

Tiana Toups (adpce.ad)

From: Gregory Becker <gbecker@bentonutilities.com>
Sent: Tuesday, June 6, 2023 4:47 PM
To: Juarez, Paul (he/him/his)
Cc: Herrera, Esteban; Alan York (adpce.ad); Todd Pedersen
Subject: RE: Notice of Potential Violation and Opportunity to Confer- Benton Utilities AR0036498
Attachments: Bio1stQtr-1st Retest 2020.pdf; Bio1stQtr-2nd Retest 2020.pdf; Bio4thQtr-1st Retest 2020.pdf; Bio4thQtr-2nd Retest 2020.pdf; Bio4thQtr-3rd Retest 2020.pdf; Bio1stQtr-1st Retest 2021.pdf; Bio1stQtr-2nd Retest 2021.pdf; AR0036498_City of Benton.pdf; AR0036498_City of Benton - Old.pdf

Hello Mr. Juarez,

Attached are the retest results for the Whole Effluent Toxicity (WET) tests reported by the Benton Utilities WWTP (AR0036498) on 3/31/2020, 12/31/2020, and 3/31/2021 DMR's.

Attachments:

DMR - Reported 3/31/2020

- Bio1stQtr-1st Retest 2020
- Bio2ndQtr-2nd Retest 2020

DMR - Reported 12/31/2020

- Bio4thQtr-1st Retest 2020
- Bio4thQtr-2nd Retest 2020
- Bio4thQtr-3rd Retest 2020

DMR - Reported 3/31/2021

- Bio1stQtr-1st Retest 2021
- Bio1stQtr-2nd Retest 2021

I have also attached copies of the current NPDES permit (AR0036498_City of Benton)(Effective Date: 4/1/2021) as well as the previous expired NPDES permit (AR0036498_City of Benton – Old)(Effective Date: 4/1/2021 – 3/30/2021).

Please let me know if you have any questions or need any additional information.

Sincerely,

Gregory Becker

Wastewater Treatment

Benton Utilities

616 West Hazel

Benton, AR 72015

Phone: 501-776-5982

Cell: 479-459-8560

gbecker@bentonutilities.com

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From: Juarez, Paul (he/him/his)
Sent: Thursday, June 1, 2023 11:49 AM
To: Todd Pedersen
Cc: Herrera, Esteban ; Alan York (adpce.ad) ; Gregory Becker
Subject: RE: Notice of Potential Violation and Opportunity to Confer- Benton Utilities AR0036498

Yes, I will send out an invitation to the meeting.

Paul Juarez (R6 ECD-WA)
Water Enforcement Branch
U.S. EPA Region 6
1201 Elm Street, Suite 500
Dallas, TX 75270-2102
ph. 214-665-7247
juarez.paul@epa.gov



From: Todd Pedersen <tpedersen@bentonutilities.com>
Sent: Thursday, June 1, 2023 11:33 AM
To: Juarez, Paul (he/him/his) <Juarez.Paul@epa.gov>
Cc: Herrera, Esteban <Herrera.Esteban@epa.gov>; Alan York (adpce.ad) <alan.york@adeq.state.ar.us>; Gregory Becker <gbecker@bentonutilities.com>
Subject: RE: Notice of Potential Violation and Opportunity to Confer- Benton Utilities AR0036498

Tuesday June 6th at 10:00 am works for me. Will you be sending a meeting invite out?

Todd Pedersen, General Manager
Benton Utilities
Office: (501) 776-5984

From: Juarez, Paul (he/him/his) <Juarez.Paul@epa.gov>
Sent: Thursday, June 1, 2023 9:29 AM
To: Todd Pedersen <tpedersen@bentonutilities.com>
Cc: Herrera, Esteban <Herrera.Esteban@epa.gov>; Alan York (adpce.ad) <alan.york@adeq.state.ar.us>; Gregory Becker <gbecker@bentonutilities.com>
Subject: RE: Notice of Potential Violation and Opportunity to Confer- Benton Utilities AR0036498

Good morning Mr. Pedersen-

Thank you for reaching out. Unfortunately I will be out this afternoon and all day June 2nd.

Could we do June 5th or 6th? My schedule is wide open.

How does Tuesday at 10am June 6th work for you?

We use Microsoft TEAMS for our conference calls.

Hopefully, that would be sufficient for you and your staff. We look forward to hearing back from you.

Paul Juarez (R6 ECD-WA)

Water Enforcement Branch

U.S. EPA Region 6

1201 Elm Street, Suite 500

Dallas, TX 75270-2102

ph. 214-665-7247

juarez.paul@epa.gov



From: Todd Pedersen <tpedersen@bentonutilities.com>

Sent: Thursday, June 1, 2023 9:23 AM

To: Juarez, Paul (he/him/his) <Juarez.Paul@epa.gov>

Cc: Herrera, Esteban <Herrera.Esteban@epa.gov>; Alan York (adpce.ad) <alan.york@adeq.state.ar.us>; Gregory Becker <gbecker@bentonutilities.com>

Subject: RE: Notice of Potential Violation and Opportunity to Confer- Benton Utilities AR0036498

Paul we would like to setup a time to discuss these violations. Benton is available at anytime on the following dates: June 2nd, June 5th, and June 6th.

Todd Pedersen, General Manager

Benton Utilities

Office: (501) 776-5984

From: Juarez, Paul (he/him/his) <Juarez.Paul@epa.gov>

Sent: Tuesday, May 30, 2023 2:04 PM

To: Todd Pedersen <tpedersen@bentonutilities.com>

Cc: Herrera, Esteban <Herrera.Esteban@epa.gov>; Alan York (adpce.ad) <alan.york@adeq.state.ar.us>

Subject: Notice of Potential Violation and Opportunity to Confer- Benton Utilities AR0036498

Paul Juarez (R6 ECD-WA)

Water Enforcement Branch

U.S. EPA Region 6
1201 Elm Street, Suite 500
Dallas, TX 75270-2102
ph. 214-665-7247
juarez.paul@epa.gov



Benton Wastewater Treatment
Plant Effluent Limitations
NPDES Permit

Arkansas Department of
Environmental Quality (ADEQ)

NPDES Permit Number
AR0036498

Permit

Effective Date October 1, 2008

Expiration Date September 30, 2013

ADEQ

ARKANSAS
Department of Environmental Quality

September 30, 2008

CERTIFIED MAIL RETURN RECEIPT REQUESTED: (7006 3450 0003 4073 7852)

Terry McClennahan
City of Benton
614 W. Hazel
Benton, AR 72015

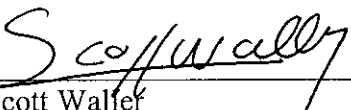
RE: NPDES Permit Number AR0036498

Dear Mr. McClennahan:

This Certificate of Service constitutes notice of the Department's final permit decision and a copy of the final permit is enclosed.

The applicant, and any other person submitting written comments during the comment period, and any other person entitled to do so, may request an adjudicatory hearing and Commission review on whether the decision of the Department should be revised or modified. Such a request shall be in the form and manner required by Department Regulation No. 8.

I, Scott Waller, hereby certify that a copy of this permit has been mailed by first class mail to Terry McClennahan at 614 W. Hazel in Benton, AR 72015 on September 30, 2008.



Scott Waller
Administrative Assistant, Water Division

**AUTHORIZATION TO DISCHARGE WASTEWATER UNDER
THE NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM AND
THE ARKANSAS WATER AND AIR POLLUTION CONTROL ACT**

In accordance with the provisions of the Arkansas Water and Air Pollution Control Act (Act 472 of 1949, as amended, Ark. Code Ann. 8-4-101 et seq.), and the Clean Water Act (33 U.S.C. § 1251 et seq.),

The applicant's mailing address and the facility address is:

City of Benton
614 West Hazel
Benton, AR 72015

is authorized to discharge from a facility located as follows: south on Sevier Street at I-30 exit to South Street, then to Richards, turn right onto Hazel from Richards, in Section 15, Township 2 South, Range 15 West in Saline County, Arkansas.

Latitude: 34° 33' 18"; Longitude: 92° 35' 38"

to receiving waters named:

unnamed tributary of Depot Creek, thence to Depot Creek, thence to the Saline River in Segment 2C of the Ouachita River Basin.

The outfall is located at the following coordinates:

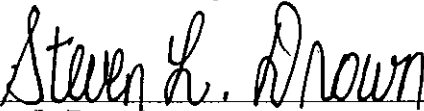
Outfall 001: Latitude: 34° 33' 6"; Longitude: 92° 35' 36"

Discharge shall be in accordance with effluent limitations, monitoring requirements, and other conditions set forth in Parts I, II, III, and IV hereof.

Issue Date: September 30, 2008

Effective Date: October 1, 2008

Expiration Date: September 30, 2013



Steven L. Drown
Chief, Water Division
Arkansas Department of Environmental Quality

**PART I
PERMIT REQUIREMENTS**

SECTION A. FINAL EFFLUENT LIMITATIONS AND MONITORING REQUIREMENTS: OUTFALL 001 - treated municipal wastewater with a design flow of 6.3 MGD.

The permittee is authorized to discharge from Outfall 001 with a design flow of 6.3 MGD in accordance with the Final Effluent Limits in the following table. Such discharges shall be limited and monitored by the permittee as specified below from a treatment system consisting of a fine screen, grit removal, activated sludge aeration (oxidation ditch), clarification, post aeration, and chlorination with a design flow of 6.3 MGD.

Effluent Characteristics	Discharge Limitations			Monitoring Requirements	
	Mass (lbs/day, unless otherwise specified)	Concentration (mg/l, unless otherwise specified)		Frequency	Sample Type
		Monthly Avg.	Monthly Avg.		
Flow ¹	N/A	Report	Report	once/day	totalizing meter
Carbonaceous Biochemical Oxygen Demand (CBOD5)					
(May-Oct)	525	10	15	three/week	24-hr composite
(Nov-Apr)	788	15	22.5	three/week	24-hr composite
Total Suspended Solids (TSS)	788	15	22.5	three/week	24-hr composite
Ammonia Nitrogen (NH3-N)					
(April)	110	2.1	5.2	three/week	24-hr composite
(May-Oct)	79	1.5	2.3	three/week	24-hr composite
(Nov-March)	210	4	6	three/week	24-hr composite
Dissolved Oxygen ²					
(May-Oct)	N/A	7.0, (Monthly Avg. Min.)		three/week	Grab
(Nov-Apr)	N/A	7.5, (Monthly Avg. Min.)		three/week	Grab
Fecal Coliform Bacteria (FCB)		(colonies/100ml)			
(Apr-Sept)	N/A	200	400	three/week	Grab
(Oct-Mar)	N/A	1000	2000	three/week	Grab
Total Residual Chlorine (TRC) ³	N/A	<0.1 mg/l (Inst. Max.)		three/week	Grab
Total Hardness ⁴	N/A	41, (Inst. Min.)		once/month	Grab
Total Phosphorus (TP)	N/A	Report	Report	three/week	Grab
Total Nitrate + Nitrite Nitrogen (as N)	N/A	Report	Report	three/week	Grab
pH	N/A	<u>Minimum</u> 6.0 s.u.	<u>Maximum</u> 9.0 s.u.	three/week	Grab
Chronic Biomonitoring ⁵	N/A	N/A	N/A	once/quarter	24-hr composite

WE WERE AWARE

WE DIDN'T KNOW

<u>Effluent Characteristics</u>	<u>Discharge Limitations</u>			<u>Monitoring Requirements</u>	
	Mass (lbs/day, unless otherwise specified)	Concentration (mg/l, unless otherwise specified)		Frequency	Sample Type
		Monthly Avg.	Monthly Avg.		
<u>Pimephales promelas (Chronic)</u> ⁵ Pass/Fail Lethality (7-day NOEC) TLP6C Pass/Fail Growth (7-day NOEC)TGP6C Survival (7-day NOEC) TOP6C Coefficient of Variation TQP6C Growth (7-day NOEC) TPP6C <u>Ceriodaphnia dubia (Chronic)</u> ⁵ Pass/Fail Lethality (7-day NOEC) TLP3B Pass/Fail production (7-day NOEC)TGP3B Survival (7-day NOEC) TOP3B Coefficient of Variation TQP3B Reproduction (7-day NOEC) TPP3B			7-Day Average Report (Pass=0/Fail=1) Report (Pass=0/Fail=1) Report % Report % Report %	once/quarter once/quarter once/quarter once/quarter once/quarter	24-hr composite 24-hr composite 24-hr composite 24-hr composite 24-hr composite 24-hr composite 24-hr composite 24-hr composite 24-hr composite 24-hr composite

- 1 Report monthly average and daily maximum as MGD.
- 2 Instantaneous Minimum. Dissolved Oxygen must be equal or exceed the permit limit at all times.
- 3 See Condition No. 10 of Part II. The TRC limit will be removed after the new ultraviolet disinfection system is operational.
- 4 The Total Hardness limit replaces the Total Recoverable Copper limit from the previous permit.
- 5 See Condition No. 9 of Part II.

There shall be no discharge of distinctly visible solids, scum, or foam of a persistent nature, nor shall there be any formation of slime, bottom deposits, or sludge banks. There shall be no visible sheen due to the presence of oil (Sheen means an iridescent appearance on the surface of the water).

Samples taken in compliance with the monitoring requirements specified above shall be taken after the final treatment unit and at the following monitoring coordinates: Latitude 34° 33' 10", Longitude 92° 35' 36".

**PART I
PERMIT REQUIREMENTS**

SECTION A. FINAL EFFLUENT LIMITATIONS AND MONITORING REQUIREMENTS: OUTFALL 001 - treated municipal wastewater with a design flow of 8.3 MGD.

The permittee is authorized to discharge from Outfall 001 with a design flow of 8.3 MGD in accordance with the Final Effluent Limits in the following table. Such discharges shall be limited and monitored by the permittee as specified below from a treatment system consisting of a fine screen, grit removal, activated sludge aeration (oxidation ditch), clarification, post aeration, and ultraviolet disinfection with a design flow of 8.3 MGD.

<u>Effluent Characteristics</u>	<u>Discharge Limitations</u>			<u>Monitoring Requirements</u>	
	Mass (lbs/day, unless otherwise specified)	Concentration (mg/l, unless otherwise specified)		Frequency	Sample Type
		Monthly Avg.	Monthly Avg.		
Flow ¹	N/A	Report	Report	once/day	totalizing meter
Carbonaceous Biochemical Oxygen Demand (CBOD5)					
(May-Oct)	692	10	15	three/week	24-hr composite
(Nov-Apr)	1038	15	22.5	three/week	24-hr composite
Total Suspended Solids (TSS)	1038	15	22.5	three/week	24-hr composite
Ammonia Nitrogen (NH3-N)					
(April)	145	2.1	5.2	three/week	24-hr composite
(May-Oct)	104	1.5	2.3	three/week	24-hr composite
(Nov-March)	277	4	6	three/week	24-hr composite
Dissolved Oxygen ²					
(May-Oct)	N/A	7.0, (Monthly Avg. Min.)		three/week	Grab
(Nov-Apr)	N/A	7.5, (Monthly Avg. Min.)		three/week	Grab
Fecal Coliform Bacteria (FCB)		(colonies/100ml)			
(Apr-Sept)	N/A	200	400	three/week	Grab
(Oct-Mar)	N/A	1000	2000	three/week	Grab
Total Hardness ⁴	N/A	41, (Inst. Min.)		once/month	Grab
Total Phosphorus (TP)	N/A	Report	Report	three/week	Grab
Total Nitrate + Nitrite Nitrogen (as N)	N/A	Report	Report	three/week	Grab
pH	N/A	<u>Minimum</u> 6.0 s.u.	<u>Maximum</u> 9.0 s.u.	three/week	Grab
Chronic Biomonitoring ⁵	N/A	N/A	N/A	once/quarter	24-hr composite

Effluent Characteristics	Discharge Limitations			Monitoring Requirements	
	Mass (lbs/day, unless otherwise specified)	Concentration (mg/l, unless otherwise specified)		Frequency	Sample Type
		Monthly Avg.	Monthly Avg.		
<u>Pimephales promelas (Chronic)</u> ⁵ Pass/Fail Lethality (7-day NOEC) TLP6C Pass/Fail Growth (7-day NOEC)TGP6C Survival (7-day NOEC) TOP6C Coefficient of Variation TQP6C Growth (7-day NOEC) TPP6C <u>Ceriodaphnia dubia (Chronic)</u> ⁵ Pass/Fail Lethality (7-day NOEC) TLP3B Pass/Fail production (7-day NOEC)TGP3B Survival (7-day NOEC) TOP3B Coefficient of Variation TQP3B Reproduction (7-day NOEC) TPP3B			7-Day Average Report (Pass=0/Fail=1) Report (Pass=0/Fail=1) Report % Report % Report %	once/quarter once/quarter once/quarter once/quarter once/quarter	24-hr composite 24-hr composite 24-hr composite 24-hr composite 24-hr composite 24-hr composite 24-hr composite 24-hr composite 24-hr composite 24-hr composite

- 1 Report monthly average and daily maximum as MGD.
- 2 Instantaneous Minimum. Dissolved Oxygen must be equal or exceed the permit limit at all times.
- 3 See Condition No. 10 of Part II.
- 4 The Total Hardness limit replaces the Total Recoverable Copper limit from the previous permit.
- 5 See Condition No. 9 of Part II.

There shall be no discharge of distinctly visible solids, scum, or foam of a persistent nature, nor shall there be any formation of slime, bottom deposits, or sludge banks. There shall be no visible sheen due to the presence of oil (Sheen means an iridescent appearance on the surface of the water).

Samples taken in compliance with the monitoring requirements specified above shall be taken after the final treatment unit and at the following monitoring coordinates: Latitude 34° 33' 10", Longitude 92° 35' 36".

SECTION B. PERMIT COMPLIANCE

The permittee shall achieve compliance with the effluent limitations specified for discharges in accordance with the following schedule:

1. Compliance is required on the effective date of the permit.
2. The permittee must sample the wastewater treatment plant's influent and effluent in accordance with the provisions in Part II.7.C once/two (2) months for one year following the effective date of the permit.
3. The permittee must submit annual reports of biosolids analysis in accordance with Part II.8.B.1.b(1) prior to May 1st of each year.

PART II OTHER CONDITIONS

1. The operator of this wastewater treatment facility shall be licensed as Class IV by the State of Arkansas in accordance with Act 211 of 1971, Act 1103 of 1991, Act 556 of 1993, and APCEC Regulation No. 3, as amended.
2. For publicly owned treatment works, the 30-day average percent removal for Carbonaceous Biochemical Oxygen Demand (CBOD5) and Total Suspended Solids shall not be less than 85 percent unless otherwise authorized by the permitting authority in accordance with 40 CFR Part 133.102, as adopted by reference in APCEC Regulation No. 6.
3. The permittee shall give at least 120 days prior notice to the Director of any change planned in the permittee's sludge disposal practice or land use applications, including types of crops grown (if applicable).
4. The permittee shall report all overflows with the Discharge Monitoring Report (DMR) submittal. These reports shall be summarized and reported in tabular format. The summaries shall include: the date, time, duration, location, estimated volume, and cause of overflow; observed environmental impacts from the overflow; action taken to address the overflow; and ultimate discharge location if not contained (e.g., storm sewer system, ditch, tributary). All overflows which endanger health or the environment shall be orally reported to this department (Enforcement Section of the Water Division), within 24 hours from the time the permittee becomes aware of the circumstance. A written report of overflows which endanger health or the environment, shall be provided within 5 days of the time the permittee becomes aware of the circumstance.
5. In accordance with 40 CFR Parts 122.62 (a)(2) and 124.5, this permit may be reopened for modification or revocation and/or reissuance to require additional monitoring and/or effluent limitations when new information is received that actual or potential exceedance of State water quality criteria and/or narrative criteria are determined to be the result of the permittee's discharge(s) to a relevant water body or a Total Maximum Daily Load (TMDL) is established or revised for the water body that was not available at the time of the permit issuance that would have justified the application of different permit conditions at the time of permit issuance.
6. Other Specified Monitoring Requirements

The permittee may use alternative appropriate monitoring methods and analytical instruments other than as specified in Part I Section A of the permit without a major permit modification under the following conditions:

- The monitoring and analytical instruments are consistent with accepted scientific practices;

- The requests shall be submitted in writing to the Permits Section of the Water Division of the ADEQ for use of the alternate method or instrument.
- The method and/or instrument is in compliance with 40 CFR Part 136 or acceptable to the Director; and
- All associated devices are installed, calibrated, and maintained to insure the accuracy of the measurements and are consistent with the accepted capability of that type of device. The calibration and maintenance shall be performed as part of the permittee's laboratory Quality Control/Quality Assurance program.

Upon written approval of the alternative monitoring method and/or analytical instruments, these methods or instruments must be consistently utilized throughout the monitoring period. ADEQ must be notified in writing and the permittee must receive written approval from ADEQ if the permittee decides to return to the original permit monitoring requirements.

7. Contributing Industries and Pretreatment Requirements

- A. The following pollutants may not be introduced into the treatment facility:
1. Pollutants which create a fire or explosion hazard in the publicly owned treatment works (POTW), including, but not limited to, waste streams with a closed cup flashpoint of less than 140 degrees Fahrenheit or 60 degrees Centigrade using the test methods specified in 40 CFR 261.21;
 2. Pollutants which will cause corrosive structural damage to the POTW, but in no case discharges with pH lower than 5.0, unless the works are specifically designed to accommodate such discharges;
 3. Solid or viscous pollutants in amounts which will cause obstruction to the flow in the POTW, resulting in Interference;
 4. Any pollutant, including oxygen demanding pollutants (e.g., BOD), released in a discharge at a flow rate and/or pollutant concentration which will cause Interference with the POTW;
 5. Heat in amounts which will inhibit biological activity in the POTW resulting in Interference, but in no case heat in such quantities that the temperature at the POTW treatment plant exceeds 40 deg. C (104 deg. F) unless the Approval Authority, upon request of the POTW, approves alternate temperature limits;
 6. Petroleum oil, non-biodegradable cutting oil, or products of mineral oil origin in amounts that will cause interference or pass through;

7. Pollutants which result in the presence of toxic gases, vapors, or fumes within the POTW in a quantity that may cause acute worker health and safety problems; and
 8. Any trucked or hauled pollutants, except at discharge points designated by the POTW.
- B. The permittee shall require any indirect discharger to the treatment works to comply with the reporting requirements of Sections 204(b), 307, and 308 of the Act, including any requirements established under 40 CFR Part 403.
- C. The permittee shall sample, analyze and report the wastewater plant's influent (prior to any return activated sludge or other treatment mixing streams), the plant's effluent after final treatment and sludge on a dry weight basis (if not generating nor land applying, please state – sludge analysis/reports not required) once/month for Molybdenum, Selenium and the parameters in Table III, 40 CFR 122 Appendix D using EPA approved methods in 40 CFR 136. This monitoring and reporting requirement shall be for a one (1) year period from the effective date of this permit.

The permittee shall sample and analyze representative domestic background wastewater for the same parameters as above once/two (2) months over this same period of time for a total of six (6) reports.

The reports shall be sent to the attention of the ADEQ Pretreatment Coordinator denoting samples as 24 hour composites (time or flow weighted) or grab when not applicable (Cyanide, Phenols, etc.) or deemed unfeasible. The table below includes the quantitation levels (MQL) that shall be required of your ADEQ certified lab(s). The analyses may be summarized and reported after that twelve month period on the table(s) in Attachment 2.

METALS AND CYANIDE	REQUIRED MQL (µg/L)
Antimony, Total Recoverable	60
Arsenic, Total Recoverable	0.5
Beryllium, Total Recoverable	0.5
Cadmium, Total Recoverable	0.5
Chromium Total Recoverable	10
Chromium (6+) Dissolved	10
Copper, Total Recoverable	0.5
Lead, Total Recoverable	0.5

METALS AND CYANIDE	REQUIRED MQL (µg/L)
Mercury, Total Recoverable	0.005
Nickel, Total Recoverable	0.5
Selenium, Total Recoverable	5
Silver, Total Recoverable	0.5
Thallium, Total Recoverable	0.5
Zinc, Total Recoverable	20
Phenols, Total Recoverable	5
Cyanide, Total Recoverable	10

D. The permittee shall provide adequate notice to the Department of the following:

1. Any new introduction of pollutants into the treatment works from an indirect discharger which would be subject to Sections 301 or 306 of the Act if it were directly discharging those pollutants; and
2. Any substantial change in the volume or character of pollutants being introduced into the treatment works by a source introducing pollutants into the treatment works at the time of issuance of the permit.
3. Any notice shall include information on (i) the quality and quantity of effluent to be introduced into the treatment works, and (ii) any anticipated impact of the change on the quality or quantity of effluent to be discharged from the POTW.

8. **ADDITIONAL CONDITIONS FOR LAND APPLICATION OF BIOSOLIDS**

The sludge produced at the treatment plant will be disposed at the following location(s):

Field No.	Section	Township	Range	Total Acres
1	32	1 South	15 West	62
2	32	1 South	15 West	80
3	32	1 South	15 West	80
4	9	2 South	15 West	48
5	9	2 South	15 West	80

A. **GENERAL REQUIREMENTS:**

1. Only biosolids which are not classified as a hazardous waste under state or federal regulations may be land applied.

2. Nutrients contained in the biosolids will not be applied at a rate exceeding the annual nutrient uptake of the crop. At no time will the nutrient application rate be allowed to exceed the site specific rate approved by the Department.
3. Biosolids with Polychlorinated Biphenyls (PCB's) concentrations equal or greater than 50 mg/kg (dry basis) will not be land applied at any time.
4. CEILING CONCENTRATIONS (milligrams per kilogram, dry weight basis): If the biosolids to be land applied exceed any of the pollutant concentrations listed in **Table 1** below, the biosolids shall not be land applied.

Element	Concentration (mg/kg)
Arsenic	75
Cadmium	85
Chromium	*
Copper	4,300
Lead	840
Mercury	57
Molybdenum	75
Nickel	420
Selenium	100
Zinc	7,500

* This value is being reevaluated by US EPA

5. POLLUTANTS LIMITS: When bulk biosolids are applied to agricultural land, forest, a public contact site, or reclamation site, the permittee shall not exceed the Cumulative Pollutant Loading Rate values listed in **Table 2**, or the Pollutant Concentration values listed in **Table 3**.

Element	Cumulative Pollutant Loading Rate	
	Kg/ha	lbs/ac
Arsenic	41	37
Cadmium	39	35
Chromium	*	*
Copper	1,500	1,350
Lead	300	270

TABLE 2		
Element	Cumulative Pollutant Loading Rate	
	Kg/ha	lbs/ac
Mercury	17	15
Molybdenum	*	*
Nickel	420	378
Selenium	100	90
Zinc	2,800	2,520

*These values are being reevaluated by US EPA.

TABLE 3	
Element	Monthly Average Concentration (mg/kg)
Arsenic	41
Cadmium	39
Chromium	*
Copper	1,500
Lead	300
Mercury	17
Molybdenum	*
Nickel	420
Selenium	36
Zinc	2,800

*These values are being reevaluated by US EPA.

6. The biosolids generator must issue a signed certification stating that the Pathogen Reduction, Vector Attraction Reduction, and Pollutant Concentration Limits have been met. The State requirements on Pathogen Reduction, Vector Attraction Reduction, and Pollutant Concentration Limits are the same as those listed in 40 CFR Part 503. All the above information must be made available to the land-applicator before the biosolids materials are delivered. Concurrently, a signed copy of each certification must be also submitted to the Permits Section of the ADEQ Water Division.
7. Biosolids can only be stored in accordance with the permit and the approved waste management plan, if provisions are made in the plan for that purpose. The utilization of improvised field storage sites or any other site not approved by the Department is strictly prohibited.

8. Transportation of the biosolids must be such that will prevent the attraction, harborage or breeding of insects or rodents. It must not produce conditions harmful to public health, the environment, odors, unsightliness, nuisances, or safety hazards.
9. The containers used for the transportation of the biosolids must be of the closed type. Transportation equipment must be leak-proof and kept in a top sanitary condition at all times. Biosolids must be enclosed or covered as to prevent littering, vector attraction, or any other nuisances.
10. The permittee will be responsible for assuring that the land owner, of any land application site not owned by the permittee, and the waste applicator, if different from the permittee, abide by the conditions of this permit.
11. Biosolids will be spread evenly over the application area and in no way biosolids will be allowed to enter the waters of the State.
12. Biosolids will not be applied to slopes with a gradient greater than 15%; or to soils that are saturated, frozen or covered with snow, during rain, or when precipitation is imminent.
13. The permittee will not cause any underground drinking water source to exceed the limitations in 40 CFR Part 257, Appendix I.
14. The permittee will not cause or contribute to the taking of life or the destruction or adverse modification of the critical habitat of any known endangered or threatened species of plant, fish or wildlife.
15. The permittee will take all necessary measures to reduce obnoxious and offensive odors. Equipment will be maintained and operated to prevent spillage and leakage.
16. Disposal of [waste] in a flood plain shall not increase the level of the base flood by one foot or more to avoid increasing the velocity of the flow downstream of the site, reducing the temporary storage capacity of the flood plain, or increasing the levels of the flood waters.
17. Biosolids will not be spread within 50 feet of rock outcrops and property lines; 100 feet of lakes, ponds, springs, streams, wetlands and sinkholes; 200 feet of drinking water wells; 300 feet of occupied buildings and streams classified as an "extraordinary resource water body."
18. All new land application sites must have a waste management plan approved by the Department prior to land application of wastewater biosolids. This change normally requires a permit modification.

B. MONITORING AND REPORTING REQUIREMENTS:

1. The permittee will be responsible for the biosolids analyses, soil analyses, and a reporting schedule that must include the following:

a. Biosolids Analysis

- (1) Biosolids samples collected must be representative of the treated biosolids to be land applied. The samples are to be stored in appropriate containers and kept refrigerated or frozen to prevent any change in composition.
- (2) Quarterly representative samples of the land-applied biosolids will be analyzed and results expressed in dry basis in mg/kg, except as otherwise indicated:

Volatile Solids(%)	Total Kjeldahl Nitrogen
Total Solids(%)	Total Phosphorus
Nitrate +Nitrate Nitrogen	Total Potassium
Ammonia Nitrogen	Arsenic
Cadmium	Copper
Lead	Mercury
Nickel	Selenium
Zinc	pH (SU)

(3) Soils Analysis

Each land application site will be soil tested in the Spring prior to application for the following parameters:

Nitrate-Nitrogen	Potassium
Phosphorus	Magnesium
Arsenic	Cadmium
Copper	Lead
Mercury	Nickel
Selenium	Zinc
pH	
Cation Exchange Capacity (me/100g)	
Salt Content (micro-mohs/cm)	

b. Reporting

- (1) Annual reports will be sent to the Department and to the owner of the land receiving biosolids prior to May 1, which must include the following:

“The biosolids and soil analyses conducted under section a. above (including a statement that the analyses were performed in accordance with EPA Document SW-846, "Test Methods for Evaluation of Solid Waste," or other procedures approved by the Director), application dates and locations, volumes of biosolids applied (in dry tons/acre-year and gallons/acre-year of biosolids), methods of disposal, identity of hauler, and type of crop grown, amounts of nitrogen applied, total elements added that year (lbs/acre), total elements applied to date, and copies of soil analyses for each site.”

- (2) The permittee will also maintain copies of the above records for Department personnel review at the biosolids generating facility.

9. WHOLE EFFLUENT TOXICITY TESTING (7-DAY CHRONIC NOEC FRESHWATER)

1. SCOPE AND METHODOLOGY

- a. The permittee shall test the effluent for toxicity in accordance with the provisions in this section.

APPLICABLE TO FINAL OUTFALL:	001
CRITICAL DILUTION (%):	100 %
EFFLUENT DILUTION SERIES (%):	32%, 42%, 56%, 75%, & 100%
COMPOSITE SAMPLE TYPE:	Defined at Part I

TEST SPECIES/METHODS: 40 CFR Part 136

Ceriodaphnia dubia chronic static renewal survival and reproduction test, Method 1002.0, EPA/600/4-91/002 or the most recent update thereof. This test should be terminated when 60% of the surviving females in the control produce three broods or at the end of eight days, whichever comes first.

Pimephales promelas (fathead minnow) chronic static renewal 7-day larval survival and growth test, Method 1000.0, EPA/600/4-91/002, or the most recent update thereof. A minimum of five (5) replicates with eight (8) organisms per replicate must be used in the control and in each effluent dilution of this test.

- b. The **NOEC** (No Observed Effect Concentration) is defined as the greatest effluent dilution at and below which lethality that is statistically different from the control (0% effluent) at the 95% confidence level does not occur. Chronic lethal test failure is defined as a demonstration of a statistically significant lethal effect at test completion to a test species at or below the critical dilution.
 - c. This permit may be reopened to require whole effluent toxicity limits, chemical specific effluent limits, additional testing, and/or other appropriate actions to address toxicity.
 - d. Test failure is defined as a demonstration of statistically significant sub-lethal or lethal effects to a test species at or below the effluent critical dilution.
2. **PERSISTENT LETHALITY:** The requirements of this subsection apply only when a toxicity test demonstrates significant lethal effects at or below the critical dilution. Significant lethal effects are herein defined as a statistically significant difference at the 95% confidence level between the survival of the appropriate test organism in a specified effluent dilution and the control (0% effluent).

a. Part I Testing Frequency Other Than Monthly

- i. The permittee shall conduct a total of two (2) additional tests for any species that demonstrates significant lethal effects at or below the critical dilution. The two additional tests shall be conducted monthly during the next two consecutive months. The permittee shall not substitute either of the two additional tests in lieu of routine toxicity testing. The full report shall be prepared for each test required by this section in accordance with procedures outlined in Item 5 of this section and submitted with the period DMR to the permitting authority for review.
- ii. If one or both of the two additional tests demonstrates significant lethal effects at or below the critical dilution, the permittee shall initiate Toxicity Reduction Evaluation (TRE) requirements as specified in Item 7 of this section. The permittee shall notify ADEQ in writing within 5 days of the failure of any retest, and the TRE initiation date will be the test completion date of the first failed retest. A TRE may be also be required due to a demonstration of persistent significant sub-lethal effects or intermittent lethal effects at or below the critical dilution, or for failure to perform the required retests. Monthly retesting is not required if the permittee is performing a TRE.
- iii. If one or both of the two additional tests demonstrates significant lethal effects at or below the critical dilution, the permittee shall henceforth increase the frequency of testing for this species to once per quarter for the life of the permit.
- iv. The provisions of Item 2.a are suspended upon submittal of the TRE Action Plan.

b. Part I Testing Frequency of Monthly

The permittee shall initiate the Toxicity Reduction Evaluation (TRE) requirements as specified in Item 7 of this section when any two of three consecutive monthly toxicity tests exhibit significant lethal effects at or below the critical dilution. A TRE may be also be required due to a demonstration of persistent significant sub-lethal effects or intermittent lethal effects at or below the critical dilution, or for failure to perform the required retests.

3. **SUB-LETHAL FAILURES:** If a statistically significant sub-lethal effect is demonstrated at or below the critical dilution during any quarterly test, the permittee shall conduct two additional tests. The additional tests shall be conducted monthly during the next two consecutive months. The permittee shall not substitute either of the two additional in lieu of routine toxicity testing.

If during the first four quarters, statistically significant sub-lethal effects are exhibited, quarterly testing will be required for that species until the effluent passes both the lethal and sub-lethal tests endpoints for the affected species, for four consecutive quarters. After passing four consecutive quarters for the affected species the permittee may request a reduction in testing frequency. Monthly retesting is not required if the permittee is performing a TRE.

4. **REQUIRED TOXICITY TESTING CONDITIONS**

a. Test Acceptance

The permittee shall repeat a test, including the control and all effluent dilutions, if the procedures and quality assurance requirements defined in the test methods or in this permit are not satisfied, including the following additional criteria:

- i. The toxicity test control (0% effluent) must have survival equal to or greater than 80%.
- ii. The mean number of Ceriodaphnia dubia neonates produced per surviving female in the control (0% effluent) must be 15 or more.
- iii. 60% of the surviving control females must produce three broods.
- iv. The mean dry weight of surviving fathead minnow larvae at the end of the 7 days in the control (0% effluent) must be 0.25 mg per larva or greater.
- v. The percent coefficient of variation between replicates shall be 40% or less in the control (0% effluent) for: the young of surviving females in the Ceriodaphnia dubia reproduction test; the growth and survival endpoints of the fathead minnow test.
- vi. The percent coefficient of variation between replicates shall be 40% or less in the critical dilution, unless significant lethal or nonlethal effects are exhibited for: the young of surviving females in the Ceriodaphnia dubia reproduction test; the growth and survival endpoints of the fathead minnow test.

Test failure may not be construed or reported as invalid due to a coefficient of variation value of greater than 40%. A repeat test shall be conducted within the required reporting period of any test determined to be invalid.

- vii. a PMSD range of 13 - 47 for water flea reproduction
- viii. a PMSD range of 12 – 30 for fathead minnow growth

b. **Statistical Interpretation**

- i. For the Ceriodaphnia dubia survival test, the statistical analyses used to determine if there is a significant difference between the control and the critical dilution shall be Fisher's Exact Test as described in EPA/600/4-91/002 or the most recent update thereof.
- ii. For the Ceriodaphnia dubia reproduction test and the fathead minnow larval survival and growth test, the statistical analyses used to determine if there is a significant difference between the control and the critical dilution shall be in accordance with the methods for determining the No Observed Effect Concentration (NOEC) as described in EPA/600/4-91/002 or the most recent update thereof.
- iii. If the conditions of Test Acceptability are met in Item 4.a above and the percent survival of the test organism is equal to or greater than 80% in the critical dilution concentration and all lower dilution concentrations, the test shall be considered to be a passing test, and the permittee shall report an NOEC of not less than the critical dilution for the DMR reporting requirements found in Item 5 below.

c. **Dilution Water**

- i. Dilution water used in the toxicity tests will be receiving water collected as close to the point of discharge as possible but unaffected by the discharge. The permittee shall substitute synthetic dilution water of similar pH, hardness, and alkalinity to the closest downstream perennial water for;
 - (A) toxicity tests conducted on effluent discharges to receiving water classified as intermittent streams; and
 - (B) toxicity tests conducted on effluent discharges where no receiving water is available due to zero flow conditions.

- ii. If the receiving water is unsatisfactory as a result of instream toxicity (fails to fulfill the test acceptance criteria of Item 4.a), the permittee may substitute synthetic dilution water for the receiving water in all subsequent tests provided the unacceptable receiving water test met the following stipulations:
 - (A) a synthetic dilution water control which fulfills the test acceptance requirements of Item 3.a was run concurrently with the receiving water control;
 - (B) the test indicating receiving water toxicity has been carried out to completion (i.e., 7 days);
 - (C) the permittee includes all test results indicating receiving water toxicity with the full report and information required by Item 5 below; and
 - (D) the synthetic dilution water shall have a pH, hardness, and alkalinity similar to that of the receiving water or closest downstream perennial water not adversely affected by the discharge, provided the magnitude of these parameters will not cause toxicity in the synthetic dilution water.

d. **Samples and Composites**

- i. The permittee shall collect a minimum of three flow-weighted composite samples from the outfall(s) listed at Item 1.a above.
- ii. The permittee shall collect second and third composite samples for use during 24-hour renewals of each dilution concentration for each test. The permittee must collect the composite samples such that the effluent samples are representative of any periodic episode of chlorination, biocide usage or other potentially toxic substance discharged on an intermittent basis.
- iii. The permittee must collect the composite samples so that the maximum holding time for any effluent sample shall not exceed 72 hours. The permittee must have initiated the toxicity test within 36 hours after the collection of the last portion of the first composite sample. Samples shall be chilled to 6 degrees Centigrade during collection, shipping, and/or storage.
- iv. If the flow from the outfall(s) being tested ceases during the collection of effluent samples, the requirements for the minimum

number of effluent samples, the minimum number of effluent portions and the sample holding time are waived during that sampling period. However, the permittee must collect an effluent composite sample volume during the period of discharge that is sufficient to complete the required toxicity tests with daily renewal of effluent. When possible, the effluent samples used for the toxicity tests shall be collected on separate days if the discharge occurs over multiple days. The effluent composite sample collection duration and the static renewal protocol associated with the abbreviated sample collection must be documented in the full report required in Item 5 of this section.

- v. **MULTIPLE OUTFALLS:** If the provisions of this section are applicable to multiple outfalls, the permittee shall combine the composite effluent samples in proportion to the average flow from the outfalls listed in Item 1.a above for the day the sample was collected. The permittee shall perform the toxicity test on the flow-weighted composite of the outfall samples.

- vi. The permittee shall not allow the sample to be dechlorinated at the laboratory. At the time of sample collection the permittee shall measure the TRC of the effluent. The measured concentration of TRC for each sample shall be included in the lab report submitted by the permittee.

5. **REPORTING**

- a. The permittee shall prepare a full report of the results of all tests conducted pursuant to this section in accordance with the Report Preparation Section of EPA/600/4-91/002, or the most current publication, for every valid or invalid toxicity test initiated whether carried to completion or not. The permittee shall retain each full report pursuant to the provisions of Part II.C.7 of this permit. The permittee shall submit full reports to the Department. For any test which fails, is considered invalid or which is terminated early for any reason, the full report must be submitted for review.

- b. A valid test for each species must be reported on the DMR during each reporting period specified in Part I of this permit unless the permittee is performing a TRE which may increase the frequency of testing and reporting. Only ONE set of biomonitoring data for each species is to be recorded on the DMR for each reporting period. The data submitted should reflect the LOWEST survival results for each species during the reporting period. All invalid tests, repeat tests (for invalid tests), and

retests (for tests previously failed) performed during the reporting period must be attached to the DMR for ADEQ review.

- c. The permittee shall submit the results of each valid toxicity test on DMR for that reporting period in accordance with Part II.D.4 of this permit, as follows below. Submit retest information clearly marked as such with the following DMR. Only results of valid tests are to be reported on the DMR.

i. Pimephales promelas (fathead minnow)

- (A) If the NOEC for survival is less than the critical dilution, enter a "1"; otherwise, enter a "0" for Parameter No. TLP6C.
- (B) If the NOEC for growth is less than the critical dilution, enter a "1"; otherwise, enter a "0" for Parameter No. TGP6C.
- (C) Report the NOEC value for survival, Parameter No. TOP6C.
- (D) Report the NOEC value for growth, Parameter No. TPP6C.
- (E) Report the highest (critical dilution or control) Coefficient of Variation, Parameter No. TQP6C.

ii. Ceriodaphnia dubia

- (A) If the NOEC for survival is less than the critical dilution, enter a "1"; otherwise, enter a "0" for Parameter No. TLP3B.
- (B) If the NOEC for reproduction is less than the critical dilution, enter a "1"; otherwise, enter a "0" for Parameter No. TGP3B.
- (C) Report the NOEC value for survival, Parameter No. TOP3B.
- (D) Report the NOEC value for reproduction, Parameter No. TPP3B.
- (E) Report the higher (critical dilution or control) Coefficient of Variation, Parameter No. TQP3B.

6. **Monitoring Frequency Reduction**

- a. The permittee may apply for a testing frequency reduction upon the successful completion of the first four consecutive quarters of testing for one or both test species, with no lethal or sub-lethal effects demonstrated at or below the critical dilution without a major modification. If granted, the monitoring frequency for that test species may be reduced to not less than once per year for the less sensitive species (usually the fathead minnow) and not less than twice per year for the more sensitive test species (usually the Ceriodaphnia dubia).
- b. CERTIFICATION - The permittee must certify in writing that no test failures have occurred and that all tests meet all test acceptability criteria in Item 4.a. above. In addition the permittee must provide a list with each test performed including test initiation date, species, NOECs for lethal and sub-lethal effects and the maximum coefficient of variation for the controls. Upon review and acceptance of this information the Department will issue a letter of confirmation of the monitoring frequency reduction. A copy of the letter will be forwarded to the Permit Compliance System section to update the permit reporting requirements.
- c. This monitoring frequency reduction applies only until the expiration date of this permit, at which time the monitoring frequency for both test species reverts to once per quarter until the permit is re-issued.

7. **TOXICITY REDUCTION EVALUATION (TRE)**

- a. Within ninety (90) days of confirming lethality in the retests, the permittee shall submit a Toxicity Reduction Evaluation (TRE) Action Plan and Schedule for conducting a TRE. The TRE Action Plan shall specify the approach and methodology to be used in performing the TRE. A Toxicity Reduction Evaluation is an investigation intended to determine those actions necessary to achieve compliance with water quality-based effluent limits by reducing an effluent's toxicity to an acceptable level. A TRE is defined as a step-wise process which combines toxicity testing and analyses of the physical and chemical characteristics of a toxic effluent to identify the constituents causing effluent toxicity and/or treatment methods which will reduce the effluent toxicity. The TRE Action Plan shall lead to the successful elimination of effluent toxicity at the critical dilution and include the following:
 - i. Specific Activities. The plan shall detail the specific approach the permittee intends to utilize in conducting the TRE. The approach may include toxicity characterizations, identifications and

confirmation activities, source evaluation, treatability studies, or alternative approaches. When the permittee conducts Toxicity Characterization Procedures the permittee shall perform multiple characterizations and follow the procedures specified in the documents "Methods for Aquatic Toxicity Identification Evaluations: Phase I Toxicity Characterization Procedures" (EPA-600/6-91/003) and "Toxicity Identification Evaluation: Characterization of Chronically Toxic Effluents, Phase I" (EPA-600/6-91/005F), or alternate procedures. When the permittee conducts Toxicity Identification Evaluations and Confirmations, the permittee shall perform multiple identifications and follow the methods specified in the documents "Methods for Aquatic Toxicity Identification Evaluations, Phase II Toxicity Identification Procedures for Samples Exhibiting Acute and Chronic Toxicity" (EPA/600/R-92/080) and "Methods for Aquatic Toxicity Identification Evaluations, Phase III Toxicity Confirmation Procedures for Samples Exhibiting Acute and Chronic Toxicity" (EPA/600/R-92/081), as appropriate.

The documents referenced above may be obtained through the National Technical Information Service (NTIS) by phone at (800) 553-6847, or by writing:

U.S. Department of Commerce
National Technical Information Service
5285 Port Royal Road
Springfield, VA 22161

- ii. Sampling Plan (e.g., locations, methods, holding times, chain of custody, preservation, etc.). The effluent sample volume collected for all tests shall be adequate to perform the toxicity test, toxicity characterization, identification and confirmation procedures, and conduct chemical specific analyses when a probable toxicant has been identified;

Where the permittee has identified or suspects specific pollutant(s) and/or source(s) of effluent toxicity, the permittee shall conduct, concurrent with toxicity testing, chemical specific analyses for the identified and/or suspected pollutant(s) and/or source(s) of effluent toxicity. Where lethality was demonstrated within 48 hours of test initiation, each composite sample shall be analyzed independently. Otherwise the permittee may substitute a composite sample, comprised of equal portions of the individual composite samples, for the chemical specific analysis;

- iii. Quality Assurance Plan (e.g., QA/QC implementation, corrective actions, etc.); and
 - iv. Project Organization (e.g., project staff, project manager, consulting services, etc.).
- b. The permittee shall initiate the TRE Action Plan within thirty (30) days of plan and schedule submittal. The permittee shall assume all risks for failure to achieve the required toxicity reduction.
- c. The permittee shall submit a quarterly TRE Activities Report, with the Discharge Monitoring Report in the months of January, April, July and October, containing information on toxicity reduction evaluation activities including:
- i. any data and/or substantiating documentation which identifies the pollutant(s) and/or source(s) of effluent toxicity;
 - ii. any studies/evaluations and results on the treatability of the facility's effluent toxicity; and
 - iii. any data which identifies effluent toxicity control mechanisms that will reduce effluent toxicity to the level necessary to meet no significant lethality at the critical dilution.
- d. The permittee shall submit a Final Report on Toxicity Reduction Evaluation Activities no later than twenty-eight (28) months from confirming lethality in the retests, which provides information pertaining to the specific control mechanism selected that will, when implemented, result in reduction of effluent toxicity to no significant lethality at the critical dilution. The report will also provide a specific corrective action schedule for implementing the selected control mechanism.

Quarterly testing during the TRE is a minimum monitoring requirement. EPA recommends that permittees required to perform a TRE not rely on quarterly testing alone to ensure success in the TRE, and that additional screening tests be performed to capture toxic samples for identification of toxicants. Failure to identify the specific chemical compound causing toxicity test failure will normally result in a permit limit for whole effluent toxicity limits per federal regulations at 40 CFR 122.44(d)(1)(v).

10. If TRC test results are less than Detection Level Achieved (DL), a value of zero (0) may be used for the Discharge Monitoring Report (DMR) calculations and reporting requirements.

Total residual chlorine (TRC) in the effluent composite sample shall be measured and reported both at the time of sample termination and at the time of toxicity test initiation. The permittee shall ensure that the effluent composite used in toxicity testing is representative of normal facility residual chlorine discharge concentration.

11. In lieu of stormwater pollution prevention plan requirements, a No Exposure Certification (Tracking #ARR00C399) was issued. Under the no exposure certification, any discharge of stormwater not in compliance with the No Exposure Certification requirements is a violation of the permit.
12. Transition Period:

The City of Benton is constructing a new treatment train at the existing wastewater plant which will increase the design flow from 6.3 MGD to 8.3 MGD. The construction will add a new activated sludge oxidation ditch, clarifier, post aeration basin, ultraviolet disinfection chamber, digester, and a return/waste activated sludge pump station with a design flow of 8.3 MGD. The construction will also include improvements to the fine screen. The existing treatment system is: Fine screen, grit removal, activated sludge aeration (oxidation ditch), clarification, post aeration, and chlorination with a design flow of 6.3 MGD.

- a. Beginning on the effective date of the permit, the permittee must submit a Discharge Monitoring Report (DMR) for each permitted design flow (i.e., 6.3 MGD and 8.3 MGD) on a monthly basis. The DMR for the 8.3 MGD design flow can be marked and submitted as "No Discharge", until such time as the new treatment train is operational. The permittee must continue to submit two (2) monthly DMRs until the report required in Part II.13.b below is received.
- b. The permittee must notify the ADEQ when the new treatment train is complete and at least 30 days after the discharge at the new design flow has begun.

**PART III
STANDARD CONDITIONS**

SECTION A – GENERAL CONDITIONS

1. Duty to Comply

The permittee must comply with all conditions of this permit. Any permit noncompliance constitutes a violation of the federal Clean Water Act and the Arkansas Water and Air Pollution Control Act and is grounds for enforcement action; for permit termination, revocation and reissuance, or modification; and/or for denial of a permit renewal application. **Any values reported in the required Discharge Monitoring Report (DMR) which are in excess of an effluent limitation specified in Part I shall constitute evidence of violation of such effluent limitation and of this permit.**

2. Penalties for Violations of Permit Conditions

The Arkansas Water and Air Pollution Control Act provides that any person who violates any provisions of a permit issued under the Act shall be guilty of a misdemeanor and upon conviction thereof shall be subject to imprisonment for not more than one (1) year, or a fine of not more than twenty-five thousand dollars (\$25,000) or by both such fine and imprisonment for each day of such violation. Any person who violates any provision of a permit issued under the Act may also be subject to civil penalty in such amount as the court shall find appropriate, not to exceed ten thousand dollars (\$10,000) for each day of such violation. The fact that any such violation may constitute a misdemeanor shall not be a bar to the maintenance of such civil action.

3. Permit Actions

This permit may be modified, revoked and reissued, or terminated for cause including, but not limited to the following:

- a. Violation of any terms or conditions of this permit;
- b. Obtaining this permit by misrepresentation or failure to disclose fully all relevant facts;
- c. A change in any conditions that requires either a temporary or permanent reduction or elimination of the authorized discharge; or
- d. A determination that the permitted activity endangers human health or the environment and can only be regulated to acceptable levels by permit modification or termination.
- e. Failure of the permittee to comply with the provisions of APCEC Regulation No. 9 (Permit fees) as required by Part III.A.10, herein.

The filing of a request by the permittee for a permit modification, revocation and reissuance, or termination, or a notification of planned changes or anticipated noncompliance, does not stay any permit condition.

4. **Toxic Pollutants**

Notwithstanding Part III.A.3, if any toxic effluent standard or prohibition (including any schedule of compliance specified in such effluent standard or prohibition) is promulgated under APCEC Regulation No. 2, as amended, or Section 307(a) of the Clean Water Act for a toxic pollutant which is present in the discharge and that standard or prohibition is more stringent than any limitations on the pollutant in this permit, this permit shall be modified or revoked and reissued to conform to the toxic effluent standards or prohibition and the permittee so notified.

The permittee shall comply with effluent standards, narrative criteria, or prohibitions established under APCEC Regulation No. 2, as amended, or Section 307(a) of the Clean Water Act for toxic pollutants within the time provided in the regulations that establish those standards or prohibitions, even if the permit has not yet been modified to incorporate the requirement.

5. **Civil and Criminal Liability**

Except as provided in permit conditions on “Bypassing” (Part III.B.4.a), and “Upsets” (Part III.B.5.b), nothing in this permit shall be construed to relieve the permittee from civil or criminal penalties for noncompliance. Any false or materially misleading representation or concealment of information required to be reported by the provisions of this permit or applicable state and federal statutes or regulations which defeats the regulatory purposes of the permit may subject the permittee to criminal enforcement pursuant to the Arkansas Water and Air Pollution Control Act (Act 472 of 1949, as amended).

6. **Oil and Hazardous Substance Liability**

Nothing in this permit shall be construed to preclude the institution of any legal action or relieve the permittee from any responsibilities, liabilities, or penalties to which the permittee is or may be subject to under Section 311 of the Clean Water Act.

7. **State Laws**

Nothing in this permit shall be construed to preclude the institution of any legal action or relieve the permittee from any responsibilities, liabilities, or penalties established pursuant to any applicable State law or regulation under authority preserved by Section 510 of the Clean Water Act.

8. Property Rights

The issuance of this permit does not convey any property rights of any sort, or any exclusive privileges, nor does it authorize any exclusive privileges, nor does it authorize any injury to private property or any invasion of personal rights, nor any infringement of Federal, State, or local laws or regulations.

9. Severability

The provisions of this permit are severable, and if any provision of this permit, or the application of any provisions of this permit to any circumstance is held invalid, the application of such provision to other circumstances, and the remainder of this permit, shall not be affected thereby.

10. Permit Fees

The permittee shall comply with all applicable permit fee requirements for wastewater discharge permits as described in APCEC Regulation No. 9 (Regulation for the Fee System for Environmental Permits). Failure to promptly remit all required fees shall be grounds for the Director to initiate action to terminate this permit under the provisions of 40 CFR Parts 122.64 and 124.5(d), as adopted in APCEC Regulation No. 6 and the provisions of APCEC Regulation No. 8.

SECTION B – OPERATION AND MAINTENANCE OF POLLUTION CONTROLS

1. Proper Operation and Maintenance

- a. The permittee shall at all times properly operate and maintain all facilities and systems of treatment and control (and related appurtenances) which are installed or used by the permittee to achieve compliance with the conditions of this permit. Proper operation and maintenance also includes adequate laboratory controls and appropriate quality assurance procedures. This provision requires the operation of backup or auxiliary facilities or similar systems which are installed by a permittee only when the operation is necessary to achieve compliance with the conditions of the permit.
- b. The permittee shall provide an adequate operating staff which is duly qualified to carryout operation, maintenance, and testing functions required to insure compliance with the conditions of this permit.

2. Need to Halt or Reduce not a Defense

It shall not be a defense for a permittee in an enforcement action that it would have been necessary to halt or reduce the permitted activity in order to maintain compliance with the conditions of this permit. Upon reduction, loss, or failure of the treatment facility, the permittee shall, to the extent necessary to maintain compliance with its permit, control production or discharges or both until the facility is restored or an alternative method of treatment is provided. This requirement applies, for example, when the primary source of power for the treatment facility is reduced, is lost, or alternate power supply fails.

3. Duty to Mitigate

The permittee shall take all reasonable steps to minimize or prevent any discharge in violation of this permit which has a reasonable likelihood of adversely affecting human health or the environment or the water receiving the discharge.

4. Bypass of Treatment Facilities

a. Bypass not exceeding limitation:

The permittee may allow any bypass to occur which does not cause effluent limitations to be exceeded, but only if it also is for essential maintenance to assure efficient operation. These bypasses are not subject to the provisions of Parts II.B.4.b and 4.c.

b. Notice:

- (1) Anticipated bypass. If the permittee knows in advance of the need for a bypass, it shall submit prior notice, if possible at least ten days before the date of the bypass.
- (2) Unanticipated bypass. The permittee shall submit notice of an unanticipated bypass as required in Part III.D.6 (24-hour notice).

c. Prohibition of bypass:

- (1) Bypass is prohibited and the Director may take enforcement action against a permittee for bypass, unless:
 - (a) Bypass was unavoidable to prevent loss of life, personal injury, or severe property damage;
 - (b) There were no feasible alternatives to the bypass, such as the use of auxiliary treatment facilities, retention of untreated wastes, or maintenance during normal periods of equipment downtime. This condition is not satisfied if the permittee could have installed

- adequate backup equipment to prevent a bypass which occurred during normal or preventive maintenance; and
- (c) The permittee submitted notices as required by Part III.B.4.b.
- (2) The Director may approve an anticipated bypass, after considering its adverse effects, if the Director determines that it will meet the three conditions listed above in Part III.B.4.c(1).

5. Upset Conditions

- a. Effect of an upset. An upset constitutes an affirmative defense to an action brought for noncompliance with such technology based permit effluent limitations if the requirements of Part III.B.5.b of this section are met. No determination made during administrative review of claims that noncompliance was caused by upset, and before an action for noncompliance, is final administrative action subject to judicial review.
- b. Conditions necessary for demonstration of upset. A permittee who wishes to establish the affirmative defense of upset shall demonstrate, through properly signed, contemporaneous operating logs, or other relevant evidence that:
 - (1) An upset occurred and that the permittee can identify the specific cause(s) of the upset;
 - (2) The permitted facility was at the time being properly operated;
 - (3) The permittee submitted notice of the upset as required by Part III.D.6; and
 - (4) The permittee complied with any remedial measures required by Part III.B.3.
- c. Burden of proof. In any enforcement proceeding, the permittee seeking to establish the occurrence of an upset has the burden of proof.

6. Removed Substances

Solids, sludges, filter backwash, or other pollutants removed in the course of treatment or control of waste waters shall be disposed of in a manner such as to prevent any pollutant from such materials from entering the waters of the State. Written approval must be obtained from the ADEQ for land application only.

7. Power Failure

The permittee is responsible for maintaining adequate safeguards to prevent the discharge of untreated or inadequately treated wastes during electrical power failure either by means of alternate power sources, standby generators, or retention of inadequately treated effluent.

SECTION C – MONITORING AND RECORDS

1. Representative Sampling

Samples and measurements taken as required herein shall be representative of the volume and nature of the monitored discharge during the entire monitoring period. All samples shall be taken at the monitoring points specified in this permit and, unless otherwise specified, before the effluent joins or is diluted by any other waste stream, body of water, or substance. Monitoring points shall not be changed without notification to and the approval of the Director. Intermittent discharges shall be monitored.

2. Flow Measurement

Appropriate flow measurement devices and methods consistent with accepted scientific practices shall be selected and used to insure the accuracy and reliability of measurements of the volume of monitored discharges. The devices shall be installed, calibrated, and maintained to insure the accuracy of the measurements are consistent with the accepted capability of that type of device. Devices selected shall be capable of measuring flows with a maximum deviation of less than +/-10% from true discharge rates throughout the range of expected discharge volumes and shall be installed at the monitoring point of the discharge.

3. Monitoring Procedures

Monitoring must be conducted according to test procedures approved under 40 CFR Part 136, unless other test procedures have been specified in this permit. The permittee shall calibrate and perform maintenance procedures on all monitoring and analytical instrumentation at intervals frequent enough to insure accuracy of measurements and shall insure that both calibration and maintenance activities will be conducted. An adequate analytical quality control program, including the analysis of sufficient standards, spikes, and duplicate samples to insure the accuracy of all required analytical results shall be maintained by the permittee or designated commercial laboratory. At a minimum, spikes and duplicate samples are to be analyzed on 10% of the samples.

4. Penalties for Tampering

The Arkansas Water and Air Pollution Control Act provides that any person who falsifies, tampers with, or knowingly renders inaccurate, any monitoring device or method required to be maintained under the Act shall be guilty of a misdemeanor and upon conviction thereof shall be subject to imprisonment for not more than one (1) year or a fine of not more than ten thousand dollars (\$10,000) or by both such fine and imprisonment.

5. **Reporting of Monitoring Results**

Monitoring results must be reported on a Discharge Monitoring Report (DMR) form (EPA No. 3320-1). Permittees are required to use preprinted DMR forms provided by ADEQ, unless specific written authorization to use other reporting forms is obtained from ADEQ. Monitoring results obtained during the previous calendar month shall be summarized and reported on a DMR form postmarked no later than the 25th day of the month following the completed reporting period to begin on the effective date of the permit. Duplicate copies of DMR forms signed and certified as required by Part III.D.11 and all other reports required by Part III.D, shall be submitted to the Director at the following address:

Permits Enforcement Branch
Water Division
Arkansas Department of Environmental Quality
5301 Northshore Drive
North Little Rock, AR 72118-5317

If permittee uses outside laboratory facilities for sampling and/or analysis, the name and address of the contract laboratory shall be included on the DMR.

6. **Additional Monitoring by the Permittee**

If the permittee monitors any pollutant more frequently than required by this permit, using test procedures approved under 40 CFR Part 136 or as specified in this permit, the results of this monitoring shall be included in the calculation and reporting of the data submitted in the DMR. Such increased frequency shall also be indicated on the DMR.

7. **Retention of Records**

The permittee shall retain records of all monitoring information, including all calibration and maintenance records and all original strip chart recordings for continuous monitoring instrumentation, copies of all reports required by this permit, and records of all data used to complete the application for this permit for a period of at least 3 years from the date of the sample, measurement, report, or application. This period may be extended by request of the Director at any time.

8. **Record Contents**

Records and monitoring information shall include:

- a. The date, exact place, time and methods of sampling or measurements, and preservatives used, if any;
- b. The individuals(s) who performed the sampling or measurements;
- c. The date(s) and time analyses were performed;

- d. The individual(s) who performed the analyses;
- e. The analytical techniques or methods used; and
- f. The measurements and results of such analyses.

9. Inspection and Entry

The permittee shall allow the Director, or an authorized representative, upon the presentation of credentials and other documents as may be required by law, to:

- a. Enter upon the permittee's premises where a regulated facility or activity is located or conducted, or where records must be kept under the conditions of this permit;
- b. Have access to and copy, at reasonable times, any records that must be kept under the conditions of this permit;
- c. Inspect at reasonable times any facilities, equipment (including monitoring and control equipment), practices, or operations regulated or required under this permit, and
- d. Sample, inspect, or monitor at reasonable times, for the purposes of assuring permit compliance or as otherwise authorized by the Clean Water Act, any substances or parameters at any location.

SECTION D – REPORTING REQUIREMENTS

1. Planned Changes

The permittee shall give notice and provide plans and specification to the Director for review and approval prior to any planned physical alterations or additions to the permitted facility. Notice is required only when:

Any change in the facility discharge (including the introduction of any new source or significant discharge or significant changes in the quantity or quality of existing discharges of pollutants) must be reported to the permitting authority. In no case are any new connections, increased flows, or significant changes in influent quality permitted that cause violation of the effluent limitations specified herein.

2. **Anticipated Noncompliance**

The permittee shall give advance notice to the Director of any planned changes in the permitted facility or activity which may result in noncompliance with permit requirements.

3. **Transfers**

The permit is nontransferable to any person except after notice to the Director. The Director may require modification or revocation and reissuance of the permit to change the name of the permittee and incorporate such other requirements as may be necessary under the Act.

4. **Monitoring Reports**

Monitoring results shall be reported at the intervals and in the form specified in Part III.C.5. **Discharge Monitoring Reports must be submitted even when no discharge occurs during the reporting period.**

5. **Compliance Schedule**

Reports of compliance or noncompliance with, or any progress reports on, interim and final requirements contained in any compliance schedule of this permit shall be submitted no later than 14 days following each schedule date. Any reports of noncompliance shall include the cause of noncompliance, any remedial actions taken, and the probability of meeting the next scheduled requirement.

6. **Twenty-four Hour Report**

- a. The permittee shall report any noncompliance which may endanger health or the environment. Any information shall be provided orally within 24 hours from the time the permittee becomes aware of the circumstances. A written submission shall also be provided within 5 days of the time the permittee becomes aware of the circumstances. The written submission shall contain the following information:
 - (1) A description of the noncompliance and its cause;
 - (2) The period of noncompliance, including exact dates and times, and if the noncompliance has not been corrected, the anticipated time it is expected to continue; and
 - (3) Steps taken or planned to reduce, eliminate, and prevent reoccurrence of the noncompliance.
- b. The following shall be included as information which must be reported within 24 hours:
 - (1) Any unanticipated bypass which exceeds any effluent limitation in the permit;

- (2) Any upset which exceeds any effluent limitation in the permit; and
 - (3) Violation of a maximum daily discharge limitation for any of the pollutants listed by the Director in Part I of the permit to be reported within 24 hours to the Enforcement Section of the Water Division of the ADEQ.
- c. The Director may waive the written report on a case-by-case basis if the oral report has been received within 24 hours to the Enforcement Section of the Water Division of the ADEQ.

7. Other Noncompliance

The permittee shall report all instances of noncompliance not reported under Parts II.D.4, 5, and 6, at the time monitoring reports are submitted. The reports shall contain the information listed at Part III.D.6.

8. Changes in Discharge of Toxic Substances for Industrial Dischargers

The permittee shall notify the Director as soon as he/she knows or has reason to believe:

- a. That any activity has occurred or will occur which would result in the discharge on a routine or frequent basis of any toxic pollutant which is not limited in the permit, if that discharge will exceed the highest of the “notification levels” described in 40 CFR Part 122.42(a)(1); or
- b. That any activity has occurred or will occur which would result in any discharge on a non-routine or infrequent basis of a toxic pollutant which is not limited in the permit, if that discharge will exceed the highest of the “notification levels” described in 40 CFR Part 122.42(a)(2).

9. Duty to Provide Information

The permittee shall furnish to the Director, within a reasonable time, any information which the Director may request to determine whether cause exists for modifying, revoking and reissuing, or terminating this permit, or to determine compliance with this permit. The permittee shall also furnish to the Director, upon request, copies of records required to be kept by this permit. Information shall be submitted in the form, manner and time frame requested by the Director.

10. Duty to Reapply

If the permittee wishes to continue an activity regulated by this permit after the expiration date of this permit, the permittee must apply for and obtain a new permit. The complete application shall be submitted at least 180 days before the expiration date of this permit. The Director may grant permission to submit an application less than 180 days in advance but no later than the permit expiration date. Continuation of expiring permits shall be governed by regulations promulgated in APCEC Regulation No. 6.

11. Signatory Requirements

All applications, reports, or information submitted to the Director shall be signed and certified as follows:

- a. All **permit applications** shall be signed as follows:
 - (1) For a corporation: by a responsible corporate officer. For the purpose of this section, a responsible corporate officer means:
 - (i) A president, secretary, treasurer, or vice-president of the corporation in charge of a principal business function, or any other person who performs similar policy or decision-making functions for the corporation; or
 - (ii) The manager of one or more manufacturing, production, or operation facilities, provided: the manager is authorized to make management decisions which govern the operation of the regulated facility including having the explicit or implicit duty of making major capital investment recommendations, and initiating and directing other comprehensive measures to assure long term environmental compliance with environmental laws and regulations; the manager can ensure that the necessary systems are established or actions taken to gather complete and accurate information for permit application requirements; and where authority to sign documents has been assigned or delegated to the manager in accordance with corporate procedures.
 - (2) For a partnership or sole proprietorship: by a general partner or proprietor, respectively; or
 - (3) For a municipality, State, Federal, or other public agency, by either a principal executive officer or ranking elected official. For purposes of this section, a principal executive officer of a Federal agency includes:
 - (i) The chief executive officer of the agency, or
 - (ii) A senior executive officer having responsibility for the overall operations of a principal geographic unit of the agency.
- b. All **reports** required by the permit and **other information** requested by the Director shall be signed by a person described above or by a duly authorized representative of that person. A person is a duly authorized representative only if:
 - (1) The authorization is made in writing by a person described above.
 - (2) The authorization specified either an individual or a position having responsibility for the overall operation of the regulated facility or activity, such as the position of plant manager, operator of a well or a well field, superintendent, or position of equivalent responsibility. (A duly authorized representative may thus be either a named individual or any individual occupying a named position); and
 - (3) The written authorization is submitted to the Director.

- c. Certification. Any person signing a document under this section shall make the following certification:

“I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.”

12. Availability of Reports

Except for data determined to be confidential under 40 CFR Part 2 and APCEC Regulation No. 6, all reports prepared in accordance with the terms of this permit shall be available for public inspection at the offices of the Department of Environmental Quality. As required by the Regulations, the name and address of any permit applicant or permittee, permit applications, permits, and effluent data shall not be considered confidential.

13. Penalties for Falsification of Reports

The Arkansas Air and Water Pollution Control Act provides that any person who knowingly makes any false statement, representation, or certification in any application, record, report, plan, or other document filed or required to be maintained under this permit shall be subject to civil penalties specified in Part III.A.2 and/or criminal penalties under the authority of the Arkansas Water and Air Pollution Control Act (Act 472 of 1949, as amended).

PART IV DEFINITIONS

All definitions contained in Section 502 of the Clean Water Act shall apply to this permit and are incorporated herein by reference. Additional definitions of words or phrases used in this permit are as follows:

1. **“Act”** means the Clean Water Act, Public Law 95-217 (33.U.S.C. 1251 et seq.) as amended.
2. **“Administrator”** means the Administrator of the U.S. Environmental Protection Agency.
3. **“Applicable effluent standards and limitations”** means all State and Federal effluent standards and limitations to which a discharge is subject under the Act, including, but not limited to, effluent limitations, standards of performance, toxic effluent standards and prohibitions, and pretreatment standards.
4. **“Applicable water quality standards”** means all water quality standards to which a discharge is subject under the federal Clean Water Act and which has been (a) approved or permitted to remain in effect by the Administrator following submission to the Administrator pursuant to Section 303(a) of the Act, or (b) promulgated by the Director pursuant to Section 303(b) or 303(c) of the Act, and standards promulgated under (APCEC) Regulation No. 2, as amended.
5. **“Bypass”** means the intentional diversion of waste streams from any portion of a treatment facility.
6. **“Daily Discharge”** means the discharge of a pollutant measured during a calendar day or any 24-hour period that reasonably represents the calendar day for purposes of sampling.
Mass Calculations: For pollutants with limitations expressed in terms of mass, the “daily discharge” is calculated as the total mass of pollutant discharged over the sampling day.
Concentration Calculations: For pollutants with limitations expressed in other units of measurement, determination of concentration made using a composite sample shall be the concentration of the composite sample. When grab samples are used, the “daily discharge” determination of concentration shall be the arithmetic average (weighted by flow value) of all the samples collected during that sampling day by using the following formula: where C = daily concentration, F = daily flow and n = number of daily samples

$$\frac{C_1F_1 + C_2F_2 + \dots + C_nF_n}{F_1 + F_2 + \dots + F_n}$$

7. **“Monthly average”** means the highest allowable average of “daily discharges” over a calendar month, calculated as the sum of all “daily discharges” measured during a calendar month divided by the number of “daily discharges” measured during that month. For Fecal Coliform Bacteria (FCB) report the monthly average (see 30-day average below).
8. **“Daily Maximum”** discharge limitation means the highest allowable “daily discharge” during the calendar month. The 7-day average for Fecal Coliform Bacteria (FCB) is the

geometric mean of the values of all effluent samples collected during the calendar week in colonies per 100 ml.

9. **“Department”** means the Arkansas Department of Environmental Quality (ADEQ).
10. **“Director”** means the Administrator of the U.S. Environmental Protection Agency and/or the Director of the Arkansas Department of Environmental Quality.
11. **“Grab sample”** means an individual sample collected in less than 15 minutes in conjunction with an instantaneous flow measurement.
12. **“Industrial User”** means a non-domestic discharger, as identified in 40 CFR Part 403, introducing pollutants to a POTW.
13. **“National Pollutant Discharge Elimination System”** means the national program for issuing, modifying, revoking and reissuing, terminating, monitoring and enforcing permits, and imposing and enforcing pretreatment requirements under Sections 307, 402, 318, and 405 of the Clean Water Act.
14. **“POTW”** means a Publicly Owned Treatment Works.
15. **“Severe property damage”** means substantial physical damage to property, damage to the treatment facilities which causes them to become inoperable, or substantial and permanent loss of natural resources which can reasonably be expected to occur in the absence of a bypass. Severe property damage does not mean economic loss caused by delays in products.
16. **“APCEC”** means the Arkansas Pollution Control and Ecology Commission.
17. **“Sewage sludge”** means the solids, residues, and precipitate separated from or created in sewage by the unit processes at a POTW. Sewage as used in this definition means any wastes, including wastes from humans, households, commercial establishments, industries, and storm water runoff that are discharged to or otherwise enter a POTW.
18. **“7-day average”** discharge limitation, other than for Fecal Coliform Bacteria (FCB), is the highest allowable arithmetic mean of the values for all effluent samples collected during the calendar week. The 7-day average for Fecal Coliform Bacteria (FCB) is the geometric mean of the values of all effluent samples collected during the calendar week in colonies/100 ml. The Discharge Monitoring Report should report the highest 7-day average obtained during the calendar month. For reporting purposes, the 7-day average values should be reported as occurring in the month in which the Saturday of the calendar week falls in.
19. **“30-day average”**, other than for Fecal Coliform Bacteria (FCB), is the arithmetic mean of the daily values for all effluent samples collected during a calendar month, calculated as the sum of all daily discharges measured during a calendar month divided by the number of daily discharges measured during that month. The 30-day average for Fecal Coliform Bacteria (FCB) is the geometric mean of the values for all effluent samples collected during a calendar month. For Fecal Coliform Bacteria (FCB), report the monthly average as a 30-day geometric mean in colonies per 100 ml.
20. **“24-hour composite sample”** consists of a minimum of 12 effluent portions collected at equal time intervals over the 24-hour period and combined proportional to flow or a sample collected at frequent intervals proportional to flow over the 24-hour period.
21. **“12-hour composite sample”** consists of 12 effluent portions, collected no closer together than one hour and composited according to flow. The daily sampling intervals shall include the highest flow periods.

22. **“6-hour composite sample”** consists of six effluent portions collected no closer together than one hour (with the first portion collected no earlier than 10:00 a.m.) and composited according to flow.
23. **“3-hour composite sample”** consists of three effluent portions collected no closer together than one hour (with the first portion collected no earlier than 10:00 a.m.) and composited according to flow.
24. **“Treatment works”** means any devices and systems used in storage, treatment, recycling, and reclamation of municipal sewage and industrial wastes, of a liquid nature to implement section 201 of the Act, or necessary to recycle reuse water at the most economic cost over the estimated life of the works, including intercepting sewers, sewage collection systems, pumping, power and other equipment, and alterations thereof; elements essential to provide a reliable recycled supply such as standby treatment units and clear well facilities, and any works, including site acquisition of the land that will be an integral part of the treatment process or is used for ultimate disposal of residues resulting from such treatment.
25. **“Upset”** means an exceptional incident in which there is unintentional and temporary noncompliance with technology-based permit effluent limitations because of factors beyond the reasonable control of the permittee. Any upset does not include noncompliance to the extent caused by operational error, improperly designed treatment facilities, lack of preventive maintenance, or careless of improper operations.
26. **“For Fecal Coliform Bacteria (FCB)”**, a sample consists of one effluent grab portion collected during a 24-hour period at peak loads. For Fecal Coliform Bacteria (FCB) report the monthly average as a 30-day geometric mean in colonies per 100 ml.
27. **“Dissolved oxygen limit”**, shall be defined as follows:
 - a. When limited in the permit as a minimum monthly average, shall mean the lowest acceptable monthly average value, determined by averaging all samples taken during the calendar month;
 - b. When limited in the permit as an instantaneous minimum value, shall mean that no value measured during the reporting period may fall below the stated value.
28. **The term “MGD”** shall mean million gallons per day.
29. **The term “mg/l”** shall mean milligrams per liter or parts per million (ppm).
30. **The term “µg/l”** shall mean micrograms per liter or parts per billion (ppb).
31. **The term “cfs”** shall mean cubic feet per second.
32. **The term “ppm”** shall mean parts per million.
33. **The term “s.u.”** shall mean standard units.
34. **The term “Instantaneous Maximum”** when limited in the permit as an instantaneous maximum value, shall mean that no value measured during the reporting period may fall above the stated value.
35. **Monitoring and Reporting:**

When a permit becomes effective, monitoring requirements are of the immediate period of the permit effective date. Where the monitoring requirement for an effluent characteristic is monthly or more frequently, the Discharge Monitoring Report (DMR) shall be submitted by the 25th of the month following the sampling. Where the monitoring requirement for an effluent characteristic is Quarterly, Semi-Annual, Annual,

or Yearly, the DMR shall be submitted by the 25th of the month following the monitoring period end date.

MONTHLY:

Is defined as a calendar month or any portion of a calendar month for monitoring requirement frequency of once/month or more frequently.

QUARTERLY:

- (1) Is defined as a fixed calendar quarter or any part of the fixed calendar quarter for a non-seasonal effluent characteristic with a measurement frequency of once/quarter. Fixed calendar quarters are: January through March, April through June, July through September, and October through December; or
- (2) Is defined as a fixed three month period (or any part of the fixed three month period) of or dependent upon the seasons specified in the permit for a seasonal effluent characteristic with a monitoring requirement frequency of once/quarter that does not coincide with the fixed calendar quarter. Seasonal calendar quarters are: May through July, August through October, November through January, and February through April.

SEMI-ANNUAL:

Is defined as the fixed time periods January through June, and July through December (or any portion thereof) for an effluent characteristic with a measurement frequency of once/6 months or twice/year.

ANNUAL or YEARLY:

Is defined as a fixed calendar year or any portion of the fixed calendar year for an effluent characteristic or parameter with a measurement frequency of once/year. A calendar year is January through December, or any portion thereof.

36. **The term “Weekday”** means Monday – Friday.

Attachment 1
Pre-Treatment Form

MONITORING RESULTS (1) FOR THE ANNUAL PRETREATMENT REPORT

REPORTING YEAR: _____, 20 TO _____, 20

TREATMENT PLANT : City of _____ NPDES PERMIT #AR00

AVERAGE POTW FLOW: _____ MGD % IU FLOW: _____ %

METALS, CYANIDE and PHENOLS (Total)	MAHL mg/l (2)	Influent Dates Sampled (mg/l) Once/quarter				WQ level/ limit mg/l (2)	Effluent Dates Sampled (mg/l) Once/quarter				Laboratory Analysis (See Attachment PPS)	
											EPA Method Used (1)	Detection Level Achieved (ug/l)
Antimony	N/A					N/A						
Cadmium												
Copper												
Lead												
Mercury												
Nickel												
Selenium												
Silver												
Zinc												
Chromium												
Cyanide												
Arsenic						N/A						
Molybdenum						N/A						
Phenols	N/A					N/A						
Beryllium	N/A					N/A						
Thallium	N/A					N/A						
Flow, MGD	N/A					N/A						

(1) It is advised that the influent and effluent samples are collected considering flow detention time through each plant. Analytical MQLs should be used so that the data can also be used for Local Limits assessment and NPDES application purpose.

(2) This value was calculated during the development of TBLL based on State WQ Standards and implementation procedures.

MAHL - Maximum Allowable Headworks Level
WQ - Water Quality

Final Fact Sheet

for renewal of the discharge Permit Number AR0036498 to discharge to Waters of the State

1. PERMITTING AUTHORITY.

The issuing office is:

Arkansas Department of Environmental Quality
5301 Northshore Drive
North Little Rock, Arkansas 72118-5317

2. APPLICANT.

The applicant's mailing address and the facility address is:

City of Benton
614 West Hazel
Benton, AR 72015

3. PREPARED BY.

The permit was prepared by:

Kimberly A. Fuller, PE, CPESC
Staff Engineer
Discharge Permits Section, Water Division
Telephone: (501) 682-0643
E-mail: fuller@adeq.state.ar.us

4. DATE PREPARED.

The permit was prepared on February 11, 2008.

5. PREVIOUS PERMIT ACTIVITY.

Effective Date: June 1, 2003
Expiration Date: May 31, 2008

The permit application was received on December 3, 2007 and was deemed administratively complete on December 7, 2007. Additional information was received on June 23, 2008. The current discharge permit is being reissued for a 5-year term in accordance with regulations promulgated at 40 CFR Part 122.46(a).

6. SIGNIFICANT CHANGES FROM THE PREVIOUSLY ISSUED PERMIT.

The permittee is responsible for carefully reading the permit in detail and becoming familiar with all of the changes therein:

1. Parts II, III, and IV have been revised.
2. The facility's location coordinates have been corrected to match the most recent field data.
3. The facility's mailing address has been revised.
4. The effluent limitations for pH have been corrected from 6-9 s.u. to 6.0 to 9.0 s.u. to ensure the required accuracy in reporting.
5. The Dissolved Oxygen limit has been changed to a monthly average minimum.
6. The Ammonia Nitrogen (NH₃-N) limits have been changed based upon the toxicity criteria contained in Section 2.512 of APCEC Regulation No. 2 for the month of April.
7. Interim limits have been added to the permit based on the existing design flow of 6.3 MGD and final limits for the new design flow following construction of 8.3 MGD.
8. The Total Recoverable Copper limit has been removed and replaced with a Total Hardness limit.
9. Total Phosphorus and Total Nitrate + Nitrite Nitrogen monitoring and reporting requirements have been added in order to establish a database of point source loadings of nutrients to waters of the state of Arkansas.
10. The required operator license Class IV for the facility has been stated in Part II of the permit.
11. Statements were added to Part I allowing the removal of the Total Residual Chlorine (TRC) limit following the installation and operation of the new ultraviolet disinfection system.
12. The pretreatment requirements in Part II have been updated to include an influent, effluent, and sludge metals sampling requirement since the facility has a Significant Industrial User (SIU).
13. A condition was added to Part II to state that the facility operates under a No Exposure Exclusion for the facility's stormwater discharges.
14. A condition was added to Part II to describe the transition period resulting from the construction of a new treatment train that will increase the facility's design flow from 6.3 MGD to 8.3 MGD.

7. RECEIVING STREAM SEGMENT AND DISCHARGE LOCATION.

The outfall is located at the following coordinates:

Latitude: 34° 33' 6" Longitude: 92° 35' 36"

The receiving waters named:

Unnamed tributary of Depot Creek, thence to Depot Creek, thence to the Saline River in Segment 2C of the Ouachita River Basin. The receiving stream with USGS Hydrologic Unit Code (H.U.C) of 08040203 and reach #012 is a Water of the State classified for secondary contact recreation, raw water source for public, industrial, and agricultural water supplies, propagation of desirable species of fish and other aquatic life, and other compatible uses.

a. **303(d) LIST AND ENDANGERED SPECIES CONSIDERATIONS.**

i. **303(d) List:**

The receiving stream is not listed on the 303(d) list. Therefore, no permit action is needed.

ii. **Endangered Species:**

The Department of Arkansas Heritage has identified the following species of conservation concern within 5 miles downstream of the outfall in a letter dated March 13, 2008:

Cyprogenia aberti, western fanshell - state concern
Lampsilis satura, sandbank pocketbook - state concern
Lasmigona costata, flutedshell - state concern
Ligumia recta, black sandshell - state concern
Lampsilis powellii, Arkansas fatmucket - federal concern
Notropis perpallidus, peppered shiner - state concern
Pleurobema rubrum, pyramid pigtoe - state concern
Ptychobranhus occidentalis, Ouachita kidneyshell - state concern
Quadrula metanevra, monkeyface - state concern
Villosa arkansasensis, Ouachita creekshell - state concern

The Department of Arkansas Heritage has identified the following species of conservation concern within the areas designated for sewage sludge disposal in a letter dated September 16, 2008:

Section 32, T1S/R15W

Cyprogenia aberti, western fanshell - state concern
Lampsilis ornata, southern pocketbook - state concern
Lasmigona costata, flutedshell - state concern
Ligumia recta, black sandshell - state concern
Lampsilis powellii, Arkansas fatmucket - federal concern (threatened)
Ptychobranhus occidentalis, Ouachita kidneyshell - state concern
Toxolasma lividus, purple lilliput - state concern
Villosa lienosa, little spectaclecase - state concern

Section 9, T1S/R15W

Lampsilis ornata, southern pocketbook - state concern
Lampsilis satura, sandbank pocketbook - state concern
Lasmigona costata, flutedshell - state concern
Ligumia recta, black sandshell - state concern
Lampsilis powellii, Arkansas fatmucket - federal concern (threatened)
Pleurobema rubrum, pyramid pigtoe - state concern
Ptychobranchus occidentalis, Ouachita kidneyshell - state concern
Quadrula metanevra, monkeyface - state concern
Villosa lienosa, little spectaclecase - state concern

The permit limits and the sewage sludge disposal requirements in the permit are designed to protect all beneficial uses of the receiving waters, including propagation of desirable species of fish and other aquatic life, including the above species of concern. Therefore, ADEQ has determined that the final permit limits and conditions will serve to help protect the species of concern identified above.

8. OUTFALL AND TREATMENT PROCESS DESCRIPTION.

The following is a description of the **existing** treatment facility described in the application:

- a. Design Flow: 6.3 MGD
- b. Type of Treatment: Fine screen, grit removal, activated sludge aeration (oxidation ditch), clarification, post aeration, and chlorination.
- c. Discharge Description: treated municipal wastewater

Transition Period:

The City of Benton is constructing a new treatment train at the existing wastewater plant which will increase the design flow from 6.3 MGD to 8.3 MGD. The construction will add a new activated sludge oxidation ditch, clarifier, post aeration basin, ultraviolet disinfection chamber, anaerobic digester, and a return/waste activated sludge pump station with a design flow of 8.3 MGD. The construction will also include improvements to the fine screen. The existing treatment system is: Fine screen, grit removal, activated sludge aeration (oxidation ditch), clarification, post aeration, and chlorination with a design flow of 6.3 MGD.

The permittee must notify the ADEQ when the new treatment train is complete and at least 30 days after the discharge at the new design flow has begun.

The following is a description of the **modified** treatment facility including the new treatment train described in the application:

- a. Design Flow: 8.3 MGD
- b. Type of Treatment: Fine screen, grit removal, activated sludge aeration (oxidation ditch), clarification, post aeration, and ultraviolet disinfection.
- c. Discharge Description: treated municipal wastewater

9. ACTIVITY.

Under the Standard Industrial Classification (SIC) code of 4952 or North American Industry Classification System (NAICS) code of 221320, the applicant's activities are the operation of a sewage treatment plant.

10. INDUSTRIAL WASTEWATER CONTRIBUTIONS.

INDUSTRIAL USERS

This facility receives process wastewater from significant industrial users. The Department has made the decision based on several criteria that the POTW will not be required to develop an approved pretreatment program at this time. Standard boilerplate Pretreatment Prohibitions (40 CFR 403.5[b]) and additional monitoring/reporting requirements to determine the potential need for local limits per 40 CFR 403.5(c)(2) are deemed appropriate at this time.

11. SEWAGE SLUDGE PRACTICES.

Sludge is land applied to the following sites:

Field No.	Section	Township	Range	Total Acres
1	32	1S	15W	62
2	32	1S	15W	80
3	32	1S	15W	80
4	9	2S	15W	48
5	9	2S	15W	80

12. PERMIT CONDITIONS.

The Arkansas Department of Environmental Quality has made a determination to issue a permit for the discharge described in the application. Permit requirements are based on federal regulations (40 CFR Parts 122, 124, and Subchapter N), the National Pretreatment Regulation in 40 CFR Part 403 and regulations promulgated pursuant to the Arkansas Water and Air Pollution Control Act (Act 472 of 1949, as amended, Ark. Code Ann. 8-4-101 et. seq.).

a. **Final Effluent Limitations**

Outfall 001 with a design flow of 6.3 MGD.

i. **Conventional and/or Toxic Pollutants**

<u>Effluent Characteristics</u>	<u>Discharge Limitations</u>			<u>Monitoring Requirements</u>	
	Mass (lbs/day, unless otherwise specified)	Concentration (mg/l, unless otherwise specified)		Frequency	Sample Type
		Monthly Avg.	Monthly Avg.		
Flow	N/A	N/A	N/A	once/day	totalizing meter
Carbonaceous Biochemical Oxygen Demand (CBOD5) (May-Oct)	525	10	15	three/week	24-hr comp.
(Nov-Apr)	788	15	22.5	three/week	24-hr comp.
Total Suspended Solids (TSS)	788	15	22.5	three/week	24-hr comp.
Ammonia Nitrogen (NH3-N) (April)	110	2.1	3.2	three/week	24-hr comp.
(May-Oct)	79	1.5	2.3	three/week	24-hr comp.
(Nov-Mar)	210	4	6	three/week	24-hr comp.
Dissolved Oxygen (May-Oct)	N/A	7.0, (Monthly Avg. Min.)		three/week	Grab
(Nov-Apr)	N/A	7.5, (Monthly Avg. Min.)		three/week	Grab
Fecal Coliform Bacteria (FCB) (April - September)	N/A	(colonies/100ml) 200 400		three/week	Grab
(October - March)	N/A	1000 2000		three/week	Grab
Total Residual Chlorine (TRC)	N/A	<0.1 mg/l (Inst. Max.)		three/week	Grab
Total Hardness	N/A	41, (Inst. Min.)		once/month	Grab
Total Phosphorus (TP)	N/A	Report	Report	three/week	Grab
Total Nitrate + Nitrite Nitrogen (as N)	N/A	Report	Report	three/week	Grab
pH	N/A	<u>Minimum</u> 6.0 s.u.	<u>Maximum</u> 9.0 s.u.	three/week	Grab
Chronic Biomonitoring	N/A	See Page 16, #15 below		once/quarter	24-hr comp.

ii. **Solids and Foam:** There shall be no discharge of distinctly visible solids, scum or foam of a persistent nature, nor shall there be any formation of slime, bottom deposits or sludge banks.

b. **Final Effluent Limitations**

Outfall 001 with a design flow of 8.3 MGD.

i. **Conventional and/or Toxic Pollutants**

<u>Effluent Characteristics</u>	<u>Discharge Limitations</u>			<u>Monitoring Requirements</u>	
	Mass (lbs/day, unless otherwise specified)	Concentration (mg/l, unless otherwise specified)		Frequency	Sample Type
		Monthly Avg.	Monthly Avg.		
Flow	N/A	N/A	N/A	once/day	totalizing meter
Carbonaceous Biochemical Oxygen Demand (CBOD5) (May-Oct)	692	10	15	three/week	24-hr comp.
(Nov-Apr)	1038	15	22.5	three/week	24-hr comp.
Total Suspended Solids (TSS)	1038	15	22.5	three/week	24-hr comp.
Ammonia Nitrogen (NH3-N) (April)	145	2.1	5.2	three/week	24-hr comp.
(May-Oct)	104	1.5	2.3	three/week	24-hr comp.
(Nov-Mar)	277	4	6	three/week	24-hr comp.
Dissolved Oxygen (May-Oct)	N/A	7.0 (Monthly Avg. Min.)		three/week	Grab
(Nov-Apr)	N/A	7.5 (Monthly Avg. Min.)		three/week	Grab
Fecal Coliform Bacteria (FCB) (April - September)	N/A	(colonies/100ml) 200 400		three/week	Grab
(October - March)	N/A	1000 2000		three/week	Grab
Total Hardness	N/A	41, (Inst. Min.)		once/month	Grab
Total Phosphorus (TP)	N/A	Report	Report	three/week	Grab
Total Nitrate + Nitrite Nitrogen (as N)	N/A	Report	Report	three/week	Grab
pH	N/A	<u>Minimum</u> 6.0 s.u.	<u>Maximum</u> 9.0 s.u.	three/week	Grab
Chronic Biomonitoring	N/A	See Page 16, #15 below		once/quarter	24-hr comp.

- ii. **Solids and Foam:** There shall be no discharge of distinctly visible solids, scum or foam of a persistent nature, nor shall there be any formation of slime, bottom deposits or sludge banks:

13. BASIS FOR PERMIT CONDITIONS.

The following is an explanation of the derivation of the conditions of the permit and the reasons for them or, in the case of notices of intent to deny or terminate, reasons suggesting the decisions as required under 40 CFR Part 124.7 (48 FR 1413, April 1, 1983).

Technology-Based Versus Water Quality-Based Effluent Limitations And Conditions

Following regulations promulgated at 40 CFR Part 122.44(1)(2)(ii), the permit limits are based on either technology-based effluent limits pursuant to 40 CFR Part 122.44(a) or on State water quality standards and requirements pursuant to 40 CFR Part 122.44(d), whichever are more stringent as follows:

Parameter	Water Quality-Based		Technology-Based/BPJ		Previous Permit		Final Permit Limit	
	Monthly Avg. mg/l	7-day Avg. mg/l	Monthly Avg. mg/l	7-day Avg. mg/l	Monthly Avg. mg/l	7-day Avg. mg/l	Monthly Avg. mg/l	7-day Avg. mg/l
CBOD5								
(May-Oct)	10	15	25	40	10	15	10	15
(Nov-Apr)	15	22.5	25	40	15	22.5	15	22.5
TSS	15	22.5	30	45	15	22.5	15	22.5
NH3-N								
(April)	2.1	5.2	N/A	N/A	4	6	2.1	5.2
(May-Oct)	1.5	2.3	N/A	N/A	1.5	2.3	1.5	2.3
(Nov-March)	4	6	N/A	N/A	4	6	4	6
Dissolved Oxygen								
(May-Oct)	7.0 (Monthly Avg. Min.)		N/A		7.0 (Inst. Min.)		7.0 (Monthly Avg. Min.)	
(Nov-Apr)	7.5 (Monthly Avg. Min.)		N/A		7.5 (Inst. Min.)		7.5 (Monthly Avg. Min.)	
FCB (col/100 ml)								
(Apr-Sept)	200	400	N/A	N/A	200	400	200	400
(Oct-Mar)	1000	2000	N/A	N/A	1000	2000	1000	2000
TRC (Inst. Max) ¹	N/A		<0.1 mg/l		<0.1 mg/l		<0.1 mg/l	
Total Recoverable Copper ²	12.20 µg/l	24.48 µg/l	N/A	N/A	12.20 µg/l	24.48 µg/l	Replaced with a Total Hardness limit.	

Parameter	Water Quality-Based		Technology-Based/BPJ		Previous Permit		Final Permit Limit	
	Monthly Avg. mg/l	7-day Avg. mg/l	Monthly Avg. mg/l	7-day Avg. mg/l	Monthly Avg. mg/l	7-day Avg. mg/l	Monthly Avg. mg/l	7-day Avg. mg/l
Total Hardness ²	41 (Inst. Min.)		N/A		N/A		41 (Inst. Min.)	
Total Phosphorus (TP)	N/A	N/A	Report	Report	N/A	N/A	Report	Report
Total Nitrate + Nitrite Nitrogen (as N)	N/A	N/A	Report	Report	N/A	N/A	Report	Report
pH	6.0-9.0 s.u.		6.0-9.0 s.u.		6-9 s.u.		6.0-9.0 s.u.	

¹ The TRC limit will be removed after the new ultraviolet disinfection system is operational.

² The Total Recoverable Copper limit is being removed and replaced with a site specific Total Hardness limit.

Parameter	Water Quality or Technology	Justification
CBOD5	Water Quality	MultiSMP Model dated February 5, 2008
TSS	Water Quality	MultiSMP Model dated February 5, 2008
NH3-N ¹	Water Quality & Previous Permit	Section 2.512 of Regulation No. 2/ MultiSMP Model dated February 5, 2008
DO	Water Quality	Section 2.505 of Regulation No. 2
Fecal Coliform Bacteria	Water Quality	Section 2.507 of Regulation No. 2
TRC ²	Technology & Previous Permit	Section 2.508 of Regulation No. 2
Total Hardness ³	Water Quality	Section 2.508 of Regulation No. 2
TP ⁴	Water Quality	Appendix D of the Continuous Planning Process (CPP)
Nitrate + Nitrite ⁴	Water Quality	Appendix D of the CPP
pH	Water Quality	Section 2.504 of Regulation No. 2

¹ The NH3-N limits for the months of November – March are based on the previous permit in lieu of the most recent limits from the MultiSMP Model. Based on the previous sampling history, the Department feels that the permittee can meet the more stringent limits.

² The TRC limit will be removed after the new ultraviolet disinfection system is operational.

³ The Total Recoverable Copper limit from the previous permit is being replaced with a site specific Total Hardness limit.

⁴ In order to establish a database of point source loadings of nutrients to waters of the state of Arkansas, a requirement for monitoring and reporting of these parameters have been included.

a. **Anti-backsliding**

The permit is consistent with the requirements to meet Anti-backsliding provisions of the Clean Water Act (CWA), Section 402(o) [40 CFR 122.44(l)]. The final effluent limitations for re-issuance permits must be as stringent as those in the previous permit, unless the less stringent-limitations can be justified using exceptions listed in 40 CFR 122.44(l)(2)(i).

The permit maintains the requirements of the previous permit with the exception of the removal of the Total Residual Chlorine (TRC) limit upon installation and operation of the new ultraviolet disinfection system and the removal of the Total Recoverable Copper limit in lieu of a Total Hardness limit. The Total Recoverable Copper limit in the previous permit was based on an Ecoregion hardness value of 31 mg/l. In order to obtain a more accurate representation of the City of Benton's receiving stream, the City conducted a study to determine the in-stream hardness value. The results of the study showed that the in-stream hardness is consistently well above 41 mg/l. Using this in-stream hardness value to determine reasonable potential eliminated the need for a Total Recoverable Copper limit. As allowed in 40 CFR 122.44(d)(1)(vi)(C)(1), a Total Hardness limit of 41 mg/l has replaced the Total Recoverable Copper limit from the previous permit. Compliance with the Total Hardness limit will be reviewed on a monthly basis. If compliance is not consistently demonstrated, the permit may be re-opened to include a Total Recoverable Copper limit.

These revisions are allowed in accordance with the federal regulations at 40 CFR 122.44(l)(2)(i)(A) and 122.44(l)(2)(i)(B)(1), respectively.

b. **Limits Calculations**

i. Mass limits:

The calculation of the loadings (lbs per day) uses a design flow of 6.3 MGD for the Interim Limits and 8.3 MGD for the Final Limits and the following equation: $\text{lbs/day} = \text{Concentration (mg/l)} \times \text{Flow (MGD)} \times 8.34$

ii. Daily Maximum Limits:

Daily Maximum limits = Monthly average limits X 1.5

iii. Ammonia-Nitrogen (NH₃-N):

The water quality effluent limitations for Ammonia are based either on DO-based effluent limits or on toxicity-based standards, whichever are more stringent. The toxicity-based effluent limitations are based on Chapter 5, Section 2.512 of APCEC Regulation No. 2 and an ADEQ internal memo dated March 28, 2005. The following formula has been used to calculate toxicity based Ammonia limits:

$$Cd = (IWC(Qd + Qb) - CbQb)/Qd,$$

Where:

Cd = effluent limit concentration

IWC = Ammonia toxicity standard for Ecoregion

Qd = design flow

Qb = Critical flow of the receiving stream is 67 percent of the 7-day, 10-year low-flow (7Q10) for the receiving stream.

Cb = background concentration

c. **208 Plan (Water Quality Management Plan)**

The 208 Plan, developed by the ADEQ under provisions of Section 208 of the federal Clean Water Act, is a comprehensive program to work toward achieving federal water goals in Arkansas. The initial 208 Plan, adopted in 1979, provides for annual updates, but can be revised more often if necessary. The 208 Plan has been revised to increase the design flow to 8.3 MGD and to lower the water quality limit for NH₃-N in April to 2.1 mg/l. The existing water quality limitations are:

May-October: CBOD₅/TSS/NH₃-N/DO = 10/15/1.5/7.0 mg/l

November-March: CBOD₅/TSS/NH₃-N/DO = 15/15/4/7.5 mg/l

April: CBOD₅/TSS/NH₃-N/DO = 15/15/2.1/7.5 mg/l

Design flow (Q): 8.3 MGD

Background Flow of the receiving stream (7Q10): 0 cfs

d. **Toxics Pollutants**

i. Post Third Round Policy and Strategy

Section 101 of the Clean Water Act (CWA) states that "...it is the national policy that the discharge of toxic pollutants in toxic amounts be prohibited...". To insure that the CWA's prohibitions on toxic discharges are met, EPA has issued a "Policy for the Development of Water Quality-Based Permit Limitations by Toxic Pollutants"(49 FR 9016-9019,3/9/84). In support of the national policy, Region 6 adopted the "Policy for post Third Round Permitting" and the "Post Third Round Permit Implementation Strategy" on October 1, 1992. The Regional policy and strategy are designed to insure that no source will be allowed to discharge any wastewater which (1) results in instream aquatic toxicity; (2) causes a violation of an applicable narrative or numerical State water quality standard resulting in non-conformance with the provisions of 40 CFR Part 122.44(d); (3) results in the endangerment of a drinking water supply; or (4) results in aquatic bioaccumulation which threatens human health.

ii. Implementation

The State of Arkansas is currently implementing EPA's Post Third-Round Policy in conformance with the EPA Regional strategy. The 5-year discharge permits contain technology-based effluent limitations reflecting the best controls available. Where these technology-based permit limits do not protect water quality or the designated uses, or where there are no applicable technology-based limits, additional water quality-based effluent limitations and/or conditions are included in the discharge permits. State narrative and numerical water quality standards from Regulation No. 2 are used in conjunction with EPA criteria and other available toxicity information to determine the adequacy of technology-based permit limits and the need for additional water quality-based controls.

iii. Priority Pollutant Scan (PPS)

In accordance with the regional policy ADEQ has reviewed and evaluated the effluent in evaluating the potential toxicity of each analyzed pollutant:

- (a) The results were evaluated and compared to EPA's Minimum Quantification Levels (MQLs) to determine the potential presence of a respective toxic pollutant. Those pollutants which are greater than or equal to the MQLs are determined to be reasonably present in the effluent and an evaluation of their potential toxicity is necessary.
- (b) Those pollutants with one datum shown as "non-detect" (ND), providing the level of detection is equal to or lower than MQL are determined to be not potentially present in the effluent and eliminated from further evaluation.
- (c) Those pollutants with a detectable value even if below the MQL are determined to be reasonably present in the effluent and an evaluation of their potential toxicity is necessary.
- (d) For those pollutants with multiple data values and all values are determined to be non-detect, therefore no further evaluation is necessary. However, where data set includes some detectable concentrations and some values as ND, one-half of the detection level is used for those values below the level of detection to calculate the geometric mean of the data set.

The concentration of each pollutant after mixing with the receiving stream was compared to the applicable water quality standards as established in the Arkansas Water Quality Standards, Reg. No. 2 and with the aquatic

toxicity, human health, and drinking water criteria obtained from the "Quality Criteria for Water, 1986 (Gold Book)". The following expression was used to calculate the pollutant instream waste concentration (IWC):

$$IWC = ((C_e \times Q_e) + (C_b \times Q_b)) / (Q_e + Q_b)$$

where:

IWC = instream concentration of pollutant after mixing with receiving stream ($\mu\text{g/l}$)

C_e = pollutant concentration in effluent ($\mu\text{g/l}$)

Q_e = effluent flow of facility (cfs)

C_b = background concentration of pollutant in receiving stream ($\mu\text{g/l}$)

Q_b = background flow of receiving stream (cfs)

The following values were used in the IWC calculations:

C_e = varies with pollutant. A single value from the Priority Pollutant Screen (PPS) submitted by the permittee as part of the discharge permit application or the geometric mean of a group of data points (less than 20 data points) is multiplied by a factor of 2.13. This factor is based on EPA's Region VI procedure (See attachment IV of Continuing Planning Process (CPP)) to extrapolate limited data sets to better evaluate the potential toxicity for higher effluent concentrations to exceed water quality standards. This procedure employs a statistical approach which yields an estimate of a selected upper percentile value (the 95th percentile) of an effluent data set which would be expected to exceed 95% of effluent concentrations in a discharge. If 20 or more data points during the last two years are available, do not multiply by 2.13, but instead use the maximum reported values.

Q_e = 8.3 MGD = 12.82 cfs

C_b = 0 $\mu\text{g/l}$

Q_b = (See below):

I. Aquatic Toxicity

Chronic Toxicity: Flow = 0 cfs, for comparison with chronic aquatic toxicity. This flow is 67 percent of the 7-day, 10-year low-flow (7Q10) for the receiving stream. The 7Q10 of 0 cfs is based on "Identification and Classification of Perennial Stream of Arkansas", Arkansas Geological Commission Map.

Acute Toxicity: Flow = 0 cfs, for comparison with acute aquatic toxicity. This flow is 33 percent of the 7Q10 for the receiving stream.

II. Bioaccumulation

Flow = 0 cfs, for comparison with bioaccumulation criteria. This flow is the long term average (LTA) of the receiving stream which is based on the "Identification and Classification of Perennial Stream of Arkansas", Arkansas Geological Commission Map.

III. Drinking Water

Flow = 0 cfs, for comparison with drinking water criteria. This flow is the 7Q10 for the receiving stream.

The following values were used to determine limits for the pollutants:

Hardness = 41 mg/l, based on site specific hardness data and a Total Hardness limit.

TSS = 5.5 mg/l, based on attachment V of CPP

pH = 7.09 s.u., based on compliance data from "Arkansas Water Quality Inventory Report" 305(b).

iv. Water Quality Standards for Metals and Cyanide

Standards for Chromium (VI), Mercury, Selenium, and Cyanide are expressed as a function of the pollutant's water-effect ratio (WER), while standards for cadmium, chromium (III), copper, lead, nickel, silver, and zinc are expressed as a function of the pollutant's water-effect ratio, and as a function of hardness.

The Water-effect ratio (WER) is assigned a value of 1.0 unless scientifically defensible study clearly demonstrates that a value less than 1.0 is necessary or a value greater than 1.0 is sufficient to fully protect the designated uses of the receiving stream from the toxic effects of the pollutant.

The WER approach compares bioavailability and toxicity of a specific pollutant in receiving water and in laboratory test water. It involves running toxicity tests for at least two species, measuring LC50 for the pollutant using the local receiving water collected from the site where the criterion is being implemented, and laboratory toxicity testing water made comparable to the site water in terms of chemical hardness. The ratio between site water and lab water LC50 is used to adjust the national acute and chronic criteria to site specific values.

v. Conversion of Dissolved Metals Criteria for Aquatic Life to Total Recoverable Metal

Metals criteria established in APCEC Regulation No. 2, Section 2.508 for aquatic life protection are based on dissolved metals concentrations and hardness values. However, Federal Regulations cited at 40 CFR Part 122.45(c) require that effluent limitations for metals in discharge permits be expressed as total recoverable based on Attachment V of CPP. Therefore a dissolved to the total recoverable metal conversion must be implemented. This involves determining a linear partition coefficient for the metal of concern and using this coefficient to determine the fraction of metal dissolved, so that the dissolved metal ambient criteria may be translated to a total effluent limit. The formula for converting dissolved metals to total recoverable metals for streams and lakes are provided in Attachment V of CPP and Region 6 Implementation Guidance for Arkansas Water Quality Standards promulgated at 40 CFR Part 131.36.

vi. Comparison of the submitted information with the water quality standards and criteria

The following pollutants were determined to be present in the effluent for each pollutant as reported by the permittee.

Pollutant	Concentration Reported, µg/l	MQL, µg/l
Zinc	37.3 ¹	20
Copper, Total Recoverable	13.7 ²	10

¹ One data concentration value from Priority Pollutant Scan (PPS).

² Highest concentration value from previous 2 years of sampling data.

However, ADEQ has determined from the information submitted by the permittee that no water quality standards or Gold Book criteria are exceeded. Therefore, no permit action is necessary to maintain these standards or criteria.

14. **TOTAL RESIDUAL CHLORINE (TRC) REQUIREMENTS.** The TRC limit will be removed after the new ultraviolet disinfection system is operational.

After dechlorination and prior to final disposal, the effluent shall contain NO MEASURABLE TRC at any time. NO MEASURABLE will be defined as no detectable concentration of TRC as determined by any approved method established in 40 CFR Part 136 as less than 0.1 mg/l. Thus, the “no measurable TRC concentration” for chlorine becomes the permit limit. The effluent limitation for TRC is the instantaneous maximum and cannot be averaged for reporting purposes. TRC shall be measured with fifteen (15) minutes of sampling.

15. BIOMONITORING.

Section 101(a)(3) of the Clean Water Act states that ".....it is the national policy that the discharge of toxic pollutants in toxic amounts be prohibited." In addition, ADEQ is required under 40 CFR Part 122.44(d)(1), adopted by reference in Regulation 6, to include conditions as necessary to achieve water quality standards as established under Section 303 of the Clean Water Act. Arkansas has established a narrative criteria which states "toxic materials shall not be present in receiving waters in such quantities as to be toxic to human, animal, plant or aquatic life or to interfere with the normal propagation, growth and survival of aquatic biota."

Whole effluent biomonitoring is the most direct measure of potential toxicity which incorporates the effects of synergism of effluent components and receiving stream water quality characteristics. It is the national policy of EPA to use bioassays as a measure of toxicity to allow evaluation of the effects of a discharge upon a receiving water (49 Federal Register 9016-9019, March 9, 1984). EPA Region 6 and the State of Arkansas are now implementing the Post Third Round Policy and Strategy established on September 9, 1992, and EPA Region 6 Post-Third Round Whole Effluent Toxicity Testing Frequencies, revised March 13, 2000. Biomonitoring of the effluent is thereby required as a condition of this permit to assess potential toxicity. The biomonitoring procedures stipulated as a condition of this permit are as follows:

TOXICITY TESTS	FREQUENCY
Chronic Biomonitoring	Once/quarter

Requirements for measurement frequency are based on appendix D of CPP.

Since 7Q10 is less than 100 cfs (ft³/sec) and dilution ratio is less than 100:1, chronic biomonitoring requirements will be included in the permit.

The calculations for dilution used for chronic biomonitoring are as follows:

$$\text{Critical dilution (CD)} = (Q_d / (Q_d + Q_b)) \times 100$$

$$Q_d = \text{Design flow} = 8.3 \text{ MGD} = 12.82 \text{ cfs}$$

$$7Q_{10} = 0 \text{ Cfs}$$

$$Q_b = \text{Background flow} = (0.67) \times 7Q_{10} = 0 \text{ cfs}$$

$$\text{Since } 7Q_{10} = 0 \text{ cfs then } CD = 100\%$$

Toxicity tests shall be performed in accordance with protocols described in "Short-term Methods for Estimating the Chronic Toxicity of Effluents and Receiving Waters to Freshwater Organisms", EPA/600/4-91/002, July 1994. A minimum of five effluent dilutions in addition to an appropriate control (0%) are to be used in the toxicity tests.

These additional effluent concentrations are **32%, 42%, 56%, 75%, and 100%** (See **Attachment I** of CPP). The low-flow effluent concentration (critical dilution) is defined as 100% effluent. The requirement for chronic biomonitoring tests is based on the magnitude of the facility's discharge with respect to receiving stream flow. The stipulated test species, *Ceriodaphnia dubia* and the Fathead Minnow (*Pimephales promelas*) are indigenous to the geographic area of the facility; the use of these is consistent with the requirements of the State water quality standards. The biomonitoring frequency has been established to provide data representative of the toxic potential of the facility's discharge, in accordance with the regulations promulgated at 40 CFR Part 122.48.

Results of all dilutions as well as the associated chemical monitoring of pH, temperature, hardness, dissolved oxygen conductivity, and alkalinity shall be reported according to EPA/600/4-91/002, July 1994 and shall be submitted as an attachment to the Discharge Monitoring Report (DMR).

This permit may be re-opened to require further biomonitoring studies, Toxicity Reduction Evaluation (TRE) and/or effluent limits if biomonitoring data submitted to the Department shows toxicity in the permittee's discharge. Modification or revocation of this permit is subject to the provisions of 40 CFR 122.62, as adopted by reference in ADEQ Regulation No. 6. Increased or intensified toxicity testing may also be required in accordance with Section 308 of the Clean Water Act and Section 8-4-201 of the Arkansas Water and Air Pollution Control Act (Act 472 of 1949, as amended).

Administrative Records

The following information summarized toxicity test submitted by the permittee during the term of the current permit at outfall **001**:

BIOMONITORING FREQUENCY RECOMMENDATION AND RATIONALE FOR ADDITIONAL REQUIREMENTS

Permit Number: **AR0036498**
Facility Name: **City of Benton**
Previous Critical Dilution: **100%** Proposed Critical Dilution: **100%**
Date of Review: **01/02/08** Name of Reviewer: **Barnett**

Number of tests performed during previous 5 years by species:
***Pimephales promelas* (Fathead minnow): 22**
***Ceriodaphnia dubia* (water flea): 22**

Failed test dates during previous 5 years by species:

<i>Pimephales promelas</i> (Fathead minnow):	<u>Lethal</u>	<u>Sublethal</u>
	None	03-03
		04-03
		07-03
		12-06

<i>Ceriodaphnia dubia</i> (water flea):	<u>Lethal</u>	<u>Sublethal</u>
	None	03-05

Previous TRE activities: None

Frequency recommendation by species:

***Pimephales promelas* (Fathead minnow): four/year**

***Ceriodaphnia dubia* (water flea): four/year**

Additional requirements (including WET Limits) rationale/comments concerning permitting:

Rationale: According to the EPA Region 6 Post-Third Round Whole Effluent Toxicity Testing Frequencies: "All major dischargers, and those minor dischargers specifically identified by EPA or the State permitting authority (based on available information on a case-by case basis) as posing a significant unaddressed toxic risk, will be required to perform Whole Effluent Toxicity testing at a frequency of once per quarter for the vertebrate and invertebrate tests species for the first year of a new or reissued permit."

16. **SAMPLE TYPE AND FREQUENCY.**

Regulations require permits to establish monitoring requirements to yield data representative of the monitored activity [40 CFR Part 122.48(b)] and to ensure compliance with permit limitations [40 CFR Part 122.44(i)(1)].

Requirements for sample type and sampling frequency have been based on the current discharge permit.

17. **STORMWATER POLLUTION PREVENTION PLAN REQUIREMENTS.**

In lieu of stormwater pollution prevention plan requirements, a No Exposure Certification (Tracking #ARR00C399) was issued. Under the no exposure certification, any discharge of stormwater not in compliance with the No Exposure Certification requirements is a violation of the permit.

18. **PERMIT COMPLIANCE.**

The permittee shall achieve compliance with the effluent limitations specified for discharges in accordance with the following schedule:

1. Compliance is required on the effective date of the permit.
2. The permittee must sample the wastewater treatment plant's influent and effluent in accordance with the provisions in Part II.7.C once/two (2) months for one year following the effective date of the permit.

3. The permittee must submit annual reports of biosolids analysis in accordance with Part II.8.B.1.b(1) prior to May 1st of each year.

19. MONITORING AND REPORTING.

The applicant is at all times required to monitor the discharge on a regular basis and report the results monthly. The monitoring results will be available to the public.

20. SOURCES.

The following sources were used to finalize the permit:

- a. Application No. AR0036498 received 12/3/2007.
- b. Arkansas Water Quality Management Plan (WQMP).
- c. APCEC Regulation No. 2.
- d. APCEC Regulation No. 3.
- e. APCEC Regulation No. 6.
- f. 40 CFR Parts 122, 125, 133 and 403.
- g. Discharge permit file AR0036498.
- h. Discharge Monitoring Reports (DMRs).
- i. "Arkansas Water Quality Inventory Report 2004 (305B)", ADEQ.
- j. Memo from Mo Shafii to Engineers dated March 28, 2005
- k. "Identification and Classification of Perennial Streams of Arkansas", Arkansas Geological Commission.
- l. Continuing Planning Process (CPP).
- m. Technical Support Document For Water Quality-based Toxic Control.
- n. Region 6 Implementation Guidance for Arkansas Water Quality Standards promulgated at 40 CFR Part 131.36.
- o. Inspection Report dated October 27, 2006.

21. POINT OF CONTACT.

For additional information, contact:

Kimberly A. Fuller, PE, CPESC
Permits Branch, Water Division
Arkansas Department of Environmental Quality
5301 Northshore Drive
North Little Rock, Arkansas 72118-5317
Telephone: (501) 682-0643
Email: fuller@adeq.state.ar.us

**AUTHORIZATION TO DISCHARGE WASTEWATER UNDER
THE NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM AND
THE ARKANSAS WATER AND AIR POLLUTION CONTROL ACT**

In accordance with the provisions of the Arkansas Water and Air Pollution Control Act (Ark. Code Ann. 8-4-101 et seq.), and the Clean Water Act (33 U.S.C. § 1251 et seq.),

Benton Utilities
Wastewater Treatment Plant

is authorized to discharge treated municipal wastewater from a facility located as follows: 616 West Hazel St., Benton, AR 72018, in Saline County. At I-30 exit 116, head east on W. South St., turn south onto S. Richards St., then turn right onto West Hazel Street, and the facility will be on the left.

Facility Coordinates: Latitude: 34° 33' 18" N; Longitude: 92° 35' 38" W

Receiving stream: unnamed tributary of Depot Creek, thence to Depot Creek, thence to the Saline River in Segment 2C of the Ouachita River Basin.

The permitted outfall is located at the following coordinates:

Outfall 001: Latitude: 34° 33' 6" N; Longitude: 92° 35' 36" W

Discharge shall be in accordance with effluent limitations, monitoring requirements, and other conditions set forth in this permit. Per Part III.D.10, the permittee must re-apply 180 days prior to the expiration date below for permit coverage to continue beyond the expiration date.

Effective Date: April 1, 2021
Expiration Date: March 31, 2026



Digitally signed by Alan J. York
DN: cn=Alan J. York, o, ou,
email=alan.york@adeq.state.ar.u
s, c=US
Date: 2021.03.30 15:47:31 -05'00'

03/30/2021

Alan J. York
Associate Director, Office of Water Quality
Arkansas Department of Energy and Environment
Division of Environmental Quality

Issue Date

PART I
PERMIT REQUIREMENTS

SECTION A. EFFLUENT LIMITATIONS AND MONITORING REQUIREMENTS: OUTFALL 001 - treated municipal wastewater.

During the period beginning on the effective date and lasting until the date of expiration, the permittee is authorized to discharge from Outfall 001. Such discharges shall be limited and monitored by the permittee as specified below as well as Parts II and III. See Part IV for all definitions and calculations.

<u>Effluent Characteristics</u>	<u>Discharge Limitations</u>			<u>Monitoring Requirements</u>	
	Mass (lbs/day, unless otherwise specified)	Concentration (mg/l, unless otherwise specified)		Frequency	Sample Type
		Monthly Avg.	Monthly Avg.		
Flow	N/A	Report, MGD	Report, MGD (Daily Max.)	once/day	totalizing meter
Overflows	Monthly Total SSOs (occurrences/month)			See Comments ¹	
Overflow Volume	Monthly Total Volume of SSOs (gallons/month)			See Comments ¹	
Carbonaceous Biochemical Oxygen Demand (CBOD ₅)					
(May – October)	692.2	10	15	three/week	composite
(November – April)	1038.3	15	22.5	three/week	composite
Total Suspended Solids (TSS)	1038.3	15.0	22.5	three/week	composite
Ammonia Nitrogen (NH ₃ -N)					
(April)	166.1	2.4	6.0	three/week	composite
(May – October)	103.8	1.5	2.3	three/week	composite
(November – March)	276.8	4.0	6.0	three/week	composite
Dissolved Oxygen (DO)					
(May – October)	N/A	7.0 (Inst. Min.)		three/week	grab
(November – April)	N/A	7.5 (Inst. Min.)		three/week	grab
Fecal Coliform Bacteria (FCB)		(colonies/100ml)			
(May – September)	N/A	200	400	three/week	grab
(October – April)	N/A	1000	2000	three/week	grab
Total Hardness	N/A	41, Inst. Min.		once/month	grab
Total Dissolved Solids (TDS)	17,034.64 ⁵	Report	Report	once/month	grab
Total Recoverable Mercury ⁴	N/A	Report µg/l	Report µg/l	once/year	composite
Total Phosphorus (TP)	N/A	Report	Report	once/year	grab
Nitrate + Nitrite Nitrogen (NO ₃ + NO ₂ -N)	N/A	Report	Report	once/year	grab
pH	N/A	<u>Minimum</u> 6.0 s.u.	<u>Maximum</u> 9.0 s.u.	three/week	grab

<u>Effluent Characteristics</u>	<u>Discharge Limitations</u>			<u>Monitoring Requirements</u>	
	Mass (lbs/day, unless otherwise specified)	Concentration (mg/l, unless otherwise specified)		Frequency	Sample Type
		Monthly Avg.	Monthly Avg.		
Chronic WET Testing ²					
<u>Pimephales promelas (Chronic)</u> ² Pass/Fail Lethality (7-day NOEC) TLP6C Pass/Fail Growth (7-day NOEC) TGP6C Survival (7-day NOEC) TOP6C Coefficient of Variation (Growth) TQP6C Growth (7-day NOEC) TPP6C Pass/Fail Retest 1 (7-day NOEC) 22418 Pass/Fail Retest 2 (7-day NOEC) 22419 Pass/Fail Retest 3 (7-day NOEC) 51444		Report (Pass=0/Fail=1) Report (Pass=0/Fail=1) Report % Report % Report %	Report (Pass=0/Fail=1) Report (Pass=0/Fail=1) Report (Pass=0/Fail=1)	once/quarter once/quarter once/quarter once/quarter once/month ³ once/month ³ once/month ³	composite composite composite composite composite composite composite
<u>Ceriodaphnia dubia (Chronic)</u> ² Pass/Fail Lethality (7-day NOEC) TLP3B Pass/Fail production (7-day NOEC) TGP3B Survival (7-day NOEC) TOP3B Coefficient of Variation (Reproduction) TQP3B Reproduction (7-day NOEC) TPP3B Pass/Fail Retest 1 (7-day NOEC) 22415 Pass/Fail Retest 2 (7-day NOEC) 22416 Pass/Fail Retest 3 (7-day NOEC) 51443		Report (Pass=0/Fail=1) Report (Pass=0/Fail=1) Report % Report %	Report (Pass=0/Fail=1) Report (Pass=0/Fail=1) Report (Pass=0/Fail=1)	once/quarter once/quarter once/quarter once/quarter once/month ³ once/month ³ once/month ³	composite composite composite composite composite composite composite

¹ See Condition No. 5 of Part II (SSO Condition). If there are no overflows during the entire month, report "zero" (0).

² See Condition No. 8 of Part II (WET Testing Condition).

³ CONDITIONAL REPORTING: Use only if conducting retests due to a test failure (demonstration of significant toxic effects at or below the critical dilution). If testing on a quarterly basis, the permittee may substitute one of the retests in lieu of one routine toxicity test. If retests are not required, Report NODI=9 (Conditional Monitoring - Not Required This Period) under retest parameters.

⁴ See Condition No. 9 of Part II (Metals Condition).

⁵ The TDS limit shall become effective three years from the effective date of the permit. In the interim, the permittee must monitor and report the levels of TDS in the effluent. See Part IB.

Oil, grease, or petrochemical substances shall not be present in receiving waters to the extent that they produce globules or other residue or any visible, colored film on the surface or coat the banks and/or bottoms of the waterbody or adversely affect any of the associated biota. There shall be no visible sheen as defined in Part IV of this permit.

Samples and measurements taken as required herein shall be representative of the volume and nature of the monitored discharge during the entire monitoring period. Samples shall be taken after the final treatment unit and prior to entering the receiving stream.

SECTION B. PERMIT COMPLIANCE SCHEDULE

Additional Testing Requirements

Within 75 days of the effective date of the permit, the permittee must conduct all testing required by EPA Form 2A that is not already required by this NPDES permit. The results of the testing must be submitted to the Division within 90 days of the effective date of the permit.

TDS Schedule of Compliance

Compliance with the Final Effluent Limitations for TDS is required three years after the effective date of the permit. The permittee shall submit progress reports addressing the progress towards attaining the Final Effluent Limitations for the aforementioned parameters according to the following schedule:

<u>ACTIVITY</u>	<u>DUE DATE</u>
Progress Report ^{1,2}	One (1) year from effective date
Progress Report ^{1,3}	Two (2) years from effective date
Achieve Final Compliance ^{1,4}	Three (3) years from effective date

All progress reports must be submitted to the OWQ at the following address:

Enforcement Branch
Office of Water Quality
Division of Environmental Quality
5301 Northshore Drive
North Little Rock, AR 72118-5317

Information can also be submitted electronically via email at water-enforcement-report@adeq.state.ar.us.

¹ If the permittee is already in compliance with a final permit limit, only documentation demonstrating compliance with the final limit will be required for the progress report.

² If the permittee is not in compliance with the Final Limitations following one (1) year of sampling, the initial Progress Report must detail how the permittee plans to come into compliance with the final limits within the remaining 2 years of the interim period. Options must be provided that were considered along with which option* was selected. Any Best Management Practices (BMPs) that have been instituted to reduce the concentration in the influent must also be discussed. If a study will be performed, a milestone schedule for the study must be provided.

* The permittee has the option to undertake any study deemed necessary to meet the final limitations during the interim period. Any additional treatment (including chemical addition) must be approved and construction approval granted prior to final installation.

- ³ The second Progress Report must contain an update on the status of the chosen option from the initial Progress Report. If the facility is not meeting any of the milestones provided in the initial Progress Report, the facility must update the milestone schedule to show how the final limits will be met by the deadline.
- ⁴ A final Progress Report must be submitted no later than 30 days following the final compliance date and include a certification that the final effluent limits were met on the effective date and that the limits are still being met.

PART II OTHER CONDITIONS

1. The operator of this wastewater treatment facility shall be licensed as Class IV by the State of Arkansas in accordance with APC&EC Rule 3.
2. For publicly owned treatment works, the 30-day average percent removal for Carbonaceous Biochemical Oxygen Demand (CBOD₅) and Total Suspended Solids (TSS) shall not be less than 85 percent unless otherwise authorized by the permitting authority in accordance with 40 C.F.R. § 133.102, as adopted by reference in APC&EC Rule 6.
3. In accordance with 40 C.F.R. §§ 122.62 (a)(2) and 124.5, this permit may be reopened for modification or revocation and/or reissuance to require additional monitoring and/or effluent limitations when new information is received that actual or potential exceedance of State water quality criteria and/or narrative criteria are determined to be the result of the permittee's discharge(s) to a relevant water body or a Total Maximum Daily Load (TMDL) is established or revised for the water body that was not available at the time of the permit issuance that would have justified the application of different permit conditions at the time of permit issuance.
4. Other Specified Monitoring Requirements

The permittee may use alternative appropriate monitoring methods and analytical instruments other than as specified in Part I Section A of the permit without a major permit modification under the following conditions:

- The monitoring and analytical instruments are consistent with accepted scientific practices.
- The requests shall be submitted in writing to the Permits Section of the Office of Water Quality of the DEQ for use of the alternate method or instrument.
- The method and/or instrument is in compliance with 40 C.F.R. § 136 or approved in accordance with 40 C.F.R. § 136.5.
- All associated devices are installed, calibrated, and maintained to ensure the accuracy of the measurements and are consistent with the accepted capability of that type of device. The calibration and maintenance shall be performed as part of the permittee's laboratory Quality Control/Quality Assurance program.

Upon written approval of the alternative monitoring method and/or analytical instruments, these methods or instruments must be consistently utilized throughout the monitoring period. DEQ must be notified in writing and the permittee must receive written approval from DEQ if the permittee decides to return to the original permit monitoring requirements.

5. Sanitary Sewer Overflow (SSO) Reporting Requirements:

A. A sanitary sewer overflow is any spill, release or diversion of wastewater from a sanitary sewer collection system including:

1. Any overflow, whether it discharges to the waters of the state or not.
2. An overflow of wastewater, including a wastewater backup into a building (other than a backup caused solely by a blockage or other malfunction in a privately owned sewer or building lateral), even if that overflow does not reach waters of the state.

B. 24-hour Reporting

Overflows that endanger health or the environment shall be orally reported to the Enforcement Branch of the Office of Water Quality by telephone **(501-682-0638)** or by email, waterefsso@adeq.state.ar.us within 24 hours from the time the permittee becomes aware of the circumstance. At a minimum, the following information shall be reported:

1. Permit number and AFIN
2. The location(s) of overflow.
3. The receiving water (If there is one).
4. Cause of overflow.
5. The estimated volume of overflow (gal)

C. 5-day Follow-Up Written web Reporting:

A web written report of overflows shall be provided to DEQ within 5 days of the 24 hours oral report.

A 5-day follow-up written report can be filled-in or downloaded from the DEQ Office of Water Quality/Enforcement Branch Web page at

http://www.adeq.state.ar.us/water/branch_enforcement/forms/ssoreport.asp

D. 24 -hour and 5 days reporting:

24- hour reporting can be filled-in or downloaded from the DEQ Office of Water Quality/Enforcement Branch Web page at address above if all information are available and 5 days reporting is not required.

E. Reporting for All SSOs on DMR

At the end of the month, total the daily occurrences and volumes from all locations on your system and report this number on the DMR. For counting occurrences, each location on the sanitary sewer system where there is an overflow, spill, release, or diversion of wastewater on a given day is counted as one occurrence. For example, if on a given day overflows occur from a manhole at one location and from a damaged pipe at another location then you should record two occurrences for that day.

6. Best Management Practices (BMPs), as defined in Part IV.6, must be implemented for the facility along with the collection system to prevent or reduce the pollution of waters of the State from stormwater runoff, spills or leaks, sludge or waste disposal, or drainage from raw sewage. The permittee must amend the BMPs whenever there is a change in the facility or a change in the operation of the facility.
7. Monitoring Frequency Reduction

With the exception of whole effluent toxicity testing (WET) requirements, the permittee may request a one-time monitoring frequency reduction for pollutants listed in Part I, Section A, *Effluent Limitations and Monitoring Requirements*. Any request for a monitoring frequency reduction must be submitted in writing to DEQ, and signed by the Responsible Official, in accordance with Part III.D.11.A of the permit.

The following requirements must be met before a review of the monitoring frequency reduction request will be performed:

- A. Compliance with the permit limits for at least the last two (2) years for the pollutants for which a request has been made for a monitoring frequency reduction;
- B. No operational or design changes have been made to the facility for at least the last two (2) years (or during period of review, if greater than two (2) years), and are not anticipated for the remaining term of this permit.

If the above conditions are met, a detailed review of the DMR data will be performed for the pollutants for which a monitoring frequency reduction has been requested. Compliance with the limits does not guarantee a monitoring frequency reduction will be granted. Data must show that the average concentration of the pollutants in the discharge are less than 75% of the permit limits for a monitoring frequency reduction to be granted.

If a monitoring frequency reduction is granted, the frequency can be reduced to no less than half the rate of the corresponding frequency listed in Part I, Section A, *Effluent Limitations and Monitoring Frequencies*. For example, a monitoring frequency of 4 per month will not be reduced to less than 2 per month. Additionally, the frequency will be no less frequent than monthly..

8. WHOLE EFFLUENT TOXICITY TESTING (7-DAY CHRONIC NOEC FRESHWATER)A. SCOPE AND METHODOLOGY

- i. The permittee shall test the effluent for toxicity in accordance with the provisions in this section.

APPLICABLE TO FINAL OUTFALL:	001
REPORTED ON DMR AS FINAL OUTFALL:	001
CRITICAL DILUTION (%):	100%
EFFLUENT DILUTION SERIES (%):	32%, 42%, 56%, 75%, & 100%
TESTING FREQUENCY:	once/quarter
COMPOSITE SAMPLE TYPE:	Defined at PART I
TEST SPECIES/METHODS:	40 C.F.R. § 136

Ceriodaphnia dubia chronic static renewal survival and reproduction test, Method 1002.0, EPA-821-R-02-013, or the most recent update thereof. This test should be terminated when 60% of the surviving females in the control produce three broods or at the end of eight days, whichever comes first.

Pimephales promelas (Fathead minnow) chronic static renewal 7-day larval survival and growth test, Method 1000.0, EPA-821-R-02-013, or the most recent update thereof. A minimum of five (5) replicates with eight (8) organisms per replicate must be used in the control and in each effluent dilution of this test.

- ii. The NOEC (No Observed Effect Concentration) is herein defined as the greatest effluent dilution at and below which toxicity (lethal or sub-lethal) that is statistically different from the control (0% effluent) at the 95% confidence level does not occur. Chronic lethal test failure is defined as a demonstration of a statistically significant lethal effect at test completion to a test species at or below the critical dilution. Chronic sub-lethal test failure is defined as a demonstration of a statistically significant sub-lethal effect (i.e., growth or reproduction) at test completion to a test species at or below the critical dilution.
- iii. This permit may be reopened to require whole effluent toxicity limits, chemical specific effluent limits, additional testing, and/or other appropriate actions to address toxicity.

B. PERSISTENT LETHAL and/or SUB-LETHAL EFFECTS

The requirements of this subsection apply only when a toxicity test demonstrates significant lethal and/or sub-lethal effects below the critical dilution. The purpose of retests is to determine the duration of a toxic event. A test that meets all test acceptability criteria and demonstrates significant toxic effects does not need additional confirmation. Such testing cannot confirm or disprove a previous test result.

If a frequency reduction, as specified in Item F, has been granted and any valid test demonstrates significant lethal or sub-lethal effects to a test species below the critical dilution, the frequency of testing for that species is automatically increased to once per quarter for the life of the permit. In addition:

i. Part I Testing Frequency Other Than Monthly

- a. The permittee shall conduct a total of three (3) retests for any species that demonstrates significant toxic effects at or below the critical dilution. The retests shall be conducted monthly during the next three consecutive months. If testing on a quarterly basis, the permittee may substitute one of the retests in lieu of one scheduled toxicity test. A full report shall be prepared for each test required by this section in accordance with procedures outlined in Item D of this section and submitted with the period discharge monitoring report (DMR) to the permitting authority for review.
- b. **IF LETHAL EFFECTS HAVE BEEN DEMONSTRATED** If any of the retests demonstrates significant lethal effects below the critical dilution, the permittee shall initiate Toxicity Reduction Evaluation (TRE) requirements as specified in Item E of this section. The permittee shall notify ADEQ in writing within 5 days of the failure of any retest, and the TRE initiation date will be the test completion date of the first failed retest. A TRE may also be required due to a demonstration of intermittent lethal effects below the critical dilution, or for failure to perform the required retests. A TRE required based on lethal effects should consider any sub-lethal effects as well.
- c. **IF SUB-LETHAL EFFECTS ONLY HAVE BEEN DEMONSTRATED** If any two of the three retests demonstrates significant sub-lethal effects at 75% effluent or lower, the permittee shall initiate the Sub-Lethal Toxicity Reduction Evaluation (TRE_{SL}) requirements as specified in Item E of this section. The permittee shall notify ADEQ in writing within 5 days of the failure of any retest, and the Sub-Lethal Effects TRE initiation date will be the test completion date of the first failed retest. A TRE may be also be required for failure to perform the required retests.
- d. The provisions of Item B.i.a are suspended upon submittal of the TRE Action Plan.

ii. Part I Testing Frequency of Monthly

The permittee shall initiate the Toxicity Reduction Evaluation (TRE) requirements as specified in Item E of this section when any two of three consecutive monthly toxicity tests exhibit significant toxic effects below the critical dilution. A TRE may also be required due to a demonstration of intermittent lethal and/or sub-lethal effects below the critical dilution, or for failure to perform the required retests.

C. REQUIRED TOXICITY TESTING CONDITIONS

i. Test Acceptance

The permittee shall repeat a test, including the control and all effluent dilutions, if the procedures and quality assurance requirements defined in the test methods or in this permit are not satisfied, including the following additional criteria:

- a. The toxicity test control (0% effluent) must have survival equal to or greater than 80%.
- b. The mean number of Ceriodaphnia dubia neonates produced per surviving female in the control (0% effluent) must be 15 or more.
- c. 60% of the surviving control females must produce three broods.
- d. The mean dry weight of surviving Fathead minnow larvae at the end of the 7 days in the control (0% effluent) must be 0.25 mg per larva or greater.
- e. The percent coefficient of variation between replicates shall be 40% or less in the control (0% effluent) for: the young of surviving females in the Ceriodaphnia dubia reproduction test; the growth and survival endpoints of the Fathead minnow test.
- f. The percent coefficient of variation between replicates shall be 40% or less in the critical dilution, unless significant lethal or sub-lethal effects are exhibited for: the young of surviving females in the Ceriodaphnia dubia reproduction test; the growth and survival endpoints of the Fathead minnow test.
- g. If a test passes, yet the percent coefficient of variation between replicates is greater than 40% in the control (0% effluent) and/or in the critical dilution for: the young of surviving females in the Ceriodaphnia dubia reproduction test; the growth and survival endpoints of the Fathead minnow test, the test is determined to be invalid. A repeat test shall be conducted within the required reporting period of any test determined to be invalid.
- h. If a test fails, test failure may not be construed or reported as invalid due to a coefficient of variation value of greater than 40%.
- i. A Percent Minimum Significant Difference (PMSD) range of 13 - 47 for Ceriodaphnia dubia reproduction;

j. A PMSD range of 12 - 30 for Fathead minnow growth.

ii. Statistical Interpretation

- a. For the Ceriodaphnia dubia survival test, the statistical analyses used to determine if there is a significant difference between the control and the critical dilution shall be Fisher's Exact Test as described in EPA/821/R-02-013 or the most recent update thereof.
- b. For the Ceriodaphnia dubia reproduction test and the Fathead minnow larval survival and growth test, the statistical analyses used to determine if there is a significant difference between the control and the critical dilution shall be in accordance with the methods for determining the No Observed Effect Concentration (NOEC) as described in EPA/821/R-02-013 or the most recent update thereof.
- c. If the conditions of Test Acceptability are met in Item C.i above and the percent survival of the test organism is equal to or greater than 80% in the critical dilution concentration and all lower dilution concentrations, the test shall be considered to be a passing test, and the permittee shall report a survival NOEC of not less than the critical dilution for the DMR reporting requirements found in Item D below.

iii. Dilution Water

- a. Dilution water used in the toxicity tests will be receiving water collected as close to the point of discharge as possible but unaffected by the discharge. The permittee shall substitute synthetic dilution water of similar pH, hardness, and alkalinity to the closest downstream perennial water for;
 - (1) toxicity tests conducted on effluent discharges to receiving water classified as intermittent streams; and
 - (2) toxicity tests conducted on effluent discharges where no receiving water is available due to zero flow conditions.
- b. If the receiving water is unsatisfactory as a result of instream toxicity (fails to fulfill the test acceptance criteria of Item C.i), the permittee may substitute synthetic dilution water for the receiving water in all subsequent tests provided the unacceptable receiving water test met the following stipulations:
 - (1) a synthetic dilution water control which fulfills the test acceptance requirements of Item C.i was run concurrently with the receiving water control;
 - (2) the test indicating receiving water toxicity has been carried out to completion (i.e., 7 days);
 - (3) the permittee includes all test results indicating receiving water toxicity with the full report and information required by Item D below; and

- (4) the synthetic dilution water shall have a pH, hardness, and alkalinity similar to that of the receiving water or closest downstream perennial water not adversely affected by the discharge, provided the magnitude of these parameters will not cause toxicity in the synthetic dilution water.

iv. Samples and Composites

- a. The permittee shall collect a minimum of three flow-weighted composite samples from the outfall(s) listed at Item A.i above. Unless otherwise stated in this section, a composite sample for WET shall consist of a minimum of 12 subsamples gathered at equal time intervals during a 24-hour period.
- b. The permittee shall collect second and third composite samples for use during 24-hour renewals of each dilution concentration for each test. The permittee must collect the composite samples such that the effluent samples, on use, are representative of any periodic episode of chlorination, biocide usage or other potentially toxic substance discharged on a regular or intermittent basis.
- c. The permittee must collect all three flow-weighted composite samples within the monitoring period. Second and/or third composite samples shall not be collected into the next monitoring period; such tests will be determined to not meet either reporting period requirements. Monitoring period definitions are listed in Part IV.
- d. The permittee must collect the composite samples so that the maximum holding time for any effluent sample shall not exceed 72 hours. The permittee must have initiated the toxicity test within 36 hours after the collection of the last portion of the first composite sample. Samples shall be chilled to between 0 and 6 degrees Centigrade during collection, shipping, and/or storage.
- e. If the flow from the outfall(s) being tested ceases during the collection of effluent samples, the requirements for the minimum number of effluent samples, the minimum number of effluent portions and the sample holding time are waived during that sampling period. However, the permittee must have collected an effluent composite sample volume during the period of discharge that is sufficient to complete the required toxicity tests with daily renewal of effluent. When possible, the effluent samples used for the toxicity tests shall be collected on separate days if the discharge occurs over multiple days. The effluent composite sample collection duration and the static renewal protocol associated with the abbreviated sample collection must be documented in the full report required in Item D of this section.
- f. MULTIPLE OUTFALLS: If the provisions of this section are applicable to multiple outfalls, the permittee shall combine the composite effluent samples in proportion to the average flow from the outfalls listed in Item A.i. above for the day the sample was collected. The permittee shall perform the toxicity test on the flow-weighted composite of the outfall samples.

- g. If chlorination is part of the treatment process, the permittee shall not allow the sample to be dechlorinated at the laboratory. At the time of sample collection the permittee shall measure the TRC of the effluent. The measured concentration of TRC for each sample shall be included in the lab report submitted by the permittee.

D. REPORTING

- i. The permittee shall prepare a full report of the results of all tests conducted pursuant to this section in accordance with the Report Preparation Section of EPA/821/R-02-013, or the most current publication, for every valid or invalid toxicity test initiated whether carried to completion or not. The permittee shall retain each full report pursuant to the provisions of PART III.C.7 of this permit. The permittee shall submit full reports. For any test or retest which fails, is considered invalid or which is terminated early for any reason, the full report must be submitted for agency review.
- ii. A valid test for each species must be reported on the DMR during each reporting period specified in PART I of this permit. The full reports for all invalid tests, repeat tests (for invalid tests), and retests (for tests previously failed) performed during the reporting period must be attached to the DMR for Agency review.
- iii. The permittee shall submit the results of each valid toxicity test and retest on the subsequent monthly DMR for that reporting period in accordance with PART III.D.4 of this permit, as follows below. Only results of valid tests are to be reported on the DMR.
- a. Pimephales promelas (Fathead minnow)
- (1) If the No Observed Effect Concentration (NOEC) for survival is less than the critical dilution, enter a '1'; otherwise, enter a '0' for Parameter No. TLP6C
 - (2) Report the NOEC value for survival, Parameter No. TOP6C
 - (3) Report the NOEC value for growth, Parameter No. TPP6C
 - (4) If the NOEC for growth is less than the critical dilution, enter a '1'; otherwise, enter a '0' for Parameter No. TGP6C
 - (5) Report the highest (critical dilution or control) Coefficient of Variation for growth, Parameter No. TQP6C
 - (6) If conducting retests due to a test failure (demonstration of significant toxic effects at or below the critical dilution):
 - (A) Consecutive Monthly Retest 1: If the NOEC (lowest lethal or sub-lethal) for *P. promelas* is less than the critical dilution, enter a '1'; otherwise, enter a '0' under Parameter No. 22418;

- (B) Consecutive Monthly Retest 2: If the NOEC (lowest lethal or sub-lethal) for *P. promelas* is less than the critical dilution, enter a '1'; otherwise, enter a '0' under Parameter No. 22419;
- (C) Consecutive Monthly Retest 3: If the NOEC (lowest lethal or sub-lethal) for *P. promelas* is less than the critical dilution, enter a '1'; otherwise, enter a '0' under Parameter No. 51444;
- (D) If testing on a quarterly basis, the permittee may substitute one of the retests in lieu of one scheduled toxicity test;
- (E) If retests are not required, Report NODI=9 (Conditional Monitoring - Not Required This Period) under Parameter Nos. 22418, 22419, 51444

b. Ceriodaphnia dubia

- (1) If the NOEC for survival is less than the critical dilution, enter a '1'; otherwise, enter a '0' for Parameter No. TLP3B
- (2) Report the NOEC value for survival, Parameter No. TOP3B
- (3) Report the NOEC value for reproduction, Parameter No. TPP3B
- (4) If the NOEC for reproduction is less than the critical dilution, enter a '1'; otherwise, enter a '0' for Parameter No. TGP3B
- (5) Report the higher (critical dilution or control) Coefficient of Variation for reproduction, Parameter No. TQP3B
- (6) If conducting retests due to a test failure (demonstration of significant toxic effects at or below the critical dilution):
 - (A) Consecutive Monthly Retest 1: If the NOEC (lowest lethal or sub-lethal) for *C. dubia* is less than the critical dilution, enter a '1'; otherwise, enter a '0' under Parameter No. 22415;
 - (B) Consecutive Monthly Retest 2: If the NOEC (lowest lethal or sub-lethal) for *C. dubia* is less than the critical dilution, enter a '1'; otherwise, enter a '0' under Parameter No. 22416;
 - (C) Consecutive Monthly Retest 3: If the NOEC (lowest lethal or sub-lethal) for *C. dubia* is less than the critical dilution, enter a '1'; otherwise, enter a '0' under Parameter No. 51443;
 - (D) If testing on a quarterly basis, the permittee may substitute one of the retests in lieu of one scheduled toxicity test;

(E) If retests are not required, Report NODI=9 (Conditional Monitoring - Not Required This Period) under Parameter Nos. 22415, 22416, and 51443

E. TOXICITY REDUCTION EVALUATIONS (TREs)

TREs for lethal and sub-lethal effects are performed in a very similar manner. EPA Region 6 is currently addressing TREs as follows: a sub-lethal TRE (TRE_{SL}) is triggered based on three sub-lethal test failures while a lethal effects TRE (TRE_L) is triggered based on only two test failures for lethality. In addition, EPA Region 6 will consider the magnitude of toxicity and use flexibility when considering a TRE_{SL} where there are no effects at effluent dilutions of 75% or lower.

- i. Within ninety (90) days of confirming toxicity, as outlined above, the permittee shall submit a Toxicity Reduction Evaluation (TRE) Action Plan and Schedule for conducting a TRE. The TRE Action Plan shall specify the approach and methodology to be used in performing the TRE. A Toxicity Reduction Evaluation is an investigation intended to determine those actions necessary to achieve compliance with water quality-based effluent limits by reducing an effluent's toxicity to an acceptable level. A TRE is defined as a step-wise process which combines toxicity testing and analyses of the physical and chemical characteristics of a toxic effluent to identify the constituents causing effluent toxicity and/or treatment methods which will reduce the effluent toxicity. The goal of the TRE is to maximally reduce the toxic effects of effluent at the critical dilution and includes the following:
 - a. **Specific Activities.** The plan shall detail the specific approach the permittee intends to utilize in conducting the TRE. The approach may include toxicity characterizations, identifications and confirmation activities, source evaluation, treatability studies, or alternative approaches. When the permittee conducts Toxicity Characterization Procedures the permittee shall perform multiple characterizations and follow the procedures specified in the documents 'Methods for Aquatic Toxicity Identification Evaluations: Phase I Toxicity Characterization Procedures' (EPA-600/6-91/003) and 'Toxicity Identification Evaluation: Characterization of Chronically Toxic Effluents, Phase I' (EPA-600/6-91/005F), or alternate procedures. When the permittee conducts Toxicity Identification Evaluations and Confirmations, the permittee shall perform multiple identifications and follow the methods specified in the documents 'Methods for Aquatic Toxicity Identification Evaluations, Phase II Toxicity Identification Procedures for Samples Exhibiting Acute and Chronic Toxicity' (EPA/600/R-92/080) and 'Methods for Aquatic Toxicity Identification Evaluations, Phase III Toxicity Confirmation Procedures for Samples Exhibiting Acute and Chronic Toxicity' (EPA/600/R-92/081), as appropriate.

The documents referenced above may be obtained through the National Technical Information Service (NTIS) by phone at (703) 487-4650, or by writing:

U.S. Department of Commerce
National Technical Information Service
5285 Port Royal Road
Springfield, VA 22161

- b. Sampling Plan (e.g., locations, methods, holding times, chain of custody, preservation, etc.). The effluent sample volume collected for all tests shall be DEQuate to perform the toxicity test, toxicity characterization, identification and confirmation procedures, and conduct chemical specific analyses when a probable toxicant has been identified;
 - c. Where the permittee has identified or suspects specific pollutant(s) and/or source(s) of effluent toxicity, the permittee shall conduct, concurrent with toxicity testing, chemical specific analyses for the identified and/or suspected pollutant(s) and/or source(s) of effluent toxicity. Where lethality was demonstrated within 48 hours of test initiation, each composite sample shall be analyzed independently. Otherwise the permittee may substitute a composite sample, comprised of equal portions of the individual composite samples, for the chemical specific analysis;
 - d. Quality Assurance Plan (e.g., QA/QC implementation, corrective actions, etc.); and
 - e. Project Organization (e.g., project staff, project manager, consulting services, etc.).
- ii. The permittee shall initiate the TRE Action Plan within thirty (30) days of plan and schedule submittal. The permittee shall assume all risks for failure to achieve the required toxicity reduction.
 - iii. The permittee shall submit a quarterly TRE Activities Report, with the Discharge Monitoring Report in the months of January, April, July and October, containing information on toxicity reduction evaluation activities including:
 - a. any data and/or substantiating documentation which identifies the pollutant(s) and/or source(s) of effluent toxicity;
 - b. any studies/evaluations and results on the treatability of the facility's effluent toxicity; and
 - c. any data which identifies effluent toxicity control mechanisms that will reduce effluent toxicity to the level necessary to meet no significant toxicity at the critical dilution.
 - iv. The permittee shall submit a Final Report on Toxicity Reduction Evaluation Activities no later than twenty-eight (28) months from confirming toxicity in the retests, which provides information pertaining to the specific control mechanism selected that will, when implemented, result in reduction of effluent toxicity to no significant toxicity at the critical dilution. The report will also provide a specific corrective action schedule for implementing the selected control mechanism.

- v. Quarterly testing during the TRE is a minimum monitoring requirement. EPA recommends that permittees required to perform a TRE not rely on quarterly testing alone to ensure success in the TRE, and that additional screening tests be performed to capture toxic samples for identification of toxicants. Failure to identify the specific chemical compound causing toxicity test failure will normally result in a permit limit for whole effluent toxicity limits per federal regulations at 40 C.F.R. § 122.44(d)(1)(v).

F. MONITORING FREQUENCY REDUCTION

- i. The permittee may apply for a testing frequency reduction upon the successful completion of the first four consecutive quarters or first twelve consecutive months (in accordance with Item A.i.) of the current permit term of testing for one or both test species, with no lethal or sub-lethal effects demonstrated below the critical dilution. If granted, the monitoring frequency for that test species may be reduced to not less than once per year for the less sensitive species (usually the Fathead minnow) and not less than twice per year for the more sensitive test species (usually the *Ceriodaphnia dubia*).
- ii. CERTIFICATION - The permittee must certify in writing that no test failures have occurred and that all tests meet all test acceptability criteria in Item C.i. above. In addition the permittee must provide a list with each test performed including test initiation date, species, NOECs for lethal and sub-lethal effects and the maximum coefficient of variation for the controls. Upon review and acceptance of this information the agency will issue a letter of confirmation of the monitoring frequency reduction. A copy of the letter will be forwarded to the agency's Permit Compliance System section to update the permit reporting requirements.
- iii. SUB-LETHAL OR SURVIVAL FAILURES - Monthly retesting is not required if the permittee is performing a TRE.
- iv. Any monitoring frequency reduction granted applies only until the expiration date of this permit, at which time the monitoring frequency for both test species reverts to once per quarter until the permit is re-issued.
9. The permittee may use any EPA approved method based on 40 C.F.R. § 136 provided the MQL for the chosen method is equal to or less than what has been specified in chart below:

Pollutant	MQL (µg/l)
Total Recoverable Mercury	0.005

The permittee may develop a matrix specific method detection limit (MDL) in accordance with Appendix B of 40 C.F.R. § 136. For any pollutant for which the permittee determines a site specific MDL, the permittee shall send to DEQ, NPDES Permits Branch, a report containing QA/QC documentation, analytical results, and calculations necessary to demonstrate that a site specific MDL was correctly calculated. A site specific minimum quantification level (MQL) shall be determined in accordance with the following calculation:

$$\text{MQL} = 3.3 \times \text{MDL}$$

Upon written approval by Permits Branch, the site specific MQL may be utilized by the permittee for all future Discharge Monitoring Report (DMR) calculations and reporting requirements

10. Contributing Industries and Pretreatment Requirements

A. The following pollutants may not be introduced into the treatment facility:

- (1) Pollutants which create a fire or explosion hazard in the publicly owned treatment works (POTW), including, but not limited to, wastestreams with a closed cup flashpoint of less than 140 degrees Fahrenheit (°F) or 60 degrees Centigrade (°C) using the test methods specified in 40 C.F.R. § 261.21;
- (2) Pollutants which will cause corrosive structural damage to the POTW, but in no case discharges with pH lower than 5.0 s.u., unless the works is specifically designed to accommodate such discharges;
- (3) Solid or viscous pollutants in amounts which will cause obstruction to the flow in the POTW, resulting in Interference* or Pass Through**;
- (4) Any pollutant, including oxygen demanding pollutants (BOD, etc.), released in a discharge at a flow rate and/or pollutant concentration which will cause Pass Through or Interference with the POTW;
- (5) Heat in amounts which will inhibit biological activity in the POTW resulting in Interference, but in no case heat in such quantities that the temperature at the POTW treatment plant exceeds 40 °C (104 °F) unless the Approval Authority, upon request of the POTW, approves alternate temperature limits;
- (6) Petroleum oil, non-biodegradable cutting oil, or products of mineral oil origin in amounts that will cause Interference or Pass Through;
- (7) Pollutants which result in the presence of toxic gases, vapors, or fumes within the POTW in a quantity that may cause acute worker health and safety problems;
- (8) Any trucked or hauled pollutants, except at discharge points designated by the POTW.

B. The permittee shall require any indirect discharger to the treatment works to comply with the reporting requirements of Sections 204(b), 307, and 308 of the Clean Water Act (CWA), including any requirements established under 40 C.F.R. § 403.

C. The permittee shall provide adequate notice to the Division of the following:

- (1) Any new introduction of pollutants into the treatment works from an indirect discharger which would be subject to Sections 301 or 306 of the CWA if it were directly discharging those pollutants; and

- (2) Any substantial change in the volume or character of pollutants being introduced into the treatment works by a source introducing pollutants into the treatment works at the time of issuance of the permit.

Any notice shall include information on (i) the quality and quantity of effluent to be introduced into the treatment works, and (ii) any anticipated impact of the change on the quality or quantity of effluent to be discharged from the POTW.

- * According to 40 C.F.R. § 403.3(k), the term *Interference* means a Discharge which, alone or in conjunction with a discharge or discharges from other sources, both:

- (1) Inhibits or disrupts the POTW, its treatment processes or operations, or its sludge processes, use or disposal; and
- (2) Therefore is a cause of a violation of any requirement of the POTW's NPDES permit (including an increase in the magnitude or duration of a violation) or of the prevention of sewage sludge use or disposal in compliance with the following statutory provisions and regulations or permits issued thereunder (or more stringent State or local regulations): Section 405 of the CWA, the Solid Waste Disposal Act (SWDA) (including title II, more commonly referred to as the Resource Conservation and Recovery Act (RCRA), and including State regulations contained in any State sludge management plan prepared pursuant to subtitle D of the SWDA), the Clean Air Act, the Toxic Substances Control Act, and the Marine Protection, Research and Sanctuaries Act.

- ** According to 40 C.F.R. § 403.3(p), the term *Pass Through* means a Discharge which exits the POTW into waters of the United States in quantities or concentrations which, alone or in conjunction with a discharge or discharges from other sources, is a cause of a violation of any requirement of the POTW's NPDES permit (including an increase in the magnitude or duration of a violation).

PART III STANDARD CONDITIONS

SECTION A – GENERAL CONDITIONS

1. Duty to Comply

The permittee must comply with all conditions of this permit. Any permit noncompliance constitutes a violation of the federal Clean Water Act and the Arkansas Water and Air Pollution Control Act and is grounds for enforcement action; for permit termination, revocation and reissuance, or modification; and/or for denial of a permit renewal application. **Any values reported in the required Discharge Monitoring Report (DMR) which are in excess of an effluent limitation specified in Part I shall constitute evidence of violation of such effluent limitation and of this permit.**

2. Penalties for Violations of Permit Conditions

The Arkansas Water and Air Pollution Control Act provides that any person who violates any provisions of a permit issued under the Act shall be guilty of a misdemeanor and upon conviction thereof shall be subject to imprisonment for not more than one (1) year, or a fine of not more than twenty-five thousand dollars (\$25,000) or by both such fine and imprisonment for each day of such violation. Any person who violates any provision of a permit issued under the Act may also be subject to civil penalty in such amount as the court shall find appropriate, not to exceed ten thousand dollars (\$10,000) for each day of such violation. The fact that any such violation may constitute a misdemeanor shall not be a bar to the maintenance of such civil action.

3. Permit Actions

This permit may be modified, revoked and reissued, or terminated for cause including, but not limited to the following:

- A. Violation of any terms or conditions of this permit.
- B. Obtaining this permit by misrepresentation or failure to disclose fully all relevant facts.
- C. A change in any conditions that requires either a temporary or permanent reduction or elimination of the authorized discharge.
- D. A determination that the permitted activity endangers human health or the environment and can only be regulated to acceptable levels by permit modification or termination.
- E. Failure of the permittee to comply with the provisions of APC&EC Rule 9 (Permit fees) as required by Part III.A.11 herein.

The filing of a request by the permittee for a permit modification, revocation and reissuance, or termination, or a notification of planned changes or anticipated noncompliance, does not stay any permit condition.

4. **Toxic Pollutants**

Notwithstanding Part III.A.3, if any toxic effluent standard or prohibition (including any schedule of compliance specified in such effluent standard or prohibition) is promulgated under APC&EC R2, as amended, or Section 307(a) of the Clean Water Act for a toxic pollutant which is present in the discharge and that standard or prohibition is more stringent than any limitations on the pollutant in this permit, this permit shall be modified or revoked and reissued to conform to the toxic effluent standards or prohibition and the permittee so notified.

The permittee shall comply with effluent standards, narrative criteria, or prohibitions established under APC&EC Rule 2, as amended, or Section 307(a) of the Clean Water Act for toxic pollutants within the time provided in the regulations that establish those standards or prohibitions, even if the permit has not yet been modified to incorporate the requirement.

5. **Civil and Criminal Liability**

Except as provided in permit conditions for “Bypass of Treatment Facilities” (Part III.B.4), and “Upset” (Part III.B.5), nothing in this permit shall be construed to relieve the permittee from civil or criminal penalties for noncompliance. Any false or materially misleading representation or concealment of information required to be reported by the provisions of this permit or applicable state and federal statutes or regulations which defeats the regulatory purposes of the permit may subject the permittee to criminal enforcement pursuant to the Arkansas Water and Air Pollution Control Act (Ark. Code Ann. § 8-4-101 et seq.).

6. **Oil and Hazardous Substance Liability**

Nothing in this permit shall be construed to preclude the institution of any legal action or relieve the permittee from any responsibilities, liabilities, or penalties to which the permittee is or may be subject to under Section 311 of the Clean Water Act.

7. **State Laws**

Nothing in this permit shall be construed to preclude the institution of any legal action or relieve the permittee from any responsibilities, liabilities, or penalties established pursuant to any applicable State law or regulation under authority preserved by Section 510 of the Clean Water Act.

8. **Property Rights**

The issuance of this permit does not convey any property rights of any sort, or any exclusive privileges, nor does it authorize any exclusive privileges, nor does it authorize any injury to private property or any invasion of personal rights, nor any infringement of Federal, State, or local laws or regulations.

9. Severability

The provisions of this permit are severable, and if any provision of this permit, or the application of any provisions of this permit to any circumstance is held invalid, the application of such provision to other circumstances, and the remainder of this permit, shall not be affected thereby.

10. Applicable Federal, State or Local Requirements

Permittees are responsible for compliance with all applicable terms and conditions of this permit. Receipt of this permit does not relieve any operator of the responsibility to comply with any other applicable federal requirements such as endangered species, state or local statute, ordinance or regulation.

11. Permit Fees

The permittee shall comply with all applicable permit fee requirements (i.e., including annual permit fees following the initial permit fee that will be invoiced every year the permit is active) for wastewater discharge permits as described in APC&EC Rule 9 (Rule for the Fee System for Environmental Permits). Failure to promptly remit all required fees shall be grounds for the Director to initiate action to terminate this permit under the provisions of 40 C.F.R. §§ 122.64 and 124.5(d), as adopted in APC&EC Rule 6 and the provisions of APC&EC Rule 8.

SECTION B – OPERATION AND MAINTENANCE OF POLLUTION CONTROLS

1. Proper Operation and Maintenance

- A. The permittee shall at all times properly operate and maintain all facilities and systems of treatment and control (and related appurtenances) which are installed or used by the permittee to achieve compliance with the conditions of this permit. Proper operation and maintenance also includes adequate laboratory controls and appropriate quality assurance procedures. This provision requires the operation of backup or auxiliary facilities or similar systems which are installed by a permittee only when the operation is necessary to achieve compliance with the conditions of the permit.
- B. The permittee shall provide an adequate operating staff which is duly qualified to carryout operation, maintenance, and testing functions required to ensure compliance with the conditions of this permit.

2. Need to Halt or Reduce not a Defense

It shall not be a defense for a permittee in an enforcement action that it would have been necessary to halt or reduce the permitted activity in order to maintain compliance with the conditions of this permit. Upon reduction, loss, or failure of the treatment facility, the permittee shall, to the extent necessary to maintain compliance with its permit, control production or discharges or both until the facility is restored or an alternative method of

treatment is provided. This requirement applies, for example, when the primary source of power for the treatment facility is reduced, is lost, or alternate power supply fails.

3. **Duty to Mitigate**

The permittee shall take all reasonable steps to minimize or prevent any discharge in violation of this permit which has a reasonable likelihood of adversely affecting human health or the environment or the water receiving the discharge.

4. **Bypass of Treatment Facilities**

“Bypass” means the intentional diversion of waste streams from any portion of a treatment facility, as defined at 40 C.F.R. § 122.41(m)(1)(i).

A. Bypass not exceeding limitation

The permittee may allow any bypass to occur which does not cause effluent limitations to be exceeded, but only if it also is for essential maintenance to assure efficient operation. These bypasses are not subject to the provisions of Parts III.B.4.B and 4.C.

B. Notice

1. Anticipated bypass. If the permittee knows in advance of the need for a bypass, it shall submit prior notice, if possible at least ten days before the date of the bypass.
2. Unanticipated bypass. The permittee shall submit notice of an unanticipated bypass as required in Part III.D.6 (24-hour notice).

C. Prohibition of bypass

1. Bypass is prohibited and the Director may take enforcement action against a permittee for bypass, unless:
 - (a) Bypass was unavoidable to prevent loss of life, personal injury, or severe property damage.
 - (b) There were no feasible alternatives to the bypass, such as the use of auxiliary treatment facilities, retention of untreated wastes, or maintenance during normal periods of equipment downtime. This condition is not satisfied if the permittee could have installed adequate backup equipment to prevent a bypass which occurred during normal or preventive maintenance.
 - (c) The permittee submitted notices as required by Part III.B.4.B.
2. The Director may approve an anticipated bypass, after considering its adverse effects, if the Director determines that it will meet the three conditions listed above in Part III.B.4.C(1).

5. Upset Conditions

- A. Effect of an upset. An upset constitutes an affirmative defense to an action brought for noncompliance with such technology based permit effluent limitations if the requirements of Part III.B.5.B of this section are met. No determination made during administrative review of claims that noncompliance was caused by upset, and before an action for noncompliance, is final administrative action subject to judicial review.
- B. Conditions necessary for demonstration of upset. A permittee who wishes to establish the affirmative defense of upset shall demonstrate, through properly signed, contemporaneous operating logs, or other relevant evidence that:
1. An upset occurred and that the permittee can identify the specific cause(s) of the upset.
 2. The permitted facility was at the time being properly operated.
 3. The permittee submitted notice of the upset as required by Part III.D.6.
 4. The permittee complied with any remedial measures required by Part III.B.3.
- C. Burden of proof. In any enforcement proceeding, the permittee seeking to establish the occurrence of an upset has the burden of proof.

6. Removed Substances

- A. Solids, sludges, filter backwash, or other pollutants removed in the course of treatment or control of wastewaters shall be disposed of in a manner such as to prevent any pollutant from such materials from entering waters of the State. The Permittee must comply with all applicable state and Federal regulations governing the disposal of sludge, including but not limited to 40 C.F.R. § 503, 40 C.F.R. § 257, and 40 C.F.R. § 258.
- B. Any changes to the permittee's disposal practices described in the «Fact Sheet Statement of Basis», as derived from the permit application, will require at least 180 days prior notice to the Director to allow time for additional permitting. Please note that the 180 day notification requirement may be waived if additional permitting is not required for the change.

7. Power Failure

The permittee is responsible for maintaining adequate safeguards to prevent the discharge of untreated or inadequately treated wastes during electrical power failure either by means of alternate power sources, standby generators, or retention of inadequately treated effluent.

SECTION C – MONITORING AND RECORDS

1. Representative Sampling

Samples and measurements taken as required herein shall be representative of the volume and nature of the monitored discharge during the entire monitoring period. All samples shall be taken at the monitoring points specified in this permit and, unless otherwise specified,

before the effluent joins or is diluted by any other waste stream, body of water, or substance. Monitoring points shall not be changed without notification to and the approval of the Director. Intermittent discharge shall be monitored.

2. **Flow Measurement**

Appropriate flow measurement devices and methods consistent with accepted scientific practices shall be selected and used to ensure the accuracy and reliability of measurements of the volume of monitored discharges. The devices shall be installed, calibrated, and maintained to ensure the accuracy of the measurements are consistent with the accepted capability of that type of device. Devices selected shall be capable of measuring flows with a maximum deviation of less than +/- 10% from true discharge rates throughout the range of expected discharge volumes and shall be installed at the monitoring point of the discharge.

Calculated Flow Measurement

For calculated flow measurements that are performed in accordance with either the permit requirements or a Division approved method (i.e., as allowed in the *Other Specified Monitoring Requirements* condition under Part II), the +/- 10% accuracy requirement described above is waived. This waiver is only applicable when the method used for calculation of the flow has been reviewed and approved by the Division.

3. **Monitoring Procedures**

Monitoring must be conducted according to test procedures approved under 40 C.F.R. § 136, unless other test procedures have been specified in this permit. The permittee shall calibrate and perform maintenance procedures on all monitoring and analytical instrumentation at intervals frequent enough to ensure accuracy of measurements and shall ensure that both calibration and maintenance activities will be conducted. An adequate analytical quality control program, including the analysis of sufficient standards, spikes, and duplicate samples to ensure the accuracy of all required analytical results shall be maintained by the permittee or designated commercial laboratory. At a minimum, spikes and duplicate samples are to be analyzed on 10% of the samples.

4. **Penalties for Tampering**

The Arkansas Water and Air Pollution Control Act provides that any person who falsifies, tampers with, or knowingly renders inaccurate, any monitoring device or method required to be maintained under the Act shall be guilty of a misdemeanor and upon conviction thereof shall be subject to imprisonment for not more than one (1) year or a fine of not more than ten thousand dollars (\$10,000) or by both such fine and imprisonment.

5. **Reporting of Monitoring Results**

40 C.F.R. § 127.11(a)(1) and 40 C.F.R. § 127.16(a) require that monitoring reports must be reported on a Discharge Monitoring Reports (DMR) and filed electronically. Signatory Authorities must initially request access for a NetDMR account. Once a NetDMR account is

established, access to electronic filing should use the following link <https://cdx.epa.gov>. Permittees who are unable to file electronically may request a waiver from the Director in accordance with 40 C.F.R. § 127.15. Monitoring results obtained during the previous monitoring period shall be summarized and reported on a DMR dated and submitted no later than the 25th day of the month, following the completed reporting period beginning on the effective date of the permit.

6. **Additional Monitoring by the Permittee**

If the permittee monitors any pollutant more frequently than required by this permit, using test procedures approved under 40 C.F.R. § 136 or as specified in this permit, the results of this monitoring shall be included in the calculation and reporting of the data submitted in the DMR. Such increased frequency shall also be indicated on the DMR.

7. **Retention of Records**

The permittee shall retain records of all monitoring information, including all calibration and maintenance records and all original strip chart recordings for continuous monitoring instrumentation, copies of all reports required by this permit, and records of all data used to complete the application for this permit for a period of at least 3 years from the date of the sample, measurement, report, or application. This period may be extended by request of the Director at any time.

8. **Record Contents**

Records and monitoring information shall include:

- A. The date, exact place, time and methods of sampling or measurements, and preservatives used, if any.
- B. The individual(s) who performed the sampling or measurements.
- C. The date(s) and time analyses were performed.
- D. The individual(s) who performed the analyses.
- E. The analytical techniques or methods used.
- F. The measurements and results of such analyses.

9. **Inspection and Entry**

The permittee shall allow the Director, or an authorized representative, upon the presentation of credentials and other documents as may be required by law, to:

- A. Enter upon the permittee's premises where a regulated facility or activity is located or conducted, or where records must be kept under the conditions of this permit.
- B. Have access to and copy, at reasonable times, any records that must be kept under the conditions of this permit.
- C. Inspect at reasonable times any facilities, equipment (including monitoring and control equipment), practices, or operations regulated or required under this permit.

- D. Sample, inspect, or monitor at reasonable times, for the purposes of assuring permit compliance or as otherwise authorized by the Clean Water Act, any substances or parameters at any location.

SECTION D – REPORTING REQUIREMENTS

1. Planned Changes

The Permittee shall give notice to the Director as soon as possible but no later than 180 days prior to any planned physical alterations or additions to the permitted facility [40 C.F.R. § 122.41(l)]. Notice is required only when:

- A. The alteration or addition to a permitted facility may meet one of the criteria for new sources at 40 C.F.R. § 122.29(b).
- B. The alteration or addition could significantly change the nature or increase the quantity of pollutants discharged. This notification applies to pollutants subject to effluent limitations in the permit, or to the notification requirements under 40 C.F.R. § 122.42(b).

2. Anticipated Noncompliance

The permittee shall give advance notice to the Director of any planned changes in the permitted facility or activity which may result in noncompliance with permit requirements.

3. Transfers

The permit is nontransferable to any person except after notice to the Director. The Director may require modification or revocation and reissuance of the permit to change the name of the permittee and incorporate such other requirements as may be necessary under the Act.

4. Monitoring Reports

Monitoring results shall be reported at the intervals and in the form specified in Part III.C.5. **Discharge Monitoring Reports must be submitted even when no discharge occurs during the reporting period.**

5. Compliance Schedule

Reports of compliance or noncompliance with, or any progress reports on, interim and final requirements contained in any compliance schedule of this permit shall be submitted no later than 14 days following each schedule date. Any reports of noncompliance shall include the cause of noncompliance, any remedial actions taken, and the probability of meeting the next scheduled requirement.

6. **Twenty-four Hour Report**

Please be aware that the notifications can be sent by email to water-enforcement-report@adeq.state.ar.us or at 501-682-0624 for immediate reporting:

- A. The permittee shall report any noncompliance which may endanger health or the environment within 24 hours from the time the permittee becomes aware of the circumstances to the Enforcement Branch of the Office of Water Quality of DEQ. A written submission shall also be provided within 5 days of the time the permittee becomes aware of the circumstances. The written submission shall contain the following information:
1. A description of the noncompliance and its cause.
 2. The period of noncompliance, including exact dates and times, and if the noncompliance has not been corrected, the anticipated time it is expected to continue.
 3. Steps taken or planned to reduce, eliminate, and prevent reoccurrence of the noncompliance.
- B. The following must be reported within 24 hours:
1. Any unanticipated bypass which exceeds any effluent limitation in the permit.
 2. Any upset which exceeds any effluent limitation in the permit.
 3. Violation of a maximum daily discharge limitation for any of the pollutants listed by the Director in Part I of the permit.
- C. The Director may waive the written report on a case-by-case basis if the notification has been received within 24 hours to the Enforcement Branch of the Office of Water Quality of the DEQ.

7. **Other Noncompliance**

The permittee shall report all instances of noncompliance not reported under Parts III.D.4, 5, and 6, at the time monitoring reports are submitted. The reports shall contain the information listed at Part III.D.6.

8. **Changes in Discharge of Toxic Substances for all Industrial Dischargers including Existing Manufacturing, Commercial, Mining, and Silvicultural Dischargers**

The Director shall be notified as soon as the permittee knows or has reason to believe:

- A. That any activity has occurred or will occur which would result in the discharge on a routine or frequent basis of any toxic pollutant including those listed in 40 CFR 401.15 which is not limited in the permit, if that discharge will exceed the highest of the “notification levels” described in 40 CFR §122.42(a)(1).
- B. That any activity has occurred or will occur which would result in any discharge on a non-routine or infrequent basis of a toxic pollutant including those listed in 40 CFR

401.15 which is not limited in the permit, if that discharge will exceed the highest of the “notification levels” described in 40 CFR § 122.42(a)(2).

9. **Duty to Provide Information**

The permittee shall furnish to the Director, within a reasonable time, any information which the Director may request to determine whether cause exists for modifying, revoking and reissuing, or terminating this permit, or to determine compliance with this permit. The permittee shall also furnish to the Director, upon request, copies of records required to be kept by this permit. Information shall be submitted in the form, manner and time frame requested by the Director.

10. **Duty to Reapply**

If the permittee wishes to continue an activity regulated by this permit after the expiration date of this permit, the permittee must apply for and obtain a new permit. The complete application shall be submitted at least 180 days before the expiration date of this permit. The Director may grant permission to submit an application less than 180 days in advance but no later than the permit expiration date. Continuation of expiring permits shall be governed by regulations promulgated in APC&EC Rule 6.

11. **Signatory Requirements**

All applications, reports, or information submitted to the Director shall be signed and certified as follows:

A. All **permit applications** shall be signed as follows:

1. For a corporation: by a responsible corporate officer. For the purpose of this section, a responsible corporate officer means:
 - (a) A president, secretary, treasurer, or vice-president of the corporation in charge of a principal business function, or any other person who performs similar policy or decision-making functions for the corporation.
 - (b) The manager of one or more manufacturing, production, or operation facilities, provided: the manager is authorized to make management decisions which govern the operation of the regulated facility including having the explicit or implicit duty of making major capital investment recommendations, and initiating and directing other comprehensive measures to assure long term environmental compliance with environmental laws and regulations; the manager can ensure that the necessary systems are established or actions taken to gather complete and accurate information for permit application requirements; and where authority to sign documents has been assigned or delegated to the manager in accordance with corporate procedures.
2. For a partnership or sole proprietorship: by a general partner or proprietor, respectively.

3. For a municipality, State, Federal, or other public agency, by either a principal executive officer or ranking elected official. For purposes of this section, a principal executive officer of a Federal agency includes:
 - (a) The chief executive officer of the agency.
 - (b) A senior executive officer having responsibility for the overall operations of a principal geographic unit of the agency.
- B. All **reports** required by the permit and **other information** requested by the Director shall be signed by a person described above or by a duly authorized representative of that person. A person is a duly authorized representative only if:
 1. The authorization is made in writing by a person described above.
 2. The authorization specified either an individual or a position having responsibility for the overall operation of the regulated facility or activity, such as the position of plant manager, operator of a well or a well field, superintendent, or position of equivalent responsibility. (A duly authorized representative may thus be either a named individual or any individual occupying a named position).
 3. The written authorization is submitted to the Director.
- C. Certification. Any person signing a document under this section shall make the following certification:

“I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.”

12. Availability of Reports

Except for data determined to be confidential under 40 C.F.R. § 2 and APC&EC Rule 6, all reports prepared in accordance with the terms of this permit shall be available for public inspection at the offices of the Division of Environmental Quality. As required by the Regulations, the name and address of any permit applicant or permittee, permit applications, permits, and effluent data shall not be considered confidential.

13. Penalties for Falsification of Reports

The Arkansas Air and Water Pollution Control Act provides that any person who knowingly makes any false statement, representation, or certification in any application, record, report, plan, or other document filed or required to be maintained under this permit shall be subject to civil penalties specified in Part III.A.2 and/or criminal penalties under the authority of the Arkansas Water and Air Pollution Control Act (Ark. Code Ann. § 8-4-101 et seq.).

14. **Other Information**

Where the permittee becomes aware that it failed to submit any relevant facts in a permit application, or submitted incorrect information in a permit application or in any report to the Director, it shall promptly submit such facts or information.

PART IV DEFINITIONS

All definitions contained in Section 502 of the Clean Water Act and 40 C.F.R. § 122.2 shall apply to this permit and are incorporated herein by reference. Additional definitions of words or phrases used in this permit are as follows:

1. **“7-Day Average”** also known as “average weekly,” means the highest allowable average of “daily discharges” over a calendar week, calculated as the sum of all “daily discharges” measured during a calendar week divided by the number of “daily discharges” measured during that week. The 7-Day Average for Fecal Coliform Bacteria (FCB) or E-Coli is the geometric mean of the “daily discharges” of all effluent samples collected during a calendar week in colonies per 100 ml.
2. **“Act”** means the Clean Water Act, Public Law 95-217 (33.U.S.C. 1251 et seq.) as amended.
3. **“Administrator”** means the Administrator of the U.S. Environmental Protection Agency.
4. **“APC&EC”** means the Arkansas Pollution Control and Ecology Commission.
5. **“Applicable effluent standards and limitations”** means all State and Federal effluent standards and limitations to which a discharge is subject under the Act, including, but not limited to, effluent limitations, standards of performance, toxic effluent standards and prohibitions, and pretreatment standards.
6. **“Applicable water quality standards”** means all water quality standards to which a discharge is subject under the federal Clean Water Act and which has been (a) approved or permitted to remain in effect by the Administrator following submission to the Administrator pursuant to Section 303(a) of the Act, or (b) promulgated by the Director pursuant to Section 303(b) or 303(c) of the Act, and standards promulgated under (APC&EC) Rule 2, as amended.
7. **“Best Management Practices (BMPs)”** are activities, practices, maintenance procedures, and other management practices designed to prevent or reduce the pollution of waters of the State. BMPs also include treatment technologies, operating procedures, and practices to control plant site runoff, spillage or leaks, sludge or waste disposal, or drainage from raw sewage. BMPs may include structural devices or nonstructural practices.
8. **“Bypass”** means the intentional diversion of waste streams from any portion of a treatment facility, as defined at 40 C.F.R. § 122.41(m)(1)(i).
9. **“Composite sample”** is a mixture of grab samples collected at the same sampling point at different times, formed either by continuous sampling or by mixing a minimum of 4 effluent portions collected at equal time intervals (but not closer than one hour apart) during operational hours, within the 24-hour period, and combined proportional to flow or a sample collected at more frequent intervals proportional to flow over the 24-hour period.
10. **“CV”** means coefficient of variation.
11. **“Daily Discharge”** means the discharge of a pollutant measured during a calendar day or any 24-hour period that reasonably represents the calendar day for purposes of sampling.
 - A. **Mass Calculations:** For pollutants with limitations expressed in terms of mass, the “daily discharge” is calculated as the total mass of pollutant discharged over the sampling day.
 - B. **Concentration Calculations:** For pollutants with limitations expressed in other units of measurement, the “daily discharge” is calculated as the average measurement of the pollutant over the day.

12. **“Daily Maximum”** discharge limitation means the highest allowable “daily discharge” during the calendar month.
13. **“Director”** means the Director of the Division of Environmental Quality.
14. **“Dissolved oxygen limit”** shall be defined as follows:
 - A. When limited in the permit as a minimum monthly average, shall mean the lowest acceptable monthly average value, determined by averaging all samples taken during the calendar month.
 - B. When limited in the permit as an instantaneous minimum value, shall mean that no value measured during the reporting period may fall below the stated value.
15. **“Division”** means the Division of Environmental Quality (**DEQ**).
16. **“E. coli”** a sample consists of one effluent grab portion collected during a 24-hour period at peak loads. For *E. coli*, report the Daily Maximum as the highest “daily discharge” during the calendar month and the Monthly Average as the geometric mean of all “daily discharges” within a calendar month, in colonies per 100 ml.
17. **“Fecal Coliform Bacteria (FCB)”** a sample consists of one effluent grab portion collected during a 24-hour period at peak loads. For FCB, report the Daily Maximum as the highest “daily discharge” during the calendar month and the Monthly Average as the geometric mean of all “daily discharges” within a calendar month, in colonies per 100 ml.
18. **“Grab sample”** means an individual sample collected in less than 15 minutes in conjunction with an instantaneous flow measurement.
19. **“Industrial User”** means a nondomestic discharger, as identified in 40 C.F.R. § 403, introducing pollutants to a publicly owned treatment works (POTW).
20. **“Instantaneous flow measurement”** means the flow measured during the minimum time required for the flow-measuring device or method to produce a result in that instance. To the extent practical, instantaneous flow measurements coincide with the collection of any grab samples required for the same sampling period so that together the samples and flow are representative of the discharge during that sampling period.
21. **“Instantaneous Maximum”** when limited in the permit as an instantaneous maximum value, shall mean that no value measured during the reporting period may fall above the stated value.
22. **“Instantaneous Minimum”** an instantaneous minimum value, shall mean that no value measured during the reporting period may fall below the stated value.
23. **“Monitoring and Reporting”**

When a permit becomes effective, monitoring requirements are of the immediate period of the permit effective date. Where the monitoring requirement for an effluent characteristic is monthly or more frequently, the Discharge Monitoring Report (DMR) shall be submitted by the 25th of the month following the sampling. Where the monitoring requirement for an effluent characteristic is Quarterly, Semi-Annual, Annual, or Yearly, the DMR shall be submitted by the 25th of the month following the monitoring period end date.

- A. **MONTHLY:**
is defined as a calendar month or any portion of a calendar month for monitoring requirement frequency of once/month or more frequently.
- B. **BI-MONTHLY:**
is defined as two (2) calendar months or any portion of 2 calendar months for monitoring requirement frequency of once/2 months or more frequently.
- C. **QUARTERLY:**
1. is defined as a **fixed calendar quarter** or any part of the fixed calendar quarter for a non-seasonal effluent characteristic with a measurement frequency of once/quarter. Fixed calendar quarters are: January through March, April through June, July through September, and October through December.
 2. is defined as a **fixed three month period** (or any part of the fixed three month period) of or dependent upon the seasons specified in the permit for a seasonal effluent characteristic with a monitoring requirement frequency of once/quarter that does not coincide with the fixed calendar quarter. Seasonal calendar quarters are: May through July, August through October, November through January, and February through April.
- D. **SEMI-ANNUAL:**
is defined as the fixed time periods January through June, and July through December (or any portion thereof) for an effluent characteristic with a measurement frequency of once/6 months or twice/year.
- E. **ANNUAL or YEARLY:**
is defined as a fixed calendar year or any portion of the fixed calendar year for an effluent characteristic or parameter with a measurement frequency of once/year. A calendar year is January through December, or any portion thereof.
24. **“Monthly Average”** means the highest allowable average of “daily discharges” over a calendar month, calculated as the sum of all “daily discharges” measured during a calendar month divided by the number of “daily discharges” measured during that month. For Fecal Coliform Bacteria (FCB) or *E. coli*, report the Monthly Average as the geometric mean of all “daily discharges” within a calendar month.
25. **“National Pollutant Discharge Elimination System (NPDES)”** means the national program for issuing, modifying, revoking and reissuing, terminating, monitoring and enforcing permits, and imposing and enforcing pretreatment requirements under Sections 307, 402, 318, and 405 of the Clean Water Act.
26. **“NOEC”** means No Observed Effect Concentration.
27. **“PMSD”** means Percent Minimum Significant Difference.
28. **“POTW”** means Publicly Owned Treatment Works;
29. **“Reduction of CBOD₅/BOD₅ and TSS in mg/l Formula”**
$$\left[\frac{\text{Influent} - \text{Effluent}}{\text{Influent}} \right] \times 100$$
30. **“Severe property damage”** means substantial physical damage to property, damage to the treatment facilities which causes them to become inoperable, or substantial and permanent loss of natural resources which can reasonably be expected to occur in the absence of a bypass. Severe property damage does not mean economic loss caused by delays in products.
31. **“Sewage sludge”** means the solids, residues, and precipitate separated from or created in sewage by the unit processes at a POTW. Sewage as used in this definition means any

wastes, including wastes from humans, households, commercial establishments, industries, and stormwater runoff that are discharged to or otherwise enter a POTW.

32. **“Treatment works”** means any devices and systems used in storage, treatment, recycling, and reclamation of municipal sewage and industrial wastes, of a liquid nature to implement section 201 of the Act, or necessary to recycle reuse water at the most economic cost over the estimated life of the works, including intercepting sewers, sewage collection systems, pumping, power and other equipment, and alterations thereof; elements essential to provide a reliable recycled supply such as standby treatment units and clear well facilities, and any works, including site acquisition of the land that will be an integral part of the treatment process or is used for ultimate disposal of residues resulting from such treatment.
33. **Units of Measure:**
 - “MGD” shall mean million gallons per day.
 - “mg/l” shall mean milligrams per liter or parts per million (ppm).
 - “µg/l” shall mean micrograms per liter or parts per billion (ppb).
 - “cfs” shall mean cubic feet per second.
 - “ppm” shall mean parts per million.
 - “s.u.” shall mean standard units.
34. **“Upset”** means an exceptional incident in which there is unintentional and temporary noncompliance with technology-based permit effluent limitations because of factors beyond the reasonable control of the permittee. Any upset does not include noncompliance to the extent caused by operational error, improperly designed treatment facilities, lack of preventive maintenance, or careless of improper operations.
35. **“Visible sheen”** means the presence of a film or sheen upon or a discoloration of the surface of the discharge. A sheen can also be from a thin glistening layer of oil on the surface of the discharge.
36. **“Weekday”** means Monday – Friday.

Final Fact Sheet

This Fact Sheet is for information and justification of the permit limits only. Please note that it is not enforceable. This permitting decision is for the renewal of discharge Permit Number AR0036498 with Arkansas Department of Energy and Environment – Division of Environmental Quality (DEQ) Facility Identification Number (AFIN) 63-00063 to discharge to Waters of the State.

1. PERMITTING AUTHORITY

The issuing office is:

Arkansas Department of Energy and Environment
Division of Environmental Quality
5301 Northshore Drive
North Little Rock, Arkansas 72118-5317

2. APPLICANT

The applicant's mailing address is:

Benton Utilities
Wastewater Treatment Plant
1827 Dale Avenue
Benton, AR 72015

The facility address is:

Benton Utilities
Wastewater Treatment Plant
616 West Hazel
Benton, AR 72018

3. PREPARED BY

The permit was prepared by:

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4. PERMIT ACTIVITY

Previous Permit Effective Date: October 1, 2008
Previous Permit Modification Date: October 17, 2008
Previous Permit Expiration Date: September 1, 2013

The permittee submitted a permit renewal application on February 13, 2013, with all additional information received by March 3, 2017. The discharge permit is reissued for a 5-year term in accordance with regulations promulgated at 40 C.F.R. § 122.46(a).

DOCUMENT ABBREVIATIONS

In the document that follows, various abbreviations are used. They are as follows:

APC&EC - Arkansas Pollution Control and Ecology Commission
BAT - best available technology economically achievable
BCT - best conventional pollutant control technology
BMP - best management practice
BOD₅ - five-day biochemical oxygen demand
BPJ - best professional judgment
BPT - best practicable control technology currently available
CBOD₅ - carbonaceous biochemical oxygen demand
CD - critical dilution
C.F.R. - Code of Federal Regulations
cfs - cubic feet per second
COD - chemical oxygen demand
COE - United States Corp of Engineers
CPP - continuing planning process
CWA - Clean Water Act
DMR - discharge monitoring report
DO - dissolved oxygen
ELG - effluent limitation guidelines
EPA - United States Environmental Protection Agency
ESA - Endangered Species Act
FCB - fecal coliform bacteria
gpm - gallons per minute
MGD - million gallons per day
MQL - minimum quantification level
NAICS - North American Industry Classification System
NH₃-N - ammonia nitrogen
NO₃ + NO₂-N - nitrate + nitrite nitrogen
NPDES - National Pollutant Discharge Elimination System
O&G - oil and grease
Rule 2 - APC&EC Rule 2
Rule 6 - APC&EC Rule 6
Rule 8 - APC&EC Rule 8
Rule 9 - APC&EC Rule 9
RP - reasonable potential

SIC - standard industrial classification
SSO – sanitary sewer overflow
TDS - total dissolved solids
TMDL - total maximum daily load
TP - total phosphorus
TRC - total residual chlorine
TSS - total suspended solids
UAA - use attainability analysis
USF&WS - United States Fish and Wildlife Service
USGS - United States Geological Survey
WET - Whole effluent toxicity
WQMP - water quality management plan
WQS - Water Quality standards
WWTP - wastewater treatment plant

Compliance and Enforcement History:

The compliance and enforcement history for this facility can be reviewed by using the following web link:

http://www.adeq.state.ar.us/downloads/WebDatabases/PermitsOnline/NPDES/PermitInformation/AR0036498_Combpliance%20Review%20Email_20200324.pdf

5. SIGNIFICANT CHANGES FROM THE PREVIOUSLY ISSUED PERMIT

The permittee is responsible for carefully reading the permit in detail and becoming familiar with all of the changes therein:

1. The monthly total number of Sanitary Sewer Overflows (SSOs) and the monthly total volume of SSOs must be reported on the Discharge Monitoring Reports.
2. Part III.C.5 of the permit now requires that DMRs be submitted electronically via NetDMR.
3. The minimum required DO limit is now expressed as an instantaneous minimum.
4. TDS limits have been included in the proposed permit due to an assigned WLA in a TMDL.
5. The description of the monitoring location has been changed from coordinates to a narrative description. This will allow for small changes to the monitoring location to take place without the need for a permit modification while maintaining the requirement for representative samples.
6. The 24-hr composite sample types for CBOD₅, TSS, and NH₃-N have been changed to composite. See Item No. 15 of this Fact Sheet for additional information.
7. The Chronic WET language has been revised.
8. The monitoring and reporting requirements for TP and Nitrates plus Nitrites as Nitrogen have been reduced to once per year. See Item No. 15 of this Fact Sheet for additional information.
9. The NH₃-N limits for the month of April have been revised due to the correction of the ecoregion in which the discharge takes place.

10. Annual monitoring and reporting requirements for Mercury have been added to the permit. See Item No. 7.B of this Fact Sheet for additional information.
11. Land application conditions have been removed from the permit. The permittee now has a separate permit for this activity. All language referring to the removal of sludge from this facility is in Part III of the permit.
12. The April FCB limit has been corrected. See Item Nos. 12.A and 12.B of this Fact Sheet for additional information.
13. Limits for the design flow of 6.3 MGD have been removed from the permit since the construction activities to increase the design flow have been completed.
14. The transition condition in Part II of the previous permit has been removed because the construction activities have been completed.
15. The TRC language has been removed from the permit since the permittee now uses UV disinfection.
16. The condition in Part II of the previous permit which forbid the discharge of any stormwater runoff not in accordance with the permittee's No Exposure Certification has been removed from the permit. This is an item already required by ARR00C399, the facility's No Exposure Certification.
17. Parts III and IV have been updated.
18. Additional testing requirements have been added to Part IB of the permit. The permittee will be required to conduct all testing required by EPA Form 2A that is not already required by the permit. This requirement has been added to the permit since the testing submitted with the application is now more than 4 ½ years old.

6. RECEIVING STREAM SEGMENT AND DISCHARGE LOCATION

The outfall is located at the following coordinates based on the previous permit and confirmed with Google Earth using WGS84:

Latitude: 34° 33' 6" N; Longitude: 92° 35' 36" W

The receiving waters named:

unnamed tributary of Depot Creek, thence to Depot Creek, thence to the Saline River in Segment 2C of the Ouachita River Basin. The receiving stream with USGS Hydrologic Unit Code (H.U.C.) of 08040203 and reach #913 is a Water of the State classified for secondary contact recreation, raw water source for domestic (public and private), industrial, and agricultural water supplies; propagation of desirable species of fish and other aquatic life; and other compatible uses. The Saline River is classified as an ERW and an ESW.

7. 303(d) LIST, TOTAL MAXIMUM DAILY LOADS, ENDANGERED SPECIES, AND ANTI-DEGRADATION CONSIDERATIONS

A. 303(d) List

The Saline River is on the 2018 303(d) list for silt (turbidity) due to unknown causes. The permit contains TSS limits which are protective of the designated uses of the receiving stream. Therefore, no additional permit action is needed regarding this listing.

B. Applicable Total Maximum Daily Loads (TMDLs)

TMDLs for Total Dissolved Solids for the Saline River Basin, Arkansas was finalized in August 2011. The TMDL contains a WLA for this facility which has been included in the permit. This TMDL based the WLA for this facility on a design flow of 6.3 MGD. Since the TMDL was finalized, the design flow of the facility has increased to 8.3 MGD. Per Section 4.7 of the TMDL, future growth between the WLA and the LA may be re-evaluated if there is expansion of existing point sources or new point sources. However, according to an EPA letter to DEQ dated April 24, 2016, a revision to the TMDL document, subject to EPA approval, would need to occur when the load is redistributed from LA to WLA. Therefore, the currently approved WLA of 17,034.64 lbs/day is required to be included in the permit until such time as the TMDL is revised, public noticed, and EPA approved.

This facility is assigned a wasteload allocation in the TMDL report entitled “TMDLs for Segments Listed for Mercury in Fish Tissue for the Ouachita River Basin, and Bayou Bartholomew, Arkansas and Louisiana to Columbia”, approved by EPA on December 18, 2002.

Consistent with the TMDL, the permit includes once per year monitoring and reporting for Mercury. EPA Method 1631E is now available which has a detection limit of 0.005 µg/L. Effluent sampling for Mercury should follow procedures as outlined in EPA Method 1631E. The data will be reviewed at next permit renewal to determine if compliance with the TMDL is being demonstrated (effluent values not exceeding 0.012 ug/L). If the data shows that the facility is discharging greater than 0.012 ug/L, the facility will need to choose another TMDL implementation requirement at next renewal.

C. Endangered Species

No comments on the application were received from the USF&WS. The draft permit and Fact Sheet were sent to the USF&WS for their review.

The Arkansas Department of Parks, Heritage, and Tourism stated that the following species of concern are known to occur at or within five miles downstream of the permitted outfall:

Cyprogenia sp. Cf. aberti, Ouachita Fanshell – state concern
Etheostoma parvipinne, goldstripe darter – state concern

Lampsillis powelli, Arkansas Fatmucket – federal concern (threatened)
Notropis perpallidus, peppered shiner – state concern
Pleurobema rubrum, Pyramid Pigtoe – state concern
Ptychobranthus occidentalis, Ouachita Kidneyshell – state concern
Truncilla donaciformis, Fawnsfoot – state concern

The Saline River has been recognized on the state's Registry of Natural and Scenic Rivers and on the Nationwide Rivers Inventory.

The limits in the permit are designed to protect all beneficial uses of the receiving waters, including propagation of desirable species of fish and other aquatic life as well as other species which are directly or indirectly affected by the receiving waters, which includes the above species of concern. Therefore, DEQ has determined that the final permit limits will serve to help protect the species of concern identified above.

D. Anti-Degradation

The limitations and requirements set forth in this permit for discharge into waters of the State are consistent with the Anti-degradation Policy and all other applicable water quality standards found in APC&EC Rule 2.

8. OUTFALL, TREATMENT PROCESS DESCRIPTION, AND FACILITY CONSTRUCTION

The following is a description of the facility described in the application:

- A. Design Flow: 8.3 MGD
- B. Type of Treatment: Fine screen, grit removal, activated sludge aeration (oxidation ditch), clarification, post aeration, and ultraviolet disinfection.
- C. Discharge Description: treated municipal wastewater
- D. Facility Status: This facility is classified as a major municipal since the design flow of the facility listed above is greater than 1.0 MGD.
- E. Facility Construction: This permit does not authorize or approve the construction or modification of any part of the treatment system or facilities. Approval for such construction must be by permit issued under Rule 6.202.

9. ACTIVITY

Under the Standard Industrial Classification (SIC) code of 4952 or North American Industry Classification System (NAICS) code of 221320, the applicant's activities are the operation of a sewage treatment plant.

10. INDUSTRIAL WASTEWATER CONTRIBUTIONS

Currently, this facility does not receive process wastewater from significant industrial users as defined by 40 C.F.R. § 403.3(v). The Division has made the decision based on several criteria that the POTW will not be required to develop an approved pretreatment program at this time. Standard boilerplate Pretreatment Prohibitions [40 C.F.R. § 403.5(b)] and reporting requirements are deemed appropriate at this time.

11. SEWAGE SLUDGE PRACTICES

Biosolids are hauled to a Class I landfill or hauled, distributed, and marketed through a composting company. Biosolids may be land applied under the terms and conditions of Permit No. 4359-WR-3 or future modifications and renewals of that permit.

12. DEVELOPMENT AND BASIS FOR PERMIT CONDITIONS

The Division of Environmental Quality has determined to issue a permit for the discharge described in the application. Permit requirements are based on federal regulations (40 C.F.R. §§ 122, 124, and Subchapter N), the National Pretreatment Regulation in 40 C.F.R. § 403 and regulations promulgated pursuant to the Arkansas Water and Air Pollution Control Act (Ark. Code Ann. 8-4-101 et seq.). All of the information contained in the application, including all of the submitted effluent testing data, was reviewed to determine the need for effluent limits and other permit requirements.

The following is an explanation of the derivation of the conditions of the permit and the reasons for them or, in the case of notices of intent to deny or terminate, reasons suggesting the decisions as required under 40 C.F.R. § 124.7.

Technology-Based Versus Water Quality-Based Effluent Limitations and Conditions

Following regulations promulgated at 40 C.F.R. § 122.44, the permit limits are based on either technology-based effluent limits pursuant to 40 C.F.R. § 122.44 (a) or on State water quality standards and requirements pursuant to 40 C.F.R. § 122.44 (d), whichever are more stringent as follows:

Parameter	Water Quality-Based		Technology-Based/BPJ		Previous Permit		Permit Limit	
	Monthly Avg. mg/l	7-day Avg. mg/l	Monthly Avg. mg/l	7-day Avg. mg/l	Monthly Avg. mg/l	7-day Avg. mg/l	Monthly Avg. mg/l	7-day Avg. mg/l
CBOD ₅								
(May – October)	10	15	25	40	10	15	10	15
(November – April)	15	22.5	25	40	15	22.5	15	22.5
TSS	N/A	N/A	15.0	22.5	15	22.5	15.0	22.5

Parameter	Water Quality-Based		Technology-Based/BPJ		Previous Permit		Permit Limit	
	Monthly Avg. mg/l	7-day Avg. mg/l	Monthly Avg. mg/l	7-day Avg. mg/l	Monthly Avg. mg/l	7-day Avg. mg/l	Monthly Avg. mg/l	7-day Avg. mg/l
NH ₃ -N								
(April)	2.4	6	N/A	N/A	2.1	5.2	2.4	6
(May – October)	1.5	2.3	N/A	N/A	1.5	2.3	1.5	2.3
(November – March)	4	6	N/A	N/A	4	6	4	6
DO								
(May – October)	7.0 (Inst. Min.)		N/A		7.0 (Monthly Avg. Min.)		7.0 (Inst. Min.)	
(November – April)	7.5 (Inst. Min.)		N/A		7.5 (Monthly Avg. Min.)		7.5 (Inst. Min.)	
FCB (col/100 ml)								
(May – September)	200	400	N/A	N/A	200	400	200	400
(October – April)	1000	2000	N/A	N/A	1000	2000	1000	2000
(April)	1000	2000	N/A	N/A	200	400	1000	2000
Total Hardness	41, Inst. Min.		N/A		41, Inst. Min.		41, Inst. Min.	
TDS	17,034.64 lbs/day, avg. monthly limit		N/A	N/A	N/A	N/A	17,034.64 lbs/day, avg. monthly limit	
Total Recoverable Mercury	N/A	N/A	Report µg/l	Report µg/l	N/A	N/A	Report µg/l	Report µg/l
pH	6.0-9.0 s.u.		6.0-9.0 s.u.		6.0-9.0 s.u.		6.0-9.0 s.u.	

A. Justification for Limitations and Conditions of the Permit

Parameter	Water Quality or Technology	Justification
CBOD ₅	Water Quality	MultiSMP Model dated August 27, 2014 (and reviewed May 11, 2017), CWA § 402(o), and previous permit
TSS	Technology	40 C.F.R. § 122.44(l) and previous permit
NH ₃ -N	Water Quality	Rule 2.512, MultiSMP Model dated August 27, 2014 (and reviewed May 11, 2017), CWA § 402(o), and previous permit
DO	Water Quality	Rule 2.505, MultiSMP Model dated August 27, 2014 (and reviewed May 11, 2017), CWA § 402(o), and previous permit
FCB	Water Quality	Rule 2.507, CWA § 402(o), and previous permit
Total Hardness	Water Quality	Rule 2.508, CWA § 402(o), and previous permit

Parameter	Water Quality or Technology	Justification
TDS	Water Quality	<i>TMDLs for Total Dissolved Solids for the Saline River Basin, Arkansas and 40 C.F.R. § 122.44(d)(1)(vii)(B)</i>
Total Rec. Mercury	Technology	<i>TMDLs for Segments Listed for Mercury in Fish Tissue for the Ouachita River Basin, and Bayou Bartholomew, Arkansas and Louisiana to Columbia</i>
TP	Technology	40 C.F.R. § 122.44(l) and previous permit
NO ₃ + NO ₂ -N	Technology	40 C.F.R. § 122.44(l) and previous permit
pH	Water Quality	Rule 2.504, CWA § 402(o), and previous permit

The CBOD₅, TSS, NH₃-N (May – March), Total Hardness, and pH limits have remained unchanged.

The NH₃-N limits for the month of April have changed due to the correction of the ecoregion in which the discharge takes place.

The required minimum DO levels are now expressed as instantaneous minimums. This change has been made in order to ensure that the standards in the unnamed tributary of Depot Creek (which has a 7Q10 = 0 cfs) are maintained at all times.

The FCB limits for the primary contact season are now applicable May – September while the secondary contact limits are applicable October – April. These changes have been made to align with the requirements for ERWs in Rule 2.507.

TDS limits have been added based on the applicable TMDL.

B. Anti-backsliding

The permit is consistent with the requirements to meet Anti-backsliding provisions of the Clean Water Act (CWA), Section 402(o) [40 C.F.R. § 122.44(l)]. The final effluent limitations for reissuance permits must be as stringent as those in the previous permit, unless the less stringent limitations can be justified using exceptions listed in CWA 402(o)(2), CWA 303(d)(4), or 40 C.F.R. § 122.44 (l)(2)(i).

The permit meets or exceeds the requirements of the previous permit with the exception of the NH₃-N and the FCB limits for the month of April.

The NH₃-N limits have been changed based on the correction of the ecoregion in which the discharge takes place. This is allowed under the anti-backsliding regulations in CWA §402(o) since a technical error was made in the previous permit.

The final effluent limitations for FCB in the previous permit were not consistent with current State WQS found in Chapter 5, Section 2.507 of Rule 2. The WQS have been updated since that time. This permit allows relaxation in the secondary contact season limitations. This relaxation in limitations does not constitute backsliding, based on CWA Sections 402(o) and 303(d)(4). The revised limitations continue to maintain the state

anti-degradation policy by meeting the primary and secondary contact season standards of Rule 2.507, and maintaining the existing uses of the receiving stream.

C. **Limits Calculations**

1. Mass limits:

In accordance with 40 C.F.R. § 122.45(f)(1), all pollutants limited in permits shall have limitations expressed in terms of mass if feasible. 40 C.F.R. § 122.45(f)(2) allows for pollutants which are limited in terms of mass to also be limited in terms of other units of measurement.

The calculation of the loadings (lbs per day) uses a design flow of 8.3 MGD and the following equation:

$$\text{lbs/day} = \text{Concentration (mg/l)} \times \text{Flow (MGD)} \times 8.34$$

2. 7-Day Average Limits:

The 7-day average limits for NH₃-N (November – March) as well as CBOD₅ and TSS are based on Section 5.4.2 of the Technical Support Document for Water Quality-Based Toxics Control:

$$\text{7-day average limits} = \text{monthly average limits} \times 1.5$$

The 7-day average NH₃-N limits for the months of April through October are based on the requirements of Rule 2.512.

The 7-Day average limits for FCB is based on Rule 2.507.

D. **208 Plan (Water Quality Management Plan)**

The 208 Plan, developed by the DEQ under provisions of Section 208 of the federal Clean Water Act, is a comprehensive program to work toward achieving federal water goals in Arkansas. The initial 208 Plan, adopted in 1979, provides for annual updates, but can be revised more often if necessary. The 208 Plan has been revised as follows:

- The TDS WLA of 17,034.64 lbs/day from *TMDLs for Total Dissolved Solids for the Saline River Basin, Arkansas* has been added to the existing water quality based limitations.
- Also, the NH₃-N limit for the month of April has been revised to 2.4 mg/l due to the correction of the ecoregion in which the discharge takes place.

E. Priority Pollutant Scan (PPS)

DEQ has reviewed and evaluated the effluent in accordance with the potential toxicity of each analyzed pollutant using the procedures outlined in the Continuing Planning Process (CPP).

The concentration of each pollutant after mixing with the receiving stream was compared to the applicable water quality standards as established in the Arkansas Water Quality Standards (AWQS), Rule 2 (Rule 2.508) and criteria obtained from the "Quality Criteria for Water, 1986 (Gold Book)".

Under Federal Regulation 40 C.F.R. § 122.44(d), as adopted by Rule 6, if a discharge poses the reasonable potential to cause or contribute to an exceedance above a water quality standard, the permit must contain an effluent limitation for that pollutant. Effluent limitations for the toxicants listed below have been derived in a manner consistent with the Technical Support Document (TSD) for Water Quality-based Toxics Control (EPA, March 1991), the CPP, and 40 C.F.R. § 122.45(c).

The following items were used in calculations:

Parameter	Value	Source
Discharge Flow = Q	8.3 MGD = 12.84 cfs	Application
critical flow, 7Q10	0 cfs	USGS
LTA Background Flow	0 cfs	Calculated ¹
TSS	5.5 mg/l	CPP, Attachment V
Hardness as CaCo3	41 mg/l	minimum required hardness, Part IA of permit
pH	7 s.u.	neutral pH since no upstream data is available
Q _b background flow, Mixing zone flow for chronic toxicity	67% of 7Q10	Rule 2.508 and CPP-Appendix D
Q _b background flow, ZID flow for acute toxicity	33% of 7Q10	Rule 2.508 and CPP-Appendix D

¹ LTA = 3 * 7Q10, Chapter 4.6.2.1.b of the Technical Support Document.

The following results were reported. The concentrations reported in the table below for Total Recoverable Copper, Total Recoverable Lead, Total Recoverable Mercury, and Total Recoverable Zinc are represented by the geometric mean of 13 samples. Parameters which were not detected during the testing are not listed in the table. The samples are from pretreatment data and the PPS submitted with the permit renewal application.

Pollutant	Concentration Reported, µg/l	MQL, µg/l
Total Recoverable Copper	6.26	0.5

Pollutant	Concentration Reported, $\mu\text{g/l}$	MQL, $\mu\text{g/l}$
Total Recoverable Lead	0.4	0.5
Total Recoverable Mercury	0.004	0.005
Total Recoverable Nickel	2.2	0.5
Total Recoverable Zinc	33.83	20
Total Phenols	27	5

Instream Waste Concentrations (IWCs) were calculated in the manner described in Appendix D of the CPP and compared to the applicable Criteria. The following tables summarize the results of the analysis. The complete evaluation can be viewed on the Division's website at the following address:

https://www.adeg.state.ar.us/downloads/WebDatabases/PermitsOnline/NPDES/PermitInformation/AR0036498_PPS_20170207.pdf

1. Aquatic Toxicity Evaluation

a. Acute Criteria Evaluation

Pollutant	Concentration Reported (C_e) $\mu\text{g/l}$	$C_e \times 2.13^1$	Instream Waste Concentration (IWC)	Criteria ²	Reasonable Potential (Yes/No)
			Acute, $\mu\text{g/l}$	Acute, $\mu\text{g/l}$	
Total Recoverable Copper	6.26	13.33	13.33	19.25	No
Total Recoverable Lead	0.4	0.85	0.85	119.33	No
Total Recoverable Mercury	0.004	0.00852	0.00852	6.70	No
Total Recoverable Nickel	2.2	4.69	4.69	1344.69	No
Total Recoverable Zinc	33.83	72.06	72.06	165.85	No

¹ Statistical ratio used to estimate the 95th percentile using a single effluent concentration or the geometric mean of a dataset.

² Criteria are from Rule 2.508 unless otherwise specified.

b. Chronic Criteria Evaluation

Pollutant	Concentration Reported (C_e) $\mu\text{g/l}$	$C_e \times 2.13^1$	Instream Waste Concentration (IWC)	Criteria ²	Reasonable Potential (Yes/No)
			Chronic, $\mu\text{g/l}$	Chronic, $\mu\text{g/l}$	
Total Recoverable Copper	6.26	13.33	13.33	13.88	No
Total Recoverable Lead	0.4	0.85	0.85	4.65	No
Total Recoverable Mercury	0.004	0.00852	0.00852	0.012	No
Total Recoverable Nickel	2.2	4.69	4.69	149.34	No
Total Recoverable Zinc	33.83	72.06	72.06	151.45	No

¹ Statistical ratio used to estimate the 95th percentile using a single effluent concentration or the geometric mean of a dataset.

² Criteria are from Rule 2.508 unless otherwise specified.

2. Human Health (Bioaccumulation) Evaluation

Pollutant	Concentration Reported (C_e) $\mu\text{g/l}$	$C_e \times 2.13^1$	Instream Waste Concentration (IWC)	Criteria	Reasonable Potential (Yes/No)
Total Phenols	27	57.51	57.51	3500 ²	No

¹ Statistical ratio used to estimate the 95th percentile using a single effluent concentration or the geometric mean of a dataset.

² EPA Gold Book criteria.

DEQ has determined from the submitted information that the discharge does not pose the reasonable potential to cause or contribute to an exceedance above a listed criteria.

13. WHOLE EFFLUENT TOXICITY

Section 101(a)(3) of the Clean Water Act states that ".....it is the national policy that the discharge of toxic pollutants in toxic amounts be prohibited." In addition, DEQ is required under 40 C.F.R. §122.44(d)(1), adopted by reference in Rule 6, to include conditions as necessary to achieve water quality standards as established under Section 303 of the Clean Water Act. Arkansas has established a narrative criteria which states "toxic materials shall not be present in receiving waters in such quantities as to be toxic to human, animal, plant or aquatic life or to interfere with the normal propagation, growth and survival of aquatic biota."

Whole effluent toxicity (WET) testing is the most direct measure of potential toxicity which incorporates the effects of synergism of effluent components and receiving stream water quality characteristics. It is the national policy of EPA to use bioassays as a measure of

toxicity to allow evaluation of the effects of a discharge upon a receiving water (49 Federal Register 9016-9019, March 9, 1984). EPA Region 6 and the State of Arkansas are now implementing the Post Third Round Policy and Strategy established on September 9, 1992, and EPA Region 6 Post-Third Round Whole Effluent Toxicity Testing Frequencies, revised March 13, 2000. Whole effluent toxicity testing of the effluent is thereby required as a condition of this permit to assess potential toxicity. The whole effluent toxicity testing procedures stipulated as a condition of this permit are as follows:

TOXICITY TESTS	FREQUENCY
Chronic WET	Once/quarter

Requirements for measurement frequency are based on the CPP.

Since 7Q10 is less than 100 cfs (ft³/sec) and dilution ratio is less than 100:1, chronic WET testing requirements will be included in the permit.

The calculations for dilution used for chronic WET testing are as follows:

$$\text{Critical dilution (CD)} = (\text{Qd}/(\text{Qd} + \text{Qb})) \times 100$$

$$\text{Qd} = \text{Design flow} = 8.3 \text{ MGD} = 12.82 \text{ cfs}$$

$$7\text{Q}10 = 0 \text{ cfs}$$

$$\text{Qb} = \text{Background flow} = 0.67 \times 7\text{Q}10 = 0 \text{ cfs}$$

$$\text{CD} = (12.82) / (12.82 + 0) \times 100 = 100\%$$

Toxicity tests shall be performed in accordance with protocols described in "Short-term Methods for Estimating the Chronic Toxicity of Effluents and Receiving Waters to Freshwater Organisms", EPA/600/4-91/002, July 1994. A minimum of five effluent dilutions in addition to an appropriate control (0%) are to be used in the toxicity tests. These additional effluent concentrations are 32%, 42%, 56%, 75%, and 100% (See the CPP). The low-flow effluent concentration (critical dilution) is defined as 100% effluent. The requirement for chronic WET tests is based on the magnitude of the facility's discharge with respect to receiving stream flow. The stipulated test species, *Ceriodaphnia dubia* and the Fathead minnow (*Pimephales promelas*) are representative of organisms indigenous to the geographic area of the facility; the use of these is consistent with the requirements of the State water quality standards. The WET testing frequency has been established to provide data representative of the toxic potential of the facility's discharge, in accordance with the regulations promulgated at 40 C.F.R. § 122.48.

Results of all dilutions as well as the associated chemical monitoring of pH, temperature, hardness, dissolved oxygen conductivity, and alkalinity shall be reported according to EPA-821-R-02-013, October 2002 and shall be submitted as an attachment to the Discharge Monitoring Report (DMR).

This permit may be reopened to require further WET testing studies, Toxicity Reduction Evaluation (TRE) and/or effluent limits if WET testing data submitted to the Division shows

toxicity in the permittee's discharge. Modification or revocation of this permit is subject to the provisions of 40 C.F.R. § 122.62, as adopted by reference in APC&EC Rule 6. Increased or intensified toxicity testing may also be required in accordance with Section 308 of the Clean Water Act and Section 8-4-201 of the Arkansas Water and Air Pollution Control Act (Act 472 of 1949, as amended).

Administrative Records

The following information summarized toxicity test submitted by the permittee during the term of the current permit at Outfall 001.

Permit Number:	AR0036498	AFIN:	63-00063	Outfall Number:	001
Date of Review:	8/12/2020	Reviewer:	M. Barnett		
Facility Name:	City of Benton				
Previous Dilution series:	32, 42, 56, 75, 100	Proposed Dilution Series:	32, 42, 56, 75, 100		
Previous Critical Dilution:	100	Proposed Critical Dilution:	100		
Previous TRE activities:	None				
Frequency recommendation by species					
<i>Pimephales promelas</i> (Fathead minnow):	once per quarter				
<i>Ceriodaphnia dubia</i> (water flea):	once per quarter				

TEST DATA SUMMARY

TEST DATE	Vertebrate (<i>Pimephales promelas</i>)		Invertebrate (<i>Ceriodaphnia dubia</i>)		
	Lethal	Sub-Lethal	Lethal	Sub-Lethal	
	NOEC	NOEC	NOEC	NOEC	
9/30/2015	100	100	100	100	
12/31/2015	100	100	100	100	
3/31/2016	100	100	100	100	
6/30/2016	100	100	100	100	
9/30/2016	100	100	100	100	
12/31/2016	100	100	100	100	
3/31/2017	100	100	100	100	
6/30/2017	100	100	100	100	
9/30/2017	100	100	100	100	
12/31/2017	100	100	100	100	
9/30/2018	100	100	100	100	
12/31/2018	100	100	100	100	
3/31/2019	100	100	100	100	
6/30/2019	100	100	100	100	
9/30/2019	100	100	100	100	
12/31/2019	100	100	100	100	
1/31/2020	100	100	0	0	1st quarter
2/29/2020			100	100	retest 1
3/31/2020			100	100	retest 2
4/30/2020	100	100	100	100	2nd quarter

REASONABLE POTENTIAL CALCULATIONS

	Vertebrate Lethal	Vertebrate Sub-lethal	Invertebrate Lethal	Invertebrate Sub-Lethal
Min NOEC Observed	100	100	31	31
TU at Min Observed	1.00	1.00	3.23	3.23
Count	18	18	20	20
Failure Count	0	0	1	1
Mean	1.000	1.000	1.111	1.111
Std. Dev.	0.000	0.000	0.498	0.498
CV	0	0	0.4	0.4
RPMF	0	0	1.2	1.2
Reasonable Potential	0.000	0.000	3.871	3.871
100/Critical dilution	1.000	1.000	1.000	1.000
Does Reasonable Potential Exist	No	No	Yes	Yes

PERMIT ACTION

P. promelas Chronic - monitoring
C. dubia Chronic - monitoring

C. dubia

During the past five years, the facility has reported one failure below the critical dilution and passed the required retests for *C. dubia* lethality and sub-lethality. The inclusion of requirements for retests for failures will provide sufficient documentation concerning the necessity for a TRE, and the potential for inclusion of WET limits if appropriate. At this time reasonable potential does not exist and there is insufficient evidence to support inclusion of limits.

14. STORMWATER REQUIREMENTS

The federal regulations at 40 C.F.R. § 122.26(b)(14)(ix) require major municipal dischargers to have NPDES permit coverage for stormwater discharges from the facility. These requirements include the development and implementation of a Stormwater Pollution Prevention Plan (SWPPP) to control the quality of stormwater discharges from the facility. In lieu of the development of a SWPPP, the facility may obtain a “No Exposure” Exclusion in accordance with 40 C.F.R. § 122.26(g) if several conditions can be certified. This facility was issued a “No Exposure” Exclusion under NPDES Tracking number ARR00C399.

15. SAMPLE TYPE AND FREQUENCY

With the following exceptions, the requirements for sample type and sampling frequency have been based on the current discharge permit.

The 24-hr composite sample type for CBOD₅, TSS, and NH₃-N have been changed to composite to allow for flexibility in how the required samples are obtained.

The sample frequency and sample type for TDS were based on the requirements for Hardness.

The sample type for Total Recoverable Mercury is composite to match the requirements for CBOD₅ and TSS. The monitoring frequency is once per year since the permittee has not demonstrated reasonable potential.

The TP and NO₃ + NO₂ – N monitoring and reporting requirements have been reduced to once per year. The purpose of the sampling requirements in the previous permit for these parameters was to gather information regarding the introduction of nutrients into Waters of the State. The permittee has tested three times per week for the term of the previous permit. The amount of data available is of sufficient quantity to allow for reduction of these requirements.

Parameter	Previous Permit		Final Permit	
	Frequency of Sample	Sample Type	Frequency of Sample	Sample Type
Flow	once/day	totalizing meter	once/day	totalizing meter
CBOD ₅				
(May – October)	three/week	24-hr composite	three/week	composite
(November – April)	three/week	24-hr composite	three/week	composite
TSS	three/week	24-hr composite	three/week	composite
NH ₃ -N				
(April)	three/week	24-hr composite	three/week	composite
(May – October)	three/week	24-hr composite	three/week	composite
(November – March)	three/week	24-hr composite	three/week	composite
DO				
(May – October)	three/week	grab	three/week	grab
(November – April)	three/week	grab	three/week	grab
FCB				
(May – September)	three/week	grab	three/week	grab
(October – April)	three/week	grab	three/week	grab
Total Hardness	once/month	grab	once/month	grab
TDS	N/A	N/A	once/month	grab
Total Recoverable Mercury	N/A	N/A	once/year	composite
TP	three/week	grab	once/year	grab
NO ₃ + NO ₂ -N	three/week	grab	once/year	grab
pH	three/week	grab	three/week	grab

16. PERMIT COMPLIANCE SCHEDULE

At this time, it is unknown if the permittee can consistently meet the WLA for TDS required by the applicable TMDL. Therefore, as allowed under Rule 2.104, a three-year schedule of compliance has been included in the permit.

The permittee is also required to conduct all testing required by EPA Form 2A and submit the results to DEQ. This requirement is due to the age of the results submitted with the original renewal application. 40 CFR 122.21 requires that the test results be no more than four and a half years old.

17. MONITORING AND REPORTING

The applicant is at all times required to monitor the discharge on a regular basis and report the results monthly. The monitoring results will be available to the public.

18. SOURCES

The following sources were used to draft the permit:

- A. Application No. AR0036498 received February 13, 2013, with all additional information received by March 3, 2017.
- B. Arkansas Water Quality Management Plan (WQMP).
- C. APC&EC Rule 2.
- D. APC&EC Rule 3.
- E. APC&EC Rule 6 which incorporates by reference certain federal regulations included in Title 40 of the Code of Federal Regulations at Rule 6.104.
- F. 40 C.F.R. §§122, 125, 133, and 403.
- G. Discharge permit file AR0036498.
- H. Discharge Monitoring Reports (DMRs).
- I. “2018 Integrated Water Quality Monitoring and Assessment Report”, DEQ.
- J. “2018 List of Impaired Waterbodies (303(d) List)”, DEQ, May 2020.
- K. *TMDLs for Total Dissolved Solids for the Saline River Basin, Arkansas.*
- L. *TMDLs for Segments Listed for Mercury in Fish Tissue for the Ouachita River Basin, and Bayou Bartholomew, Arkansas and Louisiana to Columbia.*
- M. “Low-Flow Characteristics and Regionalization of Low-Flow Characteristics for Selected Streams in Arkansas”, U.S. Dept. of the Interior, U.S. Geological Survey, Scientific Investigations Report 2008-5065.
- N. Continuing Planning Process (CPP).
- O. Technical Support Document For Water Quality-based Toxic Control.
- P. [Inspection Report](#) dated February 11, 2015.
- Q. [Compliance Review Memo](#) from Myrl Lawrence to Loretta Reiber, P.E. dated March 24, 2020.
- R. MultiSMP Model dated August 27, 2014 (and reviewed May 11, 2017).

19. PUBLIC NOTICE

The public notice of the draft permit was published for public comment on February 20, 2021. The last day of the comment period was March 22, 2021. The Arkansas Department of Parks, Heritage, and Tourism was the only party to submit comments on the draft permit.

Copies of the draft permit and public notice were sent via email to the Corps of Engineers, the Regional Director of the U.S. Fish and Wildlife Service, the Department of Parks, Heritage, and Tourism, the EPA, and the Arkansas Department of Health.

20. PERMIT FEE

In accordance with Rule 9.403(B), the annual fee for the permit is calculated from the Design Flow (Q, in MGD) as follows:

$$\text{Fee} = \$5,000 + (900 \times (Q-1)) = \$5,000 + (900 \times (8.3 - 1)) = \$11,570$$

21. POINT OF CONTACT

For additional information, contact:

Loretta Carstens, P.E.
Permits Branch, Office of Water Quality
Arkansas Department of Energy and Environment
Division of Environmental Quality
5301 Northshore Drive
North Little Rock, Arkansas 72118-5317
Telephone: (501) 682-0612

**RESPONSE TO COMMENTS
FINAL PERMITTING DECISION**

Permit No.: AR0036498

Applicant: Benton Utilities
Wastewater Treatment Plant

Prepared by: Loretta Carstens, P.E.

The following are responses to comments received by the Division of Environmental Quality (DEQ) regarding the draft permit number referenced above and are developed in accordance with regulations promulgated at 40 C.F.R. §124.17, Arkansas Pollution Control & Ecology Commission (APC&EC) Rule 8 (Administrative Procedures), and Arkansas Code Annotated (A.C.A.) §8-4-203(e)(2).

Introduction

The above permit was submitted for public comment on February 20, 2021. The public comment period ended on March 22, 2021. The Arkansas Department of Parks, Heritage, and Tourism was the only party to submit comments on the draft permit.

Comment: The Arkansas Department of Parks, Heritage, and Tourism stated that the following species of concern are known to occur at or within five miles downstream of the permitted outfall:

Cyprogenia sp. Cf. aberti, Ouachita Fanshell – state concern
Etheostoma parvipinne, goldstripe darter – state concern
Lampsilis powelli, Arkansas Fatmucket – federal concern (threatened)
Notropis perpallidus, peppered shiner – state concern
Pleurobema rubrum, Pyramid Pigtoe – state concern
Ptychobranchnus occidentalis, Ouachita Kidneyshell – state concern
Truncilla donaciformis, Fawnsfoot – state concern

The Saline River has been recognized on the state’s Registry of Natural and Scenic Rivers and on the Nationwide Rivers Inventory.

Response: The limits in the permit are designed to protect all beneficial uses of the receiving waters, including propagation of desirable species of fish and other aquatic life as well as other species which are directly or indirectly affected by the receiving waters, which includes the above species of concern. Therefore, DEQ has determined that the final permit limits will serve to help protect the species of concern identified above. The identified species of concern are included in section 7.C of the fact sheet which discusses endangered species.



March 5, 2020

Biomonitoring Testing
for
Outfall 001
Benton, AR

Control No. 242907-1

Prepared for:

Mr. Greg Becker
Benton Utilities
616 West Hazel
Benton, AR 72015

Prepared by:

AMERICAN INTERPLEX CORPORATION
8600 Kanis Road
Little Rock, AR 72204-2322

Benton Utilities
ATTN: Mr. Greg Becker
616 West Hazel
Benton, AR 72015

Re: Chronic 7-Day Renewal *Ceriodaphnia dubia*
Outfall 001 - Benton, AR
NPDES Permit No. AR0036498 AFIN# 63-00063

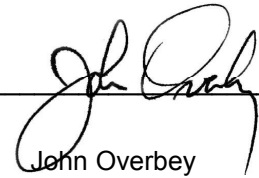
Dear Mr. Greg Becker:

This report is the analytical results and supporting information for the samples submitted to American Interplex Corporation (AIC). The following results are applicable only to the sample identified by the control number referenced above. Accurate assessment of the data requires access to the entire document. Each section of the report has been reviewed and approved by the Chief Operating Officer or qualified designee.

Testing procedures and Quality Assurance were in accordance with "Short Term Methods for Estimating the Chronic Toxicity of Effluents and Receiving Waters to Freshwater Organisms" EPA-821-R-02-013, Fourth Edition, October 2002. Test results are summarized below:

Method 1002.0 Chronic *Ceriodaphnia dubia* Survival and Reproduction Test: The No Observable Effects Concentration (NOEC) for survival occurred at 100 % effluent, which is equal to the critical dilution of 100 %. The NOEC for reproduction occurred at 100 % effluent, which is equal to the critical dilution of 100 %. **The sample, therefore, PASSED both lethal and sub-lethal effects for the *Ceriodaphnia dubia* test.**

AMERICAN INTERPLEX CORPORATION



John Overbey
Chief Operating Officer

PDF cc: Benton Utilities
ATTN: Mr. Greg Becker
gbecker@bentonar.org

Benton Utilities
ATTN: Ms. Angela Freeman
angelaf@bentonar.org

Table of Contents

- I. Control Acceptance Criteria
- II. Outlined Report
- III. Data Analysis
- IV. Standard Reference Toxicants
- V. Organism History
- VII. Results Summary
 - Ceriodaphnia dubia*
- Appendix A: Raw Data
 - A1: Test 1002.0
 - Ceriodaphnia dubia* Survival and Reproduction
 - A2: Statistics
 - A3: Reference Toxicant
- Appendix B: Summary Forms

I. Control Acceptance Criteria

Ceriodaphnia dubia Method 1002.0

CRITERIA	RESULTS	PASS/FAIL
Control Survival > or = 80%	100	PASS
Control Reproduction > or = 15 per Surviving Female	23	PASS
Control CV < or = 40% per Surviving Female	25	PASS
Reproduction Minimum Significant Difference 13 to 47%	27	PASS
Critical Dilution CV < or = 40%	11	PASS

II. Outlined Report

A. Introduction

1. Permit Number: AR0036498 AFIN# 63-00063
2. Test Requirements: Chronic Biomonitoring, Quarterly Test Method 1002.0

B. Source of Effluent/Dilution Water:

1. Effluent Samples:

- a. Sampling Point: Outfall 001
- b. Chemical Data:

Analysis	Sample 1	Sample 2	Sample 3
Dissolved oxygen (mg/l)	8.1	8.4	8.3
pH (standard units)	6.8	7.0	7.1
Alkalinity (mg/l as CaCO ₃)	34	35	39
Hardness (mg/l as CaCO ₃)	45	45	50
Conductivity (umhos/cm)	180	190	210
Residual Chlorine (mg/l)	<0.05	0.070	<0.05
Ammonia as N (mg/l)	0.45	0.74	0.89

2. Dilution Water Samples:

Soft

Analysis	242500-1
Dissolved oxygen (mg/l)	7.9
pH (standard units)	7.4
Alkalinity (mg/l as CaCO ₃)	32
Hardness (mg/l as CaCO ₃)	40
Conductivity (umhos/cm)	140
Residual Chlorine (mg/l)	<0.05

C. Test Methods

1. Test methods used:

Short Term Methods for Estimating the Chronic Toxicity of Effluents and Receiving Waters to Freshwater Organisms, EPA-821-R-02-013; test Method 1002.0, *Ceriodaphnia dubia* Survival and Reproduction.

2. Endpoint: No Observable Effects Concentration (NOEC)

3. Test Conditions:

Ceriodaphnia dubia Survival and Reproduction Method 1002.0

Date & Time Test Initiated: February 25, 2020 at 1305

Date & Time Test Terminated: March 03, 2020 at 1455

Type & Volume of Test Chamber: 30 ml disposable beaker

Volume of Sample: 15 ml

Number of Organisms per replicate: 1

Number of Replicates per dilution: 10

4. Source of test organisms: Obtained from in-house cultures

5. Test Temperature: 25 +/- 1 degree Celsius

D. Test Organisms

1. Scientific Name

a. Test 1002.0 *Ceriodaphnia dubia*

III. Data Analysis

The data was analyzed using American Interplex Corporation's Laboratory Information Management Software based on Toxstat and following EPA method criteria.

Ceriodaphnia dubia survival data was analyzed with Fisher's Exact Test. Reproduction data was analyzed using Kolmogorov's Test for Normality and Bartlett's test and analyzed with Steel's Many-One Rank Test to determine the No Observable Effects Concentration (NOEC) for Reproduction. Dunnett's Test was used to calculate the PMSD.

IV. Standard Reference Toxicants

The sensitivity of the offspring is determined by performing a standard reference toxicant test monthly. Sodium chloride in synthetic moderately hard water is used as prescribed in EPA-821-R-02-013.

Ceriodaphnia dubia

A chronic reference test was performed on January 07, 2020 at 0955 to January 13, 2020 at 0920

The results were as follows: (Control No. 241413-2.)

Survival LC-50: 1673.1 mg/l

Reproduction IC-25: 885.1 mg/l

Reproduction PMSD: 21.7

V. Organism History

Ceriodaphnia dubia

Date: February 25, 2020

Age: <24 hours

Source: In-house culture

Water: Moderately hard synthetic

Temperature: 25 deg.C

VII. Results Summary *Ceriodaphnia dubia*, Cladoceran Survival and Reproduction Test -- Method 1002.0

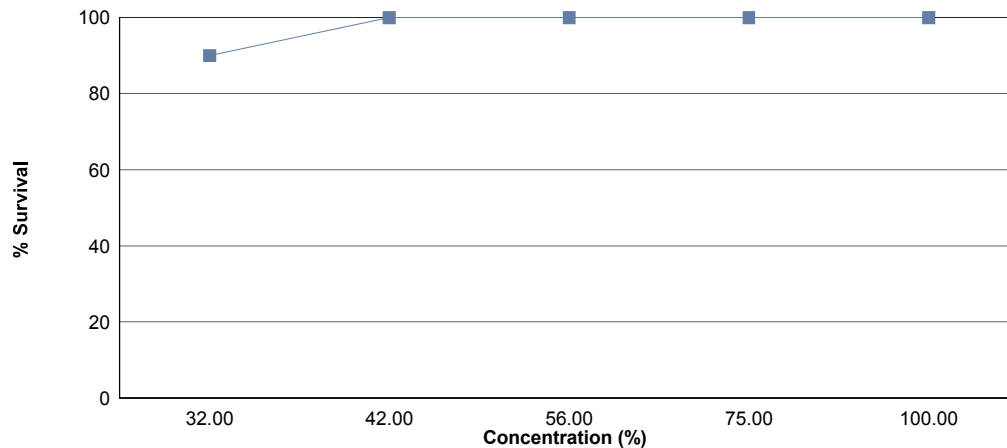
Neonates are exposed in a static renewal system to different concentrations of effluent with dilution water until 60% of surviving control organisms have three broods of offspring or a maximum of eight test days.

Effluent dilutions for this test were 32 %, 42 %, 56 %, 75 %, 100 % in accordance with the NPDES permit.

The low flow or 'critical' dilution is specified in the NPDES permit as 100 % effluent.

The test was initiated on February 25, 2020 at 1305 and continued through March 03, 2020 at 1455. Statistical analyses were performed on the observed data and the no observable effects concentrations (NOECs) were as follows:

- a.) NOEC survival = 100 % effluent
- b.) NOEC reproduction = 100 % effluent



Summary of the 7-day <i>Ceriodaphnia dubia</i> Survival and Reproduction Data		
Concentration	Percent Survival	Mean Reproduction
Control	100	23.1
32 %	90.0	27.6
42 %	100	31.9
56 %	100	30.7
75 %	100	35.9
100 %	100	35.9

Appendix A1: Test 1002.0

Ceriodaphnia dubia Survival and Reproduction

Date and Time Test Initiated: February 25, 2020 at 1305

Date and Time Test Terminated: March 03, 2020 at 1455

Concentration: Control														
Day	Replicate										No. of Young	No. of Adults	Young per Adult	
	1	2	3	4	5	6	7	8	9	10				
1	0	0	0	0	0	0	0	0	0	0	0	0	10	0.00
2	0	0	0	0	0	0	0	0	0	0	0	0	10	0.00
3	0	0	0	0	0	0	0	0	0	0	0	0	10	0.00
4	3	2	5	3	2	5	7	4	2	4	37	10	3.70	
5	0	5	0	0	0	7	10	8	7	8	45	10	4.50	
6	7	0	10	9	6	0	2	0	0	0	34	10	3.40	
7	10	11	15	15	11	11	16	10	9	7	115	10	11.5	
8														
TOTAL	20	18	30	27	19	23	35	22	18	19	231	10	23.1	

Concentration: 32 %														
Day	Replicate										No. of Young	No. of Adults	Young per Adult	
	1	2	3	4	5	6	7	8	9	10				
1	0	0	0	0	0	0	0	0	0	0	0	10	0.00	
2	0	0	0	0	0	0	0	0	0	0	0	10	0.00	
3	0	0	0	0	0	0	0	0	0	0	0	10	0.00	
4	6	3	5	6	6	4	6	5	5	5	51	10	5.10	
5	9	10	X	10	8	9	12	9	10	9	86	9	9.56	
6	0	0	X	0	0	0	0	0	11	10	21	9	2.33	
7	18	16	X	19	17	15	17	16	0	0	118	9	13.1	
8														
TOTAL	33	29	5	35	31	28	35	30	26	24	276	10	27.6	

Concentration: 42 %														
Day	Replicate										No. of Young	No. of Adults	Young per Adult	
	1	2	3	4	5	6	7	8	9	10				
1	0	0	0	0	0	0	0	0	0	0	0	10	0.00	
2	0	0	0	0	0	0	0	0	0	0	0	10	0.00	
3	0	0	0	0	0	0	0	0	0	0	0	10	0.00	
4	4	4	4	6	6	5	8	7	4	4	52	10	5.20	
5	0	7	0	10	9	17	6	10	13	12	84	10	8.40	
6	10	0	12	0	0	0	0	0	14	15	51	10	5.10	
7	13	16	16	17	19	16	18	17	0	0	132	10	13.2	
8														
TOTAL	27	27	32	33	34	38	32	34	31	31	319	10	31.9	

Appendix A1: Test 1002.0

Ceriodaphnia dubia Survival and Reproduction

Date and Time Test Initiated: February 25, 2020 at 1305

Date and Time Test Terminated: March 03, 2020 at 1455

Concentration: 56 %														
Day	Replicate										No. of Young	No. of Adults	Young per Adult	
	1	2	3	4	5	6	7	8	9	10				
1	0	0	0	0	0	0	0	0	0	0	0	0	10	0.00
2	0	0	0	0	0	0	0	0	0	0	0	0	10	0.00
3	0	0	0	0	0	0	0	0	0	0	0	0	10	0.00
4	5	4	6	6	0	7	7	6	5	5	51	10	5.10	
5	13	10	0	12	4	13	11	11	13	9	96	10	9.60	
6	0	5	11	0	0	0	0	0	10	10	36	10	3.60	
7	17	0	20	19	12	18	20	18	0	0	124	10	12.4	
8														
TOTAL	35	19	37	37	16	38	38	35	28	24	307	10	30.7	

Concentration: 75 %													
Day	Replicate										No. of Young	No. of Adults	Young per Adult
	1	2	3	4	5	6	7	8	9	10			
1	0	0	0	0	0	0	0	0	0	0	0	10	0.00
2	0	0	0	0	0	0	0	0	0	0	0	10	0.00
3	0	0	0	0	0	0	0	0	0	0	0	10	0.00
4	6	5	7	9	7	7	7	7	5	6	66	10	6.60
5	10	11	0	11	10	13	10	11	9	12	97	10	9.70
6	0	17	12	0	0	0	3	0	15	17	64	10	6.40
7	17	0	19	21	19	19	18	19	0	0	132	10	13.2
8													
TOTAL	33	33	38	41	36	39	38	37	29	35	359	10	35.9

Concentration: 100 %													
Day	Replicate										No. of Young	No. of Adults	Young per Adult
	1	2	3	4	5	6	7	8	9	10			
1	0	0	0	0	0	0	0	0	0	0	0	10	0.00
2	0	0	0	0	0	0	0	0	0	0	0	10	0.00
3	0	0	0	0	0	0	0	0	0	0	0	10	0.00
4	8	7	5	7	6	7	7	7	7	7	68	10	6.80
5	12	14	12	13	11	13	13	11	13	13	125	10	12.5
6	0	18	0	0	0	15	0	14	15	12	74	10	7.40
7	19	0	16	23	14	0	20	0	0	0	92	10	9.20
8													
TOTAL	39	39	33	43	31	35	40	32	35	32	359	10	35.9

Appendix A2: Statistics

Ceriodaphnia dubia Survival

Fisher's Exact Test			
Identification	Alive	Dead	Total Animals
Control	10	0	10
32 %	9	1	10
Total	19	1	20

Critical Fisher's value (10,10,10) (alpha=0.05) is 6. b value is 9. Since b is greater than 6 there is NO SIGNIFICANT DIFFERENCE between CONTROL and TREATMENT at the 0.05 level.

Fisher's Exact Test			
Identification	Alive	Dead	Total Animals
Control	10	0	10
42 %	10	0	10
Total	20	0	20

Critical Fisher's value (10,10,10) (alpha=0.05) is 6. b value is 10. Since b is greater than 6 there is NO SIGNIFICANT DIFFERENCE between CONTROL and TREATMENT at the 0.05 level.

Fisher's Exact Test			
Identification	Alive	Dead	Total Animals
Control	10	0	10
56 %	10	0	10
Total	20	0	20

Critical Fisher's value (10,10,10) (alpha=0.05) is 6. b value is 10. Since b is greater than 6 there is NO SIGNIFICANT DIFFERENCE between CONTROL and TREATMENT at the 0.05 level.

Fisher's Exact Test			
Identification	Alive	Dead	Total Animals
Control	10	0	10
75 %	10	0	10
Total	20	0	20

Critical Fisher's value (10,10,10) (alpha=0.05) is 6. b value is 10. Since b is greater than 6 there is NO SIGNIFICANT DIFFERENCE between CONTROL and TREATMENT at the 0.05 level.

Appendix A2: Statistics

Ceriodaphnia dubia Survival

Fisher's Exact Test			
Identification	Alive	Dead	Total Animals
Control	10	0	10
100 %	10	0	10
Total	20	0	20

Critical Fisher's value (10,10,10) (alpha=0.05) is 6. b value is 10. Since b is greater than 6 there is NO SIGNIFICANT DIFFERENCE between CONTROL and TREATMENT at the 0.05 level.

Summary of Fisher's Exact Test				
Group	Identification	Exposed	Dead	Sig 0.05
0	Control	10	0	
1	32 %	10	1	
2	42 %	10	0	
3	56 %	10	0	
4	75 %	10	0	
5	100 %	10	0	

Appendix A2: Statistics

Ceriodaphnia dubia Reproduction

Kolmogorov Test for Normality	No Transformation
D = 0.1061 D* = 0.8324 Critical D* = 1.035 (alpha = 0.01, N = 60)	
Data PASS normality test (alpha = 0.01).	

Bartlett's Test for Homogeneity of Variance	No Transformation
Calculated B1 statistic = 15.47 Critical B = 15.086 (alpha = 0.01, df = 5)	
Data FAIL B1 homogeneity test at 0.01 level.	

Steel's Many-One Rank Test				No Transformation	
Ho:Control<Treatment					
Group	Identification	Rank Sum	Critical Value	DF	Sig 0.05
1	Control				
2	32 %	130.50	75.00	10.00	
3	42 %	143.00	75.00	10.00	
4	56 %	132.00	75.00	10.00	
5	75 %	150.50	75.00	10.00	
6	100 %	150.00	75.00	10.00	
Critical values are 1 tailed (k=5)					

Appendix A2: Statistics

Ceriodaphnia dubia Reproduction

Dunnett's Test for PMSD Calculation

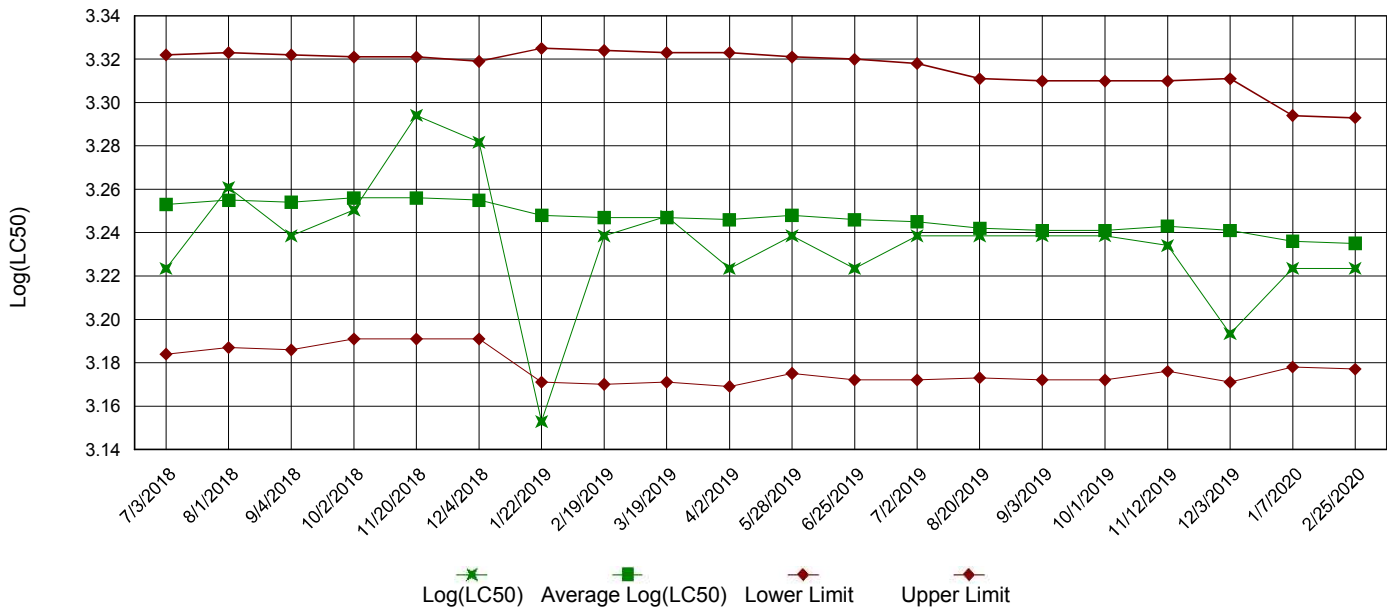
ANOVA Table				No Transformation	
SOURCE	DF	SS	MS	F	
Between	5	1228	245.5	6.722	
Within (Error)	54	1972	36.52		
Total	59	3200			
Critical F = 3.38 (alpha = 0.01, df = 5,54)					
2.38 (alpha = 0.05, df = 5,54)					
Since F > Critical F REJECT Ho: All equal (alpha = 0.05)					

Dunnett's Test - Table 1 of 2					No Transformation	
Ho:Control<Treatment						
Group	Identification	Transformed Mean	Mean In Original Units	T Stat	Sig 0.05	
1	Control	23.1	23.1			
2	32 %	27.6	27.6	-1.665		
3	42 %	31.9	31.9	-3.256		
4	56 %	30.7	30.7	-2.812		
5	75 %	35.9	35.9	-4.736		
6	100 %	35.9	35.9	-4.736		
Dunnett's critical value = 2.31 (1 Tailed, alpha = 0.05, df [used] = 5,40) (Actual df = 5,54)						

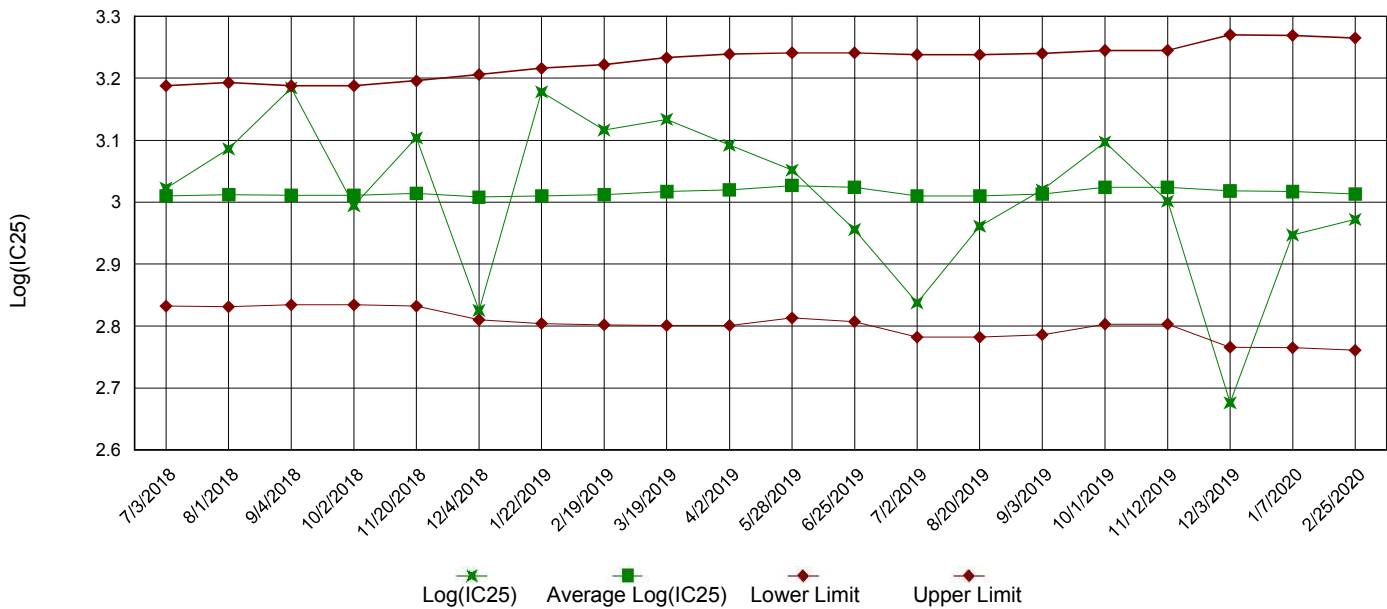
Dunnett's Test - Table 2 of 2					No Transformation	
Ho:Control<Treatment						
Group	Identification	Num of Reps	Min Sig Diff (In Orig. Units)	% of Control	Difference From Control	
1	Control	10				
2	32 %	10	6.243	27	-4.5	
3	42 %	10	6.243	27	-8.8	
4	56 %	10	6.243	27	-7.6	
5	75 %	10	6.243	27	-12.8	
6	100 %	10	6.243	27	-12.8	

Appendix A3: Test 1002.0
Chronic Reference Toxicant, *Ceriodaphnia dubia*

LC50 Survival Data



IC25 Reproduction Data



Appendix B: Test 1002.0
SUMMARY REPORTING FORMS
CHRONIC BIOMONITORING
Ceriodaphnia dubia
SURVIVAL AND REPRODUCTION

Permittee: Benton Utilities

NPDES No.: AR0036498 AFIN# 63-00063

Date and Time Test Initiated: February 25, 2020 at 1305

Date and Time Test Terminated: March 03, 2020 at 1455

Dilution water used: Soft

PERCENT SURVIVAL

Time of Reading	Control	Percent Effluent				
		32 %	42 %	56 %	75 %	100 %
24 hour	100	100	100	100	100	100
48 hour	100	100	100	100	100	100
7 day	100	90.0	100	100	100	100

NUMBER OF YOUNG PRODUCED PER FEMALE @ 7 DAYS

Replicates	Control	Percent Effluent				
		32 %	42 %	56 %	75 %	100 %
A	20	33	27	35	33	39
B	18	29	27	19	33	39
C	30	5	32	37	38	33
D	27	35	33	37	41	43
E	19	31	34	16	36	31
F	23	28	38	38	39	35
G	35	35	32	38	38	40
H	22	30	34	35	37	32
I	18	26	31	28	29	35
J	19	24	31	24	35	32
Mean per Adult	23.1	27.6	31.9	30.7	35.9	35.9
Mean per Surviving Adult	23.1	30.1	31.9	30.7	35.9	35.9
CV %	25.0	12.7	10.3	27.2	9.78	11.4

CV = Coefficient of variation = standard deviation * 100 / mean
(calculated based on young produced by surviving females)

Appendix B: Test 1002.0
SUMMARY REPORTING FORMS
CHRONIC BIOMONITORING
Ceriodaphnia dubia
SURVIVAL AND REPRODUCTION

1. Fisher's Exact Test:

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

a.) LOW FLOW OR CRITICAL DILUTION	(100 %)	<u> </u> YES	<u> X </u> NO
b.) 1/2 LOW FLOW DILUTION	(NA)	<u> </u> YES	<u> </u> NO

2. Steel's Many-One Rank Test:

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

a.) LOW FLOW OR CRITICAL DILUTION	(100 %)	<u> </u> YES	<u> X </u> NO
b.) 1/2 LOW FLOW DILUTION	(NA)	<u> </u> YES	<u> </u> NO

3. If you answered NO to 1.a) enter [0] otherwise enter [1]: 0 (TLP3B)

4. If you answered NO to 2.a) enter [0] otherwise enter [1]: 0 (TGP3B)

5. NOEC Ceriodaphnia Lethality: 100 % (TOP3B)

6. LOEC Ceriodaphnia Lethality: 100 % (TXP3B)

7. NOEC Ceriodaphnia Sublethality: 100 % (TPP3B)

8. LOEC Ceriodaphnia Sublethality: 100 % (TYP3B)

9. Coefficient of variation for Ceriodaphnia Reproduction: 25 (TQP3B)

Appendix B: Test 1002.0
CHRONIC TOXICITY SUMMARY FORM
Ceriodaphnia dubia
CHEMICAL PARAMETERS CHART

PERMITTEE: Benton Utilities
NPDES NO.: AR0036498 AFIN# 63-00063
CONTACT: Mr. Greg Becker
ANALYST: 280, 310, 343, 345

Test Initiated: DATE: February 25, 2020 TIME: 1305
Test Terminated: DATE: March 03, 2020 TIME: 1455

DILUTION	DAY						
	1	2	3	4	5	6	7
Control							
D.O. Initial	7.9	8.5	8.4	7.7	7.7	7.6	7.6
Final	7.8	7.8	7.6	7.3	7.5	7.4	7.7
pH Initial	7.4	7.5	7.3	7.4	7.5	7.6	7.6
Final	7.7	7.8	7.9	8.0	8.1	7.9	7.6

DILUTION	DAY						
	1	2	3	4	5	6	7
32 %							
D.O. Initial	7.9	7.9	8.4	7.7	8.0	7.7	7.4
Final	8.1	7.8	7.3	7.8	7.6	7.4	7.0
pH Initial	7.0	7.4	7.2	7.3	7.2	7.6	7.4
Final	7.6	7.8	7.9	7.8	8.0	7.9	7.5

DILUTION	DAY						
	1	2	3	4	5	6	7
42 %							
D.O. Initial	8.0	7.9	7.8	8.2	7.8	7.6	7.2
Final	8.0	8.0	7.3	7.9	7.9	7.8	7.0
pH Initial	7.0	7.4	7.1	7.2	7.2	7.6	7.4
Final	7.6	7.7	7.8	7.8	8.0	7.8	7.4

DILUTION	DAY						
	1	2	3	4	5	6	7
56 %							
D.O. Initial	7.8	8.5	8.1	7.7	7.9	7.8	7.6
Final	7.7	7.8	7.5	7.5	7.7	7.6	7.7
pH Initial	6.9	7.4	7.1	7.2	7.1	7.6	7.4
Final	7.6	7.7	7.8	7.8	8.0	7.9	7.4

DILUTION	DAY						
	1	2	3	4	5	6	7
75 %							
D.O. Initial	7.8	8.5	8.5	7.6	8.1	7.6	7.6
Final	7.0	7.8	7.6	7.2	7.4	7.4	7.6
pH Initial	6.9	7.3	7.0	7.1	7.1	7.6	7.4
Final	7.6	7.7	7.8	7.7	8.0	7.9	7.4

DILUTION	DAY						
	1	2	3	4	5	6	7
100 %							
D.O. Initial	8.1	8.2	8.4	7.6	8.3	7.6	7.3
Final	7.8	7.9	7.3	7.8	7.3	7.5	7.3
pH Initial	6.8	7.3	7.0	7.2	7.1	7.6	7.2
Final	7.6	7.7	7.8	7.8	8.0	7.9	7.6

Alkalinity	Hardness	Conductivity	Chlorine	Sample ID
34	45	180	<0.05	Outfall 001 25-FEB-20
35	45	190	0.070	Outfall 001 26-FEB-20
39	50	210	<0.05	Outfall 001 28-FEB-20

Alkalinity	Hardness	Conductivity	Chlorine	Sample ID
32	40	140	<0.05	242500-1



CHAIN OF CUSTODY / ANALYSIS REQUEST FORM

Client: <u>Benton Utilities</u>		PO No. <u>101919</u>	ANALYSES REQUESTED										AIC CONTROL NO: <u>242907</u>
Project Reference: <u>AL0036498</u>		MATRIX											AIC PROPOSAL NO:
Project Manager: <u>G. Becker</u>		WATER											Carrier:
Sampled By: <u>AK</u>		SOIL											Received Temperature C <u>7.4</u>
AIC No. <u>1</u>		GRA B											Remarks
Sample Identification <u>OUT Fall 001</u>		COMP											
Date/Time Collected <u>2/25/20 0859</u>													
Container Type													
Preservative													
G = Glass NO = none S = Sulfuric acid pH2													Field pH calibration on @
P = Plastic S = Sulfuric acid pH2													Buffer:
Turnaround Time Requested: (Please circle) NORMAL or EXPEDITED IN ___ DAYS													T = Sodium Thiosulfate Z = Zinc acetate A = (NH ₄) ₂ SO ₄ , NH ₄ OH
Expedited results requested by:													Date/Time Received <u>0859/2/25/20</u>
Who should AIC contact with questions: Phone: 776.5972 Fax: 501.776.5974													Date/Time <u>2-25-20</u>
Report Attention to:													Received in Lab By: <u>D. Brown</u>
Report Address to:													Comments:
Email Address: <u>G.Becker@Bentonar.org</u>													
9/2014													
<u>Angela F @ Bentonar.org</u>													



CHAIN OF CUSTODY / ANALYSIS REQUEST FORM

PAGE 2 OF 3

AIC CONTROL NO: 242907
 AIC PROPOSAL NO:

Carrier:
 Received Temperature C
 Remarks

Field pH calibration on @ Buffer:

ANALYSES REQUESTED

NO OF BOTTLES

PO No. 101919

MATRIX
 W A T E R L
 G R A B

Client: Benton Utilities
 Project Reference: AL0036498
 Project Manager: G. Becker
 Sampled By: AF

Sample Identification: 001
 Date/Time Collected: 2/26/20

NO = none
 S = Sulfuric acid pH2
 G = Glass
 P = Plastic
 V = VOA vials
 N = Nitric acid pH2

H = HCl to pH2
 B = NaOH to pH12
 T = Sodium Thiosulfate
 Z = Zinc acetate
 A = (NH4)2SO4, NH4OH

Turnaround Time Requested: (Please circle)
 NORMAL or EXPEDITED IN ___ DAYS

Expedited results requested by:
 Who should AIC contact with questions:
 Phone: 776.5982 Fax: 501.776.5974

Report Attention to:
 Report Address to:

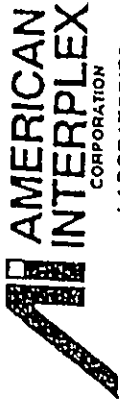
Reinquinshed By: AF
 Date/Time: 2/26/20 9:39A

Received By: TJ
 Date/Time: 2/26/20 8:55AM

Reinquinshed By: TJ
 Date/Time: 2/26/20 9:39A

Comments:

Email Address: GBecker@Bentonar.org
 9/2014
 AngJaf@Bentonar.org
 TJSolnse@Bentonar.org



LABORATORIES

CHAIN OF CUSTODY / ANALYSIS REQUEST FORM

PAGE 1 OF 1

Client: Benton Utilities Project Reference: AL0036498 Project Manager: G. Becker Sampled By: AK		PO No. 101919 MATRIX: WATER ANALYSES REQUESTED:	
AIC No. 3 Sample Identification: OUT 1411 001 Date/Time Collected: 2/28/20		NO OF BOTTLES: 1 Matrix: WATER G R A B: ✓ C O M P: ✓	
Carrier: _____ Received Temperature C: 7.2 Remarks: _____		H = HCl to pH2 B = NaOH to pH12 T = Sodium Thiosulfate Z = Zinc acetate A = (NH ₄) ₂ SO ₄ , NH ₄ OH	
Field pH calibration on _____ @ _____ Buffer: _____		Relinquished By: AK Date/Time: 2/28/20 0854 Relinquished By: GB Date/Time: 2/28/20 0950	
Turnaround Time Requested: (Please circle) _____ NORMAL or EXPEDITED IN _____ DAYS Expedited results requested by: _____ Who should AIC contact with questions: _____ Phone: 776.5982 Fax: 501.776.5974		Received By: GB Date/Time: 2/28/20 0854 Received in Lab By: D. Brown Date/Time: 2-28-20 0950	
Report Attention to: _____ Report Address to: _____		Comments: _____	
Email Address: GBecker@Bentonor.org 9/2014			

Angela F @ Bentonor.org
 T Johnson @ Bentonor.org



March 31, 2020

Biomonitoring Testing
for
Outfall 001
Benton, AR

Control No. 243785-1

Prepared for:

Mr. Greg Becker
Benton Utilities
616 West Hazel
Benton, AR 72015

Prepared by:

AMERICAN INTERPLEX CORPORATION
8600 Kanis Road
Little Rock, AR 72204-2322

Benton Utilities
ATTN: Mr. Greg Becker
616 West Hazel
Benton, AR 72015

Re: Chronic 7-Day Renewal *Ceriodaphnia dubia*
Outfall 001 - Benton, AR
NPDES Permit No. AR0036498 AFIN# 63-00063

Dear Mr. Greg Becker:

This report is the analytical results and supporting information for the samples submitted to American Interplex Corporation (AIC). The following results are applicable only to the sample identified by the control number referenced above. Accurate assessment of the data requires access to the entire document. Each section of the report has been reviewed and approved by the Chief Operating Officer or qualified designee.

Testing procedures and Quality Assurance were in accordance with "Short Term Methods for Estimating the Chronic Toxicity of Effluents and Receiving Waters to Freshwater Organisms" EPA-821-R-02-013, Fourth Edition, October 2002. Test results are summarized below:

Method 1002.0 Chronic *Ceriodaphnia dubia* Survival and Reproduction Test: The No Observable Effects Concentration (NOEC) for survival occurred at 100 % effluent, which is equal to the critical dilution of 100 %. The NOEC for reproduction occurred at 100 % effluent, which is equal to the critical dilution of 100 %. **The sample, therefore, PASSED both lethal and sub-lethal effects for the *Ceriodaphnia dubia* test.**

AMERICAN INTERPLEX CORPORATION



John Overbey
Chief Operating Officer

PDF cc: Benton Utilities
ATTN: Mr. Greg Becker
gbecker@bentonar.org

Benton Utilities
ATTN: Ms. Angela Freeman
angelaf@bentonar.org

Benton Utilities
ATTN: Mr. Tom Johnson
tjohnson@bentonar.org

Table of Contents

- I. Control Acceptance Criteria
- II. Outlined Report
- III. Data Analysis
- IV. Standard Reference Toxicants
- V. Organism History
- VII. Results Summary
 - Ceriodaphnia dubia*
- Appendix A: Raw Data
 - A1: Test 1002.0
 - Ceriodaphnia dubia* Survival and Reproduction
 - A2: Statistics
 - A3: Reference Toxicant
- Appendix B: Summary Forms

I. Control Acceptance Criteria

Ceriodaphnia dubia Method 1002.0

CRITERIA	RESULTS	PASS/FAIL
Control Survival > or = 80%	100	PASS
Control Reproduction > or = 15 per Surviving Female	22.8	PASS
Control CV < or = 40% per Surviving Female	15.7	PASS
Reproduction Minimum Significant Difference 13 to 47%	21.4	PASS
Critical Dilution CV < or = 40%	12.5	PASS

II. Outlined Report

A. Introduction

1. Permit Number: AR0036498 AFIN# 63-00063
2. Test Requirements: Chronic Biomonitoring, Quarterly Test Method 1002.0

B. Source of Effluent/Dilution Water:

1. Effluent Samples:

- a. Sampling Point: Outfall 001
- b. Chemical Data:

Analysis	Sample 1	Sample 2	Sample 3
Dissolved oxygen (mg/l)	8.3	7.8	7.9
pH (standard units)	7.3	7.2	7.3
Alkalinity (mg/l as CaCO ₃)	43	41	39
Hardness (mg/l as CaCO ₃)	51	50	50
Conductivity (umhos/cm)	200	190	190
Residual Chlorine (mg/l)	<0.05	<0.05	<0.05
Ammonia as N (mg/l)	0.27	0.11	0.33

2. Dilution Water Samples:

Soft

Analysis	243360-1
Dissolved oxygen (mg/l)	7.3
pH (standard units)	7.9
Alkalinity (mg/l as CaCO ₃)	33
Hardness (mg/l as CaCO ₃)	42
Conductivity (umhos/cm)	160
Residual Chlorine (mg/l)	<0.05

C. Test Methods

1. Test methods used:

Short Term Methods for Estimating the Chronic Toxicity of Effluents and Receiving Waters to Freshwater Organisms, EPA-821-R-02-013; test Method 1002.0, *Ceriodaphnia dubia* Survival and Reproduction.

2. Endpoint: No Observable Effects Concentration (NOEC)

3. Test Conditions:

Ceriodaphnia dubia Survival and Reproduction Method 1002.0

Date & Time Test Initiated:	March 24, 2020 at 1335
Date & Time Test Terminated:	March 30, 2020 at 1420
Type & Volume of Test Chamber:	30 ml disposable beaker
Volume of Sample:	15 ml
Number of Organisms per replicate:	1
Number of Replicates per dilution:	10

4. Source of test organisms: Obtained from in-house cultures

5. Test Temperature: 25 +/- 1 degree Celsius

D. Test Organisms

1. Scientific Name

a. Test 1002.0 *Ceriodaphnia dubia*

III. Data Analysis

The data was analyzed using American Interplex Corporation's Laboratory Information Management Software based on Toxstat and following EPA method criteria.

Ceriodaphnia dubia survival data was analyzed with Fisher's Exact Test. Reproduction data was analyzed using Kolmogorov's Test for Normality and Bartlett's test and analyzed with Steel's Many-One Rank Test to determine the No Observable Effects Concentration (NOEC) for Reproduction. Dunnett's Test was used to calculate the PMSD.

IV. Standard Reference Toxicants

The sensitivity of the offspring is determined by performing a standard reference toxicant test monthly. Sodium chloride in synthetic moderately hard water is used as prescribed in EPA-821-R-02-013.

Ceriodaphnia dubia

A chronic reference test was performed on March 17, 2020 at 1540 to March 24, 2020 at 1615

The results were as follows: (Control No. 243616-2.)

Survival LC-50: 1616.1 mg/l

Reproduction IC-25: 813.4 mg/l

Reproduction PMSD: 17

V. Organism History

Ceriodaphnia dubia

Date: March 24, 2020

Age: <24 hours

Source: In-house culture

Water: Moderately hard synthetic

Temperature: 25 deg.C

VII. Results Summary *Ceriodaphnia dubia*, Cladoceran Survival and Reproduction Test -- Method 1002.0

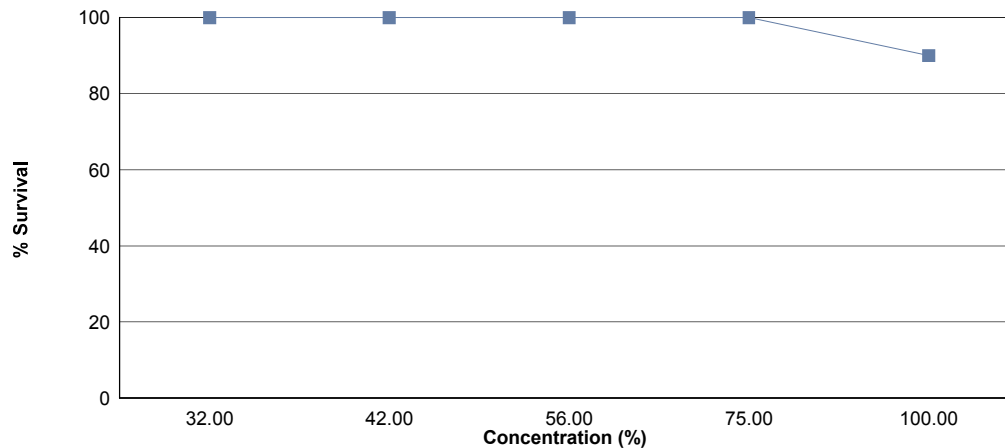
Neonates are exposed in a static renewal system to different concentrations of effluent with dilution water until 60% of surviving control organisms have three broods of offspring or a maximum of eight test days.

Effluent dilutions for this test were 32 %, 42 %, 56 %, 75 %, 100 % in accordance with the NPDES permit.

The low flow or 'critical' dilution is specified in the NPDES permit as 100 % effluent.

The test was initiated on March 24, 2020 at 1335 and continued through March 30, 2020 at 1420. Statistical analyses were performed on the observed data and the no observable effects concentrations (NOECs) were as follows:

- a.) NOEC survival = 100 % effluent
- b.) NOEC reproduction = 100 % effluent



Summary of the 6-day <i>Ceriodaphnia dubia</i> Survival and Reproduction Data		
Concentration	Percent Survival	Mean Reproduction
Control	100	22.8
32 %	100	20.2
42 %	100	24.2
56 %	100	27.8
75 %	100	29.6
100 %	90.0	25.7

Appendix A1: Test 1002.0

Ceriodaphnia dubia Survival and Reproduction

Date and Time Test Initiated: March 24, 2020 at 1335

Date and Time Test Terminated: March 30, 2020 at 1420

Concentration: Control														
Day	Replicate										No. of Young	No. of Adults	Young per Adult	
	1	2	3	4	5	6	7	8	9	10				
1	0	0	0	0	0	0	0	0	0	0	0	0	10	0.00
2	0	0	0	0	0	0	0	0	0	0	0	0	10	0.00
3	2	4	0	2	0	3	3	4	2	0	20	10	2.00	
4	0	0	0	0	0	0	0	0	0	3	3	10	0.300	
5	6	9	9	9	8	9	8	9	8	11	86	10	8.60	
6	13	15	13	12	8	12	12	14	9	11	119	10	11.9	
7														
8														
TOTAL	21	28	22	23	16	24	23	27	19	25	228	10	22.8	

Concentration: 32 %													
Day	Replicate										No. of Young	No. of Adults	Young per Adult
	1	2	3	4	5	6	7	8	9	10			
1	0	0	0	0	0	0	0	0	0	0	0	10	0.00
2	0	0	0	0	0	0	0	0	0	0	0	10	0.00
3	4	0	4	4	5	4	5	5	3	0	34	10	3.40
4	0	4	0	0	0	0	0	0	0	4	8	10	0.800
5	7	9	8	7	8	7	7	8	8	8	77	10	7.70
6	9	9	9	7	7	8	6	7	10	11	83	10	8.30
7													
8													
TOTAL	20	22	21	18	20	19	18	20	21	23	202	10	20.2

Concentration: 42 %													
Day	Replicate										No. of Young	No. of Adults	Young per Adult
	1	2	3	4	5	6	7	8	9	10			
1	0	0	0	0	0	0	0	0	0	0	0	10	0.00
2	0	0	0	0	0	0	0	0	0	0	0	10	0.00
3	2	4	4	5	4	4	5	5	4	3	40	10	4.00
4	0	0	0	0	0	0	0	0	0	0	0	10	0.00
5	9	11	9	8	9	9	8	8	9	9	89	10	8.90
6	13	12	8	10	8	12	13	9	16	12	113	10	11.3
7													
8													
TOTAL	24	27	21	23	21	25	26	22	29	24	242	10	24.2

Appendix A1: Test 1002.0

Ceriodaphnia dubia Survival and Reproduction

Date and Time Test Initiated: March 24, 2020 at 1335

Date and Time Test Terminated: March 30, 2020 at 1420

Concentration: 56 %														
Day	Replicate										No. of Young	No. of Adults	Young per Adult	
	1	2	3	4	5	6	7	8	9	10				
1	0	0	0	0	0	0	0	0	0	0	0	0	10	0.00
2	0	0	0	0	0	0	0	0	0	0	0	0	10	0.00
3	3	4	5	4	5	5	5	4	4	4	43	10	4.30	
4	0	0	0	0	0	0	0	0	0	0	0	10	0.00	
5	7	9	11	10	10	11	8	9	11	12	98	10	9.80	
6	12	12	12	16	15	17	13	14	12	14	137	10	13.7	
7														
8														
TOTAL	22	25	28	30	30	33	26	27	27	30	278	10	27.8	

Concentration: 75 %														
Day	Replicate										No. of Young	No. of Adults	Young per Adult	
	1	2	3	4	5	6	7	8	9	10				
1	0	0	0	0	0	0	0	0	0	0	0	10	0.00	
2	0	0	0	0	0	0	0	0	0	0	0	10	0.00	
3	4	3	5	3	5	6	4	6	7	4	47	10	4.70	
4	0	0	0	0	0	0	0	0	0	0	0	10	0.00	
5	10	11	12	10	11	12	9	11	10	13	109	10	10.9	
6	13	14	15	12	16	13	12	15	15	15	140	10	14.0	
7														
8														
TOTAL	27	28	32	25	32	31	25	32	32	32	296	10	29.6	

Concentration: 100 %														
Day	Replicate										No. of Young	No. of Adults	Young per Adult	
	1	2	3	4	5	6	7	8	9	10				
1	0	0	0	0	0	0	0	0	0	0	0	10	0.00	
2	0	0	0	0	0	0	0	0	0	0	0	10	0.00	
3	3	4	4	3	4	4	5	4	5	X	36	9	4.00	
4	0	0	0	0	0	0	0	0	0	X	0	9	0.00	
5	6	12	11	13	11	11	9	11	9	X	93	9	10.3	
6	11	16	14	15	14	16	13	15	14	X	128	9	14.2	
7														
8														
TOTAL	20	32	29	31	29	31	27	30	28	0	257	10	25.7	

Appendix A2: Statistics

Ceriodaphnia dubia Survival

Fisher's Exact Test			
Identification	Alive	Dead	Total Animals
Control	10	0	10
32 %	10	0	10
Total	20	0	20

Critical Fisher's value (10,10,10) (alpha=0.05) is 6. b value is 10. Since b is greater than 6 there is NO SIGNIFICANT DIFFERENCE between CONTROL and TREATMENT at the 0.05 level.

Fisher's Exact Test			
Identification	Alive	Dead	Total Animals
Control	10	0	10
42 %	10	0	10
Total	20	0	20

Critical Fisher's value (10,10,10) (alpha=0.05) is 6. b value is 10. Since b is greater than 6 there is NO SIGNIFICANT DIFFERENCE between CONTROL and TREATMENT at the 0.05 level.

Fisher's Exact Test			
Identification	Alive	Dead	Total Animals
Control	10	0	10
56 %	10	0	10
Total	20	0	20

Critical Fisher's value (10,10,10) (alpha=0.05) is 6. b value is 10. Since b is greater than 6 there is NO SIGNIFICANT DIFFERENCE between CONTROL and TREATMENT at the 0.05 level.

Fisher's Exact Test			
Identification	Alive	Dead	Total Animals
Control	10	0	10
75 %	10	0	10
Total	20	0	20

Critical Fisher's value (10,10,10) (alpha=0.05) is 6. b value is 10. Since b is greater than 6 there is NO SIGNIFICANT DIFFERENCE between CONTROL and TREATMENT at the 0.05 level.

Appendix A2: Statistics

Ceriodaphnia dubia Survival

Fisher's Exact Test			
Identification	Alive	Dead	Total Animals
Control	10	0	10
100 %	9	1	10
Total	19	1	20

Critical Fisher's value (10,10,10) (alpha=0.05) is 6. b value is 9. Since b is greater than 6 there is NO SIGNIFICANT DIFFERENCE between CONTROL and TREATMENT at the 0.05 level.

Summary of Fisher's Exact Test				
Group	Identification	Exposed	Dead	Sig 0.05
0	Control	10	0	
1	32 %	10	0	
2	42 %	10	0	
3	56 %	10	0	
4	75 %	10	0	
5	100 %	10	1	

Appendix A2: Statistics

Ceriodaphnia dubia Reproduction

Kolmogorov Test for Normality	No Transformation
<p>D = 0.1288 D* = 1.011 Critical D* = 1.035</p> <p style="text-align: right;">(alpha = 0.01, N = 60)</p> <p style="text-align: center;">Data PASS normality test (alpha = 0.01).</p>	

Bartlett's Test for Homogeneity of Variance	No Transformation
<p>Calculated B1 statistic = 36.05 Critical B = 15.086</p> <p style="text-align: right;">(alpha = 0.01, df = 5)</p> <p style="text-align: center;">Data FAIL B1 homogeneity test at 0.01 level.</p>	

Steel's Many-One Rank Test				No Transformation	
Ho:Control<Treatment					
Group	Identification	Rank Sum	Critical Value	DF	Sig 0.05
1	Control				
2	32 %	78.00	75.00	10.00	
3	42 %	115.50	75.00	10.00	
4	56 %	140.50	75.00	10.00	
5	75 %	148.00	75.00	10.00	
6	100 %	135.00	75.00	10.00	

Critical values are 1 tailed (k=5)

Appendix A2: Statistics

Ceriodaphnia dubia Reproduction

Dunnett's Test for PMSD Calculation

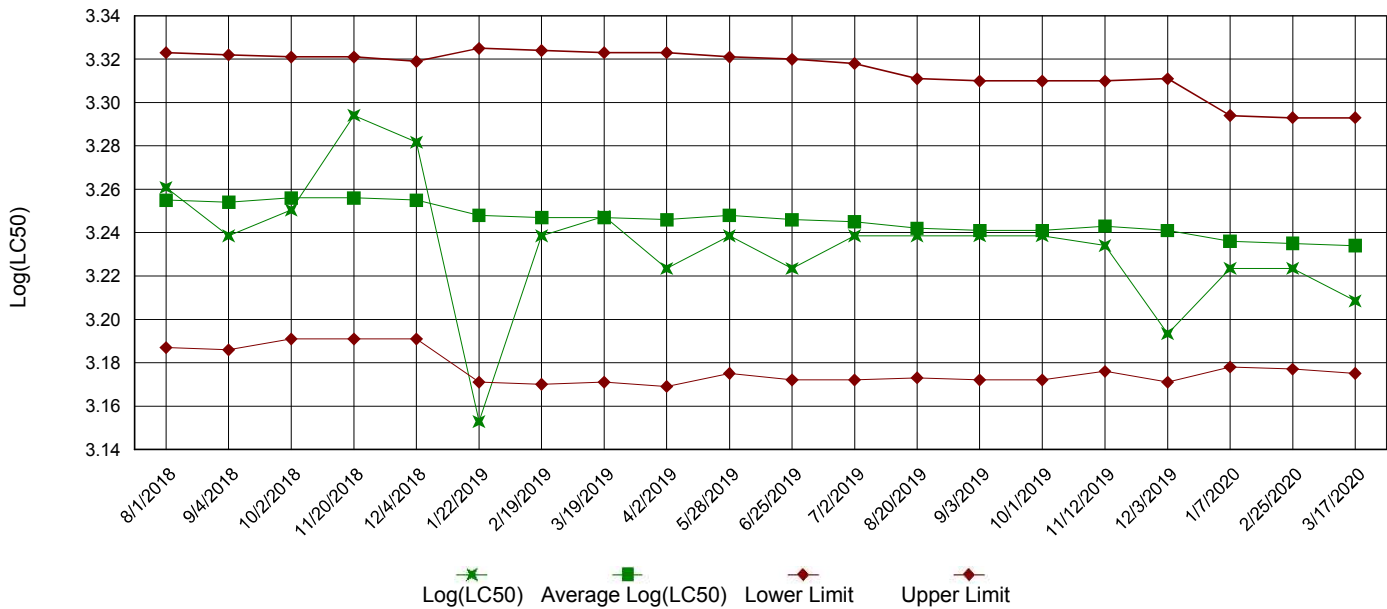
ANOVA Table				No Transformation	
SOURCE	DF	SS	MS	F	
Between	5	579.9	116	5.19	
Within (Error)	54	1207	22.35		
Total	59	1787			
Critical F = 3.38 (alpha = 0.01, df = 5,54)					
2.38 (alpha = 0.05, df = 5,54)					
Since F > Critical F REJECT Ho: All equal (alpha = 0.05)					

Dunnett's Test - Table 1 of 2					No Transformation	
Ho:Control<Treatment						
Group	Identification	Transformed Mean	Mean In Original Units	T Stat	Sig 0.05	
1	Control	22.8	22.8			
2	32 %	20.2	20.2	1.23		
3	42 %	24.2	24.2	-0.6622		
4	56 %	27.8	27.8	-2.365		
5	75 %	29.6	29.6	-3.216		
6	100 %	25.7	25.7	-1.372		
Dunnett's critical value = 2.31 (1 Tailed, alpha = 0.05, df [used] = 5,40) (Actual df = 5,54)						

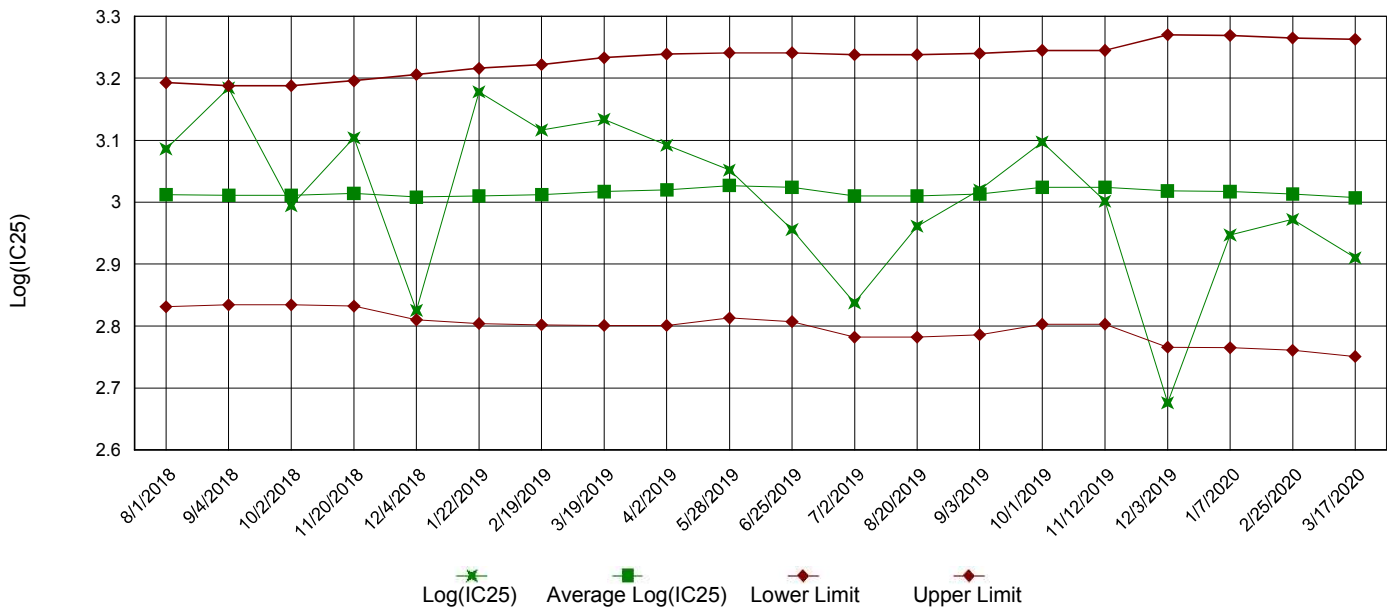
Dunnett's Test - Table 2 of 2					No Transformation	
Ho:Control<Treatment						
Group	Identification	Num of Reps	Min Sig Diff (In Orig. Units)	% of Control	Difference From Control	
1	Control	10				
2	32 %	10	4.884	21.4	2.6	
3	42 %	10	4.884	21.4	-1.4	
4	56 %	10	4.884	21.4	-5	
5	75 %	10	4.884	21.4	-6.8	
6	100 %	10	4.884	21.4	-2.9	

Appendix A3: Test 1002.0
Chronic Reference Toxicant, *Ceriodaphnia dubia*

LC50 Survival Data



IC25 Reproduction Data



Appendix B: Test 1002.0
SUMMARY REPORTING FORMS
CHRONIC BIOMONITORING
Ceriodaphnia dubia
SURVIVAL AND REPRODUCTION

Permittee: Benton Utilities

NPDES No.: AR0036498 AFIN# 63-00063

Date and Time Test Initiated: March 24, 2020 at 1335

Date and Time Test Terminated: March 30, 2020 at 1420

Dilution water used: Soft

PERCENT SURVIVAL

Time of Reading	Control	Percent Effluent				
		32 %	42 %	56 %	75 %	100 %
24 hour	100	100	100	100	100	100
48 hour	100	100	100	100	100	100
6 day	100	100	100	100	100	90.0

NUMBER OF YOUNG PRODUCED PER FEMALE @ 6 DAYS

Replicates	Control	Percent Effluent				
		32 %	42 %	56 %	75 %	100 %
A	21	20	24	22	27	20
B	28	22	27	25	28	32
C	22	21	21	28	32	29
D	23	18	23	30	25	31
E	16	20	21	30	32	29
F	24	19	25	33	31	31
G	23	18	26	26	25	27
H	27	20	22	27	32	30
I	19	21	29	27	32	28
J	25	23	24	30	32	0
Mean per Adult	22.8	20.2	24.2	27.8	29.6	25.7
Mean per Surviving Adult	22.8	20.2	24.2	27.8	29.6	28.6
CV %	15.7	8.02	10.8	11.2	10.2	12.5

CV = Coefficient of variation = standard deviation * 100 / mean
(calculated based on young produced by surviving females)

Appendix B: Test 1002.0
SUMMARY REPORTING FORMS
CHRONIC BIOMONITORING
Ceriodaphnia dubia
SURVIVAL AND REPRODUCTION

1. Fisher's Exact Test:

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

a.) LOW FLOW OR CRITICAL DILUTION	(100 %)	<u> </u> YES	<u> X </u> NO
b.) 1/2 LOW FLOW DILUTION	(NA)	<u> </u> YES	<u> </u> NO

2. Steel's Many-One Rank Test:

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

a.) LOW FLOW OR CRITICAL DILUTION	(100 %)	<u> </u> YES	<u> X </u> NO
b.) 1/2 LOW FLOW DILUTION	(NA)	<u> </u> YES	<u> </u> NO

3. If you answered NO to 1.a) enter [0] otherwise enter [1]: 0 (TLP3B)

4. If you answered NO to 2.a) enter [0] otherwise enter [1]: 0 (TGP3B)

5. NOEC Ceriodaphnia Lethality: 100 % (TOP3B)

6. LOEC Ceriodaphnia Lethality: 100 % (TXP3B)

7. NOEC Ceriodaphnia Sublethality: 100 % (TPP3B)

8. LOEC Ceriodaphnia Sublethality: 100 % (TYP3B)

9. Coefficient of variation for Ceriodaphnia Reproduction: 15.7 (TQP3B)

Appendix B: Test 1002.0
CHRONIC TOXICITY SUMMARY FORM
Ceriodaphnia dubia
CHEMICAL PARAMETERS CHART

PERMITTEE: Benton Utilities
NPDES NO.: AR0036498 AFIN# 63-00063
CONTACT: Mr. Greg Becker
ANALYST: 280, 310, 343, 345

Test Initiated: DATE: March 24, 2020 TIME: 1335
Test Terminated: DATE: March 30, 2020 TIME: 1420

DILUTION	DAY						
	1	2	3	4	5	6	7
Control							
D.O. Initial	7.3	8.4	7.6	7.4	7.3	8.2	7.4
Final	8.1	7.0	7.1	7.3	7.9	7.2	--
pH Initial	7.9	7.9	7.9	7.7	7.7	7.8	7.7
Final	7.8	7.8	7.6	7.9	7.8	7.7	--

DILUTION	DAY						
	1	2	3	4	5	6	7
32 %							
D.O. Initial	7.7	8.3	7.4	7.4	7.4	8.2	7.7
Final	7.9	6.6	6.9	7.7	8.0	7.2	--
pH Initial	7.7	7.8	7.6	7.6	7.4	7.8	7.5
Final	7.9	7.7	7.7	7.9	7.8	7.8	--

DILUTION	DAY						
	1	2	3	4	5	6	7
42 %							
D.O. Initial	7.8	7.9	7.2	7.1	7.7	7.9	7.6
Final	7.5	6.4	7.4	7.6	7.8	7.6	--
pH Initial	7.6	7.7	7.5	7.5	7.4	7.7	7.5
Final	7.9	7.6	7.7	7.9	7.7	7.8	--

DILUTION	DAY						
	1	2	3	4	5	6	7
56 %							
D.O. Initial	7.8	8.4	7.9	7.4	7.7	8.1	7.6
Final	7.9	5.9	6.8	7.5	7.7	7.3	--
pH Initial	7.5	7.7	7.3	7.4	7.4	7.7	7.5
Final	7.9	7.5	7.7	7.9	7.8	7.8	--

DILUTION	DAY						
	1	2	3	4	5	6	7
75 %							
D.O. Initial	7.8	8.3	7.8	7.2	7.4	8.2	7.6
Final	8.0	5.6	6.9	7.6	7.8	7.4	--
pH Initial	7.4	7.6	7.4	7.4	7.3	7.7	7.5
Final	7.9	7.5	7.7	7.9	7.7	7.8	--

DILUTION	DAY						
	1	2	3	4	5	6	7
100 %							
D.O. Initial	8.3	8.2	7.8	7.7	7.9	7.8	7.8
Final	6.7	5.7	7.0	7.8	7.9	7.4	--
pH Initial	7.3	7.5	7.2	7.3	7.3	7.7	7.4
Final	8.0	7.6	7.8	7.9	7.8	7.8	--

Alkalinity	Hardness	Conductivity	Chlorine	Sample ID
43	51	200	<0.05	Outfall 001 24-MAR-20
41	50	190	<0.05	Outfall 001 25-MAR-20
39	50	190	<0.05	Outfall 001 27-MAR-20

Alkalinity	Hardness	Conductivity	Chlorine	Sample ID
33	42	160	<0.05	243360-1



CHAIN OF CUSTODY / ANALYSIS REQUEST FORM

Client: <u>Benton Utilities</u>		PO No. <u>101919</u>		NO OF BOTTLES <u>3</u>		ANALYSES REQUESTED	
Project Reference: <u>A20036498</u>		MATRIX		H = HCl to pH2		T = Sodium Thiosulfate	
Project Manager: <u>Gres Becker</u>		WATER		B = NaOH to pH2		Z = Zinc acetate	
Sampled By: <u>AF</u>		SOIL		V = VOA vials		A = (NH ₄) ₂ SO ₄ , NH ₄ OH	
AIC No. <u>1</u>		GRA B		N = Nitric acid pH2		Date/Time Received <u>3/24/20</u>	
Sample Identification <u>OUTFAL001</u>		COMP		Relinquished By: <u>AF</u>		Date/Time <u>3/24/20</u>	
Date/Time Collected <u>3/24/20 0835</u>		✓		Relinquished By: <u>GB</u>		Date/Time <u>3/24/20</u>	
Remarks				Comments:			
Carrier: <u>B.V.</u>							
Received Temperature <u>0.5</u>							
Field pH calibration on _____ @ _____							
Buffer: _____							

Email Address: GBecker@Bentonar.org
 9/2014
Angela@Bentonar.org
TJohnson@Bentonar.org



CHAIN OF CUSTODY / ANALYSIS REQUEST FORM

PAGE 2 OF 3

AIC CONTROL NO: 243785
 AIC PROPOSAL NO:

Carrier:
 Received Temperature C: 0.4
 Remarks:

Field pH calibration on @ Buffer:

A = (NH₄)₂SO₄, NH₄OH
 T = Sodium Thiosulfate
 Z = Zinc acetate

AIC No.	Sample Identification	Date/Time Collected	G R A B	C O M P	W A T E R	S O I L	NO OF BOTTLES	ANALYSES REQUESTED	NO OF BOTTLES	Date/Time Relinquished	By	Date/Time Relinquished	By	Date/Time Received	By	Date/Time Received in Lab	By	Date/Time
2	DUSTY 1001	3/25/20 0920	✓	✓	✓		3	5.0 molar form G (Ret 5)		3/25/20 0920	AF	3/25/20 1015	GB	3/25/20 0920	GB	3-25-20 10:15	D. BROWN	

Turnaround Time Requested: (Please circle) NORMAL or EXPEDITED IN ___ DAYS
 Expedited results requested by:
 Who should AIC contact with questions: _____
 Phone: _____ Fax: _____
 Report Attention to: Gres Becker
 Report Address to: _____

Relinquished By: AF
 Relinquished By: GB
 Received By: GB
 Received in Lab By: D. BROWN

Comments:

Email Address: GBecker@Bentonar.org
Angela@Bentonar.org
TJohnson@Bentonar.org



CHAIN OF CUSTODY / ANALYSIS REQUEST FORM

PAGE 3 OF 3

Client: <u>Benton Utilities</u>		PO No. <u>101919</u>	ANALYSES REQUESTED	
Project Reference: <u>AR0036498</u>		MATRIX WATER	NO. OF BOTTLES	
Project Manager: <u>Gres Becker</u>				
Sampled By: <u>AF</u>		G R A B	3	
AIC No. <u>3</u>				
Sample Identification <u>05TFA1001</u>		C O M P	3	
Date/Time Collected <u>3/27/20 0306</u>				
Remarks		H = HCl to pH2 B = NaOH to pH12 T = Sodium Thiosulfate Z = Zinc acetate A = (NH ₄) ₂ SO ₄ , NH ₄ OH		
Field pH calibration on _____ @ _____		Relinquished By: <u>mf</u> Relinquished Date/Time: <u>3/27/20 0925</u> Received in Lab By: <u>JWS349</u> Received Date/Time: <u>27-Mar-20 9:25</u>		
Buffer: _____		Turnaround Time Requested: (Please circle) NORMAL or EXPEDITED IN _____ DAYS Expedited results requested by: _____ Who should AIC contact with questions: _____ Phone: _____ Fax: _____ Report Attention to: <u>Gres Becker</u> Report Address to: _____		
Email Address: <u>GBecker@Bentonar.org</u>		Comments: _____ <u>Angela@Bentonar.org</u> <u>TJohnson@Bentonar.org</u>		



November 25, 2020

Biomonitoring Testing
for
Outfall 001
Benton, AR

Control No. 250375-1

Prepared for:

Mr. Greg Becker
Benton Utilities
616 West Hazel
Benton, AR 72015

Prepared by:

AMERICAN INTERPLEX CORPORATION
8600 Kanis Road
Little Rock, AR 72204-2322

Benton Utilities
ATTN: Mr. Greg Becker
616 West Hazel
Benton, AR 72015

Re: Chronic 7-Day Renewal *Ceriodaphnia dubia*
Outfall 001 - Benton, AR
NPDES Permit No. AR0036498 AFIN# 63-00063


Dear Mr. Greg Becker:

This report is the analytical results and supporting information for the samples submitted to American Interplex Corporation (AIC). The following results are applicable only to the sample identified by the control number referenced above. Accurate assessment of the data requires access to the entire document. Each section of the report has been reviewed and approved by the Chief Operating Officer or qualified designee.

Testing procedures and Quality Assurance were in accordance with "Short Term Methods for Estimating the Chronic Toxicity of Effluents and Receiving Waters to Freshwater Organisms" EPA-821-R-02-013, Fourth Edition, October 2002. Test results are summarized below:

Method 1002.0 Chronic *Ceriodaphnia dubia* Survival and Reproduction Test: The No Observable Effects Concentration (NOEC) for survival occurred at 100 % effluent, which is equal to the critical dilution of 100 %. The NOEC for reproduction occurred at 100 % effluent, which is equal to the critical dilution of 100 %. **The sample, therefore, PASSED both lethal and sub-lethal effects for the *Ceriodaphnia dubia* test.**

AMERICAN INTERPLEX CORPORATION



John Overbey
Chief Operating Officer

PDF cc: Benton Utilities
ATTN: Mr. Greg Becker
gbecker@bentonutilities.com

Benton Utilities
ATTN: Ms. Angela Freeman
angelaf@bentonutilities.com

Benton Utilities
ATTN: Mr. Tom Johnson
tjohnson@bentonutilities.com

Table of Contents

- I. Control Acceptance Criteria
- II. Outlined Report
- III. Data Analysis
- IV. Standard Reference Toxicants
- V. Organism History
- VII. Results Summary
 - Ceriodaphnia dubia*
- Appendix A: Raw Data
 - A1: Test 1002.0
 - Ceriodaphnia dubia* Survival and Reproduction
 - A2: Statistics
 - A3: Reference Toxicant
- Appendix B: Summary Forms

I. Control Acceptance Criteria

Ceriodaphnia dubia Method 1002.0

CRITERIA	RESULTS	PASS/FAIL
Control Survival > or = 80%	100	PASS
Control Reproduction > or = 15 per Surviving Female	23.2	PASS
Control CV < or = 40% per Surviving Female	8.08	PASS
Reproduction Minimum Significant Difference 13 to 47%	26.5	PASS
Critical Dilution CV < or = 40%	23.2	PASS

II. Outlined Report

A. Introduction

1. Permit Number: AR0036498 AFIN# 63-00063
2. Test Requirements: Chronic Biomonitoring, Quarterly Test Method 1002.0

B. Source of Effluent/Dilution Water:

1. Effluent Samples:

- a. Sampling Point: Outfall 001
- b. Chemical Data:

Analysis	Sample 1	Sample 2	Sample 3
Dissolved oxygen (mg/l)	8.2	7.6	8.1
pH (standard units)	7.7	7.9	7.9
Alkalinity (mg/l as CaCO ₃)	69	76	81
Hardness (mg/l as CaCO ₃)	60	66	65
Conductivity (umhos/cm)	330	340	350
Residual Chlorine (mg/l)	<0.05	<0.05	<0.05
Ammonia as N (mg/l)	0.18	<0.1	<0.1

2. Dilution Water Samples:

Soft

Analysis	250311-1
Dissolved oxygen (mg/l)	7.5
pH (standard units)	7.9
Alkalinity (mg/l as CaCO ₃)	32
Hardness (mg/l as CaCO ₃)	41
Conductivity (umhos/cm)	170
Residual Chlorine (mg/l)	<0.05

C. Test Methods

1. Test methods used:

Short Term Methods for Estimating the Chronic Toxicity of Effluents and Receiving Waters to Freshwater Organisms, EPA-821-R-02-013; test Method 1002.0, *Ceriodaphnia dubia* Survival and Reproduction.

2. Endpoint: No Observable Effects Concentration (NOEC)

3. Test Conditions:

Ceriodaphnia dubia Survival and Reproduction Method 1002.0

Date & Time Test Initiated: November 17, 2020 at 1453

Date & Time Test Terminated: November 24, 2020 at 1625

Type & Volume of Test Chamber: 30 ml disposable beaker

Volume of Sample: 15 ml

Number of Organisms per replicate: 1

Number of Replicates per dilution: 10

4. Source of test organisms: Obtained from in-house cultures

5. Test Temperature: 25 +/- 1 degree Celsius

D. Test Organisms

1. Scientific Name

a. Test 1002.0 *Ceriodaphnia dubia*

III. Data Analysis

The data was analyzed using American Interplex Corporation's Laboratory Information Management Software based on Toxstat and following EPA method criteria.

Ceriodaphnia dubia survival data was analyzed with Fisher's Exact Test. Reproduction data was analyzed using Kolmogorov's Test for Normality and analyzed with Steel's Many-One Rank Test to determine the No Observable Effects Concentration (NOEC) for Reproduction. Dunnett's Test was used to calculate the PMSD.

IV. Standard Reference Toxicants

The sensitivity of the offspring is determined by performing a standard reference toxicant test monthly. Sodium chloride in synthetic moderately hard water is used as prescribed in EPA-821-R-02-013.

Ceriodaphnia dubia

A chronic reference test was performed on November 03, 2020 at 1520 to November 10, 2020 at 1615

The results were as follows: (Control No. 249968-2.)

Survival LC-50: 1726.4 mg/l

Reproduction IC-25: 1221 mg/l

Reproduction PMSD: 24.6

V. Organism History

Ceriodaphnia dubia

Date: November 17, 2020

Age: <24 hours

Source: In-house culture

Water: Moderately hard synthetic

Temperature: 25 deg.C

VII. Results Summary *Ceriodaphnia dubia*, Cladoceran Survival and Reproduction Test -- Method 1002.0

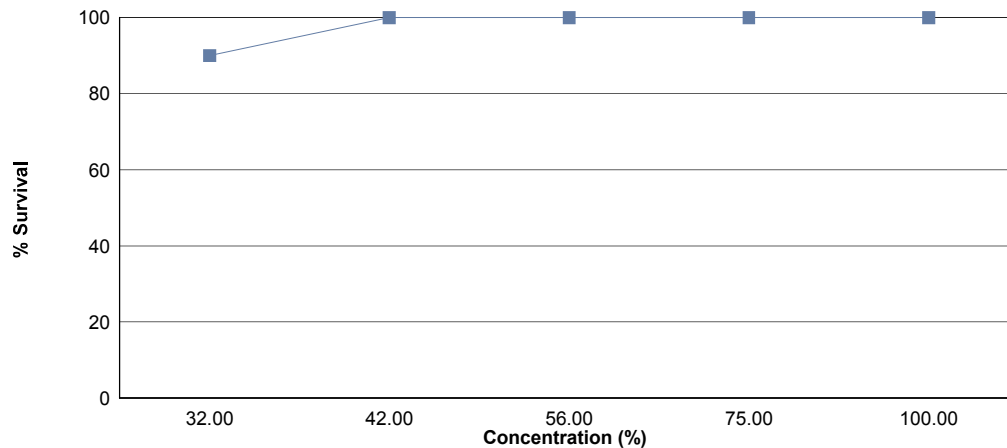
Neonates are exposed in a static renewal system to different concentrations of effluent with dilution water until 60% of surviving control organisms have three broods of offspring or a maximum of eight test days.

Effluent dilutions for this test were 32 %, 42 %, 56 %, 75 %, 100 % in accordance with the NPDES permit.

The low flow or 'critical' dilution is specified in the NPDES permit as 100 % effluent.

The test was initiated on November 17, 2020 at 1453 and continued through November 24, 2020 at 1625. Statistical analyses were performed on the observed data and the no observable effects concentrations (NOECs) were as follows:

- a.) NOEC survival = 100 % effluent
- b.) NOEC reproduction = 100 % effluent



Summary of the 7-day <i>Ceriodaphnia dubia</i> Survival and Reproduction Data		
Concentration	Percent Survival	Mean Reproduction
Control	100	23.2
32 %	90.0	30.0
42 %	100	28.2
56 %	100	31.3
75 %	100	33.0
100 %	100	28.4

Appendix A1: Test 1002.0

Ceriodaphnia dubia Survival and Reproduction

Date and Time Test Initiated: November 17, 2020 at 1453

Date and Time Test Terminated: November 24, 2020 at 1625

Concentration: Control														
Day	Replicate										No. of Young	No. of Adults	Young per Adult	
	1	2	3	4	5	6	7	8	9	10				
1	0	0	0	0	0	0	0	0	0	0	0	0	10	0.00
2	0	0	0	0	0	0	0	0	0	0	0	0	10	0.00
3	0	0	0	0	0	0	0	0	0	0	0	0	10	0.00
4	4	4	4	3	5	5	5	4	3	5	42	10	4.20	
5	0	0	0	0	0	0	0	0	0	8	8	10	0.800	
6	7	6	7	8	8	8	8	7	9	0	68	10	6.80	
7	9	11	13	13	11	11	12	11	10	13	114	10	11.4	
8														
TOTAL	20	21	24	24	24	24	25	22	22	26	232	10	23.2	

Concentration: 32 %														
Day	Replicate										No. of Young	No. of Adults	Young per Adult	
	1	2	3	4	5	6	7	8	9	10				
1	0	0	0	0	0	0	0	0	0	0	0	10	0.00	
2	0	0	0	0	0	0	0	0	0	0	0	10	0.00	
3	0	0	0	0	0	0	0	0	0	0	0	10	0.00	
4	4	5	4	5	5	4	6	5	3	3	44	10	4.40	
5	0	8	0	0	0	0	0	0	0	0	8	10	0.800	
6	12	0	10	10	9	10	13	12	9	15	100	10	10.0	
7	16	14	16	14	18	9X	13	17	14	17	148	9	16.4	
8														
TOTAL	32	27	30	29	32	23	32	34	26	35	300	10	30.0	

Concentration: 42 %														
Day	Replicate										No. of Young	No. of Adults	Young per Adult	
	1	2	3	4	5	6	7	8	9	10				
1	0	0	0	0	0	0	0	0	0	0	0	10	0.00	
2	0	0	0	0	0	0	0	0	0	0	0	10	0.00	
3	0	0	0	0	0	0	0	0	0	0	0	10	0.00	
4	5	5	4	2	0	5	5	6	4	4	40	10	4.00	
5	0	0	0	0	0	0	0	0	0	0	0	10	0.00	
6	11	10	11	3	0	11	8	10	12	12	88	10	8.80	
7	15	16	16	18	2	18	17	19	16	17	154	10	15.4	
8														
TOTAL	31	31	31	23	2	34	30	35	32	33	282	10	28.2	

Appendix A1: Test 1002.0

Ceriodaphnia dubia Survival and Reproduction

Date and Time Test Initiated: November 17, 2020 at 1453

Date and Time Test Terminated: November 24, 2020 at 1625

Concentration: 56 %														
Day	Replicate										No. of Young	No. of Adults	Young per Adult	
	1	2	3	4	5	6	7	8	9	10				
1	0	0	0	0	0	0	0	0	0	0	0	0	10	0.00
2	0	0	0	0	0	0	0	0	0	0	0	0	10	0.00
3	0	0	0	0	0	0	0	0	0	0	0	0	10	0.00
4	3	6	6	4	5	4	5	3	6	4	46	10	4.60	
5	0	0	0	0	0	7	0	0	0	10	17	10	1.70	
6	12	12	12	10	11	0	13	14	10	0	94	10	9.40	
7	17	19	14	17	16	14	17	21	18	3	156	10	15.6	
8														
TOTAL	32	37	32	31	32	25	35	38	34	17	313	10	31.3	

Concentration: 75 %														
Day	Replicate										No. of Young	No. of Adults	Young per Adult	
	1	2	3	4	5	6	7	8	9	10				
1	0	0	0	0	0	0	0	0	0	0	0	10	0.00	
2	0	0	0	0	0	0	0	0	0	0	0	10	0.00	
3	0	0	0	0	0	0	0	0	0	0	0	10	0.00	
4	6	5	5	4	3	0	4	4	5	5	41	10	4.10	
5	0	0	0	0	0	10	9	0	0	10	29	10	2.90	
6	11	12	10	11	14	12	0	13	11	12	106	10	10.6	
7	18	17	14	15	17	18	15	20	20	19E	154	10	15.4	
8														
TOTAL	35	34	29	30	34	40	28	37	36	27	330	10	33.0	

E = Excluded fourth brood neonates

Concentration: 100 %														
Day	Replicate										No. of Young	No. of Adults	Young per Adult	
	1	2	3	4	5	6	7	8	9	10				
1	0	0	0	0	0	0	0	0	0	0	0	10	0.00	
2	0	0	0	0	0	0	0	0	0	0	0	10	0.00	
3	0	0	0	0	0	0	0	0	0	0	0	10	0.00	
4	3	4	5	0	6	4	4	0	5	3	34	10	3.40	
5	0	0	0	11	0	0	12	7	0	0	30	10	3.00	
6	9	11	8	2	13	8	0	4	10	2	67	10	6.70	
7	15	17	17	16	15	2	19	15	20	17	153	10	15.3	
8														
TOTAL	27	32	30	29	34	14	35	26	35	22	284	10	28.4	

Appendix A2: Statistics

Ceriodaphnia dubia Survival

Fisher's Exact Test			
Identification	Alive	Dead	Total Animals
Control	10	0	10
32 %	9	1	10
Total	19	1	20

Critical Fisher's value (10,10,10) (alpha=0.05) is 6. b value is 9. Since b is greater than 6 there is NO SIGNIFICANT DIFFERENCE between CONTROL and TREATMENT at the 0.05 level.

Fisher's Exact Test			
Identification	Alive	Dead	Total Animals
Control	10	0	10
42 %	10	0	10
Total	20	0	20

Critical Fisher's value (10,10,10) (alpha=0.05) is 6. b value is 10. Since b is greater than 6 there is NO SIGNIFICANT DIFFERENCE between CONTROL and TREATMENT at the 0.05 level.

Fisher's Exact Test			
Identification	Alive	Dead	Total Animals
Control	10	0	10
56 %	10	0	10
Total	20	0	20

Critical Fisher's value (10,10,10) (alpha=0.05) is 6. b value is 10. Since b is greater than 6 there is NO SIGNIFICANT DIFFERENCE between CONTROL and TREATMENT at the 0.05 level.

Fisher's Exact Test			
Identification	Alive	Dead	Total Animals
Control	10	0	10
75 %	10	0	10
Total	20	0	20

Critical Fisher's value (10,10,10) (alpha=0.05) is 6. b value is 10. Since b is greater than 6 there is NO SIGNIFICANT DIFFERENCE between CONTROL and TREATMENT at the 0.05 level.

Appendix A2: Statistics

Ceriodaphnia dubia Survival

Fisher's Exact Test			
Identification	Alive	Dead	Total Animals
Control	10	0	10
100 %	10	0	10
Total	20	0	20

Critical Fisher's value (10,10,10) ($\alpha=0.05$) is 6. b value is 10. Since b is greater than 6 there is NO SIGNIFICANT DIFFERENCE between CONTROL and TREATMENT at the 0.05 level.

Summary of Fisher's Exact Test				
Group	Identification	Exposed	Dead	Sig 0.05
0	Control	10	0	
1	32 %	10	1	
2	42 %	10	0	
3	56 %	10	0	
4	75 %	10	0	
5	100 %	10	0	

Appendix A2: Statistics

Ceriodaphnia dubia Reproduction

Kolmogorov Test for Normality	No Transformation
<p>D = 0.1771 D* = 1.389 Critical D* = 1.035 (alpha = 0.01, N = 60)</p> <p>Data FAIL normality test (alpha = 0.01).</p>	

Steel's Many-One Rank Test				No Transformation	
Ho:Control<Treatment					
Group	Identification	Rank Sum	Critical Value	DF	Sig 0.05
1	Control				
2	32 %	148.50	75.00	10.00	
3	42 %	139.00	75.00	10.00	
4	56 %	143.50	75.00	10.00	
5	75 %	155.00	75.00	10.00	
6	100 %	137.50	75.00	10.00	
Critical values are 1 tailed (k=5)					

Appendix A2: Statistics

Ceriodaphnia dubia Reproduction

Dunnett's Test for PMSD Calculation

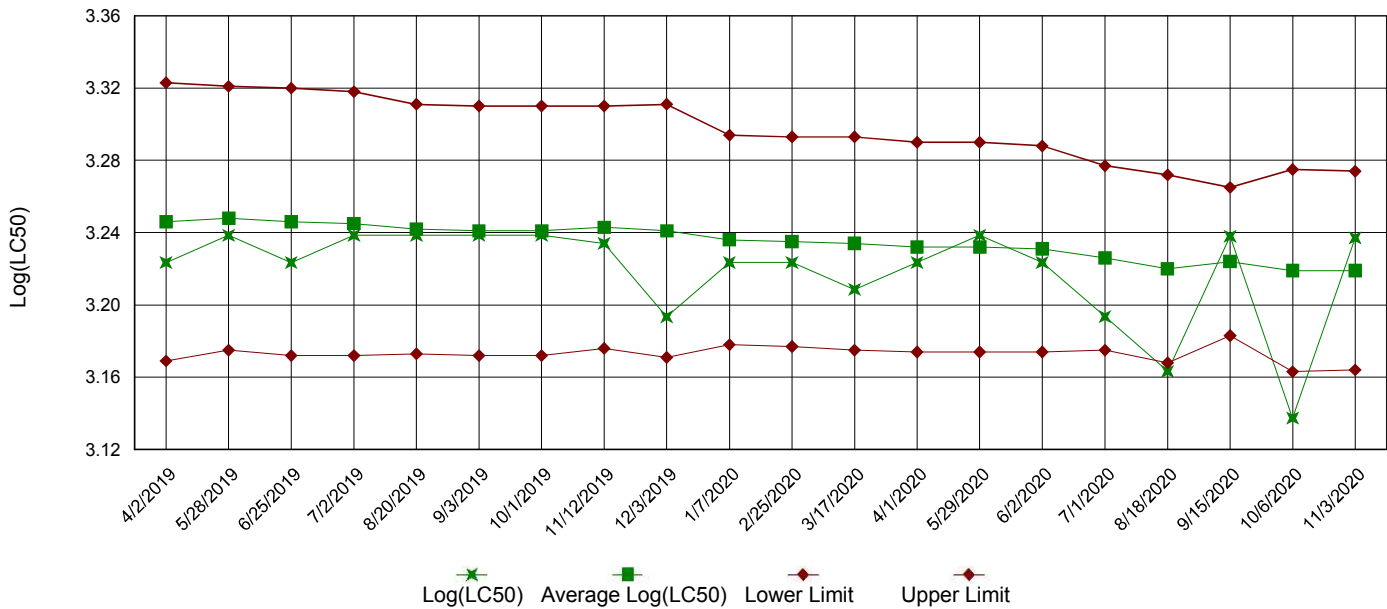
ANOVA Table				No Transformation	
SOURCE	DF	SS	MS	F	
Between	5	569.3	113.9	3.207	
Within (Error)	54	1918	35.52		
Total	59	2487			
Critical F = 3.38 (alpha = 0.01, df = 5,54) 2.38 (alpha = 0.05, df = 5,54)					
Since F > Critical F REJECT Ho: All equal (alpha = 0.05)					

Dunnett's Test - Table 1 of 2					No Transformation	
Ho:Control<Treatment						
Group	Identification	Transformed Mean	Mean In Original Units	T Stat	Sig 0.05	
1	Control	23.2	23.2			
2	32 %	30	30	-2.551		
3	42 %	28.2	28.2	-1.876		
4	56 %	31.3	31.3	-3.039		
5	75 %	33	33	-3.677		
6	100 %	28.4	28.4	-1.951		
Dunnett's critical value = 2.31 (1 Tailed, alpha = 0.05, df [used] = 5,40) (Actual df = 5,54)						

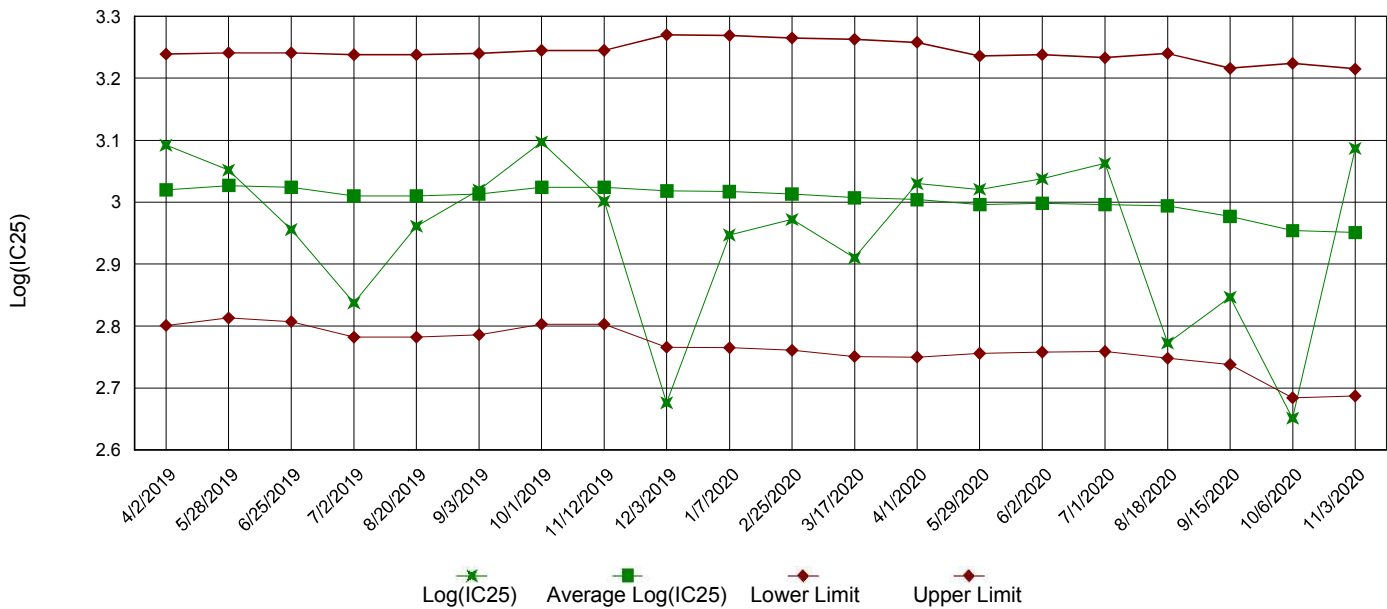
Dunnett's Test - Table 2 of 2					No Transformation	
Ho:Control<Treatment						
Group	Identification	Num of Reps	Min Sig Diff (In Orig. Units)	% of Control	Difference From Control	
1	Control	10				
2	32 %	10	6.157	26.5	-6.8	
3	42 %	10	6.157	26.5	-5	
4	56 %	10	6.157	26.5	-8.1	
5	75 %	10	6.157	26.5	-9.8	
6	100 %	10	6.157	26.5	-5.2	

Appendix A3: Test 1002.0
Chronic Reference Toxicant, *Ceriodaphnia dubia*

LC50 Survival Data



IC25 Reproduction Data



Appendix B: Test 1002.0
SUMMARY REPORTING FORMS
CHRONIC BIOMONITORING
Ceriodaphnia dubia
SURVIVAL AND REPRODUCTION

Permittee: Benton Utilities

NPDES No.: AR0036498 AFIN# 63-00063

Date and Time Test Initiated: November 17, 2020 at 1453

Date and Time Test Terminated: November 24, 2020 at 1625

Dilution water used: Soft

PERCENT SURVIVAL

Time of Reading	Control	Percent Effluent				
		32 %	42 %	56 %	75 %	100 %
24 hour	100	100	100	100	100	100
48 hour	100	100	100	100	100	100
7 day	100	90.0	100	100	100	100

NUMBER OF YOUNG PRODUCED PER FEMALE @ 7 DAYS

Replicates	Control	Percent Effluent				
		32 %	42 %	56 %	75 %	100 %
A	20	32	31	32	35	27
B	21	27	31	37	34	32
C	24	30	31	32	29	30
D	24	29	23	31	30	29
E	24	32	2	32	34	34
F	24	23	34	25	40	14
G	25	32	30	35	28	35
H	22	34	35	38	37	26
I	22	26	32	34	36	35
J	26	35	33	17	27	22
Mean per Adult	23.2	30.0	28.2	31.3	33.0	28.4
Mean per Surviving Adult	23.2	30.8	28.2	31.3	33.0	28.4
CV %	8.08	9.85	34.6	19.8	13.0	23.2

CV = Coefficient of variation = standard deviation * 100 / mean
(calculated based on young produced by surviving females)

Appendix B: Test 1002.0
SUMMARY REPORTING FORMS
CHRONIC BIOMONITORING
Ceriodaphnia dubia
SURVIVAL AND REPRODUCTION

1. Fisher's Exact Test:

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

a.) LOW FLOW OR CRITICAL DILUTION	(100 %)	<u> </u> YES	<u> X </u> NO
b.) 1/2 LOW FLOW DILUTION	(NA)	<u> </u> YES	<u> </u> NO

2. Steel's Many-One Rank Test:

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

a.) LOW FLOW OR CRITICAL DILUTION	(100 %)	<u> </u> YES	<u> X </u> NO
b.) 1/2 LOW FLOW DILUTION	(NA)	<u> </u> YES	<u> </u> NO

3. If you answered NO to 1.a) enter [0] otherwise enter [1]: 0 (TLP3B)
4. If you answered NO to 2.a) enter [0] otherwise enter [1]: 0 (TGP3B)
5. NOEC Ceriodaphnia Lethality: 100 % (TOP3B)
6. LOEC Ceriodaphnia Lethality: 100 % (TXP3B)
7. NOEC Ceriodaphnia Sublethality: 100 % (TPP3B)
8. LOEC Ceriodaphnia Sublethality: 100 % (TYP3B)
9. Coefficient of variation for Ceriodaphnia Reproduction: 23.2 (TQP3B)
10. Sublethality for this test: 100 % (51710 or 51710Q)

Appendix B: Test 1002.0
CHRONIC TOXICITY SUMMARY FORM
Ceriodaphnia dubia
CHEMICAL PARAMETERS CHART

PERMITTEE: Benton Utilities
NPDES NO.: AR0036498 AFIN# 63-00063
CONTACT: Mr. Greg Becker
ANALYST: 280, 310, 343

Test Initiated: DATE: November 17, 2020 TIME: 1453
Test Terminated: DATE: November 24, 2020 TIME: 1625

DILUTION	DAY						
	1	2	3	4	5	6	7
Control							
D.O. Initial	7.5	7.2	7.0	7.6	7.6	7.7	7.8
Final	7.1	7.2	7.7	7.1	7.6	7.2	--
pH Initial	7.9	7.8	7.9	7.9	7.9	7.9	7.9
Final	7.9	8.1	8.2	8.0	8.0	8.0	--

DILUTION	DAY						
	1	2	3	4	5	6	7
32 %							
D.O. Initial	7.8	7.1	7.5	7.4	7.7	7.2	7.4
Final	7.2	6.9	7.7	7.3	7.4	7.4	--
pH Initial	7.8	7.8	7.9	7.9	7.9	7.9	8.0
Final	8.1	8.2	8.4	8.2	8.2	8.2	--

DILUTION	DAY						
	1	2	3	4	5	6	7
42 %							
D.O. Initial	7.8	7.4	7.4	7.7	8.0	7.2	7.6
Final	7.3	7.0	7.6	7.4	7.6	7.5	--
pH Initial	7.8	7.9	7.9	7.9	7.8	7.9	7.9
Final	8.2	8.1	8.4	8.3	8.2	8.3	--

DILUTION	DAY						
	1	2	3	4	5	6	7
56 %							
D.O. Initial	7.9	7.2	7.5	7.6	7.7	7.5	7.7
Final	7.1	7.1	7.7	7.0	7.4	7.3	--
pH Initial	7.8	7.8	7.9	7.9	7.8	7.9	8.0
Final	8.2	8.1	8.4	8.3	8.3	8.3	--

DILUTION	DAY						
	1	2	3	4	5	6	7
75 %							
D.O. Initial	7.3	7.2	7.4	7.6	7.9	7.6	7.8
Final	7.1	7.0	7.6	7.2	7.6	7.3	--
pH Initial	7.7	7.8	7.9	7.9	7.8	7.9	8.0
Final	8.3	8.2	8.4	8.4	8.4	8.4	--

DILUTION	DAY						
	1	2	3	4	5	6	7
100 %							
D.O. Initial	8.2	7.3	7.6	7.0	8.1	7.7	7.3
Final	7.2	6.4	7.7	7.4	7.7	7.3	--
pH Initial	7.7	7.8	7.9	7.9	7.9	8.0	8.0
Final	8.3	8.3	8.5	8.5	8.5	8.5	--

Alkalinity	Hardness	Conductivity	Chlorine	Sample ID
69	60	330	<0.05	Outfall 001 17-NOV-20
76	66	340	<0.05	Outfall 001 18-NOV-20
81	65	350	<0.05	Outfall 001 20-NOV-20

Alkalinity	Hardness	Conductivity	Chlorine	Sample ID
32	41	170	<0.05	250311-1



CHAIN OF CUSTODY / ANALYSIS REQUEST FORM

Client: Benton Utilities		PO No. 101919	NO OF BOTTLES		ANALYSES REQUESTED												
Project Reference: AR0036498		MATRIX		WATER		SOIL		COMPOST		GRAVEL		SAND		OTHER		REMARKS	
Project Manager: GREG BECKER		Date/Time Collected: 11/17/2008		G		R		A		V		S		O		Other	
Sampled By: AF		Sample Identification: DUTFAI001		V		S		O		I		L		S		Remarks	
AIC No. 250325		Date/Time Collected: 11/17/2008		V		S		O		I		L		S		Remarks	
Carrier:		Date/Time Collected:		V		S		O		I		L		S		Remarks	
Received Temperature C: 0.1		Date/Time Collected:		V		S		O		I		L		S		Remarks	
Field pH calibration on @		Date/Time Collected:		V		S		O		I		L		S		Remarks	
Buffer:		Date/Time Collected:		V		S		O		I		L		S		Remarks	
T = Sodium Thiosulfate		Date/Time Collected:		V		S		O		I		L		S		Remarks	
Z = Zinc acetate		Date/Time Collected:		V		S		O		I		L		S		Remarks	
H = HCl to pH2		Date/Time Collected:		V		S		O		I		L		S		Remarks	
B = NaOH to pH12		Date/Time Collected:		V		S		O		I		L		S		Remarks	
A = (NH4)2SO4, NH4OH		Date/Time Collected:		V		S		O		I		L		S		Remarks	
Relinquished By: AF		Date/Time: 11/17/2008		V		S		O		I		L		S		Remarks	
Relinquished By: GS		Date/Time: 11/17/2008		V		S		O		I		L		S		Remarks	
Received By: GS		Date/Time: 11/17/2008		V		S		O		I		L		S		Remarks	
Received By: [Signature]		Date/Time: 11-17-2008		V		S		O		I		L		S		Remarks	
Comments:		Date/Time: 11/17/2008		V		S		O		I		L		S		Remarks	

Turnaround Time Requested: (Please circle)
 NORMAL or EXPEDITED IN ___ DAYS
 Expedited results requested by: _____
 Who should AIC contact with questions: _____
 Phone: _____ Fax: 501.776.5982
 Report Attention to: _____
 Report Address to: _____
 Email Address: G.Becker@bentonutilities.com
 9/2014
 Angela Fabbertonutilities.com
 T Johnson@bentonutilities.com



December 28, 2020

Biomonitoring Testing
for
Outfall 001
Benton, AR

Control No. 251261-1

Prepared for:

Mr. Greg Becker
Benton Utilities
616 West Hazel
Benton, AR 72015

Prepared by:

AMERICAN INTERPLEX CORPORATION
8600 Kanis Road
Little Rock, AR 72204-2322

Benton Utilities
ATTN: Mr. Greg Becker
616 West Hazel
Benton, AR 72015

Re: Chronic 7-Day Renewal *Ceriodaphnia dubia*
Outfall 001 - Benton, AR
NPDES Permit No. AR0036498 AFIN# 63-00063


Dear Mr. Greg Becker:

This report is the analytical results and supporting information for the samples submitted to American Interplex Corporation (AIC). The following results are applicable only to the sample identified by the control number referenced above. Accurate assessment of the data requires access to the entire document. Each section of the report has been reviewed and approved by the Chief Operating Officer or qualified designee.

Testing procedures and Quality Assurance were in accordance with "Short Term Methods for Estimating the Chronic Toxicity of Effluents and Receiving Waters to Freshwater Organisms" EPA-821-R-02-013, Fourth Edition, October 2002. Test results are summarized below:

Method 1002.0 Chronic *Ceriodaphnia dubia* Survival and Reproduction Test: The No Observable Effects Concentration (NOEC) for survival occurred at 75 % effluent, which is below the critical dilution of 100 %. The NOEC for reproduction occurred at 42 % effluent, which is below the critical dilution of 100 %. **The sample, therefore, FAILED both lethal and sub-lethal effects for the *Ceriodaphnia dubia* test.**

AMERICAN INTERPLEX CORPORATION



John Overbey
Chief Operating Officer

PDF cc: Benton Utilities
ATTN: Mr. Greg Becker
gbecker@bentonutilities.com

Benton Utilities
ATTN: Ms. Angela Freeman
angelaf@bentonutilities.com

Benton Utilities
ATTN: Mr. Tom Johnson
tjohnson@bentonutilities.com

Table of Contents

- I. Control Acceptance Criteria
- II. Outlined Report
- III. Data Analysis
- IV. Standard Reference Toxicants
- V. Organism History
- VII. Results Summary
 - Ceriodaphnia dubia*
- Appendix A: Raw Data
 - A1: Test 1002.0
 - Ceriodaphnia dubia* Survival and Reproduction
 - A2: Statistics
 - A3: Reference Toxicant
- Appendix B: Summary Forms

I. Control Acceptance Criteria

Ceriodaphnia dubia Method 1002.0

CRITERIA	RESULTS	PASS/FAIL
Control Survival > or = 80%	90.0	PASS
Control Reproduction > or = 15 per Surviving Female	19.9	PASS
Control CV < or = 40% per Surviving Female	49.9	FAIL
Reproduction Minimum Significant Difference 13 to 47%	49.7	FAIL
Critical Dilution CV < or = 40%	60.3	FAIL

II. Outlined Report

A. Introduction

1. Permit Number: AR0036498 AFIN# 63-00063
2. Test Requirements: Chronic Biomonitoring, Quarterly Test Method 1002.0

B. Source of Effluent/Dilution Water:

1. Effluent Samples:

- a. Sampling Point: Outfall 001
- b. Chemical Data:

Analysis	Sample 1	Sample 2	Sample 3
Dissolved oxygen (mg/l)	8.1	8.1	8.2
pH (standard units)	7.5	7.6	7.7
Alkalinity (mg/l as CaCO ₃)	56	55	65
Hardness (mg/l as CaCO ₃)	56	54	59
Conductivity (umhos/cm)	270	260	270
Residual Chlorine (mg/l)	<0.05	<0.05	<0.05
Ammonia as N (mg/l)	0.16	0.20	0.24

2. Dilution Water Samples:

Soft

Analysis	250898-1
Dissolved oxygen (mg/l)	7.6
pH (standard units)	7.8
Alkalinity (mg/l as CaCO ₃)	35
Hardness (mg/l as CaCO ₃)	44
Conductivity (umhos/cm)	180
Residual Chlorine (mg/l)	<0.05

C. Test Methods

1. Test methods used:

Short Term Methods for Estimating the Chronic Toxicity of Effluents and Receiving Waters to Freshwater Organisms, EPA-821-R-02-013; test Method 1002.0, *Ceriodaphnia dubia* Survival and Reproduction.

2. Endpoint: No Observable Effects Concentration (NOEC)

3. Test Conditions:

Ceriodaphnia dubia Survival and Reproduction Method 1002.0

Date & Time Test Initiated: December 15, 2020 at 1245

Date & Time Test Terminated: December 21, 2020 at 1350

Type & Volume of Test Chamber: 30 ml disposable beaker

Volume of Sample: 15 ml

Number of Organisms per replicate: 1

Number of Replicates per dilution: 10

4. Source of test organisms: Obtained from in-house cultures

5. Test Temperature: 25 +/- 1 degree Celsius

D. Test Organisms

1. Scientific Name

a. Test 1002.0 *Ceriodaphnia dubia*

III. Data Analysis

The data was analyzed using American Interplex Corporation's Laboratory Information Management Software based on Toxstat and following EPA method criteria.

Ceriodaphnia dubia survival data was analyzed with Fisher's Exact Test. Reproduction data was analyzed using Shapiro-Wilk's and Bartlett's test and analyzed with Dunnett's Test to determine the No Observable Effects Concentration (NOEC) for Reproduction.

IV. Standard Reference Toxicants

The sensitivity of the offspring is determined by performing a standard reference toxicant test monthly. Sodium chloride in synthetic moderately hard water is used as prescribed in EPA-821-R-02-013.

Ceriodaphnia dubia

A chronic reference test was performed on December 01, 2020 at 1630 to December 08, 2020 at 1515

The results were as follows: (Control No. 250739-2.)

Survival LC-50: 1840.7 mg/l

Reproduction IC-25: 991.8 mg/l

Reproduction PMSD: 8.43

V. Organism History

Ceriodaphnia dubia

Date: December 15, 2020

Age: <24 hours

Source: In-house culture

Water: Moderately hard synthetic

Temperature: 25 deg.C

VII. Results Summary *Ceriodaphnia dubia*, Cladoceran Survival and Reproduction Test -- Method 1002.0

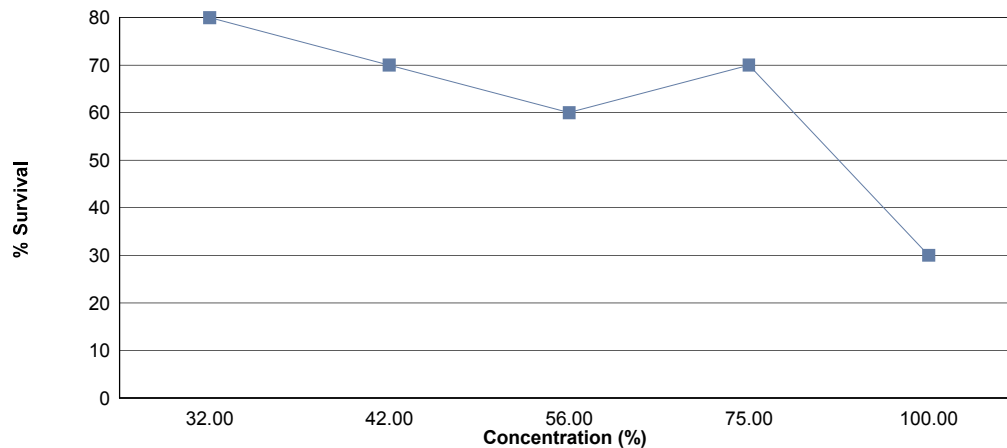
Neonates are exposed in a static renewal system to different concentrations of effluent with dilution water until 60% of surviving control organisms have three broods of offspring or a maximum of eight test days.

Effluent dilutions for this test were 32 %, 42 %, 56 %, 75 %, 100 % in accordance with the NPDES permit.

The low flow or 'critical' dilution is specified in the NPDES permit as 100 % effluent.

The test was initiated on December 15, 2020 at 1245 and continued through December 21, 2020 at 1350. Statistical analyses were performed on the observed data and the no observable effects concentrations (NOECs) were as follows:

- a.) NOEC survival = 75 % effluent
- b.) NOEC reproduction = 42 % effluent



Summary of the 6-day <i>Ceriodaphnia dubia</i> Survival and Reproduction Data		
Concentration	Percent Survival	Mean Reproduction
Control	90.0	17.9
32 %	80.0	11.7
42 %	70.0	9.10
56 %	60.0	8.60 *
75 %	70.0	9.30
100 %	30.0 *	--

*Significant difference when compared to the control (p=0.05)

Appendix A1: Test 1002.0

Ceriodaphnia dubia Survival and Reproduction

Date and Time Test Initiated: December 15, 2020 at 1245

Date and Time Test Terminated: December 21, 2020 at 1350

Concentration: Control														
Day	Replicate										No. of Young	No. of Adults	Young per Adult	
	1	2	3	4	5	6	7	8	9	10				
1	0	0	0	0	0	0	0	0	0	0	0	0	10	0.00
2	0	0	0	0	0	0	0	0	0	0	0	0	10	0.00
3	4	0	0	0	4	0	0	0	0	0	8	10	0.800	
4	0	2	4	0	0	3	4	4	4	3	24	10	2.40	
5	9	0	11	X	11	0	9	8	11	10	69	9	7.67	
6	12	0	10	X	12	0	10	12	11	11	78	9	8.67	
7														
8														
TOTAL	25	2	25	0	27	3	23	24	26	24	179	10	17.9	

Concentration: 32 %													
Day	Replicate										No. of Young	No. of Adults	Young per Adult
	1	2	3	4	5	6	7	8	9	10			
1	0	0	0	0	0	0	0	0	0	0	0	10	0.00
2	0	X	0	0	0	0	0	0	0	0	0	9	0.00
3	0	X	0	0	3	0	0	0	0	0	3	9	0.333
4	3	X	3	4	0	3	3	4	3	3	26	9	2.89
5	10	X	7	0	8	9	9	6	X	8	57	8	7.12
6	0	X	0	11	14	6	0	0	X	0	31	8	3.88
7													
8													
TOTAL	13	0	10	15	25	18	12	10	3	11	117	10	11.7

Concentration: 42 %													
Day	Replicate										No. of Young	No. of Adults	Young per Adult
	1	2	3	4	5	6	7	8	9	10			
1	0	0	0	0	0	0	0	0	0	0	0	10	0.00
2	0	0	X	0	X	0	0	0	0	0	0	8	0.00
3	0	X	X	0	X	0	0	0	0	0	0	7	0.00
4	0	X	X	4	X	2	4	4	3	4	21	7	3.00
5	6	X	X	0	X	9	10	10	8	0	43	7	6.14
6	0	X	X	13	X	0	0	0	0	14	27	7	3.86
7													
8													
TOTAL	6	0	0	17	0	11	14	14	11	18	91	10	9.10

Appendix A1: Test 1002.0

Ceriodaphnia dubia Survival and Reproduction

Date and Time Test Initiated: December 15, 2020 at 1245

Date and Time Test Terminated: December 21, 2020 at 1350

Concentration: 56 %														
Day	Replicate										No. of Young	No. of Adults	Young per Adult	
	1	2	3	4	5	6	7	8	9	10				
1	0	0	0	0	0	0	0	0	0	0	0	0	10	0.00
2	X	0	0	0	X	0	X	0	0	X	0	0	6	0.00
3	X	0	0	0	X	0	X	0	0	X	0	0	6	0.00
4	X	4	3	4	X	0	X	0	4	X	15	6	6	2.50
5	X	7	8	10	X	10	X	3	8	X	46	6	6	7.67
6	X	14	0	10	X	0	X	1	0	X	25	6	6	4.17
7														
8														
TOTAL	0	25	11	24	0	10	0	4	12	0	86	10	10	8.60

Concentration: 75 %														
Day	Replicate										No. of Young	No. of Adults	Young per Adult	
	1	2	3	4	5	6	7	8	9	10				
1	0	0	0	0	0	0	0	0	0	0	0	0	10	0.00
2	0	0	X	0	0	0	X	0	0	X	0	0	7	0.00
3	0	0	X	0	4	0	X	0	0	X	4	7	7	0.571
4	1	3	X	3	0	0	X	0	3	X	10	7	7	1.43
5	6	9	X	6	9	8	X	9	7	X	54	7	7	7.71
6	0	0	X	0	15	10	X	0	0	X	25	7	7	3.57
7														
8														
TOTAL	7	12	0	9	28	18	0	9	10	0	93	10	10	9.30

Concentration: 100 %														
Day	Replicate										No. of Young	No. of Adults	Young per Adult	
	1	2	3	4	5	6	7	8	9	10				
1	0	0	0	0	0	0	0	0	0	0	0	0	10	0.00
2	X	X	X	0	X	X	X	0	0	X	0	0	3	0.00
3	X	X	X	3	X	X	X	0	0	X	3	3	3	1.00
4	X	X	X	0	X	X	X	0	0	X	0	3	3	0.00
5	X	X	X	0	X	X	X	9	4	X	13	3	3	4.33
6	X	X	X	0	X	X	X	0	0	X	0	3	3	0.00
7														
8														
TOTAL	0	0	0	3	0	0	0	9	4	0	16	10	10	1.60

Appendix A2: Statistics

Ceriodaphnia dubia Survival

Fisher's Exact Test			
Identification	Alive	Dead	Total Animals
Control	9	1	10
32 %	8	2	10
Total	17	3	20

Critical Fisher's value (10,10,9) (alpha=0.05) is 4. b value is 8. Since b is greater than 4 there is NO SIGNIFICANT DIFFERENCE between CONTROL and TREATMENT at the 0.05 level.

Fisher's Exact Test			
Identification	Alive	Dead	Total Animals
Control	9	1	10
42 %	7	3	10
Total	16	4	20

Critical Fisher's value (10,10,9) (alpha=0.05) is 4. b value is 7. Since b is greater than 4 there is NO SIGNIFICANT DIFFERENCE between CONTROL and TREATMENT at the 0.05 level.

Fisher's Exact Test			
Identification	Alive	Dead	Total Animals
Control	9	1	10
56 %	6	4	10
Total	15	5	20

Critical Fisher's value (10,10,9) (alpha=0.05) is 4. b value is 6. Since b is greater than 4 there is NO SIGNIFICANT DIFFERENCE between CONTROL and TREATMENT at the 0.05 level.

Fisher's Exact Test			
Identification	Alive	Dead	Total Animals
Control	9	1	10
75 %	7	3	10
Total	16	4	20

Critical Fisher's value (10,10,9) (alpha=0.05) is 4. b value is 7. Since b is greater than 4 there is NO SIGNIFICANT DIFFERENCE between CONTROL and TREATMENT at the 0.05 level.

Appendix A2: Statistics

Ceriodaphnia dubia Survival

Fisher's Exact Test			
Identification	Alive	Dead	Total Animals
Control	9	1	10
100 %	3	7	10
Total	12	8	20

Critical Fisher's value (10,10,9) ($\alpha=0.05$) is 4. b value is 3. Since b is less than or equal to 4 there is A SIGNIFICANT DIFFERENCE between CONTROL and TREATMENT at the 0.05 level.

Summary of Fisher's Exact Test				
Group	Identification	Exposed	Dead	Sig 0.05
0	Control	10	1	
1	32 %	10	2	
2	42 %	10	3	
3	56 %	10	4	
4	75 %	10	3	
5	100 %	10	7	*

Appendix A2: Statistics

Ceriodaphnia dubia Reproduction

Shapiro - Wilk's Test for Normality	No Transformation
<p>D = 3588 W = 0.9664 Critical W = 0.93 (alpha = 0.01, N = 50) Critical W = 0.947 (alpha = 0.05, N = 50)</p> <p>Data PASS normality test (alpha = 0.01).</p>	

Bartlett's Test for Homogeneity of Variance	No Transformation
<p>Calculated B1 statistic = 2.821 Critical B = 13.277 (alpha = 0.01, df = 4)</p> <p>Data PASS B1 homogeneity test at 0.01 level.</p>	

Appendix A2: Statistics

Ceriodaphnia dubia Reproduction

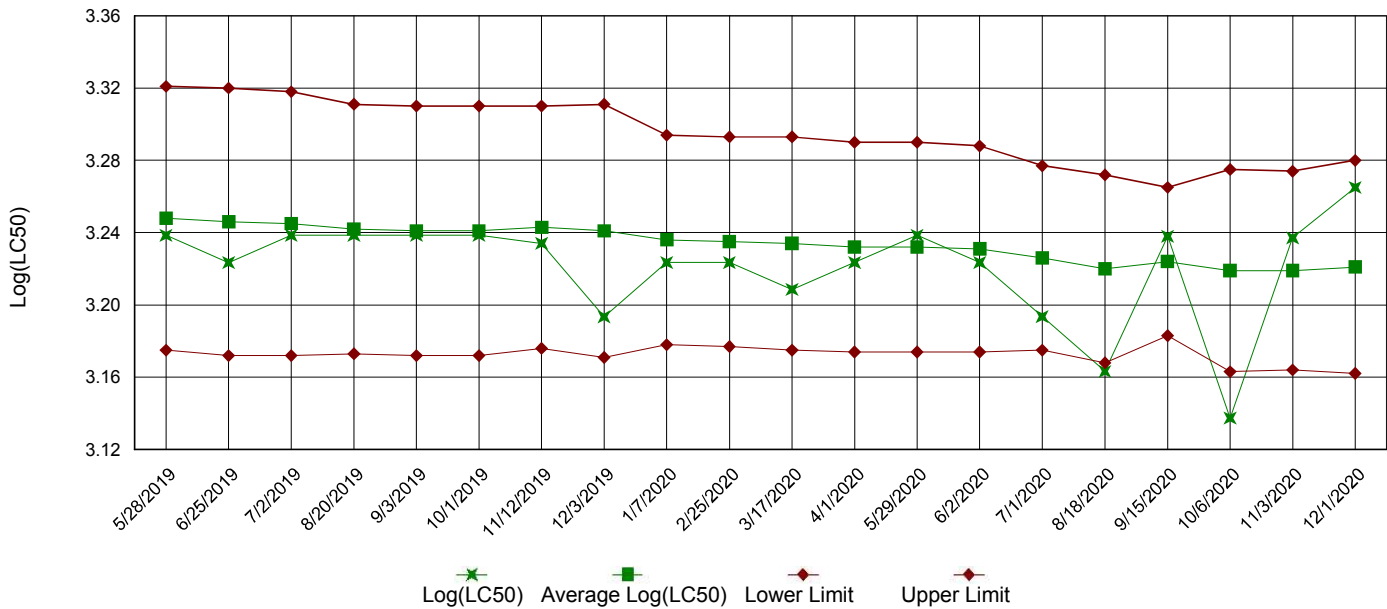
ANOVA Table				No Transformation	
SOURCE	DF	SS	MS	F	
Between	4	598.5	149.6	1.876	
Within (Error)	45	3588	79.73		
Total	49	4187			
Critical F = 3.77 (alpha = 0.01, df = 4,45) 2.58 (alpha = 0.05, df = 4,45)					
Since F < Critical F FAIL TO REJECT Ho: All equal (alpha = 0.05)					

Dunnett's Test - Table 1 of 2					No Transformation	
Ho:Control<Treatment						
Group	Identification	Transformed Mean	Mean In Original Units	T Stat	Sig 0.05	
1	Control	17.9	17.9			
2	32 %	11.7	11.7	1.553		
3	42 %	9.1	9.1	2.204		
4	56 %	8.6	8.6	2.329	*	
5	75 %	9.3	9.3	2.154		
Dunnett's critical value = 2.23 (1 Tailed, alpha = 0.05, df [used] = 4,40) (Actual df = 4,45)						

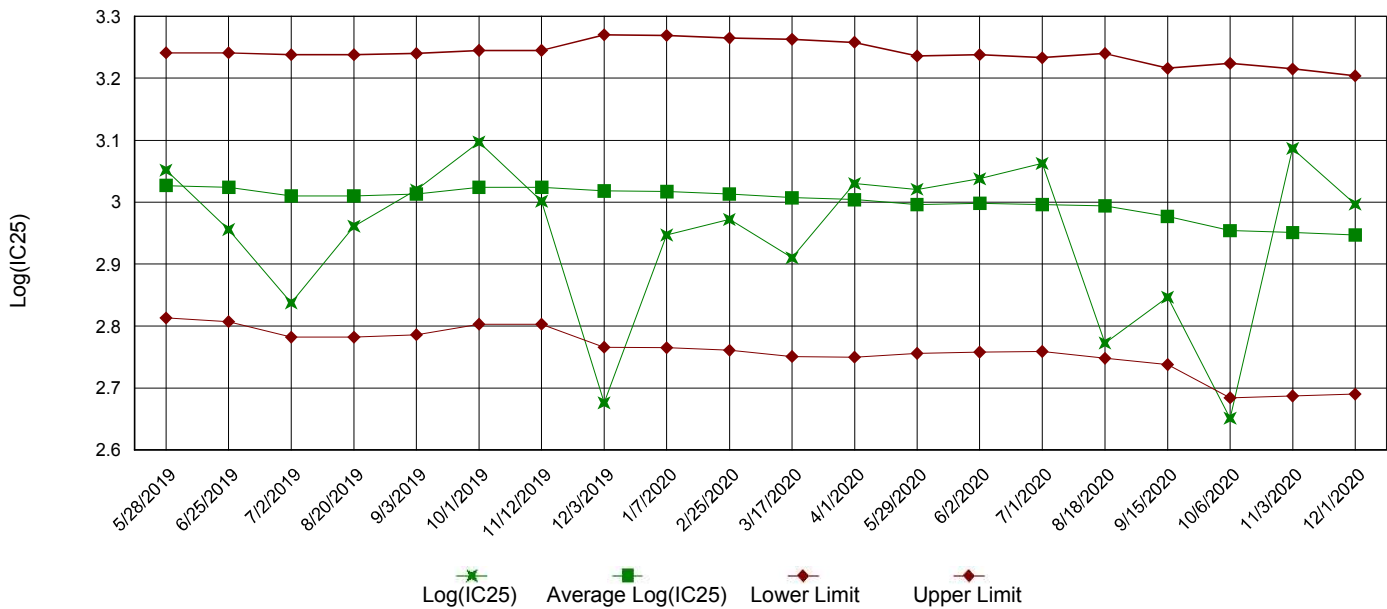
Dunnett's Test - Table 2 of 2						No Transformation	
Ho:Control<Treatment							
Group	Identification	Num of Reps	Min Sig Diff (In Orig. Units)	% of Control	Difference From Control		
1	Control	10					
2	32 %	10	8.905	49.7	6.2		
3	42 %	10	8.905	49.7	8.8		
4	56 %	10	8.905	49.7	9.3		
5	75 %	10	8.905	49.7	8.6		

Appendix A3: Test 1002.0
Chronic Reference Toxicant, *Ceriodaphnia dubia*

LC50 Survival Data



IC25 Reproduction Data



Appendix B: Test 1002.0
SUMMARY REPORTING FORMS
CHRONIC BIOMONITORING
Ceriodaphnia dubia
SURVIVAL AND REPRODUCTION

Permittee: Benton Utilities

NPDES No.: AR0036498 AFIN# 63-00063

Date and Time Test Initiated: December 15, 2020 at 1245

Date and Time Test Terminated: December 21, 2020 at 1350

Dilution water used: Soft

PERCENT SURVIVAL

Time of Reading	Control	Percent Effluent				
		32 %	42 %	56 %	75 %	100 %
24 hour	100	100	100	100	100	100
48 hour	100	90.0	80.0	60.0	70.0	30.0
6 day	90.0	80.0	70.0	60.0	70.0	30.0

NUMBER OF YOUNG PRODUCED PER FEMALE @ 6 DAYS

Replicates	Control	Percent Effluent				
		32 %	42 %	56 %	75 %	100 %
A	25	13	6	0	7	0
B	2	0	0	25	12	0
C	25	10	0	11	0	0
D	0	15	17	24	9	3
E	27	25	0	0	28	0
F	3	18	11	10	18	0
G	23	12	14	0	0	0
H	24	10	14	4	9	9
I	26	3	11	12	10	4
J	24	11	18	0	0	0
Mean per Adult	17.9	11.7	9.10	8.60	9.30	1.60
Mean per Surviving Adult	19.9	14.2	13.0	14.3	13.3	5.33
CV %	49.9	35.9	31.4	58.3	55.6	60.3

CV = Coefficient of variation = standard deviation * 100 / mean
(calculated based on young produced by surviving females)

Appendix B: Test 1002.0
SUMMARY REPORTING FORMS
CHRONIC BIOMONITORING
Ceriodaphnia dubia
SURVIVAL AND REPRODUCTION

1. Fisher's Exact Test:

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

a.) LOW FLOW OR CRITICAL DILUTION	(100 %)	<u> X </u> YES	<u> </u> NO
b.) 1/2 LOW FLOW DILUTION	(NA)	<u> </u> YES	<u> </u> NO

2. Dunnett's Test:

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

a.) LOW FLOW OR CRITICAL DILUTION	(100 %)	<u> X </u> YES	<u> </u> NO
b.) 1/2 LOW FLOW DILUTION	(NA)	<u> </u> YES	<u> </u> NO

3. If you answered NO to 1.a) enter [0] otherwise enter [1]: 1 (TLP3B)
4. If you answered NO to 2.a) enter [0] otherwise enter [1]: 1 (TGP3B)
5. NOEC Ceriodaphnia Lethality: 75 % (TOP3B)
6. LOEC Ceriodaphnia Lethality: 100 % (TXP3B)
7. NOEC Ceriodaphnia Sublethality: 42 % (TPP3B)
8. LOEC Ceriodaphnia Sublethality: 56 % (TYP3B)
9. Coefficient of variation for Ceriodaphnia Reproduction: 60.3 (TQP3B)
10. Sublethality for this test: 42 % (51710 or 51710Q)

Appendix B: Test 1002.0
CHRONIC TOXICITY SUMMARY FORM
Ceriodaphnia dubia
CHEMICAL PARAMETERS CHART

PERMITTEE: Benton Utilities
NPDES NO.: AR0036498 AFIN# 63-00063
CONTACT: Mr. Greg Becker
ANALYST: 280, 310, 343, 356

Test Initiated: DATE: December 15, 2020 TIME: 1245
Test Terminated: DATE: December 21, 2020 TIME: 1350

DILUTION	DAY						
	1	2	3	4	5	6	7
Control							
D.O. Initial	7.6	7.6	7.4	7.9	8.0	7.3	7.3
Final	7.9	8.2	7.9	7.8	7.3	7.4	--
pH Initial	7.8	7.9	7.9	7.9	7.9	7.9	7.9
Final	8.0	8.2	8.0	8.1	8.1	8.0	--

DILUTION	DAY						
	1	2	3	4	5	6	7
32 %							
D.O. Initial	7.7	7.5	7.7	7.6	8.0	7.6	7.4
Final	7.8	8.1	7.7	7.8	7.6	7.4	--
pH Initial	7.7	7.8	7.7	7.8	7.8	7.8	7.8
Final	8.1	8.3	8.1	8.2	8.2	8.1	--

DILUTION	DAY						
	1	2	3	4	5	6	7
42 %							
D.O. Initial	7.7	7.6	7.7	7.8	8.0	7.4	7.4
Final	7.8	8.2	7.9	7.9	7.8	7.4	--
pH Initial	7.6	7.8	7.7	7.8	7.7	7.8	7.8
Final	8.1	8.3	8.1	8.2	8.3	8.1	--

DILUTION	DAY						
	1	2	3	4	5	6	7
56 %							
D.O. Initial	7.8	7.7	7.7	7.8	8.1	7.5	7.4
Final	7.8	8.1	7.8	7.5	7.7	7.5	--
pH Initial	7.6	7.7	7.6	7.7	7.7	7.7	7.8
Final	8.2	8.3	8.2	8.2	8.3	8.2	--

DILUTION	DAY						
	1	2	3	4	5	6	7
75 %							
D.O. Initial	8.0	7.8	7.8	7.9	7.9	7.3	7.4
Final	7.9	8.1	8.1	7.9	7.2	7.5	--
pH Initial	7.5	7.7	7.6	7.8	7.7	7.7	7.8
Final	8.2	8.4	8.2	8.3	8.3	8.2	--

DILUTION	DAY						
	1	2	3	4	5	6	7
100 %							
D.O. Initial	8.1	7.8	8.1	7.6	8.2	7.5	7.5
Final	7.8	8.0	8.3	8.1	7.6	7.5	--
pH Initial	7.5	7.6	7.6	7.6	7.7	7.7	7.6
Final	8.2	8.8	8.3	8.4	8.5	8.3	--

Alkalinity	Hardness	Conductivity	Chlorine	Sample ID	
56	56	270	<0.05	Outfall 001	15-DEC-20
55	54	260	<0.05	Outfall 001	16-DEC-20
65	59	270	<0.05	Outfall 001	18-DEC-20

Alkalinity	Hardness	Conductivity	Chlorine	Sample ID
35	44	180	<0.05	250898-1



CHAIN OF CUSTODY / ANALYSIS REQUEST FORM

PAGE 1 OF 1

Client: <u>Benton Utilities</u>		PO No. <u>101919</u>	ANALYSES REQUESTED	
Project Reference: <u>AR003649X</u>		MATRIX		
Project Manager: <u>GREG BECKER</u>		WATER		
Sampled By: <u>AF</u>		SOIL		
AIC No. <u>057FA1001</u>		COMPOST		
Date/Time Collected: <u>12/15/20</u>		GRA B		
Sample Identification: <u>0827</u>				
Remarks: <u>1</u>				
Carrier:				
Received Temperature C: <u>66</u>				
Remarks:				
Field pH calibration on _____ @ _____				
Buffer:				
T = Sodium Thiosulfate				
Z = Zinc acetate				
A = (NH ₄) ₂ SO ₄ , NH ₄ OH				
H = HCl to pH2				
B = NaOH to pH12				
V = VOA vials				
N = Nitric acid pH2				
G = Glass				
P = Plastic				
NO = none				
S = Sulfuric acid pH2				
Turnaround Time Requested: (Please circle) _____				
NORMAL or EXPEDITED IN _____ DAYS				
Expedited results requested by: _____				
Who should AIC contact with questions: _____				
Phone: <u>501-776-5982</u>				
Report Attention to: <u>Greg Becker</u>				
Report Address to: _____				
Email Address: <u>GBecker@BentonUtilities.com</u>				
<u>9/2014</u>				
<u>AFREEMAN@BENTONUTILITIES.COM</u>				
<u>TJohnson@BentonUtilities.com</u>				
Comments: _____				
Relinquished By: <u>AF</u>		Date/Time: <u>12/15/20 0905</u>	Received By: <u>GB</u>	Date/Time: <u>12/15/20 0905</u>
Relinquished By: <u>GB</u>		Date/Time: <u>12/15/20 1003</u>	Received in Lab By: <u>[Signature]</u>	Date/Time: <u>12-15-20 1003</u>



CHAIN OF CUSTODY / ANALYSIS REQUEST FORM

PAGE 2 OF 3

Client: <u>Benton Utilities</u>		PO No. <u>101919</u>		ANALYSES REQUESTED		AIC CONTROL NO: <u>251261</u>	
Project Reference: <u>AL003649X</u>		MATRIX				AIC PROPOSAL NO:	
Project Manager: <u>GREG BECKER</u>		WATER		Carrier:		Received Temperature C <u>0.4</u>	
Sampled By: <u>AK</u>		G R A B		Remarks		Field pH calibration	
AIC No. <u>2</u>		C O M P		Date/Time Collected <u>12/16/20</u>		on _____ @ _____	
Sample Identification <u>OUTFALL 001</u>		V ✓		Date/Time <u>12/16/20</u>		Buffer:	
Date/Time Collected <u>12/16/20</u>		NO OF BOTTLES		Date/Time <u>0939</u>		T = Sodium Thiosulfate	
Container Type		NO OF VOA vials		Date/Time <u>12/16/20</u>		Z = Zinc acetate	
Preservative		N = Nitric acid pH2		Date/Time <u>12/16/20</u>		A = (NH ₄) ₂ SO ₄ , NH ₄ OH	
G = Glass		Relinquished By: <u>AK</u>		Received By: <u>GB</u>		Date/Time <u>12/16/20</u>	
NO = none		Relinquished By: <u>GB</u>		Received in Lab By: <u>DANNY BROWN</u>		Date/Time <u>12-16-20</u>	
S = Sulfuric acid pH2		Comments:					
Turnaround Time Requested: (Please circle)							
NORMAL or EXPEDITED IN _____ DAYS							
Expedited results requested by:							
Who should AIC contact with questions:							
Phone: <u>501-776-5982</u>							
Report Attention to: <u>Greg Becker</u>							
Report Address to:							

Email Address: GBecker@BentonUtilities.com
 9/2014
AFREEMAN@BentonUtilities.com
T Johnson@BentonUtilities.com



CHAIN OF CUSTODY / ANALYSIS REQUEST FORM

PAGE 1 OF 1

Client: <u>Benton Utilities</u>		PO No. <u>101919</u>		ANALYSES REQUESTED		AIC CONTROL NO. <u>25126</u>	
Project Reference: <u>AR0036498</u>		MATRIX		NO OF BOTTLES		AIC PROPOSAL NO. _____	
Project Manager: <u>GREG BECKER</u>		WATER				Carrier: _____	
Sampled By: <u>AK</u>		G R A B		NO OF VOA vials		Received Temperature C <u>0.3</u>	
AIC No. <u>0845</u>		C O M P				Remarks _____	
Date/Time Collected <u>12/18/20</u>		V = Nitric acid pH2		NO OF Nitrification vials		Field pH calibration on _____ @ _____	
Sample Identification <u>OUTFALL 001</u>		S = Sulfuric acid pH2				Buffer: _____	
Container Type _____		Relinquished By: <u>AF</u>		T = Sodium Thiosulfate		Date/Time <u>12/18/20</u>	
Preservative _____		Relinquished By: <u>GB</u>		Z = Zinc acetate		Date/Time <u>12-18-20</u>	
Turnaround Time Requested: (Please circle) _____		Comments: _____		A = (NH ₄) ₂ SO ₄ , NH ₄ OH		Received in Lab By: <u>[Signature]</u>	
Normal or EXPEDITED IN _____ DAYS		Who should AIC contact with questions: _____		Date/Time <u>12/18/20</u>		Date/Time <u>12-18-20</u>	
Expedited results requested by: _____		Phone: <u>501-776-5982</u>		Date/Time <u>1003</u>		Date/Time <u>1003</u>	
Report Attention to: <u>Greg Becker</u>		Report Address to: _____		Date/Time <u>1003</u>		Date/Time <u>1003</u>	
Email Address: <u>GBecker@BentonUt.Lites.Com</u>		Report Address to: _____		Date/Time <u>1003</u>		Date/Time <u>1003</u>	
9/2014		Report Address to: _____		Date/Time <u>1003</u>		Date/Time <u>1003</u>	



January 13, 2021

Biomonitoring Testing
for
Collection point 1, 2, 3
Benton, AR

Control No. 251787-1

Prepared for:

Mr. Greg Becker
Benton Utilities
616 West Hazel
Benton, AR 72015

Prepared by:

AMERICAN INTERPLEX CORPORATION
8600 Kanis Road
Little Rock, AR 72204-2322

Benton Utilities
ATTN: Mr. Greg Becker
616 West Hazel
Benton, AR 72015

Re: Chronic 7-Day Renewal *Ceriodaphnia dubia*
Collection point 1, 2, 3 - Benton, AR
NPDES Permit No. AR0036498 AFIN# 63-00063


Dear Mr. Greg Becker:

This report is the analytical results and supporting information for the samples submitted to American Interplex Corporation (AIC). The following results are applicable only to the sample identified by the control number referenced above. Accurate assessment of the data requires access to the entire document. Each section of the report has been reviewed and approved by the Chief Operating Officer or qualified designee.

Testing procedures and Quality Assurance were in accordance with "Short Term Methods for Estimating the Chronic Toxicity of Effluents and Receiving Waters to Freshwater Organisms" EPA-821-R-02-013, Fourth Edition, October 2002. Test results are summarized below:

Method 1002.0 Chronic *Ceriodaphnia dubia* Survival and Reproduction Test: The No Observable Effects Concentration (NOEC) for survival occurred at 100 % effluent, which is equal to the critical dilution of 100 %. The NOEC for reproduction occurred at 100 % effluent, which is equal to the critical dilution of 100 %. **The sample, therefore, PASSED both lethal and sub-lethal effects for the *Ceriodaphnia dubia* test.**

AMERICAN INTERPLEX CORPORATION



John Overbey
Chief Operating Officer

PDF cc: Benton Utilities
ATTN: Mr. Greg Becker
gbecker@bentonutilities.com

Benton Utilities
ATTN: Ms. Angela Freeman
angelaf@bentonutilities.com

Benton Utilities
ATTN: Mr. Tom Johnson
tjohnson@bentonutilities.com

Table of Contents

- I. Control Acceptance Criteria
- II. Outlined Report
- III. Data Analysis
- IV. Standard Reference Toxicants
- V. Organism History
- VII. Results Summary
 - Ceriodaphnia dubia*
- Appendix A: Raw Data
 - A1: Test 1002.0
 - Ceriodaphnia dubia* Survival and Reproduction
 - A2: Statistics
 - A3: Reference Toxicant
- Appendix B: Summary Forms

I. Control Acceptance Criteria

Ceriodaphnia dubia Method 1002.0

CRITERIA	RESULTS	PASS/FAIL
Control Survival > or = 80%	100	PASS
Control Reproduction > or = 15 per Surviving Female	31.8	PASS
Control CV < or = 40% per Surviving Female	7.23	PASS
Reproduction Minimum Significant Difference 13 to 47%	17.3	PASS
Critical Dilution CV < or = 40%	10.1	PASS

II. Outlined Report

A. Introduction

1. Permit Number: AR0036498 AFIN# 63-00063
2. Test Requirements: Chronic Biomonitoring, Quarterly Test Method 1002.0

B. Source of Effluent/Dilution Water:

1. Effluent Samples:

- a. Sampling Point: Collection point 1, 2, 3
- b. Chemical Data:

Analysis	Sample 1
Dissolved oxygen (mg/l)	8.4
pH (standard units)	7.1
Alkalinity (mg/l as CaCO ₃)	50
Hardness (mg/l as CaCO ₃)	56
Conductivity (umhos/cm)	250
Residual Chlorine (mg/l)	<0.05
Ammonia as N (mg/l)	<0.1

2. Dilution Water Samples:

Soft

Analysis	251672-1
Dissolved oxygen (mg/l)	7.4
pH (standard units)	8.0
Alkalinity (mg/l as CaCO ₃)	32
Hardness (mg/l as CaCO ₃)	42
Conductivity (umhos/cm)	180
Residual Chlorine (mg/l)	<0.05

C. Test Methods

1. Test methods used:

Short Term Methods for Estimating the Chronic Toxicity of Effluents and Receiving Waters to Freshwater Organisms, EPA-821-R-02-013; test Method 1002.0, *Ceriodaphnia dubia* Survival and Reproduction.

2. Endpoint: No Observable Effects Concentration (NOEC)

3. Test Conditions:

Ceriodaphnia dubia Survival and Reproduction Method 1002.0

Date & Time Test Initiated:	January 5, 2021 at 1430
Date & Time Test Terminated:	January 12, 2021 at 1420
Type & Volume of Test Chamber:	30 ml disposable beaker
Volume of Sample:	15 ml
Number of Organisms per replicate:	1
Number of Replicates per dilution:	10

4. Source of test organisms: Obtained from in-house cultures

5. Test Temperature: 25 +/- 1 degree Celsius

D. Test Organisms

1. Scientific Name

a. Test 1002.0 *Ceriodaphnia dubia*

III. Data Analysis

The data was analyzed using American Interplex Corporation's Laboratory Information Management Software based on Toxstat and following EPA method criteria.

Ceriodaphnia dubia survival data was analyzed with Fisher's Exact Test. Reproduction data was analyzed using Shapiro-Wilk's and analyzed with Steel's Many-One Rank Test to determine the No Observable Effects Concentration (NOEC) for Reproduction. Dunnett's Test was used to calculate the PMSD.

IV. Standard Reference Toxicants

The sensitivity of the offspring is determined by performing a standard reference toxicant test monthly. Sodium chloride in synthetic moderately hard water is used as prescribed in EPA-821-R-02-013.

Ceriodaphnia dubia

A chronic reference test was performed on December 01, 2020 at 1630 to December 08, 2020 at 1515

The results were as follows: (Control No. 250739-2.)

Survival LC-50: 1840.7 mg/l

Reproduction IC-25: 991.8 mg/l

Reproduction PMSD: 8.43

V. Organism History

Ceriodaphnia dubia

Date: January 5, 2021

Age: <24 hours

Source: In-house culture

Water: Moderately hard synthetic

Temperature: 25 deg.C

VII. Results Summary *Ceriodaphnia dubia*, Cladoceran Survival and Reproduction Test -- Method 1002.0

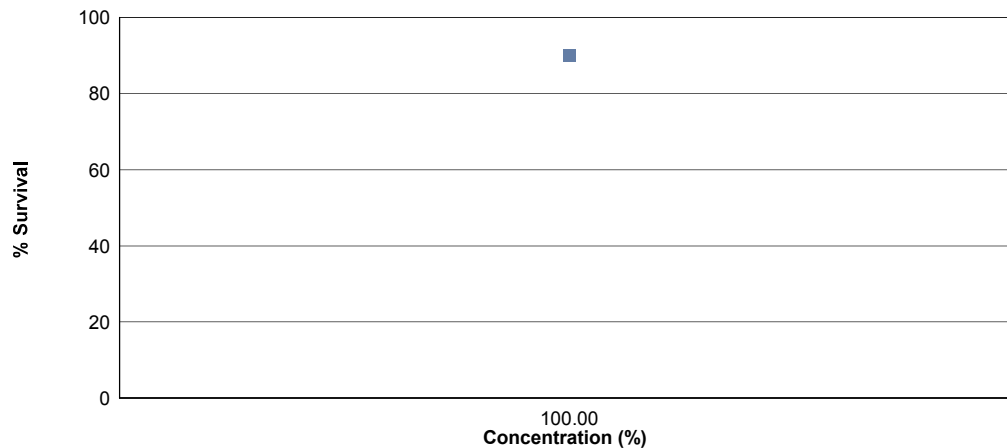
Neonates are exposed in a static renewal system to different concentrations of effluent with dilution water until 60% of surviving control organisms have three broods of offspring or a maximum of eight test days.

Effluent dilutions for this test were 100 % in accordance with the NPDES permit.

The low flow or 'critical' dilution is specified in the NPDES permit as 100 % effluent.

The test was initiated on January 5, 2021 at 1430 and continued through January 12, 2021 at 1420. Statistical analyses were performed on the observed data and the no observable effects concentrations (NOECs) were as follows:

- a.) NOEC survival = 100 % effluent
- b.) NOEC reproduction = 100 % effluent



Summary of the 7-day <i>Ceriodaphnia dubia</i> Survival and Reproduction Data		
Concentration	Percent Survival	Mean Reproduction
Control	100	31.8
100 %	90.0	28.5

Appendix A1: Test 1002.0

Ceriodaphnia dubia Survival and Reproduction

Date and Time Test Initiated: January 5, 2021 at 1430

Date and Time Test Terminated: January 12, 2021 at 1420

Concentration: Control														
Day	Replicate										No. of Young	No. of Adults	Young per Adult	
	1	2	3	4	5	6	7	8	9	10				
1	0	0	0	0	0	0	0	0	0	0	0	0	10	0.00
2	0	0	0	0	0	0	0	0	0	0	0	0	10	0.00
3	0	0	0	0	0	0	0	0	0	0	0	0	10	0.00
4	7	6	6	6	5	7	7	7	6	6	63	10	6.30	
5	10	0	7	10	11	0	10	0	9	11	68	10	6.80	
6	0	10	0	0	0	10	0	12	1	0	33	10	3.30	
7	13	13	16	16	17	17	13	17	17	15	154	10	15.4	
8														
TOTAL	30	29	29	32	33	34	30	36	33	32	318	10	31.8	

Concentration: 100 %													
Day	Replicate										No. of Young	No. of Adults	Young per Adult
	1	2	3	4	5	6	7	8	9	10			
1	0	0	0	0	0	0	0	0	0	0	0	10	0.00
2	0	0	0	0	0	0	0	0	0	0	0	10	0.00
3	0	0	0	0	0	0	0	0	0	0	0	10	0.00
4	5	4	7	0	4	4	3	7	2	7	43	10	4.30
5	0	0	0	0	0	9	12	0	X	9	30	9	3.33
6	11	13	11	11	10	0	1	12	X	0	69	9	7.67
7	13	16	16	16	17	14	19	16	X	16	143	9	15.9
8													
TOTAL	29	33	34	27	31	27	35	35	2	32	285	10	28.5

Appendix A2: Statistics

Ceriodaphnia dubia Survival

Fisher's Exact Test			
Identification	Alive	Dead	Total Animals
Control	10	0	10
100 %	9	1	10
Total	19	1	20

Critical Fisher's value (10,10,10) (alpha=0.05) is 6. b value is 9. Since b is greater than 6 there is NO SIGNIFICANT DIFFERENCE between CONTROL and TREATMENT at the 0.05 level.

Summary of Fisher's Exact Test				
Group	Identification	Exposed	Dead	Sig 0.05
0	Control	10	0	
1	100 %	10	1	

Appendix A2: Statistics

Ceriodaphnia dubia Reproduction

Shapiro - Wilk's Test for Normality	No Transformation
D = 908.1 W = 0.6518 Critical W = 0.868 Critical W = 0.905	(alpha = 0.01, N = 20) (alpha = 0.05, N = 20)
Data FAIL normality test (alpha = 0.01).	

Steel's Many-One Rank Test				No Transformation	
Ho:Control<Treatment					
Group	Identification	Rank Sum	Critical Value	DF	Sig 0.05
1	Control				
2	100 %	98.50	82.00	10.00	
Critical values are 1 tailed (k=1)					

Appendix A2: Statistics

Ceriodaphnia dubia Reproduction

Dunnett's Test for PMSD Calculation

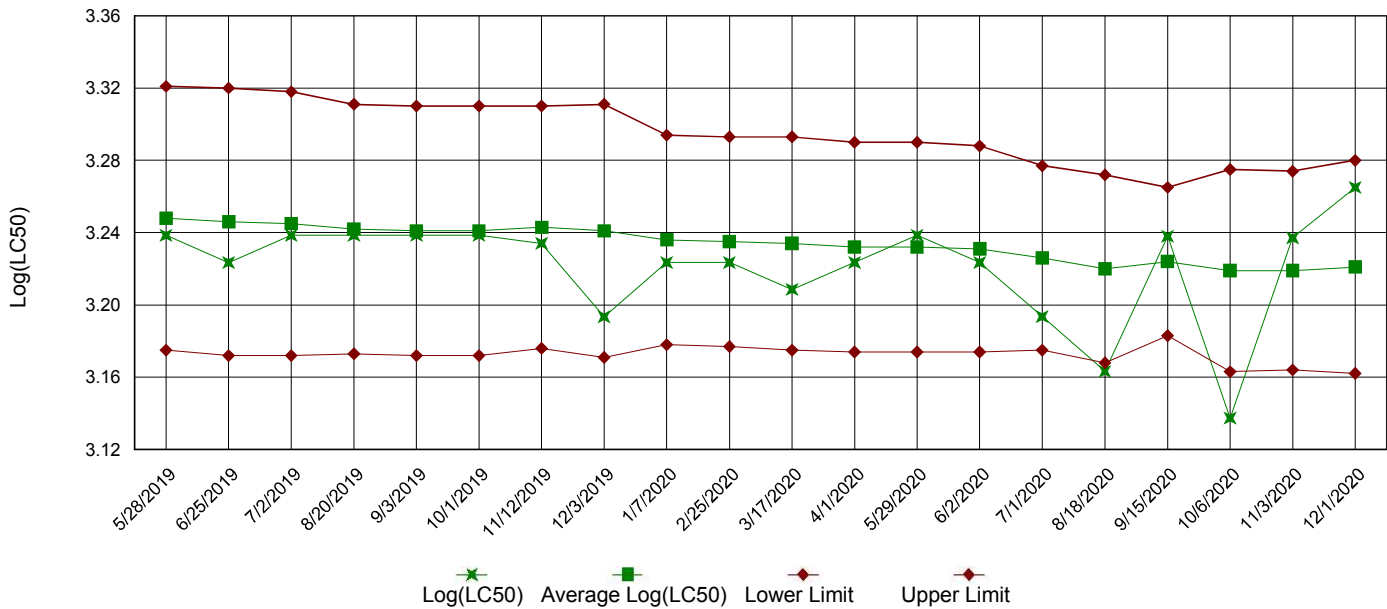
ANOVA Table				No Transformation	
SOURCE	DF	SS	MS	F	
Between	1	54.45	54.45	1.079	
Within (Error)	18	908.1	50.45		
Total	19	962.5			
Critical F = 8.28 (alpha = 0.01, df = 1,18)					
4.41 (alpha = 0.05, df = 1,18)					
Since F < Critical F FAIL TO REJECT Ho: All equal (alpha = 0.05)					

Dunnett's Test - Table 1 of 2					No Transformation	
Ho:Control<Treatment						
Group	Identification	Transformed Mean	Mean In Original Units	T Stat	Sig 0.05	
1	Control	31.8	31.8			
2	100 %	28.5	28.5	1.039		
Dunnett's critical value = 1.73 (1 Tailed, alpha = 0.05, df = 1,18)						

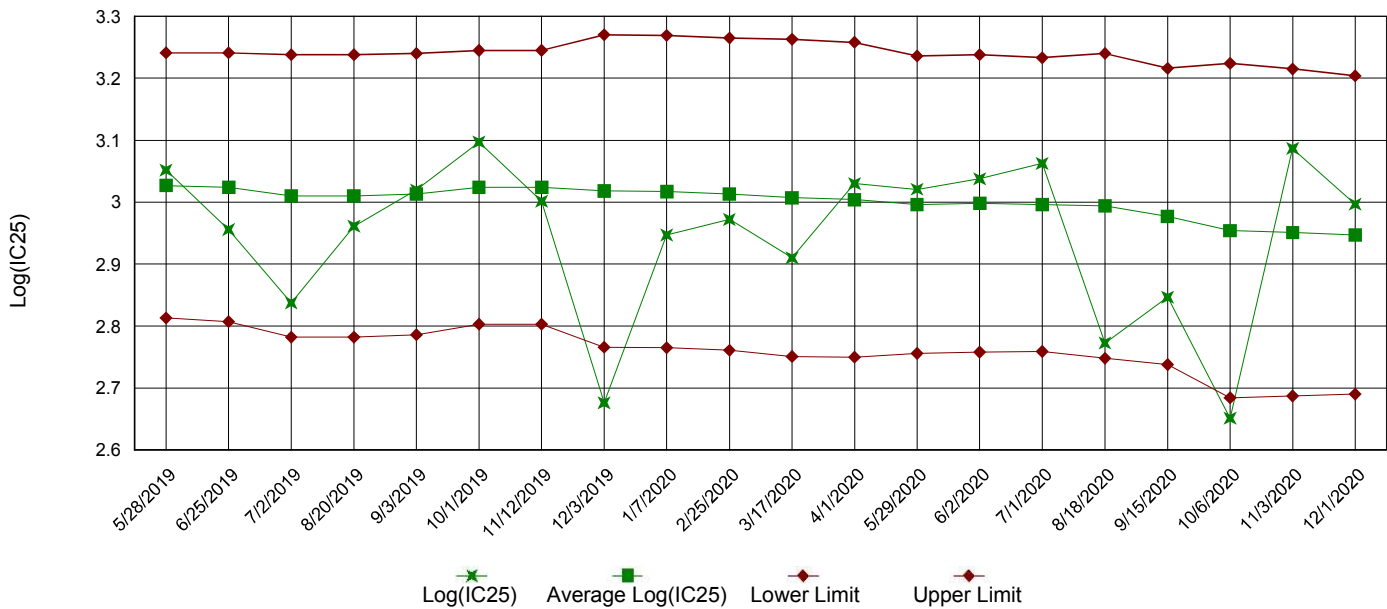
Dunnett's Test - Table 2 of 2					No Transformation	
Ho:Control<Treatment						
Group	Identification	Num of Reps	Min Sig Diff (In Orig. Units)	% of Control	Difference From Control	
1	Control	10				
2	100 %	10	5.495	17.3	3.3	

Appendix A3: Test 1002.0
Chronic Reference Toxicant, *Ceriodaphnia dubia*

LC50 Survival Data



IC25 Reproduction Data



Appendix B: Test 1002.0
SUMMARY REPORTING FORMS
CHRONIC BIOMONITORING
Ceriodaphnia dubia
SURVIVAL AND REPRODUCTION

Permittee: Benton Utilities

NPDES No.: AR0036498 AFIN# 63-00063

Date and Time Test Initiated: January 5, 2021 at 1430

Date and Time Test Terminated: January 12, 2021 at 1420

Dilution water used: Soft

PERCENT SURVIVAL

Time of Reading	Control	100 %	Percent Effluent
24 hour	100	100	
48 hour	100	100	
7 day	100	90.0	

NUMBER OF YOUNG PRODUCED PER FEMALE @ 7 DAYS

Replicates	Control	100 %	Percent Effluent
A	30	29	
B	29	33	
C	29	34	
D	32	27	
E	33	31	
F	34	27	
G	30	35	
H	36	35	
I	33	2	
J	32	32	
Mean per Adult	31.8	28.5	
Mean per Surviving Adult	31.8	31.4	
CV %	7.23	10.1	

CV = Coefficient of variation = standard deviation * 100 / mean
(calculated based on young produced by surviving females)

Appendix B: Test 1002.0
SUMMARY REPORTING FORMS
CHRONIC BIOMONITORING
Ceriodaphnia dubia
SURVIVAL AND REPRODUCTION

1. Fisher's Exact Test:

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

a.) LOW FLOW OR CRITICAL DILUTION	<u> </u> YES	<u> X </u> NO
b.) 1/2 LOW FLOW DILUTION	<u> </u> YES	<u> </u> NO

2. Steel's Many-One Rank Test:

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

a.) LOW FLOW OR CRITICAL DILUTION	<u> </u> YES	<u> X </u> NO
b.) 1/2 LOW FLOW DILUTION	<u> </u> YES	<u> </u> NO

3. If you answered NO to 1.a) enter [0] otherwise enter [1]: 0 (TLP3B)
4. If you answered NO to 2.a) enter [0] otherwise enter [1]: 0 (TGP3B)
5. NOEC Ceriodaphnia Lethality: 100 % (TOP3B)
6. LOEC Ceriodaphnia Lethality: 100 % (TXP3B)
7. NOEC Ceriodaphnia Sublethality: 100 % (TPP3B)
8. LOEC Ceriodaphnia Sublethality: 100 % (TYP3B)
9. Coefficient of variation for Ceriodaphnia Reproduction: 10.1 (TQP3B)
10. Sublethality for this test: 100 % (51710 or 51710Q)

Appendix B: Test 1002.0
CHRONIC TOXICITY SUMMARY FORM
Ceriodaphnia dubia
CHEMICAL PARAMETERS CHART

PERMITTEE: Benton Utilities
NPDES NO.: AR0036498 AFIN# 63-00063
CONTACT: Mr. Greg Becker
ANALYST: 280, 310, 343, 356

Test Initiated: DATE: January 5, 2021 TIME: 1430
Test Terminated: DATE: January 12, 2021 TIME: 1420

DILUTION	DAY						
	1	2	3	4	5	6	7
Control							
D.O. Initial	7.4	7.1	7.0	7.9	7.5	7.9	7.7
Final	7.9	7.2	7.4	7.9	7.6	7.5	8.0
pH Initial	8.0	7.8	7.8	7.9	7.8	7.9	7.8
Final	8.0	8.0	8.0	8.0	7.9	7.8	8.0

DILUTION	DAY						
	1	2	3	4	5	6	7
100 %							
D.O. Initial	8.4	6.9	6.7	7.8	7.7	7.7	7.7
Final	7.2	7.4	7.6	7.6	7.8	7.7	7.8
pH Initial	7.1	7.3	7.1	7.3	7.2	7.3	7.5
Final	8.3	8.2	8.3	8.4	8.2	8.3	8.3

Alkalinity **Hardness** **Conductivity** **Chlorine** **Sample ID**
50 56 250 <0.05 Collection Point 1,2,3 05-JAN-21

Alkalinity **Hardness** **Conductivity** **Chlorine** **Sample ID**
32 42 180 <0.05 251672-1



April 5, 2021

Biomonitoring Testing
for
Outfall 001
Benton, AR

Control No. 253688-1

Prepared for:

Mr. Greg Becker
Benton Utilities
616 West Hazel
Benton, AR 72015

Prepared by:

AMERICAN INTERPLEX CORPORATION
8600 Karis Road
Little Rock, AR 72204-2322

Benton Utilities
ATTN: Mr. Greg Becker
616 West Hazel
Benton, AR 72015

Re: Chronic 7-Day Renewal *Pimephales promelas* (Fathead minnow)
Outfall 001 - Benton, AR
NPDES Permit No. AR0036498 AFIN#63-00063

Dear Mr. Greg Becker:


This report is the analytical results and supporting information for the samples submitted to American Interplex Corporation (AIC). The following results are applicable only to the sample identified by the control number referred above. Accurate assessment of the data requires access to the entire document. Each section of the report has been reviewed and approved by the Chief Operating Officer or qualified designee.

Testing procedures and Quality Assurance were in accordance with "Short Term Methods for Estimating the Chronic Toxicity of Effluents and Receiving Waters to Freshwater Organisms" EPA-821-R-02-013, Fourth Edition, October 2002. Test results are summarized below:

A statistically significant difference was noted at the 56% effluent concentration for Fathead minnow growth. This does not follow a dose-response pattern and is considered an anomaly.

Method 1000.0 Chronic *Pimephales promelas* (Fathead minnow) Survival and Growth Test: The No Observable Effects Concentration (NOEC) for survival occurred at 100% effluent, which is equal to the critical dilution of 100%. The NOEC for growth occurred at 100% effluent, which is equal to the critical dilution of 100%. **The sample, therefore, PASSED both lethal and sub-lethal effects for the Fathead minnow test.**

AMERICAN INTERPLEX CORPORATION



John Overbey
Chief Operating Officer

PDF cc: Benton Utilities
ATTN: Mr. Greg Becker
gbecker@bentonutilities.com

BentonUtilities
ATTN: Ms. Angela Freeman
angelaf@bentonutilities.com

BentonUtilities
ATTN: Mr. Tom Johnson
tjohnson@bentonutilities.com

Table of Contents

- I. Control Acceptance Criteria
- II. Outlined Report
- III. Data Analysis
- IV. Standard Reference Toxicants
- V. Organism History
- VI. Results Summary
 - Pimephales promelas* (Fathead minnow)
- Appendix A: Raw Data
 - A1: Test 1000.0
 - Pimephales promelas* (Fathead minnow) Survival and Growth
 - A2: Statistics
 - A3: Reference Toxicant
- Appendix B: Summary Forms

I. Control Acceptance Criteria

Pimephales promelas (Fathead minnow Method 1000.0)

CRITERIA	RESULTS	PASS/FAIL
Control Survival > or = 80%	95.0	PASS
Control Growth > or = 0.25 mg per Surviving minnow	0.381	PASS
Control Growth CV < or = 40%	9.96	PASS
Growth Minimum Significant Difference 12 to 30%	20.9	PASS
Critical Dilution CV < or = 40%	11.4	PASS

II. Outlined Report

A. Introduction

1. Permit Number: AR0036498 AFIN#63-00063
2. Test Requirements: Chronic Biomonitoring, Quarter I y
Test Method 1000.0

B. Source of Effluent/Dilution Water:

1. Effluent Samples:

- a. Sampling Point: Outfall 001
- b. Chemical Data:

Analysis	Sample 1	Sample 2	Sample 3
Dissolved oxygen(mg/l)	7.6	7.5	7.8
pH (standard units)	7.2	7.2	7.6
Alkalinity (mg/l as CaCO ₃)	35	32	32
Hardness (mg/l as CaCO ₃)	51	54	49
Conductivity (umhos/cm)	260	250	240
Residual Chlorine (mg/l)	<0.05	<0.05	<0.05
Ammonia as N (mg/l)	0.28	0.19	0.17

2. Dilution Water Samples :

Soft

Analysis	253379-1
Dissolved oxygen(mg/l)	7.0
pH (standard units)	7.8
Alkalinity (mg/l as CaCO ₃)	32
Hardness (mg/l as CaCO ₃)	43
Conductivity (umhos/cm)	170
Residual Chlorine (mg/l)	<0.05

C. Test Methods

1. Test methods used:

Short Term Methods for Estimating the Chronic Toxicity of Effluents and Receiving Waters to Freshwater Organisms, EPA-821-R-02-013; test Method 1000.0, Fathead Minnow Survival and Growth.

2. Endpoint: No Observable Effects Concentration (NOEC)

3. Test Conditions:

Pimephales promelas (Fathead minnow) Survival and Growth Method 1000.0

Date & Time Test Initiated: March 16, 2021 at 1226

Date & Time Test Terminated: March 23, 2021 at 1030

Type & Volume of Test Chamber: 500 ml disposable beaker

Volume of Sample: 250 ml

Number of Organisms per replicate: 8

Number of Replicates per dilution: 5

4. Source of test organisms: Obtained from in-house cultures

5. Test Temperature: 25 +/- 1 degree Celsius

D. Test Organisms

1. Scientific Name

a. Test 1000.0 *Pimephales promelas*

III. Data Analysis

The data was analyzed using American Interplex Corporation's Laboratory Information Management Software based on tests that are following EPA method criteria.

Pimephales promelas (Fathead minnow) survival data was transformed using the Arc Sine transformation. Normality and homogeneity of variance were checked using Shapiro-Wilk's and Bartlett's test. The survival data was then analyzed using Dunnett's Test to determine the No Observable Effects Concentration (NOEC).

Fathead minnow growth data was analyzed for normality and homogeneity of variance using Shapiro-Wilk's and Bartlett's test. Dunnett's Test was used to determine the No Observable Effects Concentration (NOEC) for growth.

IV. Standard Reference Toxicants

The sensitivity of the offspring is determined by performing a standard reference toxicant test monthly. Sodium chloride synthetic moderately hard water is used as prescribed in EPA-821-R02-013.

Pimephales promelas (Fathead minnow)

A chronic reference test was performed on March 01, 2021 at 1415 to March 08, 2021 at 1410

The results were as follows: (Control No. 253029-1.)

Survival LC-50: 2762 mg/l

Growth IC-25: 1732 mg/l

Growth PMSD: 11.1

V. Organism History

Pimephales promelas (Fathead minnow)

Date: March 16, 2021

Age: <24 hours

Source: Inhouse culture

Water: Moderately hard synthetic

Temperature: 25 deg.C

VII. Results Summary *Pimephales promelas*, Fathead minnow Larval Survival and Growth Test -- Method 1000.0

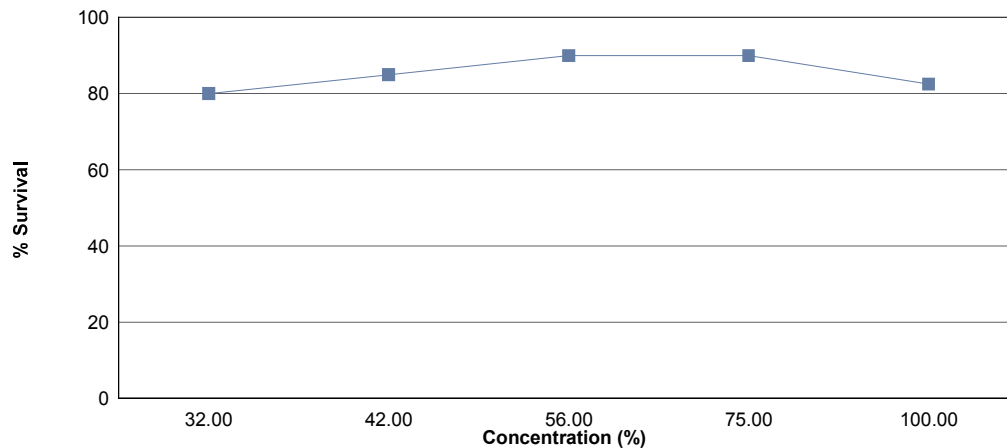
Larvae are exposed in a static renewal system for seven days to different concentrations of effluent with dilution water. Test results are based on the survival and growth (weight) of the larvae.

Effluent dilutions for this test were 32%, 42%, 56%, 75% and 100% in accordance with the NPDES permit.

The low flow 'critical' dilution is specified in the NPDES permit as 100% effluent.

The test was initiated on March 16, 2021 at 1226 and continued through March 23, 2021 at 1030. Statistical analyses were performed on the observed data and the no observable effects concentrations (NOECs) were as follows:

- a.) NOEC survival = 100% effluent
- b.) NOEC growth = 100% effluent



Summary of the 7- day Fathead Minnow Survival and Growth		
Concentration	Percent Survival	Mean Growth (mg)
Control	95.0	0.362
32 %	80.0	0.304
42 %	85.0	0.357
56 %	90.0	0.255 *
75 %	90.0	0.313
100 %	82.5	0.316

* Significant difference when compared to the control (p=0.05)

The significant toxicity is not due to true dose response effects, and should be considered anomaly.

Appendix A1: Test 1000.0

Pimephales promelas (Fathead Minrow) 7-Day Survival

Date and Time Test Initiated: March 16, 2021 at 1226

Date and Time Test Terminated: March 23, 2021 at 1030

Concentration	Replicate	Number of Survivors						
		Day 1	Day 2	Day 3	Day 4	Day 5	Day 6	Day 7
Control	A	8	8	8	8	7	7	6
	B	8	8	8	8	8	8	8
	C	8	8	8	8	8	8	8
	D	8	8	8	8	8	8	8
	E	8	8	8	8	8	8	8
32 %	A	8	8	8	8	8	8	8
	B	8	8	8	6	6	6	6
	C	8	8	8	6	6	6	6
	D	8	8	8	8	7	7	7
	E	8	8	8	7	5	5	5
42 %	A	8	8	8	7	7	7	7
	B	8	8	8	8	8	8	8
	C	8	8	8	7	7	7	7
	D	8	8	8	7	6	6	6
	E	8	8	8	6	6	6	6
56 %	A	8	8	8	8	7	6	6
	B	8	8	8	8	8	8	7
	C	8	8	7	7	7	7	7
	D	8	8	8	8	8	8	8
	E	8	8	8	8	8	8	8
75 %	A	8	8	8	7	7	7	7
	B	8	8	8	7	7	7	7
	C	8	8	8	8	7	7	7
	D	8	8	8	8	8	8	8
	E	8	8	8	7	7	7	7
100 %	A	8	8	8	8	8	8	8
	B	8	8	7	6	6	6	6
	C	8	8	8	7	7	7	7
	D	8	8	8	8	8	8	8
	E	8	8	6	5	4	4	4

Appendix A1: Test 1000.0

Pimephales promelas (Fathead Minnow) 7-Day Growth

Test Initiated: March 16, 2021 at 1226

Test Terminated: March 23, 2021 at 1030

Concentration	Replicate	Weight of pan	Weight of pan + fish	Total weight of fish (g)	Original # of fish	Meandry weight (mg)
Control	A	.76500	.76738	0.00238	8	0.298
	B	.76327	.76632	0.00305	8	0.381
	C	.76451	.76749	0.00298	8	0.372
	D	.76394	.76699	0.00305	8	0.381
	E	.76854	.77157	0.00303	8	0.379
32 %	A	.76820	.77126	0.00306	8	0.382
	B	.76921	.77122	0.00201	8	0.251
	C	.76676	.76938	0.00262	8	0.328
	D	.76622	.76874	0.00252	8	0.315
	E	.76418	.76612	0.00194	8	0.242
42 %	A	.77244	.77524	0.00280	8	0.350
	B	.76652	.76965	0.00313	8	0.391
	C	.76994	.77295	0.00301	8	0.376
	D	.77101	.77368	0.00267	8	0.334
	E	.76673	.76941	0.00268	8	0.335
56 %	A	.77705	.77984	0.00279	8	0.349
	B	.77169	.77364	0.00195	8	0.244
	C	.76962	.77238	0.00276	8	0.345
	D	.77038	.77177	0.00139	8	0.174
	E	.77090	.77220	0.00130	8	0.162
75 %	A	.76978	.77246	0.00268	8	0.335
	B	.76889	.77125	0.00236	8	0.295
	C	.76137	.76395	0.00258	8	0.322
	D	.76201	.76471	0.00270	8	0.338
	E	.77327	.77546	0.00219	8	0.274
100 %	A	.76433	.76686	0.00253	8	0.316
	B	.77441	.77733	0.00292	8	0.365
	C	.76909	.77154	0.00245	8	0.306
	D	.77761	.78022	0.00261	8	0.326
	E	.77610	.77822	0.00212	8	0.265

Appendix A2: Statistics

Pimephales promelas (Fathead minnow) Survival

Transformation of Data			Transform: ArcSin(Square Root(Y))	
Group	Identification	Rep	Value	Transformed
1	Control	1	0.75000	1.04720
1	Control	2	1.00000	1.39310
1	Control	3	1.00000	1.39310
1	Control	4	1.00000	1.39310
1	Control	5	1.00000	1.39310
2	32 %	1	1.00000	1.39310
2	32 %	2	0.75000	1.04720
2	32 %	3	0.75000	1.04720
2	32 %	4	0.87500	1.20940
2	32 %	5	0.62500	0.91174
3	42 %	1	0.87500	1.20940
3	42 %	2	1.00000	1.39310
3	42 %	3	0.87500	1.20940
3	42 %	4	0.75000	1.04720
3	42 %	5	0.75000	1.04720
4	56 %	1	0.75000	1.04720
4	56 %	2	0.87500	1.20940
4	56 %	3	0.87500	1.20940
4	56 %	4	1.00000	1.39310
4	56 %	5	1.00000	1.39310
5	75 %	1	0.87500	1.20940
5	75 %	2	0.87500	1.20940
5	75 %	3	0.87500	1.20940
5	75 %	4	1.00000	1.39310
5	75 %	5	0.87500	1.20940
6	100 %	1	1.00000	1.39310
6	100 %	2	0.75000	1.04720
6	100 %	3	0.87500	1.20940
6	100 %	4	1.00000	1.39310
6	100 %	5	0.50000	0.78540

Appendix A2: Statistics

Pimephales promelas (Fathead minnow) Survival

Shapiro - Wilk's Test for Normality Transform: ArcSin(Square Root(Y))	
D= 0.691 W= 0.9748 Critical W =0.9 Critical W =0.927	(alpha = 0.01, N = 30) (alpha = 0.05, N = 30)
Data PASS normality test (alpha = 0.01).	

Bartlett's Test for Homogeneity of Variance Transform: ArcSin(Square Root(Y))	
Calculated B statistic= 4.631 Critical B =15.086	(alpha = 0.01, df = 5)
Data PASS B homogeneity test at 0.01 level.	

Appendix A2: Statistics

Pimephales promelas (Fathead minnow) Survival

ANOVA Table			Transform: ArcSin(Square Root(Y))	
SOURCE	DF	SS	MS	F
Between	5	0.1318	0.02636	0.9156
Within(Error)	24	0.691	0.02879	
Total	29	0.8228		
Critical F = 3.9 (alpha = 0.01, df = 5,24) 2.62 (alpha = 0.05, df = 5,24)				
Since F < Critical F FAIL TO REJECT Ho: All equal (alpha = 0.05)				

Dunnett's Test - Table 1 of 2				Transform: ArcSin(Square Root(Y))	
Ho: Control < Treatment					
Group	Identification	Transformed Mean	Mean In Original Units	T Stat	Sig 0.05
1	Control	1.3239	0.95		
2	32 %	1.1217	0.8	1.884	
3	42 %	1.1813	0.85	1.329	
4	56 %	1.2504	0.9	0.6849	
5	75 %	1.2461	0.9	0.725	
6	100 %	1.1656	0.825	1.475	
Dunnett's critical value = 2.36 (1 Tailed, alpha = 0.05, df = 5,24)					

Dunnett's Test - Table 2 of 2				Transform: ArcSin(Square Root(Y))	
Ho: Control < Treatment					
Group	Identification	Num of Reps	Min Sig Diff (In Orig. Units)	% of Control	Difference From Control
1	Control	5			
2	32 %	5	0.1703	18.1	0.15
3	42 %	5	0.1703	18.1	0.1
4	56 %	5	0.1703	18.1	0.05
5	75 %	5	0.1703	18.1	0.05
6	100 %	5	0.1703	18.1	0.125

Appendix A2: Statistics

Pimephales promelas (Fathead minnow) Growth

Shapiro - Wilk's Test for Normality	No Transformation
<p>D= 0.06172 W= 0.9647 Critical W =0.9 (alpha = 0.01, N = 30) Critical W =0.927 (alpha = 0.05, N = 30)</p> <p>Data PASS normality test (alpha = 0.01).</p>	

Bartlett's Test for Homogeneity of Variance	No Transformation
<p>Calculated B statistic= 9.322 Critical B =15.086 (alpha = 0.01, df = 5)</p> <p>Data PASS B homogeneity test at 0.01 level.</p>	

Appendix A2: Statistics

Pimephales promelas (Fathead minnow) Growth

ANOVA Table				No Transformation	
SOURCE	DF	SS	MS	F	
Between	5	0.03862	0.007724	3.003	
Within(Error)	24	0.06172	0.002572		
Total	29	0.1003			
Critical F = 3.9 (alpha = 0.01, df = 5,24)					
2.62 (alpha = 0.05, df = 5,24)					
Since F > Critical F REJECT Ho: All equal (alpha = 0.05)					

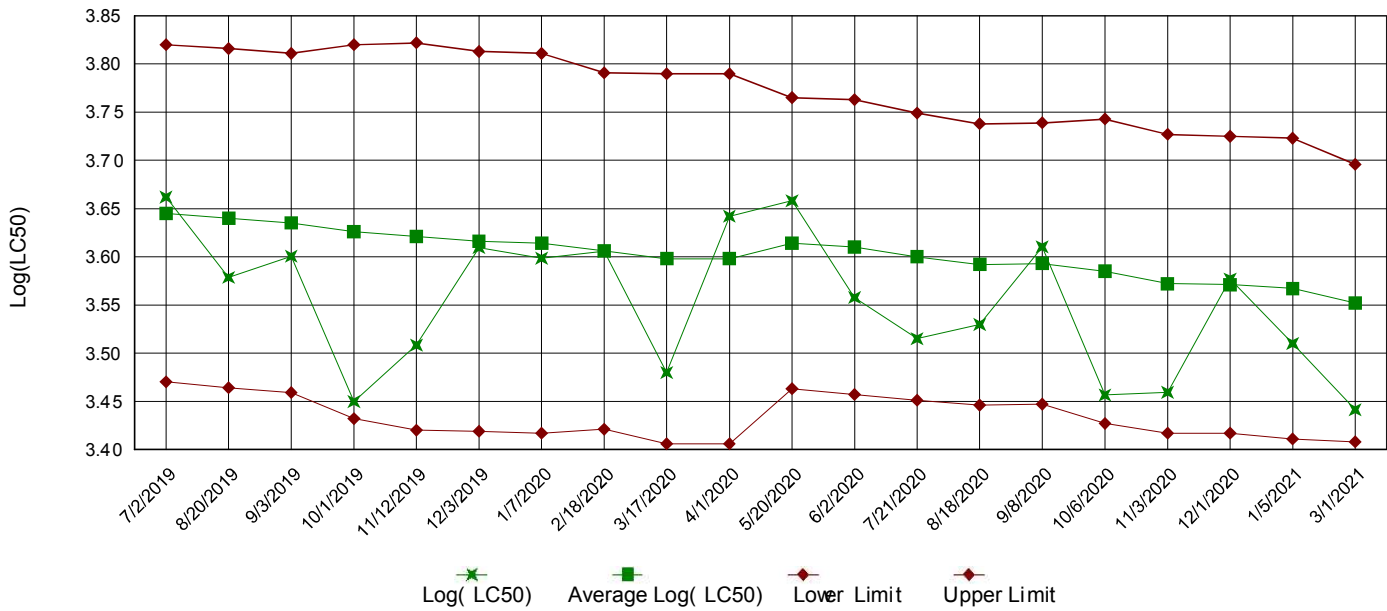
Dunnett's Test - Table 1 of 2					No Transformation	
Ho: Control < Treatment						
Group	Identification	Transformed Mean	Mean In Original Units	T Stat	Sig 0.05	
1	Control	0.3622	0.3622			
2	32 %	0.3036	0.3036	1.827		
3	42 %	0.3572	0.3572	0.1559		
4	56 %	0.2548	0.2548	3.348	*	
5	75 %	0.3128	0.3128	1.54		
6	100 %	0.3156	0.3156	1.453		
Dunnett's critical value = 2.36 (1 Tailed, alpha = 0.05, df = 5,24)						

Dunnett's Test - Table 2 of 2					No Transformation	
Ho: Control < Treatment						
Group	Identification	Num of Reps	Min Sig Diff (In Orig. Units)	% of Control	Difference From Control	
1	Control	5				
2	32 %	5	0.0757	20.9	0.0586	
3	42 %	5	0.0757	20.9	0.005	
4	56 %	5	0.0757	20.9	0.1074	
5	75 %	5	0.0757	20.9	0.0494	
6	100 %	5	0.0757	20.9	0.0466	

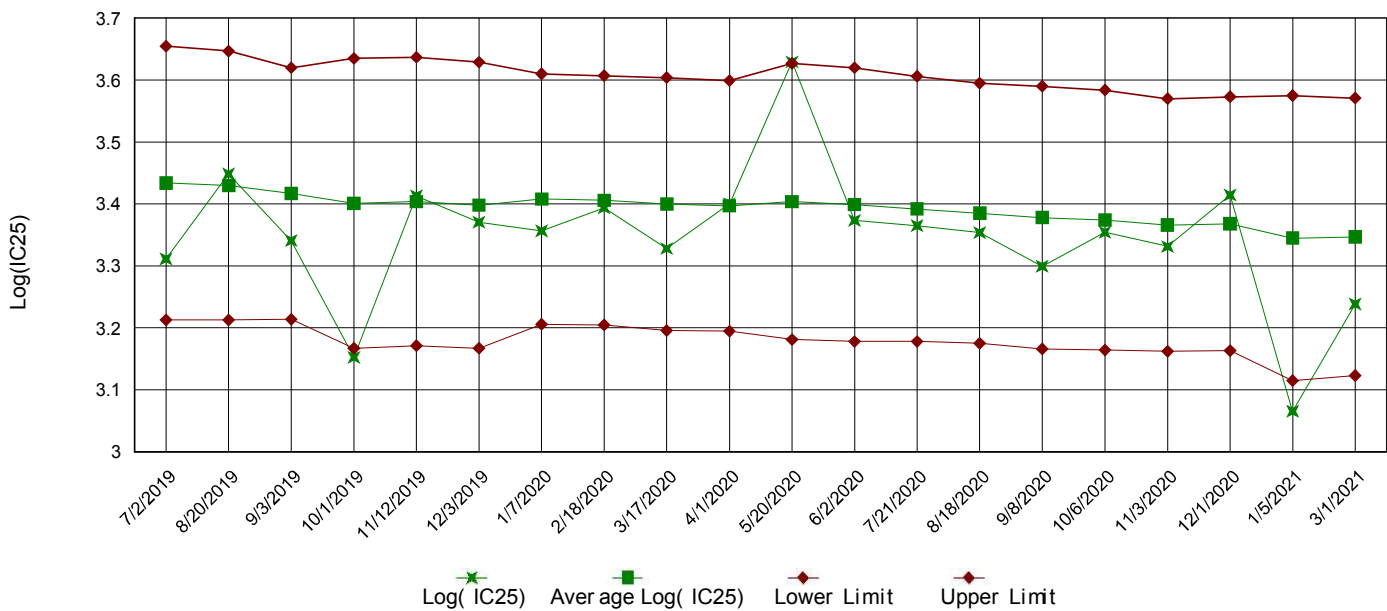
Appendix A3: Test 1000.0

Chronic Reference Toxicant, *Pimephales promelas* (Fathead Minnow)

LC50 Survival Data



IC25 Growth Data



Appendix B Test 1000.0
SUMMARY REPORTING FORMS
CHRONIC BIOMONITORING
Pimephales promelas (Fathead Minnow)
SURVIVAL AND GROWTH

Permittee: Berton Utilities

NPDES No.: AR0036498 AFIN# 63-00063

Date and Time Test Initiated: March 16, 2021 at 1226

Date and Time Test Terminated: March 23, 2021 at 1030

Dilution water used: Soft

DATA TABLE FOR SURVIVAL

Effluent Conc %	Percent Survival in replicate chambers					Mean percent survival			CV%
	A	B	C	D	E	24 hr	48 hr	7 days	
Control	75.0	100	100	100	100	100	100	95.0	11.8
32 %	100	75.0	75.0	87.5	62.5	100	100	80.0	17.8
42 %	87.5	100	87.5	75.0	75.0	100	100	85.0	12.3
56 %	75.0	87.5	87.5	100	100	100	100	90.0	11.6
75 %	87.5	87.5	87.5	100	87.5	100	100	90.0	6.21
100 %	100	75.0	87.5	100	50.0	100	100	82.5	25.4

DATA TABLE FOR GROWTH

Effluent Conc %	Average dry weight, mg replicate chambers					Meandry weight, mg	CV%
	A	B	C	D	E		
Control	0.298	0.381	0.372	0.381	0.379	0.362	9.96
32 %	0.382	0.251	0.328	0.315	0.242	0.304	19.1
42 %	0.350	0.391	0.376	0.334	0.335	0.357	7.11
56 %	0.349	0.244	0.345	0.174	0.162	0.255	35.2
75 %	0.335	0.295	0.322	0.338	0.274	0.313	8.81
100 %	0.316	0.365	0.306	0.326	0.265	0.316	11.4

CV = Coefficient of variation = standard deviation* 100 / mean

Appendix B Test 1000.0
SUMMARY REPORTING FORMS
CHRONIC BIOMONITORING
Pimephales promelas (Fathead Minnow)
SURVIVAL AND GROWTH

1. Dunnett's Test:

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

a.) LOW FLOW OR CRITICAL DILUTION	<u> </u> YES	<u> X </u> NO
b.) 1/2 LOW FLOW DILUTION	<u> </u> YES	<u> </u> NO

2. Dunnett's Test:

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

a.) LOW FLOW OR CRITICAL DILUTION	<u> </u> YES	<u> X </u> NO
b.) 1/2 LOW FLOW DILUTION	<u> </u> YES	<u> </u> NO

3. If you answered NO to 1.a) enter [0] otherwise enter [1]: 0 (LP6C)
4. If you answered NO to 2.a) enter [0] otherwise enter [1]: 0 (GP6C)
5. NOEC Pimephales Lethality: 100 % (DP6C)
6. LOEC Pimephales Lethality: 100 % (KP6C)
7. NOEC Pimephales Sublethality: 100 % (TPP6C)
8. LOEC Pimephales Sublethality: 100 % (TPP6C)
9. Coefficient of variation for Pimephales growth: 11.4 (TQP6C)
10. Sublethality for this test: 100 % (51714 or 51714S)

Appendix B Test 1000.0
CHRONIC TOXICITY SUMMARY FORM
Pimephales promelas (Fathead minnow)
CHEMICAL PARAMETERS CHART

PERMITTEE: Benton Utilities
NPDES NO.: AR0036498 AFIN# 63- 00063
CONTACT: Mr. Greg Becker
ANALYST 280, 310, 343, 356

Test Initiated: DATE: March 16, 2021 TIME: 1226
Test Terminated: DATE: March 23, 2021 TIME: 1030

DILUTON	DAY						
	1	2	3	4	5	6	7
Control							
D.O. Initial	7.0	7.3	6.8	7.7	7.8	7.8	7.5
Final	6.6	6.3	7.0	7.0	6.7	6.3	7.2
pH Initial	7.8	7.8	7.8	7.8	7.8	7.7	7.7
Final	7.6	7.6	7.6	7.7	7.5	7.5	7.8

DILUTON	DAY						
	1	2	3	4	5	6	7
32 %							
D.O. Initial	7.3	7.3	7.4	7.6	7.7	7.9	7.3
Final	6.5	6.7	6.9	9.0	6.9	6.2	7.2
pH Initial	7.4	7.5	7.5	7.5	7.5	7.5	7.5
Final	7.5	7.6	7.6	7.6	7.5	7.4	7.6

DILUTON	DAY						
	1	2	3	4	5	6	7
42 %							
D.O. Initial	7.4	7.1	7.7	7.6	7.9	7.9	7.4
Final	6.5	6.8	7.3	7.3	7.3	6.3	7.3
pH Initial	7.4	7.5	7.4	7.5	7.4	7.4	7.5
Final	7.6	7.6	7.6	7.6	7.4	7.5	7.7

DILUTON	DAY						
	1	2	3	4	5	6	7
56 %							
D.O. Initial	7.2	7.3	7.0	7.6	8.1	8.0	7.3
Final	6.5	6.7	6.7	7.1	6.7	6.4	7.0
pH Initial	7.3	7.4	7.3	7.4	7.4	7.4	7.4
Final	7.5	7.6	7.6	7.6	7.4	7.5	7.6

DILUTON	DAY						
	1	2	3	4	5	6	7
75 %							
D.O. Initial	7.6	7.5	7.0	7.8	8.1	7.9	7.4
Final	6.6	6.2	7.0	7.1	7.0	6.5	7.1
pH Initial	7.2	7.4	7.2	7.3	7.2	7.3	7.3
Final	7.5	7.6	7.6	7.6	7.4	7.5	7.6

DILUTON	DAY						
	1	2	3	4	5	6	7
100 %							
D.O. Initial	7.6	7.2	7.5	7.8	7.8	8.0	7.6
Final	6.6	6.8	6.9	7.0	6.9	6.3	7.4
pH Initial	7.2	7.2	7.2	7.1	7.6	7.2	7.2
Final	7.6	7.6	7.6	7.6	7.5	7.5	7.5

Alkalinity	Hardness	Conductivity	Chlorine	Sample ID
35	51	260	<0.05	Outfall 001 16- MAR- 21
32	54	250	<0.05	Outfall 001 17- MAR- 21
32	49	240	<0.05	Outfall 001 19- MAR- 21

Alkalinity	Hardness	Conductivity	Chlorine	Sample ID
32	43	170	<0.05	253379- 1



8600 Kanis Road
 Little Rock, AR 72204-2322
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 FAX (501) 224-5072

CHAIN OF CUSTODY / ANALYSIS REQUEST FORM

PAGE 1 OF 3

Client: Benton Utilities
 Project Reference: AR0036498
 Project Manager: GREG BECKER
 Sampled By: AK

PO No. 103915
 SAMPLE MATRIX: WATER
 ANALYSES REQUESTED: Biomonitors

AIC CONTROL NO: 253688
 AIC PROPOSAL NO: _____

Carrier: _____
 Received on Ice (4°C)? YES 0.1 NO

Remarks: _____

Field pH calibration on _____ @ _____
 Buffer: _____

NO OF BOTTLES: 3
 NO OF VOA vials: 3
 NO OF Nitric acid pH2: 3

Container Type: _____
 Preservative: _____

G = Glass P = Plastic
 NO = none S = Sulfuric acid pH2 N = Nitric acid pH2
 V = VOA vials H = HCl to pH2 B = NaOH to pH12

T turnaround Time Requested: (Please circle)
 NORMAL or EXPEDITED IN _____ DAYS

Expedited results requested by: _____

Who should AIC contact with questions: GREG BECKER
 Phone: 501.776.5982 Fax: _____

Report Attention to: _____
 Report Address to: _____

Received Date/Time: 3/16/21 10:15
 By: CB

Relinquished Date/Time: 3/16/21 11:00
 By: AK

Received in Lab Date/Time: 3-16-21 11:00
 By: [Signature]

Comments: _____

Comments: G BECKER @ BENTON UTILITIES.COM
A.F. REEMAN @ BENTON UTILITIES.COM
T. JOHNSON @ BENTON UTILITIES.COM



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CHAIN OF CUSTODY / ANALYSIS REQUEST FORM

PAGE 2 OF 3

Client: <u>Benton Utilities</u>		PO No. <u>103915</u>		NO OF BOTTLES		ANALYSES REQUESTED					
Project Reference: <u>AR0036498</u>		SAMPLE MATRIX		WATER		Biological					
Project Manager: <u>GREG BECKER</u>		G R A B		C O M P		3					
Sampled By: <u>AF</u>		Date/Time Collected: <u>3/17/21</u>		Date/Time Collected: <u>0945</u>		✓					
AIC No. <u>2</u>		Sample Identification: <u>OUTFALL 001</u>		Container Type: <u>P</u>		P P					
				Preservative: <u>NO</u>		NO NO					
				Carrier: <u>NO</u>		NO NO					
				Received on/ice (4°C)? <u>YES</u>		NO					
				Remarks: <u>REST FT</u>							
				Field pH calibration: <u>on</u>							
				Buffer: <u>@</u>							
				T = Sodium Thiosulfate							
				Z = Zinc acetate							
Turnaround Time Requested: (Please circle) NORMAL or EXPEDITED IN ___ DAYS		Relinquished By: <u>AC</u>		Date/Time: <u>3/17/21 10:40</u>		Received By: <u>GB</u>		Date/Time: <u>3/17/21 1040</u>			
Expedited results requested by: _____		Relinquished By: <u>GB</u>		Date/Time: <u>3/17/21 1110</u>		Received in Lab By: <u>[Signature]</u>		Date/Time: <u>3-17-21 1110</u>			
Who should AIC contact with questions: <u>GREG BECKER</u>		Comments: _____									
Phone: <u>501.776.5982</u>		Report Address to: <u>G BECKER @ BENTON UTILITIES.COM</u>									
Fax: _____		Report Attention to: <u>A FREEMAN @ BENTON UTILITIES.COM</u>									
Report Attention to: _____		T JOHNSON @ BENTON UTILITIES.COM									



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CHAIN OF CUSTODY / ANALYSIS REQUEST FORM

PAGE 3 OF 3

Client: Benton Utilities		PO No. 1103915		NO OF BOTTLES		ANALYSES REQUESTED	
Project Reference: AR0036498		SAMPLE MATRIX		WATER			
Project Manager: GREG BECKER		WATER		ASOIL			
Sampled By: AF		GRA B		COMP			
AIC No. 3		OUTFALL 001		3			
Date/Time Collected: 3/19/21		9:00					
Remarks:		+ 1500 mg/l					
Carrier:							
Received on Ice (4°C)?		YES		NO			
Field pH calibration		on		@			
Buffer:							
T = Sodium Thiosulfate							
Z = Zinc acetate							
H = HCl to pH2							
B = NaOH to pH12							
V = VOA vials							
N = Nitric acid pH2							
Reinquished		Date/Time		Received		Date/Time	
By: AF		3/19/21 0935		By: GB		3/19/21 0935	
Reinquished		Date/Time		Received in Lab		Date/Time	
By: GB 10		3/19/21 1018		By: [Signature]		3-19-21 1018	
Comments:							
Turnaround Time Requested: (Please circle) NORMAL or EXPEDITED IN _____ DAYS							
Expedited results requested by:							
Who should AIC contact with questions: GREG BECKER							
Phone: 501-776-5982							
Fax:							
Report Attention to:							
Report Address to:							
G BECKER @ BENTON UTILITIES .COM							
A F REEMAN @ BENTON UTILITIES .COM							
T JOHNSON @ BENTON UTILITIES .COM							



April 22, 2021

Biomonitoring Testing
for
Outfall 001
Benton, AR

Control No. 254296-1

Prepared for:

Mr. Greg Becker
Benton Utilities
616 West Hazel
Benton, AR 72015

Prepared by:

AMERICAN INTERPLEX CORPORATION
8600 Kanis Road
Little Rock, AR 72204-2322

Benton Utilities
ATTN: Mr. Greg Becker
616 West Hazel
Benton, AR 72015

Re: Chronic 7-Day Renewal *Pimephales promelas* (Fathead minnow)
Outfall 001 - Benton, AR
NPDES Permit No. AR0036498 AFIN# 63-00063

Dear Mr. Greg Becker:


This report is the analytical results and supporting information for the samples submitted to American Interplex Corporation (AIC). The following results are applicable only to the sample identified by the control number referenced above. Accurate assessment of the data requires access to the entire document. Each section of the report has been reviewed and approved by the Chief Operating Officer or qualified designee.

Testing procedures and Quality Assurance were in accordance with "Short Term Methods for Estimating the Chronic Toxicity of Effluents and Receiving Waters to Freshwater Organisms" EPA-821-R-02-013, Fourth Edition, October 2002. Test results are summarized below:

The statistically significant difference that occurred at the 42% effluent concentration for Fathead minnow growth does not follow a dose response pattern and is considered an anomaly.

Method 1000.0 Chronic *Pimephales promelas* (Fathead minnow) Survival and Growth Test: The No Observable Effects Concentration (NOEC) for survival occurred at 100 % effluent, which is equal to the critical dilution of 100 %. The NOEC for growth occurred at 100 % effluent, which is equal to the critical dilution of 100 %. **The sample, therefore, PASSED both lethal and sub-lethal effects for the Fathead minnow test.**

AMERICAN INTERPLEX CORPORATION



John Overbey
Chief Operating Officer

PDF cc: Benton Utilities
ATTN: Mr. Greg Becker
gbecker@bentonutilities.com

Benton Utilities
ATTN: Ms. Angela Freeman
angelaf@bentonutilities.com

Benton Utilities
ATTN: Mr. Tom Johnson
tjohnson@bentonutilities.com

Table of Contents

- I. Control Acceptance Criteria
- II. Outlined Report
- III. Data Analysis
- IV. Standard Reference Toxicants
- V. Organism History
- VI. Results Summary
 - Pimephales promelas* (Fathead minnow)
- Appendix A: Raw Data
 - A1: Test 1000.0
 - Pimephales promelas* (Fathead minnow) Survival and Growth
 - A2: Statistics
 - A3: Reference Toxicant
- Appendix B: Summary Forms

I. Control Acceptance Criteria

Pimephales promelas (Fathead minnow) Method 1000.0

CRITERIA	RESULTS	PASS/FAIL
Control Survival > or = 80%	97.5	PASS
Control Growth > or = 0.25 mg per Surviving minnow	0.464	PASS
Control Growth CV < or = 40%	7.47	PASS
Growth Minimum Significant Difference 12 to 30%	8.98	BELOW
Critical Dilution CV < or = 40%	3.25	PASS

II. Outlined Report

A. Introduction

1. Permit Number: AR0036498 AFIN# 63-00063
2. Test Requirements: Chronic Biomonitoring, Quarterly Test Method 1000.0

B. Source of Effluent/Dilution Water:

1. Effluent Samples:

- a. Sampling Point: Outfall 001
- b. Chemical Data:

Analysis	Sample 1	Sample 2	Sample 3
Dissolved oxygen (mg/l)	7.5	8.0	8.4
pH (standard units)	7.6	7.5	7.4
Alkalinity (mg/l as CaCO ₃)	40	47	52
Hardness (mg/l as CaCO ₃)	59	56	56
Conductivity (umhos/cm)	250	240	250
Residual Chlorine (mg/l)	<0.05	<0.05	<0.05
Ammonia as N (mg/l)	0.28	<0.1	0.12

2. Dilution Water Samples:

Soft

Analysis	254065-1
Dissolved oxygen (mg/l)	7.5
pH (standard units)	7.7
Alkalinity (mg/l as CaCO ₃)	32
Hardness (mg/l as CaCO ₃)	46
Conductivity (umhos/cm)	170
Residual Chlorine (mg/l)	<0.05

C. Test Methods

1. Test methods used:

Short Term Methods for Estimating the Chronic Toxicity of Effluents and Receiving Waters to Freshwater Organisms, EPA-821-R-02-013; test Method 1000.0, Fathead Minnow Survival and Growth.

2. Endpoint: No Observable Effects Concentration (NOEC)

3. Test Conditions:

Pimephales promelas (Fathead minnow) Survival and Growth Method 1000.0

Date & Time Test Initiated: April 6, 2021 at 1242
Date & Time Test Terminated: April 13, 2021 at 1422
Type & Volume of Test Chamber: 500 ml disposable beaker
Volume of Sample: 250 ml
Number of Organisms per replicate: 8
Number of Replicates per dilution: 5

4. Source of test organisms: Obtained from in-house cultures

5. Test Temperature: 25 +/- 1 degree Celsius

D. Test Organisms

1. Scientific Name

a. Test 1000.0 *Pimephales promelas*

III. Data Analysis

The data was analyzed using American Interplex Corporation's Laboratory Information Management Software based on Toxstat and following EPA method criteria.

Pimephales promelas (Fathead minnow) survival data was transformed using the Arc Sine transformation. Normality and homogeneity of variance were checked using Shapiro-Wilk's. The survival data was then analyzed using Steel's Many-One Rank Test to determine the No Observable Effects Concentration (NOEC).

Fathead minnow growth data was analyzed for normality and homogeneity of variance using Shapiro-Wilk's and Bartlett's test. Dunnett's Test was used to determine the No Observable Effects Concentration (NOEC) for growth.

IV. Standard Reference Toxicants

The sensitivity of the offspring is determined by performing a standard reference toxicant test monthly. Sodium chloride in synthetic moderately hard water is used as prescribed in EPA-821-R-02-013.

Pimephales promelas (Fathead minnow)

A chronic reference test was performed on March 01, 2021 at 1415 to March 08, 2021 at 1410

The results were as follows: (Control No. 253029-1.)

Survival LC-50: 2762 mg/l

Growth IC-25: 1732 mg/l

Growth PMSD: 11.1

V. Organism History

Pimephales promelas (Fathead minnow)

Date: April 6, 2021

Age: <24 hours

Source: In-house culture

Water: Moderately hard synthetic
Temperature: 25 deg.C

VII. Results Summary *Pimephales promelas*, Fathead minnow Larval Survival and Growth Test -- Method 1000.0

Larvae are exposed in a static renewal system for seven days to different concentrations of effluent with dilution water. Test results are based on the survival and growth (weight) of the larvae.

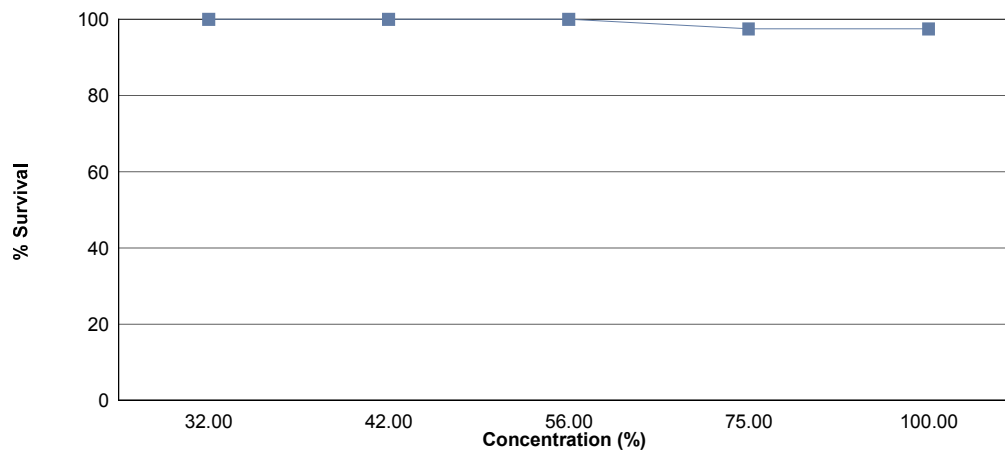
Effluent dilutions for this test were 32 %, 42 %, 56 %, 75 %, 100 % in accordance with the NPDES permit.

The low flow or 'critical' dilution is specified in the NPDES permit as 100 % effluent.

The test was initiated on April 6, 2021 at 1242 and continued through April 13, 2021 at 1422. Statistical analyses were performed on the observed data and the no observable effects concentrations (NOECs) were as follows:

- a.) NOEC survival = 100 % effluent
- b.) NOEC growth = 100 % effluent

(NOEC for sublethal effects was determined by Lower PMSD Bound Test.)



Summary of the 7-day Fathead Minnow Survival and Growth		
Concentration	Percent Survival	Mean Growth (mg)
Control	97.5	0.452
32 %	100	0.423
42 %	100	0.378 *
56 %	100	0.413
75 %	97.5	0.426
100 %	97.5	0.433

*Significant difference when compared to the control (p=0.05)

The significant toxicity is not due to true dose response effects, and should be considered an anomaly.

Appendix A1: Test 1000.0

Pimephales promelas (Fathead Minnow) 7-Day Survival

Date and Time Test Initiated: April 6, 2021 at 1242

Date and Time Test Terminated: April 13, 2021 at 1422

Concentration	Replicate	Number of Survivors						
		Day 1	Day 2	Day 3	Day 4	Day 5	Day 6	Day 7
Control	A	8	8	8	8	8	8	8
	B	8	8	8	8	8	8	8
	C	8	8	7	7	7	7	7
	D	8	8	8	8	8	8	8
	E	8	8	8	8	8	8	8
32 %	A	8	8	8	8	8	8	8
	B	8	8	8	8	8	8	8
	C	8	8	8	8	8	8	8
	D	8	8	8	8	8	8	8
	E	8	8	8	8	8	8	8
42 %	A	8	8	8	8	8	8	8
	B	8	8	8	8	8	8	8
	C	8	8	8	8	8	8	8
	D	8	8	8	8	8	8	8
	E	8	8	8	8	8	8	8
56 %	A	8	8	8	8	8	8	8
	B	8	8	8	8	8	8	8
	C	8	8	8	8	8	8	8
	D	8	8	8	8	8	8	8
	E	8	8	8	8	8	8	8
75 %	A	8	8	8	8	8	8	8
	B	8	8	8	8	8	8	8
	C	8	8	8	8	8	8	8
	D	8	8	8	8	8	7	7
	E	8	8	8	8	8	8	8
100 %	A	8	8	8	8	8	8	8
	B	8	8	8	8	8	8	8
	C	8	8	8	8	8	8	8
	D	8	8	8	7	7	7	7
	E	8	8	8	8	8	8	8

Appendix A1: Test 1000.0

Pimephales promelas (Fathead Minnow) 7-Day Growth

Test Initiated: April 6, 2021 at 1242
Test Terminated: April 13, 2021 at 1422

Concentration	Replicate	Weight of pan	Weight of pan + fish	Total weight of fish (g)	Original # of fish	Mean dry weight (mg)
Control	A	.65567	.65937	0.00370	8	0.462
	B	.65037	.65423	0.00386	8	0.482
	C	.65203	.65590	0.00387	8	0.484
	D	.66119	.66458	0.00339	8	0.424
	E	.65247	.65575	0.00328	8	0.410
32 %	A	.65567	.65902	0.00335	8	0.419
	B	.66247	.66580	0.00333	8	0.416
	C	.65489	.65850	0.00361	8	0.451
	D	.65997	.66325	0.00328	8	0.410
	E	.66342	.66678	0.00336	8	0.420
42 %	A	.65684	.66026	0.00342	8	0.428
	B	.64677	.64962	0.00285	8	0.356
	C	.64501	.64797	0.00296	8	0.370
	D	.65521	.65830	0.00309	8	0.386
	E	.64964	.65242	0.00278	8	0.348
56 %	A	.64826	.65140	0.00314	8	0.392
	B	.64832	.65143	0.00311	8	0.389
	C	.64236	.64581	0.00345	8	0.431
	D	.64819	.65147	0.00328	8	0.410
	E	.76629	.76982	0.00353	8	0.441
75 %	A	.76553	.76893	0.00340	8	0.425
	B	.76568	.76921	0.00353	8	0.441
	C	.77436	.77761	0.00325	8	0.406
	D	.76563	.76867	0.00304	8	0.380
	E	.77107	.77488	0.00381	8	0.476
100 %	A	.77593	.77922	0.00329	8	0.411
	B	.77327	.77685	0.00358	8	0.448
	C	.77198	.77550	0.00352	8	0.440
	D	.77776	.78120	0.00344	8	0.430
	E	.76366	.76716	0.00350	8	0.438

Appendix A2: Statistics

Pimephales promelas (Fathead minnow) Survival

Transformation of Data			Transform: Arc Sin(Square Root(Y))	
Group	Identification	Rep	Value	Transformed
1	Control	1	1.00000	1.39310
1	Control	2	1.00000	1.39310
1	Control	3	0.87500	1.20940
1	Control	4	1.00000	1.39310
1	Control	5	1.00000	1.39310
2	32 %	1	1.00000	1.39310
2	32 %	2	1.00000	1.39310
2	32 %	3	1.00000	1.39310
2	32 %	4	1.00000	1.39310
2	32 %	5	1.00000	1.39310
3	42 %	1	1.00000	1.39310
3	42 %	2	1.00000	1.39310
3	42 %	3	1.00000	1.39310
3	42 %	4	1.00000	1.39310
3	42 %	5	1.00000	1.39310
4	56 %	1	1.00000	1.39310
4	56 %	2	1.00000	1.39310
4	56 %	3	1.00000	1.39310
4	56 %	4	1.00000	1.39310
4	56 %	5	1.00000	1.39310
5	75 %	1	1.00000	1.39310
5	75 %	2	1.00000	1.39310
5	75 %	3	1.00000	1.39310
5	75 %	4	0.87500	1.20940
5	75 %	5	1.00000	1.39310
6	100 %	1	1.00000	1.39310
6	100 %	2	1.00000	1.39310
6	100 %	3	1.00000	1.39310
6	100 %	4	0.87500	1.20940
6	100 %	5	1.00000	1.39310

Appendix A2: Statistics

Pimephales promelas (Fathead minnow) Survival

Shapiro - Wilk's Test for Normality		Transform: Arc Sin(Square Root(Y))
<p>D = 0.08099 W = 0.5968 Critical W = 0.9 (alpha = 0.01, N = 30) Critical W = 0.927 (alpha = 0.05, N = 30)</p> <p>Data FAIL normality test (alpha = 0.01).</p>		

Steel's Many-One Rank Test				Transform: Arc Sin(Square Root(Y))	
Ho:Control<Treatment					
Group	Identification	Rank Sum	Critical Value	DF	Sig 0.05
1	Control				
2	32 %	30.00	16.00	5.00	
3	42 %	30.00	16.00	5.00	
4	56 %	30.00	16.00	5.00	
5	75 %	27.50	16.00	5.00	
6	100 %	27.50	16.00	5.00	
Critical values are 1 tailed (k=5)					

Appendix A2: Statistics

Pimephales promelas (Fathead minnow) Growth

Shapiro - Wilk's Test for Normality	No Transformation
<p>D = 0.01777 W = 0.9738 Critical W = 0.9 (alpha = 0.01, N = 30) Critical W = 0.927 (alpha = 0.05, N = 30)</p> <p>Data PASS normality test (alpha = 0.01).</p>	

Bartlett's Test for Homogeneity of Variance	No Transformation
<p>Calculated B1 statistic = 5.107 Critical B = 15.086 (alpha = 0.01, df = 5)</p> <p>Data PASS B1 homogeneity test at 0.01 level.</p>	

Appendix A2: Statistics

Pimephales promelas (Fathead minnow) Growth

ANOVA Table				No Transformation	
SOURCE	DF	SS	MS	F	
Between	5	0.0156	0.00312	4.214	
Within (Error)	24	0.01777	0.0007404		
Total	29	0.03337			
Critical F = 3.9 (alpha = 0.01, df = 5,24)					
2.62 (alpha = 0.05, df = 5,24)					
Since F > Critical F REJECT Ho: All equal (alpha = 0.05)					

Dunnett's Test - Table 1 of 2					No Transformation	
Ho:Control<Treatment						
Group	Identification	Transformed Mean	Mean In Original Units	T Stat	Sig 0.05	
1	Control	0.4524	0.4524			
2	32 %	0.4232	0.4232	1.697		
3	42 %	0.3776	0.3776	4.346	*	
4	56 %	0.4126	0.4126	2.313		
5	75 %	0.4256	0.4256	1.557		
6	100 %	0.4334	0.4334	1.104		
Dunnett's critical value = 2.36 (1 Tailed, alpha = 0.05, df = 5,24)						

Dunnett's Test - Table 2 of 2						No Transformation	
Ho:Control<Treatment							
Group	Identification	Num of Reps	Min Sig Diff (In Orig. Units)	% of Control	Difference From Control		
1	Control	5					
2	32 %	5	0.04061	8.98	0.0292		
3	42 %	5	0.04061	8.98	0.0748		
4	56 %	5	0.04061	8.98	0.0398		
5	75 %	5	0.04061	8.98	0.0268		
6	100 %	5	0.04061	8.98	0.019		

Lower PMSD Bound Test for Pimephales promelas

Concentration	Growth	Relative Difference from Control	Pass/Fail
Control	0.452	-	
32 %	0.423	6.42	PASS
42 %	0.378	16.4	FAIL
56 %	0.413	8.63	PASS
75 %	0.426	5.75	PASS
100 %	0.433	4.20	PASS

Limit = 12

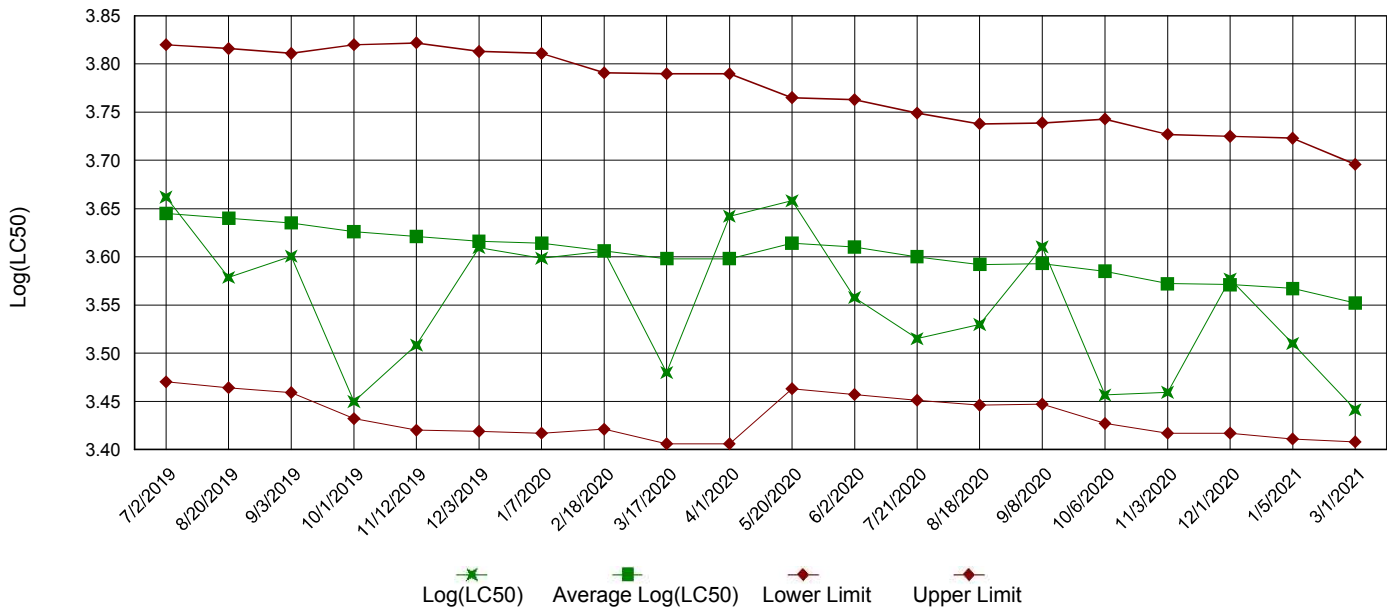
NOEC = 32 %

LOEC = 42 %

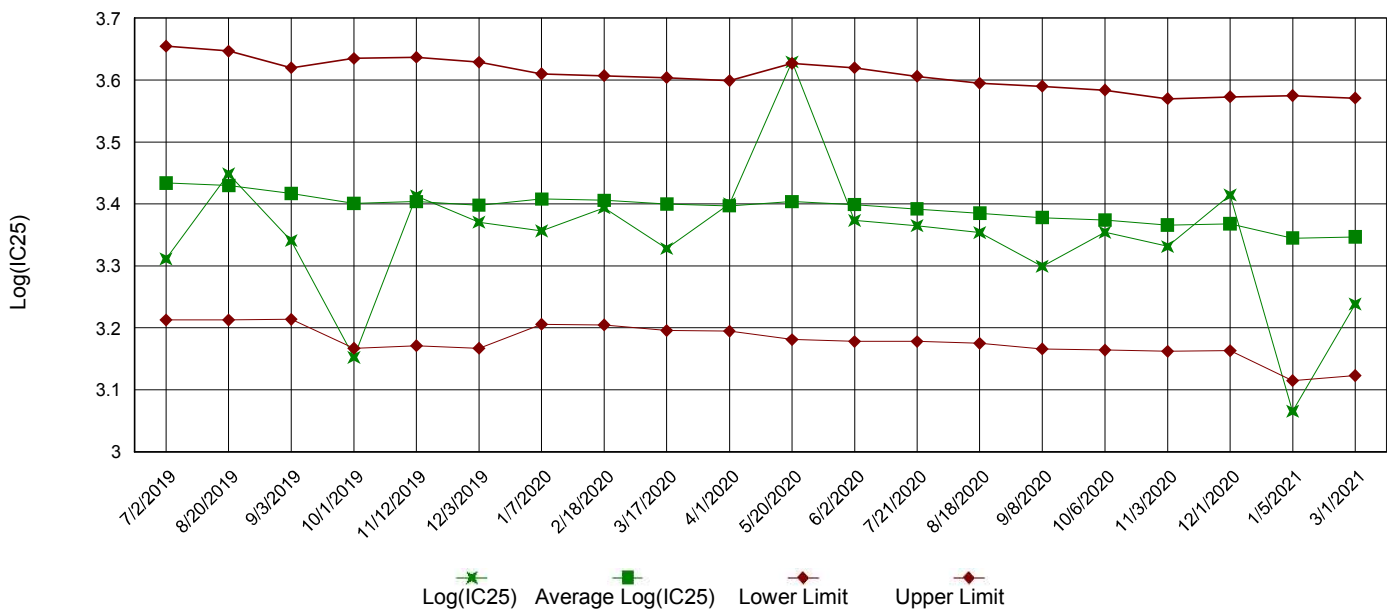
Appendix A3: Test 1000.0

Chronic Reference Toxicant, *Pimephales promelas* (Fathead Minnow)

LC50 Survival Data



IC25 Growth Data



Appendix B: Test 1000.0
SUMMARY REPORTING FORMS
CHRONIC BIOMONITORING
Pimephales promelas (Fathead Minnow)
SURVIVAL AND GROWTH

Permittee: Benton Utilities

NPDES No.: AR0036498 AFIN# 63-00063

Date and Time Test Initiated: April 6, 2021 at 1242
Date and Time Test Terminated: April 13, 2021 at 1422
Dilution water used: Soft

DATA TABLE FOR SURVIVAL

Effluent Conc. %	Percent Survival in replicate chambers					Mean percent survival			CV%
	A	B	C	D	E	24 hr	48 hr	7 days	
Control	100	100	87.5	100	100	100	100	97.5	5.73
32 %	100	100	100	100	100	100	100	100	0.00
42 %	100	100	100	100	100	100	100	100	0.00
56 %	100	100	100	100	100	100	100	100	0.00
75 %	100	100	100	87.5	100	100	100	97.5	5.73
100 %	100	100	100	87.5	100	100	100	97.5	5.73

DATA TABLE FOR GROWTH

Effluent Conc. %	Average dry weight, mg replicate chambers					Mean dry weight, mg	CV%
	A	B	C	D	E		
Control	0.462	0.482	0.484	0.424	0.410	0.452	7.47
32 %	0.419	0.416	0.451	0.410	0.420	0.423	3.79
42 %	0.428	0.356	0.370	0.386	0.348	0.378	8.39
56 %	0.392	0.389	0.431	0.410	0.441	0.413	5.60
75 %	0.425	0.441	0.406	0.380	0.476	0.426	8.51
100 %	0.411	0.448	0.440	0.430	0.438	0.433	3.25

CV = Coefficient of variation = standard deviation * 100 / mean

Appendix B: Test 1000.0
SUMMARY REPORTING FORMS
CHRONIC BIOMONITORING
Pimephales promelas (Fathead Minnow)
SURVIVAL AND GROWTH

1. Steel's Many-One Rank Test:

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

a.) LOW FLOW OR CRITICAL DILUTION	<u> </u> YES	<u> X </u> NO
b.) 1/2 LOW FLOW DILUTION	<u> </u> YES	<u> </u> NO

2. Dunnett's Test:

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

a.) LOW FLOW OR CRITICAL DILUTION	<u> </u> YES	<u> X </u> NO
b.) 1/2 LOW FLOW DILUTION	<u> </u> YES	<u> </u> NO

3. If you answered NO to 1.a) enter [0] otherwise enter [1]: 0 (TLP6C)
4. If you answered NO to 2.a) enter [0] otherwise enter [1]: 0 (TGP6C)
5. NOEC *Pimephales* Lethality: 100 % (TOP6C)
6. LOEC *Pimephales* Lethality: 100 % (TXP6C)
7. NOEC *Pimephales* Sublethality: 100 % (TPP6C)
8. LOEC *Pimephales* Sublethality: 100 % (TYP6C)
9. Coefficient of variation for *Pimephales* growth: 7.47 (TQP6C)
10. Sublethality for this test: 100 % (51714 or 51714S)

Appendix B: Test 1000.0
 CHRONIC TOXICITY SUMMARY FORM
Pimephales promelas (Fathead minnow)
 CHEMICAL PARAMETERS CHART

 PERMITTEE: Benton Utilities
 NPDES NO.: AR0036498 AFIN# 63-00063
 CONTACT: Mr. Greg Becker
 ANALYST: 280, 343, 356, 357

 Test Initiated: DATE: April 6, 2021 TIME: 1242
 Test Terminated: DATE: April 13, 2021 TIME: 1422

DILUTION	DAY						
	1	2	3	4	5	6	7
Control							
D.O. Initial	7.5	7.3	7.4	7.6	7.8	7.8	7.3
Final	5.9	5.2	6.0	7.5	6.6	6.7	6.9
pH Initial	7.7	7.6	7.6	7.6	7.7	7.7	7.6
Final	7.3	7.1	7.3	7.6	7.3	7.4	7.6

DILUTION	DAY						
	1	2	3	4	5	6	7
32 %							
D.O. Initial	7.7	7.4	7.8	7.6	7.8	7.7	7.3
Final	6.0	5.3	6.2	6.9	6.5	6.3	6.7
pH Initial	7.5	7.6	7.5	7.6	7.6	7.6	7.6
Final	7.4	7.2	7.4	7.6	7.5	7.4	7.6

DILUTION	DAY						
	1	2	3	4	5	6	7
42 %							
D.O. Initial	7.8	7.4	7.4	7.5	7.6	7.8	7.4
Final	6.1	5.7	6.1	7.2	6.7	6.3	6.4
pH Initial	7.5	7.6	7.5	7.5	7.6	7.6	7.6
Final	7.4	7.2	7.4	7.6	7.5	7.4	7.5

DILUTION	DAY						
	1	2	3	4	5	6	7
56 %							
D.O. Initial	7.6	6.9	7.9	7.4	7.7	7.6	7.3
Final	6.4	6.0	6.6	7.2	6.8	6.2	6.6
pH Initial	7.4	7.5	7.5	7.5	7.5	7.5	7.6
Final	7.4	7.3	7.5	7.6	7.5	7.4	7.6

DILUTION	DAY						
	1	2	3	4	5	6	7
75 %							
D.O. Initial	7.8	7.0	7.7	7.6	8.0	7.6	7.3
Final	6.4	6.1	6.3	7.2	7.0	6.7	6.4
pH Initial	7.4	7.4	7.4	7.4	7.4	7.5	7.5
Final	7.5	7.4	7.5	7.7	7.6	7.6	7.6

DILUTION	DAY						
	1	2	3	4	5	6	7
100 %							
D.O. Initial	7.5	7.3	8.0	7.8	8.4	7.8	7.4
Final	6.1	5.8	6.2	7.2	6.8	6.3	6.7
pH Initial	7.6	7.2	7.5	7.3	7.4	7.4	7.4
Final	7.4	7.3	7.5	7.8	7.6	7.6	7.7

Alkalinity	Hardness	Conductivity	Chlorine	Sample ID
40	59	250	<0.05	Outfall 001 06-APR-21
47	56	240	<0.05	Outfall 001 07-APR-21
52	56	250	<0.05	Outfall 001 09-APR-21

Alkalinity	Hardness	Conductivity	Chlorine	Sample ID
32	46	170	<0.05	254065-1



CHAIN OF CUSTODY / ANALYSIS REQUEST FORM

Client: <u>Benton Utilities</u>		PO No. <u>103915</u>		NO OF BOTTLES		ANALYSES REQUESTED	
Project Reference: <u>AR0036498</u>		MATRIX		WATER		CHRONIC FH Risk monitoring ReleasT (and)	
Project Manager: <u>GREG BECKER</u>		G R A B		C O M P			
Sampled By: <u>AF</u>		Date/Time Collected: <u>4/6/21 0850</u>		NO OF BOTTLES: <u>3</u>			
AIC No. <u>1</u>		Sample Identification: <u>CUTFAI 001</u>		NO OF BOTTLES: <u>3</u>			
AIC CONTROL NO: <u>254276</u>		Date/Time Collected: <u>4/6/21 0850</u>		NO OF BOTTLES: <u>3</u>			
AIC PROPOSAL NO:		Date/Time Collected:		NO OF BOTTLES:			
Carrier: <u>GB</u>		Date/Time Collected:		NO OF BOTTLES:			
Received Temperature C: <u>0.1</u>		Date/Time Collected:		NO OF BOTTLES:			
Remarks:		Date/Time Collected:		NO OF BOTTLES:			
Field pH calibration on @		Date/Time Collected:		NO OF BOTTLES:			
Buffer:		Date/Time Collected:		NO OF BOTTLES:			
T = Sodium Thiosulfate		Date/Time Collected:		NO OF BOTTLES:			
Z = Zinc acetate		Date/Time Collected:		NO OF BOTTLES:			
A = (NH ₄) ₂ SO ₄ , NH ₄ OH		Date/Time Collected:		NO OF BOTTLES:			
H = HCl to pH2		Date/Time Collected:		NO OF BOTTLES:			
B = NaOH to pH12		Date/Time Collected:		NO OF BOTTLES:			
V = VOA vials		Date/Time Collected:		NO OF BOTTLES:			
N = Nitric acid pH2		Date/Time Collected:		NO OF BOTTLES:			
S = Sulfuric acid pH2		Date/Time Collected:		NO OF BOTTLES:			
P = Plastic		Date/Time Collected:		NO OF BOTTLES:			
NO = none		Date/Time Collected:		NO OF BOTTLES:			
Container Type		Date/Time Collected:		NO OF BOTTLES:			
Preservative		Date/Time Collected:		NO OF BOTTLES:			
Relinquished By: <u>AF</u>		Date/Time Collected: <u>4/6/21 0940</u>		Received By: <u>GB</u>		Date/Time: <u>4/6/21 0940</u>	
Relinquished By: <u>GB</u>		Date/Time Collected: <u>4/6/21 1009</u>		Received in Lab By: <u>DANNY BROWN</u>		Date/Time: <u>4-6-21 1009</u>	
Comments:		Date/Time Collected:		Received in Lab By:		Date/Time:	
Turnaround Time Requested: (Please circle)		Date/Time Collected:		Received in Lab By:		Date/Time:	
NORMAL or EXPEDITED IN ___ DAYS		Date/Time Collected:		Received in Lab By:		Date/Time:	
Expedited results requested by:		Date/Time Collected:		Received in Lab By:		Date/Time:	
Who should AIC contact with questions:		Date/Time Collected:		Received in Lab By:		Date/Time:	
Phone: <u>501.776.5982</u>		Date/Time Collected:		Received in Lab By:		Date/Time:	
Fax: <u>501.776.5982</u>		Date/Time Collected:		Received in Lab By:		Date/Time:	
Report Attention to:		Date/Time Collected:		Received in Lab By:		Date/Time:	
Report Address to:		Date/Time Collected:		Received in Lab By:		Date/Time:	
Email Address: <u>G.Becker@bentonutilities.com</u>		Date/Time Collected:		Received in Lab By:		Date/Time:	
9/2014		Date/Time Collected:		Received in Lab By:		Date/Time:	

Angela F. @bentonutilities.com
TJohnson@bentonutilities.com



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CHAIN OF CUSTODY / ANALYSIS REQUEST FORM

PAGE 2 OF 3

Client: <u>Benton Utilities</u> Project Reference: <u>AR0036498</u> Project Manager: <u>GREG BECKER</u> Sampled By: <u>AF</u>		PO No. <u>103915</u> SAMPLE MATRIX W A T E R L		NO OF BOTTLES 3		ANALYSES REQUESTED <u>Chronic FH</u> <u>Resist (and)</u> <u>Biomonitoring</u>		AIC CONTROL NO.: <u>254296</u> AIC PROPOSAL NO.:	
Carrier:		Received on Ice (4°C)? YES <u>1.8</u> NO		Remarks		Field pH calibration on _____ @ _____ Buffer:		T = Sodium Thiosulfate Z = Zinc acetate	
AIC No. <u>2</u> Sample Identification <u>DUFAL001</u> Date/Time Collected <u>4/7/21</u> <u>0849</u>		G R A B C O M P V		Relinquished By: <u>AF</u>		Date/Time <u>4/12/21 0915</u>		Received By: <u>GB</u>	
Container Type Preservative		G = Glass NO = none P = Plastic S = Sulfuric acid pH2		V = VOA vials N = Nitric acid pH2		Date/Time <u>4/7/21 0939</u>		Date/Time <u>4-7-21</u> <u>0939</u>	
Turnaround Time Requested: (Please circle) NORMAL or EXPEDITED IN _____ DAYS Expedited results requested by: _____		Who should AIC contact with questions: <u>GREG BECKER</u> Phone: <u>501.776.5982</u> Fax: _____		Report Attention to: _____		Report Address to: <u>G BECKER @ BENTON UTILITIES.COM</u> <u>A FREEMAN @ BENTON UTILITIES.COM</u> <u>T JOHNSON @ BENTON UTILITIES.COM</u>		Comments:	



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CHAIN OF CUSTODY / ANALYSIS REQUEST FORM

Client: Benton Utilities
 Project Reference: AR0036498
 Project Manager: GREG BECKER
 Sampled By: GB

PO No. 103915
 SAMPLE MATRIX: WATER
 W A T E R L

NO OF BOTTLES: 3

ANALYSES REQUESTED: CHLORINE, BROMINE, (and other tests)

Received on ice (4°C)? YES

Remarks: 3 OFFALD01, 4/9/21, 0802

Field pH calibration on @ Buffer: T = Sodium Thiosulfate, Z = Zinc acetate

Relinquished By: GB Date/Time: 4/9/21 0852
 Relinquished By: [Signature] Date/Time: A-9-21 0852

Turnaround Time Requested: (Please circle) _____ DAYS
 Expedited results requested by: _____
 Who should AIC contact with questions: GREG BECKER
 Phone: 501-776-5982 Fax: _____

Report Attention to: _____
 Report Address to: GBECKER@BENTONUTILITIES.COM
 ALFIREMAN@BENTONUTILITIES.COM
 TJOHNSON@BENTONUTILITIES.COM

PAGE 3 OF 3
 AIC CONTROL NO.: _____