DATE: 2/4/2010

TO: Leetha Abazid, CHEFO/WPC/TDEC
FROM: Carrie A. Perry, Aquatic Biology/Environmental Laboratory/TDH

SUBJECT: Chronic Ceriodaphnia dubia 3-brood survival and reproduction test, AKZO-Nobel, Outfall 001.

Location:
County: Hamilton
NPDES No: TN0002798
Lab Log No: N00005593Cd

Test Dates: January 26 – February 2, 2010

Participants:
1. Principle investigator: Carrie A. Perry, Aquatic Biology/Env. Lab/TDH
2. Assistant (lab): Keith Gaddes, Aquatic Biology/Env. Lab/TDH
3. Field collection: Leetha Abazid, CHEFO/WPC/TDEC

Effluent:
1. Number of samples: Three 24-hr flow-proportionate composite samples of final effluent
2. Legal tag received with samples? Yes
3. Sample collection dates: 1/25, 1/27 and 1/29/2010

Dilution Source:
Lab water: Diluted Mineral Water (DMW), 20% Perrier, Type 1, deionized water

Food:
1. Type: YCT (yeast, ceraphyll, trout chow) and Selanastrum capricornutum (algae)
2. Quantity: 0.1 mL YCT, 0.1 mL algae, daily

Test Conditions:
1. Vessels: 30 mL plastic cups/15 mL test volume
2. Incubator temperature range: 23.4 – 25.5 oC
3. Light intensity range: 70.1 – 93.0 ft-candles
4. Photoperiod: 16hr light, 8 hr darkness

Chronic permit requirements and test results:

Permit End Point: Survivial [a] IC25 @ 3.8%
Permit End Point: Reproduction IC25@ 3.8%

Survival Test Result: [b]N.C.T. @ 15.2%
Reproduction Test Result: N.C.T. @ 15.2%
Reproduction [c]PMSD: 17.3

[a] IC25 = The effluent concentration at which a 25% inhibition of reproduction occurred.
[b] N.C.T. = No Chronic Toxicity
[c] PMSD= Percent Minimum Significant Difference calculated for sublethal endpoint

Chronic standard toxicant N5619001Cd (KCl) results, January 26–February 2, 2010

Survival IC25 Result: 0.24 g/L
Reproduction IC25 Result: 0.25 g/L
Reproduction PMSD: 12.2%

Tables Present

Table 1. Chronic Water Quality Data

Table 2. Chronic Survival and Reproduction Data

Figures Presented:

Figure 1. Plot of Reproduction by Test Concentration

CHRONIC BIOASSAY WATER QUALITY RESULTS

Discharge: AKZO Nobel Log Number: N00005593 cd Analyst: CAO

SAMPLE	1	1	2	2	3	3	3	3
DAY	set up	1	2	3	4	5	6	7
DATE	1/26	1/27	1/28	1/29	1/30	1/31	2/1	2/2
JUG	J	A	C	H	D+H+F	F	L	

DISSOLVED OXYGEN (mg/L)
(Initial/Final)

	I	F	I	F	I	F	I	F	I	F	I	F	I	F	I	F
Control	7.0	7.6	7.9	7.9	7.9	7.5	8.2	7.6	7.9	7.7	8.1/8.3	7.9	8.5	7.1		
0.95	6.8	7.6	8.0	7.8	7.9	7.5	8.0	7.6	7.9/8.1	7.5/7.7	8.1	7.8/8.0	8.5	7.0		
1.90	6.9	7.6	8.0	7.8	7.9	7.5	7.9/8.1	7.7/7.9	7.8	7.6	8.0	7.8	8.5	7.1		
3.80	6.8	8.1	8.2	8.0	7.8/8.0	7.6/7.8	8.0	7.7	7.9	7.5	8.1	8.0	8.7	7.1		
7.60	7.0	7.9	8.3/8.2	8.0/8.2	7.8	7.6	8.0	8.1	7.9	7.7	8.1	8.2	8.7/8.7	7.2/7.4		
15.20	7.0/7.2	8.0/8.1	8.2	7.8	7.8	7.6	8.0	8.1	7.9	7.8	8.2	8.1	8.6	7.3		
100	7.5	—	—	—	8.5	—	—	—	8.1	—	—	—	—	—	—	—

PH
(Initial/Final)

	I	F	I	F	I	F	I	F	I	F	I	F	I	F	I	F
Control	8.1	8.2	8.1	8.1	8.2	8.2	8.1	8.2	8.1	8.1	7.1/7.9	8.1	8.2	8.1		
0.95	8.2	8.3	8.1	8.1	8.3	8.3	8.2	8.3	8.2/8.2	8.2/8.2	8.0	8.2	8.2	8.2		
1.90	8.3	8.3	8.2	8.2	8.3	8.3	8.3/8.2	8.3/8.2	8.2	8.2	8.0	8.3	8.3	8.2/8.1		
3.80	8.3	8.3	8.2	8.2	8.3/8.2	8.3/8.2	8.3	8.3	8.2	8.2	8.0	8.3/8.2	8.3	8.2		
7.60	8.3	8.3	8.2/8.1	8.2/8.2	8.3	8.3	8.2	8.4	8.2	8.2	8.0	8.3	8.3	8.2		
15.20	8.3/8.2	8.3/8.3	8.2	8.3	8.2	8.3	8.2	8.4	8.2	8.3	8.0	8.3	8.2/8.2	8.2		
100	8.1	—	—	—	8.0	—	—	—	7.9	—	—	—	—	—	—	—

CONDUCTIVITY
(umhos/cm^3)

Control	169	171	172	175	174	170/173	174	
0.95	173	179	177	180	176/172	176	177	
1.90	174	184	179	182/178	177	177	178	
3.80	175	185	180/179	184	179	179	179/176	
7.60	181	189/182	182	185	181	182	182	
15.20	187/185	194	187	188	187	188	188	
100	252	—	248	—	248	—	—	—

CHLORINE RESIDUAL (mg/L)

100%	0	—						
Blank								

	HARDNESS (mg/L)				ALKALINITY (mg/L)		
	Sample 1	Sample 2	Sample 3		Sample 1	Sample 2	Sample 3
100%	123.22	113.12	129.28		134.64	126.72	135.63
Control	84.84/76.76	80.8/80.8	80.8/80.8/80.8/82.82		79.2/79.2	79.2/81.18	81.18/80.19/79.2/79.2

P. AR 2/4/10

Table 2. Chronic *Ceriodaphnia dubia* (C.d.) 3-brood survival and reproduction data.

C.d. Survival at Concentration

Sample No.	Day No.	Effluent Concentration (v/v)					
		Control	0.95%	1.90%	3.80%	7.60%	15.2%
1	1	10	10	10	10	10	10
1	2	10	10	10	10	10	10
2	3	10	10	10	10	10	10
2	4	10	10	10	10	10	10
3	5	10	10	10	10	10	10
3	6	10	10	10	10	10	10

C.d. Reproduction at Concentration

Replicate No.	Effluent Concentration (v/v)					
	Control	0.95%	1.90%	3.80%	7.60%	15.2%
1	41	37	29	33	34	33
2	32	31	39	30	41	30
3	35	30	33	28	35	30
4	35	32	37	35	0	35
5	38	33	30	36	33	30
6	35	32	38	39	35	41
7	33	32	35	29	29	33
8	36	37	30	41	34	40
9	40	30	39	37	42	32
10	33	38	27	33	35	43

C.d. Reproduction Summary Statistics

Effluent Concentration	Mean Reproduction	Std. Dev.
Control	35.8	3.011
0.95%	33.2	3.011
1.90%	33.7	4.498
3.80%	34.1	5.670
7.60%	31.8	11.783
15.2%	34.7	4.900

Test Review

Chronic *Ceriodaphnia dubia* 3-brood survival and reproduction test, AKZO-Nobel, Outfall 001, Hamilton County, Tennessee. NPDES No. TN0002798, Lab log No. N00005593Cd

Sampling and Handling

Effluent samples were collected by TDEC/WPC personnel on Monday, Wednesday and Friday of the test week. The samples were delivered to the environmental laboratory by TDEC/WPC personnel. The chain of custody with each sample was completed. Each sample had first use in less than 36 hr.

Test Acceptability Criteria

All 10 control organisms survived and 100% had their third brood by day six. They had an average of 35.8 young.

Test Conditions

Procedures for chronic test were followed in accordance with EPA guidelines (EPA-821-R-02-013, October 2002), the TN Environmental Laboratories Standard Operating Procedures Manual 2007, and NPDES permit No. TN0002798 with the following exceptions: The temperature dropped to 23.4 ^{o}C on the evening of the end of the test.

Statistical Methods

Statistic used (IC25) was specified by the permit.

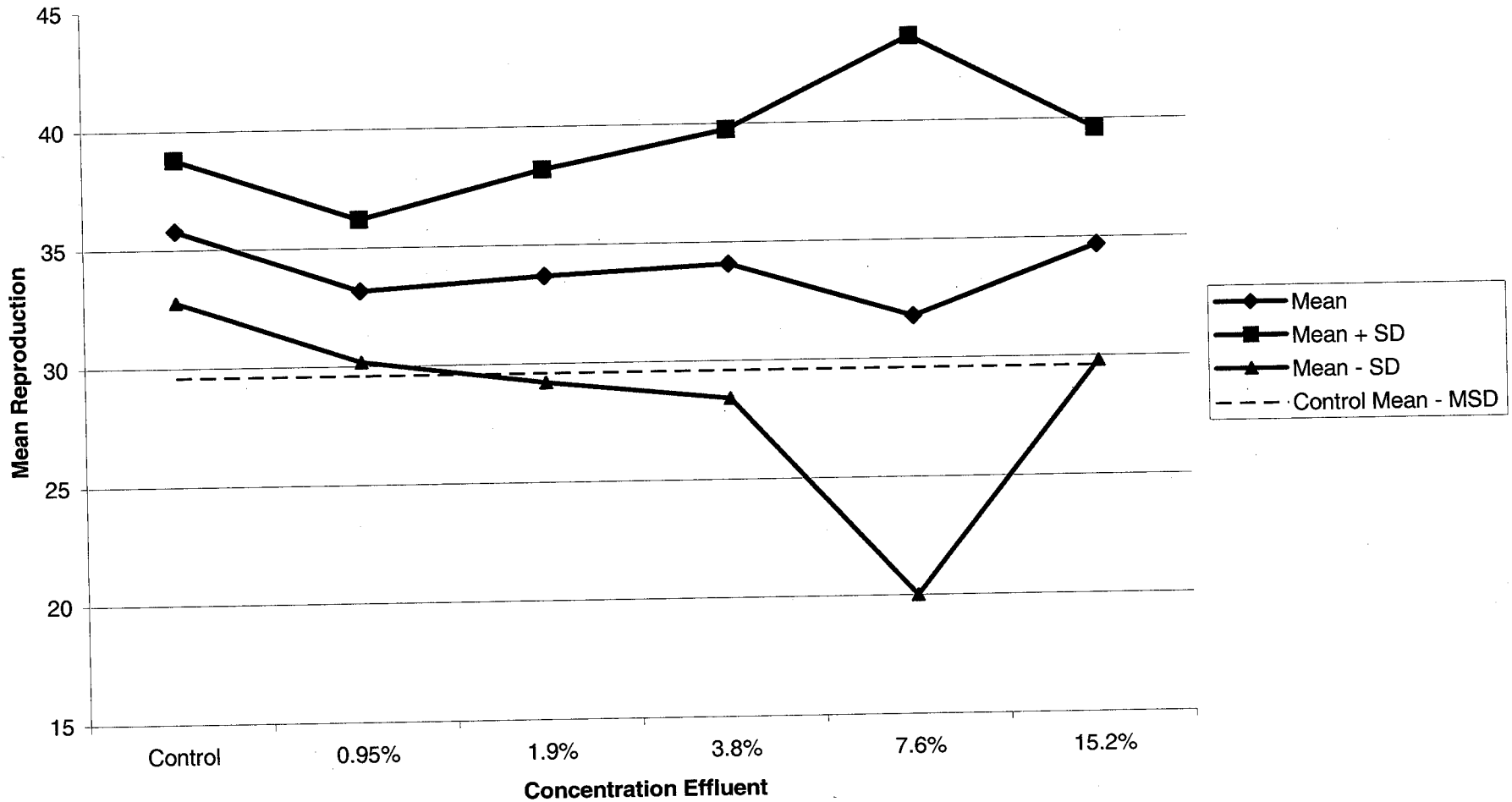
Concentration-Response Relationship

There was no toxicity present in this test. Therefore, there is no valid comparison between the results of this test and the concentration-response relationship graphs in the EPA-821-B-00-004 July 2000 publication (See Figure 1).

Reference Toxicity Test

A concurrent *Ceriodaphnia dubia* KCl standard toxicant test, Lab log #N5619001Cd, was performed with the AKZO-Nobel effluent test using the same batch of test organisms. IC25 survival endpoint was within +/- 2 standard deviations of the cumulative mean of the previous reference tests performed by the lab indicating normal sensitivity. However, the IC25 reproduction was higher making them tolerant. Since the effluent test controls met the Test Acceptable Criteria (TAC) and the AKZO-Nobel effluent test results (IC25= >15.2%) indicate no toxicity at any concentration.

Figure 1. Three-brood chronic *Ceriodaphnia dubia* reproduction data, January 26 - February 2, 2010, AKZO Nobel Chemical, Outfall 001, Hamilton Co., TN, NPDES # TN0002798, Lab Log # N00005593Cd.



QC Data Entry
SJB 2/4/10

Test: CD-Ceriodaphnia Survival and Reproduction Test
Test ID: N5593Cd
Species: CD-Ceriodaphnia dubia
Protocol: EPAF 94-EPA/600/4-91/002
Sample ID: TN0002798
Sample Type: EFF2-Industrial
Start Date: 1/26/2010 09:50
End Date: 2/2/2010 10:00
Lab ID: TDH-TDH-Lab services

Pos	ID	Rep	Group	Day 0	Day 1	Day 2	Day 3	Day 4	Day 5	Day 6	Day 7	Sex	Number of Young
5	1	1	control	0	0	0	0	7	0	14	20		41
9	2	2	control	0	0	0	0	6	9	0	17		32
16	3	3	control	0	0	0	0	4	12	0	19		35
27	4	4	control	0	0	0	0	7	9	0	19		35
34	5	5	control	0	0	0	0	7	14	0	17		38
39	6	6	control	0	0	0	0	6	13	0	16		35
44	7	7	control	0	0	0	0	2	13	0	18		33
55	8	8	control	0	0	0	0	6	13	0	17		36
61	9	9	control	0	0	0	0	7	15	0	18		40
68	10	10	control	0	0	0	0	0	0	12	21		33
4	11	1	0.950	0	0	0	0	4	0	15	18		37
10	12	2	0.950	0	0	0	0	7	0	11	13		31
15	13	3	0.950	0	0	0	0	6	11	0	13		30
25	14	4	0.950	0	0	0	0	6	12	0	14		32
33	15	5	0.950	0	0	0	0	6	14	0	13		33
37	16	6	0.950	0	0	0	0	5	12	0	15		32
46	17	7	0.950	0	0	0	0	4	13	0	15		32
54	18	8	0.950	0	0	0	0	5	14	0	18		37
60	19	9	0.950	0	0	0	0	7	8	0	15		30
67	20	10	0.950	0	0	0	0	5	0	13	20		38
3	21	1	1.900	0	0	0	0	3	0	10	16		29
11	22	2	1.900	0	0	0	0	6	11	0	22		39
17	23	3	1.900	0	0	0	0	6	10	0	17		33
23	24	4	1.900	0	0	0	0	6	0	12	19		37
31	25	5	1.900	0	0	0	0	6	13	11	0		30
38	26	6	1.900	0	0	0	0	8	12	0	18		38
48	27	7	1.900	0	0	0	0	7	11	0	17		35
51	28	8	1.900	0	0	0	0	6	8	0	16		30
58	29	9	1.900	0	0	0	0	6	13	0	20		39
65	30	10	1.900	0	0	0	0	0	9	0	18		27
2	31	1	3.800	0	0	0	0	4	0	13	16		33
8	32	2	3.800	0	0	0	0	2	10	0	18		30
21	33	3	3.800	0	0	0	0	4	12	0	12		28
28	34	4	3.800	0	0	0	0	1	14	0	20		35
35	35	5	3.800	0	0	0	0	2	15	0	19		36
40	36	6	3.800	0	0	0	0	5	14	0	20		39
43	37	7	3.800	0	0	0	0	1	0	11	17		29
53	38	8	3.800	0	0	0	0	6	15	0	20		41
62	39	9	3.800	0	0	0	0	5	12	0	20		37
64	40	10	3.800	0	0	0	0	4	0	12	17		33
7	41	1	7.600	0	0	0	0	5	0	13	16		34
13	42	2	7.600	0	0	0	0	8	13	1	19		41
19	43	3	7.600	0	0	0	0	7	13	0	15		35
26	44	4	7.600	0	0	0	0	0	0	0	0		0
30	45	5	7.600	0	0	0	0	5	14	0	14		33
41	46	6	7.600	0	0	0	0	8	14	0	13		35
47	47	7	7.600	0	0	0	0	2	14	0	13		29
56	48	8	7.600	0	0	0	0	7	9	0	18		34
57	49	9	7.600	0	0	0	0	7	16	0	19		42
70	50	10	7.600	0	0	0	0	6	0	12	17		35
1	51	1	15.200	0	0	0	0	4	0	14	15		33
12	52	2	15.200	0	0	0	0	4	9	0	17		30
20	53	3	15.200	0	0	0	0	8	11	0	11		30

ToxCalc 5.0
Reviewed by: SJB

Test: CD-Ceriodaphnia Survival and Reproduction Test
Test ID: N5593Cd
Species: CD-Ceriodaphnia dubia
Protocol: EPAF 94-EPA/600/4-91/002
Sample ID: TN0002798
Sample Type: EFF2-Industrial
Start Date: 1/26/2010 09:50
End Date: 2/2/2010 10:00
Lab ID: TDH-TDH-Lab services

Pos	ID	Rep	Group	Day 0	Day 1	Day 2	Day 3	Day 4	Day 5	Day 6	Day 7	Sex	Number of Young
22	54	4	15.200	0	0	0	0	6	0	12	17		35
32	55	5	15.200	0	0	0	0	7	12	0	11		30
36	56	6	15.200	0	0	0	0	7	0	13	21		41
45	57	7	15.200	0	0	0	0	5	11	0	17		33
52	58	8	15.200	0	0	0	0	7	15	0	18		40
63	59	9	15.200	0	0	0	0	6	10	0	16		32
69	60	10	15.200	0	0	0	0	7	0	15	21		43

Comments:

Reviewed by: SJB

QC Data Entry
SJB 2/4/10

Ceriodaphnia Survival and Reproduction Test-Reproduction

Start Date:	1/26/2010 09:50	Test ID:	N5593Cd	Sample ID:	TN0002798
End Date:	2/2/2010 10:00	Lab ID:	TDH-TDH-Lab services	Sample Type:	EFF2-Industrial
Sample Date:	1/25/2010 10:40	Protocol:	EPAF 94-EPA/600/4-91/002	Test Species:	CD-Ceriodaphnia dubia

Comments:

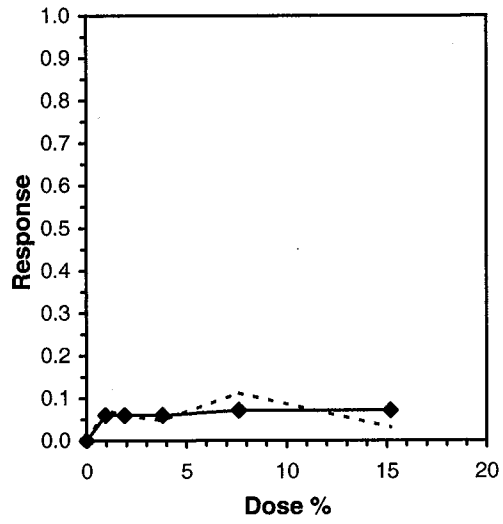
Conc-%	1	2	3	4	5	6	7	8	9	10
control	41.000	32.000	35.000	35.000	38.000	35.000	33.000	36.000	40.000	33.000
0.95	37.000	31.000	30.000	32.000	33.000	32.000	32.000	37.000	30.000	38.000
1.9	29.000	39.000	33.000	37.000	30.000	38.000	35.000	30.000	39.000	27.000
3.8	33.000	30.000	28.000	35.000	36.000	39.000	29.000	41.000	37.000	33.000
7.6	34.000	41.000	35.000	0.000	33.000	35.000	29.000	34.000	42.000	35.000
15.2	33.000	30.000	30.000	35.000	30.000	41.000	33.000	40.000	32.000	43.000

			Transform: Untransformed					Isotonic	
Conc-%	Mean	N-Mean	Mean	Min	Max	CV%	N	Mean	N-Mean
control	35.800	1.0000	35.800	32.000	41.000	8.411	10	35.800	1.0000
0.95	33.200	0.9274	33.200	30.000	38.000	9.070	10	33.667	0.9404
1.9	33.700	0.9413	33.700	27.000	39.000	13.348	10	33.667	0.9404
3.8	34.100	0.9525	34.100	28.000	41.000	12.629	10	33.667	0.9404
7.6	31.800	0.8883	31.800	0.000	42.000	37.054	10	33.250	0.9288
15.2	34.700	0.9693	34.700	30.000	43.000	14.121	10	33.250	0.9288

Auxiliary Tests	Statistic	Critical	Skew	Kurt
Kolmogorov D Test indicates non-normal distribution (p <= 0.01)	1.11253	1.035	-2.6529	14.5801
Bartlett's Test indicates unequal variances (p = 5.15E-05)	27.2297	15.0863		

Linear Interpolation (200 Resamples)

Point	%	SD	95% CL	Skew
IC25	>15.2			



 ToxCalc v5.0.23 Reviewed by:_____

Ceriodaphnia Survival and Reproduction Test-Reproduction

Start Date:	1/26/2010 09:50	Test ID:	N5593Cd	Sample ID:	TN0002798
End Date:	2/2/2010 10:00	Lab ID:	TDH-TDH-Lab services	Sample Type:	EFF2-Industrial
Sample Date:	1/25/2010 10:40	Protocol:	EPAF 94-EPA/600/4-91/002	Test Species:	CD-Ceriodaphnia dubia

Comments:

Conc-%	1	2	3	4	5	6	7	8	9	10
control	41.000	32.000	35.000	35.000	38.000	35.000	33.000	36.000	40.000	33.000
0.95	37.000	31.000	30.000	32.000	33.000	32.000	32.000	37.000	30.000	38.000
1.9	29.000	39.000	33.000	37.000	30.000	38.000	35.000	30.000	39.000	27.000
3.8	33.000	30.000	28.000	35.000	36.000	39.000	29.000	41.000	37.000	33.000
7.6	34.000	41.000	35.000	0.000	33.000	35.000	29.000	34.000	42.000	35.000
15.2	33.000	30.000	30.000	35.000	30.000	41.000	33.000	40.000	32.000	43.000

			Transform: Untransformed						1-Tailed	
Conc-%	Mean	N-Mean	Mean	Min	Max	CV%	N	t-Stat	Critical	MSD
control	35.800	1.0000	35.800	32.000	41.000	8.411	10			
0.95	33.200	0.9274	33.200	30.000	38.000	9.070	10	0.961	2.287	6.189
1.9	33.700	0.9413	33.700	27.000	39.000	13.348	10	0.776	2.287	6.189
3.8	34.100	0.9525	34.100	28.000	41.000	12.629	10	0.628	2.287	6.189
7.6	31.800	0.8883	31.800	0.000	42.000	37.054	10	1.478	2.287	6.189
15.2	34.700	0.9693	34.700	30.000	43.000	14.121	10	0.406	2.287	6.189

Auxiliary Tests	Statistic	Critical	Skew	Kurt
Kolmogorov D Test indicates non-normal distribution (p <= 0.01)	1.11253	1.035	-2.6529	14.5801
Bartlett's Test indicates unequal variances (p = 5.15E-05)	27.2297	15.0863		

Hypothesis Test (1-tail, 0.05)	NOEC	LOEC	ChV	TU	MSDu	MSDp	MSB	MSE	F-Prob	df
Dunnett's Test	15.2	>15.2		6.57895	6.18904	0.17288	18.4567	36.6278	0.77198	5, 54
Treatments vs control										

PMSD = 17.3

QC'd data entry TJM 2/4/10

ToxCalc v5.0.23

Reviewed by:

DATE: 2/4/2010

TO: Leetha Abazid, CHEFO/WPC/TDEC
FROM: Carrie A. Perry, Aquatic Biology/Environmental Laboratory/TDH

SUBJECT: Chronic *Pimephales promelas* 7-day larval survival and growth test, AKZO-Nobel, Outfall 001.

Location:
County: Hamilton
NPDES No: TN0002798
Lab Log No: N00005593Pp

Test Dates: January 26 – February 2, 2010

Participants:
1. Principle investigator: Carrie A. Perry, Aquatic Biology/Env. Lab/TDH
2. Assistant (lab): Keith Gaddes, Aquatic Biology/Env. Lab/TDH
3. Field collection: Leetha Abazid, CHEFO/WPC/TDEC

Effluent:
1. Number of samples: Three 24-hr flow- proportionate composite samples of final effluent
2. Legal tag received with samples? Yes
3. Sample collection dates: 1/25, 1/27, and 1/29/2010

Dilution Source:
Lab water: Diluted Mineral Water (DMW), 20.0% Perrier, Type 1, deionized water

Food:
1. Type: *Artemia nauplii*
2. Quantity: 0.15 mL, twice daily

Test Conditions:
1. Vessels: 600 mL plastic cups/350 mL test volume
2. Incubator temperature range: 23.4 – 25.5 °C
3. Light intensity range: 70.1 – 93.0 ft-candles
4. Photoperiod: 16hr light, 8 hr darkness

Chronic permit requirements and test results:

Permit End Point: Survival [a]IC25 @ 3.8%
Growth IC25 @ 3.8%

Survival Test Result: [b]N.C.T. @ >15.2%
Growth Test Result: N.C.T. @ >15.2%
PMSD[c]= 15.5

[a] IC25 = The effluent concentration at which a 25% inhibition of growth occurred.
[b] N.C.T.=No Chronic Toxicity
[c]PMSD=Percent Minimum Significant difference calculated for sublethal endpoints

Chronic Standard toxicant N5619001Pp (KCl) results, January 26 – February 2, 2010

Survival IC25 Result: 0.89 g/L
Growth IC25 Result: 0.86 g/L
PMSD: 9.4%

Tables Presented:
Table 1. Chronic Water Quality Data

Table 2. Chronic Survival and Growth Data

Figures Presented:

Figure 1. Plot of Growth by Test Concentration

fish

CHRONIC BIOASSAY WATER QUALITY RESULTS

Discharge: AK20 Nobel / AK20 Nobel Log Number: N00005593 Pp Analyst: CAP

SAMPLE	1	1	2	2	3	3	3	3
DAY	set up	1	2	3	4	5	6	7
DATE	1/26	1/27	1/28	1/29	1/30	1/31	2/1	2/2
JUG	J	A	C	H	H+D+F	F	L	

CAP 1/28/10

DISSOLVED OXYGEN (mg/L)
(Initial/Final)

	I	F	I	F	I	F	I	F	I	F	I	F	I	F	I	F
Control	7.0	7.4	7.9	~~7.6~~ 6.0	7.9	7.0	8.2	6.8	7.9	7.4/6.0	8.1/8.3	7.2	8.5	7.4/7.5	[illegible]	
0.95	6.8	7.3	8.0	~~7.6~~ 6.0	7.9	7.0	8.0	6.7	7.9/8.1	6.9/7.1	8.1	6.9/7.1	8.5	7.4		
1.90	6.9	7.3	8.0	6.1	7.9	7.4	7.9/8.1	6.6/6.8	7.8	6.8	8.0	6.7	8.5	7.3		
3.80	6.8	7.3	8.2	6.4	7.8/8.0	7.1/7.3	8.0	6.7	7.9	7.1	8.1	6.9	8.7	7.3		
7.60	7.0	7.3	8.3/8.2	6.2/6.4	7.8	7.1	8.0	6.4	7.9	6.9	8.1	7.0	8.7/8.7	7.2		
15.20	7.0/7.2	7.2/7.2	8.2	6.8	7.8	7.1	8.0	6.9	7.9	7.2	8.2	6.9	8.6	7.3		
100	7.5	—	—	—	8.5				8.1							

PH
(Initial/Final)

	I	F	I	F	I	F	I	F	I	F	I	F	I	F	I	F
Control	8.1	7.8	8.1	7.6	8.2	7.8	8.1	7.7	8.1	7.6	7.9/7.9	7.4	8.2	7.6/7.8		
0.95	8.2	7.8	8.1	7.6	8.3	7.8	8.2	7.8	8.3/8.2	7.6/7.6	8.0	7.5	8.2	7.8		
1.90	8.3	7.9	8.2	7.6	8.3	7.8	8.3/8.2	7.7/7.7	8.2	7.6	8.0	7.4	8.3	7.8		
3.80	8.3	7.8	8.2	7.7	8.3/8.2	7.8/7.7	8.3	7.8	8.2	7.7	8.0	7.5/7.6	8.3	7.8		
7.60	8.3	7.8	8.2/8.1	7.6/7.6	8.3	7.8	8.2	7.7	8.2	7.7	8.0	7.6	8.3	7.8		
15.20	8.3/8.2	7.8/7.8	8.2	7.7	8.2	7.8	8.2	7.8	8.2	7.7	8.0	7.6	8.2/8.2	7.8		
100	8.1	—	—	—	8.0				7.9							

CONDUCTIVITY
(umhos/cm^3)

Control	169	171	172	175	174	170/173	174	
0.95	173	179	177	180	176/172	176	177	
1.90	174	184	179	182/178	177	177	178	
3.80	175	185	180/179	184	179	179	179/176	
7.60	181	189/182	182	185	181	182	182	
15.20	187/185	194	187	188	187	188	188	
100	252	—	248		248			

CHLORINE RESIDUAL (mg/L)

100%	0	—						
Blank	—							

	HARDNESS (mg/L)				ALKALINITY (mg/L)		
	Sample 1	Sample 2	Sample 3		Sample 1	Sample 2	Sample 3
100%	123.22	113.12	129.28		134.64	126.72	135.63
Control	84.84/76.76	80.8/80.8	80.8/80.8/80.8/82.82		79.2/79.2	79.2/81.18	81.18/80.18/79.2/79.2

Can A Rea 2/4/10

Table 2. *Pimephales promelas* 7 day chronic larval survival and growth data.

P.p. Survival at Concentration

Sample No.	Day No.	Effluent Concentration (v/v)					
		Control	0.95%	1.9%	3.8%	7.6%	15.2%
1	1	40	40	40	40	40	40
1	2	38	39	40	40	40	40
2	3	38	39	40	40	40	40
2	4	38	39	40	40	40	40
3	5	38	39	40	40	40	40
3	6	38	39	40	40	40	40
3	7	38	39	40	40	40	40

P.p. Growth at Concentration

Effluent Concentration (v/v)	Replicate 1 (mg)	Replicate 2 (mg)	Replicate 3 (mg)	Replicate 4 (mg)
Control	0.39	0.42	0.42	0.46
0.95%	0.39	0.52	0.47	0.41
1.9%	0.37	0.45	0.47	0.46
3.8%	0.46	0.51	0.46	0.49
7.6%	0.49	0.5	0.47	0.54
15.2%	0.53	0.47	0.53	0.54

P.p. Growth Summary Statistics

Effluent Concentration (v/v)	Mean Growth (mg)	Std. Dev.
Control	0.423	0.0287
0.95%	0.448	0.0591
1.9%	0.438	0.0457
3.8%	0.480	0.0245
7.6%	0.500	0.0294
15.2%	0.518	0.0320

Test Review

SUBJECT: Chronic *Pimephales promelas* 7-day larval survival and growth test, AKZO Nobel, Outfall 001, Hamilton County, Tennessee. January 26 – February 2, 2010. NPDES No. TN0002798, Lab log No. N00005593Pp

Sampling and Handling

Effluent samples were collected by TDEC/WPC personnel on Monday, Wednesday and Friday of the test week. The samples were delivered to the environmental laboratory by TDEC/WPC personnel. The chain of custody with each sample was completed. Each sample had first use in less than 36 hr.

Test Acceptability Criteria

Only 38 of the control organisms survived. They had an average weight of 0.423 mg.

Test Conditions

Test procedures for chronic test were followed in accordance with EPA guidelines (EPA-821-R-02-013, October 2002), the TN Environmental Laboratories Standard Operating Procedures Manual 2007, and NPDES permit No. TN0002798 with the following exceptions: The temperature dropped to 23.4 ^{o}C on the evening of the last day of the test.

Statistical Methods

Statistic used (IC25) was specified by the permit.

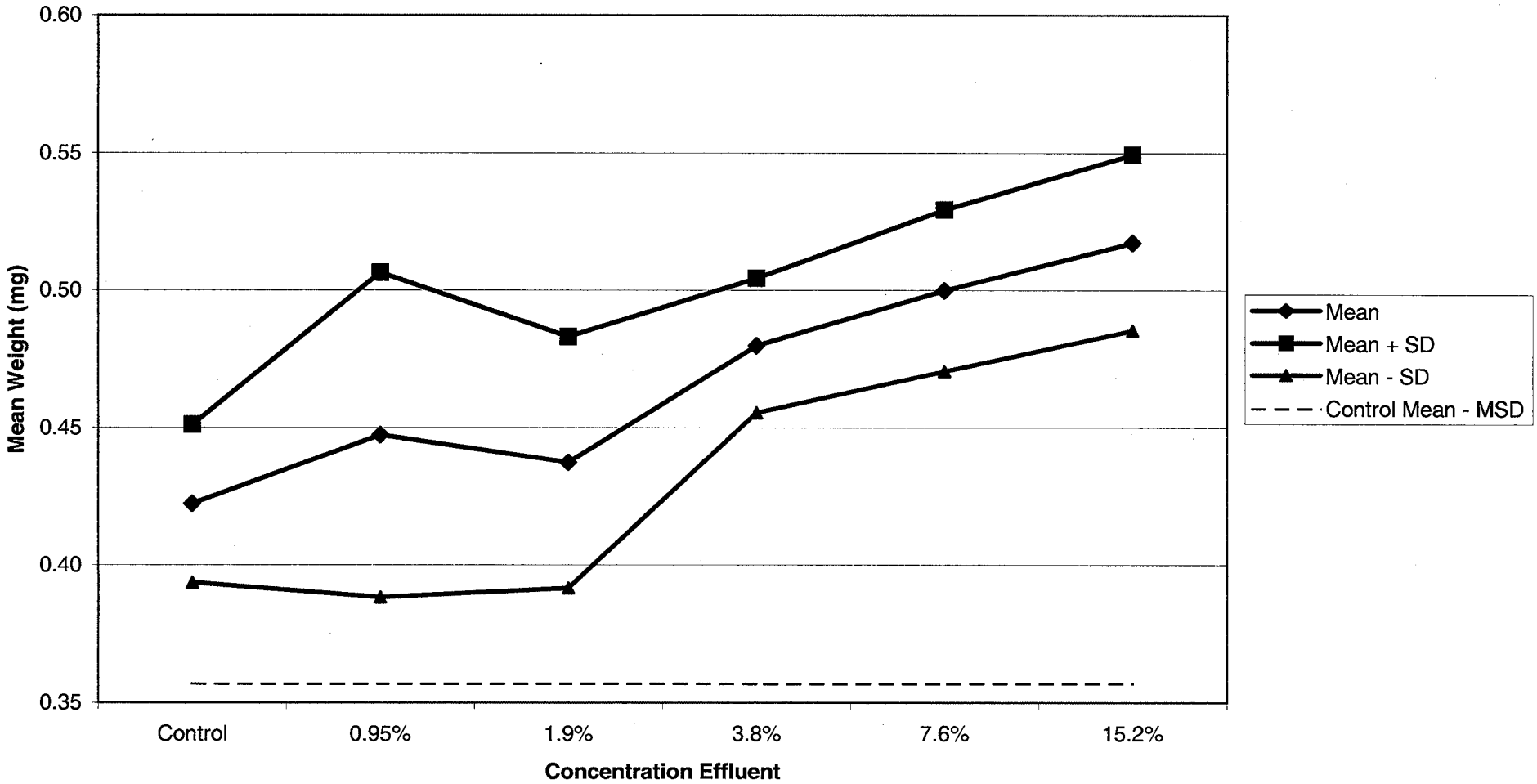
Concentration-Response Relationship

There was no toxicity present in this test. Therefore, there is no valid comparison between the Results of this test and the concentration-response relationship graphs in the EPA-821-B-00-004 July 2000 publication (See Figure 1).

Reference Toxicity Test

A concurrent Pimephales KCl standard toxicant test, Lab log #N5619001Pp, was performed with the AKZO-Nobel effluent test using the same batch of test organisms. IC25 survival and growth endpoints were within +/- 2 standard deviations of the cumulative mean of the previous reference tests performed by the lab, indicating a normal level for the organisms used in the AKZO-Nobel effluent test. Since the effluent test controls met the Test Acceptable Criteria (TAC) and the AKZO-Nobel effluent tests (IC25=>15.2%) indicate no toxicity at any concentration.

Figure 1. Seven-day chronic larval *Pimephales promelas* growth data, January 26 - February 2, 2010, AKZO Nobel Chemical, Outfall 001, Hamilton Co., TN, NPDES # TN0002798, Lab Log # N00005593Pp.



Qc date entry 2/4/10 GKH

Test: LF-Larval Fish Growth and Survival Test
Species: PP-Pimephales promelas
Sample ID: TN0002798
Start Date: 1/26/2010 12:50 End Date: 2/2/2010 13:20

Test ID: N5593Pp
Protocol: EPAF 94-EPA/600/4-91/002
Sample Type: EFF2-Industrial
Lab ID: TDH-TDH-Lab services

Pos	ID	Rep	Group	Day 0	Day 1	Day 2	Day 3	Day 4	Day 5	Day 6	Day 7	Total Wgt(mg)	Tare Wgt(mg)	Wgt Count
	1	1	control	10	10	9	9	9	9	9	9	2538.2	2534.3	0.39
	2	2	control	10	10	9	9	9	9	9	9	2563.1	2558.9	0.42
	3	3	control	10	10	10	10	10	10	10	10	2561.2	2557	0.42
	4	4	control	10	10	10	10	10	10	10	10	2532.4	2527.8	0.46
	5	1	0.950	10	10	10	10	10	10	10	10	2522	2518.1	0.39
	6	2	0.950	10	10	10	10	10	10	10	10	2565	2559.8	0.52
	7	3	0.950	10	10	10	10	10	10	10	10	2571.1	2566.4	0.47
	8	4	0.950	10	10	9	9	9	9	9	9	2564.7	2560.6	0.41
	9	1	1.900	10	10	10	10	10	10	10	10	2562.7	2559	0.37
	10	2	1.900	10	10	10	10	10	10	10	10	2562.4	2557.9	0.45
	11	3	1.900	10	10	10	10	10	10	10	10	2510.7	2506	0.47
	12	4	1.900	10	10	10	10	10	10	10	10	2556.2	2551.6	0.46
	13	1	3.800	10	10	10	10	10	10	10	10	2523	2518.4	0.46
	14	2	3.800	10	10	10	10	10	10	10	10	2516.7	2511.6	0.51
	15	3	3.800	10	10	10	10	10	10	10	10	2571.9	2567.3	0.46
	16	4	3.800	10	10	10	10	10	10	10	10	2561.2	2556.3	0.49
	17	1	7.600	10	10	10	10	10	10	10	10	2544.1	2539.2	0.49
	18	2	7.600	10	10	10	10	10	10	10	10	2556.1	2551.1	0.5
	19	3	7.600	10	10	10	10	10	10	10	10	2553.3	2548.6	0.47
	20	4	7.600	10	10	10	10	10	10	10	10	2544.1	2538.7	0.54
	21	1	15.200	10	10	10	10	10	10	10	10	2546.6	2541.3	0.53
	22	2	15.200	10	10	10	10	10	10	10	10	2544.6	2539.9	0.47
	23	3	15.200	10	10	10	10	10	10	10	10	2549.8	2544.5	0.53
	24	4	15.200	10	10	10	10	10	10	10	10	2545.8	2540.4	0.54

Comments:

QC 2/4/10 GKH

Larval Fish Growth and Survival Test-7 Day Survival

Start Date:	1/26/2010 12:50	Test ID:	N5593Pp	Sample ID:	TN0002798
End Date:	2/2/2010 13:20	Lab ID:	TDH-TDH-Lab services	Sample Type:	EFF2-Industrial
Sample Date:	1/25/2010 10:40	Protocol:	EPAF 94-EPA/600/4-91/002	Test Species:	PP-Pimephales promelas
Comments:					

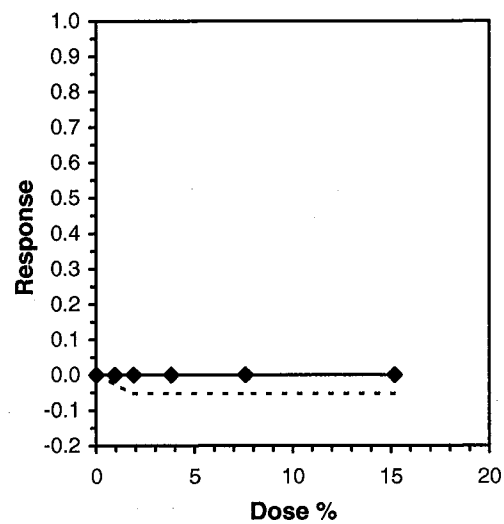
Conc-%	1	2	3	4
control	0.9000	0.9000	1.0000	1.0000
0.95	1.0000	1.0000	1.0000	0.9000
1.9	1.0000	1.0000	1.0000	1.0000
3.8	1.0000	1.0000	1.0000	1.0000
7.6	1.0000	1.0000	1.0000	1.0000
15.2	1.0000	1.0000	1.0000	1.0000

			Transform: Arcsin Square Root					Isotonic	
Conc-%	Mean	N-Mean	Mean	Min	Max	CV%	N	Mean	N-Mean
control	0.9500	1.0000	1.3305	1.2490	1.4120	7.072	4	0.9875	1.0000
0.95	0.9750	1.0263	1.3713	1.2490	1.4120	5.942	4	0.9875	1.0000
1.9	1.0000	1.0526	1.4120	1.4120	1.4120	0.000	4	0.9875	1.0000
3.8	1.0000	1.0526	1.4120	1.4120	1.4120	0.000	4	0.9875	1.0000
7.6	1.0000	1.0526	1.4120	1.4120	1.4120	0.000	4	0.9875	1.0000
15.2	1.0000	1.0526	1.4120	1.4120	1.4120	0.000	4	0.9875	1.0000

Auxiliary Tests	Statistic	Critical	Skew	Kurt
Shapiro-Wilk's Test indicates non-normal distribution (p <= 0.01)	0.77127	0.884	-0.8475	2.20368
Equality of variance cannot be confirmed				

Linear Interpolation (200 Resamples)

Point	%	SD	95% CL(Exp)	Skew
IC25	>15.2			



 ToxCalc v5.0.23 Reviewed by:_____

QC 2/4/10 GMH

Larval Fish Growth and Survival Test-7 Day Biomass

Start Date:	1/26/2010 12:50	Test ID:	N5593Pp	Sample ID:	TN0002798
End Date:	2/2/2010 13:20	Lab ID:	TDH-TDH-Lab services	Sample Type:	EFF2-Industrial
Sample Date:	1/25/2010 10:40	Protocol:	EPAF 94-EPA/600/4-91/002	Test Species:	PP-Pimephales promelas
Comments:					

Conc-%	1	2	3	4
control	0.3900	0.4200	0.4200	0.4600
0.95	0.3900	0.5200	0.4700	0.4100
1.9	0.3700	0.4500	0.4700	0.4600
3.8	0.4600	0.5100	0.4600	0.4900
7.6	0.4900	0.5000	0.4700	0.5400
15.2	0.5300	0.4700	0.5300	0.5400

			Transform: Untransformed						1-Tailed	
Conc-%	Mean	N-Mean	Mean	Min	Max	CV%	N	t-Stat	Critical	MSD
control	0.4225	1.0000	0.4225	0.3900	0.4600	6.798	4			
0.95	0.4475	1.0592	0.4475	0.3900	0.5200	13.205	4	-0.918	2.410	0.0656
1.9	0.4375	1.0355	0.4375	0.3700	0.4700	10.454	4	-0.551	2.410	0.0656
3.8	0.4800	1.1361	0.4800	0.4600	0.5100	5.103	4	-2.111	2.410	0.0656
7.6	0.5000	1.1834	0.5000	0.4700	0.5400	5.888	4	-2.846	2.410	0.0656
15.2	0.5175	1.2249	0.5175	0.4700	0.5400	6.187	4	-3.488	2.410	0.0656

Auxiliary Tests	Statistic	Critical	Skew	Kurt
Shapiro-Wilk's Test indicates normal distribution (p > 0.01)	0.97938	0.884	-0.1628	-0.2524
Bartlett's Test indicates equal variances (p = 0.67)	3.18427	15.0863		

Hypothesis Test (1-tail, 0.05)	NOEC	LOEC	ChV	TU	MSDu	MSDp	MSB	MSE	F-Prob	df
Dunnett's Test Treatments vs control	15.2	>15.2		6.57895	0.06563	0.15534	0.00563	0.00148	0.01598	5, 18

PMSD = 15.5

QC checked 2/4/10 GH

Larval Fish Growth and Survival Test-7 Day Biomass

Start Date:	1/26/2010 12:50	Test ID:	N5593Pp	Sample ID:	TN0002798
End Date:	2/2/2010 13:20	Lab ID:	TDH-TDH-Lab services	Sample Type:	EFF2-Industrial
Sample Date:	1/25/2010 10:40	Protocol:	EPAF 94-EPA/600/4-91/002	Test Species:	PP-Pimephales promelas
Comments:					

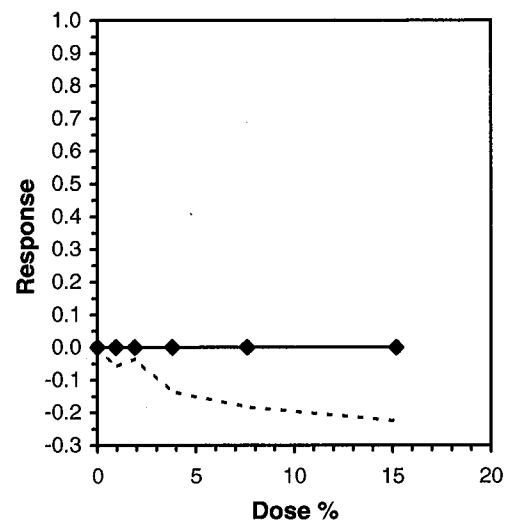
Conc-%	1	2	3	4
control	0.3900	0.4200	0.4200	0.4600
0.95	0.3900	0.5200	0.4700	0.4100
1.9	0.3700	0.4500	0.4700	0.4600
3.8	0.4600	0.5100	0.4600	0.4900
7.6	0.4900	0.5000	0.4700	0.5400
15.2	0.5300	0.4700	0.5300	0.5400

			Transform: Untransformed					Isotonic	
Conc-%	Mean	N-Mean	Mean	Min	Max	CV%	N	Mean	N-Mean
control	0.4225	1.0000	0.4225	0.3900	0.4600	6.798	4	0.4675	1.0000
0.95	0.4475	1.0592	0.4475	0.3900	0.5200	13.205	4	0.4675	1.0000
1.9	0.4375	1.0355	0.4375	0.3700	0.4700	10.454	4	0.4675	1.0000
3.8	0.4800	1.1361	0.4800	0.4600	0.5100	5.103	4	0.4675	1.0000
7.6	0.5000	1.1834	0.5000	0.4700	0.5400	5.888	4	0.4675	1.0000
15.2	0.5175	1.2249	0.5175	0.4700	0.5400	6.187	4	0.4675	1.0000

Auxiliary Tests	Statistic	Critical	Skew	Kurt
Shapiro-Wilk's Test indicates normal distribution (p > 0.01)	0.97938	0.884	-0.1628	-0.2524
Bartlett's Test indicates equal variances (p = 0.67)	3.18427	15.0863		

Linear Interpolation (200 Resamples)

Point	%	SD	95% CL(Exp)	Skew
IC25	>15.2			



 ToxCalc v5.0.23 Reviewed by:_____

STATE OF TENNESSEE - ENVIRONMENTAL LABORATORIES

Please Print Legibly

Biological Analysis

**Schedule must be arranged in advance for all tests (615) 262-6327

Project/Site No.	TN0002798
Project Name	AKZO-Nobel
Station No.	001
County	HAMILTON
Description	
Stream Mile	
Depth	
Collection Date	01-25-10
Time	1040
Sampler's name (Print)	Leetha Abazid
Sampling Agency	TDEC-WPC
Billing Code	EN00003056
If Priority, Date Needed	
Send Report to	LEETHA ABAZID
Contact Hazard	No
Date Reported	3/2/10 By [illegible]
Reviewed By	Patricia Alicea
Reviewed by	

BIOLOGICAL SURVEYS

- [ ] Macroinvertebrate Recon
- [ ] Rapid Bioassessment (State SOP)
- [ ] Intensive Survey - Surber
- [ ] Intensive Survey - Dendy
- [ ] Fish Population Recon
- [ ] Fish Population Intensive
- [ ] Fish Tissue Collection
- [ ] Chlorophyll Analysis

Log Number

Chlorophyll a

Pheophyton

SPECIAL STUDIES

(Please Specify)

Screening Bioassays

(Cannot be used for permitting)

48 hr Static Screening Cd

Log Number

LC50 @ 24 hrs

LC50 @ 48 hrs

48 hr Static Screening Pp

Log Number

LC50 @ 24 hrs

LC50 @ 48 hrs

Acute Bioassays

48 hr Static Definitive Cd

Log Number

LC50 @ 24 hrs

LC50 @ 48 hrs

NOAEC

LOAEC

48 hr Static Definitive Pp

Log Number

LC50 @ 24 hrs

LC50 @ 48 hrs

NOAEC

LOAEC

96 hr Static Definitive Cd

Log Number

LC50 @ 24 hrs

LC50 @ 48 hrs

LC50 @ 72 hrs

LC50 @ 96 hrs

NOAEC

LOAEC

96 hr Static Definitive Pp

Log Number

LC50 @ 24 hrs

LC50 @ 48 hrs

LC50 @ 72 hrs

LC50 @ 96 hrs

NOAEC

LOAEC

Chronic Bioassays

[X] Chronic Cd 001cd

Log Number N5593cd

LC50 @ 24 hrs

LC50 @ 48 hrs

LC50 @ 72 hrs

LC50 @ 96 hrs

Survival

NOAEC

~~LOAEC~~ IC25 = N.C.T

Reproduction

NOAEC

LOAEC

IC25 N.C.T

[X] Chronic Pp 001pp

Log Number N5593Pp

LC50 @ 24 hrs

LC50 @ 48 hrs

LC50 @ 72 hrs

LC50 @ 96 hrs

LC50 @ 120 hrs

LC50 @ 144 hrs

LC50 @ 168 hrs

Survival

NOAEC

~~LOAEC~~ IC25 = N.C.T

Growth

NOAEC

LOAEC

IC25 N.C.T.

Chlorine Residual

Lab Parameters

pH

Cond.

D.O.

Temp.

Branch Lab Number	347 N00005593-001

Chain of Custody (sign full name)

1. Collected by Leetha Abazid
   Date 01-25-10 Time 1040 AM EST
   Delivered to NASHVILLE LAB - P. ALICEA
   Date 01-25-10 Time 13:52 PM CST
2. Received by Nash Lab P. Alicea
   Date 01-25-10 Time 13:52 PM CST
   Delivered to
   Date Time
3. Received by
   Date Time
   Delivered to
   Date Time
4. Rec'd in Lab by Patricia Alicea
   Date 1/25/10 Time 1352
   Logged in by Pamela Wilson
   Date 1/25/10 Time 1400

Additional Information

1. Approx. volume of sample 1 GALLON
2. Nearest town or city CHATTANOOGA
3. Others present at collection W. Edward Casavant, Girish Patel
4. Number of other samples collected at same time at this point 2 - Split sample w/ AKZO.
5. Field collection procedure, handling and/or preservation of this sample No preservative SAMPLE/SEALED + PLACED ON ICE
6. Mode of transportation to lab TDEC vehicle
7. Sample/cooler sealed by TLA/WEC
8. Date sample/cooler sealed 01/25/10
9. Remarks 1.1 °C

PH-3010 (rev 1/96)

RDA 1527

STATE OF TENNESSEE - ENVIRONMENTAL LABORATORIES

Please Print Legibly

Biological Analysis

**Schedule must be arranged in advance for all tests (615) 262-6327

Project/Site No.	TN0002798
Project Name	AKZO-Nobel
Station No.	001
County	HAMILTON
Description	NON CONTACT COOLING H2O
Stream Mile	
Depth	
Collection Date	01-27-10
Time	850AM
Sampler's name (Print)	
Sampling Agency	TDEC-WPC
Billing Code	EN00003056
If Priority, Date Needed	
Send Report to	LEETHA ABAZID
Contact Hazard	NO

Date Reported 3/2/10 By CAP

Reviewed By Patricia Coleman

Reviewed by

BIOLOGICAL SURVEYS

- [ ] Macroinvertebrate Recon
- [ ] Rapid Bioassessment (State SOP)
- [ ] Intensive Survey - Surber
- [ ] Intensive Survey - Dendy
- [ ] Fish Population Recon
- [ ] Fish Population Intensive
- [ ] Fish Tissue Collection
- [ ] Chlorophyll Analysis

Log Number

Chlorophyll a

Pheophyton

SPECIAL STUDIES

(Please Specify)

Screening Bioassays

(Cannot be used for permitting)

48 hr Static Screening Cd

Log Number

LC50 @ 24 hrs

LC50 @ 48 hrs

48 hr Static Screening Pp

Log Number

LC50 @ 24 hrs

LC50 @ 48 hrs

Acute Bioassays

48 hr Static Definitive Cd

Log Number

LC50 @ 24 hrs

LC50 @ 48 hrs

NOAEC

LOAEC

48 hr Static Definitive Pp

Log Number

LC50 @ 24 hrs

LC50 @ 48 hrs

NOAEC

LOAEC

96 hr Static Definitive Cd

Log Number

LC50 @ 24 hrs

LC50 @ 48 hrs

LC50 @ 72 hrs

LC50 @ 96 hrs

NOAEC

LOAEC

96 hr Static Definitive Pp

Log Number

LC50 @ 24 hrs

LC50 @ 48 hrs

LC50 @ 72 hrs

LC50 @ 96 hrs

NOAEC

LOAEC

Chronic Bioassays

[X] Chronic Cd

Log Number

LC50 @ 24 hrs

LC50 @ 48 hrs

LC50 @ 72 hrs

LC50 @ 96 hrs

Survival

NOAEC

LOAEC

Reproduction

NOAEC

LOAEC

IC25

[X] Chronic Pp

Log Number

LC50 @ 24 hrs

LC50 @ 48 hrs

LC50 @ 72 hrs

LC50 @ 96 hrs

LC50 @ 120 hrs

LC50 @ 144 hrs

LC50 @ 168 hrs

Survival

NOAEC

LOAEC

Growth

NOAEC

LOAEC

IC25

Chlorine Residual

Lab Parameters

pH

Cond.

D.O.

Temp.

Branch Lab Number	348 N000055-93-02

Chain of Custody (sign full name)

1. Collected by Leetha Abazid
   Date 01-27-10 Time 0850 AM EST
   Delivered to TDEC - Chattanooga EFO
   Date 01-27-10 Time 0930 am EST
2. Received by Richard Dunch
   Date 01-27-10 Time 0930 am EST
   Delivered to NASHVILLE LAB - P. Alicea
   Date 1/27/10 Time 1130
3. Received by
   Date Time
   Delivered to
   Date Time
4. Rec'd in Lab by Nash Lab Pat Alicea
   Date 1/27/10 Time 1130
   Logged in by N/A 2nd set of samples PAA
   Date 1/27/10 Time 1130

X

Additional Information

1. Approx. volume of sample 1 GALLON
2. Nearest town or city CHATTANOOGA
3. Others present at collection ED. CASAVANT
   Danny Sewell (AKZO); James Cawthorne
4. Number of other samples collected at same time at this point 2 - SPLIT w/ AKZO
5. Field collection procedure, handling and/or preservation of this sample NO PRESERVATION
   PLACED ON ICE FOR SHIPPING - SEALED
   SEALED & ON ICE during collection
6. Mode of transportation to lab TDEC
7. Sample/cooler sealed by TLA/WEC
8. Date sample/cooler sealed 1-27-10
9. Remarks ISCO sampler collected from 1-26-10 @ 0830 AM to 1-27-10 at 0815 am
   1.9°C Rec'd in Lab

PH-3010 (rev 1/96)

RDA 1527

STATE OF TENNESSEE - ENVIRONMENTAL LABORATORIES

Biological Analysis

Please Print Legibly

**Schedule must be arranged in advance for all tests (615) 262-6327

Project/Site No.	TN0002798
Project Name	AKZO-Nobel
Station No.	001 County HAMILTON
Description	NON CONTACT COOLING H2O
Stream Mile	Depth
Collection Date	01-29-10 Time 820 AM
Sampler's name (Print)	Leetha Abazid
Sampling Agency	TDEC-WPC
Billing Code	EN00003056
If Priority, Date Needed	
Send Report to	LEETHA ABAZID
Contact Hazard	No

Date Reported	3/2/10 By AP
Reviewed By	Patricia Clegg
Reviewed by	

	BIOLOGICAL SURVEYS
	Macroinvertebrate Recon
	Rapid Bioassessment (State SOP)
	Intensive Survey - Surber
	Intensive Survey - Dendy
	Fish Population Recon
	Fish Population Intensive
	Fish Tissue Collection
	Chlorophyll Analysis
	Log Number
	Chlorophyll a
	Pheophyton
	SPECIAL STUDIES
	(Please Specify)

	Screening Bioassays
	(Cannot be used for permitting)
	48 hr Static Screening Cd
	Log Number
	LC50 @ 24 hrs
	LC50 @ 48 hrs
	48 hr Static Screening Pp
	Log Number
	LC50 @ 24 hrs
	LC50 @ 48 hrs
	Acute Bioassays
	48 hr Static Definitive Cd
	Log Number
	LC50 @ 24 hrs
	LC50 @ 48 hrs
	NOAEC
	LOAEC
	48 hr Static Definitive Pp
	Log Number
	LC50 @ 24 hrs
	LC50 @ 48 hrs
	NOAEC
	LOAEC
	96 hr Static Definitive Cd
	Log Number
	LC50 @ 24 hrs
	LC50 @ 48 hrs
	LC50 @ 72 hrs
	LC50 @ 96 hrs
	NOAEC
	LOAEC
	96 hr Static Definitive Pp
	Log Number
	LC50 @ 24 hrs
	LC50 @ 48 hrs
	LC50 @ 72 hrs
	LC50 @ 96 hrs
	NOAEC
	LOAEC

	Chronic Bioassays
X	Chronic Cd
	Log Number
	LC50 @ 24 hrs
	LC50 @ 48 hrs
	LC50 @ 72 hrs
	LC50 @ 96 hrs
	Survival
	NOAEC
	LOAEC
	Reproduction
	NOAEC
	LOAEC
	IC25
X	Chronic Pp
	Log Number
	LC50 @ 24 hrs
	LC50 @ 48 hrs
	LC50 @ 72 hrs
	LC50 @ 96 hrs
	LC50 @ 120 hrs
	LC50 @ 144 hrs
	LC50 @ 168 hrs
	Survival
	NOAEC
	LOAEC
	Growth
	NOAEC
	LOAEC
	IC25
	Chlorine Residual
	Lab Parameters
	pH
	Cond.
	D.O.
	Temp.

Branch Lab Number	349
Chain of Custody (sign full name)	
1. Collected by	Leetha Abazid
Date 01-29-10	Time 0820 AM
Delivered to	TDEC-Chattanooga EFO
Date 01-29-10	Time 0852 AM
2. Received by	Richard Lynch
Date 01-29-10	Time 8:52 AM
Delivered to	Nashville Lab - P. Alcea 1020
Date 01-29-10	Time 1020 X
3. Received by	
Date	Time
Delivered to	
Date	Time
4. Rec'd in Lab by	Patricia Clegg X
Date 1-29-10	Time 1020
Logged in by	
Date	Time
Additional Information	
1. Approx. volume of sample	1 GALLON
2. Nearest town or city	CHATTANOOGA
3. Others present at collection	James Cawthorne
	Edward Cagnaunt
4. Number of other samples collected at same	
time at this point	2 - Split with AKZO
5. Field collection procedure, handling and/or	
preservation of this sample	ISCO sampler
	ICED/SEALED DURING COLLECTION
	+ SHIPMENT SAMPLES - NO PRESERVATION
6. Mode of transportation to lab	TDEC
7. Sample/cooler sealed by	
8. Date sample/cooler sealed	01-29-10
9. Remarks	ISCO - COMPOSITE SAMPLE / GRAB
	START: ~~01-28-10 @ 0730 AM~~ 01-29-10 @ 800 AM STOP: 01-29-10 @ ~~07:15 AM~~ 08:20 AM

PH-3010 (rev 1/96)

RDA 1527

4.5°C Rec'd in lab 1-29-10