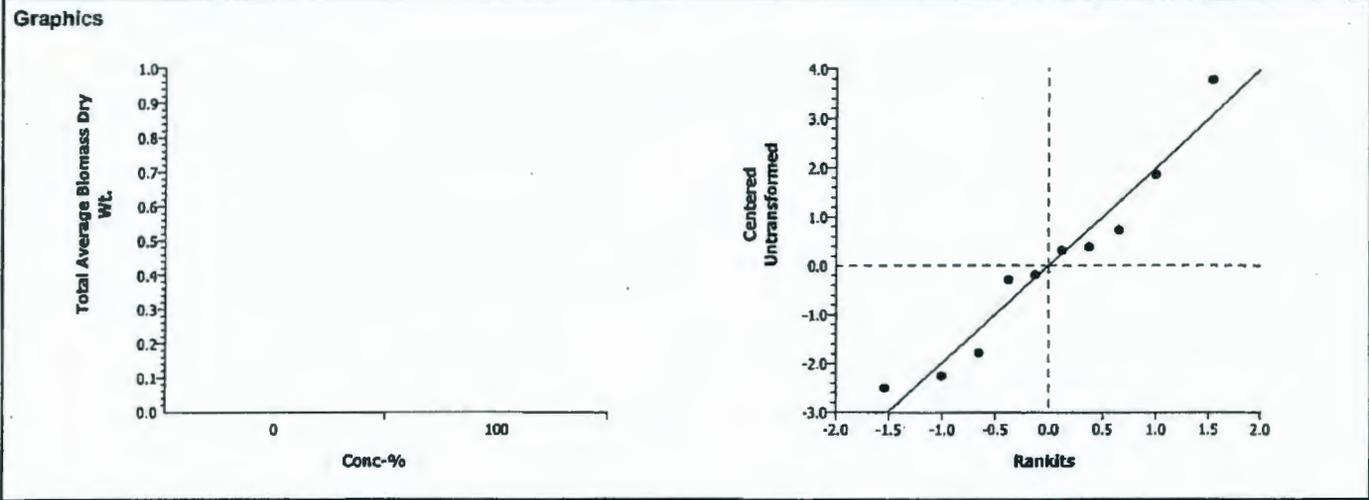
Method	Alt H	Data Transform	Zeta	NOEL	LOEL	Toxic Units	ChV	PMSD
Equal Variance t Two-Sample	C > T	Untransformed		100	>100	1	N/A	31.57%

Group Comparisons							
Control	vs	Conc-%	Statistic	Critical	P-Value	MSD	Decision(0.05)
Artificial Soil/Sedi		100	0.46510	1.85955	0.3271	2.39592	Non-Significant Effect

ANOVA Table							
Source	Sum of Squares	Mean Square	DF	F Statistic	P-Value	Decision(0.05)	
Between	0.8977821	0.897782	1	0.22	0.65425	Non-Significant Effect	
Error	33.20163	4.150204	8				
Total	34.0994155	5.0479863	9				

ANOVA Assumptions						
Attribute	Test	Statistic	Critical	P-Value	Decision(0.01)	
Variances	Variance Ratio F	2.72689	23.15450	0.35470	Equal Variances	
Distribution	Shapiro-Wilk W	0.94508		0.61078	Normal Distribution	

Data Summary		Original Data					Transformed Data			
Conc-%	Control Type	Count	Mean	Minimum	Maximum	SD	Mean	Minimum	Maximum	SD
0	Artificial Soil/S	5	7.5894	5.0750	11.36	2.4644				
100		5	6.9901	4.7267	8.854	1.4924				



CETIS Analysis Detail

Comparisons: Page 9 of 9
 Report Date: 05 Jun-06 1:33 PM
 Analysis: 04-7528-9509/B157509psc

Plant Chronic test	CH2M Hill
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Endpoint	Analysis Type	Sample Link	Control Link	Date Analyzed	Version
Total Average Biomass Wet Wt.	Comparison	12-6213-8664	12-6213-8664	05 Jun-06 1:33 PM	CETISv1.1.2

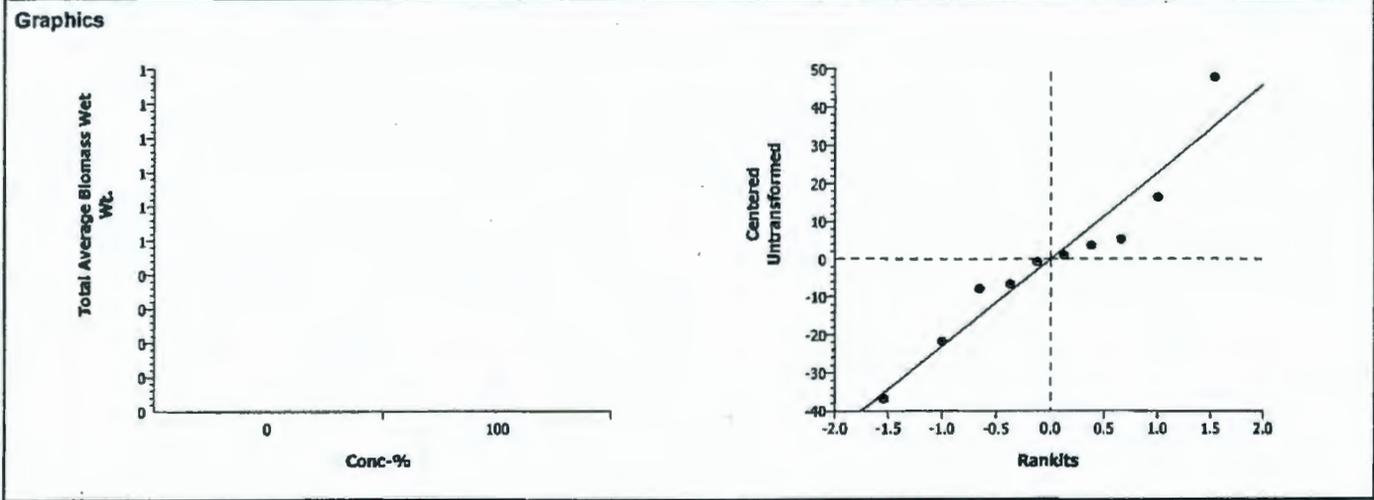
Method	Alt H	Data Transform	Zeta	NOEL	LOEL	Toxic Units	ChV	PMSD
Equal Variance t Two-Sample	C > T	Untransformed		100	>100	1	N/A	39.79%

Group Comparisons							
Control	vs	Conc-%	Statistic	Critical	P-Value	MSD	Decision(0.05)
Artificial Soil/Sedi		100	-0.2005	1.85955	0.5770	28.0288	Non-Significant Effect

ANOVA Table						
Source	Sum of Squares	Mean Square	DF	F Statistic	P-Value	Decision(0.05)
Between	22.84103	22.84103	1	0.04	0.84607	Non-Significant Effect
Error	4543.85	567.9813	8			
Total	4566.69113	590.8223	9			

ANOVA Assumptions					
Attribute	Test	Statistic	Critical	P-Value	Decision(0.01)
Variances	Variance Ratio F	4.86062	23.15450	0.15482	Equal Variances
Distribution	Shapiro-Wilk W	0.93987		0.55153	Normal Distribution

Data Summary		Original Data					Transformed Data			
Conc-%	Control Type	Count	Mean	Minimum	Maximum	SD	Mean	Minimum	Maximum	SD
0	Artificial Soil/S	5	70.439	33.550	118.26	30.694				
100		5	73.462	51.623	89.856	13.922				



BLUEGRASS GROWTH TEST

Client: Washington Closure Hanford Project

Test Start Date: 4 26-06

Day 12 NJ Day 14 NJ Day 16 NJ Day 18 TP Day 21 NIT Day 23 NJ Day 25 NJ Day 28 NJ Day 30 NJ

		Bioassay Lab ID: BG 1575- 10							Sample No: J11K40		
CONC.	REPLICATE	# seeds germinated							pH		
		12 days after planting	14 days after planting	16 days after planting	19 days after planting	21 days after planting	23 days after planting	7-DAYS POST-EMERGENCE (28 days after planting)	14-DAYS POST-EMERGENCE (35 days after planting)	INITIAL (at planting)	FINAL (at 14 days Post-Emergence)
Control	A		3	3	3	3	3	4	4	6.4	6.9
	B		1	2	3	3	3	3	3		
	C		5	5	6	6	6	5	5		
	D		3	5	8	8	8	5	5		
	E		2	2	3	3	3	3	3		

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

Replicate A: 1 lg G, 2 md G w/ brown shoot, 1 sm G
 Replicate B: 2 lg G, 1 md G
 Replicate C: 4 lg G, 2 md G, 1 sm G. Removed - 1 md G
 Replicate D: 1 lg G, 4 md G. Removed - 2 md G + 1 sm G w/ 1 B + P
 Replicate E: 2 lg G w/ 1 B + P, 1 md G

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

14-Days Post-Emergence: Describe shoot appearance:

Replicate A: 1 Lg w/ 3 B shoots, 2 md G, 1 sm G
 Replicate B: 2 Lg G, 1 md G
 Replicate C: 2 Lg G w/ 1 B shoot, 3 Lg G
 Replicate D: 1 Lg w/ 1 B shoot, 1 md, 1 B shoot, 3 md G
 Replicate E: 1 Lg w/ 2 B shoots, 2 md G

Measure Shoot Height:

Individual height of each seedling (above ground)

	1st Seedling	2nd Seedling	3rd Seedling	4th Seedling	5th Seedling
Replicate A	52 mm	84 mm	52 mm	106 mm	mm
Replicate B	11 mm	64 mm	95 mm	mm	mm
Replicate C	83 mm	84 mm	95 mm	100 mm	110 mm
Replicate D	85 mm	69 mm	75 mm	88 mm	133 mm
Replicate E	71 mm	89 mm	86 mm	mm	mm

Measure Shoot Weight:

Total mass of all seedlings (above ground)

	Tin Tare WL (mg)	Wet WL (mg)	Dry WL (mg)
Replicate A	1018.85	1109.9	1034.61
Replicate B	989.91	1069.9	1002.57
Replicate C	1009.75	1193.7	1039.62
Replicate D	999.16	1169.8	1024.80
Replicate E	995.56	1182.8	1015.03

Describe root appearance:

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

Measure Root Length:

Individual length of the longest root from each seedling

	1st Seedling	2nd Seedling	3rd Seedling	4th Seedling	5th Seedling
Replicate A	47 mm	116 mm	31 mm	30 mm	mm
Replicate B	70 mm	82 mm	51 mm	mm	mm
Replicate C	66 mm	87 mm	116 mm	132 mm	106 mm
Replicate D	80 mm	110 mm	64 mm	48 mm	75 mm
Replicate E	152 mm	116 mm	59 mm	mm	mm

Measure Root Weight:

Total mass of all roots from all seedlings

	Tin Tare WL (mg)	Wet WL (mg)	Dry WL (mg)
Replicate A	995.71	1082.0	999.71
Replicate B	989.80	1060.3	993.16
Replicate C	1003.94	1199.5	1012.74
Replicate D	991.11	1201.5	998.96
Replicate E	1242.74	1383.7	1251.42

Comments:

CETIS Test Summary

 Report Date: 05 Jun-06 1:36 PM
 Test Link: 07-3016-0892/B157510psc

Plant Chronic test		CH2M Hill				
Test No:	19-3203-7355	Test Type:	Plant Chronic test	Duration:	N/A	
Start Date:	26 Apr-06	Protocol:	ASTM E1963-02 (2002)	Species:	Poa sandbergii	
Ending Date:		Dil Water:		Source:		
Setup Date:	26 Apr-06	Brine:				
Sample No:	02-2878-1148	Code:	B1580-04	Client:		
Sample Date:	25 Apr-06	Material:	Soil	Project:		
Receive Date:		Source:	Hanford			
Sample Age:	24h	Station:				
Comments:	J11K40					
Comparison Summary						
Analysis	Endpoint	NOEL	LOEL	ChV	PMSD	Method
12-6799-4363	% Germination	100	> 100	N/A	30.05%	Equal Variance t Two-Sample
11-6924-1763	AG Average Dry Wt.	100	> 100	N/A	29.58%	Equal Variance t Two-Sample
16-6964-4127	AG Average Height	100	> 100	N/A	34.56%	Equal Variance t Two-Sample
03-5348-7765	AG Average Wet Wt.	100	> 100	N/A	47.70%	Equal Variance t Two-Sample
15-9152-6103	Root Average Dry Wt.	100	> 100	N/A	55.54%	Equal Variance t Two-Sample
02-8622-2247	Root Average Length	100	> 100	N/A	39.24%	Wilcoxon Rank Sum Two-Sample
15-3968-7811	Root Average Wet Wt.	100	> 100	N/A	50.78%	Equal Variance t Two-Sample
12-0608-9443	Total Average Biomass Dry	100	> 100	N/A	33.67%	Equal Variance t Two-Sample
14-0409-3093	Total Average Biomass Wet	100	> 100	N/A	47.40%	Equal Variance t Two-Sample

Report Date:

05 Jun-06 1:36 PM

CETIS Test Summary

Test Link:

07-3016-0892/B157510psc

% Germination Summary								
Conc-%	Control Type	Reps	Mean	Minimum	Maximum	SE	SD	CV
0	Artificial Soil/S	5	0.88000	0.40000	1.00000	0.12000	0.26833	30.49%
100		5	0.80000	0.60000	1.00000	0.08944	0.20000	25.00%
AG Average Dry Wt. Summary								
Conc-%	Control Type	Reps	Mean	Minimum	Maximum	SE	SD	CV
0	Artificial Soil/S	5	6.05361	4.14001	8.68201	0.81424	1.82070	30.08%
100		5	5.31041	3.94000	6.49001	0.51382	1.14894	21.64%
AG Average Height Summary								
Conc-%	Control Type	Reps	Mean	Minimum	Maximum	SE	SD	CV
0	Artificial Soil/S	5	21.74	15.8	33.5	3.1641	7.0752	32.54%
100		5	22.607	18.2	30	2.5129	5.6190	24.86%
AG Average Wet Wt. Summary								
Conc-%	Control Type	Reps	Mean	Minimum	Maximum	SE	SD	CV
0	Artificial Soil/S	5	34.197	19.960	53.208	5.3829	12.036	35.20%
100		5	36.711	22.763	62.413	6.9257	15.486	42.18%
Root Average Dry Wt. Summary								
Conc-%	Control Type	Reps	Mean	Minimum	Maximum	SE	SD	CV
0	Artificial Soil/S	5	1.53579	0.93500	2.67798	0.31159	0.69673	45.37%
100		5	1.66867	1.00000	2.89335	0.33661	0.75268	45.11%
Root Average Length Summary								
Conc-%	Control Type	Reps	Mean	Minimum	Maximum	SE	SD	CV
0	Artificial Soil/S	5	26.16	20.6	41	3.7499	8.385	32.05%
100		5	21.32	14	36.333	4.0505	9.0573	42.48%
Root Average Wet Wt. Summary								
Conc-%	Control Type	Reps	Mean	Minimum	Maximum	SE	SD	CV
0	Artificial Soil/S	5	36.242	13.590	65.054	8.4756	18.952	52.29%
100		5	34.65	21.572	46.987	5.1119	11.430	32.99%
Total Average Biomass Dry Wt. Summary								
Conc-%	Control Type	Reps	Mean	Minimum	Maximum	SE	SD	CV
0	Artificial Soil/S	5	7.5894	5.0750	11.36	1.1021	2.4644	32.47%
100		5	6.9791	4.9400	9.3834	0.8205	1.8347	26.29%
Total Average Biomass Wet Wt. Summary								
Conc-%	Control Type	Reps	Mean	Minimum	Maximum	SE	SD	CV
0	Artificial Soil/S	5	70.439	33.550	118.26	13.727	30.694	43.58%
100		5	71.361	44.335	109.4	11.574	25.880	36.27%

Report Date:

05 Jun-06 1:36 PM

Test Link:

07-3016-0892/B157510psc

CETIS Test Summary

% Germination Detail						
Conc-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Artificial Soil/S	1.00000	1.00000	0.40000	1.00000	1.00000
100		0.80000	0.80000	1.00000	1.00000	0.60000
AG Average Dry Wt. Detail						
Conc-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Artificial Soil/S	4.53401	6.62400	4.14001	6.28801	8.68201
100		3.94000	4.22001	5.97400	5.92802	6.49001
AG Average Height Detail						
Conc-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Artificial Soil/S	15.8	18.2	33.5	18.2	23
100		18.5	30	19	18.2	27.3333
AG Average Wet Wt. Detail						
Conc-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Artificial Soil/S	30.4100	33.172	19.9600	34.2360	53.2080
100		22.7625	26.6634	36.79	34.9280	62.4133
Root Average Dry Wt. Detail						
Conc-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Artificial Soil/S	1.26801	1.68799	0.93500	1.10999	2.67798
100		1.00000	1.12000	1.76000	1.57001	2.89335
Root Average Length Detail						
Conc-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Artificial Soil/S	20.6	22.8	41	22.4	24
100		14	22.6667	18.6	15	36.3333
Root Average Wet Wt. Detail						
Conc-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Artificial Soil/S	33.3280	40.9320	13.5900	28.3060	65.054
100		21.5725	23.5000	39.112	42.0780	46.9867
Total Average Biomass Dry Wt. Detail						
Conc-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Artificial Soil/S	5.80201	8.31199	5.07501	7.398	11.36
100		4.94000	5.34001	7.734	7.49802	9.38338
Total Average Biomass Wet Wt. Detail						
Conc-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Artificial Soil/S	63.7380	74.1040	33.5500	62.5420	118.262
100		44.3350	50.1633	75.902	77.0060	109.4

CETIS Analysis Detail

Plant Chronic test	CH2M Hill
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Endpoint	Analysis Type	Sample Link	Control Link	Date Analyzed	Version
% Germination	Comparison	07-3016-0892	07-3016-0892	05 Jun-06 1:36 PM	CETISv1.1.2

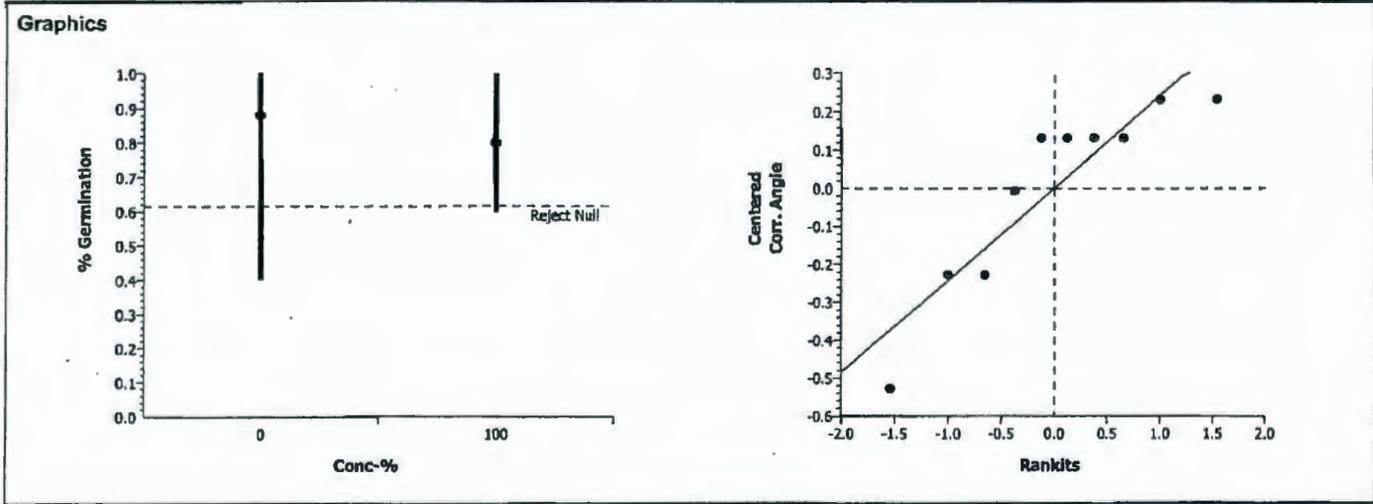
Method	Alt H	Data Transform	Zeta	NOEL	LOEL	Toxic Units	ChV	PMSD
Equal Variance t Two-Sample	C > T	Angular (Corrected)		100	>100	1	N/A	30.05%

Group Comparisons							
Control	vs	Conc-%	Statistic	Critical	P-Value	MSD	Decision(0.05)
Artificial Soil/Sedi		100	0.59281	1.85955	0.2848	0.31116	Non-Significant Effect

ANOVA Table						
Source	Sum of Squares	Mean Square	DF	F Statistic	P-Value	Decision(0.05)
Between	0.0245998	0.0246	1	0.35	0.56968	Non-Significant Effect
Error	0.5600038	0.070000	8			
Total	0.58460358	0.0946003	9			

ANOVA Assumptions					
Attribute	Test	Statistic	Critical	P-Value	Decision(0.01)
Variances	Variance Ratio F	1.65495	23.15450	0.63747	Equal Variances
Distribution	Shapiro-Wilk W	0.82857		0.03216	Normal Distribution

Data Summary		Original Data					Transformed Data			
Conc-%	Control Type	Count	Mean	Minimum	Maximum	SD	Mean	Minimum	Maximum	SD
0	Artificial Soil/S	5	0.88000	0.40000	1.00000	0.26833	1.21317	0.68472	1.34528	0.29541
100		5	0.80000	0.60000	1.00000	0.20000	1.11397	0.88608	1.34528	0.22963



CETIS Analysis Detail

Plant Chronic test CH2M Hill

Endpoint	Analysis Type	Sample Link	Control Link	Date Analyzed	Version
AG Average Dry Wt.	Comparison	07-3016-0892	07-3016-0892	05 Jun-06 1:36 PM	CETISv1.1.2

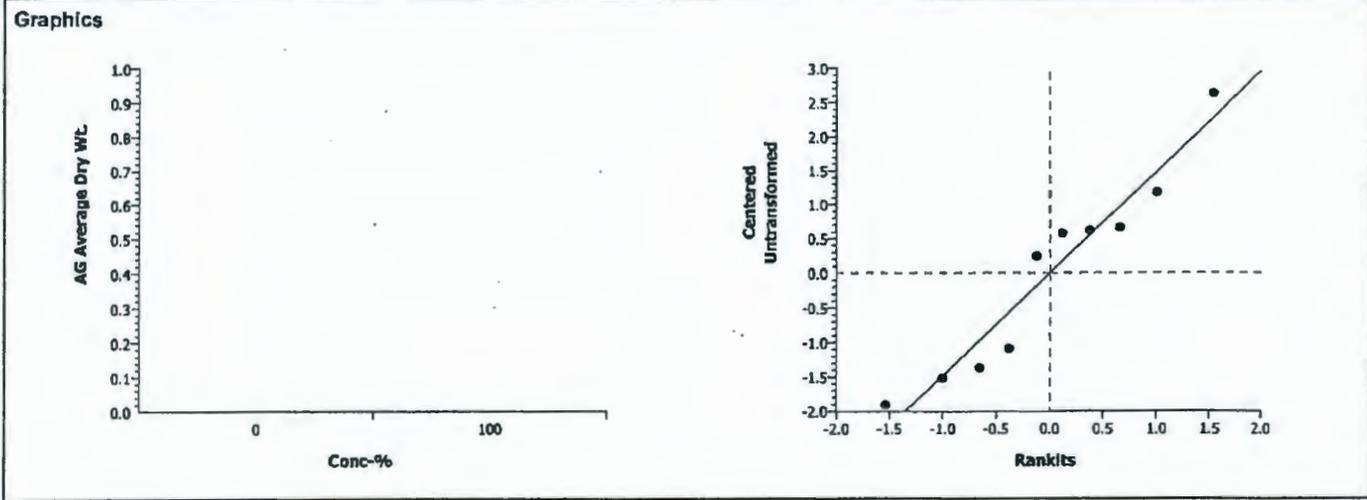
Method	Alt H	Data Transform	Zeta	NOEL	LOEL	Toxic Units	ChV	PMSD
Equal Variance t Two-Sample	C > T	Untransformed		100	>100	1	N/A	29.58%

Group Comparisons							
Control	vs	Conc-%	Statistic	Critical	P-Value	MSD	Decision(0.05)
Artificial Soil/Sedi		100	0.77191	1.85955	0.2312	1.79039	Non-Significant Effect

ANOVA Table						
Source	Sum of Squares	Mean Square	DF	F Statistic	P-Value	Decision(0.05)
Between	1.380868	1.380868	1	0.60	0.46236	Non-Significant Effect
Error	18.54002	2.317503	8			
Total	19.9208920	3.6983712	9			

ANOVA Assumptions						
Attribute	Test	Statistic	Critical	P-Value	Decision(0.01)	
Variances	Variance Ratio F	2.51121	23.15450	0.39427	Equal Variances	
Distribution	Shapiro-Wilk W	0.93026		0.45041	Normal Distribution	

Data Summary		Original Data					Transformed Data			
Conc-%	Control Type	Count	Mean	Minimum	Maximum	SD	Mean	Minimum	Maximum	SD
0	Artificial Soil/S	5	6.05361	4.14001	8.68201	1.82070				
100		5	5.31041	3.94000	6.49001	1.14894				



CETIS Analysis Detail

Plant Chronic test	CH2M Hill
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Endpoint	Analysis Type	Sample Link	Control Link	Date Analyzed	Version
AG Average Height	Comparison	07-3016-0892	07-3016-0892	05 Jun-06 1:36 PM	CETISv1.1.2

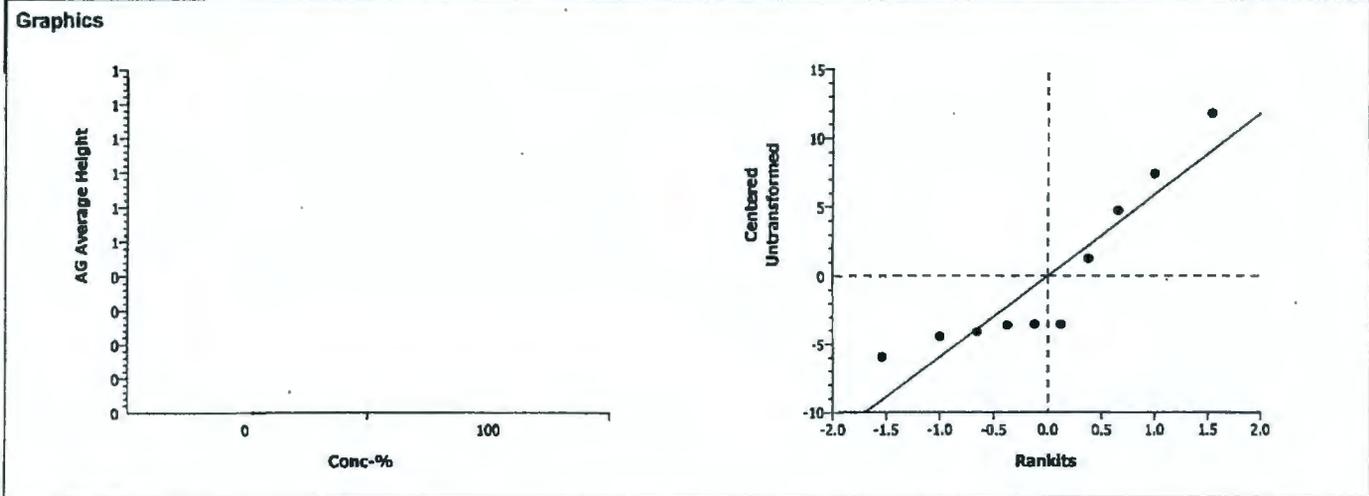
Method	Alt H	Data Transform	Zeta	NOEL	LOEL	Toxic Units	ChV	PMSD
Equal Variance t Two-Sample	C > T	Untransformed		100	>100	1	N/A	34.56%

Group Comparisons							
Control	vs	Conc-%	Statistic	Critical	P-Value	MSD	Decision(0.05)
Artificial Soil/Sedi		100	-0.2145	1.85955	0.5822	7.51366	Non-Significant Effect

ANOVA Table						
Source	Sum of Squares	Mean Square	DF	F Statistic	P-Value	Decision(0.05)
Between	1.877778	1.877778	1	0.05	0.83553	Non-Significant Effect
Error	326.5262	40.81578	8			
Total	328.403992	42.693555	9			

ANOVA Assumptions					
Attribute	Test	Statistic	Critical	P-Value	Decision(0.01)
Variances	Variance Ratio F	1.58544	23.15450	0.66615	Equal Variances
Distribution	Shapiro-Wilk W	0.83657		0.04013	Normal Distribution

Data Summary		Original Data					Transformed Data			
Conc-%	Control Type	Count	Mean	Minimum	Maximum	SD	Mean	Minimum	Maximum	SD
0	Artificial Soil/S	5	21.740	15.8	33.5	7.0752				
100		5	22.607	18.2	30	5.6190				



CETIS Analysis Detail

Plant Chronic test CH2M Hill

Endpoint	Analysis Type	Sample Link	Control Link	Date Analyzed	Version
AG Average Wet Wt.	Comparison	07-3016-0892	07-3016-0892	05 Jun-06 1:36 PM	CETISv1.1.2

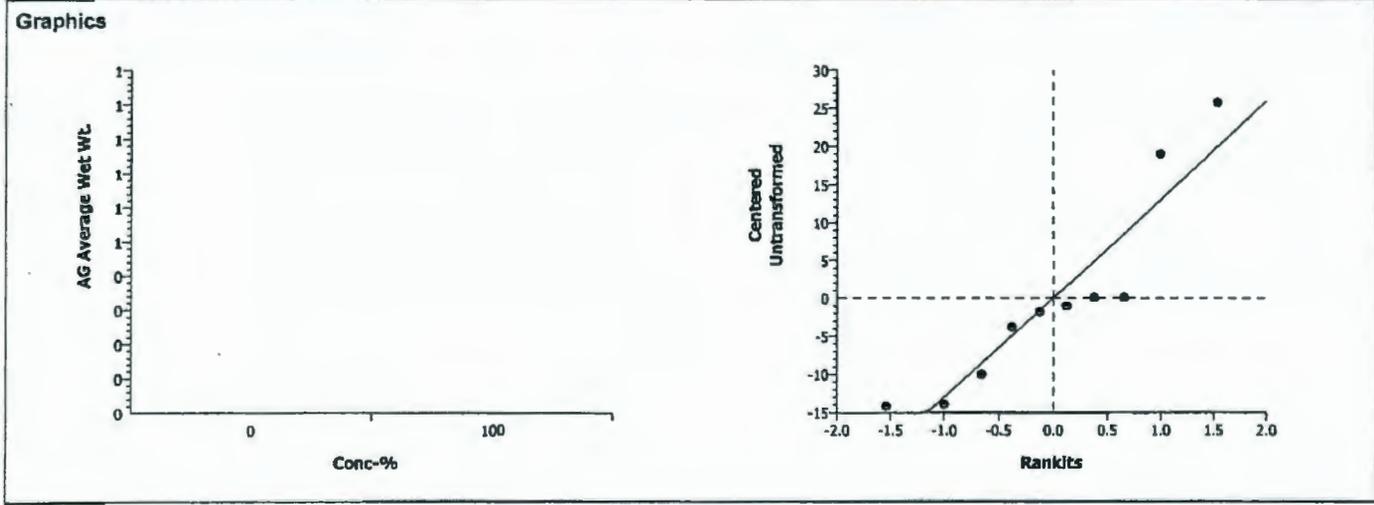
Method	Alt H	Data Transform	Zeta	NOEL	LOEL	Toxic Units	ChV	PMSD
Equal Variance t Two-Sample	C > T	Untransformed		100	>100	1	N/A	47.70%

Group Comparisons							
Control	vs	Conc-%	Statistic	Critical	P-Value	MSD	Decision(0.05)
Artificial Soil/Sedi		100	-0.2866	1.85955	0.6092	16.3112	Non-Significant Effect

ANOVA Table							
Source	Sum of Squares	Mean Square	DF	F Statistic	P-Value	Decision(0.05)	
Between	15.80343	15.80343	1	0.08	0.78168	Non-Significant Effect	
Error	1538.815	192.3519	8				
Total	1554.61837	208.15530	9				

ANOVA Assumptions						
Attribute	Test	Statistic	Critical	P-Value	Decision(0.01)	
Variances	Variance Ratio F	1.65540	23.15450	0.63729	Equal Variances	
Distribution	Shapiro-Wilk W	0.86232		0.08125	Normal Distribution	

Data Summary		Original Data					Transformed Data			
Conc-%	Control Type	Count	Mean	Minimum	Maximum	SD	Mean	Minimum	Maximum	SD
0	Artificial Soil/S	5	34.197	19.960	53.208	12.036				
100		5	36.711	22.763	62.413	15.486				



CETIS Analysis Detail

Plant Chronic test CH2M Hill

Endpoint	Analysis Type	Sample Link	Control Link	Date Analyzed	Version
Root Average Dry Wt.	Comparison	07-3016-0892	07-3016-0892	05 Jun-08 1:36 PM	CETISv1.1.2

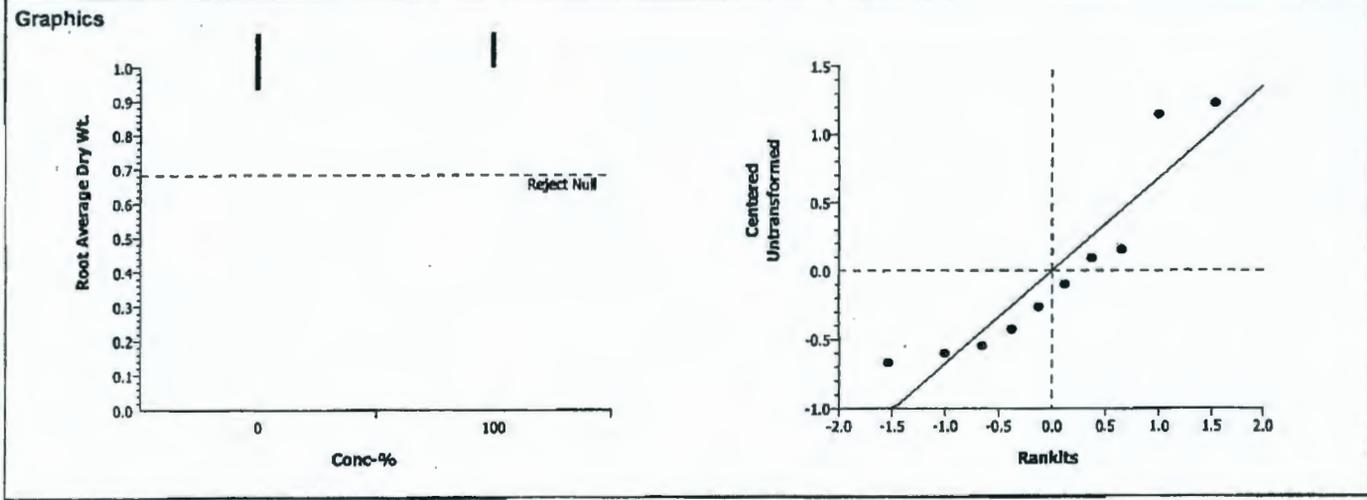
Method	Alt H	Data Transform	Zeta	NOEL	LOEL	Toxic Units	ChV	PMSD
Equal Variance t Two-Sample	C > T	Untransformed		100	>100	1	N/A	55.54%

Group Comparisons							
Control	vs	Conc-%	Statistic	Critical	P-Value	MSD	Decision(0.05)
Artificial Soil/Sedi		100	-0.2897	1.85955	0.6103	0.85294	Non-Significant Effect

ANOVA Table						
Source	Sum of Squares	Mean Square	DF	F Statistic	P-Value	Decision(0.05)
Between	0.0441422	0.044142	1	0.08	0.77941	Non-Significant Effect
Error	4.207812	0.525977	8			
Total	4.25195407	0.5701187	9			

ANOVA Assumptions					
Attribute	Test	Statistic	Critical	P-Value	Decision(0.01)
Variances	Variance Ratio F	1.16704	23.15450	0.88460	Equal Variances
Distribution	Shapiro-Wilk W	0.84009		0.04423	Normal Distribution

Data Summary		Original Data					Transformed Data			
Conc-%	Control Type	Count	Mean	Minimum	Maximum	SD	Mean	Minimum	Maximum	SD
0	Artificial Soil/S	5	1.53579	0.93500	2.67798	0.69673				
100		5	1.66867	1.00000	2.89335	0.75268				



CETIS Analysis Detail

Plant Chronic test CH2M Hill

Endpoint	Analysis Type	Sample Link	Control Link	Date Analyzed	Version
Root Average Length	Comparison	07-3016-0892	07-3016-0892	05 Jun-06 1:36 PM	CETISv1.1.2

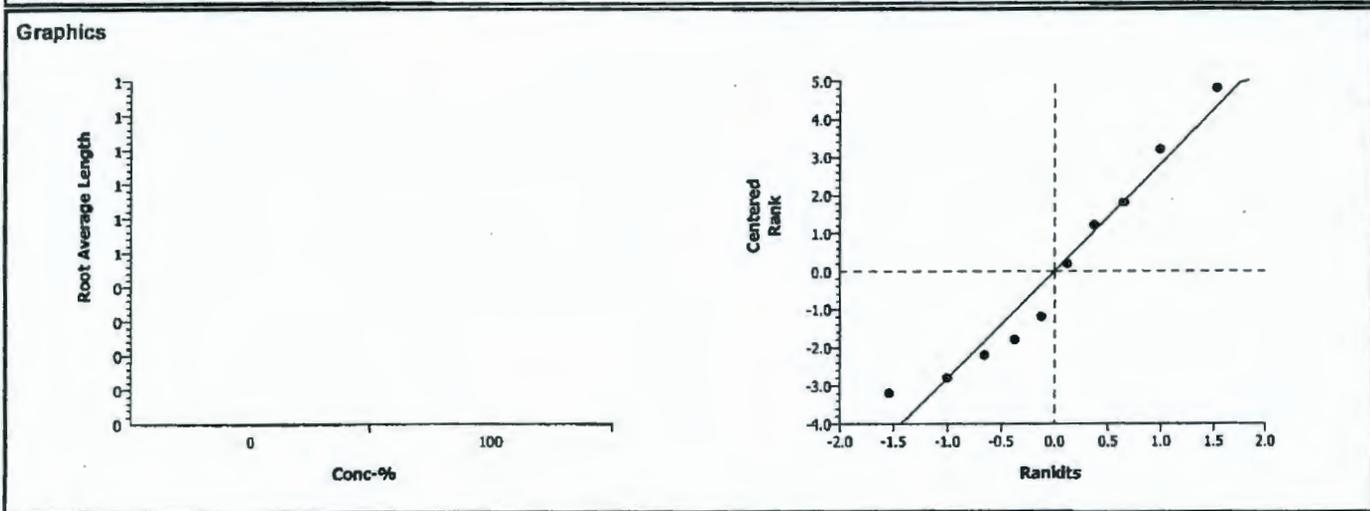
Method	Alt H	Data Transform	Zeta	NOEL	LOEL	Toxic Units	ChV	PMSD
Wilcoxon Rank Sum Two-Sample	C > T	Rank		100	>100	1	N/A	39.24%

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

ANOVA Table						
Source	Sum of Squares	Mean Square	DF	F Statistic	P-Value	Decision(0.05)
Between	58.564	58.564	1	0.77	0.40613	Non-Significant Effect
Error	609.3689	76.17111	8			
Total	667.932896	134.73511	9			

ANOVA Assumptions					
Attribute	Test	Statistic	Critical	P-Value	Decision(0.01)
Variances	Variance Ratio F	1.16678	23.15450	0.88477	Equal Variances
Distribution	Shapiro-Wilk W	0.75692		0.00433	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	26.16	20.6	41	8.385	6.80000	4.00000	10.0000	2.38747
100		5	21.32	14	36.333	9.0573	4.20000	1.00000	9.00000	3.27109



CETIS Analysis Detail

Plant Chronic test	CH2M Hill
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Endpoint	Analysis Type	Sample Link	Control Link	Date Analyzed	Version
Root Average Wet Wt.	Comparison	07-3016-0892	07-3016-0892	05 Jun-06 1:36 PM	CETISv1.1.2

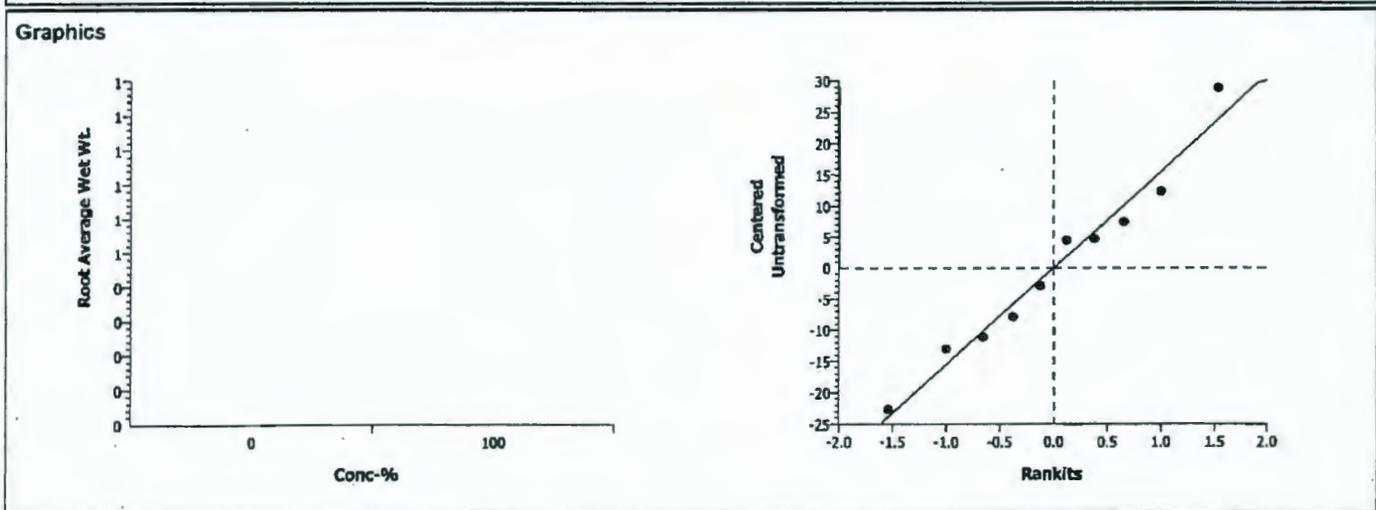
Method	Alt H	Data Transform	Zeta	NOEL	LOEL	Toxic Units	ChV	PMSD
Equal Variance t Two-Sample	C > T	Untransformed		100	>100	1	N/A	50.78%

Group Comparisons							
Control	vs	Conc-%	Statistic	Critical	P-Value	MSD	Decision(0.05)
Artificial Soil/Sedi		100	0.16086	1.85955	0.4381	18.4054	Non-Significant Effect

ANOVA Table						
Source	Sum of Squares	Mean Square	DF	F Statistic	P-Value	Decision(0.05)
Between	6.337531	6.337531	1	0.03	0.87619	Non-Significant Effect
Error	1959.33	244.9163	8			
Total	1965.66785	251.25382	9			

ANOVA Assumptions					
Attribute	Test	Statistic	Critical	P-Value	Decision(0.01)
Variances	Variance Ratio F	2.74905	23.15450	0.35097	Equal Variances
Distribution	Shapiro-Wilk W	0.97530		0.93521	Normal Distribution

Data Summary		Original Data					Transformed Data			
Conc-%	Control Type	Count	Mean	Minimum	Maximum	SD	Mean	Minimum	Maximum	SD
0	Artificial Soil/S	5	36.242	13.590	65.054	18.952				
100		5	34.65	21.572	46.987	11.430				



CETIS Analysis Detail

Plant Chronic test CH2M Hill

Endpoint	Analysis Type	Sample Link	Control Link	Date Analyzed	Version
Total Average Biomass Dry Wt.	Comparison	07-3016-0892	07-3016-0892	05 Jun-06 1:36 PM	CETISv1.1.2

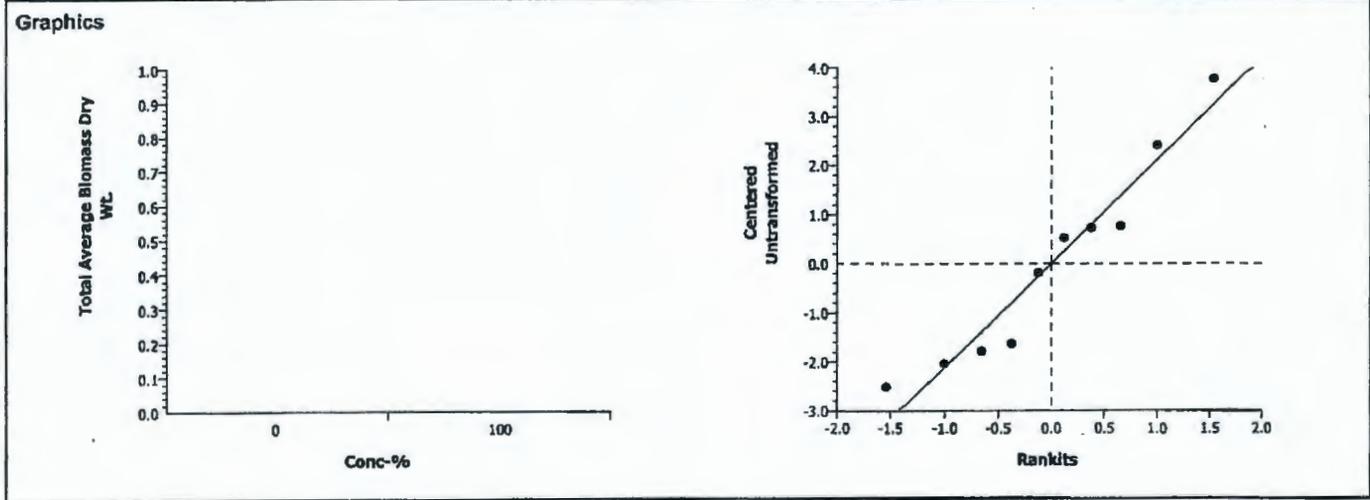
Method	Alt H	Data Transform	Zeta	NOEL	LOEL	Toxic Units	ChV	PMSD
Equal Variance t Two-Sample	C > T	Untransformed		100	>100	1	N/A	33.67%

Group Comparisons							
Control	vs	Conc-%	Statistic	Critical	P-Value	MSD	Decision(0.05)
Artificial Soil/Sedi		100	0.44419	1.85955	0.3343	2.55501	Non-Significant Effect

ANOVA Table						
Source	Sum of Squares	Mean Square	DF	F Statistic	P-Value	Decision(0.05)
Between	0.9312184	0.931218	1	0.20	0.66867	Non-Significant Effect
Error	37.75724	4.719655	8			
Total	38.6884587	5.6508734	9			

ANOVA Assumptions					
Attribute	Test	Statistic	Critical	P-Value	Decision(0.01)
Variances	Variance Ratio F	1.80426	23.15450	0.58160	Equal Variances
Distribution	Shapiro-Wilk W	0.93163		0.46414	Normal Distribution

Data Summary		Original Data					Transformed Data			
Conc-%	Control Type	Count	Mean	Minimum	Maximum	SD	Mean	Minimum	Maximum	SD
0	Artificial Soil/S	5	7.5894	5.0750	11.36	2.4644				
100		5	6.9791	4.9400	9.3834	1.8347				



CETIS Analysis Detail

Plant Chronic test	CH2M Hill
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Endpoint	Analysis Type	Sample Link	Control Link	Date Analyzed	Version
Total Average Biomass Wet Wt.	Comparison	07-3016-0892	07-3016-0892	05 Jun-06 1:36 PM	CETISv1.1.2

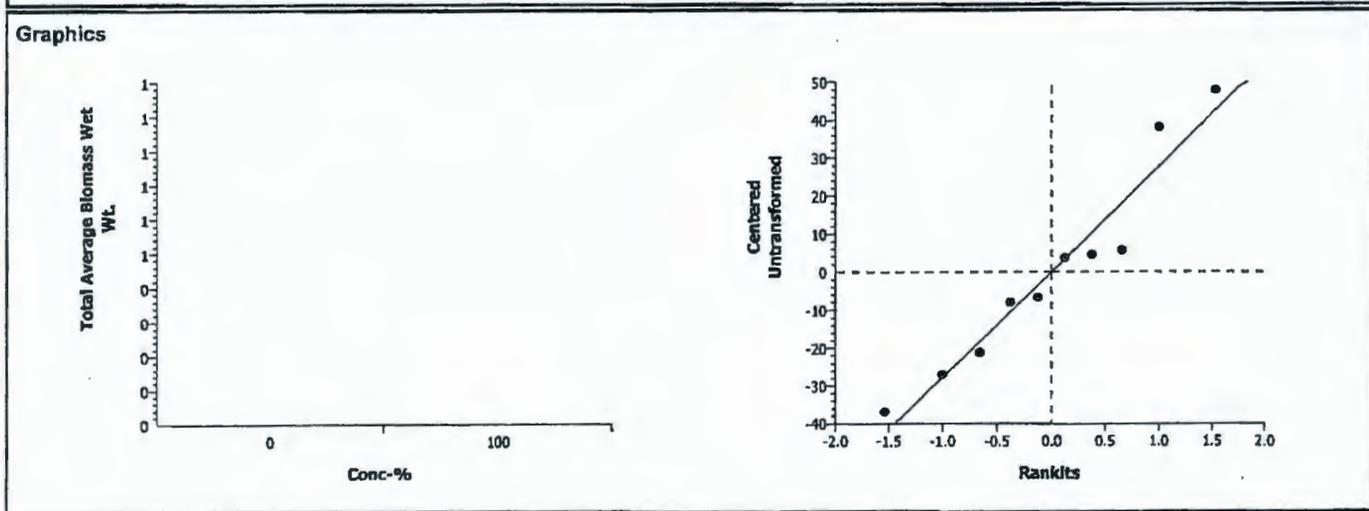
Method	Alt H	Data Transform	Zeta	NOEL	LOEL	Toxic Units	ChV	PMSD
Equal Variance t Two-Sample	C > T	Untransformed		100	>100	1	N/A	47.40%

Group Comparisons							
Control	vs	Conc-%	Statistic	Critical	P-Value	MSD	Decision(0.05)
Artificial Soil/Sedi		100	-0.0514	1.85955	0.5198	33.3884	Non-Significant Effect

ANOVA Table						
Source	Sum of Squares	Mean Square	DF	F Statistic	P-Value	Decision(0.05)
Between	2.125471	2.125471	1	0.00	0.96030	Non-Significant Effect
Error	6447.727	805.9658	8			
Total	6449.85203	808.09129	9			

ANOVA Assumptions					
Attribute	Test	Statistic	Critical	P-Value	Decision(0.01)
Variances	Variance Ratio F	1.40659	23.15450	0.74899	Equal Variances
Distribution	Shapiro-Wilk W	0.93638		0.51346	Normal Distribution

Data Summary		Original Data					Transformed Data			
Conc-%	Control Type	Count	Mean	Minimum	Maximum	SD	Mean	Minimum	Maximum	SD
0	Artificial Soil/S	5	70.439	33.550	118.26	30.694				
100		5	71.361	44.335	109.4	25.880				



BLUEGRASS GROWTH TEST

Client: Washington Closure Hanford Project

Test Start Date: 4-26-06

Day 0 20 Day 12 _____ Day 14 NT Day 16 NT Day 18 TP Day 21 NT Day 23 NT Day 25 NT Day 28 NT Day 35 2m DW

CONC.		REPLICATE	# seeds germinated						pH			
			Emergence									
			12 days after planting	14 days after planting	16 days after planting	19 days after planting	21 days after planting	23 days after planting	7-DAYS POST-EMERGENCE (28 days after planting)	14-DAYS POST-EMERGENCE (35 days after planting)	INITIAL (at planting)	FINAL (at 14 days Post-Emergence)
Control	A		4	5	6	6	6	5	5	8.1	7.6	
	B		1	1	1	1	1	1	1			
	C		3	3	4	4	4	4	4			
	D		2	3	4	4	4	4	4			
	E		1	1	3	3	3	3	3			

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

Replicate A: 3 lg G, 2 md G, 1 sm G. Removed 1 md G
 Replicate B: 1 lg G
 Replicate C: 1 lg G, 1 md G, 1 sm G
 Replicate D: 1 lg G, 2 md G, 1 sm G
 Replicate E: 1 lg G, 2 md G

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

14-Days Post-Emergence: Describe shoot appearance:

Replicate A: 3 Lg G, 1 Md G, 1 md w 1 B tip
 Replicate B: 1 Lg G
 Replicate C: 2 Lg G, 2 Md G
 Replicate D: 1 Lg G, 2 Md G, 1 Sm G
 Replicate E: 1 Lg G, 2 Md G

Measure Shoot Height:

Individual height of each seedling (above ground)

	1st Seedling	2nd Seedling	3rd Seedling	4th Seedling	5th Seedling
Replicate A	72 mm	84 mm	96 mm	96 mm	111 mm
Replicate B	90 mm	mm	mm	mm	mm
Replicate C	87 mm	108 mm	67 mm	40 mm	mm
Replicate D	75 mm	34 mm	90 mm	73 mm	mm
Replicate E	57 mm	69 mm	105 mm	mm	mm

Measure Shoot Weight:

Total mass of all seedlings (above ground)

	Tin Tare WL (mg)	Wet Wt (mg)	Dry Wt (mg)
Replicate A	1006.97	1188.01	1038.49
Replicate B	1236.50	1272.62	1243.36
Replicate C	1256.52	1361.96	1272.57
Replicate D	1246.56	1310.54	1256.27
Replicate E	1249.53	1311.90	1260.30

Describe root appearance:

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

Measure Root Length:

Individual length of the longest root from each seedling

	1st Seedling	2nd Seedling	3rd Seedling	4th Seedling	5th Seedling
Replicate A	121 mm	105 mm	93 mm	117 mm	73 mm
Replicate B	135 mm	mm	mm	mm	mm
Replicate C	21 mm	59 mm	122 mm	93 mm	mm
Replicate D	82 mm	51 mm	25 mm	46 mm	mm
Replicate E	131 mm	77 mm	43 mm	mm	mm

Measure Root Weight:

Total mass of all roots from all seedlings

	Tin Tare WL (mg)	Wet Wt (mg)	Dry Wt (mg)
Replicate A	1004.84	1256.70	1016.55
Replicate B	1241.52	1282.70	1243.55
Replicate C	1247.82	1410.42	1255.03
Replicate D	1249.26	1373.10	1252.52
Replicate E	1247.43	1308.10	1253.53

Comments:

CETIS Test Summary

Report Date:

05 Jun-06 1:39 PM

Test Link:

04-2251-3051/B157511psc

Plant Chronic test		CH2M Hill				
Test No: 05-1243-9337	Test Type: Plant Chronic test	Duration: N/A				
Start Date: 26 Apr-06	Protocol: ASTM E1963-02 (2002)	Species: Poa sandbergii				
Ending Date:	Dil Water:	Source:				
Setup Date: 26 Apr-06	Brine:					
Sample No: 12-7590-7138	Code: B1584-01	Client:				
Sample Date: 26 Apr-06	Material: Soil	Project:				
Receive Date:	Source: Hanford					
Sample Age: N/A	Station:					
Comments: J11JX6						
Comparison Summary						
Analysis	Endpoint	NOEL	LOEL	ChV	PMSD	Method
17-9538-4389	% Germination	100	> 100	N/A	36.59%	Wilcoxon Rank Sum Two-Sample
18-5676-6414	AG Average Dry Wt.	100	> 100	N/A	35.93%	Equal Variance t Two-Sample
14-6963-6653	AG Average Height	100	> 100	N/A	123.41%	Wilcoxon Rank Sum Two-Sample
10-6233-5939	AG Average Wet Wt.	100	> 100	N/A	36.63%	Equal Variance t Two-Sample
13-6508-5951	Root Average Dry Wt.	100	> 100	N/A	49.28%	Equal Variance t Two-Sample
11-4850-5174	Root Average Length	100	> 100	N/A	166.68%	Wilcoxon Rank Sum Two-Sample
06-6724-4502	Root Average Wet Wt.	100	> 100	N/A	50.84%	Equal Variance t Two-Sample
04-7794-0433	Total Average Biomass Dry	100	> 100	N/A	37.34%	Equal Variance t Two-Sample
14-7434-0702	Total Average Biomass Wet	100	> 100	N/A	42.91%	Equal Variance t Two-Sample

Report Date:

05 Jun-06 1:39 PM

Test Link:

04-2251-3051/B157511psc

CETIS Test Summary

% Germination Summary								
Conc-%	Control Type	Reps	Mean	Minimum	Maximum	SE	SD	CV
0	Artificial Soil/S	5	0.88000	0.40000	1.00000	0.12000	0.26833	30.49%
100		5	0.68000	0.20000	1.00000	0.13565	0.30332	44.61%
AG Average Dry Wt. Summary								
Conc-%	Control Type	Reps	Mean	Minimum	Maximum	SE	SD	CV
0	Artificial Soil/S	5	6.05361	4.14001	8.68201	0.81424	1.82070	30.08%
100		5	4.63746	2.42749	6.85999	0.83972	1.87768	40.49%
AG Average Height Summary								
Conc-%	Control Type	Reps	Mean	Minimum	Maximum	SE	SD	CV
0	Artificial Soil/S	5	21.74	15.8	33.5	3.1641	7.0752	32.54%
100		5	34.013	17	90	14.076	31.475	92.54%
AG Average Wet Wt. Summary								
Conc-%	Control Type	Reps	Mean	Minimum	Maximum	SE	SD	CV
0	Artificial Soil/S	5	34.197	19.960	53.208	5.3829	12.036	35.20%
100		5	27.089	15.985	36.206	4.0490	9.0539	33.42%
Root Average Dry Wt. Summary								
Conc-%	Control Type	Reps	Mean	Minimum	Maximum	SE	SD	CV
0	Artificial Soil/S	5	1.53579	0.93500	2.67798	0.31159	0.69673	45.37%
100		5	1.80457	0.81500	2.34199	0.26184	0.58550	32.45%
Root Average Length Summary								
Conc-%	Control Type	Reps	Mean	Minimum	Maximum	SE	SD	CV
0	Artificial Soil/S	5	26.16	20.6	41	3.7499	8.385	32.05%
100		5	42.93	12.75	135	23.146	51.757	120.56
Root Average Wet Wt. Summary								
Conc-%	Control Type	Reps	Mean	Minimum	Maximum	SE	SD	CV
0	Artificial Soil/S	5	36.242	13.590	65.054	8.4756	18.952	52.29%
100		5	36.676	20.223	50.372	5.1331	11.478	31.30%
Total Average Biomass Dry Wt. Summary								
Conc-%	Control Type	Reps	Mean	Minimum	Maximum	SE	SD	CV
0	Artificial Soil/S	5	7.5894	5.0750	11.36	1.1021	2.4644	32.47%
100		5	6.4420	3.2425	8.8900	1.0527	2.3538	36.54%
Total Average Biomass Wet Wt. Summary								
Conc-%	Control Type	Reps	Mean	Minimum	Maximum	SE	SD	CV
0	Artificial Soil/S	5	70.439	33.550	118.26	13.727	30.694	43.58%
100		5	63.765	41.007	86.578	8.7020	19.458	30.52%

CETIS Test Summary

% Germination Detail						
Conc-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Artificial Soil/S	1.00000	1.00000	0.40000	1.00000	1.00000
100		1.00000	0.20000	0.80000	0.80000	0.60000
AG Average Dry Wt. Detail						
Conc-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Artificial Soil/S	4.53401	6.62400	4.14001	6.28801	8.68201
100		6.30400	6.85999	4.01248	2.42749	3.58333
AG Average Height Detail						
Conc-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Artificial Soil/S	15.8	18.2	33.5	18.2	23
100		18.4	90	19	17	25.6667
AG Average Wet Wt. Detail						
Conc-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Artificial Soil/S	30.4100	33.172	19.9600	34.2360	53.2080
100		36.2060	36.1	26.37	15.985	20.7833
Root Average Dry Wt. Detail						
Conc-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Artificial Soil/S	1.26801	1.68799	0.93500	1.10999	2.67798
100		2.34199	2.03003	1.80252	0.81500	2.03333
Root Average Length Detail						
Conc-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Artificial Soil/S	20.6	22.8	41	22.4	24
100		20.4	135	18.5	12.75	28
Root Average Wet Wt. Detail						
Conc-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Artificial Soil/S	33.3280	40.9320	13.5900	28.3060	65.054
100		50.372	41.1799	40.6450	30.96	20.2233
Total Average Biomass Dry Wt. Detail						
Conc-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Artificial Soil/S	5.80201	8.31199	5.07501	7.398	11.36
100		8.64601	8.89001	5.81500	3.24249	5.61666
Total Average Biomass Wet Wt. Detail						
Conc-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Artificial Soil/S	63.7380	74.1040	33.5500	62.5420	118.262
100		86.578	77.2799	67.0150	46.945	41.0066

CETIS Analysis Detail

Plant Chronic test	CH2M Hill
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Endpoint	Analysis Type	Sample Link	Control Link	Date Analyzed	Version
% Germination	Comparison	04-2251-3051	04-2251-3051	05 Jun-06 1:38 PM	CETISv1.1.2

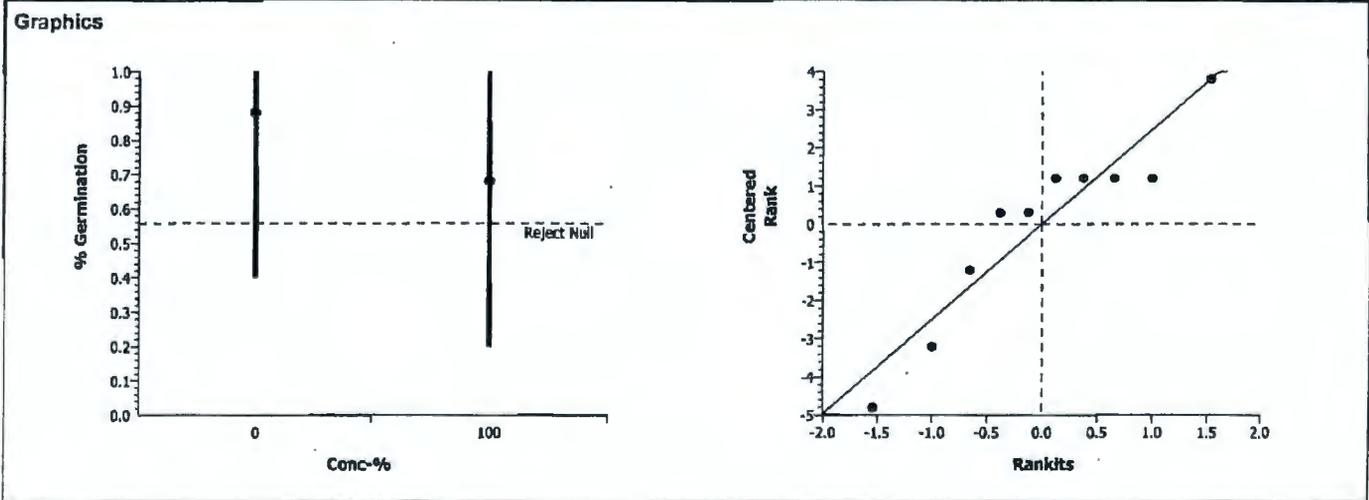
Method	Alt H	Data Transform	Zeta	NOEL	LOEL	Toxic Units	ChV	PMSD
Wilcoxon Rank Sum Two-Sample	C > T	Rank		100	>100	1	N/A	36.59%

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

ANOVA Table						
Source	Sum of Squares	Mean Square	DF	F Statistic	P-Value	Decision(0.05)
Between	0.1337598	0.13376	1	1.35	0.27810	Non-Significant Effect
Error	0.7902647	0.098783	8			
Total	0.92402454	0.2325429	9			

ANOVA Assumptions						
Attribute	Test	Statistic	Critical	P-Value	Decision(0.01)	
Variances	Variance Ratio F	1.26388	23.15450	0.82595	Equal Variances	
Distribution	Shapiro-Wilk W	0.76117		0.00488	Non-normal Distribution	

Data Summary		Original Data					Transformed Data			
Conc-%	Control Type	Count	Mean	Minimum	Maximum	SD	Mean	Minimum	Maximum	SD
0	Artificial Soil/S	5	0.88000	0.40000	1.00000	0.26833	6.80000	2.00000	8.00000	2.68328
100		5	0.68000	0.20000	1.00000	0.30332	4.20000	1.00000	8.00000	2.56418



CETIS Analysis Detail

Plant Chronic test	CH2M HILL
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Endpoint	Analysis Type	Sample Link	Control Link	Date Analyzed	Version
AG Average Dry Wt.	Comparison	04-2251-3051	04-2251-3051	05 Jun-06 1:39 PM	CETISv1.1.2

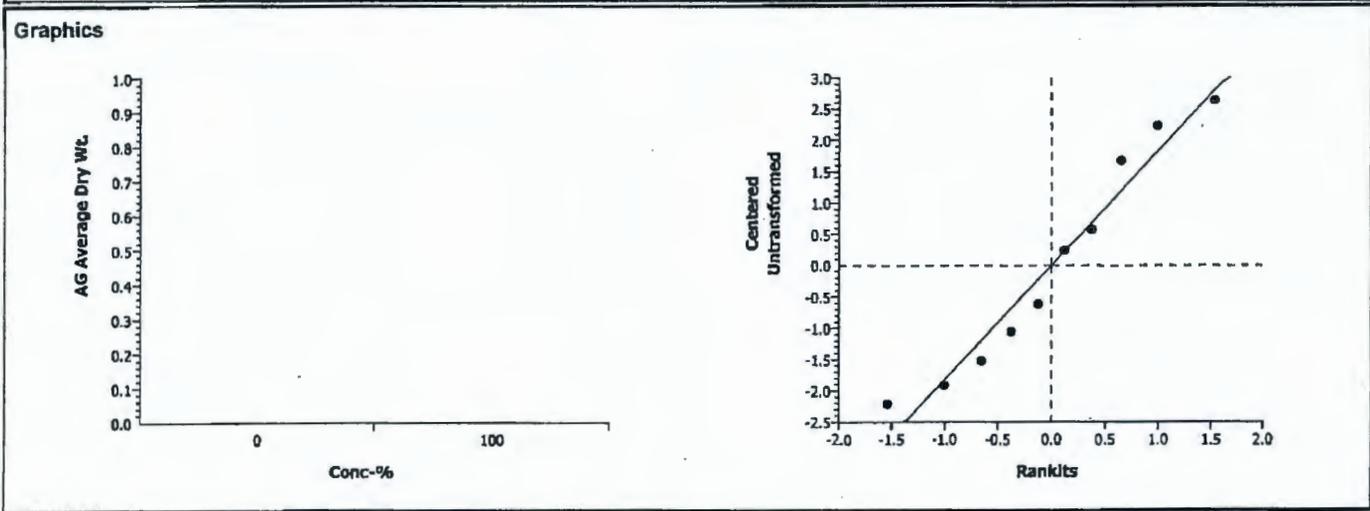
Method	Alt H	Data Transform	Zeta	NOEL	LOEL	Toxic Units	ChV	PMSD
Equal Variance t Two-Sample	C > T	Untransformed		100	>100	1	N/A	35.93%

Group Comparisons							
Control	vs	Conc-%	Statistic	Critical	P-Value	MSD	Decision(0.05)
Artificial Soil/Sedi		100	1.21073	1.85955	0.1303	2.17506	Non-Significant Effect

ANOVA Table						
Source	Sum of Squares	Mean Square	DF	F Statistic	P-Value	Decision(0.05)
Between	5.013699	5.013699	1	1.47	0.26055	Non-Significant Effect
Error	27.36253	3.420316	8			
Total	32.3762269	8.4340150	9			

ANOVA Assumptions					
Attribute	Test	Statistic	Critical	P-Value	Decision(0.01)
Variances	Variance Ratio F	1.06357	23.15450	0.95380	Equal Variances
Distribution	Shapiro-Wilk W	0.93327		0.48081	Normal Distribution

Data Summary		Original Data					Transformed Data			
Conc-%	Control Type	Count	Mean	Minimum	Maximum	SD	Mean	Minimum	Maximum	SD
0	Artificial Soil/S	5	6.05361	4.14001	8.68201	1.82070				
100		5	4.63746	2.42749	6.85999	1.87768				



CETIS Analysis Detail

Plant Chronic test CH2M Hill

Endpoint	Analysis Type	Sample Link	Control Link	Date Analyzed	Version
AG Average Height	Comparison	04-2251-3051	04-2251-3051	05 Jun-06 1:39 PM	CETISv1.1.2

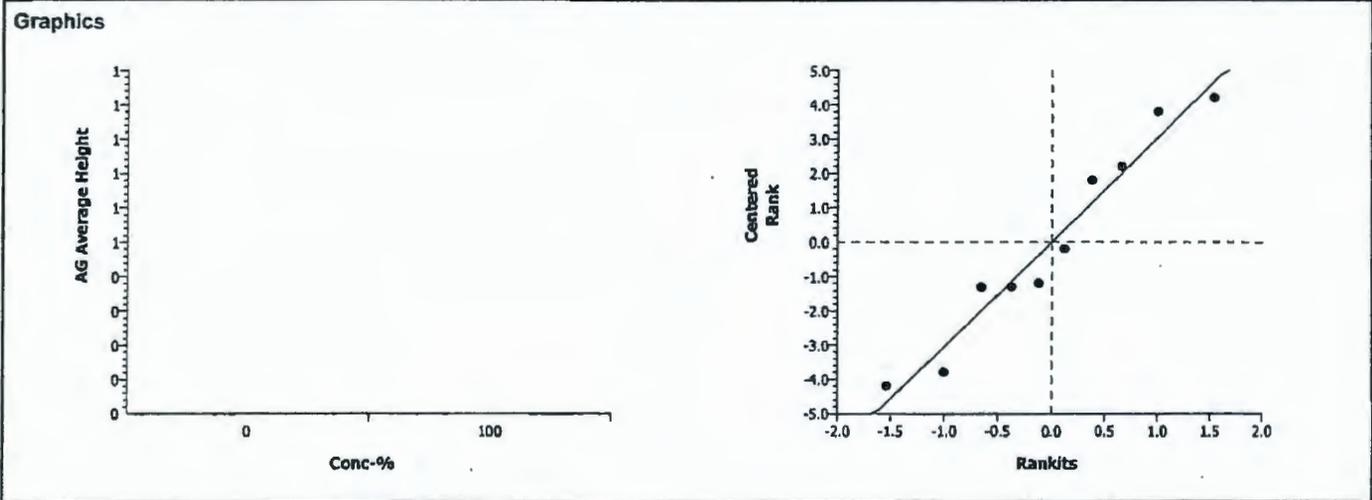
Method	Alt H	Data Transform	Zeta	NOEL	LOEL	Toxic Units	ChV	PMSD
Wilcoxon Rank Sum Two-Sample	C > T	Rank		100	>100	1	N/A	123.41%

Group Comparisons							
Control	vs	Conc-%	Statistic	Critical	P-Value	Ties	Decision(0.05)
Artificial Soil/Sedi		100	31		0.7262	0	Non-Significant Effect

ANOVA Table						
Source	Sum of Squares	Mean Square	DF	F Statistic	P-Value	Decision(0.05)
Between	376.5868	376.5868	1	0.72	0.41967	Non-Significant Effect
Error	4163.036	520.3795	8			
Total	4539.62244	896.96625	9			

ANOVA Assumptions					
Attribute	Test	Statistic	Critical	P-Value	Decision(0.01)
Variances	Variance Ratio F	19.79106	23.15450	0.01344	Equal Variances
Distribution	Shapiro-Wilk W	0.72824		0.00194	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	21.740	15.8	33.5	7.0752	4.80000	1.00000	9.00000	3.17411
100		5	34.013	17	90	31.475	6.20000	2.00000	10.0000	3.03315



CETIS Analysis Detail

Plant Chronic test CH2M Hill

Endpoint	Analysis Type	Sample Link	Control Link	Date Analyzed	Version
AG Average Wet Wt.	Comparison	04-2251-3051	04-2251-3051	05 Jun-06 1:39 PM	CETISv1.1.2

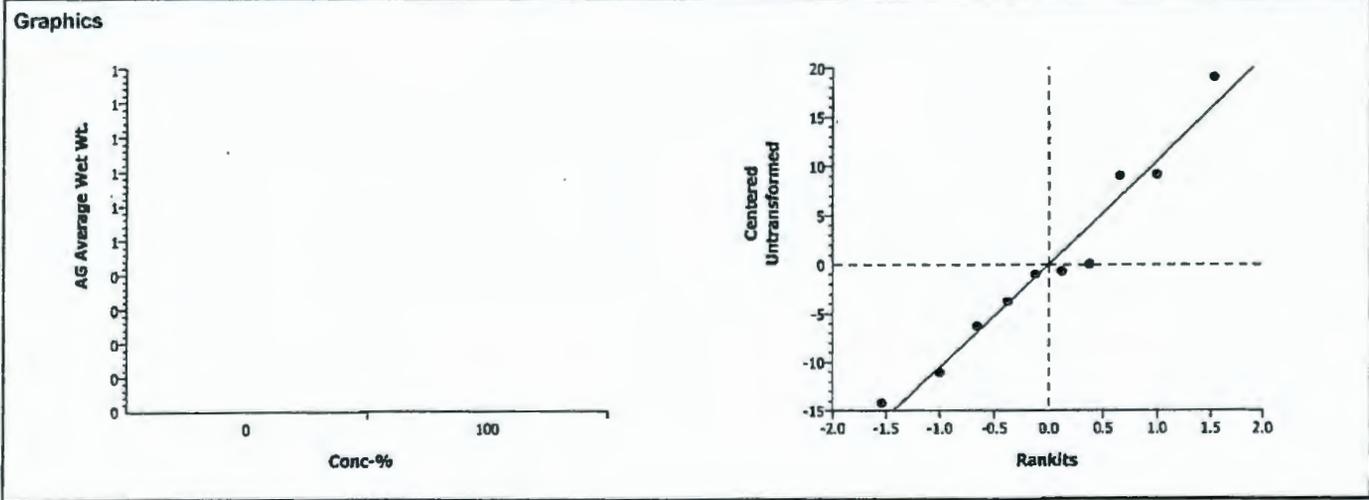
Method	Alt H	Data Transform	Zeta	NOEL	LOEL	Toxic Units	ChV	PMSD
Equal Variance t Two-Sample	C > T	Untransformed		100	>100	1	N/A	36.63%

Group Comparisons							
Control	vs	Conc-%	Statistic	Critical	P-Value	MSD	Decision(0.05)
Artificial Soil/Sedi		100	1.05532	1.85955	0.1611	12.5254	Non-Significant Effect

ANOVA Table						
Source	Sum of Squares	Mean Square	DF	F Statistic	P-Value	Decision(0.05)
Between	126.3217	126.3217	1	1.11	0.32210	Non-Significant Effect
Error	907.3985	113.4248	8			
Total	1033.72018	239.74649	9			

ANOVA Assumptions					
Attribute	Test	Statistic	Critical	P-Value	Decision(0.01)
Variances	Variance Ratio F	1.76734	23.15450	0.59473	Equal Variances
Distribution	Shapiro-Wilk W	0.95855		0.76923	Normal Distribution

Data Summary		Original Data					Transformed Data			
Conc-%	Control Type	Count	Mean	Minimum	Maximum	SD	Mean	Minimum	Maximum	SD
0	Artificial Soil/S	5	34.197	19.960	53.208	12.036				
100		5	27.089	15.985	36.206	9.0539				



CETIS Analysis Detail

Plant Chronic test CH2M Hill

Endpoint	Analysis Type	Sample Link	Control Link	Date Analyzed	Version
Root Average Dry Wt.	Comparison	04-2251-3051	04-2251-3051	05 Jun-06 1:39 PM	CETISv1.1.2

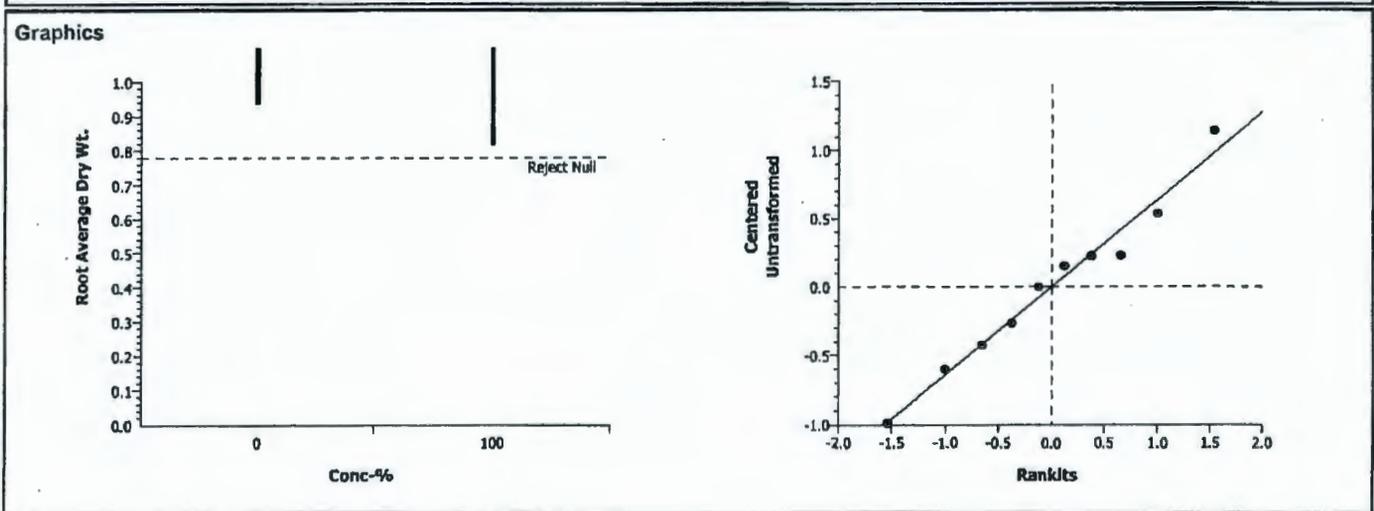
Method	Alt H	Data Transform	Zeta	NOEL	LOEL	Toxic Units	ChV	PMSD
Equal Variance t Two-Sample	C > T	Untransformed		100	>100	1	N/A	49.28%

Group Comparisons							
Control	vs	Conc-%	Statistic	Critical	P-Value	MSD	Decision(0.05)
Artificial Soil/Sedi		100	-0.6604	1.85955	0.7362	0.75683	Non-Significant Effect

ANOVA Table						
Source	Sum of Squares	Mean Square	DF	F Statistic	P-Value	Decision(0.05)
Between	0.1806107	0.180611	1	0.44	0.52755	Non-Significant Effect
Error	3.31296	0.41412	8			
Total	3.49357083	0.5947307	9			

ANOVA Assumptions						
Attribute	Test	Statistic	Critical	P-Value	Decision(0.01)	
Variances	Variance Ratio F	1.41605	23.15450	0.74425	Equal Variances	
Distribution	Shapiro-Wilk W	0.98289		0.97873	Normal Distribution	

Data Summary			Original Data				Transformed Data			
Conc-%	Control Type	Count	Mean	Minimum	Maximum	SD	Mean	Minimum	Maximum	SD
0	Artificial Soil/S	5	1.53579	0.93500	2.67798	0.69673				
100		5	1.80457	0.81500	2.34199	0.58550				



CETIS Analysis Detail

Plant Chronic test CH2M Hill

Endpoint	Analysis Type	Sample Link	Control Link	Date Analyzed	Version
Root Average Length	Comparison	04-2251-3051	04-2251-3051	05 Jun-06 1:39 PM	CETISv1.1.2

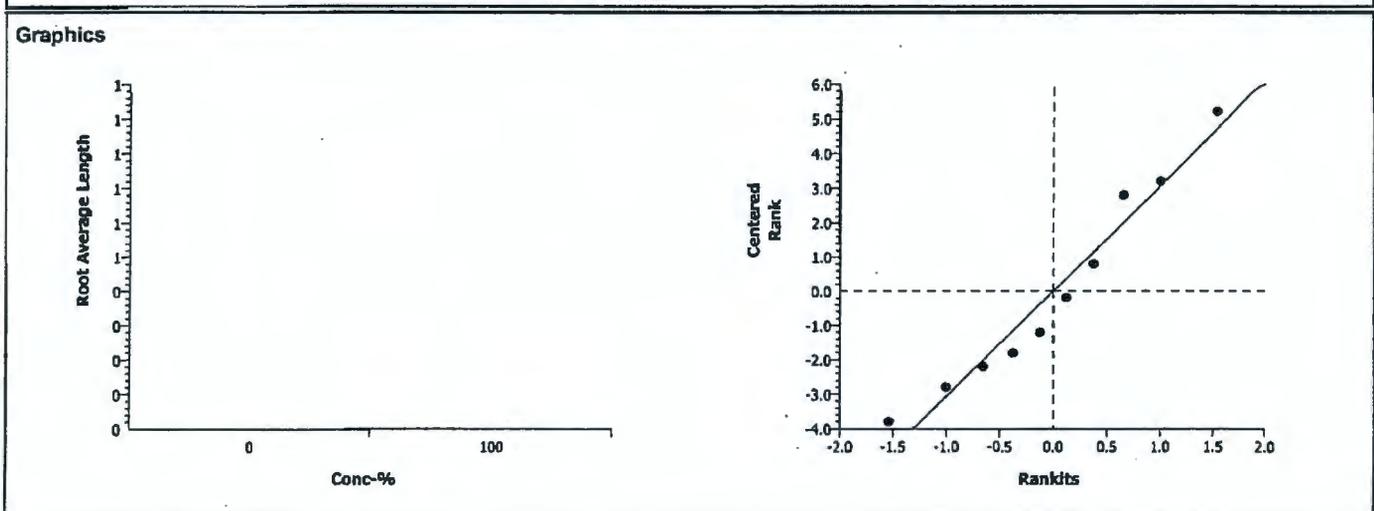
Method	Alt H	Data Transform	Zeta	NOEL	LOEL	Toxic Units	ChV	PMSD
Wilcoxon Rank Sum Two-Sample	C > T	Rank		100	>100	1	N/A	166.68%

Group Comparisons							
Control	vs	Conc-%	Statistic	Critical	P-Value	Ties	Decision(0.05)
Artificial Soil/Sedl		100	24		0.2738	0	Non-Significant Effect

ANOVA Table						
Source	Sum of Squares	Mean Square	DF	F Statistic	P-Value	Decision(0.05)
Between	703.0823	703.0823	1	0.51	0.49483	Non-Significant Effect
Error	10996.28	1374.535	8			
Total	11699.3625	2077.6173	9			

ANOVA Assumptions					
Attribute	Test	Statistic	Critical	P-Value	Decision(0.01)
Variances	Variance Ratio F	38.10039	23.15450	0.00386	Unequal Variances
Distribution	Shapiro-Wilk W	0.71895		0.00150	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	26.16	20.6	41	8.385	6.20000	4.00000	9.00000	1.92354
100		5	42.93	12.75	135	51.757	4.80000	1.00000	10.0000	3.96232



CETIS Analysis Detail

Plant Chronic test						CH2M Hill
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Endpoint	Analysis Type	Sample Link	Control Link	Date Analyzed	Version
Root Average Wet Wt.	Comparison	04-2251-3051	04-2251-3051	05 Jun-06 1:39 PM	CETISv1.1.2

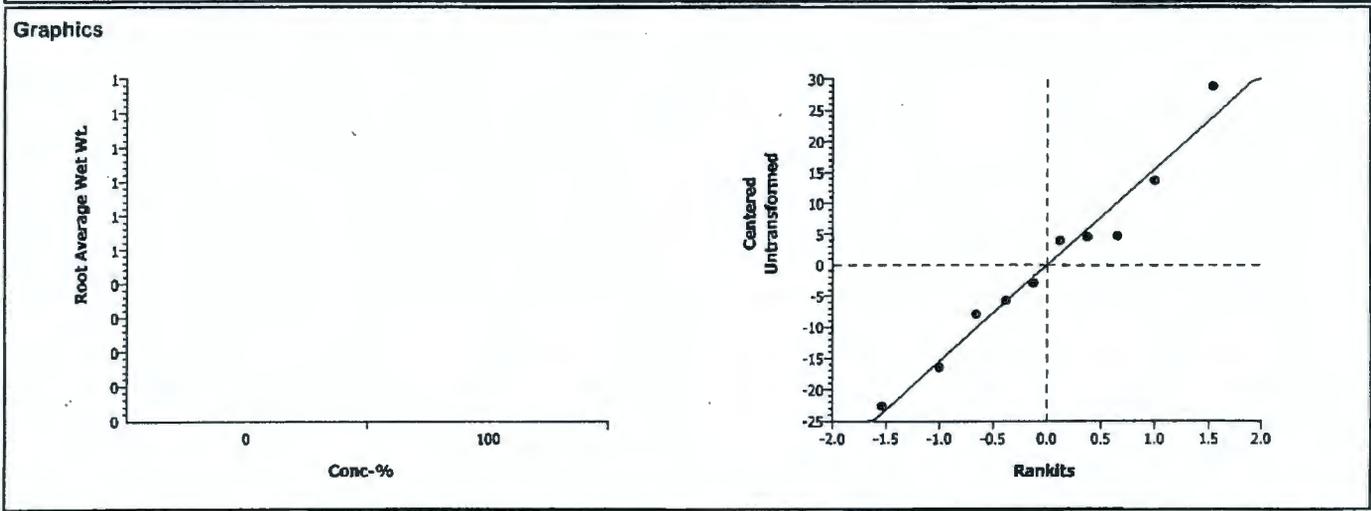
Method	Alt H	Data Transform	Zeta	NOEL	LOEL	Toxic Units	ChV	PMSD
Equal Variance t Two-Sample	C > T	Untransformed		100	>100	1	N/A	50.84%

Group Comparisons							
Control	vs	Conc-%	Statistic	Critical	P-Value	MSD	Decision(0.05)
Artificial Soil/Sedi		100	-0.0438	1.85955	0.5169	18.4259	Non-Significant Effect

ANOVA Table						
Source	Sum of Squares	Mean Square	DF	F Statistic	P-Value	Decision(0.05)
Between	0.4709786	0.470979	1	0.00	0.96613	Non-Significant Effect
Error	1963.692	245.4615	8			
Total	1964.16287	245.93247	9			

ANOVA Assumptions					
Attribute	Test	Statistic	Critical	P-Value	Decision(0.01)
Variances	Variance Ratio F	2.72629	23.15450	0.35480	Equal Variances
Distribution	Shapiro-Wilk W	0.97165		0.90569	Normal Distribution

Data Summary		Original Data					Transformed Data			
Conc-%	Control Type	Count	Mean	Minimum	Maximum	SD	Mean	Minimum	Maximum	SD
0	Artificial Soil/S	5	36.242	13.590	65.054	18.952				
100		5	36.676	20.223	50.372	11.478				



CETIS Analysis Detail

Plant Chronic test CH2M Hill

Endpoint	Analysis Type	Sample Link	Control Link	Date Analyzed	Version
Total Average Biomass Dry Wt.	Comparison	04-2251-3051	04-2251-3051	05 Jun-06 1:39 PM	CETISv1.1.2

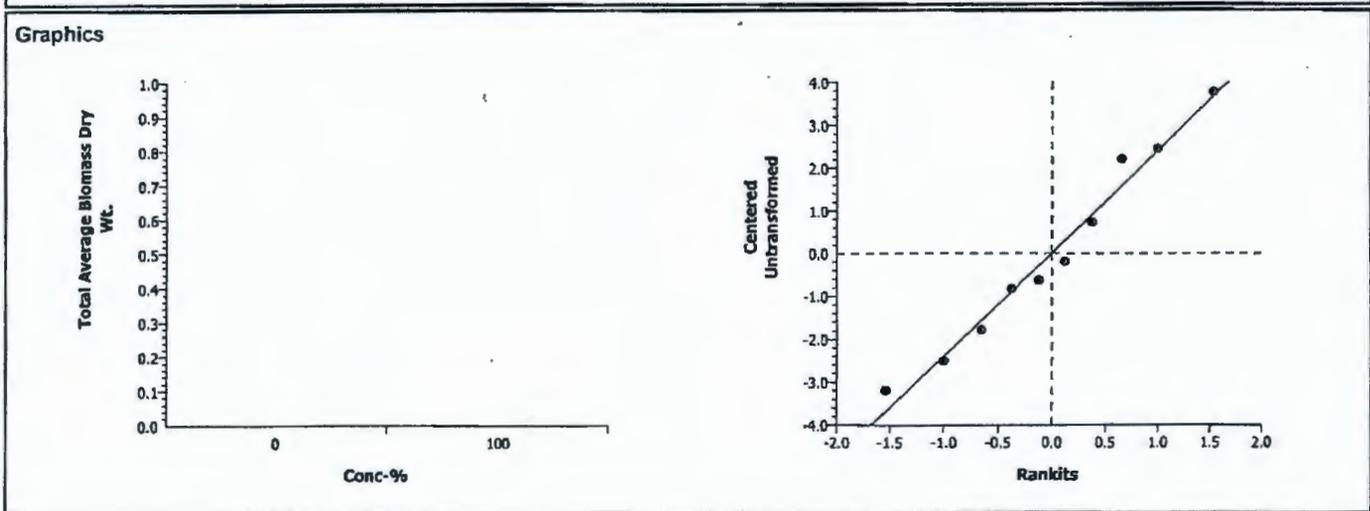
Method	Alt H	Data Transform	Zeta	NOEL	LOEL	Toxic Units	ChV	PMSD
Equal Variance t Two-Sample	C > T	Untransformed		100	>100	1	N/A	37.34%

Group Comparisons							
Control	vs	Conc-%	Statistic	Critical	P-Value	MSD	Decision(0.05)
Artificial Soil/Sedi		100	0.75284	1.85955	0.2366	2.83404	Non-Significant Effect

ANOVA Table						
Source	Sum of Squares	Mean Square	DF	F Statistic	P-Value	Decision(0.05)
Between	3.29111	3.29111	1	0.57	0.47312	Non-Significant Effect
Error	46.45456	5.80682	8			
Total	49.7456732	9.0979304	9			

ANOVA Assumptions						
Attribute	Test	Statistic	Critical	P-Value	Decision(0.01)	
Variances	Variance Ratio F	1.09617	23.15450	0.93123	Equal Variances	
Distribution	Shapiro-Wilk W	0.96471		0.83795	Normal Distribution	

Data Summary		Original Data					Transformed Data			
Conc-%	Control Type	Count	Mean	Minimum	Maximum	SD	Mean	Minimum	Maximum	SD
0	Artificial Soil/S	5	7.5894	5.0750	11.36	2.4644				
100		5	6.4420	3.2425	8.8900	2.3538				



CETIS Analysis Detail

Plant Chronic test	CH2M Hill
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Endpoint	Analysis Type	Sample Link	Control Link	Date Analyzed	Version
Total Average Biomass Wet Wt.	Comparison	04-2251-3051	04-2251-3051	05 Jun-06 1:39 PM	CETISv1.1.2

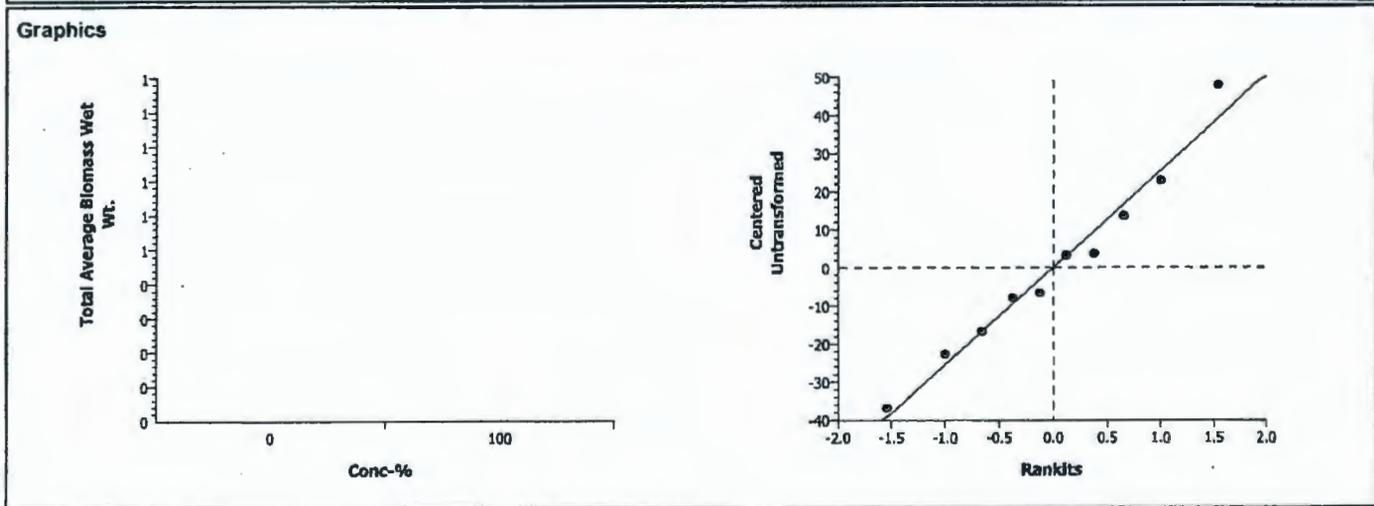
Method	Alt H	Data Transform	Zeta	NOEL	LOEL	Toxic Units	ChV	PMSD
Equal Variance t Two-Sample	C > T	Untransformed		100	>100	1	N/A	42.91%

Group Comparisons							
Control	vs	Conc-%	Statistic	Critical	P-Value	MSD	Decision(0.05)
Artificial Soil/Sedi		100	0.41066	1.85955	0.3461	30.2228	Non-Significant Effect

ANOVA Table						
Source	Sum of Squares	Mean Square	DF	F Statistic	P-Value	Decision(0.05)
Between	111.3661	111.3661	1	0.17	0.69210	Non-Significant Effect
Error	5283.035	660.3793	8			
Total	5394.40076	771.74543	9			

ANOVA Assumptions					
Attribute	Test	Statistic	Critical	P-Value	Decision(0.01)
Variances	Variance Ratio F	2.48829	23.15450	0.39885	Equal Variances
Distribution	Shapiro-Wilk W	0.97888		0.95892	Normal Distribution

Data Summary		Original Data					Transformed Data			
Conc-%	Control Type	Count	Mean	Minimum	Maximum	SD	Mean	Minimum	Maximum	SD
0	Artificial Soil/S	5	70.439	33.550	118.26	30.694				
100		5	63.765	41.007	86.578	19.458				



**APPENDIX B
CHAIN OF CUSTODY**

F1493

Washington Closure Hanford		CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST				RC-051-65		Page 1 of 1				
Collector STANKOVICH, M.		Company Contact JOAN KESSNER		Telephone No. 375-4688		Project Coordinator KESSNER, JH		Price Code 8L Data Turnaround 45 Days				
Project Designation 100 & 300 Area Component of the RCBRA - Incremental So		Sampling Location 100-H RIPARIAN #1		SAF No. RC-051		Air Quality <input type="checkbox"/>						
Ice Chest No.		Field Logbook No. EL-1596		COA BESRAS6520		Method of Shipment GROUND TRANSPORT						
Shipped To CH2MHILL		Offsite Property No. A060151				Bill of Lading/Air Bill No.						
POSSIBLE SAMPLE HAZARDS/REMARKS NONE			Preservation		None							
Special Handling and/or Storage <i>Use page 3 for original material to Corvallis for MIS preparation and aliquoting, page 1 for radioanalytical fractions to Eberline, & page 2 for chemical analytical fractions to Lionville.</i>			Type of Container		G/P							
			No. of Container(s)		1							
			Volume		1000g		4000g					
SAMPLE ANALYSIS				See Item (1) in Special Instructions.		Soil Plant Toxicity ASTM E1963; Soil Nematode Toxicity ASTM E2172						
Sample No.		Matrix *	Sample Date		Sample Time							
J11JB4		SOIL	4-5-06		18:00		1		1			
CHAIN OF POSSESSION			Sign/Print Names			SPECIAL INSTRUCTIONS					Matrix *	
Relinquished By/Removed From <i>Elizabeth M. Taylor</i>		Date/Time 4-6-06	Received By/Stored In <i>Joan Kessner</i>		Date/Time 4-6-06	These marks indicate that unless lined out, analytes to be included with Strontium-89,90 -- Total Sr analysis fraction. These marks indicate that this is a non-analysis used to properly format COC form. Contact Joan Kessner for any questions. (1) Particle Size (Dry Sieve) - D422; Moisture Content - D2216; TOC - 9060; pH (Soil) - 9045; Nitrogen by Kjeldahl - 351.2; Ammonia - 350.3; IC Anions - 300.0; Percent Solids F149301-5011 DN 1574-0 Nematode BG 1575-01 Bacteria					S=Soil SE=Soilmen SD=Solid SL=Sludge W = Water O=Oil A=Air DS=Drum Settler DL=Drum Liquid T=Tissue Wt=Wipe L=Liquid V=Vegetation X=Other	
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							
LABORATORY SECTION		Received By			Title			Date/Time				
FINAL SAMPLE DISPOSITION		Disposal Method			Disposed By			Date/Time				

E 1508

Washington Closure Hanford		CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST				RC-051-66		Page 1 of 1	
Collector STANKOVICH, M.		Company Contact JOAN KESSNER		Telephone No. 375-4688		Project Coordinator KESSNER, JH		Price Code 8L Data Turnaround 45 Days	
Project Designation 100 & 300 Area Component of the RCBRA - Incremental So		Sampling Location 100-D RIPARIAN #2		SAF No. RC-051		Air Quality <input type="checkbox"/>			
Ice Chest No.		Field Logbook No. EL-1596		COA BESRAS6520		Method of Shipment GROUND TRANSPORT			
Shipped To CH2MHILL		Offsite Property No. A060151				Bill of Lading/Air Bill No.			
POSSIBLE SAMPLE HAZARDS/REMARKS NONE			Preservation	None	None				
Special Handling and/or Storage Use page 3 for original material to Corvallis for MIS preparation and aliquoting, page 1 for radioanalytical fractions to Eberline, & page 2 for chemical analytical fractions to Lionville.			Type of Container	G/P	P/G				
			No. of Container(s)	1	1				
			Volume	1000g	4000g				
			SAMPLE ANALYSIS		See item (1) in Special Instructions.	Soil Plant Toxicity ASTM E1963; Soil Nematode Toxicity ASTM E2172			
Sample No.	Matrix *	Sample Date	Sample Time						
J11JB5	SOIL	4-9-06	15:30	1	1				
CHAIN OF POSSESSION				Sign/Print Names		SPECIAL INSTRUCTIONS			
Relinquished By/Removed From C H 2 m / Date/Time 10:30 G. Quibeth M. Tepper 4-10-06		Received By/Stored In Kathy McKelvey 4/10/06 1035				* These marks indicate that unless lined out, analytes to be included with Strontium-89,90 -- Total Sr analysis fraction. ~ These marks indicate that this is a non-analysis used to properly format COC form. Contact Joan Kessner for any questions. (1) Particle Size (Dry Sieve) - D422; Moisture Content - D2216; TOC - 9060; pH (Soil) - 9045; Nitrogen by Kjeldahl - 351.2; Ammonia - 350.3; IC Anions - 300.0; Percent Solids This is a composite of all 5 samples from 1 Investigation Area F150801-SU2			
Relinquished By/Removed From		Received By/Stored In				Matrix *			
Relinquished By/Removed From		Received By/Stored In				S=Soil SE=Settlement SO=Solid SL=Sludge W=Water O=Oil A=Air DS=Drum Solids OL=Drum Liquids T=Turner W/Wipe L=Liquid V=Vegetation X=Other			
Relinquished By/Removed From		Received By/Stored In							
Relinquished By/Removed From		Received By/Stored In							
Relinquished By/Removed From		Received By/Stored In							
LABORATORY SECTION		Received By		Title		Date/Time			
FINAL SAMPLE DISPOSITION		Disposal Method		Disposed By		Date/Time			
				BM1574-02 Nematode		361575-02 3.G.			

F1514-01

Washington Closure Hanford		CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST				RC-051-97		Page 1 of 1	
Collector STANKOVICH, M.		Company Contact JOAN KESSNER		Telephone No. 375-4688		Project Coordinator KESSNER, JH		Price Code 8L Data Turnaround 45 Days	
Project Designation 100 & 300 Arca Component of the RCBRA - Incremental So		Sampling Location 100-H RIPARIAN #9		SAF No. RC-051		Air Quality <input type="checkbox"/>			
Ice Chest No.		Field Logbook No. EL-1596		COA BESRAS6520		Method of Shipment GROUND TRANSPORT			
Shipped To CH2MHILL		Offsite Property No. A060151		Bill of Lading/Air Bill No. SEE OSPC					
POSSIBLE SAMPLE HAZARDS/REMARKS NONE				Preservation	None	None			
Special Handling and/or Storage Use page 3 for original material to Corvallis for MIS preparation and aliquoting, page 1 for radioanalytical fractions to Eberline, & page 2 for chemical analytical fractions to Lionville.				Type of Container	G/P	P/G			
				No. of Container(s)	1	1			
				Volume	1000g	4000g			
				SAMPLE ANALYSIS		See item (1) in Special Instructions.	Soil Plant Toxicity ASTM E1963; Soil Nematode Toxicity ASTM E2172		
Sample No.	Matrix *	Sample Date	Sample Time						
J11JH6	SOIL	4-10-06	16:00	1	1				
CHAIN OF POSSESSION				Sign/Print Names				SPECIAL INSTRUCTIONS	
Relinquished By/Removed From Elizabeth M. Tyson		Date/Time 4-11-06		Received By/Stored In Joan Kessner		Date/Time 4/11/06		* These marks indicate that unless lined out, analytes to be included with Strontium-89,90 -- Total Sr analysis fraction. ^- These marks indicate that this is a non-analysis used to properly format COC form. Contact Joan Kessner for any questions. (1) Particle Size (Dry Sieve) - D422; Moisture Content - D2216; TOC - 9060; pH (Soil) - 9045; Nitrogen by Kjeldahl - 351.2; Ammonia - 350.3; IC Anions - 300.0; Percent Solids B1574-03 Nematode B1575-03 BG	
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			
LABORATORY SECTION		Received By				Title			
FINAL SAMPLE DISPOSITION		Disposal Method				Disposed By			

F1518-01

Washington Closure Hanford		CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST				RC-051-101		Page 1 of 1		
Collector STANKOVICH, M.		Company Contact JOAN KESSNER		Telephone No. 375-4688		Project Coordinator KESSNER, JH		Price Code 8L Data Turnaround 45 Days		
Project Designation 100 & 300 Area Component of the RCBRA - Incremental So		Sampling Location UPPER RIPARIAN #16		SAF No. RC-051		Air Quality <input type="checkbox"/>				
Ice Chest No.		Field Logbook No. EL-1596-1		COA DESRA56520		Method of Shipment GROUND TRANSPORT				
Shipped To CH2MHILL		Offsite Property No. A060151		Bill of Lading/Air Bill No. SEE OSCP						
POSSIBLE SAMPLE HAZARDS/REMARKS NONE				Preservation		None				
Special Handling and/or Storage Use page 3 for original material to Corvallis for MIS preparation and aliquoting, page 1 for radioanalytical fractions to Eberline, & page 2 for chemical analytical fractions to Lionville.				Type of Container		G/P				
				No. of Container(s)		1				
				Volume		1000g		4000g		
				SAMPLE ANALYSIS		See item (1) in Special Instructions.		Soil Plant Toxicity ASTM E1963; Soil Nematode Toxicity ASTM E2172		
Sample No.		Matrix *	Sample Date	Sample Time						
J11JJ0		SOIL	4-11-06	16:00	1	1				
CHAIN OF POSSESSION				Sign/Print Names		SPECIAL INSTRUCTIONS				
Relinquished By/Removed From Elizabeth M Tepper		Date/Time 10:30		Received By/Stored In Joan Kessner		Date/Time 4-12-06		* These marks indicate that unless lined out, analytes to be included with Strontium-89,90 - Total Sr analysis fraction. ~ These marks indicate that this is a non-analysis used to properly format COC form. Contact Joan Kessner for any questions. (1) Particle Size (Dry Sieve) - D422; Moisture Content - D2216; TOC - 9060; pH (Soil) - 9045; Nitrogen by Kjeldahl - 351.2; Ammonia - 350.3; IC Anions - 300.0; Percent Solids B1574-04 Nematode B1575-04 B.G.		Matrix * S=Soil SSl=Soil/Slud SSt=Soil/Sludge W=Water O=Oil A=Air DS=Drum Solids DL=Drum Liquid T=Tissue WLe=Wipe L=Liquid V=Vegetation X=Other
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				
LABORATORY SECTION		Received By		Title		Date/Time				
FINAL SAMPLE DISPOSITION		Disposal Method		Disposed By		Date/Time				

F1522-01

Washington Closure Hanford		CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST				RC-051-100		Page 1 of 1		
Collector STANKOVICH, M.		Company Contact JOAN KESSNER		Telephone No. 375-4688		Project Coordinator KESSNER, JH		Price Code 8L Data Turnaround 45 Days		
Project Designation 100 & 300 Area Component of the RCBRA - Incremental So		Sampling Location UPPER RIPARIAN #14		SAF No. RC-051		Air Quality <input type="checkbox"/>				
Ice Chest No.		Field Logbook No. EL-1596		COA BESRAS6520		Method of Shipment GROUND TRANSPORT				
Shipped To CH2MHILL		Offsite Property No. A060151		Bill of Lading/Air Bill No. SEE OSPC						
POSSIBLE SAMPLE HAZARDS/REMARKS <i>NONE</i>		Preservation		None		None				
Special Handling and/or Storage <i>Use page 3 for original material to Corvallis for MIS preparation and aliquoting, page 1 for radioanalytical fractions to Eberline, & page 2 for chemical analytical fractions to Lionville.</i>		Type of Container		G/P		P/G				
		No. of Container(s)		1		1				
		Volume		1000g		4000g				
SAMPLE ANALYSIS				See item (1) in Special Instructions.		Soil Plant Toxicity ASTM E1963; Soil Nematode Toxicity ASTM E2172				
Sample No.		Matrix *	Sample Date	Sample Time						
J11JH9		SOIL	4-12-06	16:30	1	1				
CHAIN OF POSSESSION		Sign/Print Names				SPECIAL INSTRUCTIONS				Matrix *
Relinquished By/Removed From <i>Elizabeth M. Lopez</i>		Date/Time 4-13-06		Received By/Stored In <i>Joan Kessner</i>		Date/Time 4-13-06		* These marks indicate that unless lined out, analytes to be included with Strontium-89.90 -- Total Sr analysis fraction. ~ These marks indicate that this is a non-analysis used to properly format COC form. Contact Joan Kessner for any questions. (1) Particle Size (Dry Sieve) - D422; Moisture Content - D2216; TOC - 9060; pH (Soil) - 9045; Nitrogen by Kjeldahl - 351.2; Ammonia - 350.3; IC Anions - 300.0; Percent Solids <i>Nematode SW 1574-05</i> <i>BG 1575-05 BG.</i>		S=Soil SE=Sediment SO=Solid SL=Sludge W=Water O=Oil A=Air DS=Drum Solids DL=Drum Liquids T=Tissue W=Wipe L=Liquid V=Vegetative X=Other
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				
LABORATORY SECTION		Received By				Title				Date/Time
FINAL SAMPLE DISPOSITION		Disposal Method				Disposed By				Date/Time

F1548-1

Washington Closure Hanford		CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST				RC-051-67		Page 1 of 1	
Collector STANKOVICH, M.		Company Contact JOAN KESSNER		Telephone No. 375-4688		Project Coordinator KESSNER, JH		Price Code 8L Data Turnaround	
Project Designation 100 & 300 Area Component of the RCBRA - Incremental So		Sampling Location 300-A RIPARIAN #6		SAF No. RC-051		Air Quality <input type="checkbox"/>		45 Days	
Ice Chest No.		Field Logbook No. EL-1596		COA BESRAS6520		Method of Shipment GROUND TRANSPORT			
Shipped To CH2MHILL		Offsite Property No. A060151				Bill of Lading/Air Bill No.			
POSSIBLE SAMPLE HAZARDS/REMARKS <i>NONE</i>			Preservation	None	None				
Special Handling and/or Storage <i>Use page 3 for original material to Corvallis for MIS preparation and aliquoting, page 1 for radioanalytical fractions to Eberline, & page 2 for chemical analytical fractions to Lionville.</i>			Type of Container	G/P	P/G				
			No. of Container(s)	1	1				
			Volume	1000g	4000g				
SAMPLE ANALYSIS				See item (1) in Special Instructions.	Soil Plant Toxicity ASTM E1963; Soil Nematode Toxicity ASTM E2172				
Sample No.	Matrix *	Sample Date	Sample Time						
J11JB6	SOIL	4-17-06	1530	1	1				
CHAIN OF POSSESSION				Sign/Print Names		SPECIAL INSTRUCTIONS			
Relinquished By/Removed From	Date/Time	Received By/Stored In	Date/Time	These marks indicate that unless lined out, analytes to be included with Strontium-89.90 -- Total Sr analysis fraction.					
<i>E. Kessner</i>	10:30	<i>Joan Kessner</i>	4-18-06	These marks indicate that this is a non-analysis used to properly format COC form.					
Relinquished By/Removed From	Date/Time	Received By/Stored In	Date/Time	Contact Joan Kessner for any questions.					
Relinquished By/Removed From	Date/Time	Received By/Stored In	Date/Time	(1) Particle Size (Dry Sieve) - D422; Moisture Content - D2216; TOC - 9060; pH (Soil) - 9045;					
Relinquished By/Removed From	Date/Time	Received By/Stored In	Date/Time	Nitrogen by Kjeldahl - 351.2; Ammonia - 350.3; IC Anions - 300.0; Barium Solids					
Relinquished By/Removed From	Date/Time	Received By/Stored In	Date/Time	BG 1575-06 Bluegrass					
Relinquished By/Removed From	Date/Time	Received By/Stored In	Date/Time	Matrix *					
LABORATORY SECTION	Received By	Title		Date/Time					
FINAL SAMPLE DISPOSITION	Disposal Method	Disposed By		Date/Time					

F1554-01

Washington Closure Hanford		CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST			RC-051-222	Page 1 of 1
Collector STANKOVICH, M.	Company Contact JOAN KESSNER	Telephone No. 375-4688	Project Coordinator KESSNER, JH		Price Code 8L	Data Turnaround 45 Days
Project Designation 100 & 300 Area Component of the RCBRA - Incremental So		Sampling Location 600--139	SAF No. RC-051		Air Quality <input type="checkbox"/>	
Ice Chest No.	Field Logbook No. EL-1596-1	COA BESRAS6520	Method of Shipment GROUND TRANSPORT			
Shipped To CH2MHILL	Offsite Property No. A060151		Bill of Lading/Air Bill No. SEE OSPC			

POSSIBLE SAMPLE HAZARDS/REMARKS NONE Special Handling and/or Storage Use page 3 for original material to Corvallis for MIS preparation and aliquating, page 1 for radioanalytical fractions to Eberline, & page 2 for chemical analytical fractions to Lionville.	Preservation	None	None							
	Type of Container	G/P	P/G							
	No. of Container(s)	1	1							
	Volume	1000g	4000g							

SAMPLE ANALYSIS		See item (1) in Special Instructions.	Soil Plant Toxicity ASTM E1963; Soil Neurotoxicity ASTM E2172							
-----------------	--	---------------------------------------	--	--	--	--	--	--	--	--

Sample No.	Matrix *	Sample Date	Sample Time							
J11K34	SOIL	4-18-06	16:00	1	1					

CHAIN OF POSSESSION				SPECIAL INSTRUCTIONS				Matrix * S=Soil SE=Setiment SO=Solid SL=Sludge W=Water O=Oil A=Air DS=Drum Solids OL=Drum Liquids T=Tissue Wt=Wipe LL=Liquid V=Vegetation X=Other
Relinquished By/Removed From	Date/Time	Received By/Stored In	Date/Time	* These marks indicate that unless lined out, analytes to be included with Strontium-89,90 -- Total Sr analysis fraction. ~ These marks indicate that this is a non-analysis used to properly format COC form. Contact Joan Kessner for any questions.				
Relinquished By/Removed From	Date/Time	Received By/Stored In	Date/Time	(1) Particle Size (Dry Sieve) - D422; Moisture Content - D2216; TOC - 9060; pH (Soil) - 9045; Nitrogen by Kjeldahl - 351.2; Ammonia - 350.3; IC Anions - 300.0; Percent Solids				
Relinquished By/Removed From	Date/Time	Received By/Stored In	Date/Time	B6 1575-07				
Relinquished By/Removed From	Date/Time	Received By/Stored In	Date/Time					
Relinquished By/Removed From	Date/Time	Received By/Stored In	Date/Time					

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

Washington Closure Hanford		CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST				RC-051-216	Page 1 of 1
Collector STANKOVICH, M.		Company Contact JOAN KESSNER		Telephone No. 375-4688		Project Coordinator KESSNER, JH	
Project Designation 100 & 300 Area Component of the RCBRA - Incremental So		Sampling Location 600-132/600-190		SAF No. RC-051		Price Code 8L Data Turnaround 45 Days	
Ice Chest No.		Field Logbook No. EL-1596-1		COA BESRAS6520		Air Quality <input type="checkbox"/>	
Shipped To CH2MHILL		Offsite Property No. A060151		Method of Shipment GROUND TRANSPORT		Bill of Lading/Air Bill No. SEE OSCP	

POSSIBLE SAMPLE HAZARDS/REMARKS NONE Special Handling and/or Storage Use page 3 for original material to Corvallis for MIS preparation and aliquoting, page 1 for radioanalytical fractions to Eberline, & page 2 for chemical analytical fractions to Lionville.	Preservation	None	None						
	Type of Container	G/P	P/G						
	No. of Container(s)	1	1						
	Volume	1000g	4000g						
SAMPLE ANALYSIS		See item (1) in Special Instructions.	Soil Plant Toxicity ASTM E1963; Soil Nematode Toxicity ASTM E2172						

Sample No.	Matrix *	Sample Date	Sample Time						
J11K28	SOIL	4-19-06	16:00	1	1				

CHAIN OF POSSESSION		Sign/Print Names		SPECIAL INSTRUCTIONS				Matrix * SeS-1 SeS-2 SO-S-4 Sl-S-1 W - Water O - Oil A - Air DS - Debris S-4 DL - Debris Liquids T - Trash W - Waste L - Liquid V - Vegetative X - Other
Relinquished By/Removed From	Date/Time 09:30	Received By/Stored In	Date/Time 4-20-06	* These marks indicate that unless lined out, analytes to be included with Strontium-89,90 -- Total Sr analysis fraction. ~ These marks indicate that this is a non-analysis used to properly format COC form. Contact Joan Kessner for any questions. (1) Particle Size (Dry Sieve) - D423; Moisture Content - D2216; TOC - 9060; pH (Soil) - 9045; Nitrogen by Kjeldahl - 351.2; Ammonia - 350.3; IC Anions - 300.0; Percent Solids DG 1575-08				
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					

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

F1586-01

Washington Closure Hanford		CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST				RC-051-246	Page 1 of 1	
Collector STANKOVICH, M.		Company Contact JOAN KESSNER		Telephone No. 375-4688	Project Coordinator KESSNER, JH	Price Code 8L	Data Turnaround	
Project Designation 100 & 300 Arca Component of the RCBRA - Incremental So		Sampling Location 628-1		SAF No. RC-051	Air Quality <input type="checkbox"/>	45 Days		
Ice Chest No.		Field Logbook No. EL-1596-1		COA BESRAS6520	Method of Shipment GROUND TRANSPORT			
Shipped To CH2MHILL		Offsite Property No. A060151		Bill of Lading/Air Bill No. SEE OSPC				
POSSIBLE SAMPLE HAZARDS/REMARKS NONE Special Handling and/or Storage Use page 3 for original material to Corvallis for MIS preparation and aliquoting, page 1 for radioanalytical fractions to Eberline, & page 2 for chemical analytical fractions to Lionville.		Preservation	None	None				
		Type of Container	G/P	P/G				
		No. of Container(s)	1	1				
		Volume	1000g	4000g				
SAMPLE ANALYSIS		Sec item (1) in Special Instructions.	Soil Plant Toxicity ASTM E1963; Soil Neurotoxicity ASTM E2173					
Sample No.	Matrix *	Sample Date	Sample Time					
J11K61	SOIL	4-24-06	14:00	1	1			
CHAIN OF POSSESSION		Sign/Print Names		SPECIAL INSTRUCTIONS				Matrix *
Relinquished By/Removed From <i>Elizabeth H. Taylor</i>	Date/Time 4-24-06	Received By/Stored In <i>D. S. Hubbard</i>	Date/Time 4-24-06	These marks indicate that unless lined out, analytes to be included with Strontium-89,90 -- Total Sr analysis fraction. ~ These marks indicate that this is a non-analysis used to properly format COC form. Contact Joan Kessner for any questions. (1) Particle Size (Dry Sieve) - D422; Moisture Content - D2216; TOC - 9060; pH (Soil) - 9045; Nitrogen by Kjeldahl - 351.2; Ammonia - 350.3; IC Anions - 300.0; Percent Solids <div style="font-size: 1.5em; font-weight: bold; margin-top: 10px;">36 1575-09</div>				S=Soil SE=Soil/Element SD=Soil SW=Sludge W=Water O=Oil A=Air DS=Drum Solids DL=Drum Liquids T=Toxic W=Wipe L=Liquid V=Vegetative X=Other
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					
LABORATORY SECTION	Received By	Title					Date/Time	
FINAL SAMPLE DISPOSITION	Disposal Method	Disposed By				Date/Time		

-01

F15-88-01

Washington Closure Hanford		CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST				RC-051-228	Page 1 of 1
Collector STANKOVICH, M.		Company Contact JOAN KESSNER		Telephone No. 375-4688		Project Coordinator KESSNER, JH	
Project Designation 100 & 300 Area Component of the RCBRA - Incremental So		Sampling Location 600--204		SAF No. RC-051		Price Code 8L Data Turnaround 45 Days	
Ice Chest No.		Field Logbook No. EL-1596-1		COA BESRAS6520		Method of Shipment GROUND TRANSPORT	
Shipped To CH2MHILL		Offsite Property No. A060151		Bill of Lading/Air Bill No. SEE OSPC			
POSSIBLE SAMPLE HAZARDS/REMARKS							
NONE							
Special Handling and/or Storage							
Use page 3 for original material to Corvallis for MIS preparation and aliquoting, page 1 for radioanalytical fractions to Eberline, & page 2 for chemical analytical fractions to Linville.							
SAMPLE ANALYSIS				See item (1) in Special Instructions.	Soil Plant Toxicity ASTM E1963; Soil Nematode Toxicity ASTM E2172		
Preservation	None	None					
Type of Container	G/P	P/G					
No. of Container(s)	1	1					
Volume	1000g	4000g					
Sample No.	Matrix *	Sample Date	Sample Time				
J11K40	SOIL	4-24-06	1722	1	1		
CHAIN OF POSSESSION				SPECIAL INSTRUCTIONS			
Relinquished By/Removed From		Date/Time		Received By/Stored In		Date/Time	
Elizabeth M. Terro		4-25-06 9:00		Larry Hubbard CH2M HILL		9:00	
Relinquished By/Removed From		Date/Time		Received By/Stored In		Date/Time	
Relinquished By/Removed From		Date/Time		Received By/Stored In		Date/Time	
Relinquished By/Removed From		Date/Time		Received By/Stored In		Date/Time	
Relinquished By/Removed From		Date/Time		Received By/Stored In		Date/Time	
LABORATORY SECTION				Matrix *			
Received By		Title		Date/Time		S=Soil SE=Soil SO=Soil SL=Sludge W=Water O=Oil A=Air DS=Drum Solid DL=Drum Liquid T=Tissue Wt=Wipe L=Liquid V=Vegetation X=Other	
FINAL SAMPLE DISPOSITION				Disposed By			
Disposal Method		Date/Time		Date/Time			

F1600-01

Washington Closure Hanford		CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST			RC-051-174	Page 1 of 1
Collector STANKOVICH, M.	Company Contact JOAN KESSNER	Telephone No. 375-4688	Project Coordinator KESSNER, JH		Price Code 8L	Data Turnaround 45 Days
Project Designation 100 & 300 Area Component of the RCBRA - Incremental So		Sampling Location 300-49	SAF No. RC-051		Air Quality <input type="checkbox"/>	
Ice Chest No.	Field Logbook No. EL-1596-1	COA BESRAS6520	Method of Shipment GROUND TRANSPORT			
Shipped To CH2MHILL		Offsite Property No. A060151	Bill of Lading/Air Bill No. SEE OSPC			

POSSIBLE SAMPLE HAZARDS/REMARKS NONE Special Handling and/or Storage Use page 3 for original material to Corvallis for MIS preparation and aliquoting, page 1 for radioanalytical fractions to Eberline, & page 2 for chemical analytical fractions to Lionville.	Preservation	None	None								
	Type of Container	G/P	P/G								
	No. of Container(s)	1	1								
	Volume	1000g	4000g								

SAMPLE ANALYSIS				See item (1) in Special Instructions.	Soil Plant Toxicity ASTM E1963; Soil Nematode Toxicity ASTM E2172								
------------------------	--	--	--	---------------------------------------	---	--	--	--	--	--	--	--	--

Sample No.	Matrix *	Sample Date	Sample Time										
J11JX6	SOIL	4-25-06	1430	1	1								

CHAIN OF POSSESSION		Sign/Print Names		SPECIAL INSTRUCTIONS				Matrix *
Relinquished By/Removed From	Date/Time 1430	Received By/Stored In	Date/Time 4-25-06	* These marks indicate that unless lined out, analytes to be included with Strontium-89,90 -- Total Sr analysis fraction.				S=Soil SE=Soil/Screen SO=Solid SL=Sludge W=Water O=Oil A=Air DS=Drum Solids DL=Drum Liquids T=Tissue W/W=Water/Water L=Liquid V=Vegetative X=Other
<i>Elyabeth M. Tepper</i>	4-25-06	<i>Joan Kessner</i>	16:45	^ These marks indicate that this is a non-analysis used to properly format COC form. Contact Joan Kessner for any questions.				
Relinquished By/Removed From	Date/Time	Received By/Stored In	Date/Time	(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; Pesticide Solids				
Relinquished By/Removed From	Date/Time	Received By/Stored In	Date/Time	36 1575-11				
Relinquished By/Removed From	Date/Time	Received By/Stored In	Date/Time					
Relinquished By/Removed From	Date/Time	Received By/Stored In	Date/Time					

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



BIOASSAY REPORT
ACUTE SCREENING BIOASSAYS
Conducted May 2 through 3, 2006

Prepared for

ELR CONSULTING, INC.
WASHINGTON CLOSURE HANFORD
RICHLAND, WASHINGTON

Prepared by

CH2M HILL
2300 NW Walnut Boulevard
Corvallis, Oregon 97330

May 9, 2006

Lab I.D. Nos. BN1580-01 thru -05
SDG Number BN1580

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INTRODUCTION

CH2M HILL conducted acute screening bioassay tests using the nematode (*Caenorhabditis elegans*) on soil samples provided by the ELR Consulting for the Washington Closure Hanford project, Richland, Washington. The tests were conducted from May 2 through 3, 2006.

METHODS AND MATERIALS

TEST METHODS

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

TEST ORGANISMS

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

CONTROL SOIL

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

HYDRATION WATER

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

TEST CONCENTRATIONS

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

SAMPLE COLLECTION

The soil samples were collected from April 19, 2006, through April 25, 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
J11K34	4/19/2006	600--139	BN1580-01	F1556
J11K28	4/20/2006	600-132/600-190	BN1580-02	F1564
J11K61	4/24/2006	628-1	BN1580-03	F1586
J11K40	4/25/2006	600--204	BN1580-04	F1588
J11JB6	4/19/2006	300-A RIPARIAN #6	BN1580-05	F1548

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 unrecovered 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 May 2, 2006.

Client ID	Percent Survival	Percent Recovered
Control	96.7	96.7
J11K34	93.3	100
J11K28	83.3	90.0
J11K61	93.3	97.3
J11K40	80.0	87.3
J11JB6	90.0	93.3

The nematode results indicated no statistically significant reduction in survival in the J11K34, J11K28, J11K61, J11K40, and J11JB6 samples when compared to the control.

Test acceptability criteria was met with control survival of 90.0 percent and recovery of test organisms was greater than 80 percent in all test concentrations.

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

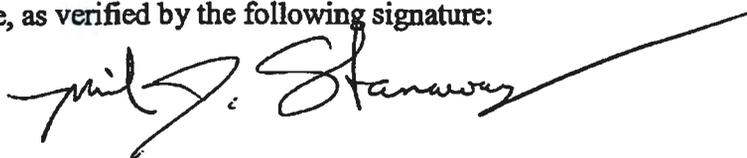
REFERENCE TOXICANT TEST

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

Species (test)	LC_{50}	Control Chart Limits
<i>Caenorhabditis elegans</i> (survival)	52.6	40.8 to 100.3

CERTIFICATION STATEMENT

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



**APPENDIX A
RAW DATA SHEETS**

CHM HILL TOXICITY TEST ORGANISM AND WATER QUALITY DATA

Client BLR - Washington Closure Hanford Test Initiation: Date 5-2-06 Test Termination: Date 5-3-06
 Contact _____ Technician Johnson
 Test Species/ID Caenorhabditis elegans / Nem 0/3 /

Sample Information								Test Species Information		ID#	ID#	ID#	ID#
Sample ID Number	Field ID	Collected		Total Residual Chlorine (mg/l) As Received / As Dechlor.	Ammonia NH ₃ -N (mg/l)	Hardness (mg/l as CaCO ₃)	Alkalinity (mg/l as CaCO ₃)	Organism Age at Initiation	Nem of 3	Acute	ID#	ID#	ID#
		Date	Time										
B11530-01	J11K34	4-19-06	-	- / -	-	-	-	4 days					
-02	J11K23	4-20-06	-	- / -	-	-	-	Test Container Size	15 mm petri				
-03	J11K61	4-24-06	-	- / -	-	-	-	Test Volume	2.33 g dry wt.				
-04	J11K40	4-25-06	-	- / -	-	-	-	Feeding: Type	none				
-05	J11J36	4-19-06	-	- / -	-	-	-	Amount	-				
				/				Aeration: Began	none				
				/				Amount	-				
				/				Dilution Water ID#	Milli-Q Equiv.				
				/				Acclimation Period	4 days				
				/				Test Location	# 7				
				/				Organism Source	Inhouse				
				/				Size (mm)	-	-	-	-	-
				/				Loading Rate	-	-	-	-	-
Dilution Water				ID#	Hardness (mg/l as CaCO ₃)	Alkalinity (mg/l as CaCO ₃)	Initial pH	Comments: <input checked="" type="checkbox"/> Indicates the following action was taken, (<input type="checkbox"/> Indicates action not taken):					
Milli-Q equivalent Water				NA	0	0	NA						
Water Quality Meters Used/ID#													
Dissolved Oxygen #2 pH #3 Conductivity #2													

CETIS Test Summary

Report Date: 04 May-06 8:37 AM
 Test Link: 01-2695-3913/BN158001ce

Nematode 24 hour Acute test							CH2M Hill		
Test No:	10-6268-4302	Test Type:	Nematode Survival	Duration:	26h				
Start Date:	02 May-06 09:05 AM	Protocol:	ASTM E2172-01 (2001)	Species:	Caenorhabditis elegans				
Ending Date:	03 May-06 11:25 AM	Dil Water:		Source:	In-House Culture				
Setup Date:	02 May-06 09:05 AM	Brine:							
Sample No:	03-3122-0322	Code:	BN1580-01	Client:					
Sample Date:	19 Apr-06	Material:	Sediment	Project:					
Receive Date:		Source:	Hanford						
Sample Age:	13d 9h	Station:							
Comments:	J11K34								
Comparison Summary									
Analysis	Endpoint	NOEL	LOEL	ChV	PMSD	Method			
14-0658-2802	% Survival	100	> 100	N/A	16.84%	Equal Variance t Two-Sample			
% Survival Summary									
Conc-%	Control Type	Reps	Mean	Minimum	Maximum	SE	SD	CV	
0	Dilution Sedim	3	0.96667	0.90000	1.00000	0.03333	0.05774	5.97%	
100		3	0.93333	0.80000	1.00000	0.06667	0.11547	12.37%	
% Survival Detail									
Conc-%	Control Type	Rep 1	Rep 2	Rep 3					
0	Dilution Sedim	1.00000	1.00000	0.90000					
100		0.80000	1.00000	1.00000					

CETIS Analysis Detail

Nematode 24 hour Acute test CH2M Hill

Endpoint	Analysis Type	Sample Link	Control Link	Date Analyzed	Version
% Survival	Comparison	01-2695-3913	01-2695-3913	04 May-06 8:37 AM	CETISv1.1.2

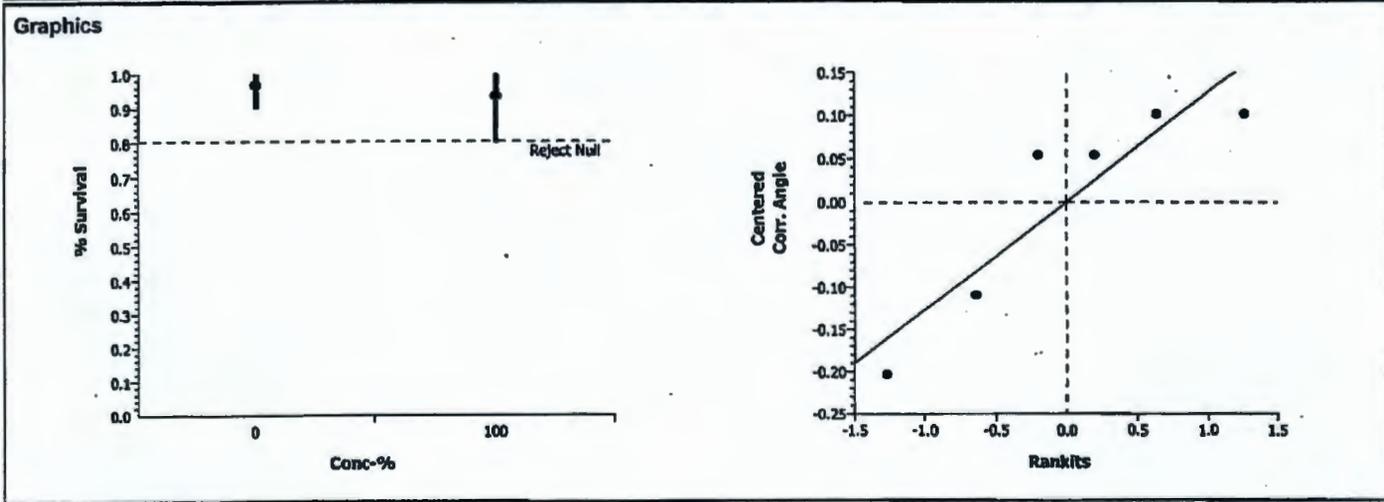
Method	Alt H	Data Transform	Zeta	NOEL	LOEL	Toxic Units	ChV	PMSD
Equal Variance t Two-Sample	C > T	Angular (Corrected)		100	>100	1	N/A	16.84%

Group Comparisons							
Control	vs	Conc-%	Statistic	Critical	P-Value	MSD	Decision(0.05)
Dilution Sediment		100	0.41047	2.13185	0.3512	0.24565	Non-Significant Effect

ANOVA Table						
Source	Sum of Squares	Mean Square	DF	F Statistic	P-Value	Decision(0.05)
Between	0.0033558	0.003356	1	0.17	0.70250	Non-Significant Effect
Error	0.079669	0.019917	4			
Total	0.08302477	0.0232730	5			

ANOVA Assumptions					
Attribute	Test	Statistic	Critical	P-Value	Decision(0.01)
Variances	Variance Ratio F	3.49949	199.00000	0.44449	Equal Variances
Distribution	Shapiro-Wilk W	0.81649		0.08226	Normal Distribution

Data Summary		Original Data					Transformed Data			
Conc-%	Control Type	Count	Mean	Minimum	Maximum	SD	Mean	Minimum	Maximum	SD
0	Dilution Sedim	3	0.96667	0.90000	1.00000	0.05773	1.35769	1.24905	1.41202	0.09409
100		3	0.93333	0.80000	1.00000	0.11547	1.31039	1.10715	1.41202	0.17602



CETIS Test Summary

Report Date: 04 May-06 8:39 AM
 Test Link: 12-7329-0280/BN158002ce

Nematode 24 hour Acute test CH2M Hill

Test No: 05-1821-4836	Test Type: Nematode Survival	Duration: 26h
Start Date: 02 May-06 09:05 AM	Protocol: ASTM E2172-01 (2001)	Species: Caenorhabditis elegans
Ending Date: 03 May-06 11:25 AM	DII Water:	Source: In-House Culture
Setup Date: 02 May-06 09:05 AM	Brine:	

Sample No: 01-3222-3250	Code: BN1580-02	Client:
Sample Date: 20 Apr-06	Material: Sediment	Project:
Receive Date:	Source: Hanford	
Sample Age: 12d 9h	Station:	

Comments: J11K28

Comparison Summary						
Analysis	Endpoint	NOEL	LOEL	ChV	PMSD	Method
02-7434-0194	% Survival	100	> 100	N/A	14.52%	Equal Variance t Two-Sample

% Survival Summary								
Conc-%	Control Type	Reps	Mean	Minimum	Maximum	SE	SD	CV
0	Dilution Sedim	3	0.96667	0.90000	1.00000	0.03333	0.05774	5.97%
100		3	0.83333	0.70000	0.90000	0.06667	0.11547	13.86%

% Survival Detail				
Conc-%	Control Type	Rep 1	Rep 2	Rep 3
0	Dilution Sedim	1.00000	1.00000	0.90000
100		0.90000	0.90000	0.70000

CETIS Analysis Detail

Nematode 24 hour Acute test CH2M Hill

Endpoint	Analysis Type	Sample Link	Control Link	Date Analyzed	Version
% Survival	Comparison	12-7329-0280	12-7329-0280	04 May-06 8:39 AM	CETISv1.1.2

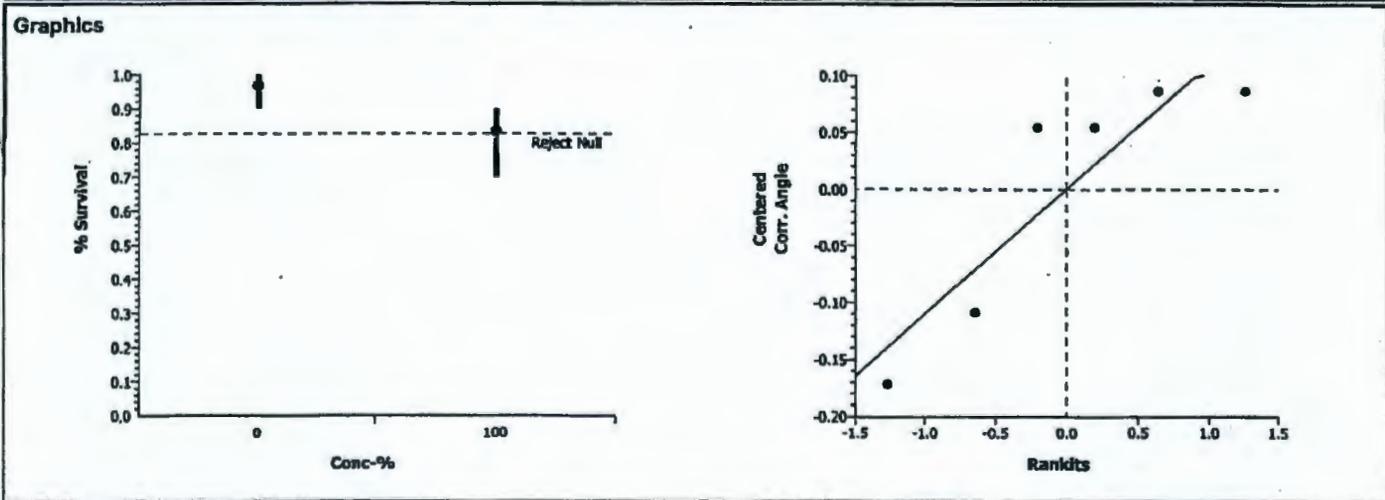
Method	Alt H	Data Transform	Zeta	NOEL	LOEL	Toxic Units	ChV	PMSD
Equal Variance t Two-Sample	C > T	Angular (Corrected)		100	>100	1	N/A	14.52%

Control	vs	Conc-%	Statistic	Critical	P-Value	MSD	Decision(0.05)
Dilution Sediment		100	1.91377	2.13185	0.0641	0.21679	Non-Significant Effect

Source	Sum of Squares	Mean Square	DF	F Statistic	P-Value	Decision(0.05)
Between	0.0568096	0.05681	1	3.66	0.12819	Non-Significant Effect
Error	0.0620441	0.015511	4			
Total	0.11885366	0.0723206	5			

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

Data Summary			Original Data				Transformed Data			
Conc-%	Control Type	Count	Mean	Minimum	Maximum	SD	Mean	Minimum	Maximum	SD
0	Dilution Sedim	3	0.96667	0.90000	1.00000	0.05773	1.35769	1.24905	1.41202	0.09409
100		3	0.83333	0.70000	0.90000	0.11547	1.16308	0.99116	1.24905	0.14889



CETIS Test Summary

Page 1 of 1
 Report Date: 04 May-06 8:42 AM
 Test Link: 17-4034-0094/BN158003ce

Nematode 24 hour Acute test							CH2M Hill		
Test No:	12-9693-0519	Test Type:	Nematode Survival	Duration:	26h				
Start Date:	02 May-06 09:05 AM	Protocol:	ASTM E2172-01 (2001)	Species:	Caenorhabditis elegans				
Ending Date:	03 May-06 11:25 AM	Dil Water:		Source:	In-House Culture				
Setup Date:	02 May-06 09:05 AM	Brine:							
Sample No:	12-9621-5455	Code:	BN1580-03	Client:					
Sample Date:	24 Apr-06	Material:	Sediment	Project:					
Receive Date:		Source:	Hanford						
Sample Age:	8d 9h	Station:							
Comments:	J11K61								
Comparison Summary									
Analysis	Endpoint	NOEL	LOEL	ChV	PMSD	Method			
00-2744-9715	% Survival	100	> 100	N/A	16.84%	Equal Variance t Two-Sample			
% Survival Summary									
Conc-%	Control Type	Reps	Mean	Minimum	Maximum	SE	SD	CV	
0	Dilution Sedim	3	0.96667	0.90000	1.00000	0.03333	0.05774	5.97%	
100		3	0.93333	0.80000	1.00000	0.06667	0.11547	12.37%	
% Survival Detail									
Conc-%	Control Type	Rep 1	Rep 2	Rep 3					
0	Dilution Sedim	1.00000	1.00000	0.90000					
100		0.80000	1.00000	1.00000					

CETIS Test Summary

Page 1 of 1
 Report Date: 04 May-06 8:45 AM
 Test Link: 05-3489-3230/BN158004ca

Nematode 24 hour Acute test CH2M Hill

Test No: 16-3728-7492	Test Type: Nematode Survival	Duration: 26h
Start Date: 02 May-06 09:05 AM	Protocol: ASTM E2172-01 (2001)	Species: Caenorhabditis elegans
Ending Date: 03 May-06 11:25 AM	DII Water:	Source: In-House Culture
Setup Date: 02 May-06 09:05 AM	Brine:	

Sample No: 02-2878-1148	Code: BN1580-04	Client:
Sample Date: 25 Apr-06	Material: Sediment	Project:
Receive Date:	Source: Hanford	
Sample Age: 7d 9h	Station:	

Comments: J11K40

Comparison Summary						
Analysis	Endpoint	NOEL	LOEL	ChV	PMSD	Method
11-8786-8041	% Survival	100	> 100	N/A	23.33%	Equal Variance t Two-Sample

% Survival Summary								
Conc-%	Control Type	Reps	Mean	Minimum	Maximum	SE	SD	CV
0	Dilution Sedim	3	0.96667	0.90000	1.00000	0.03333	0.05774	5.97%
100		3	0.80000	0.70000	1.00000	0.10000	0.17321	21.65%

% Survival Detail				
Conc-%	Control Type	Rep 1	Rep 2	Rep 3
0	Dilution Sedim	1.00000	1.00000	0.90000
100		1.00000	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	05-3489-3230	05-3489-3230	04 May-06 8:45 AM	CETISv1.1.2

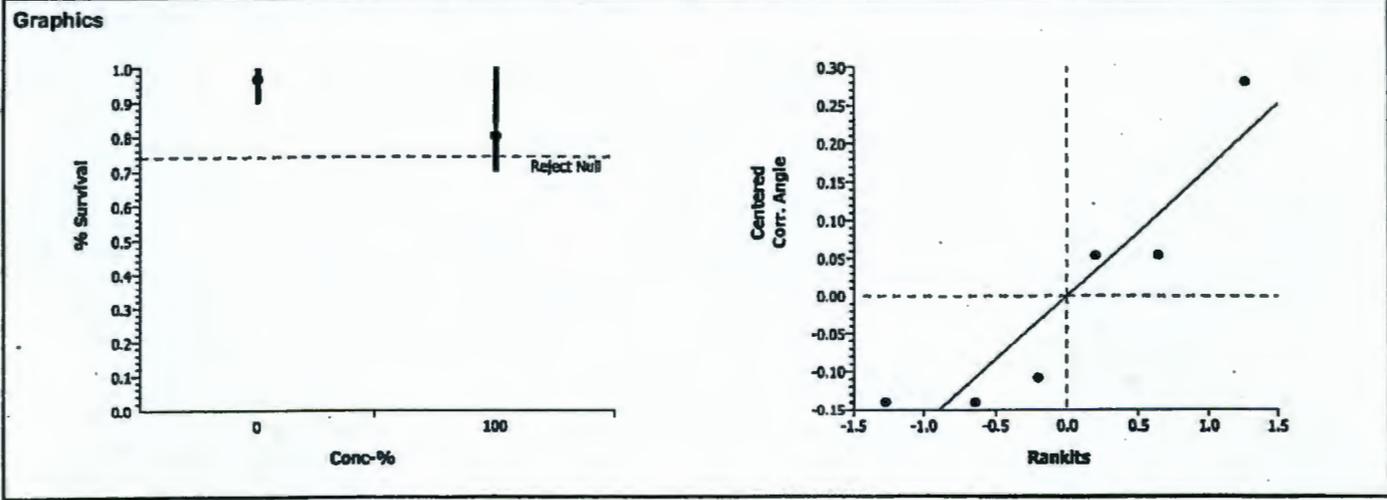
Method	Alt H	Data Transform	Zeta	NOEL	LOEL	Toxic Units	ChV	PMSD
Equal Variance t Two-Sample	C > T	Angular (Corrected)		100	>100	1	N/A	23.33%

Group Comparisons							
Control	vs	Conc-%	Statistic	Critical	P-Value	MSD	Decision(0.05)
Dilution Sediment		100	1.50395	2.13185	0.1035	0.32071	Non-Significant Effect

ANOVA Table						
Source	Sum of Squares	Mean Square	DF	F Statistic	P-Value	Decision(0.05)
Between	0.0767833	0.076783	1	2.26	0.20703	Non-Significant Effect
Error	0.1357881	0.033947	4			
Total	0.21257135	0.1107303	5			

ANOVA Assumptions					
Attribute	Test	Statistic	Critical	P-Value	Decision(0.01)
Variances	Variance Ratio F	6.66895	199.00000	0.26079	Equal Variances
Distribution	Shapiro-Wilk W'	0.84939		0.15562	Normal Distribution

Data Summary			Original Data				Transformed Data			
Conc-%	Control Type	Count	Mean	Minimum	Maximum	SD	Mean	Minimum	Maximum	SD
0	Dilution Sedim	3	0.96667	0.90000	1.00000	0.05773	1.35769	1.24905	1.41202	0.09409
100		3	0.80000	0.70000	1.00000	0.17321	1.13144	0.99116	1.41202	0.24298



CETIS Test Summary

 Report Date: 04 May-06 8:47 AM
 Test Link: 02-1088-2827/BN158005ce

Nematode 24 hour Acute test							CH2M Hill		
Test No:	13-2204-6644	Test Type:	Nematode Survival	Duration:	26h				
Start Date:	02 May-06 09:05 AM	Protocol:	ASTM E2172-01 (2001)	Species:	Caenorhabditis elegans				
Ending Date:	03 May-06 11:25 AM	Dil Water:		Source:	In-House Culture				
Setup Date:	02 May-06 09:05 AM	Brine:							
Sample No:	16-8873-9688	Code:	BN1580-05	Client:					
Sample Date:	19 Apr-06	Material:	Sediment	Project:					
Receive Date:		Source:	Hanford						
Sample Age:	13d 9h	Station:							
Comments:	J11JB6								
Comparison Summary									
Analysis	Endpoint	NOEL	LOEL	ChV	PMSD	Method			
00-9955-1357	% Survival	100	> 100	N/A	14.82%	Equal Variance t Two-Sample			
% Survival Summary									
Conc-%	Control Type	Reps	Mean	Minimum	Maximum	SE	SD	CV	
0	Dilution Sedim	3	0.96667	0.90000	1.00000	0.03333	0.05774	5.97%	
100		3	0.90000	0.80000	1.00000	0.05774	0.10000	11.11%	
% Survival Detail									
Conc-%	Control Type	Rep 1	Rep 2	Rep 3					
0	Dilution Sedim	1.00000	1.00000	0.90000					
100		0.90000	0.80000	1.00000					

CETIS Analysis Detail

Nematode 24 hour Acute test CH2M Hill

Endpoint	Analysis Type	Sample Link	Control Link	Date Analyzed	Version
% Survival	Comparison	02-1088-2827	02-1088-2827	04 May-06 8:47 AM	CETISv1.1.2

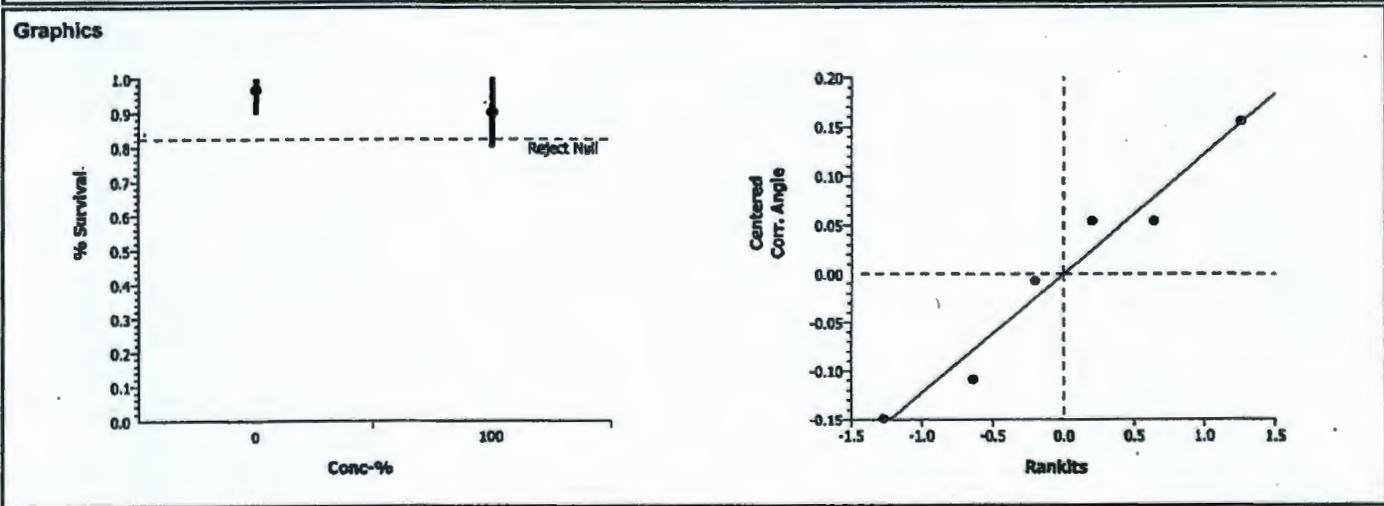
Method	Alt H	Data Transform	Zeta	NOEL	LOEL	Toxic Units	ChV	PMSD
Equal Variance t Two-Sample	C > T	Angular (Corrected)		100	>100	1	N/A	14.82%

Group Comparisons							
Control	vs	Conc-%	Statistic	Critical	P-Value	MSD	Decision(0.05)
Dilution Sediment		100	0.98202	2.13185	0.1908	0.22061	Non-Significant Effect

ANOVA Table						
Source	Sum of Squares	Mean Square	DF	F Statistic	P-Value	Decision(0.05)
Between	0.0154907	0.015491	1	0.96	0.38169	Non-Significant Effect
Error	0.0642523	0.016063	4			
Total	0.07974299	0.0315538	5			

ANOVA Assumptions					
Attribute	Test	Statistic	Critical	P-Value	Decision(0.01)
Variances	Variance Ratio F	2.62880	199.00000	0.55115	Equal Variances
Distribution	Shapiro-Wilk W	0.95093		0.74780	Normal Distribution

Data Summary			Original Data				Transformed Data			
Conc-%	Control Type	Count	Mean	Minimum	Maximum	SD	Mean	Minimum	Maximum	SD
0	Dilution Sedim	3	0.96667	0.90000	1.00000	0.05773	1.35769	1.24905	1.41202	0.09409
100		3	0.90000	0.80000	1.00000	0.10000	1.25607	1.10715	1.41202	0.15256



APPENDIX B
REFERENCE TOXICANT DATA SHEETS

Client: QA/QC
 Sample Description: Cu as CuCl₂·xH₂O Lab ID#: B053-06
 Test Species: Caenorhabditis elegans ID#: Nem 009

Beginning Date: 4-3-06 Time: 0930
 Ending Date: 4-4-06 Time: 0930

Test Initiation: Tech: NJ Time: 0930 Test Termination: Tech: NJ Time: 0830

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

Comments:

* an extra nematode was added at test initiation but was still alive at test ending.

Endpoint LC50

Cusum Chart Limits

Task Manager Natisha Johnson

Survival 52.6

40.9 to 100.3

Project Manager [Signature]

QA Officer [Signature]

CHM HILL CODE TOXICITY TEST SOIL QUALITY AND TEST CHAMBER ASSIGNMENT DATA

Client QA/QC

Tech. 0 Hrs NJ 24 Hrs NJ

Beginning, Date 4-3-06 Time 0930

Sample Description see below

Time 0 Hrs 0930 24 Hrs 0930

Ending, Date 4-4-06 Time 0830

Test Specie: Caenorhabditis elegans ID#: Nem009

Lab ID	K-Medium pH		% Moisture	Temperature (°C)		Comments:
	0 hr	24 hr		0 hr	24 hr	
Lab Control	5.8	6.2 ^{6.0} NT	NA	21.7	21.7	
10 mg/L Cu	5.4	5.5	NA	21.9	21.7	
50 mg/L Cu	5.3	5.3	NA	21.9	21.7	
100 mg/L Cu	5.2	5.2	NA	21.9	21.7	
250 mg/L Cu	4.9 ^{4.8}	4.8	NA	21.8	21.7	

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

CETIS Test Summary

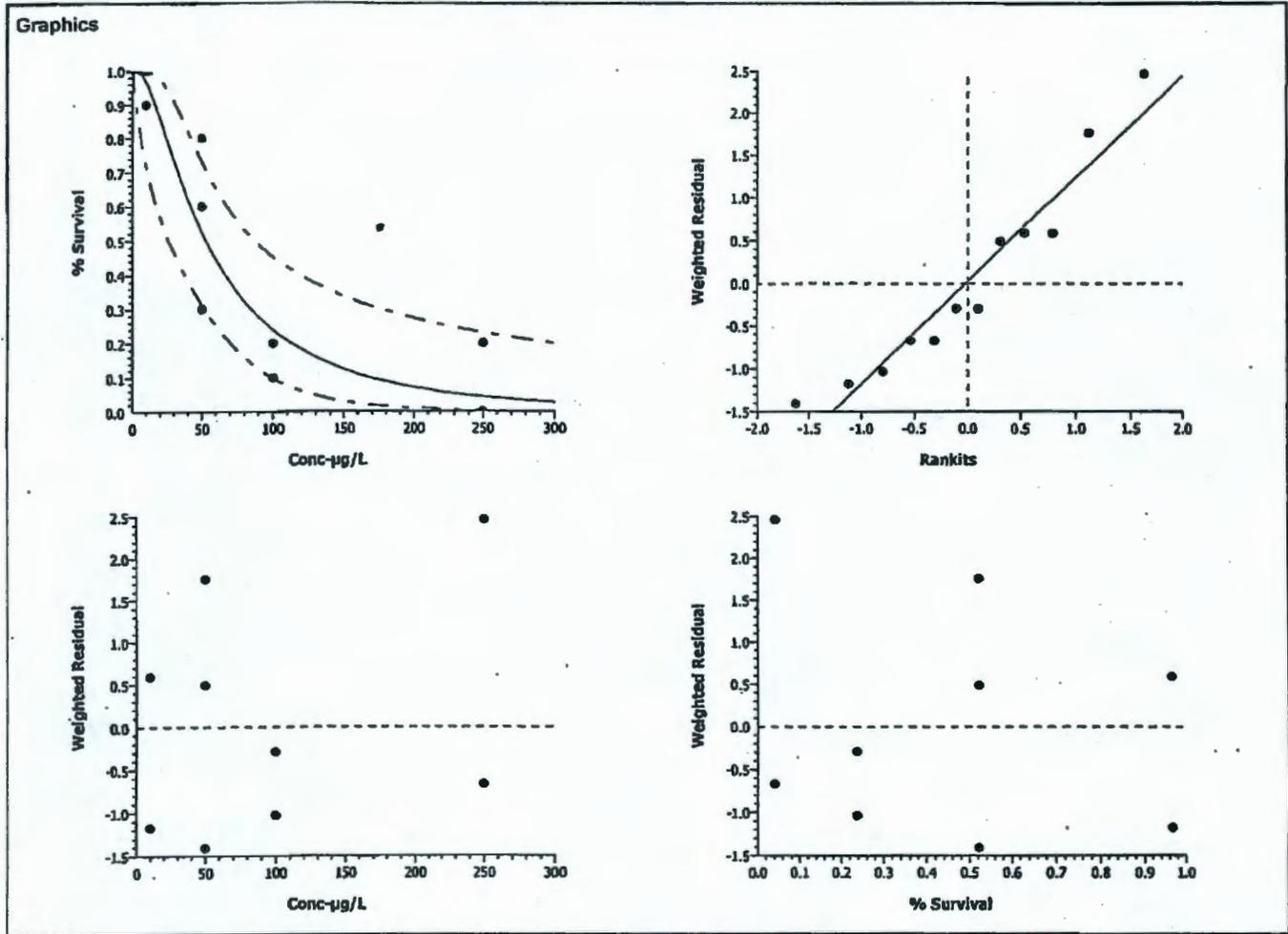
 Report Date: 04 Apr-06 11:24 AM
 Test Link: 01-8280-8779/rcea009

Nematode 24 hour Acute test		CH2M Hill						
Test No:	07-1495-1310	Test Type:	Nematode Survival	Duration:	23h			
Start Date:	03 Apr-06 09:30 AM	Protocol:	ASTM E2172-01 (2001)	Species:	Caenorhabditis elegans			
Ending Date:	04 Apr-06 08:30 AM	Dil Water:		Source:	In-House Culture			
Setup Date:	03 Apr-06 09:30 AM	Brine:						
Sample No:	09-6954-2135	Code:	1B033-06	Client:				
Sample Date:	16 Jan-06	Material:	Copper	Project:				
Receive Date:		Source:	Reference Toxicant					
Sample Age:	77d 9h	Station:						
Comments:	250 mg/L Cu in K medium							
Point Estimate Summary								
Analysis	Endpoint	% Effect	Conc- μ g/L	95% LCL	95% UCL	Method		
11-1509-7834	% Survival	50	52.63094	38.6932	68.37195	Linear Regression		
% Survival Summary								
Conc- μ g/L	Control Type	Reps	Mean	Minimum	Maximum	SE	SD	CV
0	Dilution Water	3	1.00000	1.00000	1.00000	0.00000	0.00000	0.00%
10		3	0.96667	0.90000	1.00000	0.03333	0.05774	5.97%
50		3	0.56667	0.30000	0.80000	0.14530	0.25166	44.41%
100		3	0.16667	0.10000	0.20000	0.03333	0.05774	34.64%
250		3	0.06667	0.00000	0.20000	0.06667	0.11547	173.21
% Survival Detail								
Conc- μ g/L	Control Type	Rep 1	Rep 2	Rep 3				
0	Dilution Water	1.00000	1.00000	1.00000				
10		0.90000	1.00000	1.00000				
50		0.80000	0.60000	0.30000				
100		0.20000	0.20000	0.10000				
250		0.00000	0.20000	0.00000				

CETIS Analysis Detail

Nematode 24 hour Acute test										CH2M Hill	
Endpoint	Analysis Type	Sample Link	Control Link	Date Analyzed	Version						
% Survival	Linear Regression	01-8280-8779	01-8280-8779	04 Apr-06 11:24 AM	CETISv1.1.2						
Linear Regression Options											
Model Function	Threshold Option	Threshold	Threshold Opt	Reweighted	Pooled Groups	Het Corr					
Log-Normal [NED=A+B*log(X)]	Control Threshold	0	Yes	Yes	No	No					
Regression Summary											
Iters	Log Likelihood	Mu	Sigma	G	Chi-Sq	Critical	P-Value	Decision(0.05)			
4	-46.54554	0.24538	0.39332	0.09484	15.56585	18.30704	0.11275	Non-Significant Heterogeneity			
Point Estimates											
% Effect	Conc-µg/L	95% LCL	95% UCL								
50	52.63094	38.6932	88.37195								
Regression Parameters											
Parameter	Estimate	Std Error	95% LCL	95% UCL	t Statistic	P-Value	Decision(0.05)				
Slope	2.54243	0.3994823	1.759445	3.325415	6.364	0.00008	Significant				
Intercept	0.6238645	0.7404562	-0.8274295	2.075159	0.843	0.41918	Not Significant				
Residual Analysis											
Attribute	Method	Statistic	Critical	P-Value	Decision(0.05)						
Variances	Bartlett	2.977855	7.81473	0.39505	Equal Variances						
Distribution	Shapiro-Wilk W	0.9184941		0.27369	Normal Distribution						
Data Summary											
		Calculated Variate(A/B)									
Conc-µg/L	Control Type	Count	Mean	Minimum	Maximum	SE	SD	A	B		
0	Dilution Water	3	1.00000	1.00000	1.00000	0.00000	0.00000	31	31		
10		3	0.96667	0.90000	1.00000	0.01179	0.05773	29	30		
50		3	0.56667	0.30000	0.80000	0.05137	0.25166	17	30		
100		3	0.16667	0.10000	0.20000	0.01179	0.05774	5	30		
250		3	0.06667	0.00000	0.20000	0.02357	0.11547	2	30		
Data Detail											
Conc-µg/L	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
0	Dilution Water	1.00000	1.00000	1.00000							
10		0.90000	1.00000	1.00000							
50		0.80000	0.60000	0.30000							
100		0.20000	0.20000	0.10000							
250		0.00000	0.20000	0.00000							

CETIS Analysis Detail



APPENDIX C
CHAIN OF CUSTODY

F1556-01

Washington Closure Hanford		CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST				RC-051-222		Page 1 of 1	
Collector STANKOVICH, M.		Company Contact JOAN KESSNER		Telephone No. 375-4688		Project Coordinator KESSNER, JH		Price Code 8L Data Turnaround 45 Days	
Project Designation 100 & 300 Area Component of the RCBRA - Incremental So		Sampling Location 600--139		SAF No. RC-051		Air Quality <input type="checkbox"/>			
Ice Chest No.		Field Logbook No. EL-1596-1		COA BESRAS6520		Method of Shipment GROUND TRANSPORT			
Shipped To CH2MHILL		Offsite Property No. A060151		Bill of Lading/Air Bill No. SEE OSPC					
POSSIBLE SAMPLE HAZARDS/REMARKS NONE				Preservation	None	None			
Special Handling and/or Storage Use page 3 for original material to Corvallis for MIS preparation and aliquoting, page 1 for radioanalytical fractions to Eberline, & page 2 for chemical analytical fractions to Lionville.				Type of Container	G/P	P/G			
				No. of Container(s)	1	1			
				Volume	1000g	4000g			
SAMPLE ANALYSIS				See Item (1) in Special Instructions.	Soil Plant Toxicity ASTM E1963; Soil Nematode Toxicity ASTM E2172				
Sample No.	Matrix *	Sample Date	Sample Time						
J11K34	SOIL	4-18-06	16:00	1	1				
CHAIN OF POSSESSION				Sign/Print Names		SPECIAL INSTRUCTIONS			
Relinquished By/Removed From		Date/Time	Received By/Stored In		Date/Time	* These marks indicate that unless lined out, analytes to be included with Strontium-89,90 -- Total Sr analysis fraction. ~ These marks indicate that this is a non-analysis used to properly format COC form. Contact Joan Kessner for any questions. (1) Particle Size (Dry Sieve) - D422; Moisture Content - D2216; TOC - 9060; pH (Soil) - 9045; Nitrogen by Kjeldahl - 351.2; Ammonia - 350.3; IC Anions - 300.0; Percent Solids 241580-01			
Relinquished By/Removed From		Date/Time	Received By/Stored In		Date/Time				
Relinquished By/Removed From		Date/Time	Received By/Stored In		Date/Time				
Relinquished By/Removed From		Date/Time	Received By/Stored In		Date/Time				
Relinquished By/Removed From		Date/Time	Received By/Stored In		Date/Time				
Relinquished By/Removed From		Date/Time	Received By/Stored In		Date/Time	Matrix *			
LABORATORY SECTION		Received By		Title		Date/Time			
FINAL SAMPLE DISPOSITION		Disposal Method		Disposed By		Date/Time			

F1504-01

Washington Closure Hanford		CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST				RC-051-216		Page 1 of 1	
Collector STANKOVICH, M.		Company Contact JOAN KESSNER		Telephone No. 375-4688		Project Coordinator KESSNER, JH		Price Code 8L Data Turnaround 45 Days	
Project Designation 100 & 300 Area Component of the RCBRA - Incremental So		Sampling Location 600-132/600-190		SAF No. RC-051		Air Quality <input type="checkbox"/>			
Ice Chest No.		Field Logbook No. EL-1596-1		COA BESRAS6520		Method of Shipment GROUND TRANSPORT			
Shipped To CH2MHILL		Offsite Property No. A060151		Bill of Lading/Air Bill No. SEE OSPC					
POSSIBLE SAMPLE HAZARDS/REMARKS NONE			Preservation	None	None				
Special Handling and/or Storage Use page 3 for original material to Corvallis for MIS preparation and aliquoting, page 1 for radioanalytical fractions to Eberline, & page 2 for chemical analytical fractions to Lionville.			Type of Container	G/P	P/G				
			No. of Container(s)	1	1				
			Volume	1000g	4000g				
SAMPLE ANALYSIS				See Item (1) in Special Instructions.	Soil Plant Toxicity ASTM E1963; Soil Nematode Toxicity ASTM E2172				
Sample No.	Matrix *	Sample Date	Sample Time						
J11K28	SOIL	4-19-06	16:00	1	1				
CHAIN OF POSSESSION			Sign/Print Names		SPECIAL INSTRUCTIONS				Matrix *
Relinquished By/Removed From	Date/Time	Received By/Stored In	Date/Time	* These marks indicate that unless lined out, analytes to be included with Strontium-89,90 -- Total Sr analysis fraction. ~ These marks indicate that this is a non-analysis used to properly format COC form. Contact Joan Kessner for any questions. (1) Particle Size (Dry Sieve) - D422; Moisture Content - D3316; TOC - 9060; pH (Soil) - 9045; Nitrogen by Kjeldahl - 351.2; Ammonia - 350.3; IC Anions - 300.0; Percent Solids BH 1580-02				Soil Soil Soil Water Oil Air Dioxin PCBs Lead Toluene Volatile Inorganic Other	
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						
LABORATORY SECTION	Received By	Title		Date/Time					
FINAL SAMPLE DISPOSITION	Disposal Method	Dispersed By		Date/Time					

F1586-01

Washington Closure Hanford		CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST				RC-051-246		Page 1 of 1			
Collector STANKOVICH, M.		Company Contact JOAN KESSNER		Telephone No. 375-4688		Project Coordinator KESSNER, JH		Price Code 8L Data Turnaround 45 Days			
Project Designation 100 & 300 Area Component of the RCBRA - Incremental So		Sampling Location 628-1		SAF No. RC-051		Air Quality <input type="checkbox"/>					
Ice Chest No.		Field Logbook No. EL-1596-1		COA BESRAS6520		Method of Shipment GROUND TRANSPORT					
Shipped To CH2MHILL		Offsite Property No. A060151		Bill of Lading/Air Bill No. SEE OSPC							
POSSIBLE SAMPLE HAZARDS/REMARKS NONE				Preservation		None					
Special Handling and/or Storage Use page 3 for original material to Corvallis for MIS preparation and aliquoting, page 1 for radioanalytical fractions to Eberline, & page 2 for chemical analytical fractions to Lonville.				Type of Container		G/P					
				No. of Container(s)		1					
				Volume		1000g		4000g			
SAMPLE ANALYSIS				See item (1) in Special Instructions.		Soil Plant Toxicity ASTM E1963; Soil Nutrient Toxicity ASTM E2172					
Sample No.		Matrix *	Sample Date	Sample Time							
J11K61		SOIL	4-24-06	14:00	1	1			-01		
CHAIN OF POSSESSION		Sign/Print Names		SPECIAL INSTRUCTIONS				Matrix *			
Relinquished By/Removed From Elizabeth H. [Signature] 4-24-06		Date/Time 14:20		Received By/Stored In Dana Hubbard CH2M HILL		Date/Time 4-24-06 14:40		* These marks indicate that unless lined out, analytes to be included with Strontium-89,90 -- Total Sr analysis fraction. ~ These marks indicate that this is a non-analysis used to properly format COC form. Contact Joan Kessner for any questions. (1) Particle Size (Dry Sieve) - D422; Moisture Content - D2216; TOC - 9060; pH (Soil) - 9045; Nitrogen by Kjeldahl - 351.2; Ammonia - 350.3; IC Anions - 300.0; Percent Solids 3A 080-03			
Relinquished By/Removed From		Date/Time		Received By/Stored In		Date/Time					
Relinquished By/Removed From		Date/Time		Received By/Stored In		Date/Time					
Relinquished By/Removed From		Date/Time		Received By/Stored In		Date/Time					
Relinquished By/Removed From		Date/Time		Received By/Stored In		Date/Time					
Relinquished By/Removed From		Date/Time		Received By/Stored In		Date/Time					
LABORATORY SECTION		Received By		Title				Date/Time			
FINAL SAMPLE DISPOSITION		Disposal Method		Disposed By				Date/Time			

F1588-01

Washington Closure Hanford		CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST				RC-051-228		Page 1 of 1	
Collector STANKOVICH, M.		Company Contact JOAN KESSNER		Telephone No. 375-4688		Project Coordinator KESSNER, JH		Price Code 8L Data Turnaround 45 Days	
Project Designation 100 & 300 Arca Component of the RCBRA - Incremental So		Sampling Location 600--204		SAF No. RC-051		Air Quality <input type="checkbox"/>			
Ice Chest No.		Field Logbook No. EL-1596-1		COA BESRAS6520		Method of Shipment GROUND TRANSPORT			
Shipped To CH2MHILL		Offsite Property No. A060151		Bill of Lading/Air Bill No. SEE OSPC					
POSSIBLE SAMPLE HAZARDS/REMARKS NONE				Preservation	None	None			
Special Handling and/or Storage Use page 3 for original material to Corvallis for MIS preparation and aliquoting, page 1 for radioanalytical fractions to Eberline, & page 2 for chemical analytical fractions to Lionville.				Type of Container	G/P	P/G			
				No. of Container(s)	1	1			
				Volume	1000g	4000g			
				SAMPLE ANALYSIS		See item (1) in Special Instructions.	Soil Plant Toxicity ASTM E1963; Soil Nemtode Toxicity ASTM E2173		
Sample No.	Matrix *	Sample Date	Sample Time						
J11K40	SOIL	4-24-06	1722	1	1				
CHAIN OF POSSESSION				Sign/Print Names				SPECIAL INSTRUCTIONS	
Relinquished By/Removed From <i>Elizabeth M Terra</i>		Date/Time 4-25-06 9:00		Received By/Stored In <i>Larry Hubbard</i>		Date/Time CH2MHILL 9:00		* These marks indicate that unless lined out, analytes to be included with Strontium-89,90 -- Total Sr analysis fraction. ^ These marks indicate that this is a non-analysis used to properly format COC form. Contact Joan Kessner for any questions.	
Relinquished By/Removed From		Date/Time		Received By/Stored In		Date/Time		(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; Residue Solids B1588-04	
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			
LABORATORY SECTION		Received By				Title			
FINAL SAMPLE DISPOSITION		Disposal Method				Disposed By			
						Date/Time			
						Date/Time			