Waypoint ANALYTICAL

2790 Whitten Road, Memphis, TN 38133
Main 901.213.2400 ° Fax 901.213.2440
www.waypointanalytical.com

12/01/2020

Harrison Wastewater Treatment Plant
Ms. Kathryn Catlin
PO Box 1715
Harrison, AR 72601

Ref: Analytical Testing
Report Number: 20-322-0390
Client Project Description: Bioassay QTR 4
AR0034321

Dear Ms. Kathryn Catlin:

The results of this WET (Whole Effluent Toxicity) test are acceptable according to test review criteria. There were no significant deficiencies found in sample handling, test performance, or reporting. The test results are within the limits established by your NPDES permit and were entered into the permittee's records in the database.

Results:	*Ceriodaphnia dubia*	NOEL = 84 %	CV = 35.12 %	PMSD = 39.2 %
	Fathead minnow	NOEL = 84 %	CV = 23.07 %	PMSD = 23.5 %

Permit Limit: Critical dilution = 84 %
Maximum Coefficient of Variation (CV) < 40 %

EPA Methods: 1002.0 *Ceriodaphnia dubia* Survival and Reproduction
1000.0 *Pimephales promelas* Larval Survival and Growth

All statistical interpretations generated by CETIS - Comprehensive Environmental Toxicity Information System (v.1.9.1.4). CETIS created by Tidepool Scientific Software

Respectfully,

Blake Andres
Lab Supervisor

CETIS Test Evaluation Report

Test Code: 20-322-0390 cd | 13-3288-0899

Facility:	Harrison Treatment Plant	**Test Name:**	Ceriodaphnia 7-d Survival and Reproduction Test
Sample Site:		**Organism:**	Ceriodaphnia dubia (Water Flea)
Sample Code:	20-322-0390	**Protocol:**	EPA/821/R-02-013 (2002)
Sample Date:	16 Nov-20 08:30	**Start Date:**	17 Nov-20 14:10
Sample Age:	30h (0.4 °C)	**End Date:**	24 Nov-20 14:09
Project:	WET Quarterly Compliance Test (4Q)	**Duration:**	7d **Organism Age:** <24

Permitee:	Harrison Treatment Plant	**Laboratory:**	Waypoint Analytical Tennessee , LLC.
Address:		**Address:**	2790 Whitten Road
	PO Box 1715		Memphis, TN 38133
	Harrison, AR 72601		
Contact:	Ms. Kathryn Catlin	**Contact:**	Ms. Blake Andres, Lab Supervisor
Phone:	870-741-5527	**Phone:**	901-271-5200, 901-213-2440(fax)
Email:	kathryn.catlin@cityofharrison.com	**Email:**	sandres@waypointanalytical.com

Comments:

Chronic Toxicity Evaluation

Endpoint	Criteria	Conc-%	IWC	Decision	Method
7d Survival Rate	NOEL/LOEL	84/>84	83.99	Passes IWC	Fisher Exact/Bonferroni-Holm Test
Reproduction	NOEL/LOEL	84/>84	83.99	Passes IWC	Bonferroni Adj t Test

Test Acceptability Criteria

			TAC Limits			
Endpoint	**Attribute**	**Test Stat**	**Lower**	**Upper**	**Overlap**	**Decision**
7d Survival Rate	Control Resp	1	0.8	>>	Yes	Passes Acceptibility Criteria
Reproduction	Control Resp	20.33	15	>>	Yes	Passes Acceptibility Criteria

7d Survival Rate Data Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	L	10	1	1	1	1	1	0	0	0.00%	0.0%
27		10	1	1	1	1	1	0	0	0.00%	0.0%
35		10	1	1	1	1	1	0	0	0.00%	0.0%
47		10	1	1	1	1	1	0	0	0.00%	0.0%
63		10	1	1	1	1	1	0	0	0.00%	0.0%
84		10	0.9	0.784	1	0	1	0.1	0.3162	35.14%	10.0%

Reproduction Data Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	L	9	20.33	18.36	22.31	16	34	1.795	5.385	26.48%	0.0%
27		10	16.5	13.25	19.75	0	25	2.802	8.86	53.70%	18.85%
35		10	14.6	12.74	16.46	5	21	1.607	5.082	34.81%	28.2%
47		10	15.1	12.27	17.93	3	28	2.442	7.724	51.15%	25.74%
63		10	14.6	11.6	17.6	0	30	2.587	8.181	56.04%	28.2%
84		10	20.5	17.86	23.14	9	34	2.277	7.2	35.12%	-0.82%

Ceriodaphnia 7-d Survival and Reproduction Test — **Waypoint Analytical Tennessee , LLC.**

Batch ID:	06-5000-2687	**Test Type:**	Reproduction-Survival (7d)	**Analyst:**	Ivey E. Wilkinson
Start Date:	17 Nov-20 14:10	**Protocol:**	EPA/821/R-02-013 (2002)	**Diluent:**	20% DMW
Ending Date:	24 Nov-20 14:09	**Species:**	Ceriodaphnia dubia	**Brine:**	Not Applicable
Duration:	7d	**Source:**	In-House Culture	**Age:**	<24
Sample ID:	16-9078-8217	**Code:**	20-322-0390	**Client:**	Harrison Treatment Plant
Sample Date:	16 Nov-20 08:30	**Material:**	POTW Effluent	**Project:**	WET Quarterly Compliance Test (4Q)
Receipt Date:	17 Nov-20 10:10	**Source:**	Harrison Treatment Plant (AR0034321)		
Sample Age:	30h (0.4 °C)	**Station:**			

Sample Renewals

Renewal	Sample Code	Sample Date	Receive Date	Renewal Date	Temp °C
1	20-322-0390	17 Nov-20 08:30	18 Nov-20 10:05	19 Nov-20 00:00	0.3
2	20-322-0390	19 Nov-20 09:00	20 Nov-20 10:00	21 Nov-20 00:00	2

Multiple Comparison Summary

Analysis ID	Endpoint	Comparison Method	NOEL	LOEL	TOEL	TU	PMSD ✓
13-1798-1960	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	84	> 84	n/a	1.19	n/a
21-1858-6830	Reproduction	Bonferroni Adj t Test	84	> 84	n/a	1.19	39.2%

Test Acceptability

				TAC Limits			
Analysis ID	**Endpoint**	**Attribute**	**Test Stat**	**Lower**	**Upper**	**Overlap**	**Decision**
13-1798-1960	7d Survival Rate	Control Resp	1	0.8	>>	Yes	Passes Acceptibility Criteria
21-1858-6830	Reproduction	Control Resp	20.33	15	>>	Yes	Passes Acceptibility Criteria

7d Survival Rate Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	L	10	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.0000	0.00%	0.00%
27		10	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.0000	0.00%	0.00%
35		10	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.0000	0.00%	0.00%
47		10	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.0000	0.00%	0.00%
63		10	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.0000	0.00%	0.00%
84		10	0.9000	0.6738	1.0000	0.0000	1.0000	0.1000	0.3162	35.14%	10.00%

Reproduction Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	L	9	20.33	16.19	24.47	16	34	1.795	5.385	26.48%	0.00%
27		10	16.5	10.16	22.84	0	25	2.802	8.86	53.70%	18.85%
35		10	14.6	10.96	18.24	5	21	1.607	5.082	34.81%	28.20%
47		10	15.1	9.575	20.63	3	28	2.442	7.724	51.15%	25.74%
63		10	14.6	8.747	20.45	0	30	2.587	8.181	56.04%	28.20%
84		10	20.5	15.35	25.65	9	34	2.277	7.2	35.12%	-0.82%

Ceriodaphnia 7-d Survival and Reproduction Test **Waypoint Analytical Tennessee , LLC.**

7d Survival Rate Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
0	L	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
27		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
35		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
47		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
63		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
84		1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	1.0000	1.0000	1.0000	1.0000

Reproduction Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
0	L	18	22	16	19		19	17	19	19	34
27		23	9	20	25	18	23	0	21	22	4
35		20	12	10	21	12	19	13	5	16	18
47		28	21	8	18	3	15	17	5	20	16
63		30	13	12	10	19	11	23	0	17	11
84		34	25	22	15	18	15	21	28	9	18

7d Survival Rate Binomials

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
0	L	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
27		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
35		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
47		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
63		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
84		1/1	1/1	1/1	1/1	1/1	0/1	1/1	1/1	1/1	1/1

Ceriodaphnia 7-d Survival and Reproduction Test **Waypoint Analytical Tennessee , LLC.**

Batch ID:	06-5000-2687	**Test Type:**	Reproduction-Survival (7d)	**Analyst:**	Ivey E. Wilkinson
Start Date:	17 Nov-20 14:10	**Protocol:**	EPA/821/R-02-013 (2002)	**Diluent:**	20% DMW
Ending Date:	24 Nov-20 14:09	**Species:**	Ceriodaphnia dubia	**Brine:**	Not Applicable
Duration:	7d	**Source:**	In-House Culture	**Age:**	<24
Sample ID:	16-9078-8217	**Code:**	20-322-0390	**Client:**	Harrison Treatment Plant
Sample Date:	16 Nov-20 08:30	**Material:**	POTW Effluent	**Project:**	WET Quarterly Compliance Test (4Q)
Receipt Date:	17 Nov-20 10:10	**Source:**	Harrison Treatment Plant (AR0034321)		
Sample Age:	30h (0.4 °C)	**Station:**			

Ceriodaphnia 7-d Survival and Reproduction Test **Waypoint Analytical Tennessee , LLC.**

Total Residual Chlorine-mg/L

Conc-%	Code	1	2	3	4	5	6	7
0	L	0	0	0	0	0	0	0
27								
35								
47								
63								
84		0	0	0	0	0	0	0

Conductivity-µS/cm

Conc-%	Code	1	2	3	4	5	6	7
0	L	154.2	157.1	146.9	153	149.5	152.4	149.4
27								
35								
47								
63								
84		488	457	436	463	473	469	473

Final Dissolved Oxygen-mg/L

Conc-%	Code	1	2	3	4	5	6	7
0	L	8.1	8.7	8.8	8.7	9	8.4	8.2
27		7.8	8.7	8.6	9	9	8.4	8.3
35		7.8	8.6	8.7	9	8.9	8.4	8.4
47		7.9	8.6	8.7	8.9	8.9	8.5	8.4
63		8	8.6	8.7	8.9	8.9	8.4	8.3
84		8	8.5	8.6	8.9	9	8.4	8.3

Initial Dissolved Oxygen-mg/L

Conc-%	Code	1	2	3	4	5	6	7
0	L	8.6	7.7	8	8.2	8.3	8.4	8.1
27		8.8	8	8.6	8.4	8.5	8.6	8.4
35		8.8	8.2	8.6	8.5	8.6	8.8	8.5
47		8.8	8.3	8.7	8.7	8.7	8.9	8.7
63		8.9	8.4	8.8	8.9	8.7	9	8.8
84		9.1	8.6	9.2	9.2	8.8	9.3	9.1

Final pH-Units

Conc-%	Code	1	2	3	4	5	6	7
0	L	8	8.1	8	8	7.8	7.8	7.5
27		8	8.1	7.9	8.1	7.8	7.9	7.5
35		8.2	8.1	7.9	8.1	7.8	7.9	7.5
47		8.1	8.2	7.9	8.1	7.9	7.9	7.5
63		8.1	8.2	7.9	8.1	7.9	8	7.5
84		8.1	8.2	7.9	8.1	7.9	8	7.5

Initial pH-Units

Conc-%	Code	1	2	3	4	5	6	7
0	L	7.3	7.5	8.6	7.7	7.7	7.6	7.6
27		7.2	7.5	7.7	7.5	7.5	7.3	7.5
35		7.1	7.5	7.7	7.4	7.4	7.3	7.4
47		7.1	7.5	7.6	7.4	7.4	7.3	7.4
63		7	7.5	7.6	7.3	7.3	7.2	7.3
84		7	7.5	7.4	7.2	7.2	6.9	7.2

Ceriodaphnia 7-d Survival and Reproduction Test **Waypoint Analytical Tennessee , LLC.**

Final Temperature-°C

Conc-%	Code	1	2	3	4	5	6	7
0	L	23	23.7	23.6	21.4	23.8	22.4	23
27		22.9	23.5	23.4	21.4	23.7	22.3	22.9
35		23	23.6	23.3	21.5	23.8	22.4	22.8
47		23	23.6	23.2	21.4	23.8	22.2	22.8
63		23	23.5	23.3	21.6	23.7	22.3	22.7
84		23	23.6	23.2	21.4	23.8	22.2	22.7

Initial Temperature-°C

Conc-%	Code	1	2	3	4	5	6	7
0	L	23.5	23.5	23.4	23.1	22.7	23.8	23.9
27		24	24.1	23.7	23.6	23.2	24	24.3
35		24.5	24.2	23.3	23.5	23.4	24.2	24.5
47		24.8	24.2	23.3	23.7	23.7	24.3	24.8
63		25.3	24.3	23.5	23.9	24.2	24.6	25.1
84		25.8	24.6	24.2	24.4	24.6	25.2	25.8

CETIS Test Evaluation Report

Test Code: 20-322-0390 fh | 05-9062-7907

Facility:	Harrison Treatment Plant	**Test Name:**	Fathead Minnow 7-d Larval Survival and Growth Test
Sample Site:		**Organism:**	Pimephales promelas (Fathead Minnow)
Sample Code:	20-322-0390	**Protocol:**	EPA/821/R-02-013 (2002)
Sample Date:	16 Nov-20 08:30	**Start Date:**	17 Nov-20 14:22
Sample Age:	30h (0.4 °C)	**End Date:**	24 Nov-20 13:40
Project:	WET Quarterly Compliance Test (4Q)	**Duration:**	6d 23h **Organism Age:** <24

Permitee:	Harrison Treatment Plant	**Laboratory:**	Waypoint Analytical Tennessee , LLC.
Address:		**Address:**	2790 Whitten Road
	PO Box 1715		Memphis, TN 38133
	Harrison, AR 72601		
Contact:	Ms. Kathryn Catlin	**Contact:**	Ms. Blake Andres, Lab Supervisor
Phone:	870-741-5527	**Phone:**	901-271-5200, 901-213-2440(fax)
Email:	kathryn.catlin@cityofharrison.com	**Email:**	sandres@waypointanalytical.com

Comments:

Chronic Toxicity Evaluation

Endpoint	Criteria	Conc-%	IWC	Decision	Method
7d Survival Rate	NOEL/LOEL	84/>84	83.99	Passes IWC	Steel Many-One Rank Sum Test
Mean Dry Weight-mg	NOEL/LOEL	84/>84	83.99	Passes IWC	Dunnett Multiple Comparison Test

Test Acceptability Criteria

			TAC Limits			
Endpoint	**Attribute**	**Test Stat**	**Lower**	**Upper**	**Overlap**	**Decision**
7d Survival Rate	Control Resp	0.975	0.8	>>	Yes	Passes Acceptibility Criteria
Mean Dry Weight-mg	Control Resp	0.4	0.25	>>	Yes	Passes Acceptibility Criteria

Mean Dry Weight-mg Data Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	L	5	0.4	0.3662	0.4338	0.25	0.4875	0.04127	0.09228	23.07%	0.0%
27		5	0.45	0.4338	0.4662	0.4125	0.525	0.01976	0.0442	9.82%	-12.5%
35		5	0.4975	0.4777	0.5173	0.4125	0.55	0.02417	0.05405	10.87%	-24.38%
47		5	0.53	0.5101	0.5499	0.4625	0.6125	0.02424	0.0542	10.23%	-32.5%
63		5	0.5375	0.5178	0.5572	0.475	0.6125	0.02404	0.05377	10.00%	-34.38%
84		5	0.575	0.5503	0.5997	0.4875	0.6625	0.0301	0.06731	11.71%	-43.75%

7d Survival Rate Data Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	L	5	0.975	0.9545	0.9955	0.875	1	0.025	0.0559	5.73%	0.0%
27		5	0.9	0.8498	0.9502	0.75	1	0.06124	0.1369	15.21%	7.69%
35		5	0.975	0.9545	0.9955	0.875	1	0.025	0.0559	5.73%	0.0%
47		5	0.95	0.909	0.991	0.75	1	0.05	0.1118	11.77%	2.56%
63		5	0.9	0.8498	0.9502	0.75	1	0.06124	0.1369	15.21%	7.69%
84		5	1	1	1	1	1	0	0	0.00%	-2.56%

Fathead Minnow 7-d Larval Survival and Growth Test — **Waypoint Analytical Tennessee , LLC.**

Batch ID:	18-7914-5421	**Test Type:**	Growth-Survival (7d)	**Analyst:**	Ivey E. Wilkinson
Start Date:	17 Nov-20 14:22	**Protocol:**	EPA/821/R-02-013 (2002)	**Diluent:**	20% DMW
Ending Date:	24 Nov-20 13:40	**Species:**	Pimephales promelas	**Brine:**	Not Applicable
Duration:	6d 23h	**Source:**	Aquatic Biosystems, CO	**Age:**	<24
Sample ID:	16-9078-8217	**Code:**	20-322-0390	**Client:**	Harrison Treatment Plant
Sample Date:	16 Nov-20 08:30	**Material:**	POTW Effluent	**Project:**	WET Quarterly Compliance Test (4Q)
Receipt Date:	17 Nov-20 10:10	**Source:**	Harrison Treatment Plant (AR0034321)		
Sample Age:	30h (0.4 °C)	**Station:**			

Sample Renewals

Renewal	Sample Code	Sample Date	Receive Date	Renewal Date	Temp °C
1	20-322-0390	17 Nov-20 08:30	18 Nov-20 10:05	19 Nov-20 00:00	0.3
2	20-322-0390	19 Nov-20 09:00	20 Nov-20 10:00	21 Nov-20 00:00	2

Multiple Comparison Summary

Analysis ID	Endpoint	Comparison Method	NOEL	LOEL	TOEL	TU	PMSD ✓
10-9546-2601	7d Survival Rate	Steel Many-One Rank Sum Test	84	> 84	n/a	1.19	14.2%
09-2930-6815	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	84	> 84	n/a	1.19	23.5%

Test Acceptability

				TAC Limits			
Analysis ID	**Endpoint**	**Attribute**	**Test Stat**	**Lower**	**Upper**	**Overlap**	**Decision**
10-9546-2601	7d Survival Rate	Control Resp	0.975	0.8	>>	Yes	Passes Acceptibility Criteria
09-2930-6815	Mean Dry Weight-mg	Control Resp	0.4	0.25	>>	Yes	Passes Acceptibility Criteria

7d Survival Rate Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	L	5	0.9750	0.9056	1.0000	0.8750	1.0000	0.0250	0.0559	5.73%	0.00%
27		5	0.9000	0.7300	1.0000	0.7500	1.0000	0.0612	0.1369	15.21%	7.69%
35		5	0.9750	0.9056	1.0000	0.8750	1.0000	0.0250	0.0559	5.73%	0.00%
47		5	0.9500	0.8112	1.0000	0.7500	1.0000	0.0500	0.1118	11.77%	2.56%
63		5	0.9000	0.7300	1.0000	0.7500	1.0000	0.0612	0.1369	15.21%	7.69%
84		5	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.0000	0.00%	-2.56%

Mean Dry Weight-mg Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	L	5	0.4	0.2854	0.5146	0.25	0.4875	0.04127	0.09228	23.07%	0.00%
27		5	0.45	0.3951	0.5049	0.4125	0.525	0.01976	0.0442	9.82%	-12.50%
35		5	0.4975	0.4304	0.5646	0.4125	0.55	0.02417	0.05405	10.87%	-24.38%
47		5	0.53	0.4627	0.5973	0.4625	0.6125	0.02424	0.0542	10.23%	-32.50%
63		5	0.5375	0.4707	0.6043	0.475	0.6125	0.02404	0.05377	10.00%	-34.38%
84		5	0.575	0.4914	0.6586	0.4875	0.6625	0.0301	0.06731	11.71%	-43.75%

Fathead Minnow 7-d Larval Survival and Growth Test **Waypoint Analytical Tennessee , LLC.**

7d Survival Rate Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	L	0.8750	1.0000	1.0000	1.0000	1.0000
27		1.0000	1.0000	1.0000	0.7500	0.7500
35		0.8750	1.0000	1.0000	1.0000	1.0000
47		1.0000	1.0000	1.0000	0.7500	1.0000
63		1.0000	0.7500	1.0000	0.7500	1.0000
84		1.0000	1.0000	1.0000	1.0000	1.0000

Mean Dry Weight-mg Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	L	0.25	0.4625	0.4875	0.4	0.4
27		0.525	0.4375	0.45	0.425	0.4125
35		0.4125	0.5375	0.4875	0.55	0.5
47		0.5125	0.6125	0.5375	0.4625	0.525
63		0.5	0.5375	0.6125	0.475	0.5625
84		0.6625	0.575	0.5375	0.4875	0.6125

7d Survival Rate Binomials

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	L	7/8	8/8	8/8	8/8	8/8
27		8/8	8/8	8/8	6/8	6/8
35		7/8	8/8	8/8	8/8	8/8
47		8/8	8/8	8/8	6/8	8/8
63		8/8	6/8	8/8	6/8	8/8
84		8/8	8/8	8/8	8/8	8/8

Fathead Minnow 7-d Larval Survival and Growth Test — **Waypoint Analytical Tennessee , LLC.**

Batch ID:	18-7914-5421	**Test Type:**	Growth-Survival (7d)	**Analyst:**	Ivey E. Wilkinson
Start Date:	17 Nov-20 14:22	**Protocol:**	EPA/821/R-02-013 (2002)	**Diluent:**	20% DMW
Ending Date:	24 Nov-20 13:40	**Species:**	Pimephales promelas	**Brine:**	Not Applicable
Duration:	6d 23h	**Source:**	Aquatic Biosystems, CO	**Age:**	<24
Sample ID:	16-9078-8217	**Code:**	20-322-0390	**Client:**	Harrison Treatment Plant
Sample Date:	16 Nov-20 08:30	**Material:**	POTW Effluent	**Project:**	WET Quarterly Compliance Test (4Q)
Receipt Date:	17 Nov-20 10:10	**Source:**	Harrison Treatment Plant (AR0034321)		
Sample Age:	30h (0.4 °C)	**Station:**			

Fathead Minnow 7-d Larval Survival and Growth Test **Waypoint Analytical Tennessee , LLC.**

Total Residual Chlorine-mg/L

Conc-%	Code	1	2	3	4	5	6	7
0	L	0	0	0	0	0	0	0
27								
35								
47								
63								
84		0	0	0	0	0	0	0

Conductivity-µS/cm

Conc-%	Code	1	2	3	4	5	6	7
0	L	154.2	157.1	146.9	153	149.5	152.4	149.4
27								
35								
47								
63								
84		488	457	436	463	473	469	473

Final Dissolved Oxygen-mg/L

Conc-%	Code	1	2	3	4	5	6	7
0	L	7.1	6	7.6	7.7	6.5	6	7.4
27		7.2	6.6	7.5	7.8	6	6	7.1
35		7.1	6.7	7.7	7.6	5.7	6.4	7
47		7.1	6.7	7.7	7.6	6	6.4	7
63		7.1	6.7	7.9	7.7	6	6.5	6.9
84		6.9	6.9	7.9	7.5	5.8	6.2	7

Initial Dissolved Oxygen-mg/L

Conc-%	Code	1	2	3	4	5	6	7
0	L	8.6	7.7	8	8.2	8.3	8.4	8.1
27		8.8	8	8.6	8.4	8.5	8.6	8.4
35		8.8	8.2	8.6	8.5	8.6	8.8	8.5
47		8.8	8.3	8.7	8.7	8.7	8.9	8.7
63		8.9	8.4	8.8	8.9	8.7	9	8.8
84		9.1	8.6	9.2	9.2	8.8	9.3	9.1

Final pH-Units

Conc-%	Code	1	2	3	4	5	6	7
0	L	7.3	6.9	7.2	7.3	6.8	7	7.1
27		7.4	7.1	7.2	7.4	6.8	7	7
35		7.4	7	7.3	7.3	6.7	7.1	7.1
47		7.3	7.1	7.4	7.3	6.9	7.1	7.1
63		7.3	7.1	7.5	7.4	6.9	7.1	7.1
84		7.3	7.1	7.5	7.4	6.9	7.2	7.1

Initial pH-Units

Conc-%	Code	1	2	3	4	5	6	7
0	L	7.3	7.5	8.6	7.7	7.7	7.6	7.6
27		7.2	7.5	7.7	7.5	7.5	7.3	7.5
35		7.1	7.5	7.7	7.4	7.4	7.3	7.4
47		7.1	7.5	7.6	7.4	7.4	7.3	7.4
63		7	7.5	7.6	7.3	7.3	7.2	7.3
84		7	7.5	7.4	7.2	7.2	6.9	7.2

Fathead Minnow 7-d Larval Survival and Growth Test **Waypoint Analytical Tennessee , LLC.**

Final Temperature-°C

Conc-%	Code	1	2	3	4	5	6	7
0	L	23.7	23.9	24.4	24.1	24.8	24.4	24.5
27		23.9	24.1	23.8	23.9	24.8	24.3	24.1
35		24	24	24	24	24.7	24.3	24.1
47		24	24.1	24.1	24.1	24.9	24.4	24.3
63		24.1	24	24.3	24.2	24.8	24.3	24.2
84		24.1	24.1	24.4	24.2	24.9	24.2	24.3

Initial Temperature-°C

Conc-%	Code	1	2	3	4	5	6	7
0	L	23.5	23.5	23.4	23.1	22.7	23.8	23.9
27		24	24.1	23.7	23.6	23.2	24	24.3
35		24.5	24.2	23.3	23.5	23.4	24.2	24.5
47		24.8	24.2	23.3	23.7	23.7	24.3	24.8
63		25.3	24.3	23.5	23.9	24.2	24.6	25.1
84		25.8	24.6	24.2	24.4	24.6	25.2	25.8

Waypoint Analytical, Inc.
2790 Whitten Road
Memphis, TN 38133

Additional Toxicity Test Information

1. Methods/Instrumentation used in chemical analysis:
   - Dissolved oxygen, DM 4: (SM 4500-O G-2011)
   - pH, PH 21: (SM 4500-H + B-2011)
   - Temperature, T 83
   - Conductivity, C 1: (SM 2510 B-2011)
   - Alkalinity: (SM 2320 B-2011)
   - Hardness: (EPA 200.7 / SM 2340 B-2011)
   - Total Residual Chlorine: (SM 4500-CL G-2011)
     - Reported value of "0" indicates result below detection limit of 0.02 mg/L
     - Reported value of "1" indicates result above detection limit of 0.02 mg/L
   - EPA Acute Manual Edition and Date: EPA-821-R-02-012, OCT 2002 (Fifth edition)
   - EPA Chronic Manual Edition and Date: EPA-821-R-02-013, OCT 2002 (Fourth edition)

2. Laboratory
   - Temperature: Average: 25 °C Range: 25± 1°C
     - Incubator ID: BIO Thermometer ID: 120554
   - Light Cycle: 16 hours light/ 8 hours dark
   - Light intensity: 50-100 foot-candles, average
   - Control Water: Dilute mineral water made with 20 % Perrier in Nanopure
   - Dilution Water: Laboratory control water
   - Pretreatment: none

3. Method 1002.0 *Ceriodaphnia dubia* Survival and Reproduction
   - Test chambers: 30 mL disposable plastic beakers
   - Volume per chamber: 15 mL
   - Number of organisms per chamber: 1
   - Number of replicates: 10
   - Food: *Ceriodaphnia dubia* are fed 0.15mL *Raphidocelis subcapitata* (Algae) and YTC solution daily.
   - Acclimation of organisms: In house cultures are raised at 25°C. Purchased organisms are allowed to reach 25°C prior to use.

4. Method 1000.0 *Pimephales promelas* (Fathead minnow) Larval Survival and Growth
   - Test chambers: 20 oz. Disposable plastic cups
   - Volume per chamber: 250 mL
   - Average number of organisms per chamber: 8
   - Number of replicates per concentration: 5
   - Food: Fathead minnows are fed 0.15 mL *Artemia* brine shrimp hatched in laboratory twice daily
   - Acclimation of organisms: Dilution water is added until organisms are contained in a culture media that consists of 80% dilution water. Organisms are allowed to reach 25°C prior to use.

5. Reference Toxicity
   - Reference toxicity tests are performed monthly on each method performed by the laboratory.
   - Potassium Chloride is used as the reference toxicity chemical for vertebrate species
   - Current chemical ID: CS 6156984
   - Sodium Chloride is used as the reference toxicity chemical for invertebrate species
   - Current chemical ID: CS 6158581

6. Indicate below any other relevant information that may aid in the evaluation of this report. Include any deviations from EPA methodology that were necessary for these tests as well as any sample manipulations which were performed, such as aeration, dechlorination with sodium thiosulfate, etc. and the justification for such manipulations or deviations. Attach additional pages as needed.
   - None

Waypoint ANALYTICAL
2790 Whitten Road, Memphis, TN 38133
Main 901.213.2400 ° Fax 901.213.2440
www.waypointanalytical.com

03322
Harrison Wastewater Treatment Plant
Mr. Randy Reese
1508 Silver Valley Road
Harrison , AR 72601

Project Information : Bioassay
QTR 4-A- Bioassay 11/15-16/2020

Report Date : 12/01/2020
Report Number : **20-322-0390**
REPORT OF ANALYSIS
Received : 11/17/2020

Lab No : **98128** Matrix: **Aqueous**
Sample ID : **Composite 11/15-16/20** Sampled: **11/16/2020 8:30**

Test	Results	Units	MQL	DF	Date / Time Analyzed	By	Analytical Method
Alkalinity (as CaCO3)	**83**	mg/L	1	1	11/25/20 09:51	CXB	2320B-2011
Calcium	**46.6**	mg/L	0.500	1	11/26/20 03:36	JTR	EPA-200.7
Hardness as CaCO3(SM-2340B)	**129**	mg/L	0.100	1	11/26/20 03:36		EPA-200.7
Magnesium	**2.95**	mg/L	0.100	1	11/26/20 03:36	JTR	EPA-200.7

Lab No : **98532** Matrix: **Aqueous**
Sample ID : **Composite 11/16-17/20** Sampled: **11/17/2020 8:30**

Test	Results	Units	MQL	DF	Date / Time Analyzed	By	Analytical Method
Alkalinity (as CaCO3)	**82**	mg/L	1	1	11/25/20 09:51	CXB	2320B-2011
Calcium	**46.3**	mg/L	0.500	1	11/26/20 03:42	JTR	EPA-200.7
Hardness as CaCO3(SM-2340B)	**128**	mg/L	0.100	1	11/26/20 03:42		EPA-200.7
Magnesium	**2.98**	mg/L	0.100	1	11/26/20 03:42	JTR	EPA-200.7

Lab No : **99836** Matrix: **Aqueous**
Sample ID : **Composite 11/18-19/20** Sampled: **11/19/2020 9:00**

Test	Results	Units	MQL	DF	Date / Time Analyzed	By	Analytical Method
Alkalinity (as CaCO3)	**82**	mg/L	1	1	11/25/20 09:51	CXB	2320B-2011
Calcium	**45.2**	mg/L	0.500	1	11/26/20 03:57	JTR	EPA-200.7
Hardness as CaCO3(SM-2340B)	**126**	mg/L	0.100	1	11/26/20 03:57		EPA-200.7
Magnesium	**3.07**	mg/L	0.100	1	11/26/20 03:57	JTR	EPA-200.7

Qualifiers/ Definitions
DF Dilution Factor
MQL Method Quantitation Limit
L Limit Exceeded

Waypoint ANALYTICAL

2790 Whitten Road, Memphis, TN 38133
Main 901.213.2400 ° Fax 901.213.2440
www.waypointanalytical.com

#1

Kit ID:	**146831**
Initiated By:	**Sydney Andres**
Initiated Date:	**10/28/2020**
Project Comment	Harrison WWTP Bioassay

CHAIN-OF-CUSTODY

20-322-0390
03322
11-17-2020
11:00:14
Harrison Wastewater Treatment Plant
Bioassay

Company Name	Company Number	Client Project Manager/Contact	Purchase Order Number
Harrison Wastewater Treatment Plant	03322	Harrison Wastewater Treatment Plant	
Site Name	**Project Number**	☐ RUSH – Additional charges apply ☐ Special Detection Limits(s) Date Results Needed	**Method of Shipment** ☐ Fed Ex ☑ UPS ☐ USPS ☐ Courier ☐ Client Drop Off Other
QTR 4 - A - Bioassay 11/15-16/2020			
LIMS Project ID	**Project Manager Phone #**	**Project Manager Email**	**Site/Facility ID #**
Harrison - Bioassay	(870) 741-5527		

Date	Time	Sample ID	Matrix	Grab/ Comp	# of Cont	Container Type	Preservation	Analyses
11/15-16/20	08:30 to 08:39	Composite 1	Aqueous	C	1	Plastic - Pint	HNO3 - Nitric Acid	hardness
11/15-16/20	08:30 to 08:30	Composite 1	Aqueous	C	1	Plastic - Pint	NONE	Alkalinity
11/15-16/20	08:30 to 08:30	Composite 1	Aqueous	C	2	Plastic - Gallon	NONE	Chronic CD/FH

For Laboratory Use Only			Sampled by (Name - Print)	Client Remarks/Comments			
Ice	Custody Seals	Lab Comments	Randy Reese				
(Y)/N	Y/(N)		Relinquished by: (SIGNATURE)	Date Time	Received by: (SIGNATURE)	Date Time	
(Blank)/Cooler Temp			Randy Reese	11-16-20/09:09			
0.4 T1a mw			Relinquished by: (SIGNATURE)	Date Time	Received by: (SIGNATURE)	Date Time	
			Relinquished by: (SIGNATURE)	Date Time	Received by: (SIGNATURE)	Date Time	
					Makayla Weaver	11/17/20 1010	

Waypoint ANALYTICAL

2790 Whitten Road, Memphis, TN 38133
Main 901.213.2400 ° Fax 901.213.2440
www.waypointanalytical.com

Kit ID:	**146833**
Initiated By:	**Sydney Andres**
Initiated Date:	**10/28/2020**
Project Comment	Harrison WWTP Bioassay

CHAIN-OF-CUSTODY

#2

Company Name	Company Number	Client Project Manager/Contact	Purchase Order Number
Harrison Wastewater Treatment Plant	03322	Harrison Wastewater Treatment Plant	
Site Name	**Project Number**	☐ RUSH – Additional charges apply ☐ Special Detection Limits(s) Date Results Needed	**Method of Shipment** ☐ Fed Ex ☑ UPS ☐ USPS ☐ Courier ☐ Client Drop Off Other
QTR 4 - B - Bioassay 11/17-18/2020			
LIMS Project ID	**Project Manager Phone #**	**Project Manager Email**	**Site/Facility ID #**
Harrison - Bioassay	(870) 741-5527		

Date	Time	Sample ID	Matrix	Grab/ Comp	# of Cont	Container Type	Preservation	Analyses
11/16-17/20	08:30 to 08:30	Composite 2	Aqueous	C	1	Plastic - Pint	HNO3 - Nitric Acid	hardness
11/16-17/20	08:30 to 08:30	Composite 2	Aqueous	C	1	Plastic - Pint	NONE	Alkalinity
11/16-17/20	08:30 to 08:30	Composite 2	Aqueous	C	2	Plastic - Gallon	NONE	Chronic CD/FH

20-322-0390
03322
11-17-2020
11:00:14
Harrison Wastewater Treatment Plant
Bioassay / 11/17/20

For Laboratory Use Only			Sampled by (Name - Print)	Client Remarks/Comments			
Ice	Custody Seals	Lab Comments	Randy Reese				
(Y)/N	Y/(N)		Relinquished by: (SIGNATURE)	Date Time	Received by: (SIGNATURE)	Date Time	
Blank/Cooler Temp			Randy Reese	11/17/20 09:00			
0.3 T102 SLH			Relinquished by: (SIGNATURE)	Date Time	Received by: (SIGNATURE)	Date Time	
			Relinquished by: (SIGNATURE)	Date Time	Received by: (SIGNATURE)	Date Time	
					Summer Harrison	11/18/20 10:05	

Waypoint ANALYTICAL

2790 Whitten Road, Memphis, TN 38133
Main 901.213.2400 ° Fax 901.213.2440
www.waypointanalytical.com

Kit ID:	**146835**
Initiated By:	**Sydney Andres**
Initiated Date:	**10/28/2020**
Project Comment	Harrison WWTP Bioassay

CHAIN-OF-CUSTODY

#3

Company Name	**Company Number**	**Client Project Manager/Contact**	**Purchase Order Number**
Harrison Wastewater Treatment Plant	03322	Harrison Wastewater Treatment Plant	
Site Name	**Project Number**	☐ RUSH – Additional charges apply ☐ Special Detection Limits(s) Date Results Needed	**Method of Shipment** ☐ Fed Ex ☑ UPS ☐ USPS ☐ Courier ☐ Client Drop Off Other
QTR 4 - C - Bioassay 11/19-20/2020			
LIMS Project ID	**Project Manager Phone #**	**Project Manager Email**	**Site/Facility ID #**
Harrison - Bioassay	(870) 741-5527		

Date	Time	Sample ID	Matrix	Grab/ Comp	# of Cont	Container Type	Preservation	Analyses
11/18-19/20	09:00 to 09:00	Composite 3	Aqueous	C	1	Plastic - Pint	HNO3 - Nitric Acid	hardness
11/18-19/20	09:00 to 09:00	Composite 3	Aqueous	C	1	Plastic - Pint	NONE	Alkalinity
11/18-19/20	09:00 to 09:00	Composite 3	Aqueous	C	3	Plastic - Gallon	NONE	Chronic CD/FH

20-322-0390
03322
11-17-2020
11:00:14
Harrison Wastewater Treatment Plant
Bioassay / 11/17/20/11/18/20

tracking# 1Z A48 A05 84 9198 8982

For Laboratory Use Only			Sampled by (Name - Print)	Client Remarks/Comments			
Ice	Custody Seals	Lab Comments	Randy Reese				
Y/N	Y/N		Relinquished by: (SIGNATURE)	Date Time	Received by: (SIGNATURE)	Date Time	
			[signature]	11-19-20/09:20			
Blank/Cooler Temp			Relinquished by: (SIGNATURE)	Date Time	Received by: (SIGNATURE)	Date Time	
2.0°C T100 T0			Relinquished by: (SIGNATURE)	Date Time	Received by: (SIGNATURE)	Date Time	
					Summer Harrison	11/20/20 10:00	

Sample ID: Harrison | Date/Time Start: 11/17/2020 14:10 | Analyst: IW

Report # 20-322-0390 | Date/Time End: 11/24/2020 14:09 | Analyst: CF

Data Entered By: IW 11/25/20 (date / initial) | Data Reviewed By: SBA 11/25/20. (date / initial)

Method 1002.0 - Ceriodaphnia dubia Survival and Reproduction Data

7 DAYS

Conc. % EFF	Day #	Replicate 1	2	3	4	5	6	7	8	9	10	Total live young	# live Adults	Young per Live adult
Control	1	0	0	0	0	0	0	0	0	0	0	0	10	0.0
	2	0	0	0	0	0	0	0	0	0	0	0	10	0.0
	3	0	0	0	0	0	0	0	0	0	0	0	10	0.0
	4	5	4	6	1	0	5	4	3	5	4	37	10	3.7
	5	8	10	0	8	0	0	9	8	0	10	53	10	5.3
	6	0	0	0	0	0	14	0	0	0	0	14	10	1.4
	7	5	8	10	10	0	0	4	8	14	20	79	10	7.9
Replicate Totals	-----	18	22	16	19	Male	19	17	19	19	34	Avg. Yng/ adult=	20.33 ~~18.30~~	% Coeff 26.48
32	1	0	0	0	0	0	0	0	0	0	0	0	10	0.0
	2	0	0	0	0	0	0	0	0	0	0	0	10	0.0
	3	0	0	0	0	0	0	0	0	0	0	0	10	0.0
	4	5	3	3	5	1	4	0	3	3	3	30	10	3.0
	5	9	6	8	9	9	10	0	12	11	1	75	10	7.5
	6	0	0	0	0	0	0	0	0	0	0	0	10	0.0
	7	9	0	9	11	8	9	0	6	8	0	60	10	6.0
Replicate Totals	-----	23	9	20	25	18	23	F 0	21	22	4	Avg. Yng/ adult=	16.50	% Coeff 53.70
42	1	0	0	0	0	0	0	0	0	0	0	0	10	0.0
	2	0	0	0	0	0	0	0	0	0	0	0	10	0.0
	3	0	0	0	0	0	0	0	0	0	0	0	10	0.0
	4	6	4	3	3	2	4	0	3	2	6	33	10	3.3
	5	6	8	7	7	5	0	4	2	6	3	48	10	4.8
	6	0	0	0	0	0	9	0	0	1	0	10	10	1.0
	7	8	0	0	11	5	6	9	0	7	9	55	10	5.5
Replicate Totals	-----	20	12	10	21	12	19	13	5	16	18	Avg. Yng/ adult=	14.60	% Coeff 34.81
56	1	0	0	0	0	0	0	0	0	0	0	0	10	0.0
	2	0	0	0	0	0	0	0	0	0	0	0	10	0.0
	3	0	0	0	0	0	0	0	0	0	0	0	10	0.0
	4	6	5	4	3	3	3	5	4	3	4	40	10	4.0
	5	10	7	0	7	0	5	0	1	8	5	43	10	4.3
	6	1	0	0	0	0	0	0	0	0	0	1	10	0.1
	7	11	9	4	8	0	7	12	0	9	7	67	10	6.7
Replicate Totals	-----	28	21	8	18	3	15	17	5	20	16	Avg. Yng/ adult=	15.10	% Coeff 51.15
75	1	0	0	0	0	0	0	0	0	0	0	0	10	0.0
	2	0	0	0	0	0	0	0	0	0	0	0	10	0.0
	3	0	0	0	0	0	0	0	0	0	0	0	10	0.0
	4	6	3	7	4	0	0	4	0	4	5	33	10	3.3
	5	13	1	5	0	5	11	7	0	5	0	47	10	4.7
	6	0	0	0	0	0	0	0	0	1	0	1	10	0.1
	7	11	9	0	6	14	0	12	0	7	6	65	10	6.5
Replicate Totals	-----	30	13	12	10	19	11	23	F 0	17	11	Avg. Yng/ adult=	14.60	% Coeff 56.04
100	1	0	0	0	0	0	0	0	0	0	0	0	10	0.0
	2	0	0	0	0	0	0	0	0	0	0	0	10	0.0
	3	0	0	0	0	0	0	0	0	0	0	0	10	0.0
	4	6	5	6	3	0	4	3	4	5	4	40	10	4.0
	5	10	8	10	12	7	2	7	9	4	7	76	10	7.6
	6	2	0	0	x	11	0	0	0	0	0	13	10	1.3
	7	16	12	6	x	0	9	11	15	0	7	76	10	7.6
Replicate Totals	-----	34	25	22	15	18	15	21	28	9	18	Avg. Yng/ adult=	20.50	% Coeff 35.12

183/9 = 20.33

#'s represent the number of young per live organism.
X represents death of the organism.
M represents a missing organism.

Parameters for control acceptability:
- the average number of live adults must be >= 80 %
- the average number a young per live adult must be >= 15.
- 60 % of the controls must produce 3 broods.

20-322-0390 excel

Sample ID:

REP	Control	32	42	56	75	100
A	18	23	20	28	30	34
B	22	9	12	21	13	25
C	16	20	10	8	12	22
D	19	25	21	18	10	15
E	Male	18	12	3	19	18
F	19	23	19	15	11	15
G	17	0	13	17	23	21
H	19	21	5	5	0	28
I	19	22	16	20	17	9
J	34	4	18	16	11	18
%CV	26.5	53.7	34.8	51.2	56.0	35.1

Sample ID: Harrison | Date/Time Start: 11/17/2020 14:22 | Analyst: IW

Report # 20-322-0390 | Date/Time End: 11/24/20 13:40 | Analyst: CF

Data Entered By: IW 11/25/20 (date / initial) | Data Reviewed By: SBA 11/25/20 (date / initial)

Method 1000.0 - *Pimephales promelas* (Fathead Minnow) Survial and Growth Data

Conch % EFF	REP	DAY 0	1	2	3	4	5	6	7	Proportion Survival	Avg. Dry Wt. surviving org (mg)	Avg. Dry Wt. original org (mg)	initial weight	final weight
Control	A	8	8	8	8	8	8	8	7	0.88	0.286	0.250	26.7045	26.7065
	B	8	8	8	8	8	8	8	8	1.00	0.462	0.462	31.2692	31.2729
	C	8	8	8	8	8	8	8	8	1.00	0.488	0.488	32.9917	32.9956
	D	8	8	8	8	8	8	8	8	1.00	0.400	0.400	23.7020	23.7052
	E	8	8	8	8	8	8	8	8	1.00	0.400	0.400	31.2802	31.2834
										Mean proportion survival =	0.98			
										Mean average weight (original organisms) mg =	0.4000	Survival % COEF =	5.73	
										Mean average weight (surviving organisms) mg =	0.4071	Growth % COEF =	23.07	
32	A	8	8	8	8	8	8	8	8	1.00		0.525	22.6135	22.6177
	B	8	8	8	8	8	8	8	8	1.00		0.437	31.5058	31.5093
	C	8	8	8	8	8	8	8	8	1.00		0.450	25.5921	25.5957
	D	8	8	8	8	8	7	7	6	0.75		0.425	28.8802	28.8836
	E	8	8	8	8	8	6	6	6	0.75		0.412	30.9684	30.9717
										Mean proportion survival =	0.90			
										Mean average weight (original organisms) mg =	0.4500	Survival % COEF =	15.21	
												Growth % COEF =	9.82	
42	A	8	8	8	8	8	8	8	7	0.88		0.412	32.3952	32.3985
	B	8	8	8	8	8	8	8	8	1.00		0.538	31.3817	31.3860
	C	8	8	8	8	8	8	8	8	1.00		0.488	29.5274	29.5313
	D	8	8	8	8	8	8	8	8	1.00		0.550	27.2258	27.2302
	E	8	8	8	8	8	8	8	8	1.00		0.500	30.9414	30.9454
										Mean proportion survival =	0.98			
										Mean average weight (original organisms) mg =	0.4975	Survival % COEF =	5.73	
												Growth % COEF =	10.87	
56	A	8	8	8	8	8	8	8	8	1.00		0.513	41.7581	41.7622
	B	8	8	8	8	8	8	8	8	1.00		0.612	30.8793	30.8842
	C	8	8	8	8	8	8	8	8	1.00		0.538	32.1624	32.1667
	D	8	8	8	8	8	7	7	6	0.75		0.462	25.5501	25.5538
	E	8	8	8	8	8	8	8	8	1.00		0.525	26.0374	26.0416
										Mean proportion survival =	0.95			
										Mean average weight (original organisms) mg =	0.5300	Survival % COEF =	11.77	
												Growth % COEF =	10.23	
75	A	8	8	8	8	8	8	8	8	1.00		0.500	29.3606	29.3646
	B	8	8	8	8	7	7	7	6	0.75		0.538	28.7302	28.7345
	C	8	8	8	8	8	8	8	8	1.00		0.612	31.0984	31.1033
	D	8	8	8	7	7	7	7	6	0.75		0.475	30.7122	30.7160
	E	8	8	8	8	8	8	8	8	1.00		0.563	29.2305	29.2350
										Mean proportion survival =	0.90			
										Mean average weight (original organisms) mg =	0.5375	Survival % COEF =	15.21	
												Growth % COEF =	10.00	
100	A	8	8	8	8	8	8	8	8	1.00		0.663	24.6940	24.6993
	B	8	8	8	8	8	8	8	8	1.00		0.575	25.9296	25.9342
	C	8	8	8	8	8	8	8	8	1.00		0.538	25.1913	25.1956
	D	8	8	8	8	8	8	8	8	1.00		0.488	34.3290	34.3329
	E	8	8	8	8	8	8	8	8	1.00		0.612	29.5756	29.5805
										Mean proportion survival =	1.00			
										Mean average weight (original organisms) mg =	0.5750	Survival % COEF =	0.00	
												Growth % COEF =	11.71	

Parameters for control acceptability:

- the mean proportion survival must be >= 80 %
- the mean average weight must be >= 0.250mg

Sample ID:

SURVIVAL

# org	CONC	A	B	C	D	E	24HR	48HR	7DAY	%CV
7	Control	88	100	100	100	100	100	100	98	5.73
8	32	100	100	100	75	75	100	100	90	15.21
8	42	88	100	100	100	100	100	100	98	5.73
8	56	100	100	100	75	100	100	100	95	11.77
8	75	100	75	100	75	100	100	100	90	15.21
8	100	100	100	100	100	100	100	100	100	0.00

GROWTH

CONC	A	B	C	D	E	MEAN	%CV
Control	0.250	0.462	0.488	0.400	0.400	0.4000	23.07
32	0.525	0.437	0.450	0.425	0.412	0.4500	9.82
42	0.412	0.538	0.488	0.550	0.500	0.4975	10.87
56	0.513	0.612	0.538	0.462	0.525	0.5300	10.23
75	0.500	0.538	0.612	0.475	0.563	0.5375	10.00
100	0.663	0.575	0.538	0.488	0.612	0.5750	11.71

Waypoint Analytical, LLC.
READINGS DATA SHEET FOR 7-DAY CHRONIC TESTING

SAMPLE ID: Harrison

Report Number: 20-322-0390 **Date test started:** 11/17/20

	DAY	1	2	3	4	5	6	7
INITIAL READINGS	pH CTRL	7.3	7.5	8.0	7.7	7.7	7.6	7.6
	Initial R							
	1	7.2	7.5	7.7	7.5	7.5	7.3	7.5
	2	7.1	7.5	7.7	7.4	7.4	7.3	7.4
	3	7.1	7.5	7.6	7.4	7.4	7.3	7.4
	4	7.0	7.5	7.6	7.3	7.3	7.2	7.3
	5	7.0	7.5	7.4	7.2	7.2	6.9	7.2
	DO CTRL	8.6	7.7	8.0	8.2	8.3	8.4	8.1
	Initial (mg/L) R							
	1	8.8	8.0	8.6	8.4	8.5	8.6	8.4
	2	8.8	8.2	8.6	8.5	8.6	8.8	8.5
	3	8.8	8.3	8.7	8.7	8.7	8.9	8.7
	4	8.9	8.4	8.8	8.9	8.7	9.0	8.8
	5	9.1	8.6	9.2	9.2	8.8	9.3	9.1
	Temp CTRL	23.5	23.5	23.4	23.1	22.7	23.8	23.9
	Initial (°C) R							
	1	24.0	24.1	23.7	23.6	23.2	24.0	24.3
	2	24.5	24.2	23.3	23.5	23.4	24.2	24.5
	3	24.8	24.2	23.3	23.7	23.7	24.3	24.8
	4	25.3	24.3	23.5	23.9	24.2	24.6	25.1
	5	25.8	24.6	24.2	24.1	24.6	25.2	25.8
	ANALYST:	CF	CF	CF	CF	IW	IW	IW
	DATE:	11/17/20	11/18/20	11/19/20	11/20/20	11/21/20	11/22/20	11/23/20
CERIODAPHNIA DUBIA READINGS	pH - CD CTRL	8.6	8.1	8.0	8.0	7.8	7.8	7.5
	After 24 hrs. R							
	1	8.0	8.1	7.9	8.1	7.8	7.9	7.5
	2	8.2	8.1	7.9	8.1	7.8	7.9	7.5
	3	8.1	8.2	7.9	8.1	7.9	7.9	7.5
	4	8.1	8.2	7.9	8.1	7.9	8.0	7.5
	5	8.1	8.2	7.9	8.1	7.9	8.0	7.5
	DO - CD CTRL	8.1	8.7	8.8	8.7	9.0	8.4	8.2
	After 24 hrs. R							
	1	7.8	8.7	8.6	9.0	9.0	8.4	8.3
	2	7.8	8.6	8.7	9.0	8.9	8.4	8.4
	3	7.9	8.6	8.7	8.9	8.9	8.5	8.4
	4	8.0	8.6	8.7	8.9	8.9	8.4	8.3
	5	8.0	8.5	8.6	8.9	9.0	8.4	8.3
	Temp CTRL	23.6	23.7	23.6	21.4	23.8	22.4	23.0
	After 24 hrs (°C) R							
	1	22.9	23.5	23.4	21.4	23.7	22.3	22.9
	2	23.0	23.6	23.3	21.5	23.8	22.4	22.8
	3	↓	23.6	23.2	21.4	23.8	22.2	22.8
	4		23.5	23.3	21.6	23.7	22.3	22.7
	5		23.6	23.2	21.4	23.8	22.2	22.7
	ANALYST:	CF	IW	CF	IW	IW	IW	CF
	DATE:	11/18/20	11/19/20	11/20/20	11/21/20	11/22/20	11/23/20	11/24/20

Waypoint Analytical, LLC.

READINGS DATA SHEET FOR 7-DAY CHRONIC TESTING

SAMPLE ID: Harrison

Report Number: 20-322-0390 **Date test started:** 11/17/20

FATHEAD MINNOW READINGS

DAY	1	2	3	4	5	6	7
pH - FH CTRL	7.3	6.9	7.2	7.3	6.8	7.0	7.1
After 24 hrs. R							
1	7.4	7.1	7.2	7.4	6.8	7.0	7.0
2	7.4	7.6	7.3	7.3	6.7	7.1	7.1
3	7.3	7.1	7.4	7.3	6.9	7.1	7.1
4	7.3	7.1	7.5	7.4	6.9	7.1	7.1
5	7.3	7.1	7.5	7.4	6.9	7.2	7.1
DO - FH CTRL	7.1	6.0	7.6	7.7	6.5	6.0	7.4
After 24 hrs. R							
1	7.2	6.6	7.5	7.8	6.0	6.0	7.1
2	7.1	6.7	7.7	7.6	5.7	6.4	7.0
3	7.1	6.7	7.7	7.6	6.0	6.4	7.0
4	7.1	6.7	7.9	7.7	6.0	6.5	6.9
5	6.9	6.9	7.9	7.5	5.8	6.2	7.0
Temp CTRL	23.7	23.9	24.4	24.1	24.8	24.4	24.5
After 24 hrs (°C)R							
1	23.9	24.1	23.8	23.9	24.8	24.3	24.1
2	24.0	24.0	24.0	24.0	24.7	24.3	24.1
3	24.0	24.1	24.1	24.1	24.9	24.4	24.3
4	24.1	24.0	24.3	24.2	24.8	24.3	24.2
5	24.1	24.1	24.4	24.2	24.9	24.2	24.3
ANALYST:	CF	CF	CF	IW	IW	IW	CF
DATE:	11/18/20	11/19/20	11/20/20	11/21/20	11/22/20	11/23/20	11/24/20

Conductivity (µS/cm)

INITIAL READINGS

Initial CTRL	154.2	157.1	1460.9	153.0	149.5	152.4	149.4
R							
100%	488	457	436	463	473	469	473
INITIAL :	IW	IW	CF	CF	IW	IW	IW
DATE :	11/17/20	11/18/20	11/19/20	11/20/20	11/21/20	11/22/20	11/23/20

Total Residual Chlorine **DL = 0.02mg/L**

Initial CTRL	<0.02		<0.02		<0.02		
R							
100%	<0.02		<0.02		<0.02		
INITIAL :	IW		CF		IW		
DATE :	11/17/20		11/19/20		11/21/20		
DPD Cl2 Reagent	20-Reag- 4346		20-Reag- 4346		20-Reag- 4346		

Comments / Observations:

Tests are maintained at 25 ± 1 ° C

Incubator ID: BIO Thermometer ID: 120554

Meter	ID
pH	PH 21
Conductivity	C1
DO	DM4
Temp.	T83

Waypoint Analytical, LLC.

CERIODAPHNIA SURVIVAL AND REPRODUCTION DATA

SAMPLE ID: Harrison

TEST START - DATE/TIME: 11/17/20 1410 ANALYST: IW

REPORT #: 20-322-0390

TEST END - DATE/TIME: 11/24/20 1409 ANALYST: CF

ORGANISM REF#: 19-REAG- 61916

RANDOMIZING KEY #: 10CC ANALYST: IW

CONC. 1	REPLICATE											
DAY	1	2	3	4	5	6	7	8	9	10	INITIALS	DATE
1	0	0	0	0	0	0	0	0	0	0	CF	11/18/20
2	0	0	0	0	0	0	0	0	0	0	CF	11/19/20
3	0	0	0	0	0	0	0	0	0	0	CF	11/20/20
4	6	4	3	3	1	4	5	3	5	4	IW	11/21/20
5	10	8	8	7	9	2	0	12	4	7	IW	11/22/20
6	2	0	0	0	8	0	0	0	0	0	IW	11/23/20
7	16	0	9	11	8	9	12	6	0	7	CF	11/24/20

CONC. 2	REPLICATE										
DAY	1	2	3	4	*(5) male	6	7	8	9	10	INITIALS
1	0	0	0	0	0	0	0	0	0	0	CF
2	0	0	0	0	0	0	0	0	0	0	CF
3	0	0	0	0	0	0	0	0	0	0	CF
4	6	3	6	3	0	5	4	4	3	4	IW
5	13	1	0	7	IW 0	0	7	1	8	5	IW
6	0	0	0	0	0	0	0	0	0	0	IW
7	11	9	10	8	0	14	12	0	9	7	CF

CONC. 3	REPLICATE										
DAY	1	2	3	4	5	6	7 female	8 female	9	10	INITIALS
1	0	0	0	0	0	0	0	0	0	0	CF
2	0	0	0	0	0	0	0	0	0	0	CF
3	0	0	0	0	0	0	0	0	0	0	CF
4	6	5	3	5	2	4	0	0	4	6	IW
5	6	7	7	9	5	10	0	0	5	3	IW
6	0	0	0	0	0	0	0	0	1	0	IW
7	8	9	0	11	5	9	0	0	7	4	CF

CONC. 4	REPLICATE										
DAY	1	2	3	4	5	6	7	8	9	10	INITIALS
1	0	0	0	0	0	0	0	0	0	0	CF
2	0	0	0	0	0	0	0	0	0	0	CF
3	0	0	0	0	0	0	0	0	0	0	CF
4	5	3	4	4	3	3	0	3	5	4	IW
5	8	6	0	0	0	5	4	8	0	10	IW
6	0	0	0	0	0	0	0	0	0	0	IW
7	5	0	4	6	0	7	9	8	14	20	CF

CONC. 5	REPLICATE										
DAY	1	2	3	4	5	6	7	8	9	10	INITIALS
1	0	0	0	0	0	0	0	0	0	0	CF
2	0	0	0	0	0	0	0	0	0	0	CF
3	0	0	0	0	0	0	0	0	0	0	CF
4	5	4	6	1	0	0	4	3	2	3	IW
5	9	10	10	8	7	11	9	2	6	1	IW
6	0	0	0	0	11	0	0	0	1	0	IW
7	9	8	6	10	0	0	4	0	7	0	CF

CONC. 6	REPLICATE										
DAY	1	2	3	4	5	6	7	8	9	10	INITIALS
1	0	0	0	0	0	0	0	0	0	0	CF
2	0	0	0	0	0	0	0	0	0	0	CF
3	0	0	0	0	0	0	0	0	0	0	CF
4	6	5	7	3	0	0	3	4	3	5	IW
5	10	8	5	12	5	0	7	9	11	0	IW
6	1	0	0	X	0	9	0	0	8	0	IW
7	11	12	0		14	6	11	15	8	6	CF

WAYPOINT ANALYTICAL, LLC.
TEST TRACEABILITY RECORD
7-DAY CERIODAPHNIA DUBIA

SAMPLE ID: Harrison REPORT # 20-322-0390

DATE START: 11/17/20 DATE END: 11/24/20

CERIODAPHNIA DUBIA REFERENCE # **19-REAG-** 6196

Neonates obtained from: (circle) Brood Tray ID: **Monday / (Tuesday) / Wednesday A / (B)**
Brood Tray Set: **Y / P / (B) / O / G**

REFERENCE NUMBERS

PARAMETER	DATE	INITIALS	TEST DAY	ALGAE	YCT
CHRONIC	11/17/20	IW	0	20-REAG- 5039	20-REAG- 4871
	11/18/20	CF	1	20-REAG- 5039	20-REAG- 4871
	11/19/20	CF	2	20-REAG- 5039	20-REAG- 4871
	11/20/20	CF	3	20-REAG- 5039	20-REAG- 5040
	11/21/20	IW	4	20-REAG- 5039	20-REAG- 5040
	11/22/20	IW	5	20-REAG- 5170	20-REAG- 5040
	11/23/20	IW	6	20-REAG- 5170	20-REAG- 5040

TEST DAY	CONTROL WATER	SAMPLE LAB ID
0	20-REAG- 5149	L98128
1	20-REAG- 5152	↓
2	20-REAG- 5178/87	L98532
3	20-REAG- 5196	↓
4	20-REAG- 5231	L99836
5	20-REAG- 5247	↓
6	20-REAG- 5257	↓

COMMENTS: YCT is filtered with 60 - micron mesh to remove additional debris.
Organisms are fed 0.15 mL Algae and YCT daily after renewal.
Test conducted at 25 ±1 °C Incubator ID: BIO / Thermometer ID: 120554

ANALYST COMMENTS:
If an organisms did not produce any broods, check under microscope for sex of organism.
Annotate the Concentration and Replicate of organism that is MALE: 2-5. SRA 11/25/20.

WAYPOINT ANALYTICAL, LLC.

CERIODAPHNIA RANDOMIZATION TRANSLATION

RANDOMIZING KEY #: 10CC

REPORT # 20-322-0390

TEST CONCENTRATIONS: 1: Control 2: 27 3: 35 4: 47 5: 63 6: 84

Row	REPLICATE									
	1	2	3	4	5	6	7	8	9	10
1	6	3	2	3	2	6	4	2	6	6

Row	REPLICATE									
	1	2	3	4	5	6	7	8	9	10
2	5	5	1	4	1	1	5	4	4	4

Row	REPLICATE									
	1	2	3	4	5	6	7	8	9	10
3	3	4	3	2	3	2	2	5	5	3

Row	REPLICATE									
	1	2	3	4	5	6	7	8	9	10
4	1	2	4	5	4	4	3	1	1	1

Row	REPLICATE									
	1	2	3	4	5	6	7	8	9	10
5	2	1	6	1	6	5	1	3	3	2

Row	REPLICATE									
	1	2	3	4	5	6	7	8	9	10
6	4	6	5	6	5	3	6	6	2	5

Waypoint Analytical, LLC.

TEST DATA SHEET FOR FATHEAD MINNOW SURVIVAL (7-DAY)

SAMPLE ID: Harrison REPORT #: 20-322-0390

TEST START - DATE/TIME: 11/17/20 1422 ANALYST: IW

TEST END - DATE/TIME : 11/24/20 1340 ANALYST: CF

NOTE: PER ADEQ REQUIREMENTS THE INTIAL NUMBER OF FISH PER REPLICATE MUST BE 8 II

CONC.		REP NO.	NO. OF SURVIVORS DAY 0	1	2	3	4	5	6	7	REMARKS
1	84	A	8	8	8	8	8	8	8	8	
	C	B	8	8	8	8	8	8	8	7	
	63	C	8	8	8	8	8	8	8	8	
	27	D	8	8	8	8	8	8	8	8	
	47	E	8	8	8	8	8	8	8	8	
2	63	A	8	8	8	8	7	7	7	6	
	27	B	8	8	8	8	8	8	8	8	
	35	C	8	8	8	8	8	8	8	7	
	84	D	8	8	8	8	8	8	8	8	
	C	E	8	8	8	8	8	8	8	8	
3	35	A	8	8	8	8	8	8	8	8	
	84	B	8	8	8	8	8	8	8	8	
	47	C	8	8	8	8	8	8	8	8	
	C	D	8	8	8	8	8	8	8	8	
	35	E	8	8	8	8	8	8	8	8	
4	27	A	8	8	8	8	8	8	8	8	
	47	B	8	8	8	8	8	8	8	8	
	84	C	8	8	8	8	8	8	8	8	
	C	D	8	8	8	8	8	8	8	8	
	63	E	8	8	8	8	8	8	8	8	
5	C	A	8	8	8	8	8	8	8	8	
	63	B	8	8	8	7	7	7	7	6	
	35	C	8	8	8	8	8	8	8	8	
	47	D	8	8	8	8	8	9	7	CF: 7 6	
	27	E	8	8	8	8	8	7	7	6	
6	27	A	8	8	8	8	8	6	6	6	
	35	B	8	8	8	8	8	8	8	8	
	47	C	8	8	8	8	8	8	8	8	
	63	D	8	8	8	8	8	8	8	8	
	84	E	8	8	8	8	8	8	8	8	
INITIALS			IW	CF	CF	CF	IW	IW	IW	CF	
DATE			11/17/20	11/18/20	11/19/20	11/20/20	11/21/20	11/22/20	11/23/20	11/24/20	

ORGANISM REF#: 20-REAG-5169

COMMENTS:

F:\CETIS\bio report forms\BIO BATCH SHEETS 010720\7Day FH surv 5 rep AR 010720

WAYPOINT ANALYTICAL, LLC.
TEST TRACEABILITY RECORD
7-DAY FATHEAD MINNOW

SAMPLE ID: Harrison REPORT # 20-322-0390

DATE START: 11/17/20 DATE END: 11/24/20

FATHEAD MINNOW REFERENCE # 20-REAG- 5169

REFERENCE NUMBERS

PARAMETER	DATE	INITIALS	TEST DAY	CONTROL WATER	BRINE SHRIMP	SAMPLE LAB ID:
CHRONIC	11/17/20	IW	0	20-REAG- 5149	20-REAG- 5137	L98128
	11/18/20	CF	1	20-REAG- 5150	20-REAG- 5155	↓
	11/19/20	CF	2	20-REAG- 5178/87	20-REAG- 5179	L98532
	11/20/20	CF	3	20-REAG- 5196	20-REAG- 5195	IW ↓
	11/21/20	IW	4	20-REAG- 5229	20-REAG- 5231	L98999836
	11/22/20	IW	5	20-REAG- 5247	20-REAG- 5249	↓
	11/23/20	IW	6	20-REAG- 5257	20-REAG- 5256	↓

COMMENTS: Fathead minnows are fed 0.15 mL Artemia Brine Shrimp x2 daily.
Test conducted at 25 ±1 °C Incubator ID: BIO / Thermometer ID: 120554

ANALYST COMMENTS:

Waypoint Analytical, LLC.

FATHEAD MINNOW FINAL WEIGHT SHEET

SAMPLE ID: Harrison REPORT #: 20-322-0390

INITIAL WEIGHT DATE/TIME: 11/24/20 1035 ANALYST: CF

DATE/TIME IN OVEN: 11/24/20 1710 TEMP (°C): 84 ANALYST: IW

DATE/TIME OUT OVEN: 11/25/20 915 TEMP (°C): 84 ANALYST: IW

FINAL WEIGHT DATE/TIME: 11/25/20 1140 ANALYST: IW

Oven ID: 03 Thermometer ID: T49

Balance ID: B12 Temp Range: 50 - 105 °C

	REP ID	CRUC ID	INT WEIGHT (g)	FINAL WEIGHT (g)	# LARV	REMARKS
1	A	Bob	24.6940	24.6993	8	
	B	Bull	26.7045	26.7065	7	
	C	485	29.3606	29.3646	8	
	D	SML	22.6135	22.6177	8	
	E	Pie	41.7581	41.7622	8	
2	A	Fa	28.7302	28.7345	6	
	B	GB	31.5058	31.5093	8	
	C	So	32.3952	32.3985	7	
	D	Drag	25.9296	25.9342	8	
	E	153	31.2692	31.2729	8	
3	A	FRAN	31.3817	31.3860	8	
	B	Ted	25.1913	25.1956	8	
	C	1779	30.8793	30.8842	8	
	D	Kee	32.9917	32.9956	8	
	E	Hype	29.5274	29.5313	8	
4	A	ATP	25.5921	25.5957	8	
	B	Bell	32.1624	32.1667	8	
	C	DS	34.3290	34.3329	8	
	D	92	23.7020	23.7052	8	
	E	COC	31.0984	31.1033	8	
5	A	4K	31.2802	31.2834	8	
	B	Beau	30.7122	30.7160	6	
	C	SHT	27.2258	27.2302	8	
	D	Bird	25.5501	25.5538	6	
	E	La	28.8802	28.8836	6	
6	A	Pearce	30.9684	30.9717	6	
	B	ZT	30.9414	30.9454	8	
	C	Monk	26.0374	26.0416	8	
	D	~~tot~~	29.2305	29.2350	8	
	E	Soph	29.5756	29.5805	8	

Crucibles must be in the oven a minimum of 6 hours. Immediately after removal from the oven the crucibles must be allowed to cool in the dessicator a minimum of 2 hours.

Comments/Observations:

F:\CETIS\bio report forms\BIO BATCH SHEETS 010720\WEIGHT 5 rep 121818