

ENVIRONMENTAL MONITORING DIVISION
BUREAU OF SANITATION
CITY OF LOS ANGELES

STORMWATER MONITORING PROGRAM

TOXICITY TESTING REPORT

SAMPLE DATE: July 9, 2018

TEST DATE: July 12, 2018

TEST NUMBER: 1807072A.C

TEST MATERIAL: Station BC02SAW

TEST SPECIES: *Ceriodaphnia dubia*

PROTOCOL: EPA/821/R-02-013 (2002)


TEST TYPE: Chronic

REFERENCE TOXICANT TEST: 1807RT2A.C

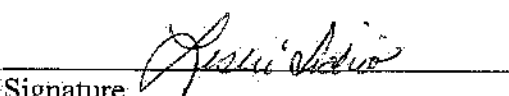
RESULT:

Survival
Reproduction

Pass, 0% effect
Pass, -3.26% effect (outlier excluded)

Rea Mara A Crinklaw
Analyst

Signature

Water Biologist III
Title
9/13/18
Date

Leslie Sidio
Supervisor

Signature

Laboratory Manager I
Title
9/24/18
Date

CETIS Summary Report

Report Date: 13 Sep-18 13:47 (p 1 of 1)
Test Code: 1807072A.C | 18-9776-0667

| Ceriodaphnia 7-d Survival and Reproduction Test | | | | | | Hyperion Treatment Plant Laboratory | | | | | |
|--|------------------|-----------------|------------------------------|-----------------|-------------------------------|-------------------------------------|--------------------|---------|---------|--------|---------|
| Batch ID: | 20-0601-9976 | Test Type: | Reproduction-Survival (7d) | Analyst: | Rea Mara Crinklaw | | | | | | |
| Start Date: | 12 Jul-18 15:25 | Protocol: | EPA/821/R-02-013 (2002) | Diluent: | Mod-Hard Synthetic Water | | | | | | |
| Ending Date: | 19 Jul-18 13:58 | Species: | Ceriodaphnia dubia | Brine: | | | | | | | |
| Duration: | 6d 23h | Source: | In-House Culture | Age: | 1-9h 7/12/18 (0655-1250) | | | | | | |
| Sample ID: | 07-6493-2402 | Code: | 2896302 | Client: | Watershed Protection Division | | | | | | |
| Sample Date: | 09 Jul-18 11:45 | Material: | Stormwater Monitoring Sample | Project: | MS4 | | | | | | |
| Receive Date: | 09 Jul-18 15:30 | Source: | Stormwater (STORMWATER) | | | | | | | | |
| Sample Age: | 76h (24.3 °C) | Station: | BC02SAW | | | | | | | | |
| Sample Renewals | | | | | | | | | | | |
| Renewal | Sample Code | Sample Date | Receive Date | Renewal Date | Temp °C | | | | | | |
| 1 | 2896302 | 09 Jul-18 11:45 | 09 Jul-18 15:30 | 13 Jul-18 13:05 | 24.3 | | | | | | |
| 2 | 2896302 | 09 Jul-18 11:45 | 09 Jul-18 15:30 | 14 Jul-18 13:55 | 24.3 | | | | | | |
| 3 | 2896302 | 09 Jul-18 11:45 | 09 Jul-18 15:30 | 15 Jul-18 14:35 | 24.3 | | | | | | |
| 4 | 2896302 | 09 Jul-18 11:45 | 09 Jul-18 15:30 | 16 Jul-18 12:38 | 24.3 | | | | | | |
| 5 | 2896302 | 09 Jul-18 11:45 | 09 Jul-18 15:30 | 17 Jul-18 10:50 | 24.3 | | | | | | |
| 6 | 2896302 | 09 Jul-18 11:45 | 09 Jul-18 15:30 | 18 Jul-18 09:35 | 24.3 | | | | | | |
| Batch Note: Batch: 1086; HBN: 58860 <i>9:00 for 9/12/18 less than</i> | | | | | | | | | | | |
| Sample Note: Initial sample set up at 7/12/18 12:00 (72 hrs from sample time). | | | | | | | | | | | |
| Comparison Summary | | | | | | | | | | | |
| Analysis ID | Endpoint | NOEL | LOEL | TOEL | PMSD | TU | Method | | | | |
| 11-4342-2525 | 7d Survival Rate | 100 | >100 | N/A | N/A | 1 | TST-Welch's t Test | | | | |
| 02-6989-5034 | Reproduction | 100 | >100 | N/A | N/A | 1 | TST-Welch's t Test | | | | |
| 09-9046-5242 | Reproduction | 100 | >100 | N/A | N/A | 1 | TST-Welch's t Test | | | | |
| Test Acceptability | | | | | | | | | | | |
| Analysis ID | Endpoint | Attribute | Test Stat | TAC Limits | Overlap | Decision | | | | | |
| 11-4342-2525 | 7d Survival Rate | Control Resp | 1 | 0.8 - NL | Yes | Passes Acceptability Criteria | | | | | |
| 02-6989-5034 | Reproduction | Control Resp | 36.8 | 15 - NL | Yes | Passes Acceptability Criteria | | | | | |
| 09-9046-5242 | Reproduction | Control Resp | 36.8 | 15 - NL | Yes | Passes Acceptability Criteria | | | | | |
| 7d Survival Rate Summary | | | | | | | | | | | |
| Conc-% | Control Type | Count | Mean | 95% LCL | 95% UCL | Min | Max | Std Err | Std Dev | CV% | %Effect |
| 0 | Dilution Water | 10 | 1 | 1 | 1 | 1 | 1 | 0 | 0 | 0.0% | 0.0% |
| 100 | | 10 | 1 | 1 | 1 | 1 | 1 | 0 | 0 | 0.0% | 0.0% |
| Reproduction Summary | | | | | | | | | | | |
| Conc-% | Control Type | Count | Mean | 95% LCL | 95% UCL | Min | Max | Std Err | Std Dev | CV% | %Effect |
| 0 | Dilution Water | 10 | 36.8 | 35.52 | 38.08 | 33 | 43 | 1.083 | 3.425 | 9.31% | 0.0% |
| 100 | | 9 | 38 | 35.89 | 40.11 | 24 | 43 | 1.886 | 5.657 | 14.89% | -3.26% |
| 7d Survival Rate Detail | | | | | | | | | | | |
| Conc-% | Control Type | Rep 1 | Rep 2 | Rep 3 | Rep 4 | Rep 5 | Rep 6 | Rep 7 | Rep 8 | Rep 9 | Rep 10 |
| 0 | Dilution Water | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| 100 | | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| Reproduction Detail | | | | | | | | | | | |
| Conc-% | Control Type | Rep 1 | Rep 2 | Rep 3 | Rep 4 | Rep 5 | Rep 6 | Rep 7 | Rep 8 | Rep 9 | Rep 10 |
| 0 | Dilution Water | 33 | 39 | 34 | 35 | 34 | 42 | 43 | 36 | 36 | 36 |
| 100 | | 40 | 40 | 43 | 43 | 24 | 38 | 38 | outlier | 37 | 39 |

CETIS Analytical Report

Report Date: 13 Sep-18 13:46 (p 1 of 6)
Test Code: 1807072A.C | 18-9776-0667

| Ceriodaphnia 7-d Survival and Reproduction Test | | | | | | Hyperion Treatment Plant Laboratory | | | | | |
|---|--------------------------|--|-----------|---------------------------------------|-------------------------------------|-------------------------------------|---------|------------------------|---------|--------|---------|
| Analysis ID: 02-6989-5034 | | Endpoint: Reproduction | | CETIS Version: CETISv1.8.1 | | | | | | | |
| Analyzed: 13 Sep-18 13:02 | | Analysis: Parametric Bioequivalence-Two Sample | | Official Results: Yes | | | | | | | |
| Batch ID: 20-0601-9976 | | Test Type: Reproduction-Survival (7d) | | Analyst: Rea Mara Crinklaw | | | | | | | |
| Start Date: 12 Jul-18 15:25 | | Protocol: EPA/821/R-02-013 (2002) | | Diluent: Mod-Hard Synthetic Water | | | | | | | |
| Ending Date: 19 Jul-18 13:58 | | Species: Ceriodaphnia dubia | | Brine: | | | | | | | |
| Duration: 6d 23h | | Source: In-House Culture | | Age: 1-9h | | 7/12/18 (0655-1250) | | | | | |
| Sample ID: 07-6493-2402 | | Code: 2896302 | | Client: Watershed Protection Division | | | | | | | |
| Sample Date: 09 Jul-18 11:45 | | Material: Stormwater Monitoring Sample | | Project: MS4 | | | | | | | |
| Receive Date: 09 Jul-18 15:30 | | Source: Stormwater (STORMWATER) | | | | | | | | | |
| Sample Age: 76h (24.3 °C) | | Station: BC02SAW | | | | | | | | | |
| Batch Note: Batch: 1086; HBN: 58860 | | | | | | | | | | | |
| Sample Note: Initial sample set up at 7/12/18 12:00 (72 hrs from sample time). <i>9:00 AM 7/12/18 less than</i> | | | | | | | | | | | |
| Data Transform | Zeta | Alt Hyp | MC Trials | TST b | Test Result | | | | | | |
| Untransformed | 0 | C*b > T | Not Run | 0.75 | Sample passes reproduction endpoint | | | | | | |
| TST-Welch's t Test | | | | | | | | | | | |
| Control | vs | Conc-% | Test Stat | Critical | DF | MSD | P-Value | Decision(α:20%) | | | |
| Dilution Water | | 100* | 2.435 | 0.8791 | 10 | | 0.0176 | Non-Significant Effect | | | |
| Test Acceptability Criteria | | | | | | | | | | | |
| Attribute | Test Stat | TAC Limits | Overlap | Decision | | | | | | | |
| Control Resp | 36.8 | 15 - NL | Yes | Passes Acceptability Criteria | | | | | | | |
| Auxiliary Tests | | | | | | | | | | | |
| Attribute | Test | Test Stat | Critical | P-Value | Decision(α:5%) | | | | | | |
| Extreme Value | 0 | 3.275 | 2.708 | 0.0014 | Outlier Detected | | | | | | |
| ANOVA Table | | | | | | | | | | | |
| Source | Sum Squares | Mean Square | DF | F Stat | P-Value | Decision(α:5%) | | | | | |
| Between | 9.8 | 9.8 | 1 | 0.1819 | 0.6748 | Non-Significant Effect | | | | | |
| Error | 970 | 53.88889 | 18 | | | | | | | | |
| Total | 979.8 | 63.68889 | 19 | | | | | | | | |
| Distributional Tests | | | | | | | | | | | |
| Attribute | Test | Test Stat | Critical | P-Value | Decision(α:1%) | | | | | | |
| Variances | Variance Ratio F | 8.186 | 6.541 | 0.0044 | Unequal Variances | | | | | | |
| Distribution | Shapiro-Wilk W Normality | 0.8056 | 0.866 | 0.0010 | Non-normal Distribution | | | | | | |
| Reproduction Summary | | | | | | | | | | | |
| Conc-% | Control Type | Count | Mean | 95% LCL | 95% UCL | Min | Max | Std Err | Std Dev | CV% | %Effect |
| 0 | Dilution Water | 10 | 36.8 | 35.5 | 38.1 | 33 | 43 | 1.083 | 3.425 | 9.31% | 0.0% |
| 100 | | 10 | 35.4 | 31.67 | 39.13 | 12 | 43 | 3.099 | 9.8 | 27.68% | 3.8% |

CETIS Analytical Report

Report Date: 13 Sep-18 13:46 (p 2 of 6)
 Test Code: 1807072A.C | 18-9776-0667

Ceriodaphnia 7-d Survival and Reproduction Test

Hyperion Treatment Plant Laboratory

Analysis ID: 02-6989-5034
 Analyzed: 13 Sep-18 13:02

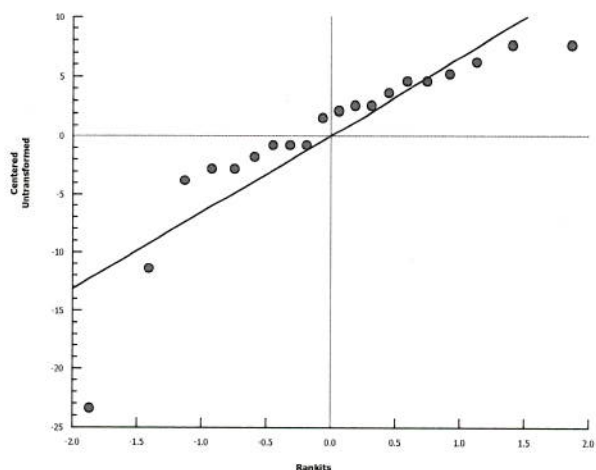
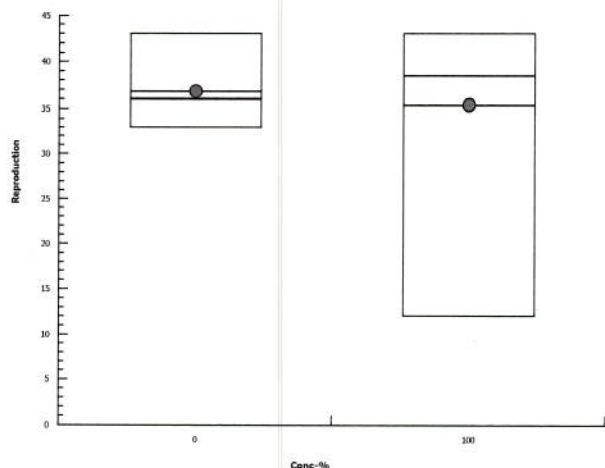
Endpoint: Reproduction
 Analysis: Parametric Bioequivalence-Two Sample

CETIS Version: CETISv1.8.1
 Official Results: Yes

Reproduction Detail

| Conc-% | Control Type | Rep 1 | Rep 2 | Rep 3 | Rep 4 | Rep 5 | Rep 6 | Rep 7 | Rep 8 | Rep 9 | Rep 10 |
|--------|----------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|--------|
| 0 | Dilution Water | 33 | 39 | 34 | 35 | 34 | 42 | 43 | 36 | 36 | 36 |
| 100 | | 40 | 40 | 43 | 43 | 24 | 38 | 38 | 12 | 37 | 39 |

Graphics



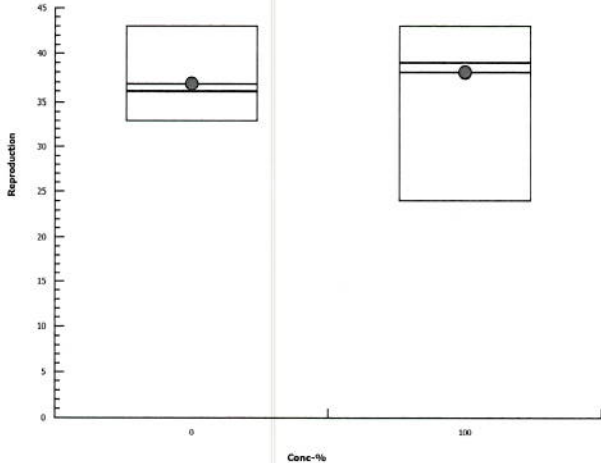
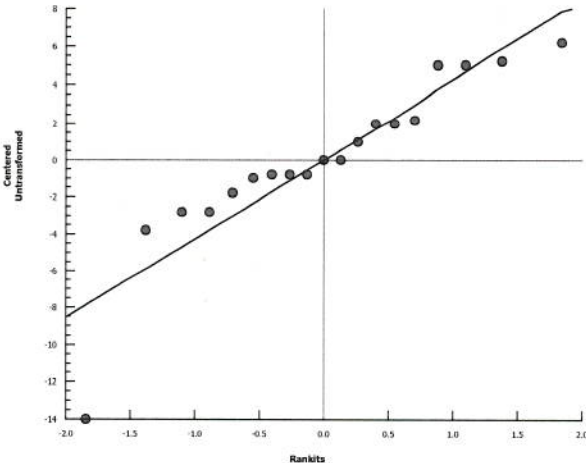
CETIS Analytical Report

Report Date: 13 Sep-18 13:46 (p 3 of 6)
 Test Code: 1807072A.C | 18-9776-0667

| Ceriodaphnia 7-d Survival and Reproduction Test | | | | Hyperion Treatment Plant Laboratory | | | | | | | |
|--|--|---------------------------------------|-----------|-------------------------------------|-------------------------------------|------------------------|------------------------|---------|---------|--------|---------|
| Analysis ID: 09-9046-5242 | Endpoint: Reproduction | CETIS Version: CETISv1.8.1 | | | | | | | | | |
| Analyzed: 13 Sep-18 13:02 | Analysis: Parametric Bioequivalence-Two Sample | Official Results: Yes | | | | | | | | | |
| Batch ID: 20-0601-9976 | Test Type: Reproduction-Survival (7d) | Analyst: Rea Mara Crinklaw | | | | | | | | | |
| Start Date: 12 Jul-18 15:25 | Protocol: EPA/821/R-02-013 (2002) | Diluent: Mod-Hard Synthetic Water | | | | | | | | | |
| Ending Date: 19 Jul-18 13:58 | Species: Ceriodaphnia dubia | Brine: | | | | | | | | | |
| Duration: 6d 23h | Source: In-House Culture | Age: 1-9h 7/12/18 (0655-1250) | | | | | | | | | |
| Sample ID: 07-6493-2402 | Code: 2896302 | Client: Watershed Protection Division | | | | | | | | | |
| Sample Date: 09 Jul-18 11:45 | Material: Stormwater Monitoring Sample | Project: MS4 | | | | | | | | | |
| Receive Date: 09 Jul-18 15:30 | Source: Stormwater (STORMWATER) | | | | | | | | | | |
| Sample Age: *76h (24.3 °C) | Station: BC02SAW | | | | | | | | | | |
| Batch Note: Batch: 1086; HBN: 58860 | | | | | | | | | | | |
| Sample Note: Initial sample set up at 7/12/18 12:00 (72 hrs from sample time). | | | | | | | | | | | |
| Data Transform | Zeta | Alt Hyp | MC Trials | TST.b | Test Result | | | | | | |
| Untransformed | 0 | C*b > T | Not Run | 0.75 | Sample passes reproduction endpoint | | | | | | |
| TST-Welch's t Test | | | | | | | | | | | |
| Control | vs Conc-% | Test Stat | Critical | DF | MSD | P-Value | Decision(α:20%) | | | | |
| Dilution Water | 100* | 5.065 | 0.8791 | 10 | | 0.0002 | Non-Significant Effect | | | | |
| Test Acceptability Criteria | | | | | | | | | | | |
| Attribute | Test Stat | TAC Limits | Overlap | Decision | | | | | | | |
| Control Resp | 36.8 | 15 - NL | Yes | Passes Acceptability Criteria | | | | | | | |
| ANOVA Table | | | | | | | | | | | |
| Source | Sum Squares | Mean Square | DF | F Stat | P-Value | Decision(α:5%) | | | | | |
| Between | 6.821053 | 6.821053 | 1 | 0.3207 | 0.5786 | Non-Significant Effect | | | | | |
| Error | 361.6 | 21.27059 | 17 | | | | | | | | |
| Total | 368.4211 | 28.09164 | 18 | | | | | | | | |
| Distributional Tests | | | | | | | | | | | |
| Attribute | Test | Test Stat | Critical | P-Value | Decision(α:1%) | | | | | | |
| Variances | Variance Ratio F | 2.727 | 6.693 | 0.1565 | Equal Variances | | | | | | |
| Distribution | Shapiro-Wilk W Normality | 0.8621 | 0.8605 | 0.0106 | Normal Distribution | | | | | | |
| Reproduction Summary | | | | | | | | | | | |
| Conc-% | Control Type | Count | Mean | 95% LCL | 95% UCL | Min | Max | Std Err | Std Dev | CV% | %Effect |
| 0 | Dilution Water | 10 | 36.8 | 35.5 | 38.1 | 33 | 43 | 1.083 | 3.425 | 9.31% | 0.0% |
| 100 | | 9 | 38 | 35.85 | 40.15 | 24 | 43 | 1.886 | 5.657 | 14.89% | -3.26% |

CETIS Analytical Report

Report Date: 13 Sep-18 13:46 (p 4 of 6)
 Test Code: 1807072A.C | 18-9776-0667

| Ceriodaphnia 7-d Survival and Reproduction Test | | | | | | | Hyperion Treatment Plant Laboratory | | | | |
|---|----------------|--|-------|----------------------------|-------|--|-------------------------------------|-------|---------|-------|--------|
| Analysis ID: 09-9046-5242 | | Endpoint: Reproduction | | CETIS Version: CETISv1.8.1 | | | | | | | |
| Analyzed: 13 Sep-18 13:02 | | Analysis: Parametric Bioequivalence-Two Sample | | Official Results: Yes | | | | | | | |
| Reproduction Detail | | | | | | | | | | | |
| Conc-% | Control Type | Rep 1 | Rep 2 | Rep 3 | Rep 4 | Rep 5 | Rep 6 | Rep 7 | Rep 8 | Rep 9 | Rep 10 |
| 0 | Dilution Water | 33 | 39 | 34 | 35 | 34 | 42 | 43 | 36 | 36 | 36 |
| 100 | | 40 | 40 | 43 | 43 | 24 | 38 | 38 | Outlier | 37 | 39 |
| Graphics | | | | | | | | | | | |
|  | | | | | |  | | | | | |

CETIS Analytical Report

Report Date: 13 Sep-18 13:46 (p 5 of 6)
 Test Code: 1807072A.C | 18-9776-0667

| Ceriodaphnia 7-d Survival and Reproduction Test | | | | | | Hyperion Treatment Plant Laboratory | | | | | |
|---|---------------------------------|--|-----------|---------------------------------------|-------------------|---|---------|------------------------|---------|------|---------|
| Analysis ID: 11-4342-2525 | | Endpoint: 7d Survival Rate | | CETIS Version: CETISv1.8.1 | | | | | | | |
| Analyzed: 13 Sep-18 13:02 | | Analysis: Parametric Bioequivalence-Two Sample | | Official Results: Yes | | | | | | | |
| Batch ID: 20-0601-9976 | | Test Type: Reproduction-Survival (7d) | | Analyst: Rea Mara Crinklaw | | | | | | | |
| Start Date: 12 Jul-18 15:25 | | Protocol: EPA/821/R-02-013 (2002) | | Diluent: Mod-Hard Synthetic Water | | | | | | | |
| Ending Date: 19 Jul-18 13:58 | | Species: Ceriodaphnia dubia | | Brine: | | | | | | | |
| Duration: 6d 23h | | Source: In-House Culture | | Age: 1-9h | | 7/12/18 (0655-1250) | | | | | |
| Sample ID: 07-6493-2402 | | Code: 2896302 | | Client: Watershed Protection Division | | | | | | | |
| Sample Date: 09 Jul-18 11:45 | | Material: Stormwater Monitoring Sample | | Project: MS4 | | | | | | | |
| Receive Date: 09 Jul-18 15:30 | | Source: Stormwater (STORMWATER) | | | | | | | | | |
| Sample Age: *76h (24.3 °C) | | Station: BC02SAW | | | | | | | | | |
| Batch Note: Batch: 1086; HBN: 58860 | | | | | | | | | | | |
| Sample Note: *Initial sample set up at 7/12/18 12:00 (72 hrs from sample time). | | | | | | | | | | | |
| Data Transform | | Zeta | Alt Hyp | MC Trials | TST b | Test Result | | | | | |
| Angular (Corrected) | | 0 | C*b > T | Not Run | 0.75 | Sample passes 7d survival rate endpoint | | | | | |
| TST-Welch's t Test | | | | | | | | | | | |
| Control | vs | Conc-% | Test Stat | Critical | DF | MSD | P-Value | Decision(α:20%) | | | |
| Dilution Water | | 100* | 0.2618 | | | | <0.2 | Non-Significant Effect | | | |
| Test Acceptability Criteria | | | | | | | | | | | |
| Attribute | Test Stat | TAC Limits | Overlap | Decision | | | | | | | |
| Control Resp | 1 | 0.8 - NL | Yes | Passes Acceptability Criteria | | | | | | | |
| ANOVA Table | | | | | | | | | | | |
| Source | Sum Squares | Mean Square | DF | F Stat | P-Value | Decision(α:5%) | | | | | |
| Between | 0 | 0 | 1 | 65540 | <0.0001 | Significant Effect | | | | | |
| Error | 0 | 0 | 18 | | | | | | | | |
| Total | 0 | 0 | 19 | | | | | | | | |
| Distributional Tests | | | | | | | | | | | |
| Attribute | Test | Test Stat | Critical | P-Value | Decision(α:1%) | | | | | | |
| Variances | Mod Levene Equality of Variance | 65540 | 8.285 | <0.0001 | Unequal Variances | | | | | | |
| 7d Survival Rate Summary | | | | | | | | | | | |
| Conc-% | Control Type | Count | Mean | 95% LCL | 95% UCL | Min | Max | Std Err | Std Dev | CV% | %Effect |
| 0 | Dilution Water | 10 | 1 | 1 | 1 | 1 | 1 | 0 | 0 | 0.0% | 0.0% |
| 100 | | 10 | 1 | 1 | 1 | 1 | 1 | 0 | 0 | 0.0% | 0.0% |
| Angular (Corrected) Transformed Summary | | | | | | | | | | | |
| Conc-% | Control Type | Count | Mean | 95% LCL | 95% UCL | Min | Max | Std Err | Std Dev | CV% | %Effect |
| 0 | Dilution Water | 10 | 1.047 | 1.047 | 1.047 | 1.047 | 1.047 | 0 | 0 | 0.0% | 0.0% |
| 100 | | 10 | 1.047 | 1.047 | 1.047 | 1.047 | 1.047 | 0 | 0 | 0.0% | 0.0% |

RC

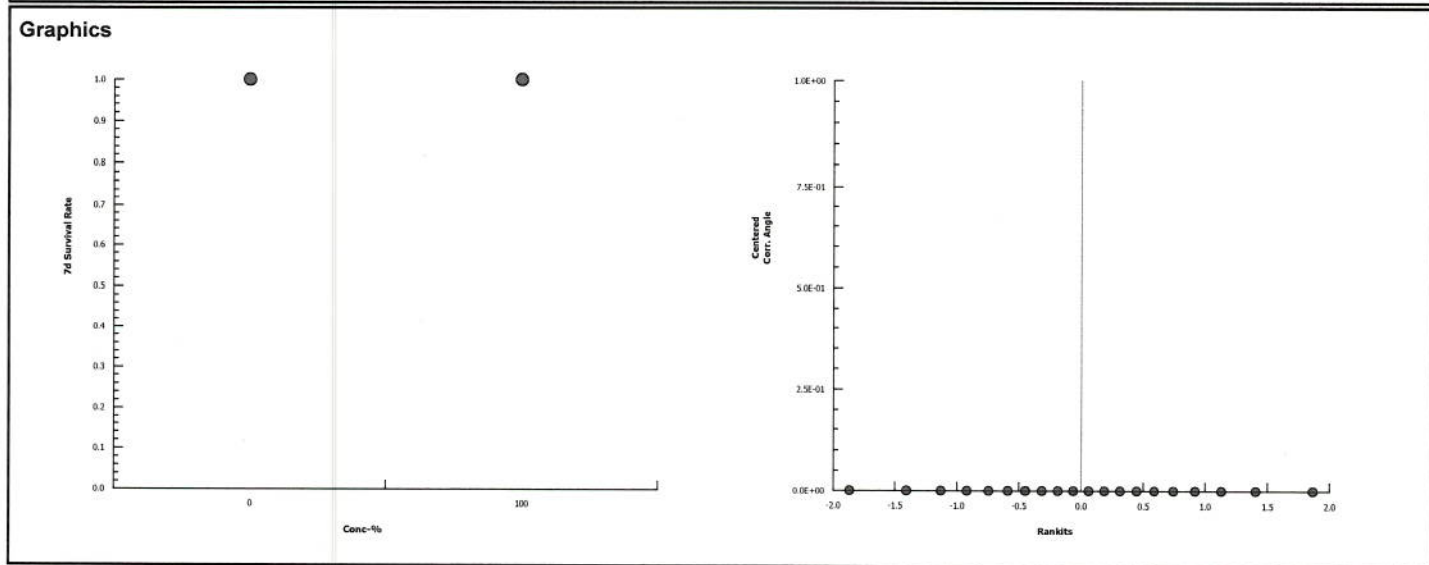
JA

CETIS Analytical Report

Report Date: 13 Sep-18 13:46 (p 6 of 6)
 Test Code: 1807072A.C | 18-9776-0667

| Ceriodaphnia 7-d Survival and Reproduction Test | | | | | | Hyperion Treatment Plant Laboratory | | | | | |
|---|--|--|--|--|--|-------------------------------------|--|--|--|--|--|
| Analysis ID: 11-4342-2525 | | Endpoint: 7d Survival Rate | | | | CETIS Version: CETISv1.8.1 | | | | | |
| Analyzed: 13 Sep-18 13:02 | | Analysis: Parametric Bioequivalence-Two Sample | | | | Official Results: Yes | | | | | |

| 7d Survival Rate Detail | | | | | | | | | | | |
|-------------------------|----------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|--------|
| Conc-% | Control Type | Rep 1 | Rep 2 | Rep 3 | Rep 4 | Rep 5 | Rep 6 | Rep 7 | Rep 8 | Rep 9 | Rep 10 |
| 0 | Dilution Water | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| 100 | | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |



BC

CETIS Test Data Worksheet

Report Date:

05 Jul-18 16:51 (p 1 of 1)

Test Code:

18-9776-0667/1807072A.C

Ceriodaphnia 7-d Survival and Reproduction Test

Hyperion Treatment Plant Laboratory

Start Date: 12 Jul-18 1525 Species: Ceriodaphnia dubia
End Date: 19 Jul-18 1358 Protocol: EPA/821/R-02-013 (2002)
Sample Date: 08 Jul-18 Material: Stormwater Monitoring Sample

Sample Code: 2D97F132
Sample Source: Stormwater
Sample Station: BC02SAW

| Conc-% | Code | Rep | Pos | # Exposed | 1d Survival | 2d Survival | 3d Survival | 4d Survival | 5d Survival | 6d Survival | 7d Survival | Neonates | Male |
|--------|------|-----|-----|-----------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|----------|---------------------|
| 0 | D | 1 | 21 | 1 | 0 | 0 | 0 | 5 | 11 | 0 | 17 | 33 | |
| 0 | D | 2 | 15 | 1 | 0 | 0 | 0 | 6 | 13 | 0 | 20 | 39 | |
| 0 | D | 3 | 6 | 1 | 0 | 0 | 0 | 5 | 12 | 0 | 17 | 34 | |
| 0 | D | 4 | 28 | 1 | 0 | 0 | 0 | 4 | 0 | 12 | 19 | 35 | |
| 0 | D | 5 | 20 | 1 | 0 | 0 | 0 | 5 | 13 | 0 | 16 | 34 | |
| 0 | D | 6 | 16 | 1 | 0 | 0 | 0 | 6 | 13 | 0 | 23 | 42 | |
| 0 | D | 7 | 12 | 1 | 0 | 0 | 0 | 6 | 15 | 0 | 22 | 43 | |
| 0 | D | 8 | 5 | 1 | 0 | 0 | 0 | 6 | 0 | 12 | 18 | 36 | |
| 0 | D | 9 | 27 | 1 | 0 | 0 | 0 | 5 | 13 | 0 | 18 | 36 | |
| 0 | D | 10 | 2 | 1 | 0 | 0 | 0 | 5 | 12 | 0 | 19 | 36 | |
| 100 | | 1 | 29 | 1 | 0 | 0 | 0 | 6 | 15 | 0 | 19 | 40 | |
| 100 | | 2 | 1 | 1 | 0 | 0 | 0 | 5 | 14 | 0 | 21 | 40 | |
| 100 | | 3 | 26 | 1 | 0 | 0 | 0 | 6 | 14 | 0 | 23 | 43 | |
| 100 | | 4 | 9 | 1 | 0 | 0 | 0 | 6 | 15 | 0 | 22 | 43 | |
| 100 | | 5 | 23 | 1 | 0 | 0 | 0 | 7 | 0 | 8 | 9 | 24 | |
| 100 | | 6 | 22 | 1 | 0 | 0 | 0 | 6 | 11 | 0 | 21 | 38 | |
| 100 | | 7 | 11 | 1 | 0 | 0 | 0 | 6 | 12 | 0 | 20 | 38 | |
| 100 | | 8 | 14 | 1 | 0 | 0 | 0 | 5 | 0 | 0 | 7 | 12 | * outlier per CETIS |
| 100 | | 9 | 25 | 1 | 0 | 0 | 0 | 4 | 13 | 0 | 20 | 37 | |
| 100 | | 10 | 7 | 1 | 0 | 0 | 0 | 8 | 11 | 0 | 20 | 39 | |

Date:

7/12 7/13 7/14 7/15 7/16 7/17 7/18

7/19

feed:

1345 1247 1345 1424 1150 1000 820
Rc Rc Rc Rc Rc Rc Rc

transfer:

1525 1305 1355 1435 1238 1050 935
Rc Rc Rc Rc Rc Rc Rc

End
@
13:58
Rc

* Sample set up at 09:00 7/11/18 Rc 9/24/18
7/12/18

Rc

Rc

CETIS Measurement Worksheet

Report Date:

05 Jul-18 16:51 (p 1 of 2)

Test Code:

1807072A.C | 18-9776-0667

Ceriodaphnia 7-d Survival and Reproduction Test

Hyperion Treatment Plant Laboratory

Start Date: 12 Jul-18

Species: Ceriodaphnia dubia

Sample Code: 2D97F132

End Date: 19 Jul-18

Protocol: EPA/821/R-02-013 (2002)

Sample Source: Stormwater

Sample Date: 08 Jul-18

Material: Stormwater Monitoring Sample

Sample Station: BC02SAW

Alkalinity (CaCO₃)-mg/L

| Conc-% | Code | Reading 1 |
|----------------|------|-------------------------------|
| 0 | D | AE |
| 100 | | 180 - see attached worksheet. |
| Measure Time: | | |
| Instrument ID: | | |
| Analyst: | | |

Conductivity-µmhos

| Conc-% | Code | Reading 1 | Reading 2 | Reading 3 | Reading 4 | Reading 5 | Reading 6 | Reading 7 |
|----------------|------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|
| 0 | D | 347 | 351 | 353 | 329 (4) | 324 | 349 | 353 |
| 100 | | 1134 | 1129 | 1085 | 1039 | 1082 | 1103 | 1086 |
| Measure Time: | | 1200 | 1220 | 1340 | 1345 | 1115 | 940 | 845 |
| Instrument ID: | | #2 | #2 | #2 | #2 | #2 | #2 | #2 |
| Analyst: | | RC | RC | RC | RC | RC | RC | RC |

Final Dissolved Oxygen-mg/L

| Conc-% | Code | Reading 1 | Reading 2 | Reading 3 | Reading 4 | Reading 5 | Reading 6 | Reading 7 |
|----------------|------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|
| 0 | D | 8.08 | 8.12 | 8.03 | 8.05 | 8.07 | 8.36 | 8.29 |
| 100 | | 8.15 | 8.21 | 8.07 | 7.99 | 8.30 | 8.25 | 8.14 |
| Measure Time: | | 1427 | 1400 | 1570 | 1545 | 1345 | 1300 | 1577 |
| Instrument ID: | | #1 | #2 | #1 | #1 | #1 | #1 | #1 |
| Analyst: | | RC | RC | RC | RC | RC | RC | RC |

Initial Dissolved Oxygen-mg/L

| Conc-% | Code | Reading 1 | Reading 2 | Reading 3 | Reading 4 | Reading 5 | Reading 6 | Reading 7 |
|----------------|------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|
| 0 | D | 8.54 | 8.22 | 8.18 | 8.01 | 8.12 | 8.14 | 8.22 |
| 100 | | 8.92 | 8.44 | 8.55 | 9.09 | 8.83 | 9.14 | 9.98 |
| Measure Time: | | 1200 | 1220 | 1340 | 1345 | 1115 | 940 | 845 |
| Instrument ID: | | #1 | #1 | #1 | #1 | #1 | #1 | #1 |
| Analyst: | | RC | RC | RC | RC | RC | RC | RC |

Hardness (CaCO₃)-mg/L

| Conc-% | Code | Reading 1 |
|----------------|------|-------------------------------|
| 0 | D | AE |
| 100 | | 300 - see attached worksheet. |
| Measure Time: | | |
| Instrument ID: | | |
| Analyst: | | |

Final pH

| Conc-% | Code | Reading 1 | Reading 2 | Reading 3 | Reading 4 | Reading 5 | Reading 6 | Reading 7 |
|----------------|------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|
| 0 | D | 7.84 | 7.82 | 7.76 | 7.82 | 7.62 | 7.73 | 8.06 |
| 100 | | 7.94 | 7.93 | 8.11 | 7.91 | 7.79 | 7.70 | 7.94 |
| Measure Time: | | 1427 | 1400 | 1570 | 1545 | 1345 | 1300 | 1577 |
| Instrument ID: | | #2 | #2 | #2 | #2 | #2 | #2 | #2 |
| Analyst: | | RC | RC | RC | RC | RC | RC | RC |

CETIS Measurement Worksheet

BC

Report Date: 05 Jul-18 16:51 (p 2 of 2)
Test Code: 1807072A.C | 18-9776-0667

| Ceriodaphnia 7-d Survival and Reproduction Test | | | | | | | | | | Hyperion Treatment Plant Laboratory | |
|---|------|--|-----------|-----------|-----------|---------------------------|-----------|-----------|------|-------------------------------------|--|
| Start Date: 12 Jul-18 | | Species: Ceriodaphnia dubia | | | | Sample Code: 2D97F132 | | | | | |
| End Date: 19 Jul-18 | | Protocol: EPA/821/R-02-013 (2002) | | | | Sample Source: Stormwater | | | | | |
| Sample Date: 08 Jul-18 | | Material: Stormwater Monitoring Sample | | | | Sample Station: BC02SAW | | | | | |
| Initial pH | | | | | | | | | | | |
| | | 7/12 | 7/13 | 7/14 | 7/15 | 7/16 | 7/17 | 7/18 | | | |
| Conc.-% | Code | Reading 1 | Reading 2 | Reading 3 | Reading 4 | Reading 5 | Reading 6 | Reading 7 | | | |
| 0 | D | 7.87 | 8.03 | 7.68 | 6.84 | 7.80 | 7.92 | 7.90 | | | |
| 100 | | 8.59 | 8.49 | 8.47 | 9.69 | 8.58 | 8.60 | 8.32 | | | |
| Measure Time: | | 1200 | 1220 | 1340 | 1345 | 1115 | 940 | 845 | | | |
| Instrument ID: | | #2 | #2 | #2 | #2 | #2 | #2 | #2 | | | |
| Analyst: | | RC | RC | RC | RC | RC | RC | RC | | | |
| Final Temperature-°C | | | | | | | | | | | |
| | | 7/13 | 7/14 | 7/15 | 7/16 | 7/17 | 7/18 | 7/19 | | | |
| Conc.-% | Code | Reading 1 | Reading 2 | Reading 3 | Reading 4 | Reading 5 | Reading 6 | Reading 7 | | | |
| 0 | D | 24.9 | 24.7 | 24.5 | 25.1 | 24.9 | 25.0 | 25.0 | | | |
| 100 | | 24.6 | 25.0 | 24.4 | 24.6 | 24.6 | 25.0 | 25.1 | | | |
| Measure Time: | | 1427 | 1400 | 1510 | 1545 | 1345 | 1300 | 1517 | | | |
| Instrument ID: | | #2 | #2 | #2 | #2 | #2 | #2 | #2 | | | |
| Analyst: | | RC | RC | RC | RC | RC | RC | RC | | | |
| Initial Temperature-°C | | | | | | | | | | | |
| | | 7/12 | 7/13 | 7/14 | 7/15 | 7/16 | 7/17 | 7/18 | 7/19 | | |
| Conc.-% | Code | Reading 1 | Reading 2 | Reading 3 | Reading 4 | Reading 5 | Reading 6 | Reading 7 | | | |
| 0 | D | 25.2 | 24.9 | 24.9 | 25.1 | 24.8 | 25.1 | 25.0 | | | |
| 100 | | 24.6 | 24.3 | 24.9 | 24.4 | 24.6 | 24.8 | 24.6 | | | |
| Measure Time: | | 1200 | 1220 | 1340 | 1345 | 1115 | 940 | 845 | | | |
| Instrument ID: | | #2 | #2 | #2 | #2 | #2 | #2 | #2 | | | |
| Analyst: | | RC | RC | RC | RC | RC | RC | RC | | | |

7/13/18

Alkalinity

Date/Time: 7/23/2018, 1230Project: NPOESAnalyst: RODEUNE ESTIVATitrant: H₂SO₄Factor: 20

| Sample | Sample Amount | Titrant Amount (ml) | Titrant Amount x Factor (mg CaCO ₃ /L) |
|----------------|---------------|---------------------|---|
| DW | 50ml | 6.2ml | 124 |
| [200mg/L] CuRT | 50ml | 5.6ml | 112 |
| DCT 7/10/18 | 50ml | 5.3ml | 106 |
| DCT 7/12/18 | 50ml | 5.2ml | 104 |
| DCT 7/15/18 | 50ml | 5.4ml | 108 |
| BC | 50ml | 9.0ml | 180 |
| DOM | 50ml | 7.9ml | 158 |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |

Date/Time: 7/25/2018, 830

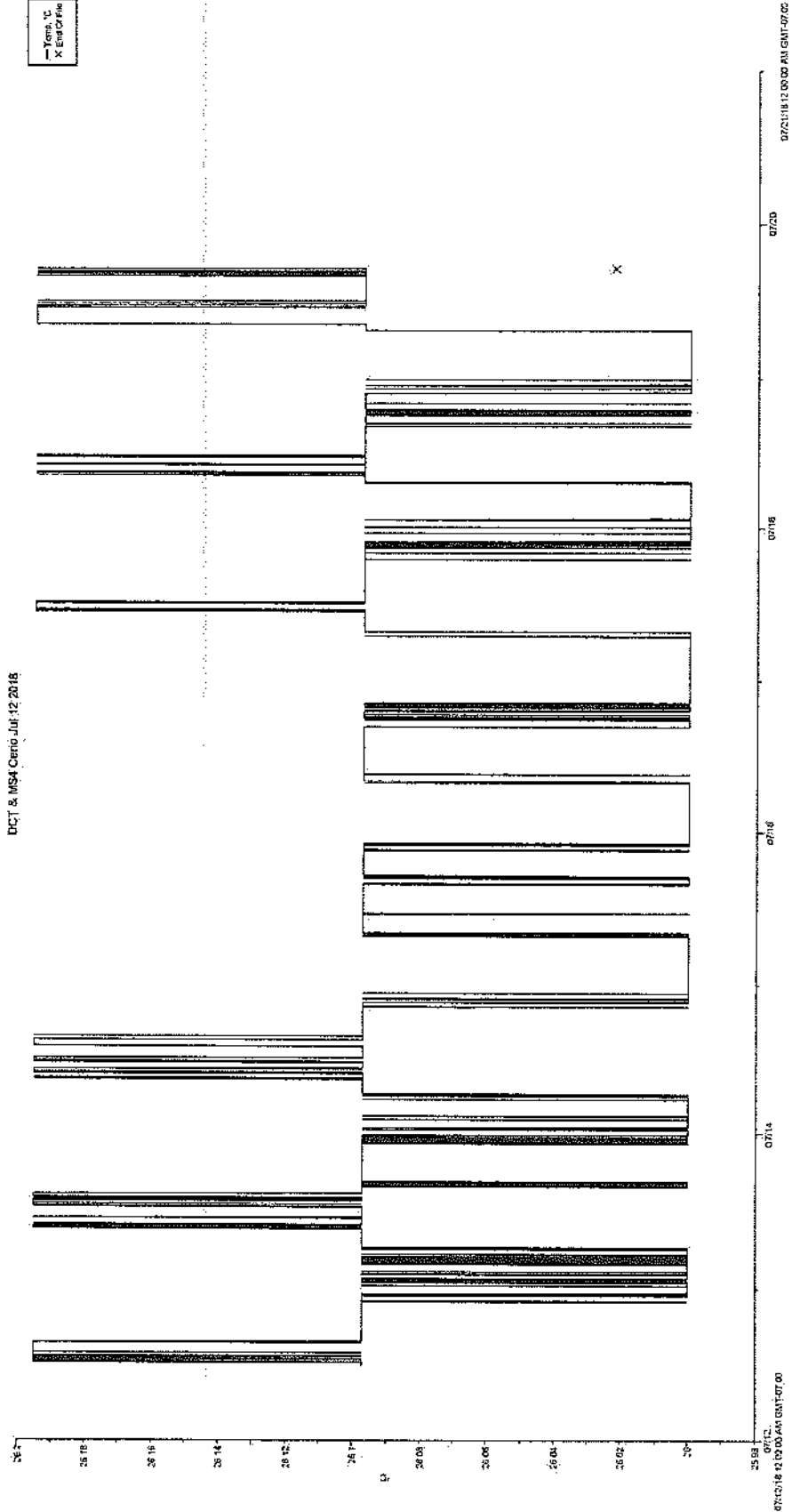
Project: NPDES

Analyst: RODFINE ESTIVA

Titrant: EDTA

Factor: 20

[illegible]



Peridomina Chronic Toxicity Test

start: Thursday, July 12, 2018

end: Thursday, July 19, 2018

RT - ~~1807~~ 1807RT2A,C

DCT eff - 1807062A,C

MS4 - 1807072A & B,C

*The temp chart recorder is broken and data is unavailable. RE 7/23/2018

ENVIRONMENTAL MONITORING DIVISION
BUREAU OF SANITATION
CITY OF LOS ANGELES

REFERENCE TOXICANT

TOXICITY TESTING REPORT

SAMPLE DATE: July 12, 2018

TEST DATE: July 12, 2018

TEST NUMBER: 1807RT2A.C

TEST MATERIAL: Copper ($\text{CuCl}_2 \cdot 2\text{H}_2\text{O}$)

TEST SPECIES: *Ceriodaphnia dubia*

PROTOCOL: EPA/821/R-02-013 (2002)

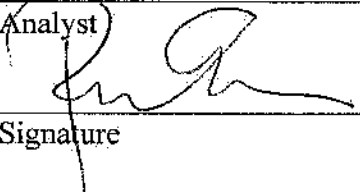
TEST TYPE: Chronic

RESULT:

NOEC = 50 $\mu\text{g/L}$ (Survival)
 EC_{50} = 70.8 $\mu\text{g/L}$ (Survival)

NOEC = 50 $\mu\text{g/L}$ (Reproduction)
 IC_{25} = 55.8 $\mu\text{g/L}$ (Reproduction)

Rodeline Estiva

Analyst



Signature

Water Biologist II

Title
July 23, 2018

Date

Rea Crinklaw

Supervisor


Signature

Water Biologist III

Title
8/6/18

Date

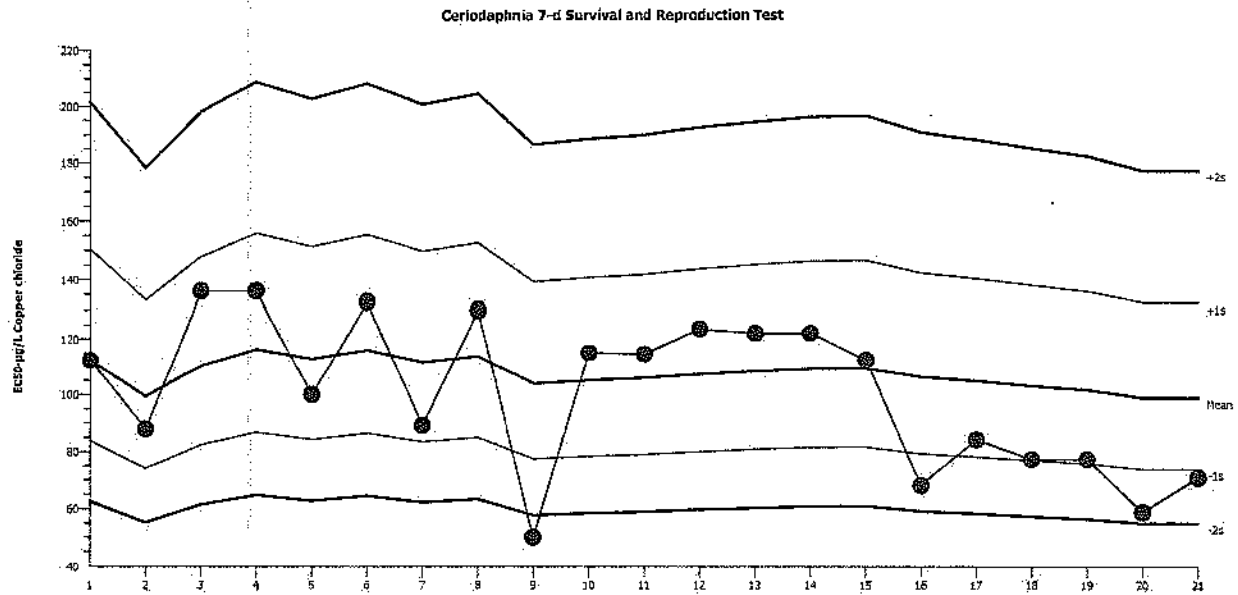
Ceriodaphnia 7-d Survival and Reproduction Test

Hyperion Treatment Plant Laboratory

Test Type: Reproduction-Survival (7d)
Protocol: EPA/821/R-02-013 (2002)

Organism: Ceriodaphnia dubia (Water Flea)
Endpoint: 7d Survival Rate

Material: Copper chloride
Source: Reference Toxicant-REF



Mean: 98.69

Count: 20

-1s Warning Limit: 73.63

-2s Action Limit: 54.96

Sigma: N/A

CV: 34.00%

+1s Warning Limit: 132.2

+2s Action Limit: 177.1

Quality Control Data

| Point | Year | Month | Day | QC Data | Delta | Sigma | Warning | Action | Test ID | Analysis ID |
|-------|------|-------|-----|---------|--------|---------|---------|--------|--------------|--------------|
| 1 | 2017 | May | 10 | 112.3 | 13.58 | 0.4409 | | | 04-6904-8294 | 00-0571-6326 |
| 2 | | | 25 | 87.85 | -10.84 | -0.3977 | | | 16-2272-5797 | 20-6787-6120 |
| 3 | | Jun | 6 | 136.1 | 37.45 | 1.1 | (+) | | 00-1105-6011 | 07-1957-9297 |
| 4 | | | 22 | 136.1 | 37.45 | 1.1 | (+) | | 10-7002-0112 | 10-9615-6318 |
| 5 | | Jul | 12 | 100 | 1.308 | 0.04503 | | | 13-9476-5989 | 08-1211-5310 |
| 6 | | | 27 | 132.6 | 33.89 | 1.009 | (+) | | 00-3533-4104 | 07-3102-4627 |
| 7 | | Aug | 9 | 89.13 | -9.563 | -0.3484 | | | 05-1646-5416 | 02-7143-5836 |
| 8 | | | 23 | 129.7 | 31.05 | 0.9351 | | | 18-0928-7994 | 14-9065-9379 |
| 9 | | Sep | 6 | 50 | -48.69 | -2.325 | (-) | (-) | 04-1283-5528 | 07-2201-0667 |
| 10 | | | 20 | 114.9 | 16.21 | 0.52 | | | 09-2547-5700 | 02-6449-6736 |
| 11 | | Oct | 18 | 114.5 | 15.77 | 0.5068 | | | 14-7896-4665 | 17-5474-2245 |
| 12 | | Nov | 15 | 123.5 | 24.77 | 0.7657 | | | 09-2671-6353 | 07-5336-3496 |
| 13 | | Dec | 13 | 121.9 | 23.25 | 0.7233 | | | 19-3949-3034 | 10-6518-1710 |
| 14 | 2018 | Jan | 4 | 121.9 | 23.25 | 0.7233 | | | 17-7500-8361 | 05-5922-1635 |
| 15 | | Feb | 7 | 112.3 | 13.58 | 0.4409 | | | 04-8492-7543 | 17-6325-1645 |
| 16 | | Mar | 2 | 68.1 | -30.59 | -1.269 | (-) | | 11-4862-8707 | 06-1686-5917 |
| 17 | | | 15 | 84.14 | -14.55 | -0.5454 | | | 20-9677-0547 | 14-4393-4243 |
| 18 | | Apr | 19 | 77.17 | -21.52 | -0.841 | | | 18-2737-1194 | 07-4972-9760 |
| 19 | | May | 16 | 77.17 | -21.52 | -0.841 | | | 05-4955-8978 | 09-0510-7297 |
| 20 | | Jun | 13 | 58.82 | -39.88 | -1.77 | (-) | | 16-1570-3305 | 01-3881-0040 |
| 21 | | Jul | 12 | 70.77 | -27.92 | -1.137 | (-) | | 05-0138-0333 | 09-5921-7712 |

Ceriodaphnia 7-d Survival and Reproduction Test

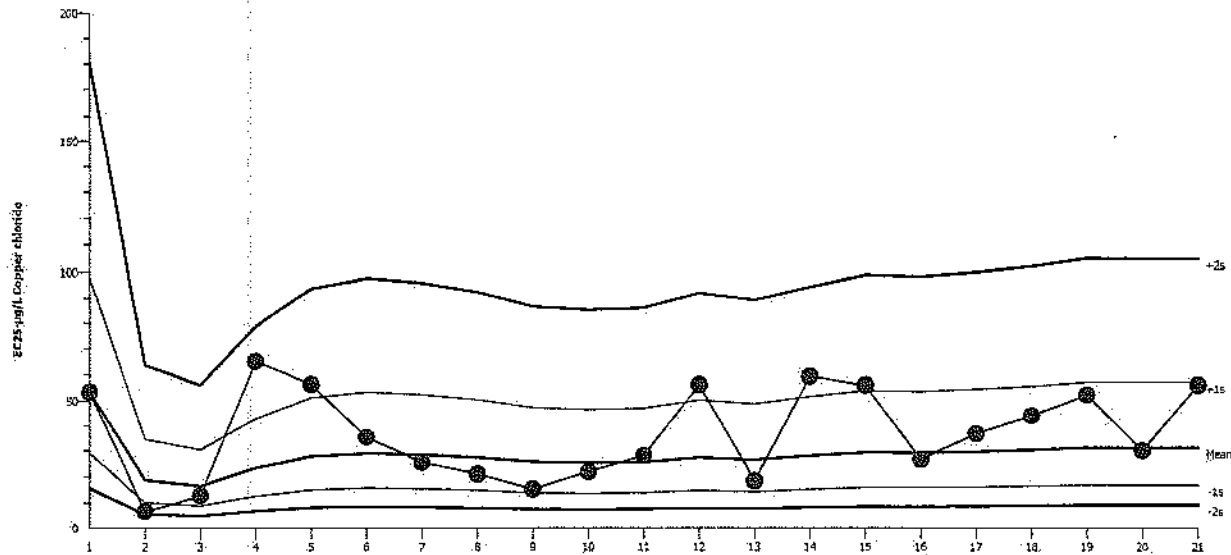
Hyperion Treatment Plant Laboratory

Test Type: Reproduction-Survival (7d)
Protocol: EPA/821/R-02-013 (2002)

Organism: Ceriodaphnia dubia (Water Flea)
Endpoint: Reproduction

Material: Copper chloride
Source: Reference Toxicant-REF

Ceriodaphnia 7-d Survival and Reproduction Test



Mean: 30.97
Sigma: N/A

Count: 20
CV: 83.70%

-1s Warning Limit: 16.85
+1s Warning Limit: 56.89

-2s Action Limit: 9.169
+2s Action Limit: 104.5

Quality Control Data

| Point | Year | Month | Day | QC Data | Delta | Sigma | Warning | Action | Test ID | Analysis ID |
|-------|------|-------|-----|---------|--------|----------|---------|--------|--------------|--------------|
| 1 | 2017 | May | 10 | 53.41 | -22.44 | 0.8959 | | | 04-6904-8294 | 08-3814-7144 |
| 2 | | | 25 | 6.656 | -24.31 | -2.527 | (-) | (-) | 16-2272-5797 | 04-1379-9830 |
| 3 | | Jun | 6 | 12.78 | -18.19 | -1.455 | (-) | | 00-1105-6011 | 17-2178-2673 |
| 4 | | | 22 | 65.16 | 34.19 | 1.223 | (+) | | 10-7002-0112 | 00-8698-9715 |
| 5 | | Jul | 12 | 56.24 | 25.27 | 0.9807 | | | 13-9476-5989 | 15-6562-8470 |
| 6 | | | 27 | 35.41 | 4.445 | 0.2204 | | | 00-3533-4104 | 15-5816-8081 |
| 7 | | Aug | 9 | 25.45 | -5.522 | -0.3228 | | | 05-1646-5416 | 12-8828-7274 |
| 8 | | | 23 | 20.93 | -10.04 | -0.6438 | | | 18-0928-7994 | 01-4455-3838 |
| 9 | | Sep | 6 | 15.28 | -15.69 | -1.162 | (-) | | 04-1283-5528 | 07-4663-1403 |
| 10 | | | 20 | 21.83 | -9.14 | -0.5749 | | | 09-2547-5700 | 05-2225-6686 |
| 11 | | Oct | 18 | 27.98 | -2.991 | -0.1669 | | | 14-7896-4665 | 10-2719-4408 |
| 12 | | Nov | 15 | 55.96 | 25 | 0.9726 | | | 09-2671-6353 | 12-1707-6477 |
| 13 | | Dec | 13 | 18.28 | -12.69 | -0.8663 | | | 19-3949-3034 | 15-1089-9957 |
| 14 | 2018 | Jan | 4 | 59.22 | 28.25 | 1.065 | (+) | | 17-7500-8361 | 03-9405-5395 |
| 15 | | Feb | 7 | 55.8 | 24.83 | 0.9677 | | | 04-8492-7543 | 19-3721-5481 |
| 16 | | Mar | 2 | 26.44 | -4.526 | -0.2597 | | | 11-4862-8707 | 08-2696-1620 |
| 17 | | | 15 | 36.61 | 5.644 | 0.2752 | | | 20-9677-0547 | 09-0026-7515 |
| 18 | | Apr | 19 | 43.76 | 12.79 | 0.5683 | | | 18-2737-1194 | 03-8342-1801 |
| 19 | | May | 16 | 51.99 | 21.02 | 0.8514 | | | 05-4955-8978 | 05-0129-1380 |
| 20 | | Jun | 13 | 29.96 | -1.009 | -0.05445 | | | 16-1570-3305 | 06-3152-2418 |
| 21 | | Jul | 12 | 55.75 | 24.78 | 0.9663 | | | 05-0138-0333 | 18-3627-7518 |

CETIS Summary Report

Report Date: 23 Jul-18 10:50 (p 1 of 2)
Test Code: 1807RT2A.C | 05-0138-0333

Ceriodaphnia 7-d Survival and Reproduction Test

Hyperion Treatment Plant Laboratory

| | | |
|-------------------------------|---------------------------------------|--------------------------------|
| Batch ID: 03-2168-1268 | Test Type: Reproduction-Survival (7d) | Analyst: Rodeline Estiva |
| Start Date: 12 Jul-18 14:20 | Protocol: EPA/821/R-02-013 (2002) | Diluent: Hard Synthetic Water |
| Ending Date: 19 Jul-18 08:15 | Species: Ceriodaphnia dubia | Brine: |
| Duration: 6d 18h | Source: In-House Culture | Age: <8 h. 7/12/18 (0715-1210) |
| Sample ID: 20-5762-1751 | Code: 7AA4D0F7 | Client: Donald C. Tillman WRP |
| Sample Date: 12 Jul-18 07:50 | Material: Copper chloride | Project: NPDES |
| Receive Date: 12 Jul-18 07:50 | Source: Reference Toxicant | |
| Sample Age: 6h | Station: | |

Sample Renewals

| Renewal | Sample Code | Sample Date | Receive Date | Renewal Date | Temp °C |
|---------|-------------|-----------------|-----------------|-----------------|---------|
| 1 | Cu RT | 12 Jul-18 07:50 | 12 Jul-18 07:50 | 13 Jul-18 14:08 | |
| 2 | Cu RT | 12 Jul-18 07:50 | 12 Jul-18 07:50 | 14 Jul-18 11:30 | |
| 3 | Cu RT | 12 Jul-18 07:50 | 12 Jul-18 07:50 | 15 Jul-18 14:52 | |
| 4 | Cu RT | 12 Jul-18 07:50 | 12 Jul-18 07:50 | 16 Jul-18 12:57 | |
| 5 | Cu RT | 12 Jul-18 07:50 | 12 Jul-18 07:50 | 17 Jul-18 10:35 | |
| 6 | Cu RT | 12 Jul-18 07:50 | 12 Jul-18 07:50 | 18 Jul-18 09:30 | |

Batch Note: Batch 1077 HBN 54108

Sample Note: Survival - ideal concentration-response relationship. Reproduction - interrupted concentration-response: non-significant effects bracketed by significant effects.

Comparison Summary

| Analysis ID | Endpoint | NOEL | LOEL | TOEL | PMSD | TU | Method |
|--------------|------------------|------|------|-------|-------|----|-----------------------------------|
| 12-6509-4346 | 7d Survival Rate | 50 | 100 | 70.71 | N/A | | Fisher Exact/Bonferroni-Holm Test |
| 13-8299-1709 | Reproduction | 50 | 100 | 70.71 | 23.9% | | Steel Many-One Rank Test |
| 12-2242-7780 | | 50 | 100 | 70.71 | 16.7% | | Wilcoxon/Bonferroni Adj Test |

Point Estimate Summary

| Analysis ID | Endpoint | Level | µg/L | 95% LCL | 95% UCL | TU | Method |
|--------------|------------------|-------|-------|---------|---------|----|------------------------------|
| 09-5921-7712 | 7d Survival Rate | EC5 | 51.77 | 51.77 | 51.77 | | Linear Interpolation (ICPIN) |
| | | EC10 | 53.61 | 53.61 | 53.61 | | |
| | | EC15 | 55.5 | 55.5 | 55.5 | | |
| | | EC20 | 57.47 | 57.47 | 57.47 | | |
| | | EC25 | 59.5 | 59.5 | 59.5 | | |
| | | EC40 | 66.03 | 66.03 | 66.03 | | |
| | | EC50 | 70.77 | 70.77 | 70.77 | | |
| 18-3627-7518 | Reproduction | IC5 | 3.131 | 1.281 | 51.01 | | Linear Interpolation (ICPIN) |
| | | IC10 | 33.7 | 4.202 | 52.86 | | |
| | | IC15 | 51.55 | 10.86 | 54.78 | | |
| | | IC20 | 53.61 | 38.24 | 56.76 | | |
| | | IC25 | 55.75 | 48.67 | 58.81 | | |
| | | IC40 | 62.69 | 57.18 | 65.42 | | |
| | | IC50 | 67.77 | 62.79 | 70.23 | | |

Test Acceptability

| Analysis ID | Endpoint | Attribute | Test Stat | TAC Limits | Overlap | Decision |
|--------------|------------------|--------------|-----------|-------------|---------|-------------------------------|
| 09-5921-7712 | 7d Survival Rate | Control Resp | 1 | 0.8 - NL | Yes | Passes Acceptability Criteria |
| 12-6509-4346 | 7d Survival Rate | Control Resp | 1 | 0.8 - NL | Yes | Passes Acceptability Criteria |
| 12-2242-7780 | Reproduction | Control Resp | 36.33 | 15 - NL | Yes | Passes Acceptability Criteria |
| 13-8299-1709 | Reproduction | Control Resp | 32.7 | 15 - NL | Yes | Passes Acceptability Criteria |
| 18-3627-7518 | Reproduction | Control Resp | 36.33 | 15 - NL | Yes | Passes Acceptability Criteria |
| 12-2242-7780 | Reproduction | PMSD | 0.1666 | 0.13 - 0.47 | Yes | Passes Acceptability Criteria |
| 13-8299-1709 | Reproduction | PMSD | 0.2395 | 0.13 - 0.47 | Yes | Passes Acceptability Criteria |

CETIS Summary Report

Report Date: 23 Jul-18 10:50 (p 2 of 2)
Test Code: 1807RT2A.C | 05-0138-0333

Ceriodaphnia 7-d Survival and Reproduction Test

Hyperion Treatment Plant Laboratory

7d Survival Rate Summary

| Conc-µg/L | Control Type | Count | Mean | 95% LCL | 95% UCL | Min | Max | Std Err | Std Dev | CV% | %Effect |
|-----------|----------------|-------|------|---------|---------|-----|-----|---------|---------|------|---------|
| 0 | Dilution Water | 9 | 1 | 1 | 1 | 1 | 1 | 0 | 0 | 0.0% | 0.0% |
| 12.5 | | 10 | 1 | 1 | 1 | 1 | 1 | 0 | 0 | 0.0% | 0.0% |
| 25 | | 10 | 1 | 1 | 1 | 1 | 1 | 0 | 0 | 0.0% | 0.0% |
| 50 | | 10 | 1 | 1 | 1 | 1 | 1 | 0 | 0 | 0.0% | 0.0% |
| 100 | | 10 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | 100.0% |
| 200 | | 10 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | 100.0% |

Reproduction Summary

| Conc-µg/L | Control Type | Count | Mean | 95% LCL | 95% UCL | Min | Max | Std Err | Std Dev | CV% | %Effect |
|-----------|----------------|-------|-------|---------|---------|-----|-----|---------|---------|--------|---------|
| 0 | Dilution Water | 9 | 36.33 | 35.14 | 37.53 | 30 | 39 | 1.067 | 3.202 | 8.81% | 0.0% |
| 12.5 | | 10 | 30.7 | 28.39 | 33.01 | 19 | 39 | 1.955 | 6.183 | 20.14% | 15.5% |
| 25 | | 10 | 35.3 | 34.2 | 36.4 | 31 | 41 | 0.9315 | 2.946 | 8.35% | 2.84% |
| 50 | | 10 | 32.3 | 28.93 | 35.67 | 8 | 41 | 2.856 | 9.031 | 27.96% | 11.1% |
| 100 | | 10 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | 100.0% |
| 200 | | 10 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | 100.0% |

7d Survival Rate Detail

| Conc-µg/L | Control Type | Rep 1 | Rep 2 | Rep 3 | Rep 4 | Rep 5 | Rep 6 | Rep 7 | Rep 8 | Rep 9 | Rep 10 |
|-----------|----------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|--------|
| 0 | Dilution Water | 1 | 1 | 1 | 1 | 1 | 1 | | 1 | 1 | 1 |
| 12.5 | | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| 25 | | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| 50 | | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| 100 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 200 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

Reproduction Detail

| Conc-µg/L | Control Type | Rep 1 | Rep 2 | Rep 3 | Rep 4 | Rep 5 | Rep 6 | Rep 7 | Rep 8 | Rep 9 | Rep 10 |
|-----------|----------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|--------|
| 0 | Dilution Water | 35 | 33 | 30 | 39 | 39 | 39 | | 36 | 39 | 37 |
| 12.5 | | 32 | 24 | 32 | 27 | 35 | 39 | 37 | 28 | 19 | 34 |
| 25 | | 31 | 33 | 35 | 36 | 37 | 41 | 33 | 33 | 38 | 36 |
| 50 | | 34 | 34 | 35 | 35 | 8 | 41 | 35 | 37 | 29 | 35 |
| 100 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 200 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

CETIS Analytical Report

 Report Date: 23-Jul-18 10:50 (p 1 of 2)
 Test Code: 1807RT2A.C | 05-0138-0333

Ceriodaphnia 7-d Survival and Reproduction Test

Hyperion Treatment Plant Laboratory

| | | |
|-------------------------------|---------------------------------------|-------------------------------|
| Analysis ID: 12-6509-4346 | Endpoint: 7d Survival Rate | CETIS Version: CETISv1.8.1 |
| Analyzed: 19 Jul-18 12:37 | Analysis: STP 2x2 Contingency Tables | Official Results: Yes |
| Batch ID: 03-2168-1268 | Test Type: Reproduction-Survival (7d) | Analyst: Rodeline Estiva |
| Start Date: 12 Jul-18 14:20 | Protocol: EPA/821/R-02-013 (2002) | Diluent: Hard Synthetic Water |
| Ending Date: 19 Jul-18 08:15 | Species: Ceriodaphnia dubia | Brine: |
| Duration: 6d 18h | Source: In-House Culture | Age: <8 h 7/12/18 (0715-1210) |
| Sample ID: 20-5762-1751 | Code: 7AA4D0F7 | Client: Donald C. Tillman WRP |
| Sample Date: 12 Jul-18 07:50 | Material: Copper chloride | Project: NPDES |
| Receive Date: 12 Jul-18 07:50 | Source: Reference Toxicant | |
| Sample Age: 6h | Station: | |

Batch Note: Batch 1077 HBN 54108

Sample Note: Survival - ideal concentration-response relationship. Reproduction - interrupted concentration-response: non-significant effects bracketed by significant effects.

| Data Transform | Zeta | Alt Hyp | MC Trials | NOEL | LOEL | TOEL | TU |
|----------------|------|---------|-----------|------|------|-------|----|
| Untransformed | | C > T | Not Run | 50 | 100 | 70.71 | |

Fisher Exact/Bonferroni-Holm Test

| Control | vs | Conc-µg/L | Test Stat | P-Value | Decision(0.05) |
|----------------|----|-----------|-----------|---------|------------------------|
| Dilution Water | | 12.5 | 1 | 1.0000 | Non-Significant Effect |
| | | 25 | 1 | 1.0000 | Non-Significant Effect |
| | | 50 | 1 | 1.0000 | Non-Significant Effect |
| | | 100 | 5.41E-06 | <0.0001 | Significant Effect |
| | | 200 | 5.41E-06 | <0.0001 | Significant Effect |

Test Acceptability Criteria

| Attribute | Test Stat | TAC Limits | Overlap | Decision |
|--------------|-----------|------------|---------|-------------------------------|
| Control Resp | 1 | 0.8 - NL | Yes | Passes Acceptability Criteria |

Data Summary

| Conc-µg/L | Control Type | No-Resp | Resp | Total |
|-----------|----------------|---------|------|-------|
| 0 | Dilution Water | 10 | 0 | 10 |
| 12.5 | | 10 | 0 | 10 |
| 25 | | 10 | 0 | 10 |
| 50 | | 10 | 0 | 10 |
| 100 | | 0 | 10 | 10 |
| 200 | | 0 | 10 | 10 |

7d Survival Rate Detail

| Conc-µg/L | Control Type | Rep 1 | Rep 2 | Rep 3 | Rep 4 | Rep 5 | Rep 6 | Rep 7 | Rep 8 | Rep 9 | Rep 10 |
|-----------|----------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|--------|
| 0 | Dilution Water | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| 12.5 | | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| 25 | | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| 50 | | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| 100 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 200 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

CETIS Analytical Report

Report Date: 23 Jul-18 10:50 (p 2 of 2)
Test Code: 1807RT2A.C | 05-0138-0333

Ceriodaphnia 7-d Survival and Reproduction Test

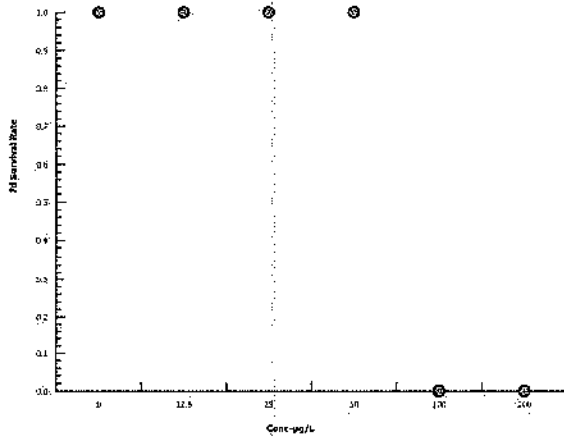
Hyperion Treatment Plant Laboratory

Analysis ID: 12-6509-4346
Analyzed: 19 Jul-18 12:37

Endpoint: 7d Survival Rate
Analysis: STP 2x2 Contingency Tables

CETIS Version: CETISv1.8.1
Official Results: Yes

Graphics



Survival - Ideal concentration-response relationship,
PE 7/23/2018

CETIS Analytical Report

Report Date: 23 Jul-18 10:49 (p 1 of 4)
Test Code: 1807RT2A.C | 05-0138-0333

Ceriodaphnia 7-d Survival and Reproduction Test

Hyperion Treatment Plant Laboratory

| | | |
|-------------------------------|---|-------------------------------|
| Analysis ID: 13-8299-1709 | Endpoint: Reproduction | CETIS Version: CETISv1.8.1 |
| Analyzed: 19 Jul-18 12:40 | Analysis: Nonparametric-Control vs Treatments | Official Results: Yes |
| Batch ID: 03-2168-1268 | Test Type: Reproduction-Survival (7d) | Analyst: Rodeline Estiva |
| Start Date: 12 Jul-18 14:20 | Protocol: EPA/821/R-02-013 (2002) | Diluent: Hard Synthetic Water |
| Ending Date: 19 Jul-18 08:15 | Species: Ceriodaphnia dubia | Brine: |
| Duration: 6d 18h | Source: In-House Culture | Age: <8 h 7/12/18 (0715-1210) |
| Sample ID: 20-5762-1751 | Code: 7AA4D0F7 | Client: Donald C. Tillman WRP |
| Sample Date: 12 Jul-18 07:50 | Material: Copper-chloride | Project: NPDES |
| Receive Date: 12 Jul-18 07:50 | Source: Reference Toxicant | |
| Sample Age: 8h | Station: | |

Batch Note: Batch 1077 HBN 54108

Sample Note: Survival - ideal concentration-response relationship. Reproduction - interrupted concentration-response: non-significant effects bracketed by significant effects.

| Data Transform | Zeta | Alt Hyp | MC Trials | NOEL | LOEL | TOEL | TU | PMSD |
|----------------|------|---------|-----------|------|------|-------|----|-------|
| Untransformed | 0 | C > T | Not Run | 50 | 100 | 70.71 | | 23.9% |

Steel Many-One Rank Test

| Control | vs Conc-µg/L | Test Stat | Critical | DF | Ties | P-Value | Decision(α:5%) |
|----------------|--------------|-----------|----------|----|------|---------|------------------------|
| Dilution Water | 12.5 | 83 | 77 | 18 | 3 | 0.1144 | Non-Significant Effect |
| | 25 | 98.5 | 77 | 18 | 4 | 0.5453 | Non-Significant Effect |
| | 50 | 92.5 | 77 | 18 | 2 | 0.3448 | Non-Significant Effect |

Test Acceptability Criteria

| Attribute | Test Stat | TAC Limits | Overlap | Decision |
|--------------|-----------|-------------|---------|-------------------------------|
| Control Resp | 32.7 | 15 - NL | Yes | Passes Acceptability Criteria |
| PMSD | 0.2395 | 0.13 - 0.47 | Yes | Passes Acceptability Criteria |

Auxiliary Tests

| Attribute | Test | Test Stat | Critical | P-Value | Decision(α:5%) |
|---------------|------|-----------|----------|---------|------------------|
| Extreme Value | 0 | 4.146 | 3.036 | <0.0001 | Outlier Detected |

ANOVA Table

| Source | Sum Squares | Mean Square | DF | F Stat | P-Value | Decision(α:5%) |
|---------|-------------|-------------|----|--------|---------|------------------------|
| Between | 109.1 | 36.36666 | 3 | 0.5396 | 0.6583 | Non-Significant Effect |
| Error | 2426.4 | 67.4 | 36 | | | |
| Total | 2535.5 | 103.7667 | 39 | | | |

Distributional Tests

| Attribute | Test | Test Stat | Critical | P-Value | Decision(α:1%) |
|--------------|-------------------------------|-----------|----------|---------|-------------------------|
| Variances | Bartlett Equality of Variance | 14.51 | 11.34 | 0.0023 | Unequal Variances |
| Distribution | Shapiro-Wilk W Normality | 0.7249 | 0.9236 | <0.0001 | Non-normal Distribution |

Reproduction Summary

| Conc-µg/L | Control Type | Count | Mean | 95% LCL | 95% UCL | Min | Max | Std Err | Std Dev | CV% | %Effect |
|-----------|----------------|-------|------|---------|---------|-----|-----|---------|---------|--------|---------|
| 0 | Dilution Water | 10 | 32.7 | 28.18 | 37.22 | 0 | 39 | 3.757 | 11.88 | 36.33% | 0.0% |
| 12.5 | | 10 | 30.7 | 28.35 | 33.05 | 19 | 39 | 1.955 | 6.183 | 20.14% | 6.12% |
| 25 | | 10 | 35.3 | 34.18 | 36.42 | 31 | 41 | 0.9315 | 2.946 | 8.35% | -7.95% |
| 50 | | 10 | 32.3 | 28.86 | 35.74 | 8 | 41 | 2.856 | 9.031 | 27.96% | 1.22% |
| 100 | | 10 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | 100.0% |
| 200 | | 10 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | 100.0% |

CETIS Analytical Report

Report Date: 23 Jul-18 10:49 (p 2 of 4)
Test Code: 1807RT2A.C | 05-0138-0333

Ceriodaphnia 7-d Survival and Reproduction Test

Hyperion Treatment Plant Laboratory

Analysis ID: 13-8299-1709
Analyzed: 19 Jul-18 12:40

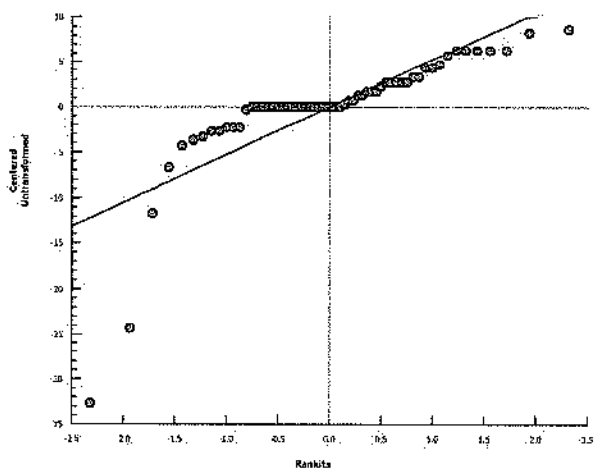
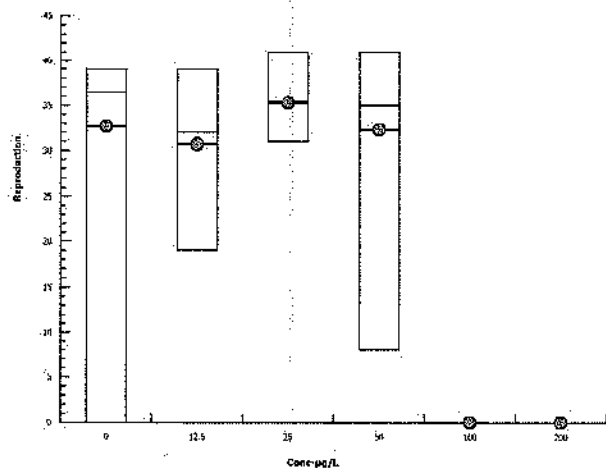
Endpoint: Reproduction
Analysis: Nonparametric-Control vs Treatments

CETIS Version: CETISv1.8.1
Official Results: Yes

Reproduction Detail

| Conc-µg/L | Control Type | Rep 1 | Rep 2 | Rep 3 | Rep 4 | Rep 5 | Rep 6 | Rep 7 | Rep 8 | Rep 9 | Rep 10 |
|-----------|----------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|--------|
| 0 | Dilution Water | 35 | 33 | 30 | 39 | 39 | 39 | 0 | 36 | 39 | 37 |
| 12.5 | | 32 | 24 | 32 | 27 | 35 | 39 | 37 | 28 | 19 | 34 |
| 25 | | 31 | 33 | 35 | 36 | 37 | 41 | 33 | 33 | 38 | 36 |
| 50 | | 34 | 34 | 35 | 35 | 8 | 41 | 35 | 37 | 29 | 35 |
| 100 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 200 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

Graphics



CETIS Analytical Report

Report Date: 23 Jul-18 10:49 (p 3 of 4)
Test Code: 1807RT2A.C | 05-0138-0333

Ceriodaphnia 7-d Survival and Reproduction Test

Hyperion Treatment Plant Laboratory

| | | |
|-------------------------------|---|-------------------------------|
| Analysis ID: 12-2242-7780 | Endpoint: Reproduction | CETIS Version: CETISv1.8.1 |
| Analyzed: 19 Jul-18 12:40 | Analysis: Nonparametric-Multiple Comparison | Official Results: Yes |
| Batch ID: 03-2168-1268 | Test Type: Reproduction-Survival (7d) | Analyst: Rodeline Estiva |
| Start Date: 12 Jul-18 14:20 | Protocol: EPA/821/R-02-013 (2002) | Diluent: Hard Synthetic Water |
| Ending Date: 19 Jul-18 08:15 | Species: Ceriodaphnia dubia | Brine: |
| Duration: 6d 18h | Source: In-House Culture | Age: <8 h 7/12/18 (0715-1210) |
| Sample ID: 20-5762-1751 | Code: 7AA4D0F7 | Client: Donald C. Tillman WRP |
| Sample Date: 12 Jul-18 07:50 | Material: Copper chloride | Project: NPDES |
| Receive Date: 12 Jul-18 07:50 | Source: Reference Toxicant | |
| Sample Age: 6h | Station: | |

Batch Note: Batch 1077 HBN 54108

Sample Note: Survival - ideal concentration-response relationship, Reproduction - interrupted concentration-response: non-significant effects bracketed by significant effects.

| Data Transform | Zeta | Alt Hyp | MC Trials | NOEL | LOEL | TOEL | TU | PMSD |
|----------------|------|---------|--------------|------|------|-------|----|-------|
| Untransformed | 0 | C > T | 10000 Trials | 50 | 100 | 70.71 | | 16.7% |

Wilcoxon/Bonferroni Adj Test

| Control | vs | Conc-µg/L | Test Stat | Critical | DF | Ties | P-Value | Decision(α:5%) |
|----------------|----|-----------|-----------|----------|----|------|---------|------------------------|
| Dilution Water | | 12.5* | 73 | | 17 | 3 | 0.0354 | Significant Effect |
| | | 25 | 88.5 | | 17 | 4 | 0.5430 | Non-Significant Effect |
| | | 50 | 82.5 | | 17 | 2 | 0.2391 | Non-Significant Effect |

Test Acceptability Criteria

| Attribute | Test Stat | TAC Limits | Overlap | Decision |
|--------------|-----------|-------------|---------|-------------------------------|
| Control Resp | 36.33 | 15 - NL | Yes | Passes Acceptability Criteria |
| PMSD | 0.1666 | 0.13 - 0.47 | Yes | Passes Acceptability Criteria |

ANOVA Table

| Source | Sum Squares | Mean Square | DF | F Stat | P-Value | Decision(α:5%) |
|---------|-------------|-------------|----|--------|---------|------------------------|
| Between | 197.1359 | 65.71197 | 3 | 1.857 | 0.1549 | Non-Significant Effect |
| Error | 1238.3 | 35.38 | 35 | | | |
| Total | 1435.436 | 101.092 | 38 | | | |

Distributional Tests

| Attribute | Test | Test Stat | Critical | P-Value | Decision(α:1%) |
|--------------|-------------------------------|-----------|----------|---------|-------------------------|
| Variances | Bartlett Equality of Variance | 13.69 | 11.34 | 0.0034 | Unequal Variances |
| Distribution | Shapiro-Wilk W Normality | 0.8203 | 0.9219 | <0.0001 | Non-normal Distribution |

Reproduction Summary

| Conc-µg/L | Control Type | Count | Mean | 95% LCL | 95% UCL | Min | Max | Std Err | Std Dev | CV% | %Effect |
|-----------|----------------|-------|-------|---------|---------|-----|-----|---------|---------|--------|---------|
| 0 | Dilution Water | 9 | 36.33 | 35.12 | 37.55 | 30 | 39 | 1.067 | 3.202 | 8.81% | 0.0% |
| 12.5 | | 10 | 30.7 | 28.35 | 33.05 | 19 | 39 | 1.955 | 6.183 | 20.14% | 15.5% |
| 25 | | 10 | 35.3 | 34.18 | 36.42 | 31 | 41 | 0.9315 | 2.946 | 8.35% | 2.84% |
| 50 | | 10 | 32.3 | 28.86 | 35.74 | 8 | 41 | 2.856 | 9.031 | 27.96% | 11.1% |
| 100 | | 10 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | 100.0% |
| 200 | | 10 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | 100.0% |

CETIS Analytical Report

Report Date: 23 Jul-18 10:49 (p 4 of 4)
Test Code: 1807RT2A.C | 05-0138-0333

Ceriodaphnia 7-d Survival and Reproduction Test

Hyperion Treatment Plant Laboratory

Analysis ID: 12-2242-7780
Analyzed: 19 Jul-18 12:40

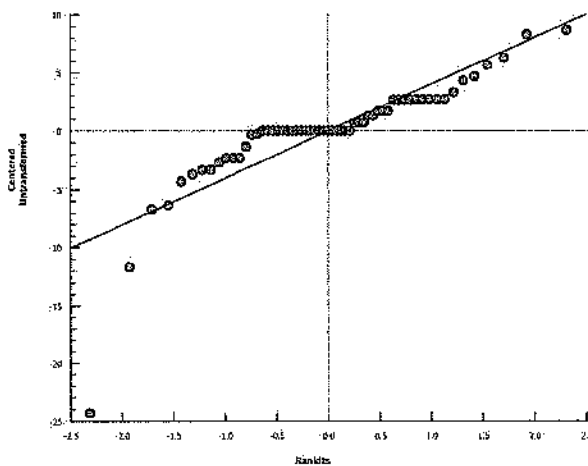
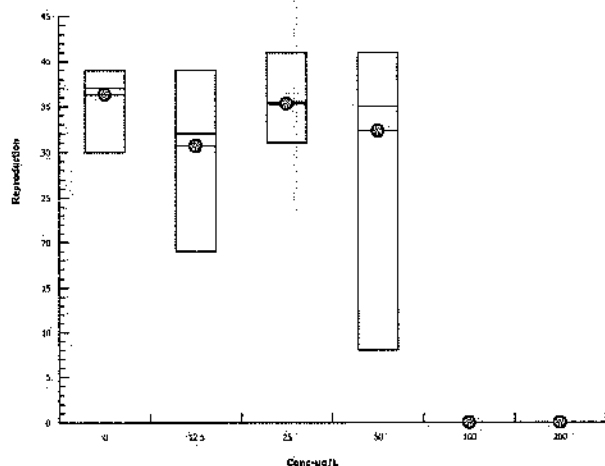
Endpoint: Reproduction
Analysis: Nonparametric-Multiple-Comparison

CETIS Version: CETISv1.8.1
Official Results: Yes

Reproduction Detail

| Conc-µg/L | Control Type | Rep 1 | Rep 2 | Rep 3 | Rep 4 | Rep 5 | Rep 6 | Rep 7 | Rep 8 | Rep 9 | Rep 10 |
|-----------|----------------|-------|-------|-------|-------|-------|-------|---------|-------|-------|--------|
| 0 | Dilution Water | 35 | 33 | 30 | 39 | 39 | 39 | Outlier | 36 | 39 | 37 |
| 12.5 | | 32 | 24 | 32 | 27 | 35 | 39 | 37 | 28 | 19 | 34 |
| 25 | | 31 | 33 | 35 | 36 | 37 | 41 | 33 | 33 | 38 | 36 |
| 50 | | 34 | 34 | 35 | 35 | 8 | 41 | 35 | 37 | 29 | 35 |
| 100 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 200 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

Graphics



reproduction - interrupted concentration-response: *the skulls* ~~non-significant~~
effects bracketed by significant effects,
non-the skulls RE 7/23/2018

CETIS Analytical Report

Report Date: 23 Jul-18 10:50 (p 1 of 4)
Test Code: 1807RT2A.C | 05-0138-0333

Ceriodaphnia 7-d Survival and Reproduction Test

Hyperion Treatment Plant Laboratory

| | | |
|-------------------------------|--|-------------------------------|
| Analysis ID: 18-3627-7518 | Endpoint: Reproduction | CETIS Version: CETISv1.8.1 |
| Analyzed: 19 Jul-18 12:42 | Analysis: Linear Interpolation (ICPIN) | Official Results: Yes |
| Batch ID: 03-2168-1268 | Test Type: Reproduction-Survival (7d) | Analyst: Rodeline Estiva |
| Start Date: 12 Jul-18 14:20 | Protocol: EPA/821/R-02-013 (2002) | Diluent: Hard Synthetic Water |
| Ending Date: 19 Jul-18 08:15 | Species: Ceriodaphnia dubia | Brine: |
| Duration: 6d 18h | Source: In-House Culture | Age: <8 h 7/12/18 (0715-1210) |
| Sample ID: 20-5762-1751 | Code: 7AA4D0F7 | Client: Donald C. Tillman WRP |
| Sample Date: 12 Jul-18 07:50 | Material: Copper chloride | Project: NPDES |
| Receive Date: 12 Jul-18 07:50 | Source: Reference Toxicant | |
| Sample Age: 6h | Station: | |

Batch Note: Batch 1077 HBN 54108

Sample Note: Survival - ideal concentration-response relationship. Reproduction - interrupted concentration-response; non-significant effects bracketed by significant effects.

Linear Interpolation Options

| X Transform | Y Transform | Seed | Resamples | Exp 95% CL | Method |
|-------------|-------------|----------|-----------|------------|-------------------------|
| Log(X+1) | Linear | 1.97E+09 | 200 | Yes | Two-Point Interpolation |

Test Acceptability Criteria

| Attribute | Test Stat | TAC Limits | Overlap | Decision |
|--------------|-----------|------------|---------|-------------------------------|
| Control Resp | 36.33 | 15 - NL | Yes | Passes Acceptability Criteria |

Point Estimates

| Level | µg/L | 95% LCL | 95% UCL |
|-------|-------|---------|---------|
| IC5 | 3.131 | 1.281 | 51.01 |
| IC10 | 33.7 | 4.202 | 52.86 |
| IC15 | 51.55 | 10.86 | 54.78 |
| IC20 | 53.61 | 38.24 | 56.76 |
| IC25 | 55.75 | 48.67 | 58.81 |
| IC40 | 62.69 | 57.18 | 65.42 |
| IC50 | 67.77 | 62.79 | 70.23 |

Reproduction Summary

Calculated Variate

| Conc-µg/L | Control Type | Count | Mean | Min | Max | Std Err | Std Dev | CV% | %Effect |
|-----------|----------------|-------|-------|-----|-----|---------|---------|--------|---------|
| 0 | Dilution Water | 9 | 36.33 | 30 | 39 | 1.067 | 3.202 | 8.81% | 0.0% |
| 12.5 | | 10 | 30.7 | 19 | 39 | 1.955 | 6.183 | 20.14% | 15.5% |
| 25 | | 10 | 35.3 | 31 | 41 | 0.9315 | 2.946 | 8.35% | 2.84% |
| 50 | | 10 | 32.3 | 8 | 41 | 2.856 | 9.031 | 27.96% | 11.1% |
| 100 | | 10 | 0 | 0 | 0 | 0 | 0 | | 100.0% |
| 200 | | 10 | 0 | 0 | 0 | 0 | 0 | | 100.0% |

Reproduction Detail

| Conc-µg/L | Control Type | Rep 1 | Rep 2 | Rep 3 | Rep 4 | Rep 5 | Rep 6 | Rep 7 | Rep 8 | Rep 9 | Rep 10 |
|-----------|----------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|--------|
| 0 | Dilution Water | 35 | 33 | 30 | 39 | 39 | 39 | 36 | 39 | 37 | |
| 12.5 | | 32 | 24 | 32 | 27 | 35 | 39 | 37 | 28 | 19 | 34 |
| 25 | | 31 | 33 | 35 | 36 | 37 | 41 | 33 | 33 | 38 | 36 |
| 50 | | 34 | 34 | 35 | 35 | 8 | 41 | 35 | 37 | 29 | 35 |
| 100 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 200 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

CETIS Analytical Report

Report Date: 23 Jul-18 10:50 (p 2 of 4)
Test Code: 1807RT2A.C | 05-0138-0333

Ceriodaphnia 7-d Survival and Reproduction Test

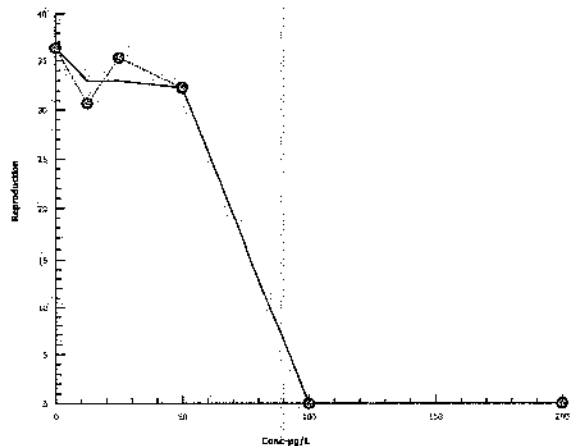
Hyperion Treatment Plant Laboratory

Analysis ID: 18-3627-7518
Analyzed: 19 Jul-18 12:42

Endpoint: Reproduction
Analysis: Linear Interpolation (ICPIN)

CETIS Version: CETISv1.8.1
Official Results: Yes

Graphics



CETIS Analytical Report

Report Date: 23 Jul-18 10:50 (p 3 of 4)
Test Code: 1807RT2A.C | 05-0138-0333

Ceriodaphnia 7-d Survival and Reproduction Test

Hyperion Treatment Plant Laboratory

| | | |
|-------------------------------|--|-------------------------------|
| Analysis ID: 09-5921-7712 | Endpoint: 7d Survival Rate | CETIS Version: CETISv1.8.1 |
| Analyzed: 19 Jul-18 12:40 | Analysis: Linear Interpolation (ICPIN) | Official Results: Yes |
| Batch ID: 03-2168-1268 | Test Type: Reproduction-Survival (7d) | Analyst: Rodeline Estiva |
| Start Date: 12 Jul-18 14:20 | Protocol: EPA/821/R-02-013 (2002) | Diluent: Hard Synthetic Water |
| Ending Date: 19 Jul-18 08:15 | Species: Ceriodaphnia dubia | Brine: |
| Duration: 6d 18h | Source: In-House Culture | Age: <8 h 7/12/18(0715-1210) |
| Sample ID: 20-5762-1751 | Code: 7AA4D0F7 | Client: Donald C. Tillman WRP |
| Sample Date: 12 Jul-18 07:50 | Material: Copper chloride | Project: NPDES |
| Receive Date: 12 Jul-18 07:50 | Source: Reference Toxicant | |
| Sample Age: 6h | Station: | |

Batch Note: Batch 1077 HBN 54108

Sample Note: Survival - ideal concentration-response relationship. Reproduction - interrupted concentration-response: non-significant effects bracketed by significant effects.

Linear Interpolation Options

| X Transform | Y Transform | Seed | Resamples | Exp 95% CL | Method |
|-------------|-------------|-----------|-----------|------------|-------------------------|
| Log(X+1) | Linear | 759345605 | 200 | Yes | Two-Point Interpolation |

Test Acceptability Criteria

| Attribute | Test Stat | TAC Limits | Overlap | Decision |
|--------------|-----------|------------|---------|-------------------------------|
| Control Resp | 1 | 0.8 - NL | Yes | Passes Acceptability Criteria |

Point Estimates

| Level | µg/L | 95% LCL | 95% UCL |
|-------|-------|---------|---------|
| EC5 | 51.77 | 51.77 | 51.77 |
| EC10 | 53.61 | 53.61 | 53.61 |
| EC15 | 55.5 | 55.5 | 55.5 |
| EC20 | 57.47 | 57.47 | 57.47 |
| EC25 | 59.5 | 59.5 | 59.5 |
| EC40 | 66.03 | 66.03 | 66.03 |
| EC50 | 70.77 | 70.77 | 70.77 |

7d Survival Rate Summary

Calculated Variate(A/B)

| Conc-µg/L | Control Type | Count | Mean | Min | Max | Std Err | Std Dev | CV% | %Effect | A | B |
|-----------|----------------|-------|------|-----|-----|---------|---------|------|---------|----|----|
| 0 | Dilution Water | 10 | 1 | 1 | 1 | 0 | 0 | 0.0% | 0.0% | 10 | 10 |
| 12.5 | | 10 | 1 | 1 | 1 | 0 | 0 | 0.0% | 0.0% | 10 | 10 |
| 25 | | 10 | 1 | 1 | 1 | 0 | 0 | 0.0% | 0.0% | 10 | 10 |
| 50 | | 10 | 1 | 1 | 1 | 0 | 0 | 0.0% | 0.0% | 10 | 10 |
| 100 | | 10 | 0 | 0 | 0 | 0 | 0 | | 100.0% | 0 | 10 |
| 200 | | 10 | 0 | 0 | 0 | 0 | 0 | | 100.0% | 0 | 10 |

7d Survival Rate Detail

| Conc-µg/L | Control Type | Rep 1 | Rep 2 | Rep 3 | Rep 4 | Rep 5 | Rep 6 | Rep 7 | Rep 8 | Rep 9 | Rep 10 |
|-----------|----------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|--------|
| 0 | Dilution Water | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| 12.5 | | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| 25 | | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| 50 | | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| 100 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 200 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

CETIS Analytical Report

Report Date: 23 Jul-18 10:50 (p 4 of 4)
Test Code: 1807RT2A.C | 05-0138-0333

Ceriodaphnia 7-d Survival and Reproduction Test

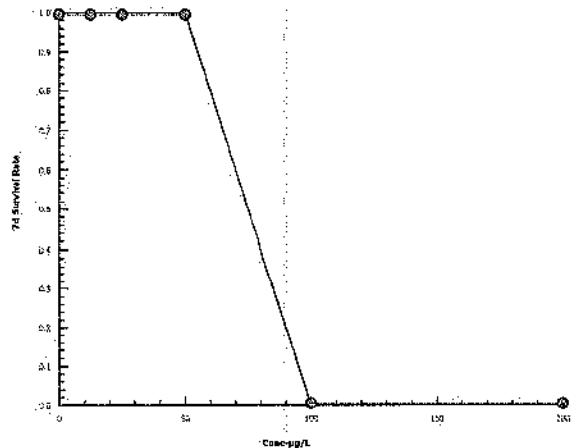
Hyperion Treatment Plant Laboratory

Analysis ID: 09-5921-7712
Analyzed: 19 Jul-18 12:40

Endpoint: 7d Survival Rate
Analysis: Linear Interpolation (ICPIN)

CETIS Version: CETISv1.8.1
Official Results: Yes

Graphics



CETIS Test Data Worksheet

RT

Report Date:

09 Jul-18 13:10 (p 1 of 2)

Test Code:

05-0138-0333/1807RT2A.C

Ceriodaphnia 7-d Survival and Reproduction Test

Hyperion Treatment Plant Laboratory

Start Date: 12 Jul-18

Species: Ceriodaphnia dubia

Sample Code: 7AA4D0F7

End Date: 19 Jul-18

Protocol: EPA/821/R-02-013 (2002)

Sample Source: Reference Toxicant

Sample Date: 12 Jul-18

Material: Copper chloride

Sample Station:

| Conc-µg/L | Code | Rep | Pos | # Exposed | 1d Survival | 2d Survival | 3d Survival | 4d Survival | 5d Survival | 6d Survival | 7d Survival | Neonates | Male |
|-----------|------|-----|-----|-----------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|----------|------|
| 0 | D | 1 | 40 | 1 | 0 | 0 | 0 | 5 | 0 | 10 | 20 | 35 | |
| 0 | D | 2 | 30 | 1 | 0 | 0 | 0 | 5 | 0 | 10 | 18 | 33 | |
| 0 | D | 3 | 53 | 1 | 0 | 0 | 0 | 4 | 10 | 0 | 16 | 30 | |
| 0 | D | 4 | 38 | 1 | 0 | 0 | 0 | 6 | 0 | 14 | 19 | 39 | |
| 0 | D | 5 | 35 | 1 | 0 | 0 | 0 | 6 | 13 | 0 | 20 | 39 | |
| 0 | D | 6 | 17 | 1 | 0 | 0 | 0 | 4 | 13 | 0 | 22 | 39 | |
| 0 | D | 7 | 47 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | |
| 0 | D | 8 | 15 | 1 | 0 | 0 | 0 | 6 | 12 | 0 | 18 | 36 | |
| 0 | D | 9 | 24 | 1 | 0 | 0 | 0 | 5 | 13 | 0 | 21 | 39 | |
| 0 | D | 10 | 25 | 1 | 0 | 0 | 0 | 6 | 12 | 0 | 19 | 37 | |
| 12.5 | | 1 | 28 | 1 | 0 | 0 | 0 | 4 | 0 | 10 | 18 | 32 | |
| 12.5 | | 2 | 14 | 1 | 0 | 0 | 0 | 4 | 8 | 0 | 12 | 24 | |
| 12.5 | | 3 | 58 | 1 | 0 | 0 | 0 | 4 | 11 | 0 | 17 | 32 | |
| 12.5 | | 4 | 12 | 1 | 0 | 0 | 0 | 4 | 8 | 0 | 15 | 27 | |
| 12.5 | | 5 | 48 | 1 | 0 | 0 | 0 | 4 | 11 | 0 | 20 | 35 | |
| 12.5 | | 6 | 5 | 1 | 0 | 0 | 0 | 4 | 14 | 0 | 21 | 39 | |
| 12.5 | | 7 | 20 | 1 | 0 | 0 | 0 | 5 | 11 | 0 | 21 | 37 | |
| 12.5 | | 8 | 46 | 1 | 0 | 0 | 0 | 4 | 9 | 0 | 15 | 28 | |
| 12.5 | | 9 | 42 | 1 | 0 | 0 | 0 | 0 | 7 | 12 | 10 | 19 | |
| 12.5 | | 10 | 41 | 1 | 0 | 0 | 0 | 7 | 11 | 0 | 16 | 34 | |
| 25 | | 1 | 3 | 1 | 0 | 0 | 0 | 4 | 12 | 0 | 15 | 31 | |
| 25 | | 2 | 52 | 1 | 0 | 0 | 0 | 4 | 11 | 0 | 15 | 31 | |
| 25 | | 3 | 56 | 1 | 0 | 0 | 0 | 6 | 10 | 0 | 19 | 33 | |
| 25 | | 4 | 44 | 1 | 0 | 0 | 0 | 6 | 11 | 0 | 19 | 35 | |
| 25 | | 5 | 8 | 1 | 0 | 0 | 0 | 5 | 12 | 0 | 20 | 36 | |
| 25 | | 6 | 13 | 1 | 0 | 0 | 0 | 6 | 12 | 0 | 23 | 41 | |
| 25 | | 7 | 19 | 1 | 0 | 0 | 0 | 6 | 11 | 0 | 16 | 33 | |
| 25 | | 8 | 4 | 1 | 0 | 0 | 0 | 4 | 9 | 0 | 20 | 33 | |
| 25 | | 9 | 57 | 1 | 0 | 0 | 0 | 5 | 13 | 0 | 20 | 38 | |
| 25 | | 10 | 39 | 1 | 0 | 0 | 0 | 4 | 0 | 20 | 20 | 36 | |
| 50 | | 1 | 21 | 1 | 0 | 0 | 0 | 5 | 12 | 0 | 17 | 34 | |
| 50 | | 2 | 29 | 1 | 0 | 0 | 0 | 4 | 10 | 0 | 19 | 34 | |
| 50 | | 3 | 37 | 1 | 0 | 0 | 0 | 4 | 12 | 0 | 19 | 35 | |
| 50 | | 4 | 11 | 1 | 0 | 0 | 0 | 5 | 13 | 0 | 17 | 35 | |
| 50 | | 5 | 31 | 1 | 0 | 0 | 0 | 5 | 12 | 0 | 17 | 35 | |
| 50 | | 6 | 16 | 1 | 0 | 0 | 0 | 5 | 14 | 0 | 21 | 41 | |
| 50 | | 7 | 54 | 1 | 0 | 0 | 0 | 5 | 14 | 0 | 19 | 35 | |
| 50 | | 8 | 7 | 1 | 0 | 0 | 0 | 5 | 14 | 0 | 18 | 37 | |
| 50 | | 9 | 6 | 1 | 0 | 0 | 0 | 5 | 14 | 0 | 16 | 37 | |
| 50 | | 10 | 50 | 1 | 0 | 0 | 0 | 6 | 10 | 0 | 19 | 35 | |
| 100 | | 1 | 45 | 1 | 0 | X | X | X | X | X | X | 0 | |
| 100 | | 2 | 26 | 1 | 0 | X | X | X | X | X | X | 0 | |
| 100 | | 3 | 33 | 1 | 0 | X | X | X | X | X | X | 0 | |
| 100 | | 4 | 49 | 1 | 0 | X | X | X | X | X | X | 0 | |
| 100 | | 5 | 55 | 1 | 0 | X | X | X | X | X | X | 0 | |
| 100 | | 6 | 23 | 1 | 0 | X | X | X | X | X | X | 0 | |
| 100 | | 7 | 43 | 1 | 0 | X | X | X | X | X | X | 0 | |

outlier
N → per
Cetis

CETIS Test Data Worksheet

RT

Report Date:

09 Jul-18 13:10 (p 2 of 2)

Test Code:

05-0138-0333/1807RT2A.C

| Conc-µg/L | Code | Rep | Pos | # Exposed | 1d Survival | 2d Survival | 3d Survival | 4d Survival | 5d Survival | 6d Survival | 7d Survival | Neonates | Male |
|-----------|------|-----|-----|-----------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|----------|------|
| 100 | | 8 | 34 | 1 | 0X | X | X | X | X | X | X | 0 | |
| 100 | | 9 | 18 | 1 | 0X | X | X | X | X | X | X | 0 | |
| 100 | | 10 | 59 | 1 | 0X | X | X | X | X | X | X | 0 | |
| 200 | | 1 | 2 | 1 | 0X | X | X | X | X | X | X | 0 | |
| 200 | | 2 | 36 | 1 | 0X | X | X | X | X | X | X | 0 | |
| 200 | | 3 | 51 | 1 | 0X | X | X | X | X | X | X | 0 | |
| 200 | | 4 | 9 | 1 | 0X | X | X | X | X | X | X | 0 | |
| 200 | | 5 | 60 | 1 | 0X | X | X | X | X | X | X | 0 | |
| 200 | | 6 | 27 | 1 | 0X | X | X | X | X | X | X | 0 | |
| 200 | | 7 | 32 | 1 | 0X | X | X | X | X | X | X | 0 | |
| 200 | | 8 | 22 | 1 | 0X | X | X | X | X | X | X | 0 | |
| 200 | | 9 | 1 | 1 | 0X | X | X | X | X | X | X | 0 | |
| 200 | | 10 | 10 | 1 | 0X | X | X | X | X | X | X | 0 | |

Date:

7/12/18
1420

7/13

7/14

7/15

7/16

7/17

7/18

7/19

815 R0

feed:

1345

1247
R0

1050
R0

1424
R0

1150
R0

1000
R0

820
R0

transfer:

1408
R0

1130
R0

1452
R0

1257
R0

1035
R0

930
R0

CETIS Measurement Worksheet

RT

Report Date:

09 Jul-18 13:10 (p 1 of 2)

Test Code:

1807RT2A.C | 05-0138-0333

Ceriodaphnia 7-d Survival and Reproduction Test

Hyperion Treatment Plant Laboratory

Start Date: 12 Jul-18

Species: Ceriodaphnia dubia

Sample Code: 7AA4D0F7

End Date: 19 Jul-18

Protocol: EPA/821/R-02-013 (2002)

Sample Source: Reference Toxicant

Sample Date: 12 Jul-18

Material: Copper chloride

Sample Station:

Alkalinity (CaCO₃)-mg/L 7/13

| Conc-µg/L | Code | Reading 1 |
|------------------------|------|-----------|
| 0 | D | 124 |
| 200 | | 112 |
| Measure Time: 12:30 | | |
| Instrument ID: titrate | | |
| Analyst: RE | | |

Conductivity-µmhos 7/12 7/13 7/14 7/15 7/16 7/17 7/18

| Conc-µg/L | Code | Reading 1 | Reading 2 | Reading 3 | Reading 4 | Reading 5 | Reading 6 | Reading 7 |
|----------------|------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|
| 0 | D | 632 | 631 | 602 | 621 | 621 | 628 | 647 |
| 12.5 | | 628 | 604 | 606 | 632 | 623 | 632 | 635 |
| 25 | | 628 | 606 | 604 | 632 | 621 | 631 | 632 |
| 50 | | 625 | 603 | 589 | 621 | 609 | 600 | 614 |
| 100 | | 625 | 628 | — | — | — | — | — |
| 200 | | 607 | 620 | — | — | — | — | — |
| Measure Time: | | 1145 | 1156 | 1035 | 1357 | 1134 | 925 | 830 |
| Instrument ID: | | #2 | #2 | #2 | #2 | #2 | #2 | #2 |
| Analyst: | | RE | RE | RE | RE | RE | RE | RE |

Final Dissolved Oxygen-mg/L 7/13 7/14 7/15 7/16 7/17 7/18 7/19

| Conc-µg/L | Code | Reading 1 | Reading 2 | Reading 3 | Reading 4 | Reading 5 | Reading 6 | Reading 7 |
|----------------|------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|
| 0 | D | 7.85 | 8.10 | 8.25 | 8.01 | 8.69 | 8.25 | 8.13 |
| 12.5 | | 7.80 | 8.35 | 8.28 | 8.13 | 8.53 | 8.19 | 8.21 |
| 25 | | 7.88 | 8.27 | 8.26 | 8.14 | 8.38 | 8.21 | 8.15 |
| 50 | | 7.87 | 8.24 | 8.22 | 8.13 | 8.25 | 8.36 | 8.22 |
| 100 | | 7.70 | — | — | — | — | — | — |
| 200 | | 7.93 | — | — | — | — | — | — |
| Measure Time: | | 1427 | 1405 | 1528 | 1557 | 1330 | 1250 | 1000 |
| Instrument ID: | | #1 | #1 | #1 | #1 | #1 | #1 | #1 |
| Analyst: | | RE | RE | RE | RE | RE | RE | RE |

Initial Dissolved Oxygen-mg/L 7/13 7/14 7/15 7/16 7/17 7/18

| Conc-µg/L | Code | Reading 1 | Reading 2 | Reading 3 | Reading 4 | Reading 5 | Reading 6 | Reading 7 |
|----------------|------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|
| 0 | D | 8.23 | 8.35 | 8.17 | 8.28 | 8.14 | 8.58 | 8.29 |
| 12.5 | | 8.44 | 8.47 | 8.23 | 8.11 | 8.20 | 8.56 | 8.34 |
| 25 | | 8.45 | 8.52 | 8.30 | 8.14 | 8.24 | 8.56 | 8.35 |
| 50 | | 8.43 | 8.57 | 8.39 | 8.11 | 8.22 | 8.58 | 8.34 |
| 100 | | 8.43 | 8.60 | — | — | — | — | — |
| 200 | | 8.38 | 8.53 | — | — | — | — | — |
| Measure Time: | | 1145 | 1156 | 1035 | 1357 | 1134 | 925 | 830 |
| Instrument ID: | | #1 | #1 | #1 | #1 | #1 | #1 | #1 |
| Analyst: | | RE | RE | RE | RE | RE | RE | RE |

Hardness (CaCO₃)-mg/L 7/25

| Conc-µg/L | Code | Reading 1 |
|------------------------|------|-----------|
| 0 | D | 190 |
| 200 | | AE* |
| Measure Time: 830 | | |
| Instrument ID: titrate | | |
| Analyst: RE | | |

* Sample dumped. RE 7/25/18

CETIS Measurement Worksheet

RT

Report Date: 09 Jul-18 13:10 (p 2 of 2)

Test Code: 1807RT2A.C | 05-0138-0333

Ceriodaphnia 7-d Survival and Reproduction Test

Hyperion Treatment Plant Laboratory

Start Date: 12 Jul-18

Species: Ceriodaphnia dubia

Sample Code: 7AA4D0F7

End Date: 19 Jul-18

Protocol: EPA/821/R-02-013 (2002)

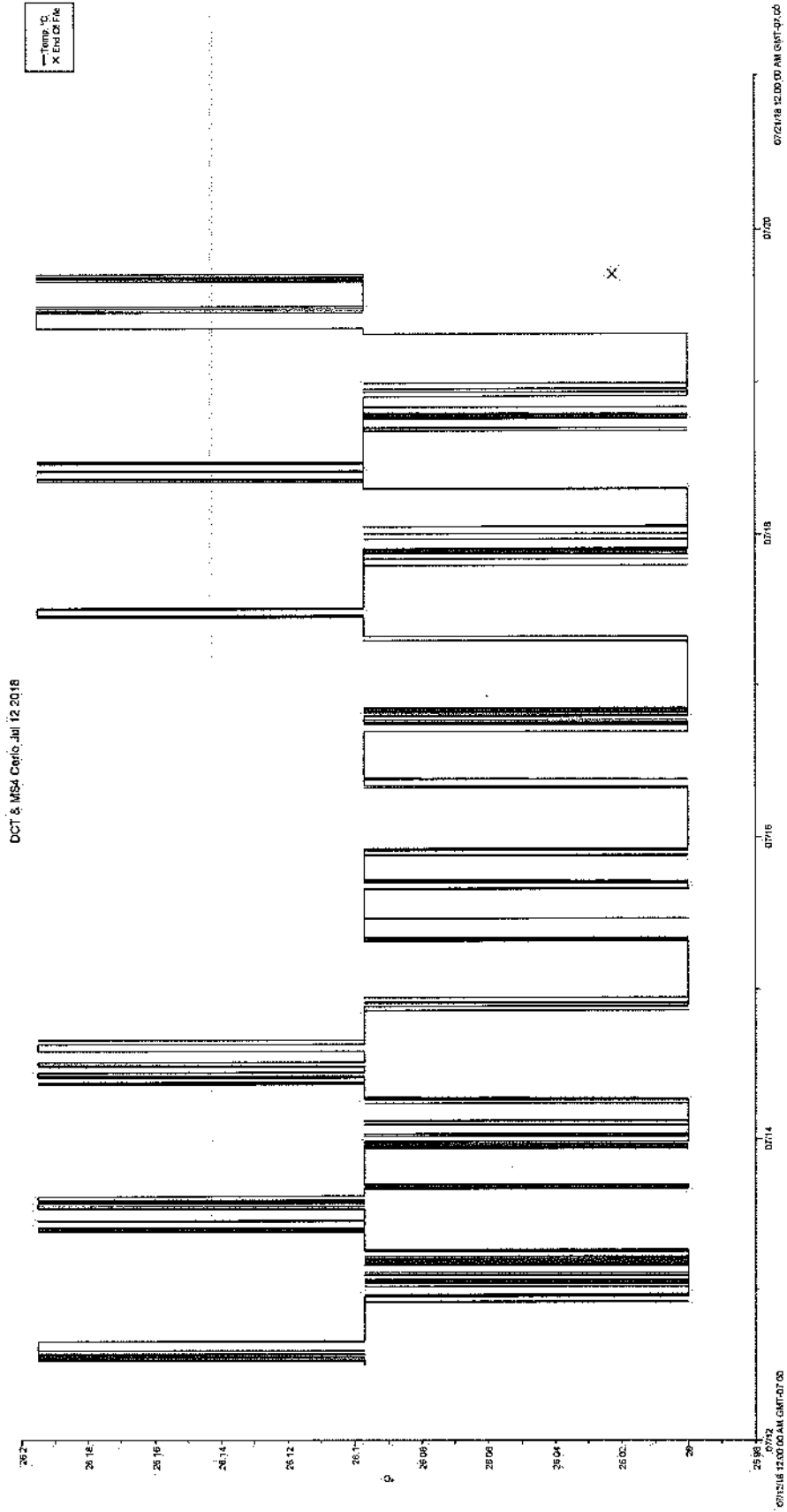
Sample Source: Reference Toxicant

Sample Date: 12 Jul-18

Material: Copper chloride

Sample Station:

| Final pH | | 7/13 | 7/14 | 7/15 | 7/16 | 7/17 | 7/18 | 7/19 |
|------------------------|------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|
| Conc-µg/L | Code | Reading 1 | Reading 2 | Reading 3 | Reading 4 | Reading 5 | Reading 6 | Reading 7 |
| 0 | D | 7.86 | 7.89 | 7.90 | 7.89 | 7.76 | 7.87 | 7.13 |
| 12.5 | | 7.86 | 7.87 | 7.98 | 7.93 | 7.78 | 7.86 | 7.62 |
| 25 | | 7.87 | 7.86 | 8.01 | 7.94 | 7.74 | 7.86 | 7.61 |
| 50 | | 7.85 | 7.83 | 8.00 | 7.90 | 7.76 | 7.83 | 7.73 |
| 100 | | 7.83 | — | — | — | — | — | — |
| 200 | | 7.84 | — | — | — | — | — | — |
| Measure Time: | | 1427 | 1405 | 1528 | 1557 | 1330 | 1250 | 1000 |
| Instrument ID: | | #2 | #2 | #2 | #2 | #2 | #2 | #2 |
| Analyst: | | RC | RC | RC | RC | RC | RC | RC |
| Initial pH | | 7/12 | 7/13 | 7/14 | 7/15 | 7/16 | 7/17 | 7/18 |
| Conc-µg/L | Code | Reading 1 | Reading 2 | Reading 3 | Reading 4 | Reading 5 | Reading 6 | Reading 7 |
| 0 | D | 7.96 | 8.06 | 7.49 | 8.17 | 8.02 | 8.11 | 7.94 |
| 12.5 | | 7.92 | 7.99 | 7.64 | 8.15 | 8.02 | 8.11 | 7.96 |
| 25 | | 7.91 | 7.98 | 7.71 | 8.14 | 8.05 | 8.11 | 7.98 |
| 50 | | 7.90 | 8.01 | 7.78 | 8.12 | 8.05 | 8.11 | 7.99 |
| 100 | | 7.86 | 7.98 | — | — | — | — | — |
| 200 | | 7.91 | 8.00 | — | — | — | — | — |
| Measure Time: | | 1145 | 1156 | 1035 | 1357 | 1134 | 925 | 830 |
| Instrument ID: | | #2 | #2 | #2 | #2 | #2 | #2 | #2 |
| Analyst: | | RC | RC | RC | RC | RC | RC | RC |
| Final Temperature-°C | | 7/13 | 7/14 | 7/15 | 7/16 | 7/17 | 7/18 | 7/19 |
| Conc-µg/L | Code | Reading 1 | Reading 2 | Reading 3 | Reading 4 | Reading 5 | Reading 6 | Reading 7 |
| 0 | D | 24.5 | 24.8 | 24.8 | 24.9 | 24.7 | 24.8 | 24.5 |
| 12.5 | | 24.3 | 24.8 | 24.6 | 24.8 | 24.6 | 24.7 | 24.4 |
| 25 | | 24.4 | 24.8 | 24.6 | 24.7 | 24.5 | 24.5 | 24.5 |
| 50 | | 24.3 | 24.9 | 24.5 | 24.6 | 24.7 | 24.5 | 24.7 |
| 100 | | 24.2 | — | — | — | — | — | — |
| 200 | | 24.2 | — | — | — | — | — | — |
| Measure Time: | | 1427 | 1405 | 1528 | 1557 | 1330 | 1250 | 1000 |
| Instrument ID: | | #2 | #2 | #2 | #2 | #2 | #2 | #2 |
| Analyst: | | RC | RC | RC | RC | RC | RC | RC |
| Initial Temperature-°C | | 7/12 | 7/13 | 7/14 | 7/15 | 7/16 | 7/17 | 7/18 |
| Conc-µg/L | Code | Reading 1 | Reading 2 | Reading 3 | Reading 4 | Reading 5 | Reading 6 | Reading 7 |
| 0 | D | 24.7 | 25.0 | 24.9 | 24.8 | 24.4 | 25.0 | 24.7 |
| 12.5 | | 24.6 | 24.6 | 25.0 | 24.6 | 24.3 | 24.9 | 24.9 |
| 25 | | 24.5 | 24.2 | 25.1 | 24.5 | 24.1 | 24.8 | 24.9 |
| 50 | | 24.3 | 24.1 | 25.2 | 24.3 | 24.1 | 24.8 | 24.8 |
| 100 | | 24.2 | 24.0 | — | — | — | — | — |
| 200 | | 24.2 | 24.0 | — | — | — | — | — |
| Measure Time: | | 1145 | 1156 | 1035 | 1357 | 1134 | 925 | 830 |
| Instrument ID: | | #2 | #2 | #2 | #2 | #2 | #2 | #2 |
| Analyst: | | RC | RC | RC | RC | RC | RC | RC |



Caridodaphnia Chronic Toxicity Test

start: Thursday, July 12, 2018

end: Thursday, July 19, 2018

RT - ^{RE 1123} 1807RT2A,C

DCT eff - 1807062A,C

*The temp chart recorder is broken and data is unavailable. RE 71231201B

ENVIRONMENTAL MONITORING DIVISION
BUREAU OF SANITATION
CITY OF LOS ANGELES

STORMWATER MONITORING PROGRAM

TOXICITY TESTING REPORT

SAMPLE DATE: November 22, 2018

TEST DATE: November 23, 2018

TEST NUMBER: 1811072D.C

TEST MATERIAL: Station BC01NAT

TEST SPECIES: *Ceriodaphnia dubia*

PROTOCOL: EPA/821/R-02-013 (2002)

TEST TYPE: Chronic


REFERENCE TOXICANT TEST: 1811RT2B.C

RESULT:

Survival
Reproduction

Pass, 10.0% effect
Fail, 19.2% effect

Rea Mara A Crinklaw

Analyst


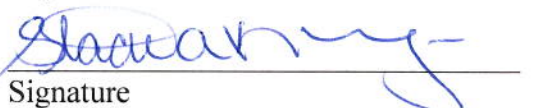
Signature

Water Biologist III

Title
1/25/19

Date

Stacey Karnya

Supervisor


Signature

Acting Laboratory Manager I

Title
1-28-19

Date

CETIS Summary Report

Report Date: 25 Jan-19 13:03 (p 1 of 1)
 Test Code: 1811072D.C | 05-2060-5653

| Ceriodaphnia 7-d Survival and Reproduction Test | | | | | | Hyperion Treatment Plant Laboratory | | | | | |
|---|------------------|-----------------|------------------------------|-----------------------|-------------------------------|-------------------------------------|--------------------|---------|---------|--------|---------|
| Batch ID: | 17-1558-0949 | Test Type: | Reproduction-Survival (7d) | Analyst: | Rea Mara Crinklaw | | | | | | |
| Start Date: | 23 Nov-18 14:04 | Protocol: | EPA/821/R-02-013 (2002) | Diluent: | Hard Synthetic Water | | | | | | |
| Ending Date: | 30 Nov-18 15:18 | Species: | Ceriodaphnia dubia | Brine: | | | | | | | |
| Duration: | 7d 1h | Source: | In-House Culture | Age: | <8h 11/23/18 (09:50-13:35) | | | | | | |
| Sample ID: | 04-2899-9323 | Code: | 3281904 | Client: | Watershed Protection Division | | | | | | |
| Sample Date: | 22 Nov-18 02:30 | Material: | Stormwater Monitoring Sample | Project: | MS4 | | | | | | |
| Receive Date: | 22 Nov-18 08:05 | Source: | Stormwater (STORMWATER) | Batch 1116; HBN 69941 | | | | | | | |
| Sample Age: | 36h (19.6 °C) | Station: | BC01NAT | | | | | | | | |
| Sample Renewals | | | | | | | | | | | |
| Renewal | Sample Code | Sample Date | Receive Date | Renewal Date | Temp °C | | | | | | |
| 1 | 3281904 | 22 Nov-18 02:30 | 22 Nov-18 08:05 | 24 Nov-18 12:28 | 19.6 | | | | | | |
| 2 | 3281904 | 22 Nov-18 02:30 | 22 Nov-18 08:05 | 25 Nov-18 12:42 | 19.6 | | | | | | |
| 3 | 3281904 | 22 Nov-18 02:30 | 22 Nov-18 08:05 | 26 Nov-18 13:08 | 19.6 | | | | | | |
| 4 | 3281904 | 22 Nov-18 02:30 | 22 Nov-18 08:05 | 27 Nov-18 11:57 | 19.6 | | | | | | |
| 5 | 3281904 | 22 Nov-18 02:30 | 22 Nov-18 08:05 | 28 Nov-18 10:31 | 19.6 | | | | | | |
| 6 | 3281904 | 22 Nov-18 02:30 | 22 Nov-18 08:05 | 29 Nov-18 12:41 | 19.6 | | | | | | |
| Batch Note: Insufficient neonate production from the broodboards to use for the test. Neonates from Master Culture Beakers #2 & #4 (11/23/18 9:50 - 13:35) were used. Blocking by known parentage not performed. | | | | | | | | | | | |
| Comparison Summary | | | | | | | | | | | |
| Analysis ID | Endpoint | NOEL | LOEL | TOEL | PMSD | TU | Method | | | | |
| 12-9171-1166 | 7d Survival Rate | 100 | >100 | N/A | N/A | 1 | TST-Welch's t Test | | | | |
| 00-5769-5832 | Reproduction | <100 | 100 | N/A | N/A | >1 | TST-Welch's t Test | | | | |
| Test Acceptability | | | | | | | | | | | |
| Analysis ID | Endpoint | Attribute | Test Stat | TAC Limits | Overlap | Decision | | | | | |
| 12-9171-1166 | 7d Survival Rate | Control Resp | 1 | 0.8 - NL | Yes | Passes Acceptability Criteria | | | | | |
| 00-5769-5832 | Reproduction | Control Resp | 31.8 | 15 - NL | Yes | Passes Acceptability Criteria | | | | | |
| 7d Survival Rate Summary | | | | | | | | | | | |
| Conc-% | Control Type | Count | Mean | 95% LCL | 95% UCL | Min | Max | Std Err | Std Dev | CV% | %Effect |
| 0 | Dilution Water | 10 | 1 | 1 | 1 | 1 | 1 | 0 | 0 | 0.0% | 0.0% |
| 100 | | 10 | 0.9 | 0.7819 | 1 | 0 | 1 | 0.1 | 0.3162 | 35.14% | 10.0% |
| Reproduction Summary | | | | | | | | | | | |
| Conc-% | Control Type | Count | Mean | 95% LCL | 95% UCL | Min | Max | Std Err | Std Dev | CV% | %Effect |
| 0 | Dilution Water | 10 | 31.8 | 29.81 | 33.79 | 22 | 39 | 1.685 | 5.329 | 16.76% | 0.0% |
| 100 | | 10 | 25.7 | 21.67 | 29.73 | 7 | 38 | 3.409 | 10.78 | 41.95% | 19.18% |
| 7d Survival Rate Detail | | | | | | | | | | | |
| Conc-% | Control Type | Rep 1 | Rep 2 | Rep 3 | Rep 4 | Rep 5 | Rep 6 | Rep 7 | Rep 8 | Rep 9 | Rep 10 |
| 0 | Dilution Water | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| 100 | | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 0 |
| Reproduction Detail | | | | | | | | | | | |
| Conc-% | Control Type | Rep 1 | Rep 2 | Rep 3 | Rep 4 | Rep 5 | Rep 6 | Rep 7 | Rep 8 | Rep 9 | Rep 10 |
| 0 | Dilution Water | 35 | 32 | 22 | 39 | 24 | 36 | 34 | 33 | 29 | 34 |
| 100 | | 31 | 26 | 33 | 33 | 7 | 38 | 29 | 15 | 34 | 11 |

CETIS Analytical Report

Report Date: 25 Jan-19 13:03 (p 1 of 4)
 Test Code: 1811072D.C | 05-2060-5653

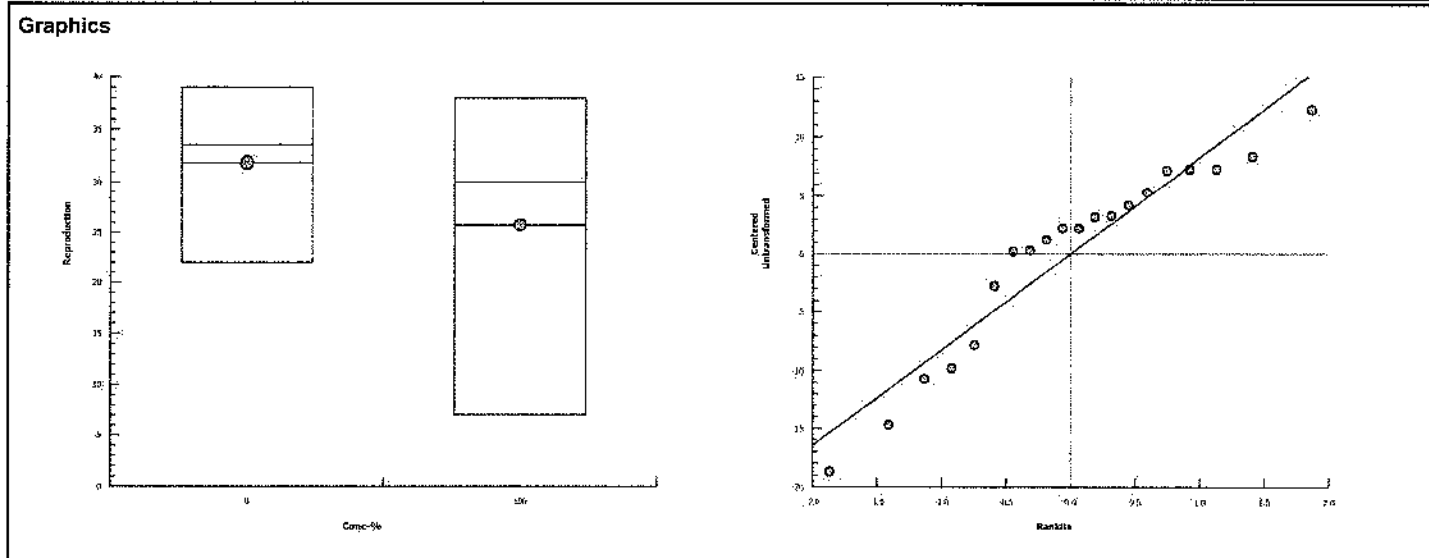
| Ceriodaphnia 7-d Survival and Reproduction Test | | | | Hyperion Treatment Plant Laboratory | | | | | | | |
|---|--|--|-----------|-------------------------------------|------------------------------------|------------------------|---------|--------------------|---------|--------|---------|
| Analysis ID: 00-5769-5832 | Endpoint: Reproduction | CETIS Version: CETISv1.8.1 | | | | | | | | | |
| Analyzed: 04 Dec-18 10:26 | Analysis: Parametric Bioequivalence-Two Sample | Official Results: Yes | | | | | | | | | |
| Batch ID: 17-1558-0949 | Test Type: Reproduction-Survival (7d) | Analyst: Rea Mara Crinklaw | | | | | | | | | |
| Start Date: 23 Nov-18 14:04 | Protocol: EPA/821/R-02-013 (2002) | Diluent: <i>Med</i> Hard Synthetic Water | | | | | | | | | |
| Ending Date: 30 Nov-18 15:18 | Species: Ceriodaphnia dubia | Brine: | | | | | | | | | |
| Duration: 7d 1h | Source: In-House Culture | Age: <8h <i>11/23/18 (09:50-13:35)</i> | | | | | | | | | |
| Sample ID: 04-2899-9323 | Code: 3281904 | Client: Watershed Protection Division | | | | | | | | | |
| Sample Date: 22 Nov-18 02:30 | Material: Stormwater Monitoring Sample | Project: MS4 | | | | | | | | | |
| Receive Date: 22 Nov-18 08:05 | Source: Stormwater (STORMWATER) | | | | | | | | | | |
| Sample Age: 36h (19.6 °C) | Station: BC01NAT | | | | | | | | | | |
| Batch Note: Insufficient neonate production from the broodboards to use for the test. Neonates from Master Culture Beakers #2 & #4 (11/23/18 9:50 - 13:35) were used. Blocking by known parentage not performed. | | | | | | | | | | | |
| Data Transform | Zeta | Alt Hyp | MC Trials | TST b | Test Result | | | | | | |
| Untransformed | 0 | C*b > T | Not Run | 0.75 | Sample fails reproduction endpoint | | | | | | |
| TST-Welch's t Test | | | | | | | | | | | |
| Control | vs | Conc-% | Test Stat | Critical | DF | MSD | P-Value | Decision(α:20%) | | | |
| Dilution Water | | 100 | 0.5088 | 0.8755 | 11 | | 0.3105 | Significant Effect | | | |
| Test Acceptability Criteria | | | | | | | | | | | |
| Attribute | Test Stat | TAC Limits | Overlap | Decision | | | | | | | |
| Control Resp | 31.8 | 15 - NL | Yes | Passes Acceptability Criteria | | | | | | | |
| Auxiliary Tests | | | | | | | | | | | |
| Attribute | Test | Test Stat | Critical | P-Value | Decision(α:5%) | | | | | | |
| Extreme Value | 0 | 2.259 | 2.708 | 0.3163 | No Outliers Detected | | | | | | |
| ANOVA Table | | | | | | | | | | | |
| Source | Sum Squares | Mean Square | DF | F Stat | P-Value | Decision(α:5%) | | | | | |
| Between | 186.05 | 186.05 | 1 | 2.573 | 0.1261 | Non-Significant Effect | | | | | |
| Error | 1301.7 | 72.31667 | 18 | | | | | | | | |
| Total | 1487.75 | 258.3667 | 19 | | | | | | | | |
| Distributional Tests | | | | | | | | | | | |
| Attribute | Test | Test Stat | Critical | P-Value | Decision(α:1%) | | | | | | |
| Variances | Variance Ratio F | 4.093 | 6.541 | 0.0475 | Equal Variances | | | | | | |
| Distribution | Shapiro-Wilk W Normality | 0.9173 | 0.866 | 0.0878 | Normal Distribution | | | | | | |
| Reproduction Summary | | | | | | | | | | | |
| Conc-% | Control Type | Count | Mean | 95% LCL | 95% UCL | Min | Max | Std Err | Std Dev | CV% | %Effect |
| 0 | Dilution Water | 10 | 31.8 | 29.77 | 33.83 | 22 | 39 | 1.685 | 5.329 | 16.76% | 0.0% |
| 100 | | 10 | 25.7 | 21.6 | 29.8 | 7 | 38 | 3.409 | 10.78 | 41.95% | 19.18% |

CETIS Analytical Report

Report Date: 25 Jan-19 13:03 (p 2 of 4)
Test Code: 1811072D.C | 05-2060-5653

| Ceriodaphnia 7-d Survival and Reproduction Test | | | | Hyperion Treatment Plant Laboratory | | | |
|---|-----------------|-----------|--------------------------------------|-------------------------------------|-------------|--|--|
| Analysis ID: | 00-5769-5832 | Endpoint: | Reproduction | CETIS Version: | CETISv1.8.1 | | |
| Analyzed: | 04 Dec-18 10:26 | Analysis: | Parametric Bioequivalence-Two Sample | Official Results: | Yes | | |

| Reproduction Detail | | | | | | | | | | | |
|---------------------|----------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|--------|
| Conc-% | Control Type | Rep 1 | Rep 2 | Rep 3 | Rep 4 | Rep 5 | Rep 6 | Rep 7 | Rep 8 | Rep 9 | Rep 10 |
| 0 | Dilution Water | 35 | 32 | 22 | 39 | 24 | 36 | 34 | 33 | 29 | 34 |
| 100 | | 31 | 26 | 33 | 33 | 7 | 38 | 29 | 15 | 34 | 11 |



CETIS Analytical Report

Report Date: 25 Jan-19 13:03 (p 3 of 4)

Test Code: 1811072D.C | 05-2060-5653

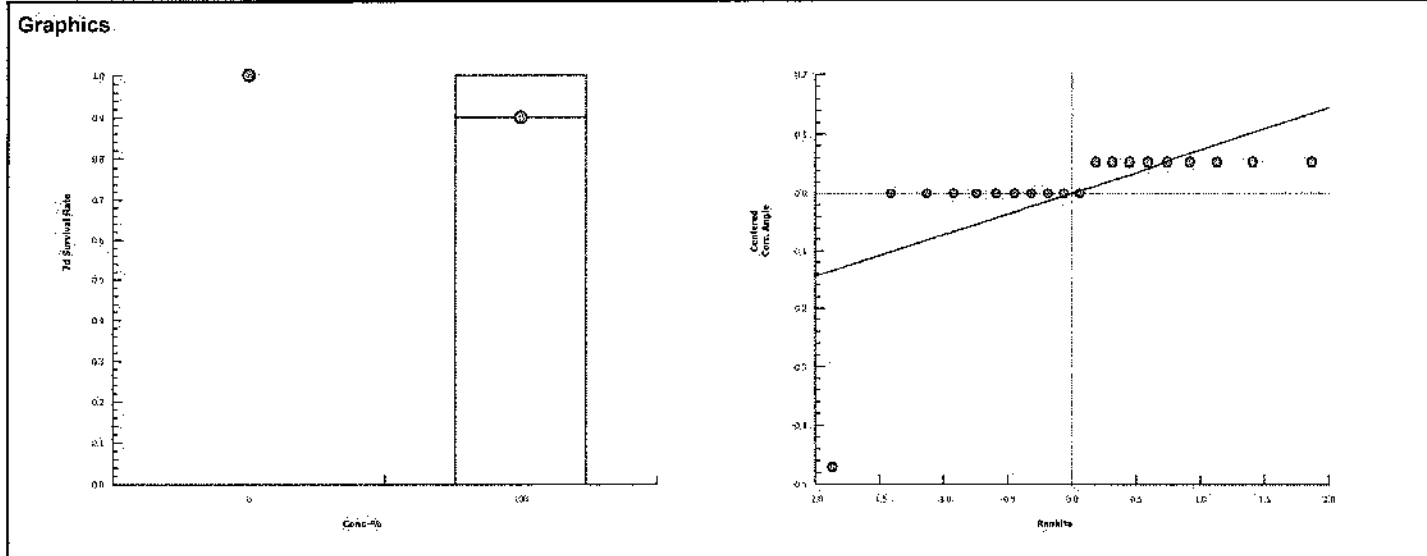
| Ceriodaphnia 7-d Survival and Reproduction Test | | | | | | Hyperion Treatment Plant Laboratory | | | | | |
|--|---------------------------------|--|-----------|--|---|-------------------------------------|---------|------------------------|---------|--------|---------|
| Analysis ID: 12-9171-1166 | | Endpoint: 7d Survival Rate | | CETIS Version: CETISv1.8.1 | | | | | | | |
| Analyzed: 04 Dec-18 10:26 | | Analysis: Parametric Bioequivalence-Two Sample | | Official Results: Yes | | | | | | | |
| Batch ID: 17-1558-0949 | | Test Type: Reproduction-Survival (7d) | | Analyst: Rea Mara Crinklaw | | | | | | | |
| Start Date: 23 Nov-18 14:04 | | Protocol: EPA/821/R-02-013 (2002) | | Diluent: <i>Mod</i> Hard Synthetic Water | | | | | | | |
| Ending Date: 30 Nov-18 15:18 | | Species: Ceriodaphnia dubia | | Brine: | | | | | | | |
| Duration: 7d 1h | | Source: In-House Culture | | Age: <8h <i>11/23/18 (09:50-13:35)</i> | | | | | | | |
| Sample ID: 04-2899-9323 | | Code: 3281904 | | Client: Watershed Protection Division | | | | | | | |
| Sample Date: 22 Nov-18 02:30 | | Material: Stormwater Monitoring Sample | | Project: MS4 | | | | | | | |
| Receive Date: 22 Nov-18 08:05 | | Source: Stormwater (STORMWATER) | | | | | | | | | |
| Sample Age: 36h (19.6 °C) | | Station: BC01NAT | | | | | | | | | |
| Batch Note: Insufficient neonate production from the broodboards to use for the test. Neonates from Master Culture Beakers #2 & #4 (11/23/18 9:50 - 13:35) were used. Blocking by known parentage not performed. | | | | | | | | | | | |
| Data Transform | Zeta | Alt Hyp | MC Trials | TST b | Test Result | | | | | | |
| Angular (Corrected) | 0 | C*b > T | Not Run | 0.75 | Sample passes 7d survival rate endpoint | | | | | | |
| TST-Welch's t Test | | | | | | | | | | | |
| Control | vs | Conc-% | Test Stat | Critical | DF | MSD | P-Value | Decision(α:20%) | | | |
| Dilution Water | | 100* | 4 | 0.8834 | 9 | | 0.0016 | Non-Significant Effect | | | |
| Test Acceptability Criteria | | | | | | | | | | | |
| Attribute | Test Stat | TAC Limits | Overlap | Decision | | | | | | | |
| Control Resp | 1 | 0.8 - NL | Yes | Passes Acceptability Criteria | | | | | | | |
| ANOVA Table | | | | | | | | | | | |
| Source | Sum Squares | Mean Square | DF | F Stat | P-Value | Decision(α:5%) | | | | | |
| Between | 0.01370778 | 0.01370778 | 1 | 1 | 0.3306 | Non-Significant Effect | | | | | |
| Error | 0.2467401 | 0.01370778 | 18 | | | | | | | | |
| Total | 0.2604479 | 0.02741557 | 19 | | | | | | | | |
| Distributional Tests | | | | | | | | | | | |
| Attribute | Test | Test Stat | Critical | P-Value | Decision(α:1%) | | | | | | |
| Variances | Mod Levene Equality of Variance | 1 | 8.285 | 0.3306 | Equal Variances | | | | | | |
| Distribution | Shapiro-Wilk W Normality | 0.4049 | 0.866 | <0.0001 | Non-normal Distribution | | | | | | |
| 7d Survival Rate Summary | | | | | | | | | | | |
| Conc-% | Control Type | Count | Mean | 95% LCL | 95% UCL | Min | Max | Std Err | Std Dev | CV% | %Effect |
| 0 | Dilution Water | 10 | 1 | 1 | 1 | 1 | 1 | 0 | 0 | 0.0% | 0.0% |
| 100 | | 10 | 0.9 | 0.7797 | 1 | 0 | 1 | 0.1 | 0.3162 | 35.14% | 10.0% |
| Angular (Corrected) Transformed Summary | | | | | | | | | | | |
| Conc-% | Control Type | Count | Mean | 95% LCL | 95% UCL | Min | Max | Std Err | Std Dev | CV% | %Effect |
| 0 | Dilution Water | 10 | 1.047 | 1.047 | 1.047 | 1.047 | 1.047 | 0 | 0 | 0.0% | 0.0% |
| 100 | | 10 | 0.9948 | 0.9319 | 1.058 | 0.5236 | 1.047 | 0.05236 | 0.1656 | 16.64% | 5.0% |

CETIS Analytical Report

Report Date: 25-Jan-19 13:03 (p 4 of 4)
 Test Code: 1811072D.C | 05-2060-5653

| Ceriodaphnia 7-d Survival and Reproduction Test | | | | | Hyperion Treatment Plant Laboratory | |
|---|-----------------|-----------|--------------------------------------|-------------------|-------------------------------------|--|
| Analysis ID: | 12-9171-1166 | Endpoint: | 7d Survival Rate | CETIS Version: | CETISv1.8.1 | |
| Analyzed: | 04 Dec-18 10:26 | Analysis: | Parametric Bioequivalence-Two Sample | Official Results: | Yes | |

| 7d Survival Rate Detail | | | | | | | | | | | |
|-------------------------|----------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|--------|
| Conc-% | Control Type | Rep 1 | Rep 2 | Rep 3 | Rep 4 | Rep 5 | Rep 6 | Rep 7 | Rep 8 | Rep 9 | Rep 10 |
| 0 | Dilution Water | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| 100 | | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 0 |



CETIS Test Data Worksheet

Report Date:

21 Nov-18 11:01 (p 1 of 1)

Test Code:

05-2060-5653/1811072D.C

Ceriodaphnia 7-d Survival and Reproduction Test

Hyperion Treatment Plant Laboratory

Start Date: 23 Nov-18 ¹⁴⁰⁴
 End Date: 30 Nov-18 ¹⁵¹⁸
 Sample Date: 21 Nov-18

Species: Ceriodaphnia dubia
 Protocol: EPA/821/R-02-013 (2002)
 Material: Stormwater Monitoring Sample

Sample Code: 1992029B
 Sample Source: Stormwater
 Sample Station: BC01NAT

| Conc-% | Code | Rep | Pos | # Exposed | 1d Survival | 2d Survival | 3d Survival | 4d Survival | 5d Survival | 6d Survival | 7d Survival | Neonates | Male |
|--------|------|-----|-----|-----------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|----------|------|
| 0 | D | 1 | | 1 | 0 | 0 | 0 | 5 | 8 | 0 | 22 | 35 | |
| 0 | D | 2 | | 1 | 0 | 0 | 0 | 4 | 9 | 0 | 19 | 32 | |
| 0 | D | 3 | | 1 | 0 | 0 | 0 | 3 | 9 | 10 | 0 | 22 | |
| 0 | D | 4 | | 1 | 0 | 0 | 0 | 6 | 0 | 13 | 20 | 39 | |
| 0 | D | 5 | | 1 | 0 | 0 | 0 | 4 | 7 | 0 | 13 | 24 | |
| 0 | D | 6 | | 1 | 0 | 0 | 0 | 3 | 11 | 0 | 22 | 36 | |
| 0 | D | 7 | | 1 | 0 | 0 | 0 | 5 | 9 | 20 | 0 | 34 | |
| 0 | D | 8 | | 1 | 0 | 0 | 0 | 5 | 0 | 12 | 16 | 33 | |
| 0 | D | 9 | | 1 | 0 | 0 | 0 | 4 | 10 | 0 | 15 | 29 | |
| 0 | D | 10 | | 1 | 0 | 0 | 0 | 4 | 0 | 15 | 15 | 34 | |
| 100 | | 1 | 43 | 1 | 0 | 0 | 0 | 3 | 0 | 9 | 19 | 31 | |
| 100 | | 2 | 36 | 1 | 0 | 0 | 0 | 4 | 7 | 0 | 15 | 26 | |
| 100 | | 3 | 5 | 1 | 0 | 0 | 0 | 4 | 9 | 0 | 20 | 33 | |
| 100 | | 4 | 31 | 1 | 0 | 0 | 0 | 3 | 0 | 13 | 17 | 33 | |
| 100 | | 5 | 24 | 1 | 0 | 0 | 0 | 2 | 3 | 0 | 2 | 7 | |
| 100 | | 6 | 79 | 1 | 0 | 0 | 0 | 3 | 14 | 0 | 21 | 38 | |
| 100 | | 7 | 8 | 1 | 0 | 0 | 0 | 3 | 8 | 0 | 18 | 29 | |
| 100 | | 8 | 47 | 1 | 0 | 0 | 0 | 0 | 6 | 9 | 0 | 15 | |
| 100 | | 9 | 54 | 1 | 0 | 0 | 0 | 4 | 0 | 10 | 20 | 34 | |
| 100 | | 10 | 15 | 1 | 0 | 0 | 0 | 2 | 5 | 0 | 4X | 11 | |

Shared controls
see 1811072A.C

11/23 11/24 11/25 11/26 11/27 11/28 11/29 11/30
 Food Added: 1358 1109 1210 1241 1018+ 0842 1127
 Fe Fe Fe Fe Fe Fe Fe
 End @ 1518 Fe

Transferred: 1404 1228 1242 1308 1157 1031 1241
 Fe Fe Fe Fe Fe Fe Fe

+ possibly double fed 200 μ L of algae 11-27-18 Fe

CETIS Measurement Worksheet

Report Date: 21 Nov-18 11:02 (p 1 of 2)
Test Code: 1811072D.C | 05-2060-5653

| Ceriodaphnia 7-d Survival and Reproduction Test | | | | | | Hyperion Treatment Plant Laboratory | | |
|---|--|--|--|---------------------------|--|-------------------------------------|--|--|
| Start Date: 23 Nov-18 | | Species: Ceriodaphnia dubia | | Sample Code: 1992029B | | | | |
| End Date: 30 Nov-18 | | Protocol: EPA/821/R-02-013 (2002) | | Sample Source: Stormwater | | | | |
| Sample Date: 21 Nov-18 | | Material: Stormwater Monitoring Sample | | Sample Station: BC01NAT | | | | |

| Alkalinity (CaCO3)-mg/L | | | | | | | | |
|-------------------------|------|-----------|---|--|--|--|--|--|
| Conc-% | Code | Reading 1 | | | | | | |
| 0 | D | 60 | <div style="font-size: 2em;">}</div> <div style="font-size: 1.5em;">see attached worksheet.</div> | | | | | |
| 100 | | 36 | | | | | | |
| Measure Time: | | | | | | | | |
| Instrument ID: | | | | | | | | |
| Analyst: | | | | | | | | |

| Conductivity-µmhos | | | | | | | | |
|--------------------|------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|
| Conc-% | Code | Reading 1 | Reading 2 | Reading 3 | Reading 4 | Reading 5 | Reading 6 | Reading 7 |
| 0 | D | 302 | 297 | 302 | 305 | 294 | 298 | 303 |
| 100 | | 134 | 128 | 124 | 127 | 126 | 129 | 123 |
| Measure Time: | | 1218 | 1052 | 1145 | 1107 | 1037 | 0925 | 1135 |
| Instrument ID: | | #3 | #3 | #3 | #3 | #3 | #3 | #3 |
| Analyst: | | fc | fc | fc | fc | fc | fc | fc |

| Final Dissolved Oxygen-mg/L | | | | | | | | |
|-----------------------------|------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|
| Conc-% | Code | Reading 1 | Reading 2 | Reading 3 | Reading 4 | Reading 5 | Reading 6 | Reading 7 |
| 0 | D | 7.61 | 7.73 | 7.73 | 7.43 | 7.82 | 7.52 | 7.60 |
| 100 | | 6.70 | 7.02 | 7.11 | 7.24 | 7.37 | 7.11 | 7.18 |
| Measure Time: | | 1239 | 1314 | 1327 | 1436 | 1038 | 1545 | 1730 |
| Instrument ID: | | #4 | #4 | #4 | 4 | 4 | #4 | #4 |
| Analyst: | | fc | fc | fc | fc | fc | fc | fc |

| Initial Dissolved Oxygen-mg/L | | | | | | | | |
|-------------------------------|------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|
| Conc-% | Code | Reading 1 | Reading 2 | Reading 3 | Reading 4 | Reading 5 | Reading 6 | Reading 7 |
| 0 | D | 7.43 | 7.60 | 7.68 | 7.82 | 7.78 | 7.75 | 7.92 |
| 100 | | 7.96 | 7.58 | 6.96 | 6.58 | 6.18 | 7.06 | 7.36 |
| Measure Time: | | 1218 | 1052 | 1145 | 1107 | 1037 | 0925 | 1135 |
| Instrument ID: | | #4 | #4 | #4 | #4 | 4 | 4 | 4 |
| Analyst: | | fc | fc | fc | fc | fc | fc | fc |

| Hardness (CaCO3)-mg/L | | | | | | | | |
|-----------------------|------|-----------|---|--|--|--|--|--|
| Conc-% | Code | Reading 1 | | | | | | |
| 0 | D | 88 | <div style="font-size: 2em;">}</div> <div style="font-size: 1.5em;">see attached worksheet.</div> | | | | | |
| 100 | | 48 | | | | | | |
| Measure Time: | | | | | | | | |
| Instrument ID: | | | | | | | | |
| Analyst: | | | | | | | | |

| Final pH | | | | | | | | |
|----------------|------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|
| Conc-% | Code | Reading 1 | Reading 2 | Reading 3 | Reading 4 | Reading 5 | Reading 6 | Reading 7 |
| 0 | D | 7.87 | 7.31 | 7.71 | 8.01 | 7.82 | 7.84 | 7.96 |
| 100 | | 7.03 | 6.61 | 7.09 | 7.22 | 7.09 | 7.16 | 7.29 |
| Measure Time: | | 1239 | 1314 | 1327 | 1436 | 1038 | 1545 | 1730 |
| Instrument ID: | | #3 | #3 | #3 | 3 | 3 | #3 | #3 |
| Analyst: | | fc | fc | fc | fc | fc | fc | fc |

CETIS Measurement Worksheet

Report Date: 21 Nov-18 11:02 (p 2 of 2)

Test Code: 1811072D.C | 05-2060-5653

| Ceriodaphnia 7-d Survival and Reproduction Test | | | | | | | | Hyperion Treatment Plant Laboratory |
|---|------|--|-----------|-----------|---------------------------|-----------|-----------|-------------------------------------|
| Start Date: 23 Nov-18 | | Species: Ceriodaphnia dubia | | | Sample Code: 1992029B | | | |
| End Date: 30 Nov-18 | | Protocol: EPA/821/R-02-013 (2002) | | | Sample Source: Stormwater | | | |
| Sample Date: 21 Nov-18 | | Material: Stormwater Monitoring Sample | | | Sample Station: BC01NAT | | | |
| Initial pH | | | | | | | | |
| Conc.-% | Code | Reading 1 | Reading 2 | Reading 3 | Reading 4 | Reading 5 | Reading 6 | |
| 0 | D | 7.79 | 7.60 | 7.88 | 7.83 | 8.08 | 7.97 | |
| 100 | | 6.95 | 6.80 | 6.66 | 6.45 | 6.40 | 6.61 | |
| Measure Time: | | 1218 | 1052 | 1145 | 1107 | 1037 | 0925 | |
| Instrument ID: | | #3 | #3 | #3 | #3 | 3 | 3 | |
| Analyst: | | fc | fc | fc | fc | DL | DL | |
| Final Temperature-°C | | | | | | | | |
| Conc.-% | Code | Reading 1 | Reading 2 | Reading 3 | Reading 4 | Reading 5 | Reading 6 | |
| 0 | D | 25.6 | 25.4 | 25.1 | 24.8 | 24.9 | 25.3 | |
| 100 | | 25.3 | 25.2 | 25.0 | 25.1 | 25.3 | 24.6 | |
| Measure Time: | | 1239 | 1314 | 1327 | 1436 | 1038 | 1545 | |
| Instrument ID: | | #3 | #3 | #3 | 3 | 3 | #3 | |
| Analyst: | | fc | fc | fc | DL | DL | DL | |
| Initial Temperature-°C | | | | | | | | |
| Conc.-% | Code | Reading 1 | Reading 2 | Reading 3 | Reading 4 | Reading 5 | Reading 6 | |
| 0 | D | 25.3 | 25.1 | 25.2 | 24.8 | 24.5 | 24.8 | |
| 100 | | 24.5 | 25.0 | 24.5 | 24.7 | 24.0 | 24.5 | |
| Measure Time: | | 1218 | 1052 | 1145 | 1107 | 1037 | 0925 | |
| Instrument ID: | | #3 | #3 | #3 | #3 | 3 | 3 | |
| Analyst: | | fc | fc | fc | fc | DL | DL | |

Alkalinity

Date/Time: 2/4/10, 1306Project: M34 Lt Fresh CelioAnalyst: 102Titrant: H₂SO₄Factor: 20 @ 50 mL

| Sample | Sample Amount (ml) | Titrant Amount (ml) | Titrant Amount x Factor (mg CaCO ₃ /L) |
|----------|--------------------------|------------------------|--|
| MHSPW | 25 | 1.5 | 60 |
| [200] Cu | | 3.1 | 124 |
| THJ | | 1.2 | 48 |
| WAS | | 2.4 | 96 |
| RASLA | | 0.6 | 24 |
| DOM | | 0.5 | 20 |
| SMB | | 2.6 | 104 |
| NAT | | 0.9 | 36 |
| SAW | 25 | 1.0 | 40 |
| | | | |
| | | | |
| | | | |

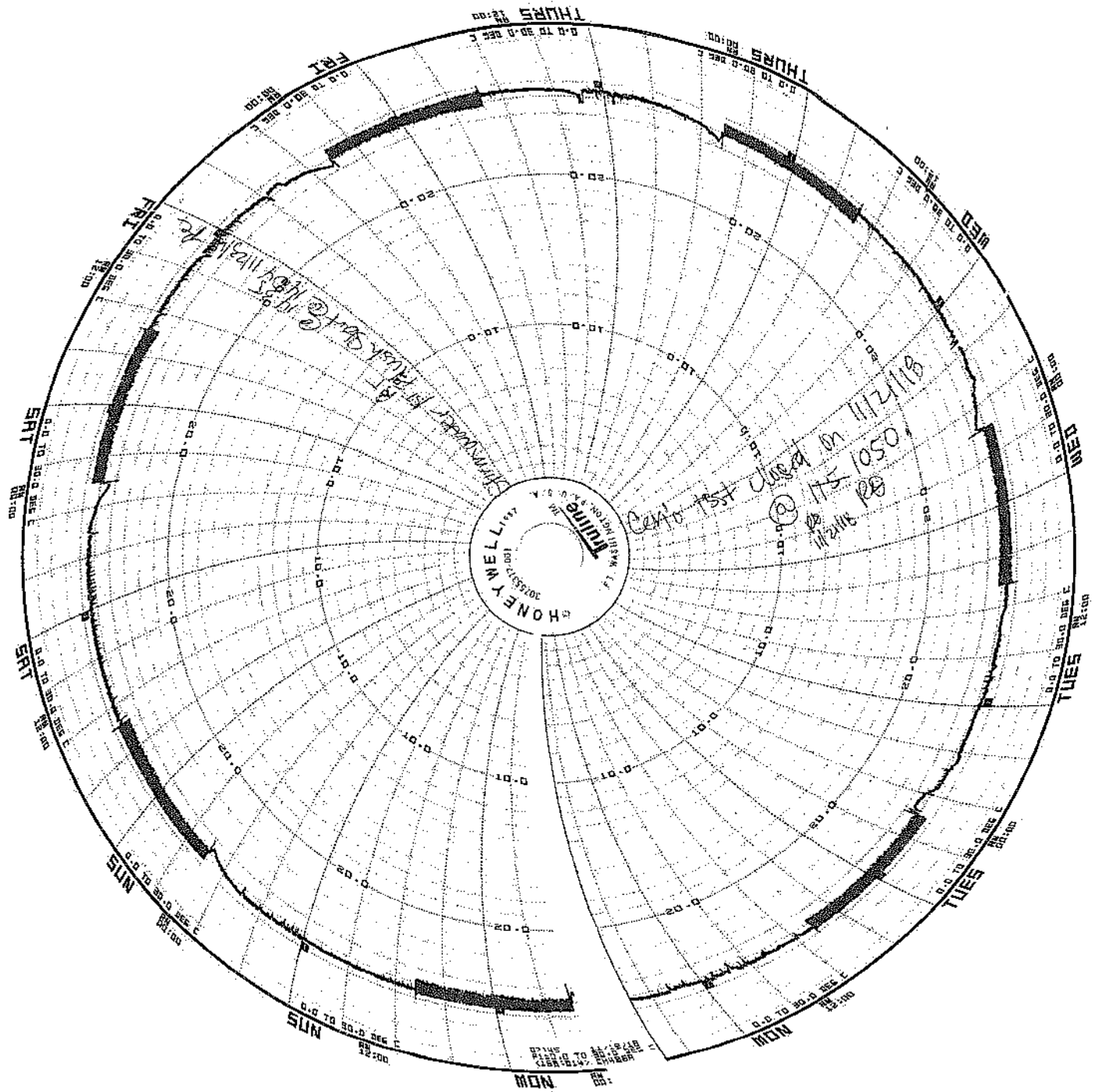
Hardness

Date/Time: 12/4/10, 1300Project: MJ4 1st FlushAnalyst: 102

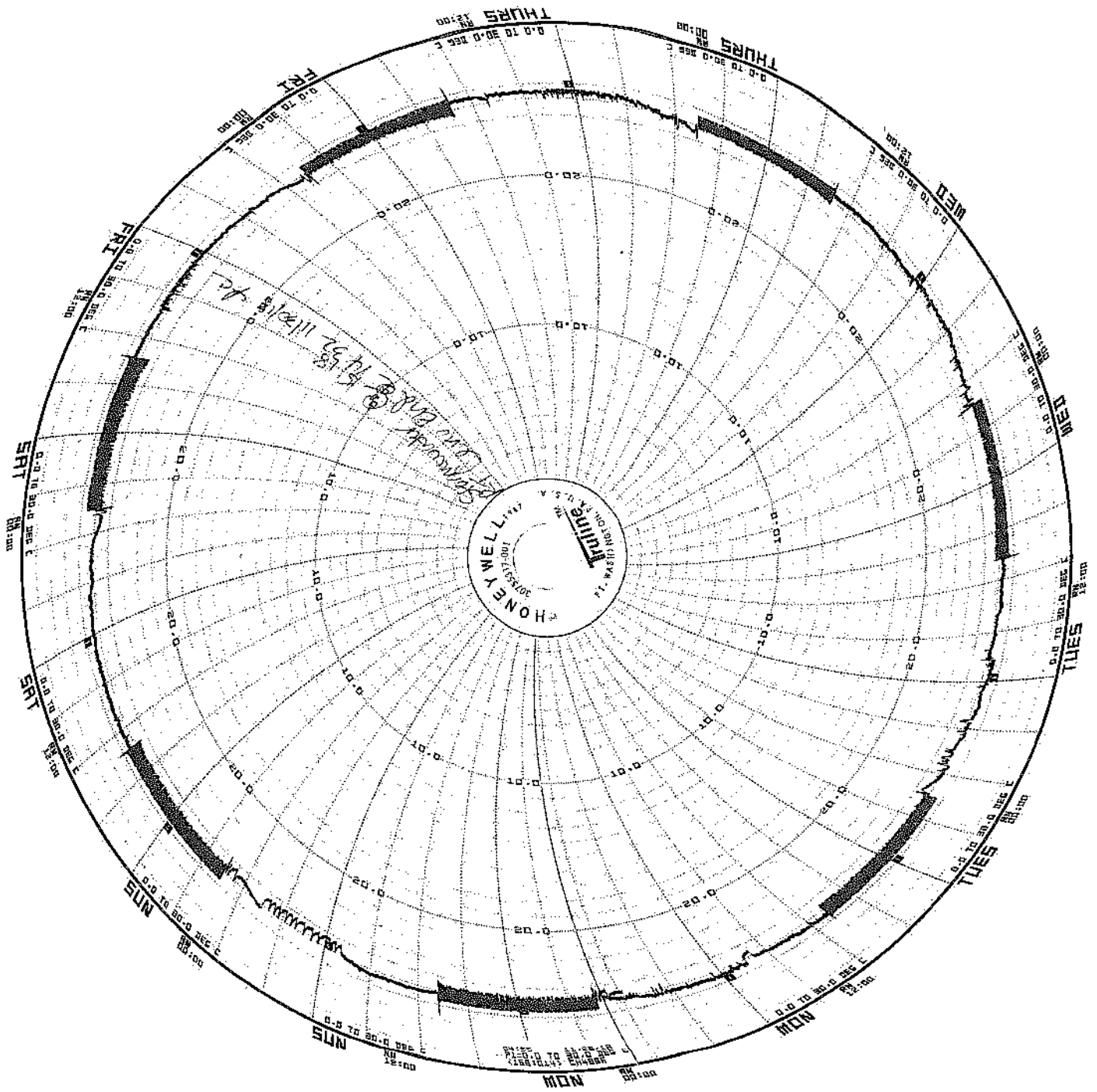
Cent

Titrant: EDTAFactor: 20050 mL

| Sample | Sample Amount (mL) | Titrant Amount (mL) | Titrant Amount x Factor (mg CaCO ₃ /L) |
|----------|--------------------|---------------------|---|
| MJFW | 25 | 2.2 | 48 ^{12/4/10} (88) |
| [200] CH | | 4.5 | 180 |
| TWJ | | 1.7 | 60 |
| WAS | | 3.6 | 144 |
| PHLA | | 0.7 | 28 |
| DOM | | 0.6 | 24 |
| SMB | | 5.6 | 224 |
| NAT | | 1.2 | 48 |
| SAW | 25 | 1.2 | 48 |
| | | | |
| | | | |
| | | | |



Test: 1811RT2B.C, 1811072A-G.C
 Date: 11/23/18(14:04) - 11/30/18(15:18)



Test: 1811 RTZB.C, 1811072A-G.C
 Date: 11/23/18 (14:04) - 11/30/18 (15:18)

ENVIRONMENTAL MONITORING DIVISION
BUREAU OF SANITATION
CITY OF LOS ANGELES

STORMWATER MONITORING PROGRAM

TOXICITY TESTING REPORT

SAMPLE DATE: November 22, 2018

TEST DATE: November 23, 2018

TEST NUMBER: 1811072E.C

TEST MATERIAL: Station BC02SAW

TEST SPECIES: *Ceriodaphnia dubia*

PROTOCOL: EPA/821/R-02-013 (2002)


TEST TYPE: Chronic

REFERENCE TOXICANT TEST: 1811RT2B.C


RESULT:

Survival
Reproduction

Pass, 0% effect
Pass, 6.6% effect

Rea Mara A Crinklaw
Analyst

Signature

Water Biologist III
Title
1/23/19
Date

Stacey Karnya
Supervisor

Signature

Acting Laboratory Manager I
Title
1-28-19
Date

CETIS Summary Report

Report Date: 23 Jan-19 16:26 (p 1 of 1)
Test Code: 1811072E.C | 13-4165-6350

| Ceriodaphnia 7-d Survival and Reproduction Test | | | | | | Hyperion Treatment Plant Laboratory | | | | | |
|---|--|--|-----------------|-------------------------------|---------|-------------------------------------|--------------------|---------|---------|--------|---------|
| Batch ID: 17-1558-0949 | Test Type: Reproduction-Survival (7d) | Analyst: Rea Mara Crinklaw | | | | | | | | | |
| Start Date: 23 Nov-18 14:04 | Protocol: EPA/821/R-02-013 (2002) | Diluent: <i>Mid</i> Hard Synthetic Water | | | | | | | | | |
| Ending Date: 30 Nov-18 15:18 | Species: Ceriodaphnia dubia | Brine: | | | | | | | | | |
| Duration: 7d 1h | Source: In-House Culture | Age: <8h | | <i>11/23/18 (09:50-13:35)</i> | | | | | | | |
| Sample ID: 12-3996-9830 | Code: 3281901 | Client: Watershed Protection Division | | | | | | | | | |
| Sample Date: 22 Nov-18 06:10 | Material: Stormwater Monitoring Sample | Project: MS4 | | | | | | | | | |
| Receive Date: 22 Nov-18 08:05 | Source: Stormwater (STORMWATER) | | | | | | | | | | |
| Sample Age: 32h (16.6 °C) | Station: BC02SAW | <i>Batch 1116; HBN 69941</i> | | | | | | | | | |
| Sample Renewals | | | | | | | | | | | |
| Renewal | Sample Code | Sample Date | Receive Date | Renewal Date | Temp °C | | | | | | |
| 1 | 3281901 | 22 Nov-18 06:10 | 22 Nov-18 08:05 | 24 Nov-18 12:28 | 16.6 | | | | | | |
| 2 | 3281901 | 22 Nov-18 06:10 | 22 Nov-18 08:05 | 25 Nov-18 12:42 | 16.6 | | | | | | |
| 3 | 3281901 | 22 Nov-18 06:10 | 22 Nov-18 08:05 | 26 Nov-18 13:08 | 16.6 | | | | | | |
| 4 | 3281901 | 22 Nov-18 06:10 | 22 Nov-18 08:05 | 27 Nov-18 11:57 | 16.6 | | | | | | |
| 5 | 3281901 | 22 Nov-18 06:10 | 22 Nov-18 08:05 | 28 Nov-18 10:31 | 16.6 | | | | | | |
| 6 | 3281901 | 22 Nov-18 06:10 | 22 Nov-18 08:05 | 29 Nov-18 12:41 | 16.6 | | | | | | |
| Batch Note: Insufficient neonate production from the broodboards to use for the test. Neonates from Master Culture Beakers #2 & #4 (11/23/18 9:50 - 13:35) were used. Blocking by known parentage not performed. | | | | | | | | | | | |
| Comparison Summary | | | | | | | | | | | |
| Analysis ID | Endpoint | NOEL | LOEL | TOEL | PMSD | TU | Method | | | | |
| 13-4865-0713 | 7d Survival Rate | 100 | >100 | N/A | N/A | 1 | TST-Welch's t Test | | | | |
| 10-7951-5047 | Reproduction | 100 | >100 | N/A | N/A | 1 | TST-Welch's t Test | | | | |
| Test Acceptability | | | | | | | | | | | |
| Analysis ID | Endpoint | Attribute | Test Stat | TAC Limits | Overlap | Decision | | | | | |
| 13-4865-0713 | 7d Survival Rate | Control Resp | 1 | 0.8 - NL | Yes | Passes Acceptability Criteria | | | | | |
| 10-7951-5047 | Reproduction | Control Resp | 31.8 | 15 - NL | Yes | Passes Acceptability Criteria | | | | | |
| 7d Survival Rate Summary | | | | | | | | | | | |
| Conc-% | Control Type | Count | Mean | 95% LCL | 95% UCL | Min | Max | Std Err | Std Dev | CV% | %Effect |
| 0 | Dilution Water | 10 | 1 | 1 | 1 | 1 | 1 | 0 | 0 | 0.0% | 0.0% |
| 100 | | 10 | 1 | 1 | 1 | 1 | 1 | 0 | 0 | 0.0% | 0.0% |
| Reproduction Summary | | | | | | | | | | | |
| Conc-% | Control Type | Count | Mean | 95% LCL | 95% UCL | Min | Max | Std Err | Std Dev | CV% | %Effect |
| 0 | Dilution Water | 10 | 31.8 | 29.81 | 33.79 | 22 | 39 | 1.685 | 5.329 | 16.76% | 0.0% |
| 100 | | 10 | 29.7 | 27.02 | 32.38 | 19 | 43 | 2.266 | 7.166 | 24.13% | 6.6% |
| 7d Survival Rate Detail | | | | | | | | | | | |
| Conc-% | Control Type | Rep 1 | Rep 2 | Rep 3 | Rep 4 | Rep 5 | Rep 6 | Rep 7 | Rep 8 | Rep 9 | Rep 10 |
| 0 | Dilution Water | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| 100 | | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| Reproduction Detail | | | | | | | | | | | |
| Conc-% | Control Type | Rep 1 | Rep 2 | Rep 3 | Rep 4 | Rep 5 | Rep 6 | Rep 7 | Rep 8 | Rep 9 | Rep 10 |
| 0 | Dilution Water | 35 | 32 | 22 | 39 | 24 | 36 | 34 | 33 | 29 | 34 |
| 100 | | 26 | 25 | 43 | 19 | 27 | 27 | 32 | 27 | 40 | 31 |

CETIS Analytical Report

Report Date: 23 Jan-19 16:26 (p 1 of 4)
Test Code: 1811072E.C | 13-4165-6350

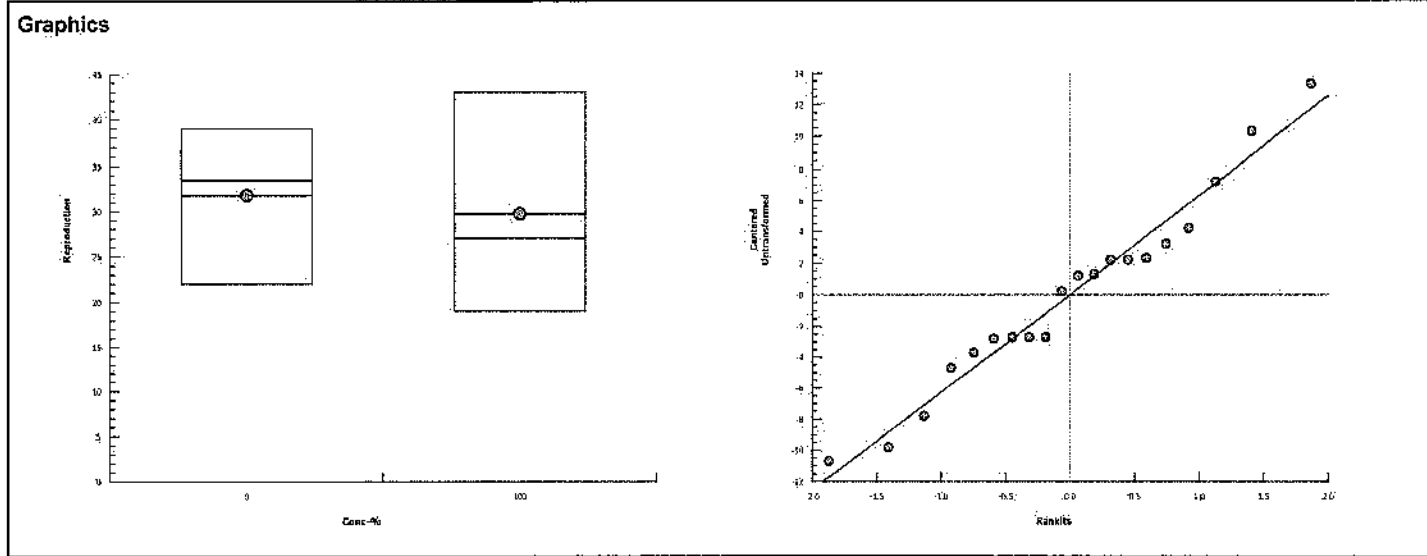
| Ceriodaphnia 7-d Survival and Reproduction Test | | | | | | Hyperion Treatment Plant Laboratory | | | | | |
|--|--------------------------|--|-----------|--|----------------------|-------------------------------------|---------|------------------------|---------|--------|---------|
| Analysis ID: 10-7951-5047 | | Endpoint: Reproduction | | CETIS Version: CETISv1.8.1 | | | | | | | |
| Analyzed: 04 Dec-18 11:04 | | Analysis: Parametric Bioequivalence-Two Sample | | Official Results: Yes | | | | | | | |
| Batch ID: 17-1558-0949 | | Test Type: Reproduction-Survival (7d) | | Analyst: Rea Mara Crinklaw | | | | | | | |
| Start Date: 23 Nov-18 14:04 | | Protocol: EPA/821/R-02-013 (2002) | | Diluent: <i>Red</i> Hard Synthetic Water | | | | | | | |
| Ending Date: 30 Nov-18 15:18 | | Species: Ceriodaphnia dubia | | Brine: | | | | | | | |
| Duration: 7d 1h | | Source: In-House Culture | | Age: <8h <i>11/23/18 (09:50-13:35)</i> | | | | | | | |
| Sample ID: 12-3996-9830 | | Code: 3281901 | | Client: Watershed Protection Division | | | | | | | |
| Sample Date: 22 Nov-18 06:10 | | Material: Stormwater Monitoring Sample | | Project: MS4 | | | | | | | |
| Receive Date: 22 Nov-18 08:05 | | Source: Stormwater (STORMWATER) | | | | | | | | | |
| Sample Age: 32h (16.6 °C) | | Station: BC02SAW | | | | | | | | | |
| Batch Note: Insufficient neonate production from the broodboards to use for the test. Neonates from Master Culture Beakers #2 & #4 (11/23/18 9:50 - 13:35) were used. Blocking by known parentage not performed. | | | | | | | | | | | |
| Data Transform | | Zeta | Alt Hyp | MC Trials | TST b | Test Result | | | | | |
| Untransformed | | 0 | C*b > T | Not Run | 0.75 | Sample passes reproduction endpoint | | | | | |
| TST-Welch's t Test | | | | | | | | | | | |
| Control | vs | Conc-% | Test Stat | Critical | DF | MSD | P-Value | Decision(α:20%) | | | |
| Dilution Water | | 100* | 2.255 | 0.8681 | 14 | | 0.0203 | Non-Significant Effect | | | |
| Test Acceptability Criteria | | | | | | | | | | | |
| Attribute | Test Stat | TAC Limits | Overlap | Decision | | | | | | | |
| Control Resp | 31.8 | 15 - NL | Yes | Passes Acceptability Criteria | | | | | | | |
| Auxiliary Tests | | | | | | | | | | | |
| Attribute | Test | Test Stat | Critical | P-Value | Decision(α:5%) | | | | | | |
| Extreme Value | 0 | 2.164 | 2.708 | 0.4359 | No Outliers Detected | | | | | | |
| ANOVA Table | | | | | | | | | | | |
| Source | Sum Squares | Mean Square | DF | F Stat | P-Value | Decision(α:5%) | | | | | |
| Between | 22.05 | 22.05 | 1 | 0.553 | 0.4667 | Non-Significant Effect | | | | | |
| Error | 717.7 | 39.87222 | 18 | | | | | | | | |
| Total | 739.75 | 61.92222 | 19 | | | | | | | | |
| Distributional Tests | | | | | | | | | | | |
| Attribute | Test | Test Stat | Critical | P-Value | Decision(α:1%) | | | | | | |
| Variances | Variance Ratio F | 1.808 | 6.541 | 0.3909 | Equal Variances | | | | | | |
| Distribution | Shapiro-Wilk W Normality | 0.9705 | 0.866 | 0.7648 | Normal Distribution | | | | | | |
| Reproduction Summary | | | | | | | | | | | |
| Conc-% | Control Type | Count | Mean | 95% LCL | 95% UCL | Min | Max | Std Err | Std Dev | CV% | %Effect |
| 0 | Dilution Water | 10 | 31.8 | 29.77 | 33.83 | 22 | 39 | 1.685 | 5.329 | 16.76% | 0.0% |
| 100 | | 10 | 29.7 | 26.97 | 32.43 | 19 | 43 | 2.266 | 7.166 | 24.13% | 6.6% |

CETIS Analytical Report

Report Date: 23 Jan-19 16:26 (p 2 of 4)
 Test Code: 1811072E.G | 13-4165-6350

| Ceriodaphnia 7-d Survival and Reproduction Test | | | | | Hyperion Treatment Plant Laboratory | |
|---|-----------------|-----------|--------------------------------------|-------------------|-------------------------------------|--|
| Analysis ID: | 10-7951-5047 | Endpoint: | Reproduction | CETIS Version: | CETISv1.8.1 | |
| Analyzed: | 04 Dec-18 11:04 | Analysis: | Parametric Bioequivalence-Two Sample | Official Results: | Yes | |

| Reproduction Detail | | | | | | | | | | | |
|---------------------|----------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|--------|
| Conc-% | Control Type | Rep 1 | Rep 2 | Rep 3 | Rep 4 | Rep 5 | Rep 6 | Rep 7 | Rep 8 | Rep 9 | Rep 10 |
| 0 | Dilution Water | 35 | 32 | 22 | 39 | 24 | 36 | 34 | 33 | 29 | 34 |
| 100 | | 26 | 25 | 43 | 19 | 27 | 27 | 32 | 27 | 40 | 31 |



CETIS Analytical Report

Report Date: 23 Jan-19 16:26 (p 3 of 4)
Test Code: 1811072E.C | 13-4165-6350

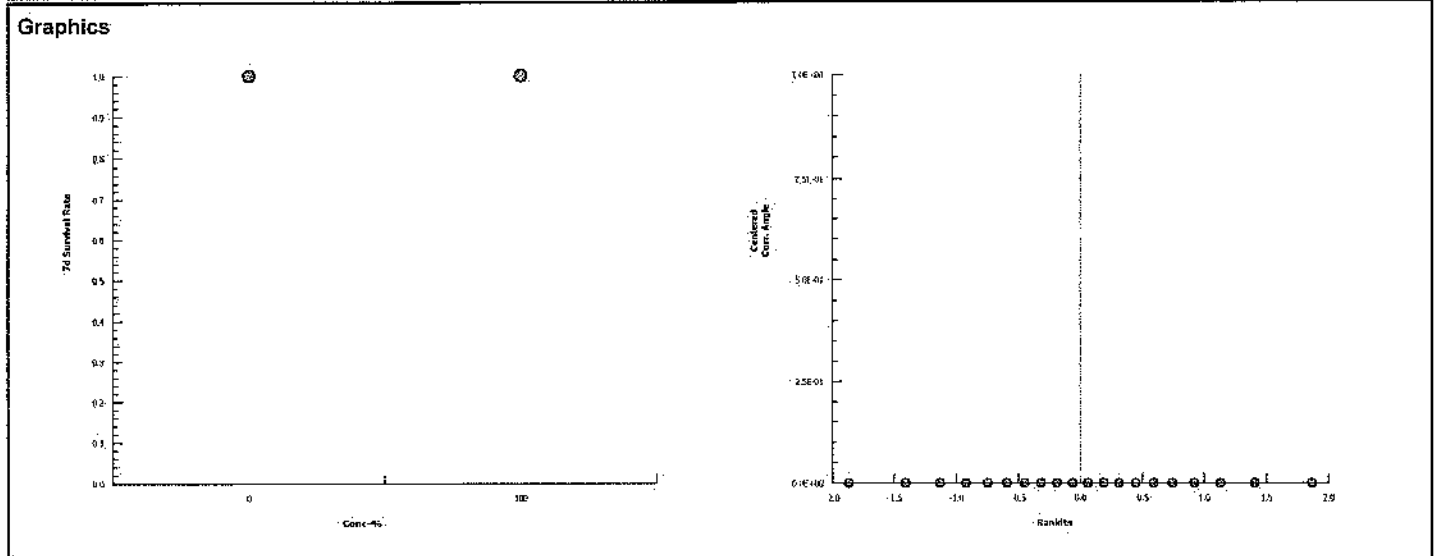
| Ceriodaphnia 7-d Survival and Reproduction Test | | | | | | Hyperion Treatment Plant Laboratory | | | | | |
|---|---------------------------------|--|-----------|--|-------------------|---|---------|------------------------|---------|------|---------|
| Analysis ID: 13-4865-0713 | | Endpoint: 7d Survival Rate | | CETIS Version: CETISv1.8.1 | | | | | | | |
| Analyzed: 04 Dec-18 11:04 | | Analysis: Parametric Bioequivalence-Two Sample | | Official Results: Yes | | | | | | | |
| Batch ID: 17-1558-0949 | | Test Type: Reproduction-Survival (7d) | | Analyst: Rea Mara Crinklaw | | | | | | | |
| Start Date: 23 Nov-18 14:04 | | Protocol: EPA/821/R-02-013 (2002) | | Diluent: <i>Mod</i> Hard Synthetic Water | | | | | | | |
| Ending Date: 30 Nov-18 15:18 | | Species: Ceriodaphnia dubia | | Brine: | | | | | | | |
| Duration: 7d 1h | | Source: In-House Culture | | Age: <8h | | <i>11/23/18 (09:50-13:35)</i> | | | | | |
| Sample ID: 12-3996-9830 | | Code: 3281901 | | Client: Watershed Protection Division | | | | | | | |
| Sample Date: 22 Nov-18 06:10 | | Material: Stormwater Monitoring Sample | | Project: MS4 | | | | | | | |
| Receive Date: 22 Nov-18 08:05 | | Source: Stormwater (STORMWATER) | | | | | | | | | |
| Sample Age: 32h (16.6 °C) | | Station: BC02SAW | | | | | | | | | |
| Batch Note: Insufficient neonate production from the broodboards to use for the test. Neonates from Master Culture Beakers #2 & #4 (11/23/18 9:50 - 13:35) were used. Blocking by known parentage not performed. | | | | | | | | | | | |
| Data Transform | | Zeta | Alt Hyp | MC Trials | TST b | Test Result | | | | | |
| Angular (Corrected) | | 0 | C*b > T | Not Run | 0.75 | Sample passes 7d survival rate endpoint | | | | | |
| TST-Welch's t Test | | | | | | | | | | | |
| Control | vs | Conc-% | Test Stat | Critical | DF | MSD | P-Value | Decision(α:20%) | | | |
| Dilution Water | | 100* | 0.2618 | | | | <0.2 | Non-Significant Effect | | | |
| Test Acceptability Criteria | | | | | | | | | | | |
| Attribute | Test Stat | TAC Limits | Overlap | Decision | | | | | | | |
| Control Resp | 1 | 0.8 - NL | Yes | Passes Acceptability Criteria | | | | | | | |
| ANOVA Table | | | | | | | | | | | |
| Source | Sum Squares | Mean Square | DF | F Stat | P-Value | Decision(α:5%) | | | | | |
| Between | 0 | 0 | 1 | 65540 | <0.0001 | Significant Effect | | | | | |
| Error | 0 | 0 | 18 | | | | | | | | |
| Total | 0 | 0 | 19 | | | | | | | | |
| Distributional Tests | | | | | | | | | | | |
| Attribute | Test | Test Stat | Critical | P-Value | Decision(α:1%) | | | | | | |
| Variances | Mod Levene Equality of Variance | 65540 | 8.285 | <0.0001 | Unequal Variances | | | | | | |
| 7d Survival Rate Summary | | | | | | | | | | | |
| Conc-% | Control Type | Count | Mean | 95% LCL | 95% UCL | Min | Max | Std Err | Std Dev | CV% | %Effect |
| 0 | Dilution Water | 10 | 1 | 1 | 1 | 1 | 1 | 0 | 0 | 0.0% | 0.0% |
| 100 | | 10 | 1 | 1 | 1 | 1 | 1 | 0 | 0 | 0.0% | 0.0% |
| Angular (Corrected) Transformed Summary | | | | | | | | | | | |
| Conc-% | Control Type | Count | Mean | 95% LCL | 95% UCL | Min | Max | Std Err | Std Dev | CV% | %Effect |
| 0 | Dilution Water | 10 | 1.047 | 1.047 | 1.047 | 1.047 | 1.047 | 0 | 0 | 0.0% | 0.0% |
| 100 | | 10 | 1.047 | 1.047 | 1.047 | 1.047 | 1.047 | 0 | 0 | 0.0% | 0.0% |

CETIS Analytical Report

Report Date: 23 Jan-19 16:26 (p 4 of 4)
 Test Code: 1811072E.C | 13-4165-6350

| Ceriodaphnia 7-d Survival and Reproduction Test | | | | | | Hyperion Treatment Plant Laboratory | | | | | |
|---|-----------------|-----------|--------------------------------------|-------------------|-------------|-------------------------------------|--|--|--|--|--|
| Analysis ID: | 13-4865-0713 | Endpoint: | 7d Survival Rate | CETIS Version: | CETISv1.8.1 | | | | | | |
| Analyzed: | 04 Dec-18 11:04 | Analysis: | Parametric Bioequivalence-Two Sample | Official Results: | Yes | | | | | | |

| 7d Survival Rate Detail | | | | | | | | | | | |
|-------------------------|----------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|--------|
| Conc-% | Control Type | Rep 1 | Rep 2 | Rep 3 | Rep 4 | Rep 5 | Rep 6 | Rep 7 | Rep 8 | Rep 9 | Rep 10 |
| 0 | Dilution Water | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| 100 | | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |



CETIS Test Data Worksheet

Report Date: 21 Nov-18 11:02 (p 1 of 1)
Test Code: 13-4165-6350/1811072E.C

| Ceriodaphnia 7-d Survival and Reproduction Test | | | | | | | | Hyperion Treatment Plant Laboratory | | | | | |
|---|-----------|------|-----------|------------------------------|-----------------|------------|--|-------------------------------------|--|--|--|--|--|
| Start Date: | 23 Nov-18 | 1404 | Species: | Ceriodaphnia dubia | Sample Code: | 49E87026 | | | | | | | |
| End Date: | 30 Nov-18 | 1518 | Protocol: | EPA/821/R-02-013 (2002) | Sample Source: | Stormwater | | | | | | | |
| Sample Date: | 21 Nov-18 | | Material: | Stormwater Monitoring Sample | Sample Station: | BC02SAW | | | | | | | |

| Conc-% | Code | Rep | Pos | # Exposed | 1d Survival | 2d Survival | 3d Survival | 4d Survival | 5d Survival | 6d Survival | 7d Survival | Neonates | Male |
|--------|------|-----|-----|-----------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|----------|------|
| 0 | D | 1 | | 1 | 0 | 0 | 0 | 5 | 8 | 0 | 22 | 35 | |
| 0 | D | 2 | | 1 | 0 | 0 | 0 | 4 | 9 | 0 | 19 | 32 | |
| 0 | D | 3 | | 1 | 0 | 0 | 0 | 3 | 9 | 10 | 0 | 22 | |
| 0 | D | 4 | | 1 | 0 | 0 | 0 | 6 | 0 | 13 | 20 | 39 | |
| 0 | D | 5 | | 1 | 0 | 0 | 0 | 4 | 7 | 0 | 13 | 24 | |
| 0 | D | 6 | | 1 | 0 | 0 | 0 | 3 | 11 | 0 | 22 | 36 | |
| 0 | D | 7 | | 1 | 0 | 0 | 0 | 5 | 9 | 20 | 0 | 34 | |
| 0 | D | 8 | | 1 | 0 | 0 | 0 | 5 | 0 | 12 | 16 | 33 | |
| 0 | D | 9 | | 1 | 0 | 0 | 0 | 4 | 10 | 0 | 15 | 29 | |
| 0 | D | 10 | | 1 | 0 | 0 | 0 | 4 | 0 | 15 | 15 | 34 | |
| 100 | | 1 | 19 | 1 | 0 | 0 | 0 | 4 | 7 | 15 | 0 | 26 | |
| 100 | | 2 | 41 | 1 | 0 | 0 | 0 | 1 | 11 | 13 | 0 | 25 | |
| 100 | | 3 | 11 | 1 | 0 | 0 | 0 | 0 | 0 | 11 | 23 | 43 | |
| 100 | | 4 | 38 | 1 | 0 | 0 | 0 | 4 | 0 | 7 | 8 | 19 | |
| 100 | | 5 | 6 | 1 | 0 | 0 | 0 | 0 | 10 | 17 | 0 | 27 | |
| 100 | | 6 | 25 | 1 | 0 | 0 | 0 | 1 | 8 | 18 | 0 | 27 | |
| 100 | | 7 | 26 | 1 | 0 | 0 | 0 | 3 | 0 | 10 | 19 | 32 | |
| 100 | | 8 | 37 | 1 | 0 | 0 | 0 | 1 | 9 | 17 | 0 | 27 | |
| 100 | | 9 | 73 | 1 | 0 | 0 | 0 | 4 | 0 | 13 | 23 | 40 | |
| 100 | | 10 | 60 | 1 | 0 | 0 | 0 | 2 | 9 | 0 | 20 | 31 | |

Shared controls
See 1811072A.C

11/23 11/24 11/25 11/26 11/27 11/28 11/29 11/30

Food Added: 1358 1109 1210 1241 1016 0842 1127
 Transferred: 1404 1228 1242 1308 1157 1031 1241
 End @ 1518

CETIS Measurement Worksheet

Report Date: 21 Nov-18 11:02 (p 1 of 2)
Test Code: 1811072E.C | 13-4165-6350

| Ceriodaphnia 7-d Survival and Reproduction Test | | | | | | Hyperion Treatment Plant Laboratory | | |
|---|--|--|--|---------------------------|--|-------------------------------------|--|--|
| Start Date: 23 Nov-18 | | Species: Ceriodaphnia dubia | | Sample Code: 49E87026 | | | | |
| End Date: 30 Nov-18 | | Protocol: EPA/821/R-02-013 (2002) | | Sample Source: Stormwater | | | | |
| Sample Date: 21 Nov-18 | | Material: Stormwater Monitoring Sample | | Sample Station: BC02SAW | | | | |

| Alkalinity (CaCO3)-mg/L | | | | | | | | |
|-------------------------|------|-----------|---------------------------|--|--|--|--|--|
| Conc.-% | Code | Reading 1 | | | | | | |
| 0 | D | 60 | } see attached worksheet. | | | | | |
| 100 | | 40 | | | | | | |
| Measure Time: | | | | | | | | |
| Instrument ID: | | | | | | | | |
| Analyst: | | | | | | | | |

| Conductivity-µmhos | | | | | | | | |
|--------------------|------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|
| Conc.-% | Code | Reading 1 | Reading 2 | Reading 3 | Reading 4 | Reading 5 | Reading 6 | Reading 7 |
| 0 | D | 302 | 297 | 302 | 305 | 294 | 298 | 303 |
| 100 | | 171 | 161 | 163 | 159 | 165 | 180 | 191 |
| Measure Time: | | 1218 | 1052 | 1145 | 1107 | 1037 | 0925 | 1135 |
| Instrument ID: | | #3 | #3 | #3 | #3 | 3 | 3 | 3 |
| Analyst: | | TC | TC | TC | TC | DL | DL | DL |

| Final Dissolved Oxygen-mg/L | | | | | | | | |
|-----------------------------|------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|
| Conc.-% | Code | Reading 1 | Reading 2 | Reading 3 | Reading 4 | Reading 5 | Reading 6 | Reading 7 |
| 0 | D | 7.61 | 7.73 | 7.73 | 7.43 | 7.82 | 7.52 | 7.60 |
| 100 | | 6.88 | 7.18 | 7.20 | 7.37 | 7.57 | 7.20 | 7.34 |
| Measure Time: | | 1239 | 1314 | 1327 | 1436 | 1036 | 1545 | 1730 |
| Instrument ID: | | #4 | #4 | #4 | 4 | 4 | #4 | #4 |
| Analyst: | | TC | TC | TC | DL | DL | DL | TC |

| Initial Dissolved Oxygen-mg/L | | | | | | | | |
|-------------------------------|------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|
| Conc.-% | Code | Reading 1 | Reading 2 | Reading 3 | Reading 4 | Reading 5 | Reading 6 | Reading 7 |
| 0 | D | 7.43 | 7.60 | 7.68 | 7.80 | 7.78 | 7.75 | 7.92 |
| 100 | | 8.06 | 7.60 | 7.38 | 6.73 | 7.21 | 7.53 | 8.05 |
| Measure Time: | | 1218 | 1052 | 1145 | 1107 | 1037 | 0925 | 1135 |
| Instrument ID: | | #4 | #4 | #4 | #4 | 4 | 4 | 4 |
| Analyst: | | TC | TC | TC | TC | DL | DL | DL |

| Hardness (CaCO3)-mg/L | | | | | | | | |
|-----------------------|------|-----------|---------------------------|--|--|--|--|--|
| Conc.-% | Code | Reading 1 | | | | | | |
| 0 | D | 88 | } see attached worksheet. | | | | | |
| 100 | | 48 | | | | | | |
| Measure Time: | | | | | | | | |
| Instrument ID: | | | | | | | | |
| Analyst: | | | | | | | | |

| Final pH | | | | | | | | |
|----------------|------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|
| Conc.-% | Code | Reading 1 | Reading 2 | Reading 3 | Reading 4 | Reading 5 | Reading 6 | Reading 7 |
| 0 | D | 7.87 | 7.31 | 7.71 | 8.01 | 7.82 | 7.84 | 7.96 |
| 100 | | 7.16 | 6.76 | 7.16 | 7.34 | 7.24 | 7.25 | 7.36 |
| Measure Time: | | 1239 | 1314 | 1327 | 1436 | 1036 | 1545 | 1730 |
| Instrument ID: | | #3 | #3 | #3 | 3 | 3 | #3 | #3 |
| Analyst: | | TC | TC | TC | DL | DL | DL | TC |

CETIS Measurement Worksheet

Report Date: 21 Nov-18 11:02 (p 2 of 2)
Test Code: 1811072E.C | 13-4165-6350

| Ceriodaphnia 7-d Survival and Reproduction Test | | | | | | | | Hyperion Treatment Plant Laboratory |
|---|------|--|-----------|-----------|---------------------------|-----------|-----------|-------------------------------------|
| Start Date: 23 Nov-18 | | Species: Ceriodaphnia dubia | | | Sample Code: 49E87026 | | | |
| End Date: 30 Nov-18 | | Protocol: EPA/821/R-02-013 (2002) | | | Sample Source: Stormwater | | | |
| Sample Date: 21 Nov-18 | | Material: Stormwater Monitoring Sample | | | Sample Station: BC02SAW | | | |
| Initial pH | | | | | | | | |
| Conc.-% | Code | Reading 1 | Reading 2 | Reading 3 | Reading 4 | Reading 5 | Reading 6 | Reading 7 |
| 0 | D | 7.79 | 7.60 | 7.88 | 7.83 | 8.08 | 7.97 | 8.06 |
| 100 | | 7.04 | 6.91 | 6.79 | 6.71 | 6.90 | 6.83 | 6.97 |
| Measure Time: | | 1218 | 1052 | 1145 | 1107 | 1037 | 0925 | 1135 |
| Instrument ID: | | #3 | #3 | #3 | #3 | 3 | 3 | 3 |
| Analyst: | | RC | RC | RC | RC | RL | RL | RL |
| Final Temperature-°C | | | | | | | | |
| Conc.-% | Code | Reading 1 | Reading 2 | Reading 3 | Reading 4 | Reading 5 | Reading 6 | Reading 7 |
| 0 | D | 25.6 | 25.4 | 25.1 | 24.8 | 24.9 | 25.3 | 25.3 |
| 100 | | 25.4 | 25.2 | 25.0 | 25.0 | 25.4 | 24.5 | 24.4 |
| Measure Time: | | 1239 | 1314 | 1327 | 1436 | 1038 | 1545 | 1730 |
| Instrument ID: | | #3 | #3 | #3 | 3 | 3 | #3 | #3 |
| Analyst: | | RC | RC | RC | RL | RL | RL | RC |
| Initial Temperature-°C | | | | | | | | |
| Conc.-% | Code | Reading 1 | Reading 2 | Reading 3 | Reading 4 | Reading 5 | Reading 6 | Reading 7 |
| 0 | D | 25.3 | 25.1 | 25.2 | 24.8 | 24.5 | 24.8 | 25.1 |
| 100 | | 24.5 | 25.1 | 24.8 | 24.7 | 24.1 | 24.6 | 25.0 |
| Measure Time: | | 1218 | 1052 | 1145 | 1107 | 1037 | 0925 | 1135 |
| Instrument ID: | | #3 | #3 | #3 | #3 | 3 | 3 | 3 |
| Analyst: | | RC | RC | RC | RC | RL | RL | RL |

Alkalinity

Date/Time: 2/4/10, 1306Project: MS4 1st Flush CELIOAnalyst: 102Titrant: H₂SO₄Factor: 20 @ 50 ml

| Sample | Sample (ml) Amount | Titrant Amount (ml) | Titrant Amount x Factor (mg CaCO ₃ /L) |
|----------|--------------------------|------------------------|--|
| MH(FW) | 25 | 1.5 | 60 |
| [200] Cu | | 3.1 | 124 |
| TUJ | | 1.2 | 48 |
| WAS | | 2.4 | 96 |
| RHSLA | | 0.6 | 24 |
| DOM | | 0.5 | 20 |
| SMB | | 2.6 | 104 |
| NAT | | 0.9 | 36 |
| SAW | 25 | 1.0 | 40 |
| | | | |
| | | | |
| | | | |

Hardness

Date/Time: 12/4/16, 1308

Project: MJ4 1st Flush

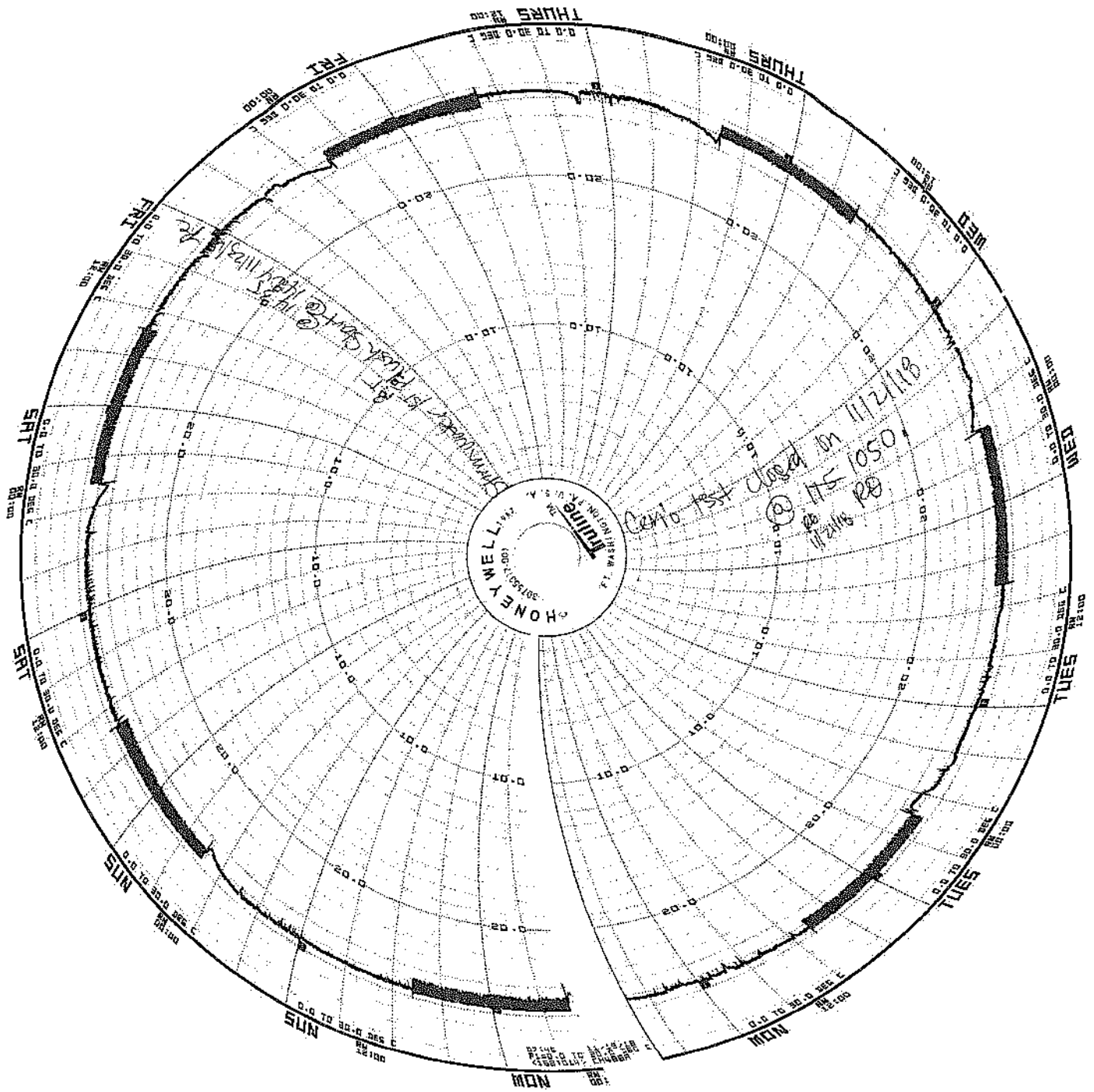
Analyst: RZ

Cent

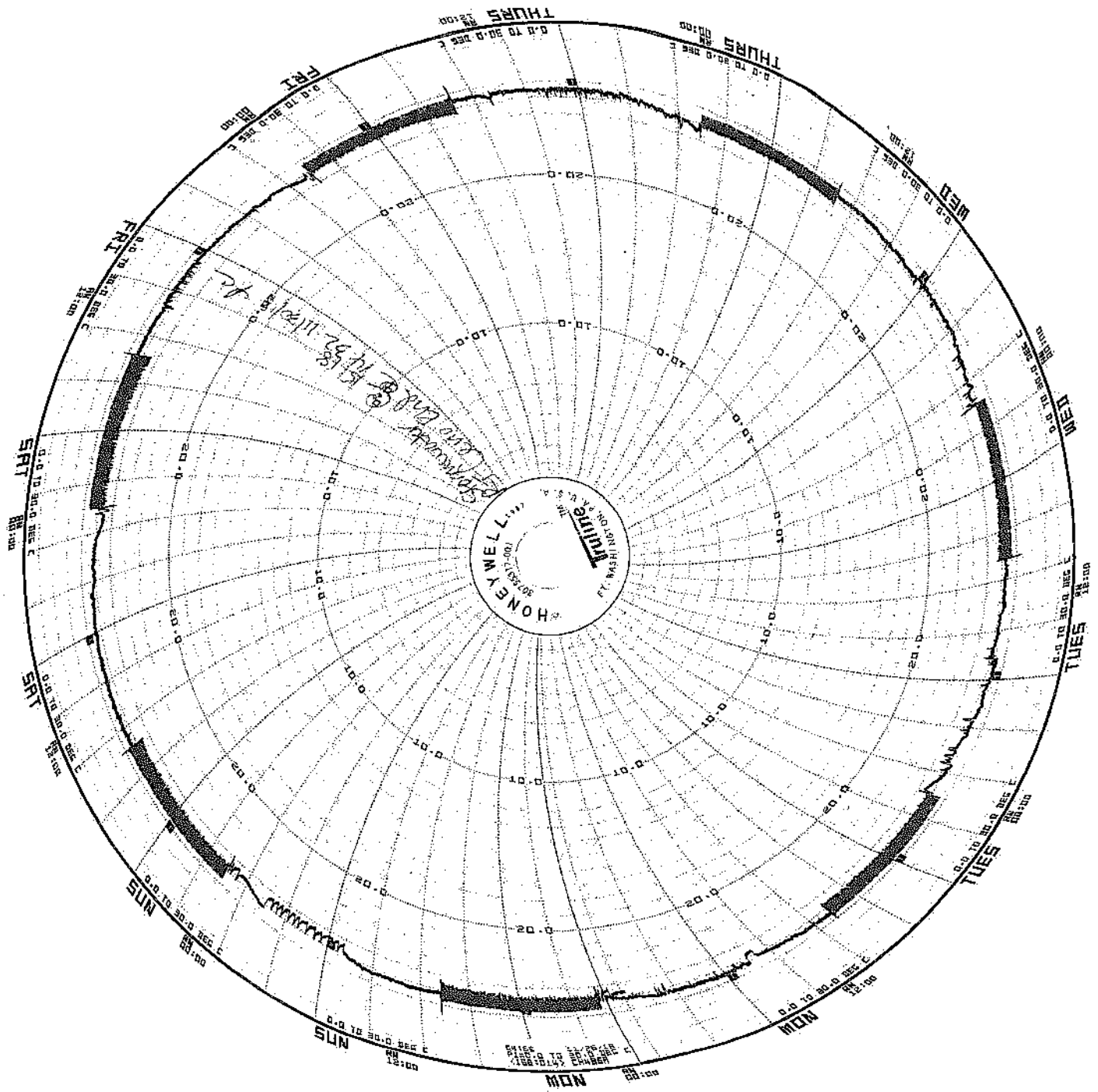
Titant: EDTA

Factor: 20250 mL

| Sample | Sample Amount (mL) | Titant Amount (ml) | Titant Amount x Factor (mg CaCO ₃ /L) |
|----------|--------------------|--------------------|--|
| MJFW | 25 | 2.2 | 48 ^{12/4/16} (88) |
| [200] CH | | 4.5 | 180 |
| TWJ | | 1.7 | 60 |
| INAS | | 3.6 | 144 |
| PHLA | | 0.7 | 28 |
| DOM | | 0.6 | 24 |
| SMB | | 5.6 | 224 |
| NAT | ▽ | 1.2 | 48 |
| SAW | 25 | 1.2 | 48 |
| | | | |
| | | | |
| | | | |



Test: 1811RT2B.C, 1811072A-G.C
 Date: 11/23/18(14:04) - 11/30/18(15:18)



Test: 1811 RT2B.C, 1811072A-G.C
 Date: 11/23/18 (14:04) - 11/30/18 (15:18)

ENVIRONMENTAL MONITORING DIVISION
BUREAU OF SANITATION
CITY OF LOS ANGELES

REFERENCE TOXICANT

TOXICITY TESTING REPORT

SAMPLE DATE: November 23, 2018

TEST DATE: November 23, 2018

TEST NUMBER: 1811RT2B.C

TEST MATERIAL: Copper ($\text{CuCl}_2 \cdot 2\text{H}_2\text{O}$)

TEST SPECIES: *Ceriodaphnia dubia*

PROTOCOL: EPA/821/R-02-013 (2002)

TEST TYPE: Chronic

RESULT:

NOEC = 100 $\mu\text{g/L}$ (Survival)

NOEC = 50 $\mu\text{g/L}$ (Reproduction)

EC₅₀ = 142 $\mu\text{g/L}$ (Survival)

IC₂₅ = 58.8 $\mu\text{g/L}$ (Reproduction)

Rea Mara A Crinklaw

Analyst



Signature

Water Biologist III

Title

11/23/19

Date

Stacey Karnya

Supervisor



Signature

Acting Laboratory Manager I

Title

1-28-19

Date

CETIS Summary Report

Report Date: 27 Dec-18 15:00 (p 1 of 2)
Test Code: 1811RT2B.C | 07-8581-3240

| Ceriodaphnia 7-d Survival and Reproduction Test | | | | | | Hyperion Treatment Plant Laboratory | |
|---|------------------|-----------------|----------------------------|-----------------|------------------------------|-------------------------------------|-----------------------------------|
| Batch ID: | 17-1558-0949 | Test Type: | Reproduction-Survival (7d) | Analyst: | Rea Mara Crinklaw | | |
| Start Date: | 23 Nov-18 14:34 | Protocol: | EPA/821/R-02-013 (2002) | Diluent: | Hard Synthetic Water | | |
| Ending Date: | 30 Nov-18 14:32 | Species: | Ceriodaphnia dubia | Brine: | | | |
| Duration: | 7d | Source: | In-House Culture | Age: | <8h 11/23/18 (09:50 - 13:35) | | |
| Sample ID: | 00-5008-1686 | Code: | Cu RT | Client: | Donald C. Tillman WRP | | |
| Sample Date: | 23 Nov-18 11:35 | Material: | Copper chloride | Project: | NPDES | | |
| Receive Date: | 23 Nov-18 11:35 | Source: | Reference Toxicant | | | | |
| Sample Age: | 3h | Station: | | | | | |
| Sample Renewals | | | | | | | |
| Renewal | Sample Code | Sample Date | Receive Date | Renewal Date | Temp °C | | |
| 1 | Cu RT | 23 Nov-18 11:35 | 23 Nov-18 11:35 | 24 Nov-18 11:24 | | | |
| 2 | Cu RT | 23 Nov-18 11:35 | 23 Nov-18 11:35 | 25 Nov-18 13:00 | | | |
| 3 | Cu RT | 23 Nov-18 11:35 | 23 Nov-18 11:35 | 26 Nov-18 13:23 | | | |
| 4 | Cu RT | 23 Nov-18 11:35 | 23 Nov-18 11:35 | 27 Nov-18 11:25 | | | |
| 5 | Cu RT | 23 Nov-18 11:35 | 23 Nov-18 11:35 | 28 Nov-18 09:22 | | | |
| 6 | Cu RT | 23 Nov-18 11:35 | 23 Nov-18 11:35 | 29 Nov-18 12:15 | | | |
| Batch Note: Insufficient neonate production from the broodboards to use for the test. Neonates from Master Culture Beakers #2 & #4 (11/23/18 9:50 - 13:35) were used. Blocking by known parentage not performed. | | | | | | | |
| Test Note: Concentration-response relationship is all or nothing for survival and ideal for reproduction. | | | | | | | |
| Comparison Summary | | | | | | | |
| Analysis ID | Endpoint | NOEL | LOEL | TOEL | PMSD | TU | Method |
| 10-5688-4561 | 7d Survival Rate | 100 | >100 | N/A | N/A | | Fisher Exact/Bonferroni-Holm Test |
| 05-0217-4531 | Reproduction | 50 | 100 | 70.71 | 22.7% | | Dunnett Multiple Comparison Test |
| Point Estimate Summary | | | | | | | |
| Analysis ID | Endpoint | Level | µg/L | 95% LCL | 95% UCL | TU | Method |
| 03-2855-8063 | 7d Survival Rate | EC5 | 103.5 | 103.5 | 103.5 | | Linear Interpolation (ICPIN) |
| | | EC10 | 107.2 | 107.2 | 107.2 | | |
| | | EC15 | 111 | 111 | 111 | | |
| | | EC20 | 114.9 | 114.9 | 114.9 | | |
| | | EC25 | 119 | 119 | 119 | | |
| | | EC40 | 132 | 132 | 132 | | |
| | | EC50 | 141.5 | 141.5 | 141.5 | | |
| 21-2452-6843 | Reproduction | IC5 | 17.72 | 4.635 | 52.41 | | Linear Interpolation (ICPIN) |
| | | IC10 | 24.95 | 16.27 | 55.18 | | |
| | | IC15 | 52.54 | 20.05 | 58.1 | | |
| | | IC20 | 55.58 | 23.49 | 61.07 | | |
| | | IC25 | 58.79 | 49.13 | 64.29 | | |
| | | IC40 | 69.55 | 60.94 | 75.96 | | |
| | | IC50 | 77.79 | 68.91 | 87.21 | | |
| Test Acceptability | | | | | | | |
| Analysis ID | Endpoint | Attribute | Test Stat | TAC Limits | Overlap | Decision | |
| 03-2855-8063 | 7d Survival Rate | Control Resp | 1 | 0.8 - NL | Yes | Passes Acceptability Criteria | |
| 10-5688-4561 | 7d Survival Rate | Control Resp | 1 | 0.8 - NL | Yes | Passes Acceptability Criteria | |
| 05-0217-4531 | Reproduction | Control Resp | 34.2 | 15 - NL | Yes | Passes Acceptability Criteria | |
| 21-2452-6843 | Reproduction | Control Resp | 34.2 | 15 - NL | Yes | Passes Acceptability Criteria | |
| 05-0217-4531 | Reproduction | PMSD | 0.2269 | 0.13 - 0.47 | Yes | Passes Acceptability Criteria | |

CETIS Summary Report

Report Date: 27 Dec-18 15:00 (p 2 of 2)
Test Code: 1811RT2B.C | 07-8581-3240

| Ceriodaphnia 7-d Survival and Reproduction Test | | | | | | | | Hyperion Treatment Plant Laboratory | | | |
|---|----------------|-------|-------|---------|---------|-------|-------|-------------------------------------|---------|--------|---------|
| 7d Survival Rate Summary: | | | | | | | | | | | |
| Conc-µg/L | Control Type | Count | Mean | 95% LCL | 95% UCL | Min | Max | Std Err | Std Dev | CV% | %Effect |
| 0 | Dilution Water | 10 | 1 | 1 | 1 | 1 | 1 | 0 | 0 | 0.0% | 0.0% |
| 12.5 | | 10 | 1 | 1 | 1 | 1 | 1 | 0 | 0 | 0.0% | 0.0% |
| 25 | | 10 | 1 | 1 | 1 | 1 | 1 | 0 | 0 | 0.0% | 0.0% |
| 50 | | 10 | 1 | 1 | 1 | 1 | 1 | 0 | 0 | 0.0% | 0.0% |
| 100 | | 10 | 1 | 1 | 1 | 1 | 1 | 0 | 0 | 0.0% | 0.0% |
| 200 | | 10 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | 100.0% |
| Reproduction Summary | | | | | | | | | | | |
| Conc-µg/L | Control Type | Count | Mean | 95% LCL | 95% UCL | Min | Max | Std Err | Std Dev | CV% | %Effect |
| 0 | Dilution Water | 10 | 34.2 | 32.23 | 36.17 | 28 | 43 | 1.672 | 5.287 | 15.46% | 0.0% |
| 12.5 | | 10 | 35.6 | 33.51 | 37.69 | 29 | 46 | 1.771 | 5.602 | 15.73% | -4.09% |
| 25 | | 10 | 31.4 | 27.13 | 35.67 | 11 | 42 | 3.612 | 11.42 | 36.38% | 8.19% |
| 50 | | 10 | 31.2 | 28.38 | 34.02 | 20 | 42 | 2.384 | 7.54 | 24.17% | 8.77% |
| 100 | | 10 | 9.6 | 6.755 | 12.44 | 0 | 25 | 2.409 | 7.619 | 79.36% | 71.93% |
| 200 | | 10 | 0.3 | 0.1196 | 0.4804 | 0 | 1 | 0.1528 | 0.483 | 161.0% | 99.12% |
| 7d Survival Rate Detail | | | | | | | | | | | |
| Conc-µg/L | Control Type | Rep 1 | Rep 2 | Rep 3 | Rep 4 | Rep 5 | Rep 6 | Rep 7 | Rep 8 | Rep 9 | Rep 10 |
| 0 | Dilution Water | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| 12.5 | | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| 25 | | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| 50 | | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| 100 | | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| 200 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Reproduction Detail | | | | | | | | | | | |
| Conc-µg/L | Control Type | Rep 1 | Rep 2 | Rep 3 | Rep 4 | Rep 5 | Rep 6 | Rep 7 | Rep 8 | Rep 9 | Rep 10 |
| 0 | Dilution Water | 42 | 35 | 31 | 31 | 43 | 31 | 31 | 39 | 31 | 28 |
| 12.5 | | 38 | 30 | 33 | 46 | 30 | 34 | 42 | 39 | 35 | 29 |
| 25 | | 42 | 40 | 31 | 38 | 38 | 17 | 37 | 41 | 19 | 11 |
| 50 | | 34 | 29 | 42 | 31 | 23 | 39 | 39 | 23 | 32 | 20 |
| 100 | | 13 | 25 | 0 | 2 | 10 | 9 | 14 | 0 | 10 | 13 |
| 200 | | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 1 | 0 |

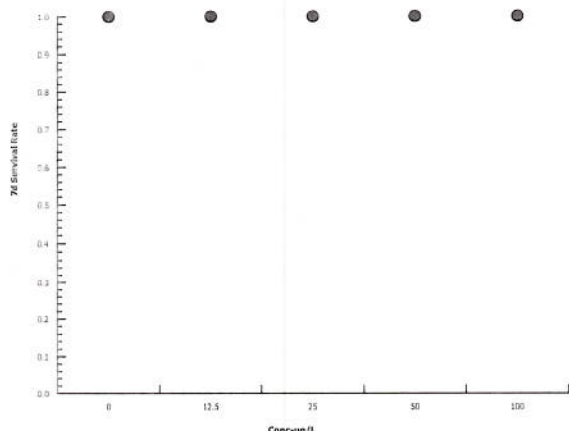
CETIS Analytical Report

Report Date: 27 Dec-18 15:00 (p 1 of 2)
 Test Code: 1811RT2B.C | 07-8581-3240

| Ceriodaphnia 7-d Survival and Reproduction Test | | | | Hyperion Treatment Plant Laboratory | | | | | | | |
|--|---------------------------------------|---------------------------------|-----------|-------------------------------------|------------------------|-------|-------|-------|-------|-------|--------|
| Analysis ID: 10-5688-4561 | Endpoint: 7d Survival Rate | CETIS Version: CETISv1.8.1 | | | | | | | | | |
| Analyzed: 03 Dec-18 9:02 | Analysis: STP 2x2 Contingency Tables | Official Results: Yes | | | | | | | | | |
| Batch ID: 17-1558-0949 | Test Type: Reproduction-Survival (7d) | Analyst: Rea Mara Crinklaw | | | | | | | | | |
| Start Date: 23 Nov-18 14:34 | Protocol: EPA/821/R-02-013 (2002) | Diluent: Hard Synthetic Water | | | | | | | | | |
| Ending Date: 30 Nov-18 14:32 | Species: Ceriodaphnia dubia | Brine: | | | | | | | | | |
| Duration: 7d | Source: In-House Culture | Age: <8h 11/23/18 (09:50-13:35) | | | | | | | | | |
| Sample ID: 00-5008-1686 | Code: Cu RT | Client: Donald C. Tillman WRP | | | | | | | | | |
| Sample Date: 23 Nov-18 11:35 | Material: Copper chloride | Project: NPDES | | | | | | | | | |
| Receive Date: 23 Nov-18 11:35 | Source: Reference Toxicant | | | | | | | | | | |
| Sample Age: 3h | Station: | | | | | | | | | | |
| Batch Note: Insufficient neonate production from the broodboards to use for the test. Neonates from Master Culture Beakers #2 & #4 (11/23/18 9:50 - 13:35) were used. Blocking by known parentage not performed. | | | | | | | | | | | |
| Test Note: Concentration-response relationship is all or nothing for survival and ideal for reproduction. | | | | | | | | | | | |
| Data Transform | Zeta | Alt Hyp | MC Trials | NOEL | LOEL | TOEL | TU | | | | |
| Untransformed | | C > T | Not Run | 100 | >100 | N/A | | | | | |
| Fisher Exact/Bonferroni-Holm Test | | | | | | | | | | | |
| Control | vs | Conc-µg/L | Test Stat | P-Value | Decision(0.05) | | | | | | |
| Dilution Water | | 12.5 | 1 | 1.0000 | Non-Significant Effect | | | | | | |
| | | 25 | 1 | 1.0000 | Non-Significant Effect | | | | | | |
| | | 50 | 1 | 1.0000 | Non-Significant Effect | | | | | | |
| | | 100 | 1 | 1.0000 | Non-Significant Effect | | | | | | |
| Test Acceptability Criteria | | | | | | | | | | | |
| Attribute | Test Stat | TAC Limits | Overlap | Decision | | | | | | | |
| Control Resp | 1 | 0.8 - NL | Yes | Passes Acceptability Criteria | | | | | | | |
| Data Summary | | | | | | | | | | | |
| Conc-µg/L | Control Type | No-Resp | Resp | Total | | | | | | | |
| 0 | Dilution Water | 10 | 0 | 10 | | | | | | | |
| 12.5 | | 10 | 0 | 10 | | | | | | | |
| 25 | | 10 | 0 | 10 | | | | | | | |
| 50 | | 10 | 0 | 10 | | | | | | | |
| 100 | | 10 | 0 | 10 | | | | | | | |
| 7d Survival Rate Detail | | | | | | | | | | | |
| Conc-µg/L | Control Type | Rep 1 | Rep 2 | Rep 3 | Rep 4 | Rep 5 | Rep 6 | Rep 7 | Rep 8 | Rep 9 | Rep 10 |
| 0 | Dilution Water | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| 12.5 | | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| 25 | | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| 50 | | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| 100 | | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |

CETIS Analytical Report

Report Date: 27 Dec-18 15:00 (p 2 of 2)
Test Code: 1811RT2B.C | 07-8581-3240

| Ceriodaphnia 7-d Survival and Reproduction Test | | Hyperion Treatment Plant Laboratory | | | | | | | | | | | | | |
|---|--------------------------------------|-------------------------------------|--|-----------|------------------|---|-----|------|-----|----|-----|----|-----|-----|-----|
| Analysis ID: 10-5688-4561 | Endpoint: 7d Survival Rate | CETIS Version: CETISv1.8.1 | | | | | | | | | | | | | |
| Analyzed: 03 Dec-18 9:02 | Analysis: STP 2x2 Contingency Tables | Official Results: Yes | | | | | | | | | | | | | |
| Graphics | | | | | | | | | | | | | | | |
|  <table><thead><tr><th>Conc-µg/L</th><th>7d Survival Rate</th></tr></thead><tbody><tr><td>0</td><td>1.0</td></tr><tr><td>12.5</td><td>1.0</td></tr><tr><td>25</td><td>1.0</td></tr><tr><td>50</td><td>1.0</td></tr><tr><td>100</td><td>1.0</td></tr></tbody></table> | | | | Conc-µg/L | 7d Survival Rate | 0 | 1.0 | 12.5 | 1.0 | 25 | 1.0 | 50 | 1.0 | 100 | 1.0 |
| Conc-µg/L | 7d Survival Rate | | | | | | | | | | | | | | |
| 0 | 1.0 | | | | | | | | | | | | | | |
| 12.5 | 1.0 | | | | | | | | | | | | | | |
| 25 | 1.0 | | | | | | | | | | | | | | |
| 50 | 1.0 | | | | | | | | | | | | | | |
| 100 | 1.0 | | | | | | | | | | | | | | |

Concentration-response relationship is all or nothing,
12/27/18 *Rc*

CETIS Analytical Report

Report Date: 27 Dec-18 15:00 (p 1 of 2)
Test Code: 1811RT2B.C | 07-8581-3240

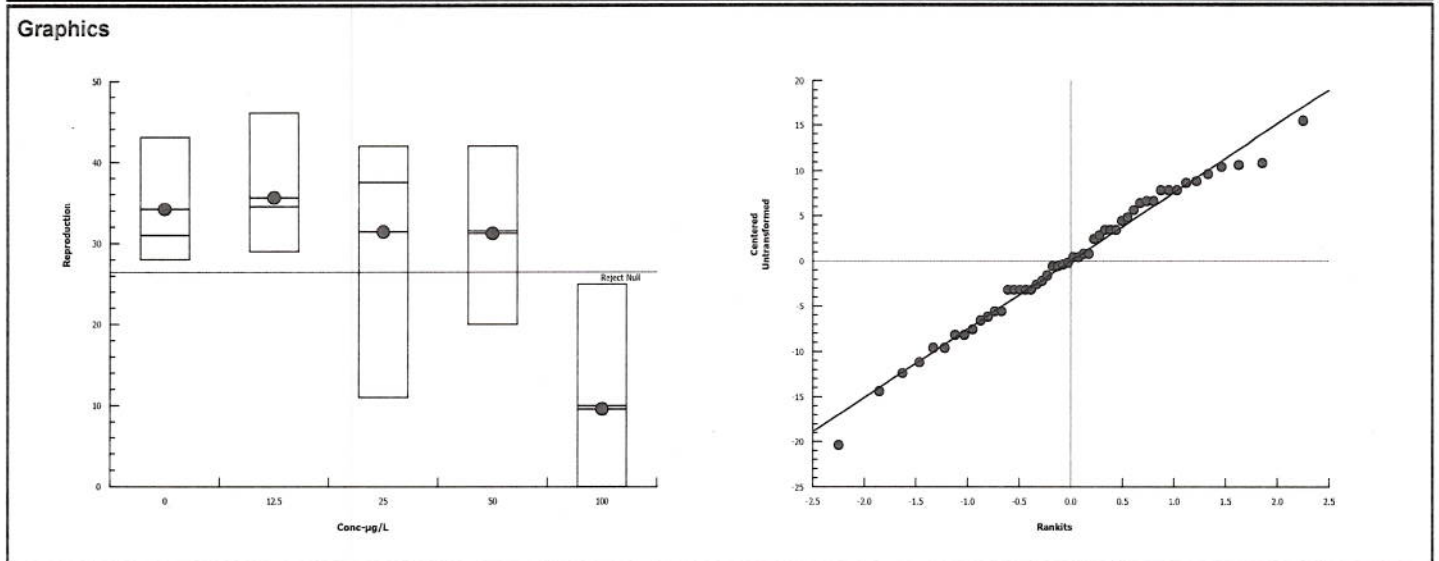
| Ceriodaphnia 7-d Survival and Reproduction Test | | | | | Hyperion Treatment Plant Laboratory | | | | | | | | | | | | | | | | | | | | | | |
|--|-------------------------------|--|-----------|-------------------------------|-------------------------------------|--------------------------|---------|------------------------|---------|----------------|---------|---------|-----------|------|------|------|----|------|---------------|---|-------|---------|----|-----|-------|--|-------|
| Analysis ID: 05-0217-4531 | | Endpoint: Reproduction | | CETIS Version: CETISv1.8.1 | | | | | | | | | | | | | | | | | | | | | | | |
| Analyzed: 03 Dec-18 9:02 | | Analysis: Parametric-Control vs Treatments | | Official Results: Yes | | | | | | | | | | | | | | | | | | | | | | | |
| Batch ID: 17-1558-0949 | | Test Type: Reproduction-Survival (7d) | | Analyst: Rea Mara Crinklaw | | | | | | | | | | | | | | | | | | | | | | | |
| Start Date: 23 Nov-18 14:34 | | Protocol: EPA/821/R-02-013 (2002) | | Diluent: Hard Synthetic Water | | | | | | | | | | | | | | | | | | | | | | | |
| Ending Date: 30 Nov-18 14:32 | | Species: Ceriodaphnia dubia | | Brine: | | | | | | | | | | | | | | | | | | | | | | | |
| Duration: 7d | | Source: In-House Culture | | Age: <8h | | 11/23/18 (09:50 - 13:35) | | | | | | | | | | | | | | | | | | | | | |
| Sample ID: 00-5008-1686 | | Code: Cu RT | | Client: Donald C. Tillman WRP | | | | | | | | | | | | | | | | | | | | | | | |
| Sample Date: 23 Nov-18 11:35 | | Material: Copper chloride | | Project: NPDES | | | | | | | | | | | | | | | | | | | | | | | |
| Receive Date: 23 Nov-18 11:35 | | Source: Reference Toxicant | | | | | | | | | | | | | | | | | | | | | | | | | |
| Sample Age: 3h | | Station: | | | | | | | | | | | | | | | | | | | | | | | | | |
| Batch Note: Insufficient neonate production from the broodboards to use for the test. Neonates from Master Culture Beakers #2 & #4 (11/23/18 9:50 - 13:35) were used. Blocking by known parentage not performed. | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Test Note: Concentration-response relationship is all or nothing for survival and ideal for reproduction. | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| <table border="1" style="width:100%; border-collapse: collapse;"> <thead> <tr> <th>Data Transform</th> <th>Zeta</th> <th>Alt Hyp</th> <th>MC Trials</th> <th>NOEL</th> <th>LOEL</th> <th>TOEL</th> <th>TU</th> <th>PMSD</th> </tr> </thead> <tbody> <tr> <td>Untransformed</td> <td>0</td> <td>C > T</td> <td>Not Run</td> <td>50</td> <td>100</td> <td>70.71</td> <td></td> <td>22.7%</td> </tr> </tbody> </table> | | | | | | | | | | Data Transform | Zeta | Alt Hyp | MC Trials | NOEL | LOEL | TOEL | TU | PMSD | Untransformed | 0 | C > T | Not Run | 50 | 100 | 70.71 | | 22.7% |
| Data Transform | Zeta | Alt Hyp | MC Trials | NOEL | LOEL | TOEL | TU | PMSD | | | | | | | | | | | | | | | | | | | |
| Untransformed | 0 | C > T | Not Run | 50 | 100 | 70.71 | | 22.7% | | | | | | | | | | | | | | | | | | | |
| Dunnett Multiple Comparison Test | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Control | vs | Conc-µg/L | Test Stat | Critical | DF | MSD | P-Value | Decision(α:5%) | | | | | | | | | | | | | | | | | | | |
| Dilution Water | | 12.5 | -0.401 | 2.222 | 18 | 7.759 | 0.9049 | Non-Significant Effect | | | | | | | | | | | | | | | | | | | |
| | | 25 | 0.802 | 2.222 | 18 | 7.759 | 0.4647 | Non-Significant Effect | | | | | | | | | | | | | | | | | | | |
| | | 50 | 0.8593 | 2.222 | 18 | 7.759 | 0.4388 | Non-Significant Effect | | | | | | | | | | | | | | | | | | | |
| | | 100* | 7.046 | 2.222 | 18 | 7.759 | <0.0001 | Significant Effect | | | | | | | | | | | | | | | | | | | |
| Test Acceptability Criteria | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Attribute | Test Stat | TAC Limits | Overlap | Decision | | | | | | | | | | | | | | | | | | | | | | | |
| Control Resp | 34.2 | 15 - NL | Yes | Passes Acceptability Criteria | | | | | | | | | | | | | | | | | | | | | | | |
| PMSD | 0.2269 | 0.13 - 0.47 | Yes | Passes Acceptability Criteria | | | | | | | | | | | | | | | | | | | | | | | |
| Auxiliary Tests | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Attribute | Test | Test Stat | Critical | P-Value | Decision(α:5%) | | | | | | | | | | | | | | | | | | | | | | |
| Extreme Value | 0 | 2.727 | 3.128 | 0.2348 | No Outliers Detected | | | | | | | | | | | | | | | | | | | | | | |
| ANOVA Table | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Source | Sum Squares | Mean Square | DF | F Stat | P-Value | Decision(α:5%) | | | | | | | | | | | | | | | | | | | | | |
| Between | 4557.6 | 1139.4 | 4 | 18.7 | <0.0001 | Significant Effect | | | | | | | | | | | | | | | | | | | | | |
| Error | 2742.4 | 60.94222 | 45 | | | | | | | | | | | | | | | | | | | | | | | | |
| Total | 7300 | 1200.342 | 49 | | | | | | | | | | | | | | | | | | | | | | | | |
| Distributional Tests | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Attribute | Test | Test Stat | Critical | P-Value | Decision(α:1%) | | | | | | | | | | | | | | | | | | | | | | |
| Variances | Bartlett Equality of Variance | 6.894 | 13.28 | 0.1416 | Equal Variances | | | | | | | | | | | | | | | | | | | | | | |
| Distribution | Shapiro-Wilk W Normality | 0.9849 | 0.9367 | 0.7664 | Normal Distribution | | | | | | | | | | | | | | | | | | | | | | |
| Reproduction Summary | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Conc-µg/L | Control Type | Count | Mean | 95% LCL | 95% UCL | Min | Max | Std Err | Std Dev | CV% | %Effect | | | | | | | | | | | | | | | | |
| 0 | Dilution Water | 10 | 34.2 | 32.19 | 36.21 | 28 | 43 | 1.672 | 5.287 | 15.46% | 0.0% | | | | | | | | | | | | | | | | |
| 12.5 | | 10 | 35.6 | 33.47 | 37.73 | 29 | 46 | 1.771 | 5.602 | 15.73% | -4.09% | | | | | | | | | | | | | | | | |
| 25 | | 10 | 31.4 | 27.05 | 35.75 | 11 | 42 | 3.612 | 11.42 | 36.38% | 8.19% | | | | | | | | | | | | | | | | |
| 50 | | 10 | 31.2 | 28.33 | 34.07 | 20 | 42 | 2.384 | 7.54 | 24.17% | 8.77% | | | | | | | | | | | | | | | | |
| 100 | | 10 | 9.6 | 6.702 | 12.5 | 0 | 25 | 2.409 | 7.619 | 79.36% | 71.93% | | | | | | | | | | | | | | | | |

CETIS Analytical Report

Report Date: 27 Dec-18 15:00 (p 2 of 2)
 Test Code: 1811RT2B.C | 07-8581-3240

| Ceriodaphnia 7-d Survival and Reproduction Test | | | | | Hyperion Treatment Plant Laboratory | |
|---|----------------|-----------|----------------------------------|-------------------|-------------------------------------|--|
| Analysis ID: | 05-0217-4531 | Endpoint: | Reproduction | CETIS Version: | CETISv1.8.1 | |
| Analyzed: | 03 Dec-18 9:02 | Analysis: | Parametric-Control vs Treatments | Official Results: | Yes | |

| Reproduction Detail | | | | | | | | | | | |
|---------------------|----------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|--------|
| Conc-µg/L | Control Type | Rep 1 | Rep 2 | Rep 3 | Rep 4 | Rep 5 | Rep 6 | Rep 7 | Rep 8 | Rep 9 | Rep 10 |
| 0 | Dilution Water | 42 | 35 | 31 | 31 | 43 | 31 | 31 | 39 | 31 | 28 |
| 12.5 | | 38 | 30 | 33 | 46 | 30 | 34 | 42 | 39 | 35 | 29 |
| 25 | | 42 | 40 | 31 | 38 | 38 | 17 | 37 | 41 | 19 | 11 |
| 50 | | 34 | 29 | 42 | 31 | 23 | 39 | 39 | 23 | 32 | 20 |
| 100 | | 13 | 25 | 0 | 2 | 10 | 9 | 14 | 0 | 10 | 13 |



Concentration-response relationship is ideal. 12/27/18 Re

CETIS Analytical Report

Report Date: 27 Dec-18 15:00 (p 1 of 4)

Test Code: 1811RT2B.C | 07-8581-3240

| Ceriodaphnia 7-d Survival and Reproduction Test | | | | | Hyperion Treatment Plant Laboratory | | | | | | |
|--|----------------|--|-----------|---------------------------------|-------------------------------------|---------|---------|-------|---------|-------|--------|
| Analysis ID: 03-2855-8063 | | Endpoint: 7d Survival Rate | | CETIS Version: CETISv1.8.1 | | | | | | | |
| Analyzed: 03 Dec-18 9:02 | | Analysis: Linear Interpolation (ICPIN) | | Official Results: Yes | | | | | | | |
| Batch ID: 17-1558-0949 | | Test Type: Reproduction-Survival (7d) | | Analyst: Rea Mara Crinklaw | | | | | | | |
| Start Date: 23 Nov-18 14:34 | | Protocol: EPA/821/R-02-013 (2002) | | Diluent: Hard Synthetic Water | | | | | | | |
| Ending Date: 30 Nov-18 14:32 | | Species: Ceriodaphnia dubia | | Brine: | | | | | | | |
| Duration: 7d | | Source: In-House Culture | | Age: <8h 11/23/18 (09:50-13:35) | | | | | | | |
| Sample ID: 00-5008-1686 | | Code: Cu RT | | Client: Donald C. Tillman WRP | | | | | | | |
| Sample Date: 23 Nov-18 11:35 | | Material: Copper chloride | | Project: NPDES | | | | | | | |
| Receive Date: 23 Nov-18 11:35 | | Source: Reference Toxicant | | | | | | | | | |
| Sample Age: 3h | | Station: | | | | | | | | | |
| Batch Note: Insufficient neonate production from the broodboards to use for the test. Neonates from Master Culture Beakers #2 & #4 (11/23/18 9:50 - 13:35) were used. Blocking by known parentage not performed. | | | | | | | | | | | |
| Test Note: Concentration-response relationship is all or nothing for survival and ideal for reproduction. | | | | | | | | | | | |
| Linear Interpolation Options | | | | | | | | | | | |
| X Transform | Y Transform | Seed | Resamples | Exp 95% CL | Method | | | | | | |
| Log(X+1) | Linear | 265187057 | 200 | Yes | Two-Point Interpolation | | | | | | |
| Test Acceptability Criteria | | | | | | | | | | | |
| Attribute | Test Stat | TAC Limits | Overlap | Decision | | | | | | | |
| Control Resp | 1 | 0.8 - NL | Yes | Passes Acceptability Criteria | | | | | | | |
| Point Estimates | | | | | | | | | | | |
| Level | µg/L | 95% LCL | 95% UCL | | | | | | | | |
| EC5 | 103.5 | 103.5 | 103.5 | | | | | | | | |
| EC10 | 107.2 | 107.2 | 107.2 | | | | | | | | |
| EC15 | 111 | 111 | 111 | | | | | | | | |
| EC20 | 114.9 | 114.9 | 114.9 | | | | | | | | |
| EC25 | 119 | 119 | 119 | | | | | | | | |
| EC40 | 132 | 132 | 132 | | | | | | | | |
| EC50 | 141.5 | 141.5 | 141.5 | | | | | | | | |
| 7d Survival Rate Summary | | | | | | | | | | | |
| | | Calculated Variate(A/B) | | | | | | | | | |
| Conc-µg/L | Control Type | Count | Mean | Min | Max | Std Err | Std Dev | CV% | %Effect | A | B |
| 0 | Dilution Water | 10 | 1 | 1 | 1 | 0 | 0 | 0.0% | 0.0% | 10 | 10 |
| 12.5 | | 10 | 1 | 1 | 1 | 0 | 0 | 0.0% | 0.0% | 10 | 10 |
| 25 | | 10 | 1 | 1 | 1 | 0 | 0 | 0.0% | 0.0% | 10 | 10 |
| 50 | | 10 | 1 | 1 | 1 | 0 | 0 | 0.0% | 0.0% | 10 | 10 |
| 100 | | 10 | 1 | 1 | 1 | 0 | 0 | 0.0% | 0.0% | 10 | 10 |
| 200 | | 10 | 0 | 0 | 0 | 0 | 0 | | 100.0% | 0 | 10 |
| 7d Survival Rate Detail | | | | | | | | | | | |
| Conc-µg/L | Control Type | Rep 1 | Rep 2 | Rep 3 | Rep 4 | Rep 5 | Rep 6 | Rep 7 | Rep 8 | Rep 9 | Rep 10 |
| 0 | Dilution Water | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| 12.5 | | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| 25 | | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| 50 | | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| 100 | | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| 200 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

CETIS Analytical Report

Report Date: 27 Dec-18 15:00 (p 2 of 4)
 Test Code: 1811RT2B.C | 07-8581-3240

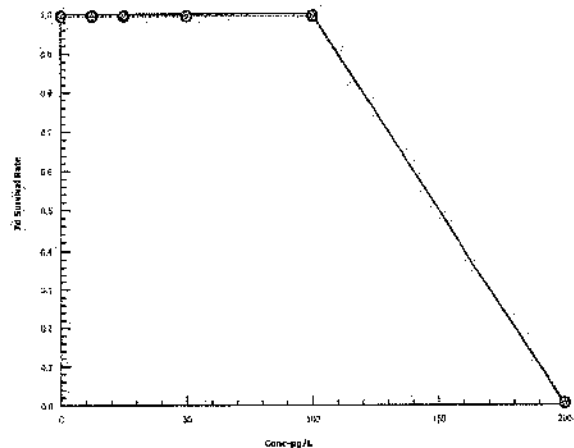
Ceriodaphnia 7-d Survival and Reproduction Test

Hyperion Treatment Plant Laboratory

Analysis ID: 03-2855-8063 Endpoint: 7d Survival Rate
 Analyzed: 03 Dec-18 9:02 Analysis: Linear Interpolation (ICPIN)

CETIS Version: CETISv1.8.1
 Official Results: Yes

Graphics



CETIS Analytical Report

Report Date: 27 Dec-18 15:00 (p 3 of 4)
Test Code: 1811RT2B.C | 07-8581-3240

| Ceriodaphnia 7-d Survival and Reproduction Test | | | | | | Hyperion Treatment Plant Laboratory | | | | | |
|--|----------------------|--|-----------|---------------------------------|-------------------------|-------------------------------------|---------|--------|---------|-------|--------|
| Analysis ID: 21-2452-6843 | | Endpoint: Reproduction | | CETIS Version: CETISv1.8.1 | | | | | | | |
| Analyzed: 03 Dec-18 9:02 | | Analysis: Linear Interpolation (ICPIN) | | Official Results: Yes | | | | | | | |
| Batch ID: 17-1558-0949 | | Test Type: Reproduction-Survival (7d) | | Analyst: Rea Mara Crinklaw | | | | | | | |
| Start Date: 23 Nov-18 14:34 | | Protocol: EPA/821/R-02-013 (2002) | | Diluent: Hard Synthetic Water | | | | | | | |
| Ending Date: 30 Nov-18 14:32 | | Species: Ceriodaphnia dubia | | Brine: | | | | | | | |
| Duration: 7d | | Source: In-House Culture | | Age: <8h 11/23/18 (09:50-13:35) | | | | | | | |
| Sample ID: 00-5008-1686 | | Code: Cu RT | | Client: Donald C. Tillman WRP | | | | | | | |
| Sample Date: 23 Nov-18 11:35 | | Material: Copper chloride | | Project: NPDES | | | | | | | |
| Receive Date: 23 Nov-18 11:35 | | Source: Reference Toxicant | | | | | | | | | |
| Sample Age: 3h | | Station: | | | | | | | | | |
| Batch Note: Insufficient neonate production from the broodboards to use for the test. Neonates from Master Culture Beakers #2 & #4 (11/23/18 9:50 - 13:35) were used. Blocking by known parentage not performed. | | | | | | | | | | | |
| Test Note: Concentration-response relationship is all or nothing for survival and ideal for reproduction. | | | | | | | | | | | |
| Linear Interpolation Options | | | | | | | | | | | |
| X Transform | Y Transform | Seed | Resamples | Exp 95% CL | Method | | | | | | |
| Log(X+1) | Linear | 1.536E+09 | 200 | Yes | Two-Point Interpolation | | | | | | |
| Test Acceptability Criteria | | | | | | | | | | | |
| Attribute | Test Stat | TAC Limits | Overlap | Decision | | | | | | | |
| Control Resp | 34.2 | 15 - NL | Yes | Passes Acceptability Criteria | | | | | | | |
| Residual Analysis | | | | | | | | | | | |
| Attribute | Method | Test Stat | Critical | P-Value | Decision(α:5%) | | | | | | |
| Extreme Value | Grubbs Extreme Value | 2.991 | 3.2 | 0.1148 | No Outliers Detected | | | | | | |
| Point Estimates | | | | | | | | | | | |
| Level | µg/L | 95% LCL | 95% UCL | | | | | | | | |
| IC5 | 17.72 | 4.635 | 52.41 | | | | | | | | |
| IC10 | 24.95 | 16.27 | 55.18 | | | | | | | | |
| IC15 | 52.54 | 20.05 | 58.1 | | | | | | | | |
| IC20 | 55.58 | 23.49 | 61.07 | | | | | | | | |
| IC25 | 58.79 | 49.13 | 64.29 | | | | | | | | |
| IC40 | 69.55 | 60.94 | 75.96 | | | | | | | | |
| IC50 | 77.79 | 68.91 | 87.21 | | | | | | | | |
| Reproduction Summary | | | | | | | | | | | |
| | | Calculated Variate | | | | | | | | | |
| Conc-µg/L | Control Type | Count | Mean | Min | Max | Std Err | Std Dev | CV% | %Effect | | |
| 0 | Dilution Water | 10 | 34.2 | 28 | 43 | 1.672 | 5.287 | 15.46% | 0.0% | | |
| 12.5 | | 10 | 35.6 | 29 | 46 | 1.771 | 5.602 | 15.73% | -4.09% | | |
| 25 | | 10 | 31.4 | 11 | 42 | 3.612 | 11.42 | 36.38% | 8.19% | | |
| 50 | | 10 | 31.2 | 20 | 42 | 2.384 | 7.54 | 24.17% | 8.77% | | |
| 100 | | 10 | 9.6 | 0 | 25 | 2.409 | 7.619 | 79.36% | 71.93% | | |
| 200 | | 10 | 0.3 | 0 | 1 | 0.1528 | 0.483 | 161.0% | 99.12% | | |
| Reproduction Detail | | | | | | | | | | | |
| Conc-µg/L | Control Type | Rep 1 | Rep 2 | Rep 3 | Rep 4 | Rep 5 | Rep 6 | Rep 7 | Rep 8 | Rep 9 | Rep 10 |
| 0 | Dilution Water | 42 | 35 | 31 | 31 | 43 | 31 | 31 | 39 | 31 | 28 |
| 12.5 | | 38 | 30 | 33 | 46 | 30 | 34 | 42 | 39 | 35 | 29 |
| 25 | | 42 | 40 | 31 | 38 | 38 | 17 | 37 | 41 | 19 | 11 |
| 50 | | 34 | 29 | 42 | 31 | 23 | 39 | 39 | 23 | 32 | 20 |
| 100 | | 13 | 25 | 0 | 2 | 10 | 9 | 14 | 0 | 10 | 13 |
| 200 | | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 1 | 0 |

CETIS Analytical Report

Report Date: 27 Dec-18 15:00 (p 4 of 4)
Test Code: 1811RT2B.C | 07-8581-3240

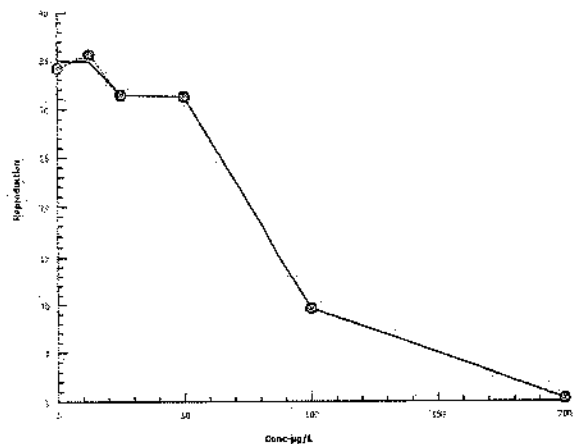
Ceriodaphnia 7-d Survival and Reproduction Test

Hyperion Treatment Plant Laboratory

Analysis ID: 21-2452-6843 Endpoint: Reproduction
Analyzed: 03 Dec-18 9:02 Analysis: Linear Interpolation (ICPIN)

CETIS Version: CETISv1.8.1
Official Results: Yes

Graphics



Ceriodaphnia 7-d Survival and Reproduction Test

Hyperion Treatment Plant Laboratory

Test Type: Reproduction-Survival (7d)

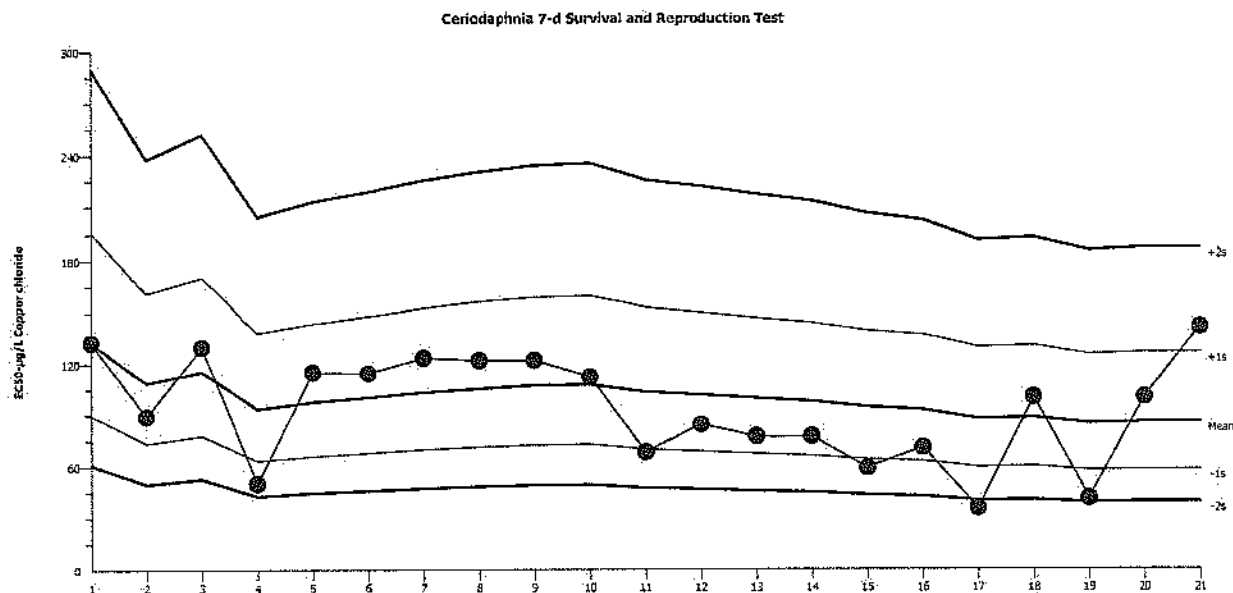
Organism: Ceriodaphnia dubia (Water Flea)

Material: Copper chloride

Protocol: EPA/821/R-02-013 (2002)

Endpoint: 7d Survival Rate

Source: Reference Toxicant-REF



Mean: 85.46

Count: 20

-1s Warning Limit: 57.8

-2s Action Limit: 39.1

Sigma: N/A

CV: 47.80%

+1s Warning Limit: 126.3

+2s Action Limit: 186.7

Quality Control Data

| Point | Year | Month | Day | QC Data | Delta | Sigma | Warning | Action | Test ID | Analysis ID |
|-------|------|-------|-----|---------|--------|----------|---------|--------|--------------|--------------|
| 1 | 2017 | Jul | 27 | 132.6 | 47.12 | 1.124 | (+) | | 00-3533-4104 | 07-3102-4627 |
| 2 | | Aug | 9 | 89.13 | 3.673 | 0.1077 | | | 05-1646-5416 | 02-7143-5836 |
| 3 | | | 23 | 129.7 | 44.28 | 1.068 | (+) | | 18-0928-7994 | 14-9065-9379 |
| 4 | | Sep | 6 | 50 | -35.46 | -1.371 | (-) | | 04-1283-5528 | 07-2201-0667 |
| 5 | | | 20 | 114.9 | 29.45 | 0.7577 | | | 09-2547-5700 | 02-6449-6736 |
| 6 | | Oct | 18 | 114.5 | 29.01 | 0.7478 | | | 14-7896-4665 | 17-5474-2245 |
| 7 | | Nov | 15 | 123.5 | 38.01 | 0.9416 | | | 09-2671-6353 | 07-5336-3496 |
| 8 | | Dec | 13 | 121.9 | 36.49 | 0.9099 | | | 19-3949-3034 | 10-6518-1710 |
| 9 | 2018 | Jan | 4 | 121.9 | 36.49 | 0.9099 | | | 17-7500-8361 | 05-5922-1635 |
| 10 | | Feb | 7 | 112.3 | 26.82 | 0.6984 | | | 04-8492-7543 | 17-6325-1645 |
| 11 | | Mar | 2 | 68.1 | -17.36 | -0.581 | | | 11-4862-8707 | 06-1686-5917 |
| 12 | | | 15 | 84.14 | -1.316 | -0.03971 | | | 20-9677-0547 | 14-4393-4243 |
| 13 | | Apr | 19 | 77.17 | -8.286 | -0.261 | | | 18-2737-1194 | 07-4972-9760 |
| 14 | | May | 16 | 77.17 | -8.286 | -0.261 | | | 05-4955-8978 | 09-0510-7297 |
| 15 | | Jun | 13 | 58.82 | -26.64 | -0.956 | | | 16-1570-3305 | 01-3881-0040 |
| 16 | | Jul | 12 | 70.77 | -14.69 | -0.4825 | | | 05-0138-0333 | 09-5921-7712 |
| 17 | | Aug | 22 | 35.41 | -50.04 | -2.254 | (-) | (-) | 11-5251-4189 | 02-6103-0961 |
| 18 | | Sep | 12 | 100 | 14.54 | 0.4022 | | | 10-4359-2259 | 02-9718-5741 |
| 19 | | Oct | 17 | 41.07 | -44.39 | -1.875 | (-) | | 09-6713-5129 | 03-7900-4433 |
| 20 | | Nov | 14 | 100 | 14.54 | 0.4022 | | | 16-4205-8005 | 13-0463-7350 |
| 21 | | | 23 | 141.5 | 56.03 | 1.29 | (+) | | 07-8581-3240 | 03-2855-8063 |

Ceriodaphnia 7-d Survival and Reproduction Test

Hyperion Treatment Plant Laboratory

Test Type: Reproduction-Survival (7d)

Organism: Ceriodaphnia dubia (Water Flea)

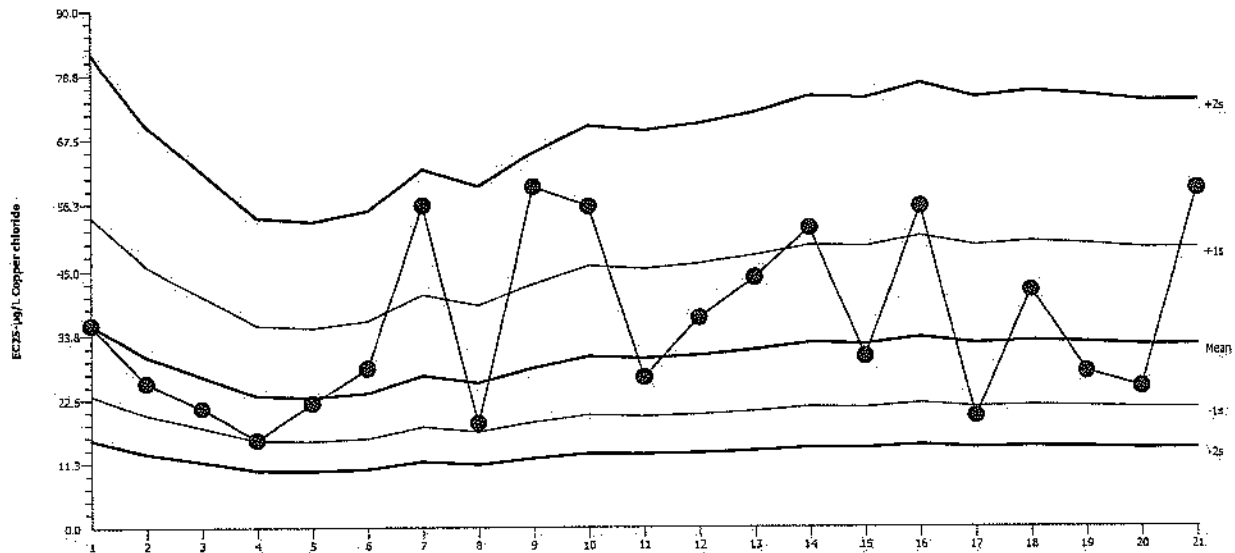
Material: Copper chloride

Protocol: EPA/821/R-02-013 (2002)

Endpoint: Reproduction

Source: Reference Toxicant-REF

Ceriodaphnia 7-d Survival and Reproduction Test



Mean: 31.88

Count: 20

-1s Warning Limit: 20.92

-2s Action Limit: 13.72

Sigma: N/A

CV: 52.50%

+1s Warning Limit: 48.63

+2s Action Limit: 74.15

Quality Control Data

| Point | Year | Month | Day | QC Data | Delta | Sigma | Warning | Action | Test ID | Analysis ID |
|-------|------|-------|-----|---------|--------|---------|---------|--------|--------------|--------------|
| 1 | 2017 | Jul | 27 | 35.41 | 3.534 | 0.2492 | | | 00-3533-4104 | 15-5816-8081 |
| 2 | | Aug | 9 | 25.45 | -6.433 | -0.5343 | | | 05-1646-5416 | 12-8828-7274 |
| 3 | | | 23 | 20.93 | -10.95 | -0.9974 | | | 18-0928-7994 | 01-4455-3838 |
| 4 | | Sep | 6 | 15.28 | -16.6 | -1.744 | (-) | | 04-1283-5528 | 07-4663-1403 |
| 5 | | | 20 | 21.83 | -10.05 | -0.898 | | | 09-2547-5700 | 05-2225-6686 |
| 6 | | Oct | 18 | 27.98 | -3.902 | -0.3095 | | | 14-7896-4665 | 10-2719-4408 |
| 7 | | Nov | 15 | 55.96 | 24.08 | 1.334 | (+) | | 09-2671-6353 | 12-1707-6477 |
| 8 | | Dec | 13 | 18.28 | -13.6 | -1.318 | (-) | | 19-3949-3034 | 15-1089-9957 |
| 9 | 2018 | Jan | 4 | 59.22 | 27.34 | 1.468 | (+) | | 17-7500-8361 | 03-9405-5395 |
| 10 | | Feb | 7 | 55.8 | 23.92 | 1.327 | (+) | | 04-8492-7543 | 19-3721-5481 |
| 11 | | Mar | 2 | 26.44 | -5.437 | -0.4433 | | | 11-4862-8707 | 08-2696-1620 |
| 12 | | | 15 | 36.61 | 4.733 | 0.3282 | | | 20-9677-0547 | 09-0026-7515 |
| 13 | | Apr | 19 | 43.76 | 11.88 | 0.751 | | | 18-2737-1194 | 03-8342-1801 |
| 14 | | May | 16 | 51.99 | 20.11 | 1.159 | (+) | | 05-4955-8978 | 05-0129-1380 |
| 15 | | Jun | 13 | 29.96 | -1.92 | -0.1473 | | | 16-1570-3305 | 06-3152-2418 |
| 16 | | Jul | 12 | 55.75 | 23.87 | 1.325 | (+) | | 05-0138-0333 | 18-3627-7518 |
| 17 | | Aug | 22 | 19.4 | -12.48 | -1.178 | (-) | | 11-5251-4189 | 07-5888-1093 |
| 18 | | Sep | 12 | 41.54 | 9.659 | 0.6275 | | | 10-4359-2259 | 01-2617-3703 |
| 19 | | Oct | 17 | 27.3 | -4.578 | -0.3675 | | | 09-6713-5129 | 11-3265-6236 |
| 20 | | Nov | 14 | 24.67 | -7.213 | -0.6081 | | | 16-4205-8005 | 10-8446-2066 |
| 21 | | | 23 | 58.79 | 26.91 | 1.451 | (+) | | 07-8581-3240 | 21-2452-6843 |

CETIS Test Data Worksheet

Report Date:

22 Nov-18 14:13 (p 1 of 2)

Test Code:

07-8581-3240/1811RT2B.C

Ceriodaphnia 7-d Survival and Reproduction Test MC #29#4 → 11/23/18 Hyperion Treatment Plant Laboratory

Start Date: 23 Nov-18 1435 Species: Ceriodaphnia dubia (9:50-13:35) Sample Code: 2FC2F96

End Date: 30 Nov-18 1432 Protocol: EPA/821/R-02-013 (2002) Sample Source: Reference Toxicant

Sample Date: 23 Nov-18 1135 Material: Copper chloride Sample Station:

| Conc-µg/L | Code | Rep | Pos | # Exposed | 1d Survival | 2d Survival | 3d Survival | 4d Survival | 5d Survival | 6d Survival | 7d Survival | Neonates | Male |
|-----------|------|-----|-----|-----------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|----------|------|
| 0 | D | 1 | 1 | 1 | 0 | 0 | 0 | 6 | 0 | 13 | 23 | 42 | |
| 0 | D | 2 | 12 | 1 | 0 | 0 | 0 | 4 | 10 | 21 | 0 | 35 | |
| 0 | D | 3 | 15 | 1 | 0 | 0 | 0 | 5 | 0 | 10 | 16 | 31 | |
| 0 | D | 4 | 8 | 1 | 0 | 0 | 0 | 4 | 10 | 0 | 17 | 31 | |
| 0 | D | 5 | 5 | 1 | 0 | 0 | 0 | 6 | 0 | 13 | 24 | 43 | |
| 0 | D | 6 | 25 | 1 | 0 | 0 | 0 | 4 | 9 | 0 | 18 | 31 | |
| 0 | D | 7 | 16 | 1 | 0 | 0 | 0 | 3 | 9 | 0 | 19 | 31 | |
| 0 | D | 8 | 42 | 1 | 0 | 0 | 0 | 6 | 0 | 18 | 18 | 39 | |
| 0 | D | 9 | 32 | 1 | 0 | 0 | 0 | 5 | 0 | 18 | 16 | 31 | |
| 0 | D | 10 | 22 | 1 | 0 | 0 | 0 | 4 | 7 | 18 | 17 | 28 | |
| 12.5 | | 1 | 21 | 1 | 0 | 0 | 0 | 4 | 0 | 11 | 21 | 38 | |
| 12.5 | | 2 | 55 | 1 | 0 | 0 | 0 | 4 | 0 | 11 | 15 | 30 | |
| 12.5 | | 3 | 41 | 1 | 0 | 0 | 0 | 3 | 0 | 11 | 16 | 33 | |
| 12.5 | | 4 | 44 | 1 | 0 | 0 | 0 | 6 | 0 | 11 | 24 | 46 | |
| 12.5 | | 5 | 33 | 1 | 0 | 0 | 0 | 0 | 6 | 11 | 6 | 30 | |
| 12.5 | | 6 | 18 | 1 | 0 | 0 | 0 | 4 | 0 | 11 | 20 | 34 | |
| 12.5 | | 7 | 24 | 1 | 0 | 0 | 0 | 7 | 0 | 11 | 20 | 42 | |
| 12.5 | | 8 | 37 | 1 | 0 | 0 | 0 | 6 | 0 | 11 | 20 | 39 | |
| 12.5 | | 9 | 20 | 1 | 0 | 0 | 0 | 5 | 0 | 11 | 17 | 35 | |
| 12.5 | | 10 | 10 | 1 | 0 | 0 | 0 | 4 | 9 | 11 | 16 | 29 | |
| 25 | | 1 | 50 | 1 | 0 | 0 | 0 | 5 | 0 | 14 | 23 | 42 | |
| 25 | | 2 | 47 | 1 | 0 | 0 | 0 | 5 | 0 | 15 | 20 | 40 | |
| 25 | | 3 | 30 | 1 | 0 | 0 | 0 | 4 | 0 | 15 | 17 | 31 | |
| 25 | | 4 | 58 | 1 | 0 | 0 | 0 | 5 | 12 | 14 | 21 | 38 | |
| 25 | | 5 | 39 | 1 | 0 | 0 | 0 | 5 | 0 | 14 | 19 | 38 | |
| 25 | | 6 | 46 | 1 | 0 | 0 | 0 | 4 | 0 | 14 | 12 | 17 | |
| 25 | | 7 | 14 | 1 | 0 | 0 | 0 | 5 | 12 | 14 | 20 | 37 | |
| 25 | | 8 | 3 | 1 | 0 | 0 | 0 | 5 | 0 | 12 | 24 | 41 | |
| 25 | | 9 | 27 | 1 | 0 | 0 | 0 | 1 | 0 | 14 | 14 | 19 | |
| 25 | | 10 | 26 | 1 | 0 | 0 | 0 | 0 | 6 | 14 | 1 | 11 | |
| 50 | | 1 | 56 | 1 | 0 | 0 | 0 | 4 | 0 | 14 | 19 | 34 | |
| 50 | | 2 | 9 | 1 | 0 | 0 | 0 | 3 | 9 | 15 | 17 | 29 | |
| 50 | | 3 | 45 | 1 | 0 | 0 | 0 | 0 | 7 | 15 | 20 | 42 | |
| 50 | | 4 | 29 | 1 | 0 | 0 | 0 | 5 | 0 | 15 | 15 | 31 | |
| 50 | | 5 | 60 | 1 | 0 | 0 | 0 | 0 | 4 | 18 | 11 | 23 | |
| 50 | | 6 | 11 | 1 | 0 | 0 | 0 | 0 | 0 | 12 | 19 | 39 | |
| 50 | | 7 | 40 | 1 | 0 | 0 | 0 | 6 | 0 | 13 | 20 | 39 | |
| 50 | | 8 | 17 | 1 | 0 | 0 | 0 | 5 | 0 | 9 | 9 | 23 | |
| 50 | | 9 | 19 | 1 | 0 | 0 | 0 | 4 | 0 | 0 | 20 | 32 | |
| 50 | | 10 | 4 | 1 | 0 | 0 | 0 | 6 | 0 | 0 | 8 | 20 | |
| 100 | | 1 | 52 | 1 | 0 | 0 | 0 | 5 | 0 | 0 | 0 | 13 | |
| 100 | | 2 | 43 | 1 | 0 | 0 | 0 | 5 | 0 | 0 | 11 | 25 | |
| 100 | | 3 | 53 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | |
| 100 | | 4 | 6 | 1 | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 2 | |
| 100 | | 5 | 31 | 1 | 0 | 0 | 0 | 4 | 0 | 0 | 0 | 10 | |
| 100 | | 6 | 2 | 1 | 0 | 0 | 0 | 5 | 2 | 0 | 0 | 9 | |
| 100 | | 7 | 23 | 1 | 0 | 0 | 0 | 6 | 2 | 0 | 0 | 14 | |

CETIS Test Data Worksheet

Report Date:

22 Nov-18 14:13 (p 2 of 2)

Test Code:

07-8581-3240/1811RT2B.C

| Conc-µg/L | Code | Rep | Pos | # Exposed | 1d Survival | 2d Survival | 3d Survival | 4d Survival | 5d Survival | 6d Survival | 7d Survival | Neonates | Male |
|-----------|------|-----|-----|-----------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|----------|------|
| 100 | | 8 | 13 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | |
| 100 | | 9 | 38 | 1 | 0 | 0 | 0 | 3 | 0 | 4 | 3 | 10 | |
| 100 | | 10 | 48 | 1 | 0 | 0 | 0 | 3 | 10 | 0 | 0 | 13 | |
| 200 | | 1 | 59 | 1 | 0 | 0X | X | X | X | X | X | 0 | |
| 200 | | 2 | 35 | 1 | 0 | 0X | 0 | 0X | X | X | X | 0 | |
| 200 | | 3 | 57 | 1 | 0 | 0 | 0X | X | X | X | X | 0 | |
| 200 | | 4 | 36 | 1 | 0 | 0X | X | X | X | X | X | 0 | |
| 200 | | 5 | 28 | 1 | 0 | 0 | 0X | X | X | X | X | 0 | |
| 200 | | 6 | 49 | 1 | 0 | 0 | 0 | 0 | 1 | 0X | X | 1 | |
| 200 | | 7 | 54 | 1 | 0 | 0 | 0 | 0X | X | X | X | 0 | |
| 200 | | 8 | 34 | 1 | 0 | 0 | 0 | 0 | 1 | 0X | X | 1 | |
| 200 | | 9 | 7 | 1 | 0 | 0 | 0 | 0 | 0 | 1X | X | 1 | |
| 200 | | 10 | 51 | 1 | 0 | 0 | 0 | 0 | 0 | 0X | X | 0 | |

11/23 11/24 11/25 11/26 11/27 11/28 11/29 11/30

Food Added: 1358 1109 1210 1241 1018 0842 1127 1430 11/30/18
 Fe Fe Fe Fe DL DL DL @ 1430 1432
 Transferred: 1435 1124 1300 1323 1125 0927 1215
 Fe Fe Fe Fe DL DL DL

Re

Re

CETIS Measurement Worksheet

Report Date: 22 Nov-18 14:13 (p 1 of 2)
Test Code: 1811RT2B.C | 07-8581-3240

Ceriodaphnia 7-d Survival and Reproduction Test

Hyperion Treatment Plant Laboratory

Start Date: 23 Nov-18 Species: Ceriodaphnia dubia Sample Code: 2FC2F96
End Date: 30 Nov-18 Protocol: EPA/821/R-02-013 (2002) Sample Source: Reference Toxicant
Sample Date: 23 Nov-18 Material: Copper chloride Sample Station:

Alkalinity (CaCO₃)-mg/L

| Conc-µg/L | Code | Reading 1 |
|----------------|------|-----------|
| 0 | D | 120 |
| 200 | | 124 |
| Measure Time: | | |
| Instrument ID: | | |
| Analyst: | | |

see Reconstituted Water Prep. Logbook (11/21/18 AS)
see attached worksheet

Conductivity-µmhos

| Conc-µg/L | Code | Reading 1 | Reading 2 | Reading 3 | Reading 4 | Reading 5 | Reading 6 | Reading 7 |
|----------------|------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|
| 0 | D | 579 | 556 | 557 | 543 | 579 | 579 | 580 |
| 12.5 | | 589 | 564 | 563 | 560 | 565 | 593 | 589 |
| 25 | | 591 | 563 | 564 | 560 | 561 | 536 | 519 |
| 50 | | 590 | 562 | 563 | 561 | 540 | 589 | 477 |
| 100 | | 591 | 561 | 563 | 560 | 534 | 575 | 548 |
| 200 | | 582 | 553 | 545 | 553 | 491 | 378 | 575 |
| Measure Time: | | 1218 | 1100 | 1140 | 1130 | 1024 | 0847 | 1130 |
| Instrument ID: | | #3 | #3 | #3 | #3 | 2 | 2 | 2 |
| Analyst: | | RC | RC | RC | RC | RL | RL | RL |

11-28-18 102
565

Final Dissolved Oxygen-mg/L

| Conc-µg/L | Code | Reading 1 | Reading 2 | Reading 3 | Reading 4 | Reading 5 | Reading 6 | Reading 7 |
|----------------|------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|
| 0 | D | 7.43 | 7.57 | 7.66 | 7.48 | 7.99 | 7.42 | 7.64 |
| 12.5 | | 7.52 | 7.66 | 7.74 | 7.59 | 7.93 | 7.46 | 7.61 |
| 25 | | 7.59 | 7.62 | 7.85 | 7.63 | 7.86 | 7.51 | 7.59 |
| 50 | | 7.58 | 7.45 | 7.79 | 7.70 | 7.83 | 7.49 | 7.61 |
| 100 | | 7.54 | 7.85 | 7.85 | 7.73 | 7.75 | 7.51 | 7.69 |
| 200 | | 7.42 | 7.49 | 8.03 | 7.80 | 7.78 | 7.52 | — |
| Measure Time: | | 1232 | 1218 | 1330 | 1432 | 1034 | 1540 | 1725 |
| Instrument ID: | | #4 | #4 | #4 | 4 | 4 | #4 | #4 |
| Analyst: | | RC | RC | RC | RL | RL | RC | RC |

Initial Dissolved Oxygen-mg/L

| Conc-µg/L | Code | Reading 1 | Reading 2 | Reading 3 | Reading 4 | Reading 5 | Reading 6 | Reading 7 |
|----------------|------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|
| 0 | D | 7.57 | 7.61 | 7.78 | 7.75 | 8.01 | 7.99 | 7.88 |
| 12.5 | | 7.66 | 7.66 | 7.71 | 7.89 | 8.05 | 7.99 | 7.92 |
| 25 | | 7.62 | 7.62 | 7.70 | 7.88 | 8.00 | 8.03 | 7.94 |
| 50 | | 7.65 | 7.59 | 7.71 | 7.91 | 8.02 | 8.00 | 7.93 |
| 100 | | 7.55 | 7.57 | 7.74 | 7.94 | 8.00 | 8.04 | 7.94 |
| 200 | | 7.49 | 7.53 | 7.81 | 7.91 | 7.98 | 8.02 | 7.97 |
| Measure Time: | | 1218 | 1100 | 1140 | 1130 | 1024 | 0847 | 1130 |
| Instrument ID: | | #4 | #4 | #4 | #4 | 4 | 4 | 4 |
| Analyst: | | RC | RC | RC | RC | RL | RL | RL |

Hardness (CaCO₃)-mg/L

| Conc-µg/L | Code | Reading 1 |
|----------------|------|-----------|
| 0 | D | 172 |
| 200 | | 180 |
| Measure Time: | | |
| Instrument ID: | | |
| Analyst: | | |

see Reconstituted Water Prep. Logbook (11/21/18 AS)
see attached worksheet

CETIS Measurement Worksheet

Report Date: 22 Nov-18 14:13 (p 2 of 2)
Test Code: 1811RT2B.C | 07-8581-3240

| Ceriodaphnia 7-d Survival and Reproduction Test | | | | | | | | Hyperion Treatment Plant Laboratory |
|---|--|-----------------------------------|--|--|-----------------------------------|--|--|-------------------------------------|
| Start Date: 23 Nov-18 | | Species: Ceriodaphnia dubia | | | Sample Code: 2FC2F96 | | | |
| End Date: 30 Nov-18 | | Protocol: EPA/821/R-02-013 (2002) | | | Sample Source: Reference Toxicant | | | |
| Sample Date: 23 Nov-18 | | Material: Copper chloride | | | Sample Station: | | | |

| Final pH | | | | | | | | |
|----------------|------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|
| Conc-µg/L | Code | Reading 1 | Reading 2 | Reading 3 | Reading 4 | Reading 5 | Reading 6 | Reading 7 |
| 0 | D | 8.13 | 7.81 | 8.15 | 8.27 | 8.18 | 8.08 | 8.37 |
| 12.5 | | 8.22 | 7.89 | 8.19 | 8.26 | 8.16 | 8.08 | 8.32 |
| 25 | | 8.21 | 7.90 | 8.16 | 8.25 | 8.12 | 8.09 | 8.28 |
| 50 | | 8.18 | 7.88 | 8.13 | 8.24 | 8.15 | 8.08 | 8.28 |
| 100 | | 8.19 | 7.92 | 8.17 | 8.22 | 8.11 | 8.09 | 8.31 |
| 200 | | 8.14 | 7.94 | 8.19 | 8.27 | 8.13 | 8.09 | — |
| Measure Time: | | 1232 | 1330 | 1343 | 1432 | 1034 | 1540 | 1725 |
| Instrument ID: | | #3 | #3 | #3 | 3 | 3 | #3 | #3 |
| Analyst: | | Rc | Rc | Rc | Rc | Rc | Rc | Rc |

| Initial pH | | | | | | | | |
|----------------|------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|
| Conc-µg/L | Code | Reading 1 | Reading 2 | Reading 3 | Reading 4 | Reading 5 | Reading 6 | Reading 7 |
| 0 | D | 8.05 | 7.84 | 8.00 | 8.03 | 8.13 | 8.07 | 8.12 |
| 12.5 | | 8.10 | 7.87 | 8.04 | 8.11 | 8.13 | 8.08 | 8.12 |
| 25 | | 8.11 | 7.90 | 8.07 | 8.13 | 8.13 | 8.07 | 8.13 |
| 50 | | 8.13 | 7.92 | 8.06 | 8.15 | 8.14 | 8.08 | 8.13 |
| 100 | | 8.14 | 7.93 | 8.07 | 8.15 | 8.13 | 8.08 | 8.14 |
| 200 | | 8.14 | 7.94 | 8.06 | 8.14 | 8.13 | 8.07 | 8.13 |
| Measure Time: | | 1218 | 1100 | 1140 | 1130 | 1024 | 0847 | 1130 |
| Instrument ID: | | #3 | #3 | #3 | #3 | 3 | 3 | 3 |
| Analyst: | | Rc | Rc | Rc | Rc | Rc | Rc | Rc |

| Final Temperature-°C | | | | | | | | |
|----------------------|------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|
| Conc-µg/L | Code | Reading 1 | Reading 2 | Reading 3 | Reading 4 | Reading 5 | Reading 6 | Reading 7 |
| 0 | D | 25.5 | 25.7 | 25.4 | 25.1 | 24.3 | 25.3 | 25.2 |
| 12.5 | | 25.4 | 25.7 | 25.2 | 25.0 | 24.7 | 25.1 | 25.0 |
| 25 | | 25.3 | 25.5 | 25.1 | 25.0 | 24.7 | 25.0 | 24.9 |
| 50 | | 25.3 | 25.5 | 25.1 | 24.9 | 24.9 | 24.9 | 24.9 |
| 100 | | 25.2 | 25.5 | 25.1 | 25.1 | 24.9 | 24.8 | 24.7 |
| 200 | | 25.1 | 25.6 | 25.0 | 25.0 | 24.9 | 24.5 | — |
| Measure Time: | | 1232 | 1330 | 1343 | 1432 | 1034 | 1540 | 1725 |
| Instrument ID: | | #3 | #3 | #3 | 3 | 3 | #3 | #3 |
| Analyst: | | Rc | Rc | Rc | Rc | Rc | Rc | Rc |

| Initial Temperature-°C | | | | | | | | |
|------------------------|------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|
| Conc-µg/L | Code | Reading 1 | Reading 2 | Reading 3 | Reading 4 | Reading 5 | Reading 6 | Reading 7 |
| 0 | D | 25.2 | 25.1 | 25.2 | 24.9 | 24.3 | 25.1 | 25.4 |
| 12.5 | | 25.7 | 25.9 | 24.9 | 24.8 | 24.5 | 24.9 | 25.2 |
| 25 | | 25.8 | 25.9 | 24.8 | 24.5 | 24.4 | 24.9 | 25.1 |
| 50 | | 25.7 | 25.8 | 24.7 | 24.5 | 24.5 | 24.8 | 25.1 |
| 100 | | 25.6 | 25.5 | 24.6 | 24.8 | 24.4 | 24.7 | 25.0 |
| 200 | | 25.5 | 25.3 | 24.7 | 24.5 | 24.3 | 24.6 | 24.8 |
| Measure Time: | | 1218 | 1100 | 1140 | 1130 | 1024 | 0847 | 1130 |
| Instrument ID: | | #3 | #3 | #3 | #3 | 3 | 3 | 3 |
| Analyst: | | Rc | Rc | Rc | Rc | Rc | Rc | Rc |

Alkalinity

Date/Time: 2/4/10, 1300Project: MS4 1st Flush CelioAnalyst: 102Titrant: H₂SO₄Factor: 20 @ 50 mL

| Sample | Sample (mL) Amount | Titrant Amount (mL) | Titrant Amount x Factor (mg CaCO ₃ /L) |
|----------|--------------------------|------------------------|--|
| MTHSPW | 25 | 1.5 | 60 |
| [200] Cu | | 3.1 | 124 |
| THJ | | 1.2 | 48 |
| WAS | | 2.4 | 96 |
| R#5 LA | | 0.6 | 24 |
| DOM | | 0.5 | 20 |
| SMB | | 2.6 | 104 |
| NAT | | 0.9 | 36 |
| SAW | 25 | 1.0 | 40 |
| | | | |
| | | | |
| | | | |

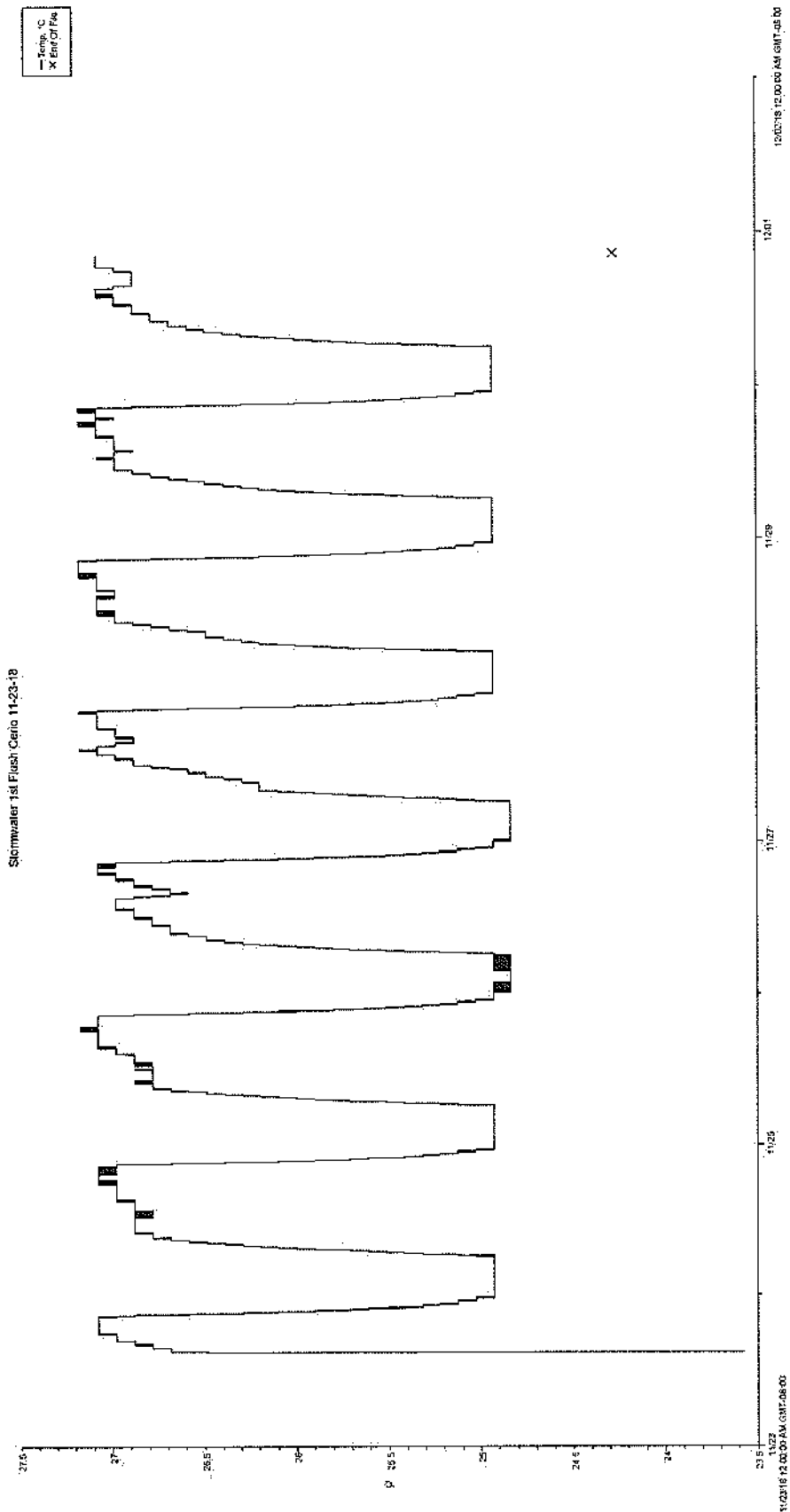
Hardness

Date/Time: 12/4/18, 1300Project: M54 1st FlushAnalyst: RL

Certo

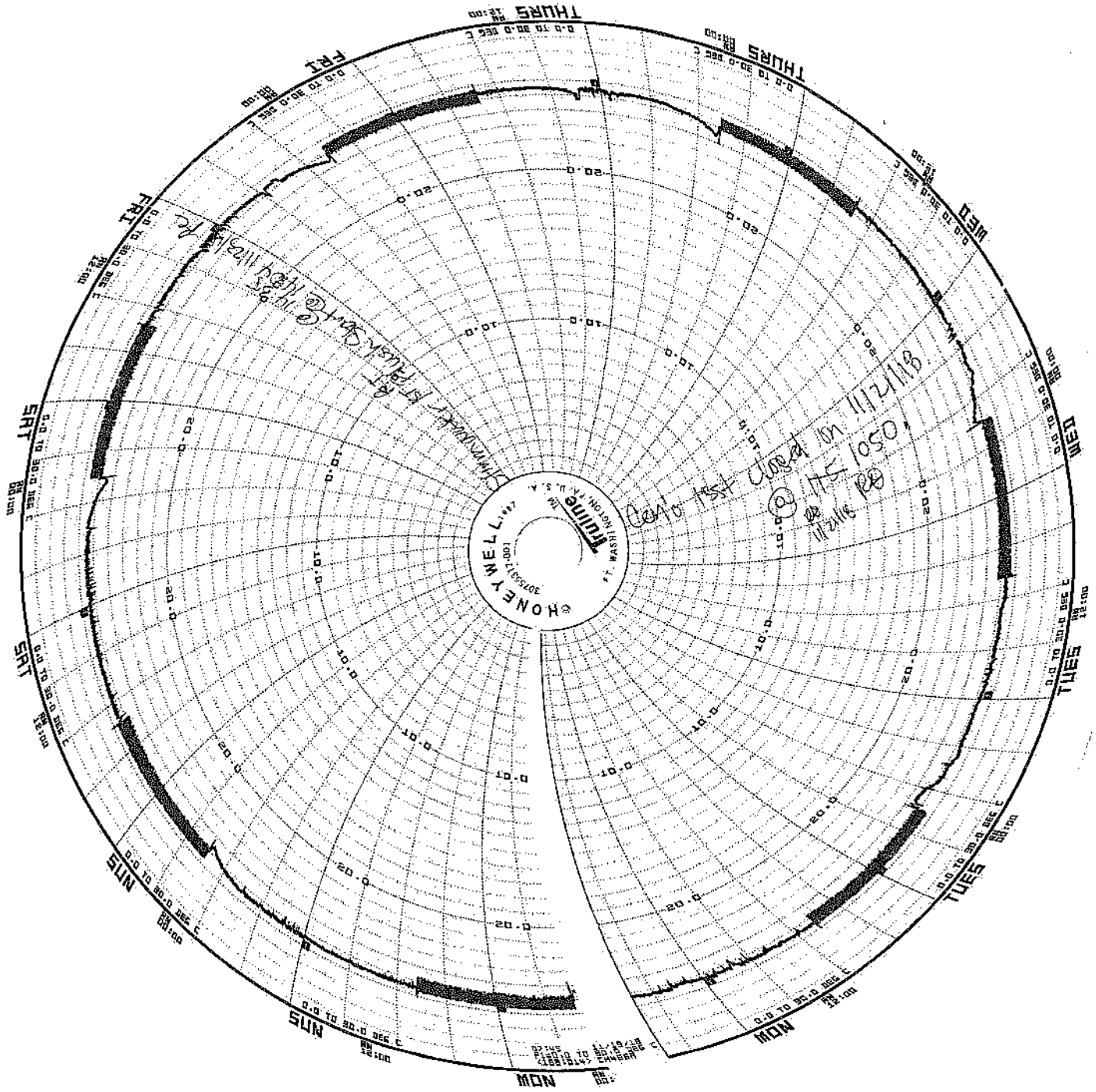
Titrant: EDTAFactor: 20050 mL

| Sample | Sample Amount (mL) | Titrant Amount (mL) | Titrant Amount x Factor (mg CaCO ₃ /L) |
|----------|--------------------|---------------------|---|
| MFW | 25 | 2.2 | 48 ^{RL 12/4/18} (88) |
| [200] CU | 1 | 4.5 | 180 |
| TWJ | 1 | 1.7 | 60 |
| WAS | 1 | 3.6 | 144 |
| PLSLA | 1 | 0.7 | 20 |
| DOM | 1 | 0.6 | 24 |
| SMB | 1 | 5.6 | 224 |
| NAT | 1 | 1.2 | 48 |
| SAW | 25 | 1.2 | 48 |
| | | | |
| | | | |
| | | | |

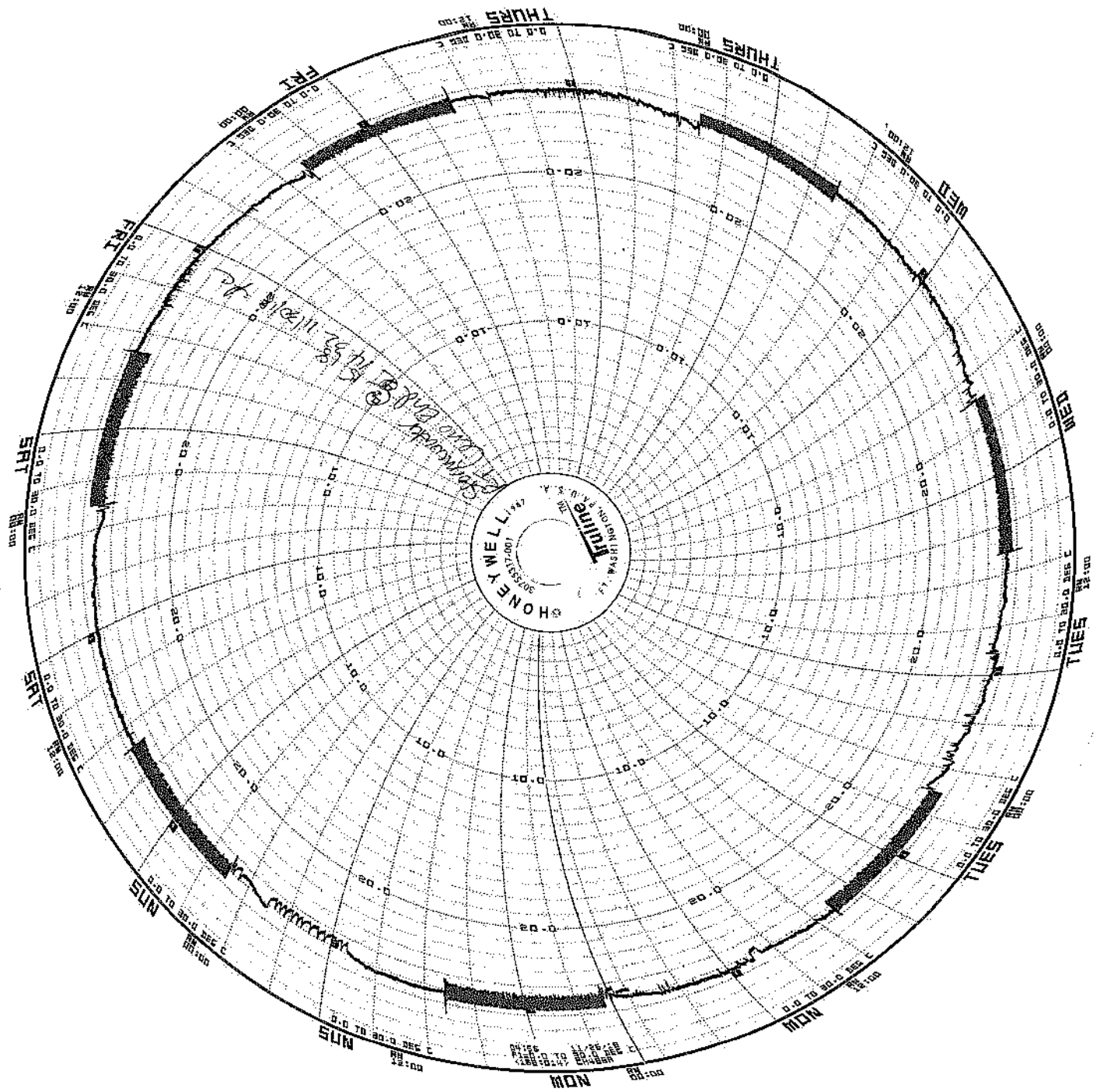


Test: 1811RT28.C, 1811072A.C - G.C

Date: 11/23/18(14:04) - 11/30/18(15:18)



Test: 1811RT2B.C, 1811072A-G.C
 Date: 11/23/18(14:04) - 11/30/18(15:18)



Test: 1811 RTZB.C, 1811072A-G.C
 Date: 11/23/18 (14:04) - 11/30/18 (15:18)