Appendix 29: Raw Data for 96-hour Toxicity of Fluoride on *Sphaerium simile*

Raw Laboratory Data

96 Hour Water Column Acute Test Data Sheet

Toxicant: Fluoride | Species: S. simile

Rate: 3.5356g/2L EPA

Water: EPA-A 7/10/09 | Culture: Spring Creek, Loda, IL collected 6-26-09

Start Date/Time: 7/13/09 2pm | Age: unknown | Initials: AD, KM

Temp: 22°C | Light: 16:8

Treatment	rep	Survival 0 h	24 h	48 h	72 h	96 h	Chem	0h	24h	48h	72h	96h
A	1	5	5	5	5	5	temp	22.9	22.9	22.8	22.7	22.9
	2	5	5	5	5	5	pH	8.0	x			8.0
	3	5	5	5	5	4	cond	307	x			310
	4	5	5	5	5	5	D.O.	7.76	7.97	8.00	7.63	8.05
control							Alk	62	x	x	x	62
							Hard	96	x	x	x	96
B	1	5	5	5	5	4	temp	22.8	22.8	22.8	22.7	22.9
	2	5	5	5	5	5	pH	8.1				8.0
	3	5	5	5	5	2	cond	555				558
	4	5	5	5	5	4	D.O.	7.82	7.92	7.83	7.70	8.04
50							Alk	64	x	x	x	68
							Hard	94	x	x	x	80
C	1	5	5	5	5	3	temp	22.8	22.9	22.8	22.7	22.9
	2	5	5	5	5	1	pH	8.1				8.1
	3	5	5	5	5	0	cond	785				784
	4	5	5	5	5	1	D.O.	7.80	8.11	7.95	7.67	7.53
100							Alk	66	x	x	x	68
							Hard	80	x	x	x	62
D	1	5	5	5	2	0	temp	22.9	22.8	22.9	22.8	22.9
	2	5	5	5	3	0	pH	8.0				8.1
	3	5	5	5	5	0	cond	1264				1268
	4	5	5	5	3	0	D.O.	7.82	8.05	7.82	6.63	6.03
200							Alk	78	x	x	x	82
							Hard	76	x	x	x	50
E	1	5	5	5	4	0	temp	22.9	22.9	22.8	22.8	23.0
	2	5	5	4	1	0	pH	8.2				7.9
	3	5	5	5	4	0	cond	2.21mS				2.21mS/cm
	4	5	5	5	1	0	D.O.	7.78	7.99	7.79	4.88	5.49
400							Alk	120	x	x	x	120
							Hard	64	x	x	x	30
F	1	5	5	5	5	0	temp	23.0	22.9	22.9	22.8	22.9
	2	5	5	5	4	0	pH	8.2				8.0
	3	5	5	5	5	0	cond	4.05mS				4.09mS/cm
	4	5	5	4	1	0	D.O.	7.82	8.05	8.02	6.51	~~22.9~~ 6.89 µM
800							Alk	160	x	x	x	160
							Hard	14	x	x	x	2
Initials		AD	AD	AD	KM	KM/AD						

Analytical Chemistry Data

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Underwriters Laboratories

LABORATORY REPORT

This report contains 6 pages.
(including the cover page)

If you have any questions concerning this report, please do not hesitate to call us at (800) 332-4345 or (574) 233-4777.

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Underwriters Laboratories Inc.
110 S. Hill Street, South Bend, IN 46617-2702 USA
T: 800.332.4345 / F: 574.233.8207 / W: ul.com

the standard in safety

Underwriters Laboratories

Laboratory Report

Client: Illinois Natural History Survey

Attn: Amy Dickinson
1910 South Griffith Drive
Champaign, IL 61820

Report: 230164
Priority: Standard Written
Status: Final
PWS ID: Not Supplied

Copies to: None

Sample Information

UL ID #	Client ID	Method	Collected Date / Time	Collected By:	Received Date / Time
2112303	A Control Fluoride In	300.0	07/13/09 14:00	Client	07/23/09 09:45
2112304	B 50 ppm Fluoride In	300.0	07/13/09 14:00	Client	07/23/09 09:45
2112305	C 100 ppm Fluoride In	300.0	07/13/09 14:00	Client	07/23/09 09:45
2112306	D 200 ppm Fluoride In	300.0	07/13/09 14:00	Client	07/23/09 09:45
2112307	E 400 ppm Fluoride In	300.0	07/13/09 14:00	Client	07/23/09 09:45
2112308	F 800 ppm Fluoride In	300.0	07/13/09 14:00	Client	07/23/09 09:45
2112309	A Control Fluoride Out	300.0	07/17/09 14:00	Client	07/23/09 09:45
2112310	B 50 ppm Fluoride Out	300.0	07/17/09 14:00	Client	07/23/09 09:45
2112311	C 100 ppm Fluoride Out	300.0	07/17/09 14:00	Client	07/23/09 09:45
2112312	D 200 ppm Fluoride Out	300.0	07/17/09 14:00	Client	07/23/09 09:45
2112313	E 400 ppm Fluoride Out	300.0	07/17/09 14:00	Client	07/23/09 09:45
2112314	F 800 ppm Fluoride Out	300.0	07/17/09 14:00	Client	07/23/09 09:45

Report Summary

Project: Clam Acute Fluoride

Detailed quantitative results are presented on the following pages. The results presented relate only to the samples provided for analysis.

We appreciate the opportunity to provide you with this analysis. If you have any questions concerning this report, please do not hesitate to call Kelly Trott at (574) 233-4777.

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Kelly Trott — Authorized Signature

Project Manager — Title

8/4/2009 — Date

Client Name: Illinois Natural History Survey
Report #: 230164

Underwriters Laboratories Inc.
110 S. Hill Street, South Bend, IN 46617-2702 USA
T:: 800.332.4345 / F:: 574.233.8207 / W:: ul.com

Client Name: Illinois Natural History Survey

Report #: 230164

Sampling Point: A Control Fluoride In

PWS ID: Not Supplied

General Chemistry									
Analyte ID #	Analyte	Method	Reg Limit	MRL†	Result	Units	Preparation Date	Analyzed Date	UL ID #
16984-48-8	Fluoride	300.0	4 *	0.5	< 0.5	mg/L	---	07/30/09 03:08	2112303

Sampling Point: B 50 ppm Fluoride In

PWS ID: Not Supplied

General Chemistry									
Analyte ID #	Analyte	Method	Reg Limit	MRL†	Result	Units	Preparation Date	Analyzed Date	UL ID #
16984-48-8	Fluoride	300.0	4 *	0.5	**45**	mg/L	---	07/30/09 03:33	2112304

Sampling Point: C 100 ppm Fluoride In

PWS ID: Not Supplied

General Chemistry									
Analyte ID #	Analyte	Method	Reg Limit	MRL†	Result	Units	Preparation Date	Analyzed Date	UL ID #
16984-48-8	Fluoride	300.0	4 *	0.5	**86**	mg/L	---	07/30/09 03:57	2112305

Sampling Point: D 200 ppm Fluoride In

PWS ID: Not Supplied

General Chemistry									
Analyte ID #	Analyte	Method	Reg Limit	MRL†	Result	Units	Preparation Date	Analyzed Date	UL ID #
16984-48-8	Fluoride	300.0	4 *	0.5	**190**	mg/L	---	07/30/09 04:22	2112306

Sampling Point: E 400 ppm Fluoride In

PWS ID: Not Supplied

General Chemistry									
Analyte ID #	Analyte	Method	Reg Limit	MRL†	Result	Units	Preparation Date	Analyzed Date	UL ID #
16984-48-8	Fluoride	300.0	4 *	0.5	**400**	mg/L	---	07/30/09 04:46	2112307

Client Name: Illinois Natural History Survey

Report #: 230164

Sampling Point: F 800 ppm Fluoride In

PWS ID: Not Supplied

General Chemistry									
Analyte ID #	Analyte	Method	Reg Limit	MRL†	Result	Units	Preparation Date	Analyzed Date	UL ID #
16984-48-8	Fluoride	300.0	4 *	0.5	**800**	mg/L	---	07/30/09 05:11	2112308

Sampling Point: A Control Fluoride Out

PWS ID: Not Supplied

General Chemistry									
Analyte ID #	Analyte	Method	Reg Limit	MRL†	Result	Units	Preparation Date	Analyzed Date	UL ID #
16984-48-8	Fluoride	300.0	4 *	0.5	< 0.5	mg/L	---	07/30/09 05:35	2112309

Sampling Point: B 50 ppm Fluoride Out

PWS ID: Not Supplied

General Chemistry									
Analyte ID #	Analyte	Method	Reg Limit	MRL†	Result	Units	Preparation Date	Analyzed Date	UL ID #
16984-48-8	Fluoride	300.0	4 *	0.5	**44**	mg/L	---	07/30/09 06:00	2112310

Sampling Point: C 100 ppm Fluoride Out

PWS ID: Not Supplied

General Chemistry									
Analyte ID #	Analyte	Method	Reg Limit	MRL†	Result	Units	Preparation Date	Analyzed Date	UL ID #
16984-48-8	Fluoride	300.0	4 *	0.5	**91**	mg/L	---	07/30/09 06:24	2112311

Sampling Point: D 200 ppm Fluoride Out

PWS ID: Not Supplied

General Chemistry									
Analyte ID #	Analyte	Method	Reg Limit	MRL†	Result	Units	Preparation Date	Analyzed Date	UL ID #
16984-48-8	Fluoride	300.0	4 *	0.5	**180**	mg/L	---	07/30/09 07:38	2112312

Client Name: Illinois Natural History Survey

Report #: 230164

Sampling Point: E 400 ppm Fluoride Out

PWS ID: Not Supplied

General Chemistry									
Analyte ID #	Analyte	Method	Reg Limit	MRL†	Result	Units	Preparation Date	Analyzed Date	UL ID #
16984-48-8	Fluoride	300.0	4 *	0.5	**380**	mg/L	---	07/30/09 08:02	2112313

Sampling Point: F 800 ppm Fluoride Out

PWS ID: Not Supplied

General Chemistry									
Analyte ID #	Analyte	Method	Reg Limit	MRL†	Result	Units	Preparation Date	Analyzed Date	UL ID #
16984-48-8	Fluoride	300.0	4 *	0.5	**800**	mg/L	---	07/30/09 08:27	2112314

† UL has demonstrated it can achieve these report limits in reagent water, but can not document them in all sample matrices.

Reg Limit Type:	MCL	SMCL	AL
Symbol:	*	^	!

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South Bend, IN 46617
(800) 332-4345
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Order # 181415
Batch # 230164

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CHAIN OF CUSTODY RECORD

Page 1 of 1

REPORT TO: Amy Dickinson

BILL TO: Amy Dickinson
Illinois Natural History Survey

SAMPLER (Signature): Amy Dickinson

STATE (of sample origin)	PWS ID#	PROJECT NAME	PO#
IL		Clam Acute Fluoride	

COMPLIANCE MONITORING Yes	No	POPULATION SERVED	SOURCE WATER
	✓		RW

	LAB Number	COLLECTION DATE	TIME	AM	PM	SAMPLING SITE	TEST NAME	SAMPLE REMARKS	CHLORINATED YES	NO	# OF CONTAINERS	MATRIX CODE	TURNAROUND TIME
1	2112303	7/13/09	2		X	A Control Fluoride IN	Fluoride	Not spiked	✓		1	RW	SW
2	304					B 50 ppm Fluoride IN		Spiked					
3	305					C 100 ppm Fluoride IN							
4	306					D 200 ppm Fluoride IN							
5	307					E 400 ppm Fluoride							
6	308					F 800 ppm Fluoride							
7	309	7/17/09	2		X	A Control Fluoride OUT		NOT SPIKED					
8	310					B 50 ppm Fluoride OUT		SPIKED					
9	311					C 100 ppm Fluoride OUT							
10	312					D 200 ppm Fluoride OUT							
11	313					E 400 ppm Fluoride OUT							
12	314					F 800 ppm Fluoride OUT							
13													
14													

RELINQUISHED BY:(Signature)	DATE	TIME	RECEIVED BY:(Signature)	DATE	TIME
Amy Dickinson	7/21/09	2 AM PM			AM PM
RELINQUISHED BY:(Signature)	DATE	TIME	RECEIVED BY:(Signature)	DATE	TIME
		AM PM			AM PM
RELINQUISHED BY:(Signature)	DATE	TIME	RECEIVED FOR LABORATORY BY:	DATE	TIME
		AM PM	Keelie Deprest	7-23-09	0945 AM PM

LAB RESERVES THE RIGHT TO RETURN UNUSED PORTIONS OF NON-AQUEOUS SAMPLES TO CLIENT

LAB COMMENTS

CONDITIONS UPON RECEIPT (check one): X Iced: Wet Blue ____ Ambient

Temperature: 2.4 °C Upon Receipt ____ N/A

MATRIX CODES:
- DW-DRINKING WATER
- RW-REAGENT WATER
- GW-GROUND WATER
- EW-EXPOSURE WATER
- SW-SURFACE WATER
- PW-POOL WATER
- WW-WASTE WATER

TURN-AROUND TIME (TAT) - SURCHARGES

SW = Standard Written: (15 working days)	**0%**	**IV*** = Immediate Verbal: (3 working days)	**100%**
RV* = Rush Verbal: (5 Working days)	**50%**	**IW*** =Immediate Written: (3 working days)	**125%**
RW* = Rush Written: (5 working days)	**75%**	**SP*** = Weekend, Holiday	**CALL**
		STAT* = Less than 48 hours	**CALL**

*Please call, Expedited service not available for all testing

UL-SBN-SHIP-F-002-08 Effective Date: 03/09/2009

Samples received unannounced less than 48 hours holding time remaining may be subject to additional charges.

Sample analysis will be provided according to the standard UL GSA/Water Services Terms, which are available upon request. Any other terms proposed by Customer are deemed material alterations and are rejected unless expressly agree to in writing by UL.

Statistical Analyses

CT-TOX: BINOMIAL, MOVING AVERAGE, PROBIT, AND SPEARMAN METHODS

MINIMUM REQUIRED TRIM IS TOO LARGE: 100.0,SO SK IS NOT CALCULABLE.
SPEARMAN-KARBER

TRIM: .00%
LC50: .000
95% LOWER CONFIDENCE: .000
95% UPPER CONFIDENCE: .000

CONC. mg/L	NUMBER EXPOSED	NUMBER DEAD	PERCENT DEAD	BINOMIAL PROB.(%)
44.00	20.	0.	.00	.9537D-04
88.00	20.	0.	.00	.9537D-04
185.00	20.	0.	.00	.9537D-04
390.00	20.	0.	.00	.9537D-04
800.00	20.	0.	.00	.9537D-04

THE BINOMIAL TEST SHOWS THAT 800.00 AND +INFINITY CAN BE USED AS STATISTICALLY
SOUND CONSERVATIVE 95 PERCENT CONFIDENCE LIMITS SINCE THE ACTUAL CONFIDENCE
LEVEL ASSOCIATED WITH THESE LIMITS IS 99.9999 PERCENT.
THE LC50 FOR THIS DATA SET IS GREATER THAN 800.00

WHEN THERE ARE LESS THAN TWO CONCENTRATIONS AT
WHICH THE PERCENT DEAD IS BETWEEN 0 AND 100, NEITHER
THE MOVING AVERAGE NOR THE PROBIT METHOD CAN GIVE
ANY STATISCALLY SOUND RESULTS.

DATE: July 13, 2009 TEST NUMBER: DURATION: 24 h
SAMPLE: Fluoride SPECIES: Sphaerium simile

METHOD	LC50	CONFIDENCE LIMITS LOWER	UPPER	SPAN
BINOMIAL	*******	800.000	*******	*******
MAA	*******	*******	*******	*******
PROBIT	*******	*******	*******	*******
SPEARMAN	.000	.000	.000	.000

**** = LIMIT DOES NOT EXIST

MINIMUM REQUIRED TRIM IS TOO LARGE: 95.0,SO SK IS NOT CALCULABLE.
SPEARMAN-KARBER

TRIM: .00%
LC50: .000
95% LOWER CONFIDENCE: .000
95% UPPER CONFIDENCE: .000

CONC. mg/L	NUMBER EXPOSED	NUMBER DEAD	PERCENT DEAD	BINOMIAL PROB.(%)
44.00	20.	0.	.00	.9537D-04
88.00	20.	0.	.00	.9537D-04
185.00	20.	0.	.00	.9537D-04
390.00	20.	1.	5.00	.2003D-02
800.00	20.	1.	5.00	.2003D-02

THE BINOMIAL TEST SHOWS THAT 800.00 AND +INFINITY CAN BE USED AS STATISTICALLY
SOUND CONSERVATIVE 95 PERCENT CONFIDENCE LIMITS SINCE THE ACTUAL CONFIDENCE
LEVEL ASSOCIATED WITH THESE LIMITS IS 99.9980 PERCENT.
THE LC50 FOR THIS DATA SET IS GREATER THAN 800.00

THE MOVING AVERAGE METHOD CANNOT BE USED WITH
THIS DATA SET BECAUSE NO SPAN WHICH PRODUCES
AVERAGE ANGLES BRACKETING 45 DEGREES ALSO USES
TWO PERCENT DEAD BETWEEN 0 AND 100 PERCENT.

NO CONVERGENCE IN 25 ITERATIONS. PROBIT METHOD
PROBABLY CAN NOT BE USE WITH THIS SET OF DATA.

DATE: July 13, 2009 TEST NUMBER: DURATION: 48 h
SAMPLE: Fluoride SPECIES: Sphaerium simile

METHOD	LC50	CONFIDENCE LIMITS LOWER	UPPER	SPAN
BINOMIAL	*******	800.000	*******	*******
MAA	*******	*******	*******	*******
PROBIT	*******	*******	*******	*******
SPEARMAN	.000	.000	.000	.000

**** = LIMIT DOES NOT EXIST

MINIMUM REQUIRED TRIM IS TOO LARGE: 62.5,SO SK IS NOT CALCULABLE.
SPEARMAN-KARBER

TRIM: .00%
LC50: .000
95% LOWER CONFIDENCE: .000
95% UPPER CONFIDENCE: .000

CONC. mg/L	NUMBER EXPOSED	NUMBER DEAD	PERCENT DEAD	BINOMIAL PROB.(%)
44.00	20.	0.	.00	.9537D-04
88.00	20.	0.	.00	.9537D-04
185.00	20.	7.	35.00	.1316D+02
390.00	20.	10.	50.00	.5881D+02
800.00	20.	5.	25.00	.2069D+01

THE BINOMIAL TEST SHOWS THAT 88.00 AND +INFINITY CAN BE USED AS STATISTICALLY
SOUND CONSERVATIVE 95 PERCENT CONFIDENCE LIMITS SINCE THE ACTUAL CONFIDENCE
LEVEL ASSOCIATED WITH THESE LIMITS IS 99.9999 PERCENT.
THE LC50 FOR THIS DATA SET IS GREATER THAN 800.00

RESULTS USING MOVING AVERAGE

SPAN	G	LC50	95% CONFIDENCE LIMIT	
1	4.453	390.00	0	+ INFINITY

****** RESULTS CALCULATED BY PROBIT METHOD

ITERATIONS	G	H	GOODNESS OF FIT
7	3.754	4.62	.00

SINCE THE PROBABILITY IS LESS THAN 0.05,
RESULTS CALCULATED USING THE PROBIT METHOD
PROBABLY SHOULD NOT BE USED.
SLOPE = 1.30
95% CONFIDENCE LIMITS: -1.22 AND 3.82

LC50= 937.27
95% CONFIDENCE LIMITS: 0 AND + INFINITY

LC1 = 15.23
95% CONFIDENCE LIMITS: 0 AND 140.53

DATE: July 13, 2009 TEST NUMBER: DURATION: 72 h
SAMPLE: Fluoride SPECIES: Sphaerium simile

METHOD	LC50	CONFIDENCE LIMITS LOWER	UPPER	SPAN
BINOMIAL	*******	88.000	*******	*******
MAA	390.000	*******	*******	*******
PROBIT	937.274	*******	*******	*******
SPEARMAN	.000	.000	.000	.000

NOTE: MORTALITY PROPORTIONS WERE NOT MONOTONICALLY INCREASING.
ADJUSTMENTS WERE MADE PRIOR TO SPEARMAN-KARBER ESTIMATION.
**** = LIMIT DOES NOT EXIST

SPEARMAN-KARBER

TRIM: 25.00%
LC50: 62.225
95% LOWER CONFIDENCE: 51.467
95% UPPER CONFIDENCE: 75.233

CONC. mg/L	NUMBER EXPOSED	NUMBER DEAD	PERCENT DEAD	BINOMIAL PROB.(%)
44.00	20.	5.	25.00	.2069D+01
88.00	20.	15.	75.00	.2069D+01
185.00	20.	20.	100.00	.9537D-04
390.00	20.	20.	100.00	.9537D-04
800.00	20.	20.	100.00	.9537D-04

THE BINOMIAL TEST SHOWS THAT 44.00 AND 88.00 CAN BE USED AS STATISTICALLY SOUND CONSERVATIVE 95 PERCENT CONFIDENCE LIMITS SINCE THE ACTUAL CONFIDENCE
LEVEL ASSOCIATED WITH THESE LIMITS IS 95.8611 PERCENT.
AN APPROXIMATE LC50 FOR THIS DATA SET IS 62.225

RESULTS USING MOVING AVERAGE

SPAN	G	LC50	95% CONFIDENCE LIMIT	
1	.379	62.23	47.46	81.58

****** RESULTS CALCULATED BY PROBIT METHOD

ITERATIONS	G	H	GOODNESS OF FIT
7	.207	1.00	.96

SLOPE = 4.96
95% CONFIDENCE LIMITS: 2.71 AND 7.22

LC50= 61.56
95% CONFIDENCE LIMITS: 48.42 AND 75.38

LC1 = 20.91
95% CONFIDENCE LIMITS: 7.73 AND 31.04

DATE: July 13, 2009 TEST NUMBER: DURATION: 96 h
SAMPLE: Fluoride SPECIES: Sphaerium simile

METHOD	LC50	CONFIDENCE LIMITS LOWER	UPPER	SPAN
BINOMIAL	62.225	44.000	88.000	44.000
MAA	62.225	47.462	81.582	34.120
PROBIT	61.560	48.415	75.381	26.966
SPEARMAN	62.225	51.467	75.233	23.766

**** = LIMIT DOES NOT EXIST

Appendix 30: Raw Data for 96-hour Toxicity of Fluoride on *Hyalella azteca*

Raw Laboratory Data

96-HOUR STATIC ACUTE TOXICITY TEST

GLEC
Great Lakes Environmental Center

PROJECT NUMBER:
TEST SPECIES: H. amphea
INVESTIGATORS:

TEST MATERIAL: 6112-12 Fluoride
TYPE OF TEST: definitive
NUMBER OF ORGANISMS/CHAMBER: 5
NUMBER OF CHAMBERS: 4+1 for chems
AGE OF ORGANISMS: 14 days

DILUTION WATER: MH 1715
GLC AND/OR BATCH NUMBER:
TEST TEMPERATURE: 22±1°C
INCUBATOR #: 6 PHOTOPERIOD: 16:8

DATE / TIME	TEST DAY	TECH. INITIALS	TREATMENT LEVEL	MH CONTROL				A. 7.8mg/L				B 12.9mg/L				C 21.6mg/L				D 36mg/L				E 60mg/L			
			REPLICATE NUMBER	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
1500 9/17/09	0	MWB	TEMPERATURE	22.0				22.0				22.0				22.0				22.0				22.0			
			pH	7.84				7.84				7.85				7.85				7.88				7.88			
			DO (mg/L)	8.0				8.0				8.0				8.0				8.0				8.0			
			SP. COND. (µmhos/cm)	300				368				393				432				502				622			
9/18/09	1	MWB	NUMBER LIVE	5	5	5	5	5	5	5	5	5	5	5	5	4	4	3	5	Ø	Ø	Ø	Ø	Ø	Ø	Ø	Ø
			OBSERVATIONS																								
			pH	7.79				7.78				7.85				7.90				7.91				7.92			
			DO (mg/L)	7.5				7.5				7.5				7.5				7.5				7.5			
			TEMPERATURE (°C)	21.9				22.0				22.0				21.9				21.9				21.9			
9/19/09	2	DS	NUMBER LIVE	5	5	5	5	5	5	5	5	2	3	3	3	0	3	1	0								
			OBSERVATIONS																								
			pH	7.79				7.83				7.88				7.89											
			DO (mg/L)	7.1				7.3				7.4				7.3											
			TEMPERATURE (°C)	22.1				22.1				22.1				22.0											
9/20	3	DS	NUMBER LIVE	5	5	5	5	5	5	5	5	2	1	1	2	0	2	0	0								
			OBSERVATIONS	~~5~~	~~5~~	~~5~~	~~5~~	–																			
			pH	7.84				7.91				7.97				8.02											
			DO (mg/L)	7.4				7.7				8.1				8.0											
			TEMPERATURE (°C)	22.0				22.0				21.9				21.8											
9/21/09	4	MWB	NUMBER LIVE	5	5	5	5	5	5	5	5	2	1	1	2	0	1	0	0								
			OBSERVATIONS																								
			pH	7.81				7.87				7.89				7.97											
			DO (mg/L)	8.0				8.0				8.0				8.0											
			SP. CONDUCTANCE	325				363				377				422											
			TEMPERATURE (°C)	22.2				22.2				22.2				21.9											

OBSERVATION KEY:

DOB - Dried out on Beaker

F - Floater FS - Film on Surface

PM - Particulate Matter

	DAY 0: CONTROL		DAY 4: CONTROL		DAY 0: HIGH CONCENTRATION 100mg/L day 0		DAY 4: HIGH CONCENTRATION 100mg/L day 1	
	HARDNESS	ALKALINITY	HARDNESS	ALKALINITY	HARDNESS	ALKALINITY	HARDNESS	ALKALINITY
END (mL):					7.4	18.1	9.1	21.6
START (mL):					5.7	14.5	7.4	18.1
					1.7x40	3.6x20	1.7x40	3.5x20
					68	72	68	70

REVIEWED BY: [signature]

DATE: 9/21/09

LC50 = 11.99 mg/L

96-HOUR STATIC ACUTE TOXICITY TEST

GLEC
Great Lakes Environmental Center

PROJECT NUMBER: 6112.12
TEST MATERIAL: 6112.12 Fluoride
TEST SPECIES: H. azteca
INVESTIGATORS: [illegible]

TYPE OF TEST: Definitive
NUMBER OF ORGANISMS/CHAMBER: 5
NUMBER OF CHAMBERS: 4+1 for chems
AGE OF ORGANISMS: 14 day

DILUTION WATER: MH 1715
GLC AND/OR BATCH NUMBER: —
TEST TEMPERATURE: 22±1°C
INCUBATOR #: 6 PHOTOPERIOD: 16:8

DATE / TIME	TEST DAY	TECH. INITIALS	TREATMENT LEVEL	~~CONTROL~~				F 100 mg/L																			
			REPLICATE NUMBER	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
9/18/09	0	[illegible]	TEMPERATURE						22.0																		
			pH						7.89																		
			DO (mg/L)						8.0																		
			SP. COND. (µmhos/cm)						781																		
9/18/09	1	[illegible]	NUMBER LIVE					Ø	Ø	Ø	Ø																
			OBSERVATIONS																								
			pH						7.99																		
			DO (mg/L)						7.5																		
			TEMPERATURE (°C)						21.9																		
9/19	2	DS	NUMBER LIVE																								
			OBSERVATIONS																								
			pH																								
			DO (mg/L)																								
			TEMPERATURE (°C)																								
9/20	3	DS	NUMBER LIVE																								
			OBSERVATIONS																								
			pH																								
			DO (mg/L)																								
			TEMPERATURE (°C)																								
9/21/09	4	[illegible]	NUMBER LIVE																								
			OBSERVATIONS																								
			pH																								
			DO (mg/L)																								
			SP. CONDUCTANCE																								
			TEMPERATURE (°C)																								

OBSERVATION KEY:

DOB - Dried out on Beaker

F - Floater FS - Film on Surface

PM - Particulate Matter

	DAY 0: CONTROL		DAY 4: CONTROL		DAY 0: HIGH CONCENTRATION		DAY 4: HIGH CONCENTRATION C. 21.6 mg/L	
	HARDNESS	ALKALINITY	HARDNESS	ALKALINITY	HARDNESS	ALKALINITY	HARDNESS	ALKALINITY
END (mL):			29.9	15.3			32.4	18.6
START (mL):			27.7	11.9			29.9	15.3

REVIEWED BY: [illegible]

DATE: 9/21/09

Analytical Chemistry Data

SOS ANALYTICAL

4125 Cedar Run Rd., Suite B
Traverse City, MI 49684
Phone **231-946-6767**
Fax 231-946-8741
www.sosanalytical.com

COMPANY:	GREAT LAKES ENVIRONMENTAL CENTER	SOS PROJECT NO:	093769
NAME:	MAILEE GARTON/JAMIE SAXTON	SAMPLED BY:	
PROJECT NO:			
WSSN:		DATE SAMPLED:	9/17/2009
WELL PERMIT:		TIME SAMPLED:	
TAX ID:			
LOCATION:		SAMPLE MATRIX:	WATER
		DATE RECEIVED:	9/22/2009
	TRAVERSE CITY	TIME RECEIVED:	11:43 AM
	MI		
COUNTY:			
TWP:			

INORGANICS

No:	Analysis	Concentration	LOD	Units	Analyst	Date Completed	Drinking Water Reg Limit(MCL)
SAMPLE ID: HAFLW-0-01							
1	FLUORIDE EPA 300.0	ND	0.1	mg/L (PPM)	KMJ	9/23/2009	
SAMPLE ID: HAFLW-0-02							
2	FLUORIDE EPA 300.0	1,020	50	mg/L (PPM)	KMJ	9/23/2009	
SAMPLE ID: HAFLW-0-03							
3	FLUORIDE EPA 300.0	91.0	2.5	mg/L (PPM)	KMJ	9/23/2009	
SAMPLE ID: HAFLW-0-04							
4	FLUORIDE EPA 300.0	58.1	2.0	mg/L (PPM)	KMJ	9/23/2009	
SAMPLE ID: HAFLW-0-05							
5	FLUORIDE EPA 300.0	33.4	1.0	mg/L (PPM)	KMJ	9/23/2009	
SAMPLE ID: HAFLW-0-06							
6	FLUORIDE EPA 300.0	22.0	0.5	mg/L (PPM)	KMJ	9/23/2009	
SAMPLE ID: HAFLW-0-07							
7	FLUORIDE EPA 300.0	14.1	0.3	mg/L (PPM)	KMJ	9/23/2009	
SAMPLE ID: HAFLW-0-08							
8	FLUORIDE EPA 300.0	8.4	0.2	mg/L (PPM)	KMJ	9/23/2009	

ND = NOT DETECTED
LOD = LIMIT OF DETECTION
SMCL = FEDERAL NON-ENFORCEABLE LIMIT
MCL = MAXIMUM CONTAMINANT LEVEL
s.u. = STANDARD pH UNITS REPORTED AT 25 C
DISS = DISSOLVED

APPROVED BY: Shanna Shea
SHANNA SHEA
LAB MANAGER

SOS ANALYTICAL, INC. IS CERTIFIED FOR COMPLIANCE MONITORING UNDER THE SAFE DRINKING WATER ACT.

SOS ANALYTICAL

4125 Cedar Run Rd., Suite B
Traverse City, MI 49684
Phone **231-946-6767**
Fax 231-946-8741
www.sosanalytical.com

COMPANY: GREAT LAKES ENVIRONMENTAL CENTER

NAME: MAILEE GARTON/JAMIE SAXTON

PROJECT NO:

WSSN:

WELL PERMIT:

TAX ID:

LOCATION:

TRAVERSE CITY
MI

COUNTY:

TWP:

SOS PROJECT NO: 093771

SAMPLED BY:

DATE SAMPLED: 9/21/2009

TIME SAMPLED:

SAMPLE MATRIX: WATER

DATE RECEIVED: 9/22/2009

TIME RECEIVED: 11:43 AM

INORGANICS

No:	Analysis	Concentration	LOD	Units	Analyst	Date Completed	Drinking Water Reg Limit(MCL)
SAMPLE ID: HAFLW-4-01							
1	FLUORIDE EPA 300.0	ND	0.1	mg/L (PPM)	KMJ	9/23/2009	
SAMPLE ID: HAFLW-1-02							
2	FLUORIDE EPA 300.0	87.7	2.5	mg/L (PPM)	KMJ	9/23/2009	
SAMPLE ID: HAFLW-1-03							
3	FLUORIDE EPA 300.0	59.6	2.0	mg/L (PPM)	KMJ	9/23/2009	
SAMPLE ID: HAFLW-1-04							
4	FLUORIDE EPA 300.0	32.0	1.0	mg/L (PPM)	KMJ	9/23/2009	
SAMPLE ID: HAFLW-4-05							
5	FLUORIDE EPA 300.0	23.5	0.5	mg/L (PPM)	KMJ	9/23/2009	
SAMPLE ID: HAFLW-4-06							
6	FLUORIDE EPA 300.0	14.5	0.3	mg/L (PPM)	KMJ	9/23/2009	
SAMPLE ID: HAFLW-4-07							
7	FLUORIDE EPA 300.0	8.6	0.2	mg/L (PPM)	KMJ	9/23/2009	

ND = NOT DETECTED
LOD = LIMIT OF DETECTION
SMCL = FEDERAL NON-ENFORCEABLE LIMIT
MCL = MAXIMUM CONTAMINANT LEVEL
s.u. = STANDARD pH UNITS REPORTED AT 25 C
DISS = DISSOLVED

APPROVED BY: Shanna Shea
SHANNA SHEA
LAB MANAGER

SOS ANALYTICAL, INC. IS CERTIFIED FOR COMPLIANCE MONITORING UNDER THE SAFE DRINKING WATER ACT.

GLEC
Great Lakes Environmental Center

PREPARATION OF RECONSTITUTED WATER

WATER TYPE: Mod Hard [redacted]

BATCH NUMBER: 1715 **TOTAL VOLUME:** 202
DATE PREPARED: 9/16/09 **DATA BY:** Mule

SALTS	AMOUNT ADDED TO FINAL VOLUME	NOTES
$NaHCO_3$	1.92	2.00
$CaSO_5 \cdot 2H_2O$	1.24	1.34
$MgSO_4$	1.24	1.34
KCl	0.08	0.08

WATER SOURCE: Laboneo

RECONSTITUTED HARD WATER - WATER QUALITY

Date: 9/17/09 Checked By: DR

pH	7.87		
SPECIFIC CONDUCTANCE	276		
TOTAL HARDNESS	80		
SAMPLE VOLUME 25 mL	DILUTED TO 50 mL	mL TITRANT USED 2.0	mg/L $CaCO_3$ 80
TOTAL ALKALINITY	54		
SAMPLE VOLUME 50	DILUTED TO —	mL TITRANT USED 2.7	mg/L $CaCO_3$ 54

Hardness:
End mls: 18.8
Start mls: 16.8

Alkalinity:
End mls: 34.3
Start mls: ~~4~~ 31.6

PROJECT #: **6112-12** Date **17/09/2009**

PROJECT NAME **HECD B-12 Nitrate, Nitrite, Boron, Flouride**

Test Day 0

CALIBRATION

Concentrations (ppm)			**Natural log**	**Millivolts**
0.5			-0.6931472	-20.9
1			0	-32.8
10			2.30258509	-89.9
25			3.21887582	-113.8
50			3.91202301	-131.4

Regression Output:

Constant		-35.247955
Std Err of Y Est		2.250867
R Squared		0.998413
No. of Observations		5
Degrees of Freedom		3

X Coefficient(s)	-24.319455
Std Err of Coef.	0.55977263

OUTPUT

Test Organism	GLC Number	Test Day	Test Material	Milli-volts	Natural Log	Predicted Ammonia Levels	Ammonia Minus Blank
	Con MH 1715	0	water	6	-1.696089	0.18339944	-0.1296052
	100 mg/L Fluoride	0	water	6.5	-1.716648	0.1796673	-0.1333373
		0	water		-1.449373	0.23471747	-0.0782871
n/a	Blank	0	n/a	-7	-1.161537	0.31300462	0

CHAIN OF CUSTODY RECORD

(To be completed and submitted with samples)

093766[redacted]9

Page 1 of 2

Great Lakes Environmental Center
739 Hastings St.
Traverse City, MI 49686
Phone: 231-941-2230
Fax: 231-941-2240
www.glec.com

Facility: Great Lakes Environmental Center

Location: Traverse City, MI

Date: 9/22/09

Contact Person: Mailee Garton/Jamie Saxton

Email Address:

Phone Number:

Collector: m. garton

Bottle ID	Date / Time of Sample	Volume Collected	Type of Sample Container	Sample Description (Site information / sample type)	Preservation	Alkalinity	BOD_5	Chloride	Chlorophyll a	Hardness	NH_3-N	NO_3 / NO_2-N	TDS	TKN	TP	TSS		Fluoride	
						Check the requested analysis (see definitions below)													
HAFLW-0-01	9/17/09	125 mL	HDPE	Mod. Hard Control – ~~nitrate/nitrite~~ Fluoride	Cold													X	-1
HAFLW-0-02	9/17/09	125 mL	HDPE	Stock ~~g/L~~ Fluoride 1000 mg/L	Cold													X	-2
HAFLW-0-03	9/17/09	125 mL	HDPE	100 mg/L – Fluoride day 0	Cold													X	-3
HAFLW-0-04	9/17/09	125 mL	HDPE	60 mg/L – Fluoride day 0	Cold													X	-4
HAFLW-0-05	9/17/09	125 mL	HDPE	36 mg/L – Fluoride day 0	Cold													X	-5
HAFLW-0-06	9/17/09	125 mL	HDPE	21.6 mg/L – Fluoride day 0	Cold													X	-6

COPY

Shipper:	Date/Time:	Receiver:	Date/Time:	Temperature:
1. [signature]	9/22 11:15	C. Gerhard	9/22/09 11:43am	
2.				

Definitions

BOD_5 = Biochemical Oxygen Demand-5 day
NH_3-N = Ammonia-Nitrogen
NO_3/NO_2-N = Nitrate/Nitrite-Nitrogen
TDS = Total Dissolve Solids
TKN = Total Kjeldahl Nitrogen
TP = Total Phosphorus
TSS = Total Suspended Solids

Abbreviations for other frequently requested analyses

NO_2-N = Nitrite Nitrogen
NO_3-N = Nitrate Nitrogen
Total N = Total Nitrogen
SRP = Soluble Reactive Phosphorus

CHAIN OF CUSTODY RECORD

(To be completed and submitted with samples)

0937769

GLEC
Great Lakes Environmental Center
739 Hastings St.
Traverse City, MI 49686
Phone: 231-941-2230
Fax: 231-941-2240
www.glec.com

Facility: Great Lakes Environmental Center

Location: Traverse City, MI

Date:

Contact Person: Mailee Garton/Jamie Saxton

Email Address:

Phone Number:

Collector: m. garton

Bottle ID	Date / Time of Sample	Volume Collected	Type of Sample Container	Sample Description (Site information / sample type)	Preservation	Check the requested analysis (see definitions below)														
						Alkalinity	BOD_5	Chloride	Chlorophyll a	Hardness	NH_3-N	NO_3/NO_2-N	TDS	TKN	TP	TSS		Fluoride		
HAFLW-0-07	9/17/09	125 mL	HDPE	12.9 mg/L – Fluoride day 0	Cold													X		-7
HAFLW-0-08	9/17/09	125 mL	HDPE	7.78 mg/L – Fluoride day 0	Cold													X		-8

COPY

Shipper: Date/Time: Receiver: Date/Time: Temperature:

1. C. Gerhard 9/22/09 11:45am

2.

Definitions

BOD_5 = Biochemical Oxygen Demand-5 day
NH_3-N = Ammonia-Nitrogen
NO_3/NO_2-N = Nitrate/Nitrite-Nitrogen
TDS = Total Dissolve Solids
TKN = Total Kjeldahl Nitrogen
TP = Total Phosphorus
TSS = Total Suspended Solids

Abbreviations for other frequently requested analyses

NO_2-N = Nitrite Nitrogen
NO_3-N = Nitrate Nitrogen
Total N = Total Nitrogen
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CHAIN OF CUSTODY RECORD
(To be completed and submitted with samples)

0937 71

Page 1 of 2

Great Lakes Environmental Center
739 Hastings St.
Traverse City, MI 49686
Phone: 231-941-2230
Fax: 231-941-2240
www.glec.com

Facility: Great Lakes Environmental Center
Location: Traverse City, MI

Date: 9/22/09
Contact Person: Mailee Garton/Jamie Saxton
Email Address:
Phone Number:
Collector: m. garton

Bottle ID	Date / Time of Sample	Volume Collected	Type of Sample Container	Sample Description (Site information / sample type)	Preservation	Check the requested analysis (see definitions below)													
						Alkalinity	BOD_5	Chloride	Chlorophyll a	Hardness	NH_3-N	NO_3/NO_2-N	TDS	TKN	TP	TSS		Fluoride	
HAFLW-4-01	9/21/09	125 mL	HDPE	Mod. Hard Control – ~~nitrate/nitrite~~ Fluoride -day4	Cold													X	-1
																		[redacted]	
HAFLW-1-02	9/18/09	125 mL	HDPE	100 mg/L – Fluoride day 1	Cold													X	-2
HAFLW-1-03	9/18/09	125 mL	HDPE	60 mg/L – Fluoride day 1	Cold													X	-3
HAFLW-1-04	9/18/09	125 mL	HDPE	36 mg/L – Fluoride day 1	Cold													X	-4
HAFLW-4-05	9/21/09	125 mL	HDPE	21.6 mg/L – Fluoride day 4	Cold													X	-5

COPY

Shipper:	Date/Time:	Receiver:	Date/Time:	Temperature:
1. [signature]	9/22 11:15			
2.		C. Gerhard	9/22/09 11:43am	

Definitions

BOD_5 = Biochemical Oxygen Demand-5 day
NH_3-N = Ammonia-Nitrogen
NO_3/NO_2-N = Nitrate/Nitrite-Nitrogen
TDS = Total Dissolve Solids
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Abbreviations for other frequently requested analyses

NO_2-N = Nitrite Nitrogen
NO_3-N = Nitrate Nitrogen
Total N = Total Nitrogen
SRP = Soluble Reactive Phosphorus

CHAIN OF CUSTODY RECORD

(To be completed and submitted with samples)

093771

GLEC
Great Lakes Environmental Center
739 Hastings St.
Traverse City, MI 49686
Phone: 231-941-2230
Fax: 231-941-2240
www.glec.com

Facility: Great Lakes Environmental Center

Location: Traverse City, MI

Date:

Contact Person: Mailee Garton/Jamie Saxton

Email Address:

Phone Number:

Collector: m. garton

Bottle ID	Date / Time of Sample	Volume Collected	Type of Sample Container	Sample Description (Site information / sample type)	Preservation	Check the requested analysis (see definitions below)														
						Alkalinity	BOD_5	Chloride	Chlorophyll a	Hardness	NH_3-N	NO_3/NO_2-N	TDS	TKN	TP	TSS		Fluoride		
HAFLW-4-06	9/21/09	125 mL	HDPE	12.9 mg/L – Fluoride day 4	Cold													X	-6	
HAFLW-4-07	9/21/09	125 mL	HDPE	7.78 mg/L – Fluoride day 4	Cold													X	-7	

COPY

Shipper: Date/Time: Receiver: Date/Time: Temperature:

1. _____ _____ C. Gerhard 9/22/09 11:43am
2. _____ _____

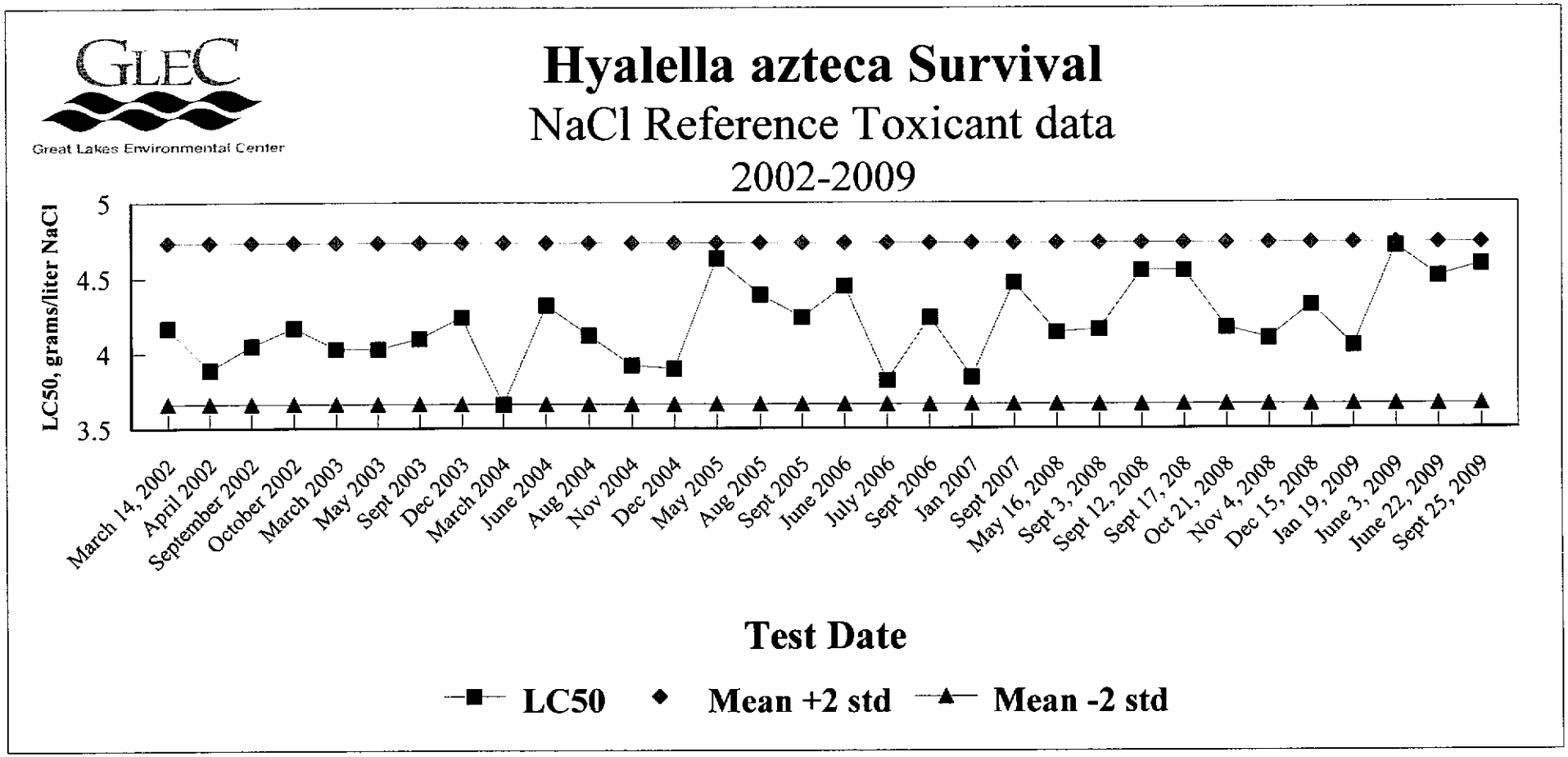
Definitions

BOD_5 = Biochemical Oxygen Demand-5 day
NH_3-N = Ammonia-Nitrogen
NO_3/NO_2-N = Nitrate/Nitrite-Nitrogen
TDS = Total Dissolve Solids
TKN = Total Kjeldahl Nitrogen
TP = Total Phosphorus
TSS = Total Suspended Solids

Abbreviations for other frequently requested analyses

NO_2-N = Nitrite Nitrogen
NO_3-N = Nitrate Nitrogen
Total N = Total Nitrogen
SRP = Soluble Reactive Phosphorus

Reference Toxicant Data


GLEC
Great Lakes Environmental Center
Hyalella azteca Survival
NaCl Reference Toxicant data
2002-2009
LC50, grams/liter NaCl
5
4.5
4
3.5
March 14, 2002
April 2002
September 2002
October 2002
March 2003
May 2003
Sept 2003
Dec 2003
March 2004
June 2004
Aug 2004
Nov 2004
Dec 2004
May 2005
Aug 2005
Sept 2005
June 2006
July 2006
Sept 2006
Jan 2007
Sept 2007
May 16, 2008
Sept 3, 2008
Sept 12, 2008
Sept 17, 208
Oct 21, 2008
Nov 4, 2008
Dec 15, 2008
Jan 19, 2009
June 3, 2009
June 22, 2009
Sept 25, 2009
Test Date
LC50
Mean +2 std
Mean -2 std

Statistical Analyses

TRIMMED SPEARMAN-KARBER METHOD. MONTANA STATE UNIV

FOR REFERENCE, CITE:
HAMILTON, M.A., R.C. RUSSO, AND R.V. THURSTON, 1977.
TRIMMED SPEARMAN-KARBER METHOD FOR ESTIMATING MEDIAN
LETHAL CONCENTRATIONS IN TOXICITY BIOASSAYS.
ENVIRON. SCI. TECHNOL. 11(7): 714-719;
CORRECTION 12(4):417 (1978).

DATE: 9/17/09
CHEMICAL: FLUORIDE

TEST NUMBER: 6112-12
SPECIES: H AZTECA

RAW DATA:

CONCENTRATION(MG/L)	8.50	14.30	22.80	32.70	58.90	89.40
NUMBER EXPOSED:	20	20	20	20	20	20

DURATION (HOURS)	LC50	LOWER 95% LIMIT	UPPER 95% LIMIT	PERCENT TRIM
24	25.14	23.34	27.07	.00

EPA PROBIT ANALYSIS PROGRAM
USED FOR CALCULATING LC/EC VALUES
Version 1.5

fluoride hazteca 96 hour acute 48 hour

Conc.	Number Exposed	Number Resp.	Observed Proportion Responding	Proportion Responding Adjusted for Controls	Predicted Proportion Responding
8.5000	20	0	0.0000	0.0000	0.0234
14.3000	20	9	0.4500	0.4500	0.3605
22.8000	20	16	0.8000	0.8000	0.8656
32.7000	20	20	1.0000	1.0000	0.9874
58.9000	20	20	1.0000	1.0000	1.0000
89.4000	20	20	1.0000	1.0000	1.0000

Chi - Square for Heterogeneity (calculated) = 2.171
Chi - Square for Heterogeneity
(tabular value at 0.05 level) = 9.488

Mu = 1.204805
Sigma = 0.138476

Parameter	Estimate	Std. Err.	95% Confidence Limits	
Intercept	-3.700495	1.616762	(-6.869348,	-0.531642)
Slope	7.221493	1.312366	(4.649255,	9.793732)

Theoretical Spontaneous Response Rate = 0.0000

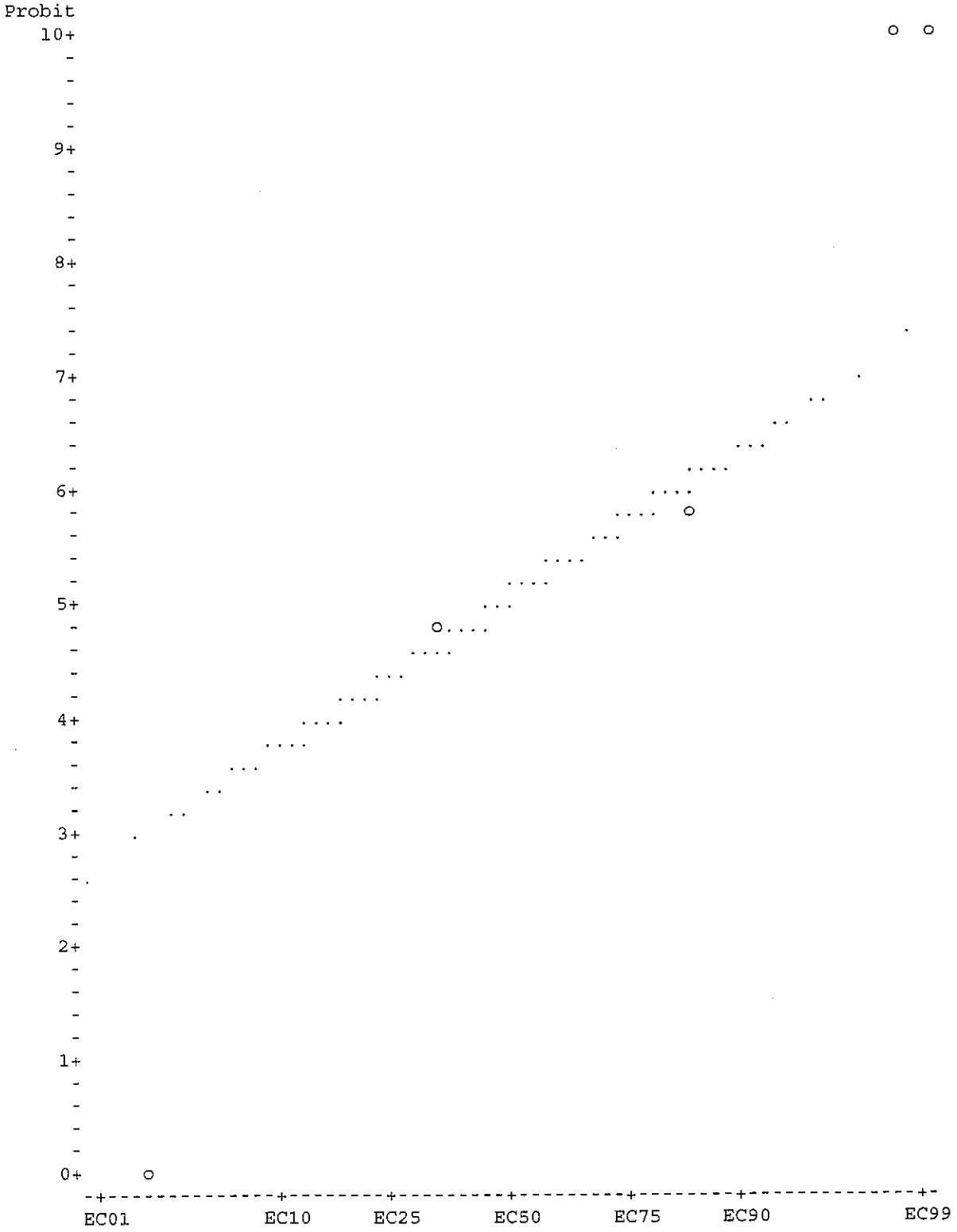
fluoride hazteca 96 hour acute 48 hour

Estimated LC/EC Values and Confidence Limits

Point	Exposure Conc.	95% Confidence Limits Lower	Upper
LC/EC 1.00	7.633	4.818	9.633
LC/EC 5.00	9.485	6.690	11.411
LC/EC 10.00	10.650	7.947	12.525
LC/EC 15.00	11.516	8.910	13.363
LC/EC 50.00	16.025	13.908	18.250
LC/EC 85.00	22.301	19.441	27.832
LC/EC 90.00	24.114	20.789	31.131
LC/EC 95.00	27.076	22.871	36.897
LC/EC 99.00	33.647	27.154	51.119

fluoride hazteca 96 hour acute 48 hour

PLOT OF ADJUSTED PROBITS AND PREDICTED REGRESSION LINE



EPA PROBIT ANALYSIS PROGRAM
USED FOR CALCULATING LC/EC VALUES
Version 1.5

fluoride hazteca 96 hour acute 72 hour

Conc.	Number Exposed	Number Resp.	Observed Proportion Responding	Proportion Responding Adjusted for Controls	Predicted Proportion Responding
8.5000	20	0	0.0000	0.0000	0.0501
14.3000	20	14	0.7000	0.7000	0.5539
22.8000	20	18	0.9000	0.9000	0.9583
32.7000	20	20	1.0000	1.0000	0.9985
58.9000	20	20	1.0000	1.0000	1.0000
89.4000	20	20	1.0000	1.0000	1.0000

Chi - Square for Heterogeneity (calculated) = 4.513
Chi - Square for Heterogeneity
(tabular value at 0.05 level) = 9.488

Mu = 1.138144
Sigma = 0.126964

Parameter	Estimate	Std. Err.	95% Confidence Limits	
Intercept	-3.964316	1.762206	(-7.418240,	-0.510393)
Slope	7.876259	1.519419	(4.898198,	10.854321)

Theoretical Spontaneous Response Rate = 0.0000

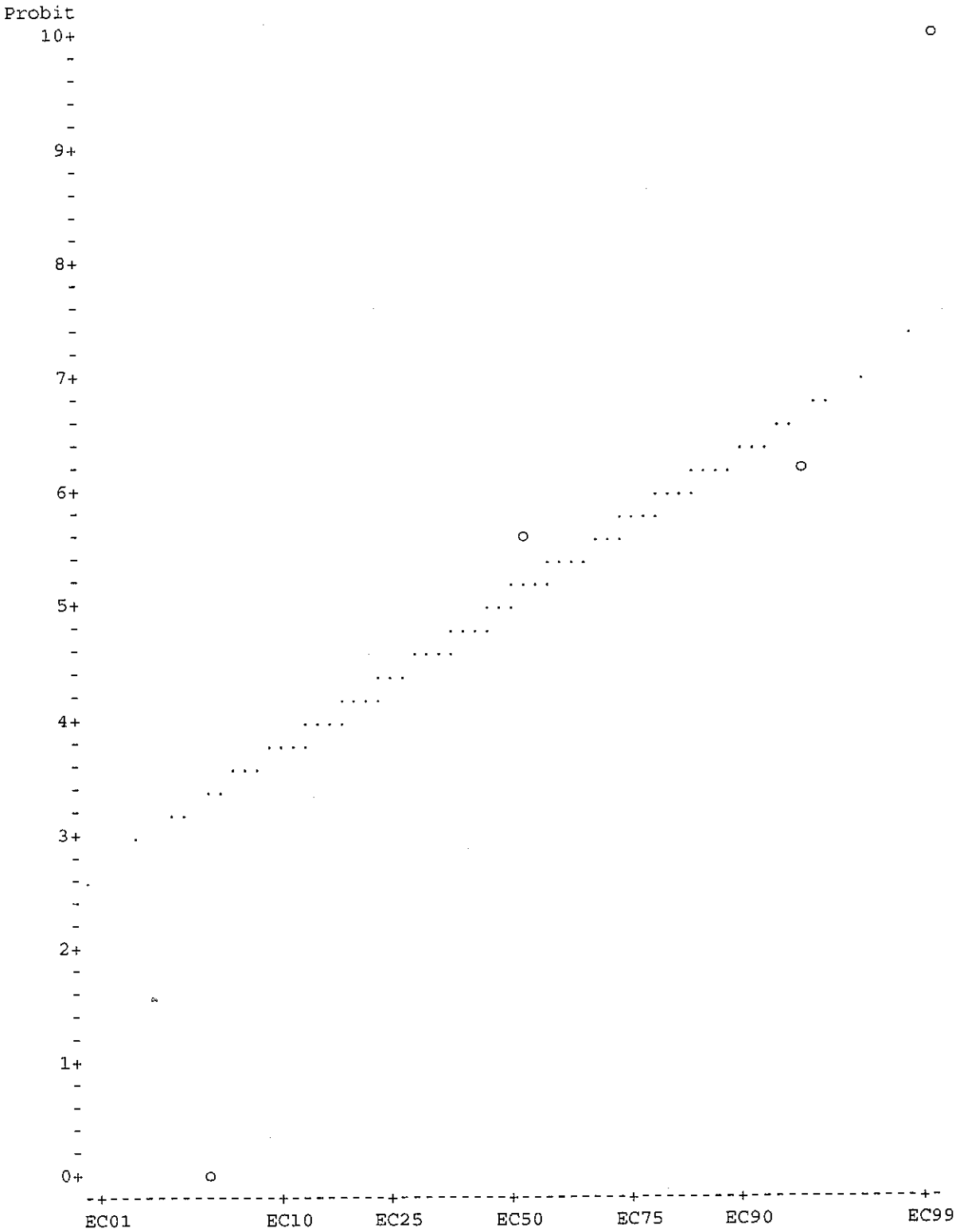
fluoride hazteca 96 hour acute 72 hour

Estimated LC/EC Values and Confidence Limits

Point	Exposure Conc.	95% Confidence Limits Lower	Upper
LC/EC 1.00	6.963	4.400	8.694
LC/EC 5.00	8.498	6.006	10.141
LC/EC 10.00	9.450	7.068	11.040
LC/EC 15.00	10.152	7.875	11.713
LC/EC 50.00	13.745	11.958	15.644
LC/EC 85.00	18.609	16.268	23.319
LC/EC 90.00	19.992	17.293	25.932
LC/EC 95.00	22.232	18.860	30.466
LC/EC 99.00	27.133	22.036	41.505

fluoride hazteca 96 hour acute 72 hour

PLOT OF ADJUSTED PROBITS AND PREDICTED REGRESSION LINE



EPA PROBIT ANALYSIS PROGRAM
USED FOR CALCULATING LC/EC VALUES
Version 1.5

Fluoride H azteca 96 hour acute

Conc.	Number Exposed	Number Resp.	Observed Proportion Responding	Proportion Responding Adjusted for Controls	Predicted Proportion Responding
8.5000	20	0	0.0000	0.0000	0.0327
14.3000	20	14	0.7000	0.7000	0.6005
22.8000	20	19	0.9500	0.9500	0.9836
32.7000	20	20	1.0000	1.0000	0.9998
58.9000	20	20	1.0000	1.0000	1.0000
89.4000	20	20	1.0000	1.0000	1.0000

Chi - Square for Heterogeneity (calculated) = 2.912
Chi - Square for Heterogeneity
(tabular value at 0.05 level) = 9.488

Mu = 1.127905
Sigma = 0.107709

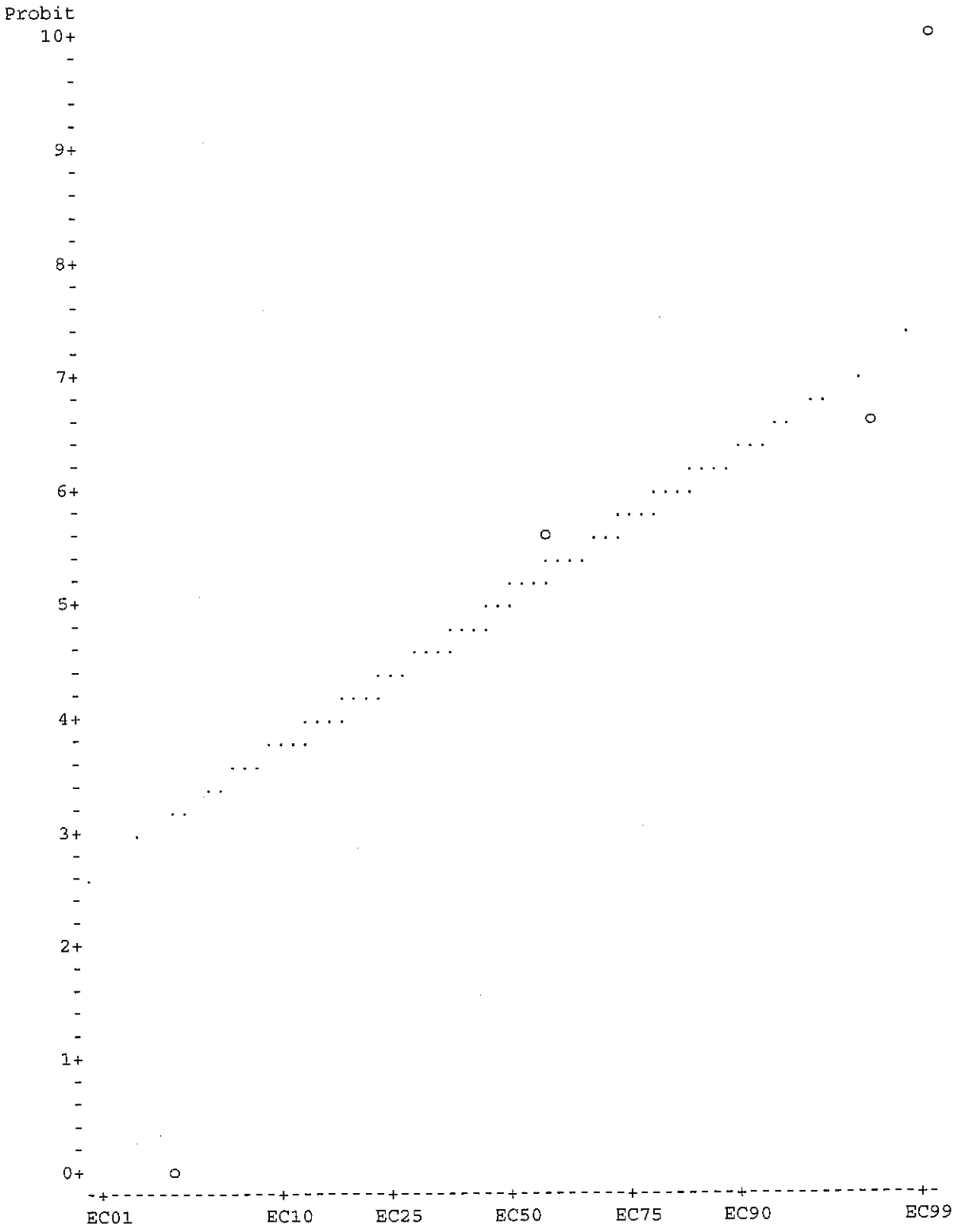
Parameter	Estimate	Std. Err.	95% Confidence Limits	
Intercept	-5.471785	2.253286	(-9.888226,	-1.055345)
Slope	9.284281	1.970604	(5.421896,	13.146665)

Theoretical Spontaneous Response Rate = 0.0000

Fluoride H azteca 96 hour acute

Estimated LC/EC Values and Confidence Limits

Point	Exposure Conc.	95% Confidence Limits Lower	Upper
LC/EC 1.00	7.539	4.800	9.219
LC/EC 5.00	8.928	6.355	10.480
LC/EC 10.00	9.769	7.360	11.252
LC/EC 15.00	10.382	8.111	11.827
LC/EC 50.00	13.425	11.775	15.170
LC/EC 85.00	17.359	15.337	21.687
LC/EC 90.00	18.448	16.144	23.866
LC/EC 95.00	20.187	17.358	27.602
LC/EC 99.00	23.904	19.759	36.491

Fluoride H azteca 96 hour acute

PLOT OF ADJUSTED PROBITS AND PREDICTED REGRESSION LINE