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April 26, 2013

Ms. Sara Clem
Arkansas Department of Environmental Quality
5301 Northshore Drive
North Little Rock, AR 72118-5317

RE: Biomonitoring for NPDES Permit No. AR0020605

Dear Ms. Clem:

Enclosed please find a copy of the results from the most recent Chronic Biomonitoring performed on wastewater samples from our system. The samples were submitted to Sorrels Research Associates in March 2013.

If there are questions, please contact me.

Sincerely,

A handwritten signature in cursive script that reads "Brenda Gills".

Brenda Gills
Utilities Manager

Enclosure

CITY OF ARKADELPHIA
PERMIT NO: AR0020605
CHRONIC BIOMONITORING

METHOD 1000.0 - PIMEPHALES PROMELAS
METHOD 1002.0 - CERIODAPHNIA DUBIA

Report Prepared by:
Sorrells Research Associates, Inc.
8100 National Dr.
Little Rock, AR 72209

Cecil A. Sorrells, Biomonitoring Laboratory Supervisor

K. E. Sorrells, M.S., Quality Assurance Officer

April 16, 2013

Laboratory Number: 15766.0001, 0002, 0003

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INTRODUCTION AND SUMMARY

Chronic biomonitoring tests:

7 day fathead minnow larval survival and growth (method 1000.0) and 7 day ceriodaphnia dubia survival and reproduction (method 1002.0) were performed by Sorrells Research Associates for Arkadelphia 24 hour composite samples of plant effluent for dates 03/17-18/13, 03/19-20/13, 03/21-22/13.

The samples were delivered to Sorrells lab in ice chest, cooled to 4 degrees c.

These samples were logged in as #15766.0001, 0002 and 0003. Chain of custody included in report.

Moderately hard 20% deionized mineral water was used as dilution water.

Testing was initiated 03/19/13 at 1600 hours and continued through 03/27/13 at 1600 hours.

The results of these tests are as follows:

TEST 1000.0 FATHEAD MINNOW

SURVIVAL - NOEL 6.3% Effluent

GROWTH - NOEL 6.3% Effluent

TEST 1002.0 CERIODAPHNIA DUBIA

SURVIVAL - NOEL 6.3% Effluent

REPRODUCTION - NOEL 6.3% Effluent

Fishers Exact Test statistics are included in this report for these observations. No other adjustments were made.

TEST ACCEPTANCE CRITERIA
FOR CONTROL

| TEST METHOD | ORGANISM | CRITERIA | RESULTS | PASS/FAIL |
|-------------|---------------------|---|---------|-----------|
| 1000 | Pimephales promelas | Control surv. >or= 80 % | 100% | PASS |
| 1002 | Ceriodaphnia dubia | Control surv. >or= 80 % | 100% | PASS |
| 1000 | Pimephales promelas | Control wt. .25 mg or> per larvae. | .315 | PASS |
| 1002 | Ceriodaphnia dubia | Control repro. 15 or> neonates per surviving female. | 18.6 | PASS |
| 1000 | Pimephales promelas | Control CV 40 % or < | 4.7 | PASS |
| 1002 | Ceriodaphnia Dubia | Control CV 40 % or < | 11.67 | PASS |

NOTE: The test acceptance criteria is based upon the synthetic laboratory control. Laboratory control is moderately hard 20% deionized mineral water, as directed by EPA/600/4-91/002.

OUTLINED REPORT

PERMIT NO: AR0020605
PERMIT REQUIREMENTS:
PLANT LOCATION:
RECEIVING WATER BODY:

CLIENT: Arkadelphia, City of
ADDRESS: 700 Clay St.
Arkadelphia, AR 71923

PLANT OPERATIONS

PRODUCT (S): n/a
RAW MATERIALS: n/a
OPERATING SCHEDULE:
SCHEMATIC OF WASTE TREATMENT:

RETENTION TIME:

VOLUME OF WASTE FLOW (MGD, CFS, GPM)

BIOMONITORING CHRONIC TOXICITY REPORT
CHEMICAL PARAMETER CHART

SOURCE OF EFFLUENT (AMBIENT) AND DILUTION WATER

EFFLUENT SAMPLES-

SAMPLING POINT: PLANT EFFLUENT

| | | | |
|-------------------------|--------------------------|--------------------------|--------------------------|
| COLLECTION DATES/TIMES: | 03/17-18/13 0800-0800 | 03/19-20/13 0800-0800 | 03/21-22/13 0800-0800 |
|-------------------------|--------------------------|--------------------------|--------------------------|

SAMPLING COLLECTION METHOD: COMPOSITE

PHYSICAL AND CHEMICAL DATA:

| CONTROL | DATE 03/19/13 | DATE 03/21/13 | DATE 03/23/13 |
|----------------------|------------------|------------------|------------------|
| DO (mg/l) | 8.66 | 8.50 | 8.50 |
| pH (S.U.) | 7.22 | 7.16 | 7.24 |
| Conductivity (umhos) | 265 | 217 | 217 |
| Alkalinity (mg/l) | 76 | 62 | 74 |
| Hardness (mg/l) | 88 | 66 | 60 |
| Res. Chlorine (mg/l) | 0 | 0 | 0 |

| 3.5% | DATE 03/19/13 | DATE 03/21/13 | DATE 03/23/13 |
|----------------------|------------------|------------------|------------------|
| DO (mg/l) | 8.60 | 8.46 | 8.45 |
| pH (S.U.) | 7.28 | 7.19 | 7.28 |
| Conductivity (umhos) | 251 | 232 | 218 |
| Alkalinity (mg/l) | 64 | 60 | 54 |
| Hardness (mg/l) | 68 | 58 | 60 |

(Cont.)

| PHYSICAL AND CHEMICAL DATA: | DATE | DATE | DATE |
|-----------------------------|----------|----------|----------|
| 6.3 EFFLUENT | 03/19/13 | 03/21/13 | 03/23/13 |
| DO (mg/l) | 8.55 | 8.40 | 8.39 |
| pH (S.U.) | 7.31 | 7.25 | 7.30 |
| Conductivity (umhos) | 240 | 243 | 233 |
| Alkalinity (mg/l) | 58 | 56 | 48 |
| Hardness (mg/l) | 78 | 76 | 84 |
| Res. Chlorine (mg/l) | 0 | 0 | 0 |
| Temperature .c | 25 | 25 | 25 |

DILUTION WATER SAMPLES -

SOURCE: 20% DMW

COLLECTION DATE: N/A

TIME: N/A

PRETREATMENT: AERATED

Hardness is to be reported as mg/l CaCO₃

D.O. Dissolved Oxygen mg/l

Temperature degrees centigrade

pH standard units

Conductivity = us/cm

Chlorine Residual = mg/l

Chemical Data For Daily Biomonitoring

Permittee Ark Alpha Date 3-19-13 1600

Analyst A/TM Lab no. 15766

Dilution Control

| Day | 1 | 2 | 3 | 4 | 5 | 6 | 7 | notes |
|-----------------|------|------|------|------|------|------|---|-------|
| Temp | 25.0 | 25.0 | 25.0 | 25.0 | 25.0 | 25.0 | | |
| pH | 7.22 | 7.24 | 7.16 | 7.18 | 7.24 | 7.22 | | |
| D.O. <u>gde</u> | | 8.59 | 8.50 | 8.46 | 8.50 | 8.44 | | |
| Alk | 76 | | 62 | | 74 | | | |
| Hard. | 88 | | 66 | | 60 | | | |
| Cond. | 265 | | 217 | | 217 | | | |

Dilution 3.5

| Day | 1 | 2 | 3 | 4 | 5 | 6 | 7 | notes |
|-------|------|------|------|-----------------|------|------|---|-------|
| Temp | 25.0 | 25.0 | 25.1 | 25.0 | 25.0 | 25.1 | | |
| pH | 7.28 | 7.31 | 7.19 | 7.22 | 7.28 | 7.31 | | |
| D.O. | 8.60 | 8.58 | 8.46 | 8.40 | 8.45 | 8.39 | | |
| Alk | 64 | | 60 | | 54 | | | |
| Hard. | 68 | | 58 | | 60 | | | |
| Cond. | 251 | | 232 | | 218 | | | |

Dilution 6.3

| Day | 1 | 2 | 3 | 4 | 5 | 6 | 7 | notes |
|-------|------|------|------|------|------|------|---|-------|
| Temp | 25.0 | 25.0 | 25.0 | 25.0 | 25.0 | 25.0 | | |
| pH | 7.31 | 7.30 | 7.25 | 7.29 | 7.30 | 7.36 | | |
| D.O. | 8.55 | 8.48 | 8.40 | 8.33 | 8.39 | 8.25 | | |
| Alk | 58 | | 56 | | | 48 | | |
| Hard. | 78 | | 76 | | | 84 | | |
| Cond. | 240 | | 243 | | 233 | | | |

82
 74
 80

0
0
0

DATA ANALYSIS

ACCORDING TO EPA/600/4-91/002.

STATISTICAL ANALYSIS

TOXSTAT VERSION 3.3

Percent minimum significant difference (PMSD) calculated for sub-lethal endpoints.

This information for *C. dubia* reproduction is found in the inserted tables after page 8. We will highlight these values in Dunnetts Table 2, for all sub-lethal endpoints.

TITLE: ARKADELPHIA 15766 CERIO REPS
FILE: 15766ACR
TRANSFORM: NO TRANSFORM

NUMBER OF GROUPS: 6

| GRP | IDENTIFICATION | REP | VALUE | TRANS VALUE |
|-----|----------------|-----|---------|-------------|
| 1 | CONTROL | 1 | 16.0000 | 16.0000 |
| 1 | CONTROL | 2 | 19.0000 | 19.0000 |
| 1 | CONTROL | 3 | 21.0000 | 21.0000 |
| 1 | CONTROL | 4 | 20.0000 | 20.0000 |
| 1 | CONTROL | 5 | 16.0000 | 16.0000 |
| 1 | CONTROL | 6 | 18.0000 | 18.0000 |
| 1 | CONTROL | 7 | 18.0000 | 18.0000 |
| 1 | CONTROL | 8 | 22.0000 | 22.0000 |
| 1 | CONTROL | 9 | 20.0000 | 20.0000 |
| 1 | CONTROL | 10 | 16.0000 | 16.0000 |
| 2 | 2.00 | 1 | 20.0000 | 20.0000 |
| 2 | 2.00 | 2 | 19.0000 | 19.0000 |
| 2 | 2.00 | 3 | 16.0000 | 16.0000 |
| 2 | 2.00 | 4 | 19.0000 | 19.0000 |
| 2 | 2.00 | 5 | 17.0000 | 17.0000 |
| 2 | 2.00 | 6 | 19.0000 | 19.0000 |
| 2 | 2.00 | 7 | 19.0000 | 19.0000 |
| 2 | 2.00 | 8 | 21.0000 | 21.0000 |
| 2 | 2.00 | 9 | 19.0000 | 19.0000 |
| 2 | 2.00 | 10 | 16.0000 | 16.0000 |
| 3 | 2.60 | 1 | 18.0000 | 18.0000 |
| 3 | 2.60 | 2 | 20.0000 | 20.0000 |
| 3 | 2.60 | 3 | 19.0000 | 19.0000 |
| 3 | 2.60 | 4 | 19.0000 | 19.0000 |
| 3 | 2.60 | 5 | 21.0000 | 21.0000 |
| 3 | 2.60 | 6 | 17.0000 | 17.0000 |
| 3 | 2.60 | 7 | 23.0000 | 23.0000 |
| 3 | 2.60 | 8 | 19.0000 | 19.0000 |
| 3 | 2.60 | 9 | 18.0000 | 18.0000 |
| 3 | 2.60 | 10 | 18.0000 | 18.0000 |
| 4 | 3.50 | 1 | 19.0000 | 19.0000 |
| 4 | 3.50 | 2 | 18.0000 | 18.0000 |
| 4 | 3.50 | 3 | 20.0000 | 20.0000 |
| 4 | 3.50 | 4 | 16.0000 | 16.0000 |
| 4 | 3.50 | 5 | 18.0000 | 18.0000 |
| 4 | 3.50 | 6 | 20.0000 | 20.0000 |
| 4 | 3.50 | 7 | 18.0000 | 18.0000 |
| 4 | 3.50 | 8 | 20.0000 | 20.0000 |
| 4 | 3.50 | 9 | 19.0000 | 19.0000 |
| 4 | 3.50 | 10 | 20.0000 | 20.0000 |
| 5 | 4.70 | 1 | 21.0000 | 21.0000 |
| 5 | 4.70 | 2 | 21.0000 | 21.0000 |
| 5 | 4.70 | 3 | 19.0000 | 19.0000 |
| 5 | 4.70 | 4 | 17.0000 | 17.0000 |
| 5 | 4.70 | 5 | 20.0000 | 20.0000 |
| 5 | 4.70 | 6 | 22.0000 | 22.0000 |
| 5 | 4.70 | 7 | 19.0000 | 19.0000 |
| 5 | 4.70 | 8 | 17.0000 | 17.0000 |
| 5 | 4.70 | 9 | 20.0000 | 20.0000 |
| 5 | 4.70 | 10 | 19.0000 | 19.0000 |

| | | | | |
|---|------|----|---------|---------|
| 6 | 6.30 | 1 | 16.0000 | 16.0000 |
| 6 | 6.30 | 2 | 21.0000 | 21.0000 |
| 6 | 6.30 | 3 | 16.0000 | 16.0000 |
| 6 | 6.30 | 4 | 20.0000 | 20.0000 |
| 6 | 6.30 | 5 | 19.0000 | 19.0000 |
| 6 | 6.30 | 6 | 22.0000 | 22.0000 |
| 6 | 6.30 | 7 | 18.0000 | 18.0000 |
| 6 | 6.30 | 8 | 17.0000 | 17.0000 |
| 6 | 6.30 | 9 | 18.0000 | 18.0000 |
| 6 | 6.30 | 10 | 21.0000 | 21.0000 |

ARKADELPHIA 15766 CERIO REPS

File: 15766ACR Transform: NO TRANSFORM

SUMMARY STATISTICS ON TRANSFORMED DATA TABLE 1 of 2

| GRP | IDENTIFICATION | N | MIN | MAX | MEAN |
|-----|----------------|----|--------|--------|--------|
| 1 | CONTROL | 10 | 16.000 | 22.000 | 18.600 |
| 2 | 2.00 | 10 | 16.000 | 21.000 | 18.500 |
| 3 | 2.60 | 10 | 17.000 | 23.000 | 19.200 |
| 4 | 3.50 | 10 | 16.000 | 20.000 | 18.800 |
| 5 | 4.70 | 10 | 17.000 | 22.000 | 19.500 |
| 6 | 6.30 | 10 | 16.000 | 22.000 | 18.800 |

ARKADELPHIA 15766 CERIO REPS

File: 15766ACR Transform: NO TRANSFORM

SUMMARY STATISTICS ON TRANSFORMED DATA TABLE 2 of 2

| GRP | IDENTIFICATION | VARIANCE | SD | SEM |
|-----|----------------|----------|-------|-------|
| 1 | CONTROL | 4.711 | 2.171 | 0.686 |
| 2 | 2.00 | 2.722 | 1.650 | 0.522 |
| 3 | 2.60 | 3.067 | 1.751 | 0.554 |
| 4 | 3.50 | 1.733 | 1.317 | 0.416 |
| 5 | 4.70 | 2.722 | 1.650 | 0.522 |
| 6 | 6.30 | 4.622 | 2.150 | 0.680 |

ARKADELPHIA 15766 CERIO REPS

File: 15766ACR Transform: NO TRANSFORM

ANOVA TABLE

| SOURCE | DF | SS | MS | F |
|----------------|----|---------|-------|-------|
| Between | 5 | 7.200 | 1.440 | 0.441 |
| Within (Error) | 54 | 176.200 | 3.263 | |

 Total 59 183.400

Critical F value = 2.45 (0.05,5,40)
 Since F < Critical F FAIL TO REJECT Ho:All groups equal

ARKADELPHIA 15766 CERIO REPS
 File: 15766ACR Transform: NO TRANSFORM

DUNNETTS TEST - TABLE 1 OF 2 Ho:Control<Treatment

| GROUP | IDENTIFICATION | TRANSFORMED MEAN | MEAN CALCULATED IN ORIGINAL UNITS | T STAT | SIG |
|-------|----------------|------------------|-----------------------------------|--------|-----|
| 1 | CONTROL | 18.600 | 18.600 | | |
| 2 | 2.00 | 18.500 | 18.500 | 0.124 | |
| 3 | 2.60 | 19.200 | 19.200 | -0.743 | |
| 4 | 3.50 | 18.800 | 18.800 | -0.248 | |
| 5 | 4.70 | 19.500 | 19.500 | -1.114 | |
| 6 | 6.30 | 18.800 | 18.800 | -0.248 | |

Dunnett table value = 2.31 (1 Tailed Value, P=0.05, df=40,5)

ARKADELPHIA 15766 CERIO REPS
 File: 15766ACR Transform: NO TRANSFORM

DUNNETTS TEST - TABLE 2 OF 2 Ho:Control<Treatment

| GROUP | IDENTIFICATION | NUM OF REPS | Minimum Sig Diff (IN ORIG. UNITS) | % of CONTROL | DIFFERENCE FROM CONTROL |
|-------|----------------|-------------|-----------------------------------|--------------|-------------------------|
| 1 | CONTROL | 10 | | | |
| 2 | 2.00 | 10 | 1.866 | 10.0 | 0.100 |
| 3 | 2.60 | 10 | 1.866 | 10.0 | -0.600 |
| 4 | 3.50 | 10 | 1.866 | 10.0 | -0.200 |
| 5 | 4.70 | 10 | 1.866 | 10.0 | -0.900 |
| 6 | 6.30 | 10 | 1.866 | 10.0 | -0.200 |

ARKADELPHIA 15766 CERIO REPS
 File: 15766ACR Transform: NO TRANSFORM

WILLIAMS TEST (Isotonic regression model) TABLE 1 OF 2

| GROUP | IDENTIFICATION | N | ORIGINAL MEAN | TRANSFORMED MEAN | ISOTONIZED MEAN |
|-------|----------------|----|---------------|------------------|-----------------|
| 1 | CONTROL | 10 | 18.600 | 18.600 | 18.550 |
| 2 | 2.00 | 10 | 18.500 | 18.500 | 18.550 |
| 3 | 2.60 | 10 | 19.200 | 19.200 | 19.000 |
| 4 | 3.50 | 10 | 18.800 | 18.800 | 19.000 |
| 5 | 4.70 | 10 | 19.500 | 19.500 | 19.150 |
| 6 | 6.30 | 10 | 18.800 | 18.800 | 19.150 |

ARKADELPHIA 15766 CERIO REPS

File: 15766ACR

Transform: NO TRANSFORM

WILLIAMS TEST (Isotonic regression model)

TABLE 2 OF 2

| IDENTIFICATION | ISOTONIZED MEAN | CALC. WILLIAMS | SIG P=.05 | TABLE WILLIAMS | DEGREES OF FREEDOM |
|----------------|--------------------|-------------------|--------------|-------------------|-----------------------|
| CONTROL | 18.550 | | | | |
| 2.00 | 18.550 | 0.062 | | 1.68 | k= 1, v=54 |
| 2.60 | 19.000 | 0.495 | | 1.76 | k= 2, v=54 |
| 3.50 | 19.000 | 0.495 | | 1.79 | k= 3, v=54 |
| 4.70 | 19.150 | 0.681 | | 1.80 | k= 4, v=54 |
| 6.30 | 19.150 | 0.681 | | 1.80 | k= 5, v=54 |

s = 1.806

Note: df used for table values are approximate when v > 20.

ARKADELPHIA 15766 CERIO REPS

File: 15766ACR

Transform: NO TRANSFORM

STEELS MANY-ONE RANK TEST

Ho: Control < Treatment

| GROUP | IDENTIFICATION | TRANSFORMED MEAN | RANK SUM | CRIT. VALUE | df | SIG |
|-------|----------------|---------------------|-------------|----------------|-------|-----|
| 1 | CONTROL | 18.600 | | | | |
| 2 | 2.00 | 18.500 | 104.00 | 75.00 | 10.00 | |
| 3 | 2.60 | 19.200 | 112.00 | 75.00 | 10.00 | |
| 4 | 3.50 | 18.800 | 107.50 | 75.00 | 10.00 | |
| 5 | 4.70 | 19.500 | 118.00 | 75.00 | 10.00 | |
| 6 | 6.30 | 18.800 | 108.00 | 75.00 | 10.00 | |

Critical values use k = 5, are 1 tailed, and alpha = 0.05

TITLE: ARKADELPHIA 15766 MINNOW WEIGHTS

FILE: 15766AMW

TRANSFORM: NO TRANSFORM

NUMBER OF GROUPS: 6

| GRP | IDENTIFICATION | REP | VALUE | TRANS VALUE |
|-----|----------------|-----|--------|-------------|
| 1 | CONTROL | 1 | 0.3150 | 0.3150 |
| 1 | CONTROL | 2 | 0.3200 | 0.3200 |
| 1 | CONTROL | 3 | 0.3350 | 0.3350 |
| 1 | CONTROL | 4 | 0.3160 | 0.3160 |
| 2 | 2.00 | 1 | 0.3390 | 0.3390 |
| 2 | 2.00 | 2 | 0.3050 | 0.3050 |
| 2 | 2.00 | 3 | 0.3220 | 0.3220 |
| 2 | 2.00 | 4 | 0.3370 | 0.3370 |
| 3 | 2.60 | 1 | 0.3460 | 0.3460 |
| 3 | 2.60 | 2 | 0.3310 | 0.3310 |
| 3 | 2.60 | 3 | 0.3190 | 0.3190 |
| 3 | 2.60 | 4 | 0.3400 | 0.3400 |
| 4 | 3.50 | 1 | 0.3280 | 0.3280 |
| 4 | 3.50 | 2 | 0.3250 | 0.3250 |
| 4 | 3.50 | 3 | 0.3100 | 0.3100 |
| 4 | 3.50 | 4 | 0.2960 | 0.2960 |
| 5 | 4.70 | 1 | 0.3340 | 0.3340 |
| 5 | 4.70 | 2 | 0.3100 | 0.3100 |
| 5 | 4.70 | 3 | 0.3360 | 0.3360 |
| 5 | 4.70 | 4 | 0.3440 | 0.3440 |
| 6 | 6.30 | 1 | 0.3290 | 0.3290 |
| 6 | 6.30 | 2 | 0.3150 | 0.3150 |
| 6 | 6.30 | 3 | 0.3490 | 0.3490 |
| 6 | 6.30 | 4 | 0.3220 | 0.3220 |

ARKADELPHIA 15766 MINNOW WEIGHTS

File: 15766AMW

Transform: NO TRANSFORM

SUMMARY STATISTICS ON TRANSFORMED DATA TABLE 1 of 2

| GRP | IDENTIFICATION | N | MIN | MAX | MEAN |
|-----|----------------|---|-------|-------|-------|
| 1 | CONTROL | 4 | 0.315 | 0.335 | 0.322 |
| 2 | 2.00 | 4 | 0.305 | 0.339 | 0.326 |
| 3 | 2.60 | 4 | 0.319 | 0.346 | 0.334 |
| 4 | 3.50 | 4 | 0.296 | 0.328 | 0.315 |
| 5 | 4.70 | 4 | 0.310 | 0.344 | 0.331 |
| 6 | 6.30 | 4 | 0.315 | 0.349 | 0.329 |

ARKADELPHIA 15766 MINNOW WEIGHTS

File: 15766AMW

Transform: NO TRANSFORM

SUMMARY STATISTICS ON TRANSFORMED DATA TABLE 2 of 2

| GRP | IDENTIFICATION | VARIANCE | SD | SEM |
|-----|----------------|----------|-------|-------|
| 1 | CONTROL | 0.000 | 0.009 | 0.005 |
| 2 | 2.00 | 0.000 | 0.016 | 0.008 |
| 3 | 2.60 | 0.000 | 0.012 | 0.006 |
| 4 | 3.50 | 0.000 | 0.015 | 0.007 |
| 5 | 4.70 | 0.000 | 0.015 | 0.007 |
| 6 | 6.30 | 0.000 | 0.015 | 0.007 |

ARKADELPHIA 15766 MINNOW WEIGHTS
 File: 15766AMW Transform: NO TRANSFORM

ANOVA TABLE

| SOURCE | DF | SS | MS | F |
|----------------|----|-------|-------|-------|
| Between | 5 | 0.001 | 0.000 | 1.043 |
| Within (Error) | 18 | 0.003 | 0.000 | |
| Total | 23 | 0.004 | | |

Critical F value = 2.77 (0.05,5,18)
 Since $F < \text{Critical } F$ FAIL TO REJECT H_0 :All groups equal

ARKADELPHIA 15766 MINNOW WEIGHTS
 File: 15766AMW Transform: NO TRANSFORM

DUNNETTS TEST - TABLE 1 OF 2 H_0 :Control<Treatment

| GROUP | IDENTIFICATION | TRANSFORMED MEAN | MEAN CALCULATED IN ORIGINAL UNITS | T STAT | SIG |
|-------|----------------|------------------|-----------------------------------|--------|-----|
| 1 | CONTROL | 0.322 | 0.322 | | |
| 2 | 2.00 | 0.326 | 0.326 | -0.440 | |
| 3 | 2.60 | 0.334 | 0.334 | -1.294 | |
| 4 | 3.50 | 0.315 | 0.315 | 0.699 | |
| 5 | 4.70 | 0.331 | 0.331 | -0.983 | |
| 6 | 6.30 | 0.329 | 0.329 | -0.750 | |

Dunnett table value = 2.41 (1 Tailed Value, $P=0.05$, $df=18,5$)

ARKADELPHIA 15766 MINNOW WEIGHTS
 File: 15766AMW Transform: NO TRANSFORM

DUNNETTS TEST - TABLE 2 OF 2 H_0 :Control<Treatment

| GROUP | IDENTIFICATION | NUM OF REPS | Minimum Sig Diff (IN ORIG. UNITS) | % of CONTROL | DIFFERENCE FROM CONTROL |
|-------|----------------|-------------|-----------------------------------|--------------|-------------------------|
|-------|----------------|-------------|-----------------------------------|--------------|-------------------------|

| | | | | | |
|---|---------|---|-------|-----|--------|
| 1 | CONTROL | 4 | | | |
| 2 | 2.00 | 4 | 0.023 | 7.2 | -0.004 |
| 3 | 2.60 | 4 | 0.023 | 7.2 | -0.013 |
| 4 | 3.50 | 4 | 0.023 | 7.2 | 0.007 |
| 5 | 4.70 | 4 | 0.023 | 7.2 | -0.010 |
| 6 | 6.30 | 4 | 0.023 | 7.2 | -0.007 |

ARKADELPHIA 15766 MINNOW WEIGHTS
 File: 15766AMW Transform: NO TRANSFORM

WILLIAMS TEST (Isotonic regression model) TABLE 1 OF 2

| GROUP | IDENTIFICATION | N | ORIGINAL MEAN | TRANSFORMED MEAN | ISOTONIZED MEAN |
|-------|----------------|---|---------------|------------------|-----------------|
| 1 | CONTROL | 4 | 0.322 | 0.322 | 0.322 |
| 2 | 2.00 | 4 | 0.326 | 0.326 | 0.325 |
| 3 | 2.60 | 4 | 0.334 | 0.334 | 0.325 |
| 4 | 3.50 | 4 | 0.315 | 0.315 | 0.325 |
| 5 | 4.70 | 4 | 0.331 | 0.331 | 0.330 |
| 6 | 6.30 | 4 | 0.329 | 0.329 | 0.330 |

ARKADELPHIA 15766 MINNOW WEIGHTS
 File: 15766AMW Transform: NO TRANSFORM

WILLIAMS TEST (Isotonic regression model) TABLE 2 OF 2

| IDENTIFICATION | ISOTONIZED MEAN | CALC. WILLIAMS | SIG P=.05 | TABLE WILLIAMS | DEGREES OF FREEDOM |
|----------------|-----------------|----------------|-----------|----------------|--------------------|
| CONTROL | 0.322 | | | | |
| 2.00 | 0.325 | 0.342 | | 1.73 | k= 1, v=18 |
| 2.60 | 0.325 | 0.342 | | 1.82 | k= 2, v=18 |
| 3.50 | 0.325 | 0.342 | | 1.85 | k= 3, v=18 |
| 4.70 | 0.330 | 0.859 | | 1.86 | k= 4, v=18 |
| 6.30 | 0.330 | 0.859 | | 1.87 | k= 5, v=18 |

s = 0.014

Note: df used for table values are approximate when v > 20.

ARKADELPHIA 15766 MINNOW WEIGHTS
 File: 15766AMW Transform: NO TRANSFORM

STEELS MANY-ONE RANK TEST - Ho: Control < Treatment

| GROUP | IDENTIFICATION | TRANSFORMED MEAN | RANK SUM | CRIT. VALUE | df | SIG |
|-------|----------------|------------------|----------|-------------|------|-----|
| 1 | CONTROL | 0.322 | | | | |
| 2 | 2.00 | 0.326 | 21.00 | 10.00 | 4.00 | |
| 3 | 2.60 | 0.334 | 23.00 | 10.00 | 4.00 | |

| | | | | | |
|---|------|-------|-------|-------|------|
| 4 | 3.50 | 0.315 | 16.00 | 10.00 | 4.00 |
| 5 | 4.70 | 0.331 | 21.00 | 10.00 | 4.00 |
| 6 | 6.30 | 0.329 | 20.50 | 10.00 | 4.00 |

Critical values use $k = 5$, are 1 tailed, and $\alpha = 0.05$

TEST METHOD
1000.0

TEST METHOD USED: 1000.0
END POINT(S) OF TEST: NOEL 6.3%
DEVIATIONS FROM REFERENCE METHOD: None

DATE AND TIME TEST STARTED: 03/19/13 1600
DATE AND TIME TEST TERMINATED: 03/26/13 1600
TYPE OF TEST CHAMBERS: 600 ml
VOLUME OF SOLUTIONS USED/CHAMBER: 400 ml
NUMBER OF ORGANISMS/TEST CHAMBER: 10
NUMBER OF REPLICATE TEST CHAMBERS/TREATMENT: 4

TEST TEMPERATURE (MEAN): mean = 25

TEST ORGANISMS

SCIENTIFIC NAME: Pimephales promelas
AGE: Less than 24 hours.
LIFE STAGE: Larvae
SOURCE: Aquatic BioSystems, Inc.
DISEASES AND TREATMENT: None
FEEDING REGIME: 2/day Brine Shrimp
ORGANISM HISTORY SHEETS ARE ATTACHED

RESULTS SUMMARY

FATHEAD MINNOW, PIMEPHALES PROMELAS, LARVAL SURVIVAL AND GROWTH TEST
METHOD 1000.0

Larvae are exposed in a static renewal system for seven days to different concentrations of effluent or to receiving water. Test results are based on the survival and growth (increase in weight) of the larvae. Effluent dilution's chosen for this test were 2.0%, 2.6%, 3.5%, 4.7% and 6.3% in accordance with the NPDES permit. The low flow or "critical" dilution is specified in the NPDES Permit as 6.3% effluent.

NOEL(S) ARE AS FOLLOWS:

100% Survival 6.3% effluent

NOEL Growth 6.3% effluent

BIOMONITORING REPORT
FATHEAD MINNOW LARVAE GROWTH AND SURVIVAL

DATA TABLE FOR FATHEAD MINNOW SURVIVAL

| Effluent Conc. % | Percent Survival In | | | | Mean Percent | | | CV%* |
|---------------------|---------------------|-----|-----|-----|--------------|-----|-----|------|
| | A | B | C | D | 24h | 48h | 7d | |
| Dilution Water | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 0.0 |
| 2.0% | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 0.0 |
| 2.6% | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 0.0 |
| 3.5% | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 0.0 |
| 4.7% | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 0.0 |
| 6.3% | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 0.0 |

*coefficient of variation = standard deviation x 100/mean

**ph unadjusted 6.3% effluent

1. Dunnett's Procedure or Steel's Many-One Rank Test as appropriate:
Is the mean survival at 7 days significantly different (p=0.5)
than the control survival for the % effluent corresponding to:

- a.) LOW FLOW OR CRITICAL DILUTION (6.3%): YES [] NO [X]
b.) 1/2 LOW FLOW OR 2 X CRITICAL DILUTION (4.7%): YES [] NO [X]

2. Dunnett's Procedure:

Is the mean dry weight (growth) at 7 days effluent significantly
different (p=0.05) than the control's dry weight (growth) for the %
effluent corresponding to (significant non-lethal effects):

- a.) LOW FLOW OR CRITICAL DILUTION (6.3%): YES [] NO [X]
b.) 1/2 LOW FLOW OR 2 X CRITICAL DILUTION (4.7%): YES [] NO [X]

3. If you answered NO to 1.a) and 2.a) enter [0]
otherwise enter [1]: [0]

4. If you answered NO to 1.b) and 2.b) enter [0]
otherwise enter [1]: [0]

5. Enter response to item 3 on DMR Form, parameter # TEP6C.

6. Enter response to item 4 on DMR Form, parameter # TFP6C.

7. Enter percent effluent corresponding to each NOEL below and
circle lowest number:

- a.) NOEL survival = 6.3% effluent
b.) NOEL growth = 6.3% effluent

FATHEAD MINNOW LARVAE GROWTH AND SURVIVAL
(Pimephales promelas)

Permittee: Arkadelphia, City of NPDES permit no. AR0020605

Dilution water used: Receiving [] Reconstituted [X]

DATA TABLE FOR GROWTH

| EFFLUENT CONC. % | AVERAGE DRY WEIGHT IN MILLIGRAMS IN REPLICATE CHAMBERS | | | | MEAN DRY WEIGHT (MG) 7 days | CV%* |
|---------------------|--|------|------|------|--|------|
| | A | B | C | D | | |
| CONTROL | .315 | .320 | .335 | .316 | .322 | 2.9 |
| 2.0 | .339 | .305 | .322 | .337 | .326 | 4.8 |
| 2.6 | .346 | .331 | .319 | .340 | .334 | 3.5 |
| 3.5 | .328 | .325 | .310 | .296 | .315 | 4.7 |
| 4.7 | .334 | .310 | .336 | .344 | .331 | 4.4 |
| 6.3 | .329 | .315 | .349 | .322 | .329 | 4.5 |

*Coefficient of variation = standard deviation X 100/mean

(Coef Of Var Statre 7Day Chronic Pimephales TQP6C = 4.7)

TEST METHOD
1002.0

TEST METHOD USED: 1002.0
END POINT(S) OF TEST: NOEL 6.3%
DEVIATIONS FROM REFERENCE METHOD: None

DATE AND TIME TEST STARTED: 03/19/13 1600
DATE AND TIME TEST TERMINATED: 03/27/13 1600
TYPE OF TEST CHAMBERS: 30 ml
VOLUME OF SOLUTIONS USED/CHAMBER: 15 ml
NUMBER OF ORGANISMS/TEST CHAMBER: 1
NUMBER OF REPLICATE TEST CHAMBERS/TREATMENT: 10

TEST TEMPERATURE (MEAN AND RANGE): 25

TEST ORGANISMS

SCIENTIFIC NAME: Ceriodaphnia dubia
AGE: Less than 24 hours
LIFE STAGE: Neonates
SOURCE: Aquatic BioSystems, Inc.
DISEASES AND TREATMENT: None
FEEDING REGIME: Daily
ORGANISM HISTORY SHEETS ARE ATTACHED

RESULTS SUMMARY
CLADOCERAN, CERIODAPHNIA DUBIA, SURVIVAL AND REPRODUCTION TEST
METHOD 1002.0

Ceriodaphnia are exposed in a static renewal system to different concentrations of effluent, and to receiving water until 60% of surviving control organisms have three broods of offspring (15 neonates per surviving female). Effluent dilutions for this test were 2.0%, 2.6%, 3.5%, 4.7%, and 6.3% in accordance with the NPDES Permit. The "critical" dilution is specified as 6.3% effluent. Test results are based on survival and reproduction. If the test is conducted as described, the control organism should produce three broods of young during a seven-day period.

BIOMONITORING REPORT
CERIODAPHNIA DUBIA SURVIVAL AND REPRODUCTION

PERCENT SURVIVAL

| Time of Reading | 0% | 2.0% | 2.6% | 3.5% | 4.7% | 6.3% |
|-----------------|-----|------|------|------|------|------|
| 24h | 100 | 100 | 100 | 100 | 100 | 100 |
| 48h | 100 | 100 | 100 | 100 | 100 | 100 |
| 7 day | 100 | 100 | 100 | 100 | 100 | 100 |

1. Fisher's Exact Test:

Is the mean survival at 7 days significantly different ($p=0.05$) than the control survival for the % effluent corresponding to (lethality):

a.) LOW FLOW OR CRITICAL DILUTION (6.3 %): YES [] NO [**X**]

b.) 1/2 LOW FLOW OR 2 X

CRITICAL DILUTION (4.7%): YES [] NO [**X**]

2. Dunnett's Procedure or Steel's Many-One Rank Test as appropriate:

Is the mean number of young produced per female significantly different ($p=0.05$) than the control's number of young per female for the % effluent corresponding to (significant non-lethal effects):

a.) LOW FLOW OR CRITICAL DILUTION (6.3%): YES [] NO [**X**]

b.) 1/2 LOW FLOW OR 2 X

CRITICAL DILUTION (4.7%): YES [] NO [**X**]

3. If you answered NO to 1.a) and 2.a) enter [0]
otherwise enter [1]: **[0]**

4. If you answered NO to 1.b) and 2.b) enter [0]
otherwise enter [1]: **[0]**

5. Enter response to item 3 on DMR Form, parameter #TEP3B.

6. Enter response to item 4 on DMR Form, parameter #TFP3B.

7. Enter percent effluent corresponding to each NOEL below and circle lowest number:

a.) NOEL survival = 6.3% effluent

b.) NOEL reproduction = 6.3% effluent

BIOMONITORING REPORT
CERIODAPHNIA DUBIA SURVIVAL AND REPRODUCTION

Permittee: Arkadelphia, City of NPDES NO. AR0020605
Dilution water used: Receiving () Reconstituted (X)

NUMBER OF YOUNG PRODUCED PER FEMALE @ 7 DAYS

PERCENT EFFLUENT (%)

| REP | 0 % | 2.0% | 2.6% | 3.5% | 4.7% | 6.3% |
|------|--------------|------|------|------|------|-------|
| A | 16 | 20 | 18 | 19 | 21 | 16 |
| B | 19 | 19 | 20 | 18 | 21 | 21 |
| C | 21 | 16 | 19 | 20 | 19 | 16 |
| D | 20 | 19 | 19 | 16 | 17 | 20 |
| E | 16 | 17 | 21 | 18 | 20 | 19 |
| F | 18 | 19 | 17 | 20 | 22 | 22 |
| G | 18 | 19 | 23 | 18 | 19 | 18 |
| H | 22 | 21 | 19 | 20 | 17 | 17 |
| I | 20 | 19 | 18 | 19 | 20 | 18 |
| J | 16 | 16 | 18 | 20 | 19 | 21 |
| *CV% | 11.67 | 8.92 | 9.12 | 7.00 | 8.46 | 11.44 |
| MEAN | 18.6 | 18.5 | 19.2 | 18.8 | 19.5 | 18.8 |

*coefficient of variation = standard deviation x 100/mean

(Coef Of Var Statre 7Day Chronic Ceriodaphnia TQP3B = **11.67**)

STANDARD REFERENCE TOXICANTS

STANDARD TOXICANT USED AND SOURCE: SODIUM CHLORIDE *
DATES AND TIMES OF CONCURRENT TEST: 03/12/13 1600

DILUTION WATER USED IN TEST: 20% DMW
RESULTS(LC50 OR, NOEC AND/OR ECL): LC50 = 1720.2 FATHEAD MINNOW
RESULTS(LC50 OR, NOEC AND/OR ECL): LC50 = 734.9 CERIODAPHNIA
ACCEPTABLE PERFORMANCE, STUDY 31 = 100%
PHYSICAL AND CHEMICAL METHODS USED:

SPECIFIC CONDUCTANCE METHOD 2510 B
OXYGEN, DISSOLVED METHOD 4500- O G
CHLORINE, TOTAL RESIDUAL METHOD 4500- C I F
ALKALINITY, CACO3 METHOD 2320 B

SUMMARY OF REFERENCE TOXICANT (S) ARE AS FOLLOWS:

FATHEAD MINNOW

Standard Recovery FATHEAD MINNOW 98.9%

CERIODAPHNIA

Standard Recovery CERODAPHNIA 97.7%

APPENDIX 1A
TEST 1000.0

15766CCWeightArk.XLS

| Permittee Arkadelphia 15766 | | | | | | | | | |
|-----------------------------|-----------------------------------|-------|-------|-------|-----------------------|--------|------|--------|-----|
| Effluent | Percent Survival In Rep. Chambers | | | | Mean Percent Survival | | | CV%* | |
| | Conc. | A | B | C | D | 24h | 48h | 7 days | * |
| CONTROL | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 0.0 |
| 2.00% | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 0.0 |
| 2.60% | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 0.0 |
| 3.50% | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 0.0 |
| 4.70% | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 0.0 |
| 6.30% | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 0.0 |
| Permittee Arkadelphia 15766 | | | | | | | | | |
| Effluent | Average Dry Weight (mg) | | | | Mean Dry Weight (mg) | | | | |
| | Conc. | A | B | C | D | 7 days | CV%* | | |
| CONTROL | 0.315 | 0.320 | 0.335 | 0.316 | 0.322 | 2.9 | | | |
| 2 | 0.339 | 0.305 | 0.322 | 0.337 | 0.326 | 4.8 | | | |
| 2.6 | 0.346 | 0.331 | 0.319 | 0.340 | 0.334 | 3.5 | | | |
| 3.5 | 0.328 | 0.325 | 0.310 | 0.296 | 0.315 | 4.7 | | | |
| 4.7 | 0.334 | 0.310 | 0.336 | 0.344 | 0.331 | 4.4 | | | |
| 6.3 | 0.329 | 0.315 | 0.349 | 0.322 | 0.329 | 4.5 | | | |

Figure 2. Survival data for fathead minnow larval survival and growth to

Discharger: Ankadelphia
 Location: _____

Test Dates: 3-19-13 1600
 Analyst: _____

| Conc: | Rep. No. | No. Survivors | | | | | | | Remarks |
|--------------|----------|---------------|----|----|----|----|----|----|---------|
| | | Day | | | | | | | |
| Control | 1 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | |
| | 2 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | |
| | 3 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | |
| | 4 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | |
| Conc: 2.0 | 5 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | |
| | 6 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | |
| | 7 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | |
| | 8 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | |
| Conc: 2.6 | 9 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | |
| | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | |
| | 11 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | |
| | 12 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | |
| Conc: 3.5 | 13 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | |
| | 14 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | |
| | 15 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | |
| | 16 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | |
| Conc: 4.7 | 17 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | |
| | 18 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | |
| | 19 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | |
| | 20 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | |
| Conc: 6.3 | 21 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | |
| | 22 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | |
| | 23 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | |
| | 24 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | |

Comments:

Discharge: Arkadelphia
 Location: 15766
 Analyst: _____

Test Date(s): 3-19-13
 Weighing Date: _____

Drying Temperature (°C): _____
 Drying Time (h): _____

| Conc: | Rep. No. | A Wgt. of boat (mg) | B Dry wgt: foil and larvae (mg) | B-A Total dry wgt of larvae (mg) | C No. of larvae | (B-A)/C Mean dry wgt of larvae (mg) | Remarks |
|--------------|----------|---------------------|---------------------------------|----------------------------------|-----------------|-------------------------------------|---------|
| Control | 1 | 126405 | 126720 | 3.15 | 10 | .315 | |
| | 2 | 127211 | 127531 | 3.20 | 10 | .320 | |
| | 3 | 128305 | 128640 | 3.35 | 10 | .335 | |
| | 4 | 127468 | 127784 | 3.16 | 10 | .316 | |
| Conc: | 5 | 127354 | 127693 | 3.39 | 10 | .339 | |
| | 6 | 127137 | 127442 | 3.05 | 10 | .305 | |
| | 7 | 128861 | 129183 | 3.22 | 10 | .322 | |
| | 8 | 124502 | 124839 | 3.37 | 10 | .337 | |
| 4.6 Conc: | 9 | 127436 | 127782 | 3.46 | 10 | .346 | |
| | 10 | 128675 | 129006 | 3.31 | 10 | .331 | |
| | 11 | 127377 | 127696 | 3.19 | 10 | .319 | |
| | 12 | 128222 | 128562 | 3.40 | 10 | .340 | |
| 2.6 Conc: | 13 | 127283 | 127611 | 3.28 | 10 | .328 | |
| | 14 | 127466 | 127791 | 3.25 | 10 | .325 | |
| | 15 | 127599 | 127909 | 3.10 | 10 | .310 | |
| | 16 | 127342 | 127638 | 2.96 | 10 | .296 | |
| 3.5 Conc: | 17 | 127536 | 127870 | 3.34 | 10 | .334 | |
| | 18 | 127252 | 127562 | 3.10 | 10 | .310 | |
| | 19 | 127495 | 127831 | 3.36 | 10 | .336 | |
| | 20 | 127621 | 127965 | 3.44 | 10 | .344 | |
| 4.7 Conc: | 21 | 127388 | 127717 | 3.29 | 10 | .329 | |
| | 22 | 127324 | 127639 | 3.15 | 10 | .315 | |
| | 23 | 127512 | 127861 | 3.49 | 10 | .349 | |
| | 24 | 127264 | 127586 | 3.22 | 10 | .322 | |

¹Adapted from Hughes, et al., 1987.

Control: 127867 127866

FIGURE 3 - FATHEAD MINNOW
 page 14

APPENDIX 2A
TEST 1002.0

| Arkadelphia 15766 | | CERIO | REPLICATE CONTAINERS | | | | | | s.d.= 2.17051 | CV% = | 11.669405 | | | |
|-------------------|-------|----------------------|----------------------|----|----|----|----|---------------|---------------|-----------|--------------|------------|------|-------|
| control | DAY | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 #young | #adult | | |
| temp: | 1 | | | | | | | | | | 0 | 10 | 0.00 | |
| temp: | 2 | | | | | | | | | | 0 | 10 | 0.00 | |
| temp: | 3 | | | 1 | | | 1 | | | | 2 | 10 | 0.20 | |
| temp: | 4 | 4 | 3 | 3 | 2 | 4 | | 2 | 4 | 4 | 1 | 27 | 10 | 2.70 |
| temp: | 5 | | | | 1 | | 3 | | 1 | | 2 | 7 | 10 | 0.70 |
| temp: | 6 | 6 | 5 | 7 | 7 | 5 | 6 | 6 | 6 | 7 | 5 | 60 | 10 | 6.00 |
| temp: | 7 | | 5 | | 1 | | | 2 | | | 3 | 11 | 10 | 1.10 |
| temp: | 8 | 6 | 6 | 10 | 9 | 7 | 8 | 8 | 11 | 9 | 5 | 79 | 10 | 7.90 |
| | TOTAL | 16 | 19 | 21 | 20 | 16 | 18 | 18 | 22 | 20 | 16 | 186 | 10 | 18.60 |
| 2.00 DAY | | REPLICATE CONTAINERS | | | | | | s.d.= 1.64992 | CV% = | 8.9184639 | | | | |
| temp: | 1 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 no. young | no. adults | | |
| temp: | 1 | | | | | | | | | | 0 | 10 | 0.00 | |
| temp: | 2 | | | | | | | | | | 0 | 10 | 0.00 | |
| temp: | 3 | | | 2 | | | | | 1 | | 3 | 10 | 0.30 | |
| temp: | 4 | 4 | 3 | 1 | 2 | 2 | 2 | 4 | 1 | 3 | 3 | 25 | 10 | 2.50 |
| temp: | 5 | | 2 | | 1 | | 1 | | 2 | 1 | 7 | 10 | 0.70 | |
| temp: | 6 | 5 | 5 | 6 | 7 | 7 | 7 | 6 | 7 | 5 | 6 | 61 | 10 | 6.10 |
| temp: | 7 | 3 | 1 | | | 2 | | | | 2 | 8 | 10 | 0.80 | |
| temp: | 8 | 8 | 8 | 7 | 9 | 6 | 9 | 9 | 10 | 8 | 7 | 81 | 10 | 8.10 |
| | TOTAL | 20 | 19 | 16 | 19 | 17 | 19 | 19 | 21 | 19 | 16 | 185 | 10 | 18.50 |
| 2.60 DAY | | REPLICATE CONTAINERS | | | | | | s.d.= 1.75119 | CV% = | 9.1207816 | | | | |
| temp: | 1 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 no. young | no. adults | | |
| temp: | 1 | | | | | | | | | | 0 | 10 | 0.00 | |
| temp: | 2 | | | | | | | | | | 0 | 10 | 0.00 | |
| temp: | 3 | | | | | | | | | | 0 | 10 | 0.00 | |
| temp: | 4 | 4 | 2 | 4 | 2 | 3 | 4 | 4 | 2 | 2 | 4 | 31 | 10 | 3.10 |
| temp: | 5 | | 2 | | 1 | | | | 1 | | 4 | 10 | 0.40 | |
| temp: | 6 | 6 | 5 | 7 | 7 | 7 | 6 | 8 | 7 | 6 | 7 | 66 | 10 | 6.60 |
| temp: | 7 | 2 | 3 | | | 1 | | | | 2 | 1 | 9 | 10 | 0.90 |
| temp: | 8 | 6 | 8 | 8 | 9 | 10 | 7 | 11 | 9 | 8 | 6 | 82 | 10 | 8.20 |
| | TOTAL | 18 | 20 | 19 | 19 | 21 | 17 | 23 | 19 | 18 | 18 | 192 | 10 | 19.20 |
| 3.50 DAY | | REPLICATE CONTAINERS | | | | | | s.d.= 1.31656 | CV% = | 7.002985 | | | | |
| temp: | 1 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 no. young | no. adults | | |
| temp: | 1 | | | | | | | | | | 0 | 10 | 0.00 | |
| temp: | 2 | | | | | | | | | | 0 | 10 | 0.00 | |
| temp: | 3 | 1 | 1 | | | | | | 1 | | 3 | 10 | 0.30 | |
| temp: | 4 | 2 | 1 | 3 | 3 | 3 | 4 | 2 | 3 | 4 | 2 | 27 | 10 | 2.70 |
| temp: | 5 | | 3 | 1 | | | | 1 | | 2 | 7 | 10 | 0.70 | |
| temp: | 6 | 7 | 4 | 6 | 3 | 7 | 7 | 8 | 6 | 7 | 5 | 60 | 10 | 6.00 |
| temp: | 7 | | 4 | 3 | 5 | 2 | 1 | | | 1 | 3 | 19 | 10 | 1.90 |
| temp: | 8 | 9 | 5 | 7 | 5 | 6 | 8 | 7 | 10 | 7 | 8 | 72 | 10 | 7.20 |
| | TOTAL | 19 | 18 | 20 | 16 | 18 | 20 | 18 | 20 | 19 | 20 | 188 | 10 | 18.80 |
| 4.70 DAY | | REPLICATE CONTAINERS | | | | | | s.d.= 1.64992 | CV% = | 8.4611068 | | | | |
| temp: | 1 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 no. young | no. adults | | |
| temp: | 1 | | | | | | | | | | 0 | 10 | 0.00 | |
| temp: | 2 | | | | | | | | | | 0 | 10 | 0.00 | |
| temp: | 3 | 2 | 2 | | | 1 | | | 2 | | 7 | 10 | 0.70 | |
| temp: | 4 | 3 | 1 | 4 | 2 | 2 | 4 | 3 | 3 | 4 | 2 | 28 | 10 | 2.80 |
| temp: | 5 | | 2 | | | | | | | 1 | 3 | 10 | 0.30 | |
| temp: | 6 | 8 | 6 | 5 | 7 | 7 | 7 | 7 | 6 | 5 | 8 | 66 | 10 | 6.60 |
| temp: | 7 | | 2 | | 1 | 3 | | | | 4 | 10 | 10 | 1.00 | |
| temp: | 8 | 8 | 8 | 10 | 7 | 7 | 11 | 9 | 6 | 7 | 8 | 81 | 10 | 8.10 |
| | TOTAL | 21 | 21 | 19 | 17 | 20 | 22 | 19 | 17 | 20 | 19 | 195 | 10 | 19.50 |
| 6.30 DAY | | REPLICATE CONTAINERS | | | | | | s.d.= 2.14994 | CV% = | 11.435827 | | | | |
| temp: | 1 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 no. young | no. adults | | |
| temp: | 1 | | | | | | | | | | 0 | 10 | 0.00 | |
| temp: | 2 | | | | | | | | | | 0 | 10 | 0.00 | |
| temp: | 3 | 1 | | 1 | | | 1 | | 1 | | 1 | 5 | 10 | 0.50 |
| temp: | 4 | 2 | 5 | 1 | 3 | 3 | 4 | 2 | 3 | 2 | 4 | 29 | 10 | 2.90 |
| temp: | 5 | 1 | | | | 1 | | | | 3 | 5 | 10 | 0.50 | |
| temp: | 6 | 6 | 5 | 7 | 7 | 6 | 7 | 8 | 6 | 5 | 7 | 64 | 10 | 6.40 |
| temp: | 7 | | 3 | | 1 | | 2 | | | 3 | 9 | 10 | 0.90 | |
| temp: | 8 | 6 | 8 | 7 | 9 | 9 | 8 | 8 | 7 | 5 | 9 | 76 | 10 | 7.60 |
| | TOTAL | 16 | 21 | 16 | 20 | 19 | 22 | 18 | 17 | 18 | 21 | 188 | 10 | 18.80 |

Arkadelphia 15766 3-19-13 1600

| CONC. | DAY | REPLICATE CONTAINERS | | | | | | | | | | s.d.= | CVX = | #DIV/O! | young/adu |
|---------|-----|----------------------|---|----|---|---|---|---|----|---|----|-------|----------|------------|-----------|
| control | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 0 | no. youn | no. adults | |
| temp: | 1 | | | | | | | | | | | | 0 | 11 | #DIV/O! |
| temp: | 2 | | | | | | | | | | | | 0 | 10 | #DIV/O! |
| temp: | 3 | | | | | | | | | | | | 0 | 13 | #DIV/O! |
| temp: | 4 | 4 | 3 | 3 | 2 | 4 | 1 | 2 | 4 | 4 | 1 | | 0 | 10 | #DIV/O! |
| temp: | 5 | | | | | | | | | | | | 0 | 10 | #DIV/O! |
| temp: | 6 | 6 | 5 | 7 | 7 | 5 | 6 | 6 | 6 | 7 | 5 | | 0 | 10 | #DIV/O! |
| temp: | 7 | | | | | | | | | | | | 0 | 10 | #DIV/O! |
| temp: | 8 | 6 | 6 | 10 | 9 | 7 | 8 | 8 | 11 | 9 | 5 | | 0 | 10 | #DIV/O! |
| * TOTAL | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | 0 | 10 | 0 |

| CONC. | DAY | REPLICATE CONTAINERS | | | | | | | | | | s.d.= | CVX = | #DIV/O! | young/adu |
|---------|-----|----------------------|---|---|---|---|---|---|----|---|----|-------|----------|------------|-----------|
| Z.O | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 0 | no. youn | no. adults | |
| temp: | 1 | | | | | | | | | | | | 0 | 10 | #DIV/O |
| temp: | 2 | | | | | | | | | | | | 0 | 10 | #DIV/O |
| temp: | 3 | | | | | | | | | | | | 0 | 10 | #DIV/O |
| temp: | 4 | 4 | 3 | 1 | 2 | 2 | 2 | 4 | 1 | 3 | 3 | | 0 | 10 | #DIV/O |
| temp: | 5 | | | | | | | | | | | | 0 | 10 | #DIV/O |
| temp: | 6 | 5 | 5 | 6 | 7 | 7 | 7 | 6 | 7 | 5 | 6 | | 0 | 10 | #DIV/O |
| temp: | 7 | 3 | 1 | | | | | | | | | | 0 | 10 | #DIV/O |
| temp: | 8 | 8 | 8 | 7 | 9 | 6 | 9 | 9 | 10 | 8 | 7 | | 0 | 10 | #DIV/O |
| * TOTAL | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | 0 | 10 | 0 |

| CONC. | DAY | REPLICATE CONTAINERS | | | | | | | | | | s.d.= | CVX = | #DIV/O! | young/adu |
|---------|-----|----------------------|---|---|---|----|---|----|---|---|----|-------|----------|------------|-----------|
| Z.6 | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 0 | no. youn | no. adults | |
| temp: | 1 | | | | | | | | | | | | 0 | 10 | #DIV/O |
| temp: | 2 | | | | | | | | | | | | 0 | 10 | #DIV/O |
| temp: | 3 | | | | | | | | | | | | 0 | 10 | #DIV/O |
| temp: | 4 | 4 | 2 | 4 | 2 | 3 | 4 | 4 | 2 | 2 | 4 | | 0 | 10 | #DIV/O |
| temp: | 5 | | | | | | | | | | | | 0 | 10 | #DIV/O |
| temp: | 6 | 6 | 5 | 7 | 7 | 7 | 6 | 8 | 7 | 6 | 7 | | 0 | 10 | #DIV/O |
| temp: | 7 | 2 | 3 | | | | | | | | | | 0 | 10 | #DIV/O |
| temp: | 8 | 6 | 8 | 8 | 9 | 10 | 7 | 11 | 9 | 8 | 6 | | 0 | 10 | #DIV/O |
| * TOTAL | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | 0 | 10 | 0 |

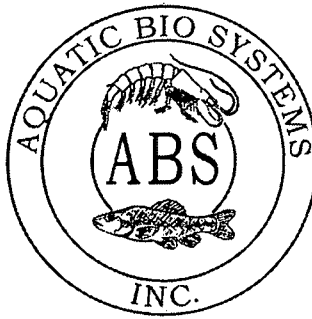
| CONC. | DAY | REPLICATE CONTAINERS | | | | | | | | | | s.d.= | CVX = | #DIV/O! | young/adu |
|---------|-----|----------------------|---|---|---|---|---|---|----|---|----|-------|----------|------------|-----------|
| 3.5 | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 0 | no. youn | no. adults | |
| temp: | 1 | | | | | | | | | | | | 0 | 10 | #DIV/O |
| temp: | 2 | | | | | | | | | | | | 0 | 10 | #DIV/O |
| temp: | 3 | 1 | 1 | | | | | | | | | | 0 | 10 | #DIV/O |
| temp: | 4 | 2 | 1 | 3 | 3 | 3 | 4 | 2 | 3 | 4 | 2 | | 0 | 10 | #DIV/O |
| temp: | 5 | | | | | | | | | | | | 0 | 10 | #DIV/O |
| temp: | 6 | 7 | 4 | 6 | 3 | 7 | 7 | 8 | 6 | 7 | 5 | | 0 | 10 | #DIV/O |
| temp: | 7 | | | | | | | | | | | | 0 | 10 | #DIV/O |
| temp: | 8 | 9 | 5 | 7 | 5 | 6 | 8 | 7 | 10 | 7 | 8 | | 0 | 10 | #DIV/O |
| * TOTAL | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | 0 | 10 | 0 |

| CONC. | DAY | REPLICATE CONTAINERS | | | | | | | | | | s.d.= | CVX = | #DIV/O! | young/a |
|---------|-----|----------------------|---|----|---|---|----|---|---|---|----|-------|----------|------------|---------|
| 4.7 | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 0 | no. youn | no. adults | |
| temp: | 1 | | | | | | | | | | | | 0 | 10 | #DIV/O |
| temp: | 2 | | | | | | | | | | | | 0 | 10 | #DIV/O |
| temp: | 3 | 2 | 2 | | | | | | | | | | 0 | 10 | #DIV/O |
| temp: | 4 | 3 | 1 | 4 | 2 | 2 | 4 | 3 | 3 | 4 | 2 | | 0 | 10 | #DIV/O |
| temp: | 5 | | | | | | | | | | | | 0 | 10 | #DIV/O |
| temp: | 6 | 8 | 6 | 5 | 7 | 7 | 7 | 7 | 6 | 5 | 8 | | 0 | 10 | #DIV/O |
| temp: | 7 | | | | | | | | | | | | 0 | 10 | #DIV/O |
| temp: | 8 | 8 | 8 | 10 | 7 | 7 | 11 | 9 | 6 | 7 | 8 | | 0 | 10 | #DIV/O |
| * TOTAL | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | 0 | 10 | 0 |

| CONC. | DAY | REPLICATE CONTAINERS | | | | | | | | | | s.d.= | CVX = | #DIV/O! | young/e |
|-------|-----|----------------------|---|---|---|---|---|---|---|---|----|-------|----------|------------|---------|
| 6.3 | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 0 | no. youn | no. adults | |
| temp: | 1 | | | | | | | | | | | | 0 | 10 | #DIV/O |
| temp: | 2 | | | | | | | | | | | | 0 | 10 | #DIV/O |
| temp: | 3 | 1 | | | | | | | | | | | 0 | 10 | #DIV/O |
| temp: | 4 | 2 | 5 | 1 | 3 | 3 | 4 | 2 | 3 | 2 | 4 | | 0 | 10 | #DIV/O |
| temp: | 5 | | | | | | | | | | | | 0 | 10 | #DIV/O |
| temp: | 6 | 6 | 5 | 7 | 7 | 6 | 7 | 8 | 6 | 5 | 7 | | 0 | 10 | #DIV/O |
| temp: | 7 | | | | | | | | | | | | 0 | 10 | #DIV/O |
| temp: | 8 | 6 | 8 | 7 | 9 | 9 | 8 | 8 | 7 | 7 | 9 | | 0 | 10 | #DIV/O |

APPENDIX B
ORGANISM HISTORY

1300 Blue Spruce Drive, Suite C
Fort Collins, Colorado 80524



Toll Free: 800/331-5916
Tel: 970/484-5091 Fax: 970/484-2514

ORGANISM HISTORY

DATE: 3/18/2013

SPECIES: *Pinephales promelas*

AGE: N/A

LIFE STAGE: Embryo

HATCH DATE: 3/18/2013

BEGAN FEEDING: N/A

FOOD: N/A

Water Chemistry Record:

| | Current | Range |
|---|-----------------|-----------|
| TEMPERATURE: | <u>23°C</u> | <u>--</u> |
| SALINITY/CONDUCTIVITY: | <u>--</u> | <u>--</u> |
| TOTAL HARDNESS (as CaCO ₃): | <u>122 mg/l</u> | <u>--</u> |
| TOTAL ALKALINITY (as CaCO ₃): | <u>100 mg/l</u> | <u>--</u> |
| pH: | <u>7.65</u> | <u>--</u> |

Comments:



Facility Supervisor

APPENDIX C
CHAINS OF CUSTODY

8100 NATIONAL DRIVE, LITTLE ROCK, AR 72209

501-562-8139 800-331-8139

FAX 501-562-7025

CHAIN OF CUSTODY RECORD

TURN AROUND TIME
RUSH 24HR. 48 HR.
5 DAY REG
OTHER _____

FOR LAB/OFFICE USE ONLY

LAB # 15766, 0001B
CLIENT # 1144
P.O.# _____

STANDARD METHODS PRESERVATION PER EPA 40 CFR
C 4= COOL TO 4.C
S<2= SULFURIC ACID TO pH<2
N<2= NITRIC ACID TO pH<2
T= THIOSULFATE FOR DECHLORINATION
W= WINKLER AZIDE MODIFICATION
P= MEMBRANE ELECTRODE
NaOH= pH >12

NAME OF COMPANY, CITY, OR PROJECT

PROJECT NO:

SAMPLER(S) NAME: (PRINT)

110913k2

Arkadelphia Water Dept

Randy Windham

| SAMPLE NO: | SAMPLE ID AND/OR COLLECTION LOCATION | START | END | COMP | FIELD ANALYSIS | | | | D.O (W) | CONTAINER TYPE | ANALYSIS REQUIRED |
|------------|--------------------------------------|--------------|--------------|------|----------------|------|------|-----|---------|----------------|-------------------|
| | | DATE/TIME | DATE/TIME | GRAB | pH | TEMP | FLOW | CL2 | D.O(P) | PRESERVATIVE | |
| | out Falls 001 | 3/17/13 0800 | 3/18/13 0800 | comp | | | | | | Plastic/None | chronic BIO |
| | | | | | | | | | | | |
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METHOD OF SHIPMENT (CIRCLE)
FED EX WALK IN SRA UPS OTHER

FIELD CALIBRATION RECORD

pH 7
pH 4
pH 10
D.O

NOTES/COMMENTS/OBSERVATIONS

Temp @ Lab 1.6°C

TYPE OF SAMPLE(S): (CIRCLE)
WATER SOIL W/W SLUDGE OTHER

FIELD ANALYSIS CONDUCTED BY: (CIRCLE) SRA CLIENT

RELINQUISHED BY: *[Signature]* DATE/TIME: 3-18-13 10:26

RECEIVED BY: *[Signature]* DATE/TIME: 3-18-13 1:26

RELINQUISHED BY: _____ DATE/TIME: _____

RECEIVED BY: _____ DATE/TIME: _____

8100 NATIONAL DRIVE, LITTLE ROCK, AR 72209

501-562-8139 800-331-8139

FAX 501-562-7025

CHAIN OF CUSTODY RECORD

TURN AROUND TIME
RUSH 24HR. 48 HR.
5 DAY REG
OTHER _____

FOR LAB/OFFICE USE ONLY

STANDARD METHODS PRESERVATION PER EPA 40 CFR

C 4= COOL TO 4.C

S<2= SULFURIC ACID TO pH<2

N<2= NITRIC ACID TO pH<2

T= THIOSULFATE FOR DECHLORINATION

W= WINKLER AZIDE MODIFICATION

P= MEMBRANE ELECTRODE

NaOH= pH >12

LAB # 15766000 ZB

CLIENT # 1144

P.O.# _____

NAME OF COMPANY, CITY, OR PROJECT

PROJECT NO:

SAMPLER(S) NAME: (PRINT)

110913K2

City of Arkadelphia

Randy Windham

| SAMPLE NO: | SAMPLE ID AND/OR COLLECTION LOCATION | START | END | COMP | FIELD ANALYSIS | | | | D,O (W) | CONTAINER TYPE | ANALYSIS REQUIRED |
|------------|--------------------------------------|---------------------|---------------------|-------------|----------------|------|------|-----|---------|-----------------------|---------------------|
| | | DATE/TIME | DATE/TIME | GRAB | pH | TEMP | FLOW | CL2 | D.O(P) | PRESERVATIVE | |
| | <u>outfalls 001</u> | <u>3-19-13 6:00</u> | <u>3-20-13 0800</u> | <u>comp</u> | | | | | | <u>Plastic \ None</u> | <u>chronc \ BIO</u> |
| | | | | | | | | | | | |
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METHOD OF SHIPMENT (CIRCLE)

FED EX (WALK IN) SRA UPS OTHER

FIELD CALIBRATION RECORD

pH 7

pH 4

pH 10

D.O

NOTES/COMMENTS/OBSERVATIONS

Temp @ Lab 1.8°C

TYPE OF SAMPLE(S): (CIRCLE)

WATER SOIL W/W SLUDGE OTHER

FIELD ANALYSIS CONDUCTED BY: (CIRCLE) SRA CLIENT

RELINQUISHED BY: Randy Windham

DATE/TIME: 3-20-13 1427

RECEIVED BY: [Signature]

DATE/TIME:

RELINQUISHED BY:

DATE/TIME:

RECEIVED BY (LAB): [Signature]

3-20-13

DATE/TIME:

8100 NATIONAL DRIVE, LITTLE ROCK, AR 72209

501-562-8139 800-331-8139

FAX 501-562-7025

CHAIN OF CUSTODY RECORD

TURN AROUND TIME

RUSH 24HR. 48 HR.

5 DAY REG

OTHER _____

FOR LAB/OFFICE USE ONLY

LAB # 157660003B

CLIENT # 1144

P.O.# _____

STANDARD METHODS PRESERVATION PER EPA 40 CFR

C 4= COOL TO 4.C

S<2= SULFURIC ACID TO pH<2

N<2= NITRIC ACID TO pH<2

T= THIOSULFATE FOR DECHLORINATION

W= WINKLER AZIDE MODIFICATION

P= MEMBRANE ELECTRODE

NaOH= pH >12

110913h2

NAME OF COMPANY, CITY, OR PROJECT

PROJECT NO:

SAMPLER(S) NAME: (PRINT)

City of Arkadelphia

Randy Windham

| SAMPLE NO: | SAMPLE ID AND/OR COLLECTION LOCATION | START | END | COMP | FIELD ANALYSIS | | | | D.O (W) | CONTAINER TYPE | ANALYSIS REQUIRED |
|------------|--------------------------------------|---------------------|---------------------|-------------|----------------|------|------|-----|---------|-----------------------|----------------------|
| | | DATE/TIME | DATE/TIME | GRAB | pH | TEMP | FLOW | CL2 | D.O(P) | PRESERVATIVE | |
| | <u>outfalls 001</u> | <u>3/21/13 6800</u> | <u>3/22/13 6800</u> | <u>Comp</u> | | | | | | <u>Plastic / None</u> | <u>chronic / BTo</u> |
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METHOD OF SHIPMENT (CIRCLE)

FED EX WALK IN SRA UPS OTHER

FIELD CALIBRATION RECORD

pH 7

pH 4

pH 10

D.O

NOTES/COMMENTS/OBSERVATIONS

Temp @ Lab 1.6°F

TYPE OF SAMPLE(S): (CIRCLE)

WATER SOIL W/W SLUDGE OTHER

FIELD ANALYSIS CONDUCTED BY: (CIRCLE) SRA CLIENT

RELINQUISHED BY:

Randy Windham

DATE/TIME:

3-22-13

RECEIVED BY:

Danny Riddle

DATE/TIME:

3-22-13 10:00

RELINQUISHED

DATE/TIME:

RECEIVED BY (LAB):

DATE/TIME:



APPENDIX D
LABORATORY CONTROL
CERIO CULTURE RECORD

3-11-13 *aria*

| DATE START | * | | | | | | | | | | | | | | | | | |
|--------------------|------------------|----|----|----|----|----|----|----|----|----|---------|---------|--------|--|--|--|--|--|
| DATE END | * | | | | | | | | | | | | | | | | | |
| ANALYST | * | | | | | | | | | | | | | | | | | |
| WATER TYPE | * | | | | | | | | | | day 8 | day 14 | | | | | | |
| % SURVIVAL | * | | | | | | | | | | #VALUE! | #VALUE! | | | | | | |
| #YOUNG MEAN | | | | | | | | | | | 0 | | | | | | | |
| stnd DEV from mean | | | | | | | | | | | 0 | #DIV/0! | | | | | | |
| | REPLICATE NUMBER | | | | | | | | | | No. | No. | Young/ | | | | | |
| DAY | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | Young | Adults | Adult | | | | | |
| 1 | | | | | | | | | | | 0 | | ##### | | | | | |
| 2 | | | | | | | | | | | 0 | | ##### | | | | | |
| 3 | | | | 1 | | | | | 2 | | 0 | 10 | ##### | | | | | |
| 4 | 3 | 4 | 2 | 3 | 3 | 4 | 4 | 1 | 1 | 5 | 0 | 10 | ##### | | | | | |
| 5 | 2 | | 1 | | | | | 4 | 3 | | 0 | 10 | ##### | | | | | |
| 6 | 5 | 7 | 6 | 6 | 7 | 7 | 5 | 4 | 7 | 6 | 0 | 10 | ##### | | | | | |
| 7 | | 1 | | 3 | | 2 | 5 | 4 | 1 | | 0 | 10 | ##### | | | | | |
| 8 | 8 | 8 | 9 | 6 | 10 | 7 | 6 | 8 | 7 | 10 | 0 | 10 | ##### | | | | | |
| total8 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | ##### | | | | | |
| 9 | | | | | | | | | | | 0 | | ##### | | | | | |
| 10 | | | | .. | | | | | | | 0 | | ##### | | | | | |
| 11 | | | | | | | | | | | 0 | | ##### | | | | | |
| 12 | | | | | | | | | | | 0 | | ##### | | | | | |
| 13 | | | | | | | | | | | 0 | | ##### | | | | | |
| 14 | | | | | | | | | | | 0 | | ##### | | | | | |
| total14 | | | | | | | | | | | 0 | | ##### | | | | | |
| | REPLICATE NUMBER | | | | | | | | | | No. | No. | Young/ | | | | | |
| DAY | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | Young | Adults | Adult | | | | | |
| 1 | | | | | | | | | | | 0 | | ##### | | | | | |
| 2 | | | | | | | | | | | 0 | | ##### | | | | | |
| 3 | | | 1 | | 1 | | | | | | 0 | 10 | ##### | | | | | |
| 4 | 4 | 2 | 3 | 3 | 3 | 4 | | 2 | 5 | 4 | 0 | 10 | ##### | | | | | |
| 5 | | 2 | | 1 | | | 3 | 1 | | | 0 | 10 | ##### | | | | | |
| 6 | 5 | 5 | 6 | 6 | 6 | 6 | 5 | 7 | 7 | 7 | 0 | 10 | ##### | | | | | |
| 7 | 3 | 2 | | 1 | | 2 | | | | 1 | 0 | 10 | ##### | | | | | |
| 8 | 8 | 6 | 9 | 9 | 11 | 9 | 8 | 7 | 8 | 9 | 0 | 10 | ##### | | | | | |
| total8 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 10 | 0 | | | | | |
| 9 | | | | | | | | | | | 0 | | ##### | | | | | |
| 10 | | | | | | | | | | | 0 | | ##### | | | | | |
| 11 | | | | | | | | | | | 0 | | ##### | | | | | |
| 12 | | | | | | | | | | | 0 | | ##### | | | | | |
| 13 | | | | | | | | | | | 0 | | ##### | | | | | |
| 14 | | | | | | | | | | | 0 | | ##### | | | | | |
| total14 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 10 | 0 | | | | | |

FIGURE 5

**BIOMONITORING ANALYSIS
BY
SORRELLS RESEARCH ASSOCIATES, INC**

REVIEW



**CECIL A. SORRELLS
BIOMONITORING MANAGER/PRESIDENT**



**K.E. SORRELLS, M.S.
QUALITY ASSURANCE/OFFICER**

ARK
700

P.O. Box 495
Arkadelphia, AR 71920



02 1P \$ 002.
0003925991 APR 26
MAILED FROM ZIP CODE 7

Ms. Sara Clem
Arkansas Department of Environmental Quality
5301 Northshore Drive
North Little Rock, AR 72118-5317