

ECONOMIC IMPACT/ENVIRONMENTAL BENEFIT ANALYSIS

Answer to best of the proponent's ability, as required by APC&EC Regulation 8.812

**STEP 1: DETERMINATION OF ANALYSIS REQUIREMENT
(to be included in petition to initiate rulemaking)**

The Arkansas Pollution Control and Ecology Commission's (Commission) Regulation No. 8 requires the Commission to duly consider the economic impact and the environmental benefit of any rule or regulation prior to promulgation. By Act 143 of 2007, the Governor has directed that impacts to small businesses be analyzed prior to adoption of regulations. Furthermore, the Arkansas Legislative Council requires the submission of a Financial Impact Statement and Questionnaire for Filing Proposed Rules and Regulations with the Arkansas Legislative Council and Joint Interim Committee with proposed regulation changes. The following procedures are outlined to provide clarity in the requirements of these various impact statements.

1. Prepare and submit the Financial Impact Statement and Questionnaire for Filing Proposed Rules and Regulations with the Arkansas Legislative Council and Joint Interim Committee required by the Arkansas Legislative Council for all proposed rulemakings.
2. The following analysis is necessary for the Commission to consider the economic impact and environmental benefit of any proposed rule or regulation. This Economic Impact/ Environmental Benefit Analysis ("Analysis") must be prepared by the proponent of the rulemaking initiated before the Commission based upon information reasonably available. If a rulemaking proposes to alter or amend an existing Commission rule, the Analysis shall be restricted to the economic impact and environmental benefits of the proposed changes. This Analysis must be included in the Petition to Initiate Rulemaking before the Commission for all regulatory changes, unless the proposed rule is exempt for one or more of the following reasons:
 - The proposed rule incorporates or adopts the language of a federal statute or regulation without substantive change;*
 - The proposed rule incorporates or adopts the language of an Arkansas state statute or regulation without substantive change;
 - The proposed rule is limited to matters arising under Regulation No. 8 regarding the rules of practice or procedure before the Commission;
 - The proposed rule makes only *de minimis* changes to existing rules or regulations, such as the correction of typographical errors or the renumbering of paragraphs or sections; or
 - The proposed rule is an emergency rule that is temporary in duration.

If the proposed rulemaking does not require the following Analysis due to one or more of the exemptions listed above, state in the Petition to Initiate Rulemaking which exemptions apply and explain specifically why each is applicable.

**If a proposed rule incorporates or adopts the language of a state or federal statute or regulation but does include one or more substantive change, then the Analysis shall address only the substantive changes.*

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| <p style="text-align: center;">STEP 2: THE ANALYSIS (to be included in petition to initiate rulemaking, if required)</p> |
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Directions for Analysis Completion:

1. Answer all questions, unless an exemption applies, using information reasonably available.
2. List source(s) for any data used in an answer. If a response cannot be provided to any question because information is not reasonably available, describe the sources consulted or steps taken in an effort to obtain the information in question.
3. Describe any assumptions used.
4. Complete the Economic Impact Statement, if applicable, as required by Act 143 of 2007.
5. Highlight on the attached map the boundary of the geographical area impacted by the proposed rule, unless the proposed rule applies to the entire state.

This Analysis shall be available for public review along with the proposed rule in the public comment period. The Commission shall compile a response to comments demonstrating a reasoned evaluation of the relative economic impact and environmental benefits.

**ARKANSAS POLLUTION CONTROL & ECOLOGY COMMISSION
ECONOMIC IMPACT/ENVIRONMENTAL BENEFIT ANALYSIS**

Rule Number & Title: Regulation No. 2, Regulation Establishing Water Quality Standards for Surface Waters of the State of Arkansas

Petitioner: Arkansas Department of Environmental Quality

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Date Analysis Prepared: October 5, 2010

The following Regulations are exempt from this economic impact and environmental benefit analysis according to Reg. 8.812(A)(4) which states “the proposed rule makes only de minimis changes to existing rules or regulations, such as the correction of typographical errors or the renumbering of paragraphs or sections;”

Reg. 2.106 Definitions- definitions for: 304(a) Guidance, Algae, Criterion Continuous Concentration (CCC), Criterion Maximum Concentration (CMC), Department, Design Flow, Existing Uses, Groundwater, Harmonic mean flow, Maximum contaminant level (MCL), Milligrams per liter, Mixing zone, Natural background, Nephelometric Turbidity Unit (NTU), Nonpoint Source, Primary Season Critical Flow, Q7-10, and State of Arkansas Continuing Planning Process
Reg. 2.202 High Quality Waters
Reg. 2.203 Outstanding Resource Waters
Reg. 2.204 Thermal Discharges
Reg. 2.302 Designated Uses
Reg. 2.303 Use Attainability Analysis
Reg. 2.306 Procedures for Removal of Any Designated Use Except Fishable/Swimmable,
Reg. 2.310 Procedure for the Removal of the Designated Use of Extraordinary Resource Water...
Reg. 2.311 Procedure for the Addition of the Designate Use of Extraordinary Resource Water ...
Reg. 2.401 Applicability
Reg. 2.402 Nuisance Species
Reg. 2.404 Mixing Zones
Reg. 2.409 Toxic Substances
Reg. 2.501 Applicability
Reg. 2.505 Dissolved Oxygen
Reg. 2.512 Ammonia

The following Regulations are not exempt from this economic impact and environmental benefit analysis.

- Reg. 2.106 Definitions- definition for: Critical flows
- Reg. 2.304 Physical Alteration of Habitat
- Reg. 2.405 Biological Integrity
- Reg. 2.503 Turbidity
- Reg. 2.504 pH
- Reg. 2.507 Bacteria
- Reg. 2.508 Toxic Substances
- Reg. 2.509 Nutrients
- Reg. 2.510 Oil and Grease
- Reg. 2.511 (A) Mineral Quality
- Reg. 2.511 (B) Mineral Quality
- Appendix A – Designated Uses, Specific Standards and Maps of Waters of the State ...

2A. ECONOMIC IMPACT

1. Who will be affected economically by this proposed rule?

State: a) the specific public and/or private entities affected by this rulemaking, indicating for each category if it is a positive or negative economic effect; and b) provide the estimated number of entities affected by this proposed rule.

In general, these proposed water quality standards revisions will have a positive economic effect from continued protection of waters of the State of Arkansas, benefiting industry, tourism, recreational and domestic water supply usages. Arkansas has over 699,293 acres of surface water, with some 11,900 miles of streams and rivers and more than 500,000 acres of lakes. Over 800 billion liters of high quality ground water are contained in aquifers capable of yielding over 2,000 liters per minute. As per the 2010 Integrated Water Quality Monitoring and Assessment Report (305(b)), over 60% of Arkansas's assessed surface waters are fully supporting their designated uses (Table 1).

Table 1. Designated Use & Water Quality Standards Support in Arkansas

| Degree of Use Support | Assessed Total (miles) | Percentage |
|------------------------------|------------------------|------------|
| Supporting all assessed uses | 6025.1 | 61.57 |
| Not supporting a use | 3761.1 | 38.43 |
| Total Waters Assessed | 9786.2 | |

Economic Earnings from Clean Water

According to the Cost Benefit Analysis prepared for FY 2005, the costs for implementing the Clean Water Act, 33 U.S.C. § 1251 et seq. (CWA), in Arkansas were approximately \$13.86 million, and benefits were \$3.712 billion. Thus, the State of Arkansas received more than 267 times return on each dollar invested in implementing the CWA in FY 2005.

Specifically, the benefit to industries in Arkansas from implementing the CWA was estimated to be \$1.049 billion. According to the Bureau of Economic Analysis, U.S. Department of Commerce, Arkansas's annual Gross Domestic Product from 1997-2008 ranged from \$2.9-3.3 million for agriculture, forestry, fishing, and hunting industries. All of which are directly impacted by water quality.

Fishing and Aquaculture Benefits

Arkansas is renowned for its year round fishing. Recreational fishing is a major tourist attraction for Arkansas contributing \$446 million to the State's economy annually through direct expenditures.

Arkansas is an important state nationally for aquaculture. In fact, Arkansas is the birthplace of warm-water aquaculture in the United States (see link from Encyclopedia of AR). The first commercial fish farms were built in Arkansas in the 1940s to raise goldfish. Arkansas ranks second in the U.S. in catfish production, and leads the nation in baitfish, goldfish, sport-fish, largemouth bass, hybrid striped bass, and Chinese carp production. Aquaculture has a total economic impact of over \$1.1 billion in Arkansas, primarily in the Delta region. In Chicot County alone, the catfish industry accounted for 2,665 jobs and \$22 million in tax revenue.

Warm-water (smallmouth bass, striped bass, and walleye), and cold-water (trout) fisheries is another economically important industry for Arkansas. Arkansas has five hatcheries operated by the AR Game and Fish Commission (AGFC) and three National Fish Hatcheries (NFH). According to the US Fish and Wildlife Service (USFWS), for every dollar spent by Norfolk NFH, \$94.98 is generated with a total economic output of \$90.4 million (2010 dollars). For every tax dollar spent for recreational fish production at Mammoth Spring NFH \$12 of net economic value is created resulting in a total economic output of more than \$1.5 million every year. Greers Ferry produces an annual economic impact of \$45.7 million (1999 dollars) between Arkansas and Oklahoma. That's over \$117 million.

In the report, TMDLS for Dissolved Oxygen for White River below Bull Shoals Dam and North Fork River below Norfolk Dam, FTN Associates, Ltd. discussed the economic benefits of a healthy trout population. Their report, quoting information from the USFWS, stated that "estimates [of] the number of people fishing for trout in Arkansas multiplied by the number of days per year that each person fished ("angler days") is over 1.5 million, which represents 39% of the total estimate for trout fishing in all US waterbodies stocked with trout from national fish hatcheries (USFWS 2005).

Thus, aquaculture and fishing, which benefit directly from water quality, provide \$1.456 billion in direct and indirect benefits to the State of Arkansas.

Hunting Benefits

The most recent year for which data exists regarding the economic impact of hunting is 2001. In that year, Arkansas had 430,694 registered hunters with an economic impact for all hunting-related activities of over \$905 million based on direct, indirect, and induced effects. The impact of deer hunting during that period was over 42 percent of the total value, or over \$383 million. The economic impact of migratory waterfowl and upland bird hunting was almost 30 percent of the total, or over \$270 million. Significant portions of the deer and migratory waterfowl industry benefits from and is dependent upon well managed water resources. A conservative estimate of the benefit derived from high quality water for those two hunting components would be 50 percent, resulting in a direct benefit of approximately \$327 million in total benefit from hunting.

Eco-Tourism Benefits

Eco-tourism in Arkansas is calculated as the combination of watchable wildlife recreation (particularly bird watching) and general tourism less special attractions, hunting, fishing, and historic tourism. For 2001, the most recent year for which data is available, 841,000 people participated in watchable wildlife activities in Arkansas, and the total economic benefit was almost \$456 million, most of which was for retail sales (Table 2).

The Arkansas tourism industry experienced a year of record growth in 2004, with travel expenditures increasing from \$3.9 billion to \$4.3 billion (7.9%) and visitors increasing from 19.7 million to almost 21 million. These estimates are calculated using the Travel Industry Association of America (TIA) 2001 Impact of Travel on Arkansas Counties as a reference. During 2004, visitors to Arkansas totaled 20.7 million person-trips. Visitors spent an average of \$205.60 per trip, resulting in \$4.3 billion in total travel expenditures, \$238 million in state taxes and \$89 million in local taxes. The Arkansas travel industry employed 59,287 persons and paid \$940 million in wages and salaries. A conservative estimate of the economic benefit derived from well-managed water resources to eco-tourism would be half of all eco-tourism, or 13 percent of the total, for an economic benefit of more than \$553 million plus half of bird-watching, \$237 million, for a total impact of \$790 million. The perception of clean water is central to the advertising campaign of Arkansas as the “Natural State.”

Table 2: 2001 Economic Benefits of Watchable Wildlife Recreation in Arkansas

| | Resident | Non-Resident | Total |
|-----------------------|-----------------|---------------------|-----------------|
| Retail sales | \$232.0 million | \$11.9 million | \$244.0 million |
| Salaries & wages | \$101.2 million | \$4.8 million | \$106.0 million |
| Full & part-time jobs | 4,532 | 238 | 4,770 |
| Tax revenues: | | | |
| State sales tax | \$12.0 million | \$957,000 | \$12.9 million |
| State income tax | \$5.0 million | \$260,000 | \$5.2 million |
| Federal income tax | \$14.9 million | \$783,000 | \$15.7 million |
| Total economic effect | \$454.1 million | \$21.7 million | \$475.7 million |

Water-Critical Industry Benefits

The principal industries in Arkansas are manufacturing, agriculture, forestry, business services, and tourism (Table 3). These industries are dependent upon, and thus benefit from, high quality water resources. A conservative estimate of the benefit of implementing the CWA, and thus achieving high quality water, can be made by subtracting fishing from the Agriculture, Forest, and Fishing category, and considering a marginal value of 10 percent for high quality water. The benefit to industries in Arkansas from implementing the CWA was estimated to be \$1.049 billion.

Table 3: Economic Benefits from Industries in Arkansas by Category, 2004

| Industry Category | 2004 Revenues (million) | Percent GSP (\$80.902 billion) |
|--|------------------------------------|---|
| Agriculture, Forestry & Fishing | \$3,154 | 3.9 |
| Nondurable Goods Manufacturing Industry | \$7,095 | 8.8 |
| Accommodation and Food Services Industry | \$1,784 | 2.2 |
| TOTAL | \$12,033 | 14.9 |

Summary of Benefits

The cumulative benefits of implementing CWA programs in Arkansas for FY 2005 were estimated to be more than \$3.7 billion (Table 4). These estimates were conservative (that is, likely underestimated) and based upon the most recent data available. In addition, these estimates do not consider other critical benefits that were not available for this CBA, including the cost of water treatment for drinking water, the health effects of untreated poor quality water, etc.

Table 4: Summary of Benefits Associated With Implementing CWA Programs in Arkansas for FY 2005.

| Economic Source | Principal Activities | Economic Benefits (Million) |
|---------------------------|---|--|
| Fishing | Aquaculture and recreational fishing | \$1,546 |
| Hunting | Migratory waterfowl and riparian game (deer, upland game birds) | \$327 |
| Eco-tourism | Bird watching, recreational water sports, etc. | \$790 |
| Water-Critical Industries | Agriculture, forestry, manufacturing, accommodations, etc. | \$1,049 |
| | TOTAL | \$3,712 |

Economic Savings from Clean Water

Water utility customers will not sustain negative economic impacts through increased costs for drinking water, if water quality standards are upheld and designated uses are maintained.

Water Treatment Costs

Water treatment costs directly impact citizens because the higher the cost of water treatment due to water quality issues the higher the cost is to the municipal user. One such issue requiring additional treatment is taste and odor (hereinafter “T&O”). Taste currently has no national primary drinking water regulations; however, USEPA has set a Secondary Maximum Contaminant Level (SMCL) for odor. Although there are not always direct discharges of the constituents that cause T&O issues to lakes and streams, exceedances of other water quality standards (due to point sources and non-point sources) create conditions which cause bacteria and/or algae to thrive and create T&O issues indirectly.

As an example, in a 2008 study by Black and Veatch for Beaver Water District, options for T&O control were investigated and costs were analyzed (Table 5). Objectionable T&O in drinking water may be caused by the presence of microbial metabolites and degradation products, anthropogenic volatile and synthetic organic compounds, and naturally occurring inorganic compounds. Numerous microbial species produce odors variously described as sweet, grassy, musty, earthy, swampy, fishy, and septic. Different methods to control the T&O were considered and a preliminary evaluation was conducted for four viable T&O control options: powdered activated carbon (PAC), granular activated carbon (GAC), ozonation, and ultraviolet (UV) with hydrogen peroxide.

Table 5: Order of Magnitude Cost

| Alternative | Capital Cost (\$ million) | O&M Cost (\$ thousand) | Annualized Cost (\$ thousand) | Wholesale Rate Impact (\$/1000 gal) |
|--|--------------------------------------|---------------------------------------|--|--|
| PAC | 60.5 | 1,790 | 6,440 | 0.48 |
| Ozonation | 37.7 | 480 | 4,010 | 0.27 |
| PAC & Ozonation | 42.2 | 790 | 4,500 | 0.32 |
| UV/H ₂ O ₂ | 83.8 | 1,110 | 8,920 | 0.61 |
| PAC & UV/H ₂ O ₂ | 65.2 | 1,220 | 6,940 | 0.49 |

For assumptions, please refer to Black and Veatch. 2008. Beaver Water District Taste and Odor Evaluation Report.

For Beaver Water District, the recommended alternative, PAC and ozonation, had capital costs of \$42.2 million, annual O&M costs of \$790,000, and a wholesale rate impact of \$0.32 per 1000 gallons. If the cost is only applied to residential customers, the wholesale rate impact could be as high as \$0.42 per 1000 gallons. With an average household usage of 6,000 gallons per month, the average bill would increase from about \$21 per month to about \$23.5 per month, which is about \$30 per year.

Drinking water sources may have water quality issues unrelated to taste and odor. Other water quality issues may require additional treatment using coagulants, disinfectants, pH adjusters, etc. As an example, a 1997 study titled Costs of Water Treatment due to diminished water quality: a case study in Texas, found that when regional raw water contamination is present, the chemical cost of water treatment is increased by \$95 per million gallons from a base of \$75.

The processes needed to treat for these other water quality issues and associated costs vary (Table 6). Municipal users would save money by not having to incur the costs associated with additions to the treat plant processes.

Table 6. Water treatment chemical and costs per unit.

| Chemical | Cost/unit | Use |
|-------------------------|------------------|---------------|
| Alum (aluminum sulfate) | 0.10 | coagulation |
| Lime | 0.10 | pH adjustment |
| Chlorine | 0.10 | disinfection |
| Polymer | 3.00 | coagulation |
| Caustic soda | 0.32 | coagulation |
| Ferric sulfate | 0.18 | disinfection |
| Activated carbon | 0.58 | coagulation |
| Ammonia | 0.24 | disinfection |
| Potassium permanganate | 1.58 | coagulation |
| Copper sulfate | 0.06 | disinfection |
| Soda Ash | 0.10 | pH adjustment |
| Sodium chlorite | 0.14 | disinfection |

Regulation-Specific Impacts

2.106

a) This proposed rulemaking will affect those entities permitted or seeking permits to discharge minerals in waters designated as ERWs or ESWs or waters listed as impaired for minerals. This proposed rule will result in a positive economic effect for those entities discharging to watersheds greater than ten square miles, as permit limits for minerals could be less stringent. This proposed rule may result in a negative economic effect for those entities discharging to watersheds less than ten square miles, as permit monitoring and/or limits for minerals could be more stringent.

b) It is estimated that there are currently approximately 115 entities with individual NPDES permits that discharge into a water designated as ERW, ESW, or listed as impaired for minerals.

2.304

a) This proposed rulemaking will not affect any specific public and/or private entities. This proposed rule reverts back to the previously approved 2004 language.

b) There will be no entities affected by this proposed rule.

2.405

a) This proposed rulemaking will have no added burden to permitted entities. The revision in response variable requirements will not lead to stricter permit limits. As previously written, the only comparison between communities that can currently be made is with communities that have similar aquatic species with similar abundances. Thus, comparisons between impacted and non-impacted sites are not permissible. This is clearly not the intent of the regulation.

The removal of the words “collect and” from the last sentence is in direct compliance with 40 CFR 130.7(5) “Each state shall assemble and evaluate all existing and readily available water

quality-related data...”. If this language is not removed, Regulation No. 2.405 will remain in violation of 40CFR 130.7(5). It would continue to prohibit the use of outside data and force ADEQ into nullifying any and all previous determination that have occurred using data collected by outside entities. This would include all third party rule makings that have occurred since the adoption of this language in 2004. In addition, leaving this language in the regulation would require ADEQ to perform all biological assessments as they relate to standards changes, thus drastically changing the third party rule making process. This would result in enormous delays in the rule making process because the small staff and limited resources of ADEQ are not equipped to handle the potential additional work load. As a result, standards revisions would not keep pace with permitting; permits would be issued with more stringent limits; and point source dischargers would be required to implement additional treatment options to meet the more stringent permit limits. Not removing this language will have an enormous economic impact on the point source discharger community.

b) It is estimated that every two years ADEQ solicits data from approximately 17 entities when preparing the most recent update of the 303(d) list and 305(b) report.

If the previous language remains, approximately ten facilities may be negatively impacted by the nullifying of all third party rule makings that have occurred since the adoption of this language in 2004.

2.503

a) This proposed rulemaking will not affect any specific public and/or private entities. This proposed rule will more accurately reflect ADEQ’s Assessment Methodology. ADEQ will be positively affected in that there will no longer be inconsistency concerning the assessment of turbidity.

b) ADEQ will be the only entity affected.

2.504

a) This rulemaking will affect those entities permitted or seeking permits to discharge into waters that can be shown to have natural background conditions resulting in pH values of either less than or greater than the criteria listed. No negative affects are anticipated. Positive affects are anticipated in that permit limits and assessment criteria would more accurately reflect natural conditions and not be unnecessarily restrictive.

b) Currently there are no waterbodies shown to have natural background conditions resulting in pH values of either less than or greater than the criteria listed.

2.507

a) This proposed rulemaking will not affect any specific public and/or private entities. This proposed rule only reformats the regulation for ease of reading.

b) There will be no entities affected by this proposed rule.

2.508

a) This proposed rulemaking will not affect any specific public and/or private entities. This proposed rule only removes “shall not exceed” type language. Based on recent litigation, EPA has stated that language such as “shall not exceed” may not be appropriate for standards when the states assessment methodology allows for more than one exceedance. This proposed rule will more accurately reflect ADEQ’s Assessment Methodology.

b) ADEQ will be the only entity affected.

2.509

a) This proposed rulemaking will affect those entities permitted or seeking permits to discharge into Beaver Lake. Entities with individual NPDES permits may receive more stringent permit monitoring and/or limits.

This proposed rule will result in a positive economic effect in that the drinking water source will be further protected. This further protection may negate the need for further treatment practices in the future. If taste and odor events were to continue and ozonation and activated carbon treatment were added, water customers would see a wholesale rate increase of \$0.32 per thousand gallons.

b) It is estimated that there are currently approximately four entities with individual NPDES permits that discharge into Beaver Lake. There are over 250,000 people and industries that rely on Beaver Lake as a drinking water source.

2.510

a) This proposed rulemaking will not affect any specific public and/or private entities. This proposed rule only removes “shall not exceed” type language.

b) There will be no entities affected by this proposed rule.

2.511(A)

a) This proposed rulemaking will affect the Bayou Meto Water District and any future entities permitted or seeking permits to discharge into the portion of Bayou Two Prairie that flows thru the Smoke Hole Natural Area. The portion of Bayou Two Prairie that flows thru the Smoke Hole Natural Area is designated as an Extraordinary Resource Water. Entities that discharge into a waterbody designated as an ERW may be negatively affected by stricter permit limits.

b) Currently there are no entities that discharge directly into the segment of Bayou Two Prairie that is designated as an ERW. It is estimated that there are currently approximately five entities with individual NPDES permits that discharge to portions of Bayou Two Prairie upstream of the ERW designated segment.

2.511(B)

a) This rulemaking will not affect any specific public and/or private entities. The April 23, 2004 version of Regulation No. 2 contained a table of Ecoregion Reference Stream Values and the text describing how to calculate the ecoregion reference stream values. In the October 26, 2007 version of Regulation No. 2 these ecoregion reference stream values were calculated out in the table, however the text describing how to calculate the ecoregion reference stream values was inadvertently left in the document. In 2007, EPA disapproved of the Calculated Ecoregion Reference Stream Values (Regulation 2.511(B) table because it retained the previous text describing the calculations and because the text references the now revised table. Ecoregion chloride, sulfate, and total dissolved solids criteria associated with Regulation 2.511 had been effectively revised to less stringent concentrations. EPA suggested that the text after the first sentence be removed.

b) The implementation of Reg. 2.511(B) has not changed from the 2004, 2007 or the proposed 2010 versions, there will be no entities affected by this proposed rule.

Appendix A

a) *This proposed rulemaking will not negatively affect any specific public and/or private entities. These proposed revisions to Appendix A will make the document easier to understand and make use of the most up to date GIS data.*

b) *There will be no entities affected by this proposed rule.*

Sources and Assumptions (for all of the above):

Regulation Establishing Water Quality Standards for Surface Waters of the State of Arkansas as revised, effective April 23, 2004.

Regulation Establishing Water Quality Standards for Surface Waters of the State of Arkansas as revised, effective October 26, 2007.

Integrated Compliance Information System – NPDES

EPA Comments for State Consideration for the 2010 Triennial Revision of Regulation No. 2: Regulation Establishing Water Quality Standards for Surface Waters of the State of Arkansas, received August 28, 2009.

Beaver Water District Taste and Odor Evaluation Report, prepared by Black & Veatch (2008)

Beaver Lake Site-Specific Water Quality Criteria Development: Recommended Criteria, prepared by FTN-Associates, Ltd., February 8, 2008

2006 Integrated Water Quality Monitoring and Assessment Report, Prepared pursuant to Sections 305(b) and 303(d) of the Federal Water Pollution Control Act

2008 Integrated Water Quality Monitoring and Assessment Report, Prepared pursuant to Sections 305(b) and 303(d) of the Federal Water Pollution Control Act

2010 Integrated Water Quality Monitoring and Assessment Report, Prepared pursuant to Sections 305(b) and 303(d) of the Federal Water Pollution Control Act

TMDLS for Dissolved Oxygen for White River below Bull Shoals Dam and North Fork River below Norfork Dam. 2009. FTN Associates, Ltd.

Costs of Water Treatment due to diminished water quality: a case study in Texas. 1997

The 2001 Economic Benefits of Watchable Wildlife Recreation in Arkansas (Report prepared for the Arkansas Game and Fish Commission.) (Table 2)

Arkansas Department of Economic Development, Bureau of Economic Analysis (Table 3)

<http://encyclopediaofarkansas.net/encyclopedia/entry-detail.aspx?entryID=3640>

<http://www.fws.gov/southeast/pubs/facts/norcon.pdf> (Norfork data)

<http://www.fws.gov/greersferry/> (Greers Ferry data)

<http://www.fws.gov/mammothspring/aboutus.html> (Mammoth Spring data)

2. What are the economic effects of the proposed rule? State: 1) the estimated increased or decreased cost for an average facility to implement the proposed rule; and 2) the estimated total cost to implement the rule.

2.106

1) *Entities discharging minerals into waters designated as ERWs or ESWs or waters listed as impaired for minerals may have stricter monitoring and/or permit limits. The costs associated with updating facilities in order to meet stricter limits due to the potential differences in facility design can vary greatly. These differences could include, but are not limited to: type of discharge; chemicals, processes, and mechanics used during production; characteristics of receiving waterbody; age and size of facility.*

Entities with stricter monitoring requirements for minerals may incur increased cost of monitoring Cl, SO₄, and TDS. Estimated cost for analysis for these parameters is \$20.00 per parameter per sample.

In order to meet stricter permit limits for minerals, permittees may implement additional treatment. Reverse osmosis (RO) treatment is capable of removing chlorides, sulfates, and TDS. Capital costs of installing a three stage RO treatment system handling an average of 1,500 gpm of water for a municipal wastewater facility have been estimated as follows:

Capital cost \$6,500,000

Annual operating cost \$4,400,000

Failure to meet these limits may result in a formal enforcement action including the assessment of civil penalties.

2) *There is no extra cost to implement this proposed rule.*

2.304

1) *There will be no increased or decreased cost for the average facility to implement this proposed rule.*

2) *There is no extra cost to implement this proposed rule.*

2.405

1) *There will be no increased or decreased cost for the average facility to implement this proposed rule.*

2) *There is no extra cost to implement this proposed rule.*

2.503

1) *There will be no increased or decreased cost for the average facility to implement this proposed rule.*

2) *There is no extra cost to implement this proposed rule.*

2.504

1) *Entities discharging into waters that can be shown to have natural background conditions resulting in pH values of either less than or greater than the criteria may have less stringent permit limits. This would allow for potential saving to these entities. Savings may be incurred by not having a formal enforcement action.*

2) *There is no extra cost to implement this proposed rule.*

2.507

1) *There will be no increased or decreased cost for the average facility to implement this proposed rule.*

2) *There is no extra cost to implement this proposed rule.*

2.508

1) *There will be no increased or decreased cost for the average facility to implement this proposed rule.*

2) *There is no extra cost to implement this proposed rule.*

2.509

1) *Entities discharging into Beaver Lake may have stricter permit monitoring and/or limits. The costs associated with updating facilities in order to meet stricter limits due to the potential differences in facility design can vary greatly. These differences could include, but are not limited to: type of discharge; chemicals, processes, and mechanics used during production; characteristics of receiving waterbody; age and size of facility.*

Entities with stricter monitoring requirements for nutrients may incur increased cost of monitoring Total Nitrogen (TN) and Total Phosphorus (TP). Estimated cost for analysis for these parameters is \$28.00 per sample for TP and \$82.00 per sample for TN.

Failure to meet these limits may result in a formal enforcement action including the assessment of civil penalties.

2) *There is no extra cost to implement this proposed rule.*

2.510

1) *There will be no increased or decreased cost for the average facility to implement this proposed rule.*

2) *There is no extra cost to implement this proposed rule.*

2.511(A)

1) *Entities discharging into Bayou Two Prairie, in or upstream of the ERW designated segment, may have stricter permit limits. Updating facilities in order to meet stricter limits due to the potential differences in facility design can vary greatly. These differences could include, but are not limited to: type of discharge; chemicals, processes, and mechanics used during production; characteristics of receiving waterbody; age and size of facility.*

Failure to meet these limits may result in a formal enforcement action including the assessment of civil penalties.

2) *There is no extra cost to implement this proposed rule.*

2.511(B)

- 1) *There will be no increased or decreased cost for the average facility to implement this proposed rule.*
- 2) *There is no extra cost to implement this proposed rule.*

Appendix A

- 1) *There will be no increased or decreased cost for the average facility to implement this proposed rule.*
- 2) *There is no extra cost to implement this proposed rule.*

Sources and Assumptions (for all of the above):

Arkansas Regulations Department of Pollution Control and Ecology Regulation No. 7 -- Civil Penalties

Use Attainability Analysis Report, Bayou DeView and Big Creek, Craighead County, AR, August 26, 2009

3. List any fee changes imposed by this proposal and justification for each.

There are no fee changes associated with this proposed rule.

4. What is the probable cost to ADEQ in manpower and associated resources to implement and enforce this proposed change, and what is the source of revenue supporting this proposed rule?

Pursuant to the CWA, Arkansas has been delegated the authority to establish and administer water quality standard. The CWA requires states to review their water quality standards on a triennial basis and to amend those standards as necessary. The manpower and associated resources required to implement this proposed rule is funded through the Environmental Protection Agency through the delegated CWA program.

Sources and Assumptions:

Ark. Code Ann. §8-4-206 and 8-4-207 (authority and responsibilities as state water pollution control agency).

5. Is there a known beneficial or adverse impact to any other relevant state agency to implement or enforce this proposed rule? Is there any other relevant state agency's rule that could adequately address this issue, or is this proposed rulemaking in conflict with or have any nexus to any other relevant state agency's rule? Identify state agency and/or rule.

There are no known adverse impacts to any other relevant state agency. Other state agencies that are charged with protecting the state's natural resources or water quality, such as Arkansas Game and Fish Commission and the Arkansas Department of Health, will benefit from the proposed rule, as it will support their mission. This proposed rule cannot be adequately addressed by another state agency's rule, as the authority to adopt water quality standards was vested in the Arkansas Pollution Control and Ecology Commission. This proposed rulemaking is

not in conflict with nor has any nexus to another state agency's rule.

Sources and Assumptions:

Ark. Code Ann. §8-4-202(b) (authority of Commission to adopt water quality standards).

6. Are there any less costly, non-regulatory, or less intrusive methods that would achieve the same purpose of this proposed rule?

There are no less costly, non-regulatory, or less intrusive methods that would achieve the same purpose of the proposed rule. As stated above, the Clean Water Act requires the State to review and update water quality standards every three years. The related federal regulations outline a specific procedure for this process. Alternative methods are not available to comply with the federal requirements.

Sources and Assumptions:

40 C.F.R. 131.1 et seq.

2B. ENVIRONMENTAL BENEFIT

1. What issues affecting the environment are addressed by this proposal?

These proposed rules address water quality for all waters of the State. These proposals provide for the continued protection of ecological, recreational, and water supply benefits.

2.106

Minerals criteria for waterbodies designated as an ERW, ESW or impaired for minerals

2.304

Physical alteration of habitat in waterbodies designated as ERW, ESW, or NSW

2.405

The collection of biological data for aquatic biota assessments

2.503

The collection and assessment of turbidity data

2.504

pH values in waterbodies with natural background values below 6.0 or above 9.0

2.507

Appropriate interpretation of bacteria criteria

2.508

Continued protection of waters receiving toxic substances

2.509

Protection of drinking water sources

2.510

Continued protection of waters receiving oil and grease

2.511(A)

Protection of water quality in the segment of Bayou Two Prairie designated as an ERW

2.511(B)

Appropriate interpretation of ecoregion reference stream values

Appendix A

Use of most up-to-date waterbody GIS data

2. How does this proposed rule protect, enhance, or restore the natural environment for the well being of all Arkansans?

These proposed rules will protect, enhance, or restore the natural environment for the well being of all Arkansans by maintaining and protecting the water quality and biological integrity of all waters of the State.

2.106

Provides further protection for Extraordinary Resource Waters, Ecologically Sensitive Waters, and waters impaired for minerals. These designations are given to waters with high scientific, recreational, and social values, as well as waters inhabited by threatened, endangered or endemic aquatic species.

2.304

Allows for continued protection of aquatic habitats within waterbodies designated as ERW, ESW, and NSW.

2.405

Allows for the collection of biological data from entities outside of ADEQ. Allowing outside entities to collect additional biological data will enhance ADEQ's decision making and management concerning the state's aquatic biological resources.

2.503

Allows for more turbidity data to be taken into consideration for impaired waterbodies assessments. Additional turbidity data will enhance ADEQ's decision making and management practices of the state's waterbodies.

2.504

Allows the potential for waterbodies to be designated as having natural background conditions higher or lower than the standards, therefore more accurately representing the natural conditions.

2.507

The reformatting of this regulation allows for easier understanding, thereby providing better protection by eliminating misunderstanding.

2.508

Allows for continued protection of waterbodies from toxic substances. This revision clarifies the intent of the regulation and allows for easier understanding, thereby providing better protection by eliminating misunderstanding.

2.509

Establishes water quality standards for the protection of Northwest Arkansas's major drinking water source. Beaver Lake provides drinking water to over 250,000 Arkansans.

2.510

Allows for continued protection of waterbodies from oil and grease. This revision clarifies the intent of the regulation and allows for easier understanding, thereby providing better protection by eliminating misunderstanding.

2.511(A)

Allows for continued protection of the portion of bayou Two Prairie that runs thru the Smoke Hole Natural Area that is designated as an ERW. The Arkansas Natural Heritage Commission is responsible for designating Natural Areas in the state.

2.511(B)

The revision of this Regulation allows for easier understanding, thereby providing better protection by eliminating misunderstanding.

Appendix A

The revision of this Regulation allows for easier understanding, thereby providing better protection by eliminating misunderstanding.

Sources and Assumptions:

Beaver Lake Site-Specific Water Quality Criteria Development: Recommended Criteria, prepared by FTN-Associates, Ltd., February 8, 2008

3. What detrimental effect will there be to the environment or to the public health and safety if this proposed rule is not implemented?

The proposed changes are necessary to ensure that existing uses and designated uses for waters of the State, and the water quality necessary to protect those uses, are protected and maintained.

2.106

Potential degradation of water quality in waters designated as Extraordinary Resource Waters, Ecologically Sensitive Waters, and waters impaired for minerals.

2.304

The current language is unclear and could be misinterpreted allowing uncontrolled physical alterations of habitat within ERW, ESW, and NSW and loss of use by the citizens of Arkansas.

2.405

Requiring ADEQ to perform all biological studies would result in a large decrease in the number of biological studies that are available for evaluation due to limitations in personnel and resources available to conduct biological studies. Fewer biological studies could result in missed opportunities to evaluate degradation of water quality.

2.503

Fewer turbidity data points could result in missed opportunities to assess degradation of water quality due to turbidity. Unassessed increases in turbidity could result in degradation of aquatic habitat.

2.504

No detrimental environmental effects would be noted.

2.507

Misunderstanding in the interpretation of the bacteria Regulation could lead to inappropriate permitting practices and under protected waterbodies.

2.508

Misunderstanding in the interpretation of the toxic substances regulation could lead to inappropriate permitting practices and under protected waterbodies resulting in more waterbodies being impaired and/or failing to meet their designated uses.

2.509

Potential for increases in nuisance algae species leading to an increase in taste and odor issues in a major drinking water source. Beaver Lake is already experiencing high turbidity/sediment inflows and taste and odor problems due to blue-green algae. Past and present water quality problems indicate that the current water quality criteria are not adequate to protect Beaver Lake from being impacted by nutrients or sediment/turbidity. For example, the current turbidity standard for all reservoirs in Arkansas is 25 NTUs. This value has a water clarity depth of less than two feet. For a deep clear water lake, used for recreation and as a public water supply, a water clarity depth of less than 24 inches is not suitable. With current water quality criteria, Beaver Lake could be severely impacted before it would be listed on the impaired waterbody list. Continuation of these issues could lead to loss of drinking water and/or recreational uses.

2.511(A)

Potential degradation of water quality in the portion of Bayou Two Prairie designated as an Extraordinary Resource Water.

2.511(B)

Misunderstanding in the interpretation of the minerals regulation could lead to inappropriate permitting practices and under protected waterbodies resulting in more waterbodies being impaired and/or failing to meet their designated uses.

Appendix A

No detrimental environmental effects would be noted.

Sources and Assumptions:

State of Arkansas Nutrient Criteria Development Plan, 2008

4. What risks are addressed by the proposal and to what extent are the risks anticipated to be reduced?

Risks for potential degradation of water quality and aquatic habitat, as discussed in the section on positive economic impacts.

Sources and assumptions:

See above.