BEFORE THE ARKANSAS COMMISSION ON POLLUTION CONTROL & ECOLOGY

IN RE: CITY OF HUNTSVILLE PETITION TO INITIATE RULEMAKING TO AMEND REGULATION NO. 2	)))	DOCKET NO. 13-006-R

RESPONSIVE SUMMARY - CITY OF HUNTSVILLE

The City of Huntsville (Huntsville), by its attorney, Charles R. Nestrud, Barber Law Firm, for its Responsive Summary states as follows:

1. On July 26, 2013 the Arkansas Commission on Pollution Control and Ecology (Commission) granted Huntsville's Petition to Initiate Third Party Rulemaking to Amend Regulation No. 2 (Petition). In support of the Petition Huntsville submitted its *Section 2.306 Site Specific Water Quality Study: Town Branch, Holman Creek, and War Eagle Creek,* March 2013 – Revised July 26, 2013 (Report).[1] A public hearing was held on October 28, 2013 in Huntsville, Arkansas. The public comment period ended on November 12, 2013.
2. Through Minute Order No. 13-23 the Commission requested Huntsville to conduct an additional review of the feasibility of treatment alternatives for the removal of dissolved solids (minerals) from the effluent of Huntsville's existing wastewater treatment system. On October 21, 2013 Huntsville filed herein its *Supplemental Report: Feasibility of Treatment Alternatives for Total Dissolved Solids and Chloride (Supplemental Report).*
3. Thirty-two (32) comments were filed on the Petition during the comment period, and additional comments were submitted by the United States Environmental Protection Agency (EPA) after the close of the comment period. The responses to comments are enumerated below.

[1] Prior versions were filed. The July 26, 2013 Report was the last version filed herein prior to the comment period.

4. To implement the Response to Comments, Huntsville the proposed changes to Regulation No. 2 have been revised as follows:

Town Branch from Point of Discharge of the City of Huntsville WWTP downstream to the confluence with Holman Creek			**Holman Creek from the confluence with Town Branch downstream to the confluence with War Eagle Creek**			**War Eagle Creek from the confluence with Holman Creek to Clifty Creek.**			**War Eagle Creek downstream from the confluence with Clifty Creek to Beaver Lake**		
Site Specific Criteria Proposed			**Site Specific Criteria Proposed**			**Site Specific Criteria Proposed**			**Site Specific Criteria Proposed - NONE**		
Chloride (mg/L)	TDS (mg/L	Sulfate (mg/L	Chloride (mg/L)	TDS (mg/L	Sulfate (mg/L	Chloride (mg/L)	TDS (mg/L	Sulfate (mg/L	Chloride (mg/L)	TDS (mg/L	Sulfate (mg/L
~~185~~ 223	~~525~~ 779	~~41~~ 61	~~185~~ 180	~~525~~ 621	~~41~~ 48	~~185~~ ~~130~~ 39	~~525~~ ~~407~~ 248	~~41~~ ~~30~~ 17[1]	~~97~~ 13[1]	~~337~~ 240[1]	~~24~~ 17[1]

[1] Existing Ecoregion Reference Stream Value, no revision

- Removal of the Domestic Water Supply use for Town Branch beginning at Latitude 36.112330°, Longitude- 93.732833° and extending downstream to its confluence with Holman Creek at Latitude 36.0118158°, Longitude- 93.736039°; and for Holman Creek beginning at its confluence with Town Branch at Latitude 36.118158°, Longtitude -93.736039° and extending downstream to its confluence with War Eagle Creek at Latitude 36.140824°, Longitude -93.729594°.

5. **The following are comments from the ADEQ Water Quality Planning Branch and responses to those comments:**

(1) Use of 4 cfs as the critical background flow for Town Branch and Holman Creek is inappropriate and does not represent actual flow conditions. 7Q10 is appropriate and protective of designated and existing uses within the waterbodies.

Response – The criteria amendments for chloride, sulfate, and TDS associated with the City of Huntsville third-party rulemaking incorporate the comments from ADEQ and are based on comments of the ADEQ. The following criteria amendments are based upon 95th percentile calculations from data collected during the study:

Town Branch from Point of Discharge of the City of Huntsville WWTP downstream to the confluence with Holman Creek.			Holman Creek from the confluence with Town Branch downstream to the confluence with War Eagle Creek.			War Eagle Creek from the confluence with Holman Creek to Clifty Creek.		
Site Specific Criteria Proposed			Site Specific Criteria Proposed			Site Specific Criteria Proposed		
Chloride (mg/L)	Sulfate (mg/L)	TDS (mg/L)	Chloride (mg/L)	Sulfate (mg/L)	TDS (mg/L)	Chloride (mg/L)	Sulfate (mg/L)	TDS (mg/L)
223	61	779	180	48	621	39	17[1]	248

[1]Existing Ecoregion Reference Stream Value, no revision recommended.

(2) *The use of the effluent flow and effluent mineral* concentration *(Qe and Ce) in calculations for Holman Creek and War Eagle is inappropriate. Flow and minerals concentrations should reflect the entirety of the contributing waterbodies, not just the downstream effluent.*

Response – The criteria amendments are now based upon 95th percentile calculations from data collected during the study.

(3) *The Department opposes use of ecoregion values as background concentrations for minerals used for all stream segments. Data collected during the study (Tables 5.1 and 5.2 in the UAA) show that mineral concentrations above the outfall/confluence generally average higher than the ecoregion value (Table 1). Actual instream values, not ecoregion values, should be used and are protective of designated and existing uses within these stream segments.*

Response – As described above, the criteria amendments are now based upon 95th percentile calculations from data collected during the study. Background values were not used in the calculations.

(4) *The Department requests that the Regulation 2 entries for War Eagle Creek be changed to a specific order, that the footnotes for War Eagle Creek and for Holman and Town Branch Creeks be removed, and that Regulation 2 amendments should be modified for consistency with the Petition to Initiate Rulemaking.*

Response – The requested changes are reflected in the final criteria amendments.

6. **The following are responses to the comments of Debbie Doss, Conservation Chair, Arkansas Canoe Club, who provided several statements regarding the quality of War Eagle Creek, and responses to those comments:**

(1) Is it possible to lower water quality standards without damaging streams? Possibly but, downgrading water quality standards for these creeks should be based on good science, not a "mother may I" system of arbitrarily changing numbers because the ones in the regulation are inconvenient.

Response – The request to change the Arkansas Water Quality Standards for chloride, sulfate, and TDS (minerals) was made following a yearlong technical study of the chemical, physical, and biological characteristics of Town Branch, Holman, and War Eagle Creeks at both stations upstream of and downstream from the City of Huntsville wastewater discharge point. The results of the study indicated aquatic life in each of the streams was fully supported; the downstream fish communities contained sensitive darter species and were generally more diverse than the communities upstream of the point source discharge.

The request for amendment of the minerals criteria is being made to adjust the criteria to reflect the historical discharge from the City of Huntsville, not to allow future increases in allowable discharge of minerals. The majority of the minerals component of the City's discharge comes from the Butterball Turkey Plant in Huntsville which has been in operation since 1974. Although no data is available from that time period the discharge has been relatively consistent with respect to chloride and TDS since that time. Sulfate in the Huntsville discharge has been increased since around 2011 because aluminum sulfate is added as a treatment chemical by the City so that NPDES effluent limits for phosphorus can be met.

In addition to the study conducted as part of this rulemaking, the USGS conducted a modeling study to determine the effect of the Huntsville discharge on mineral quality of Beaver Lake. Based on the results of that study the minerals discharged by the City of Huntsville make up about 5% of the minerals load of War Eagle Creek at Hindsville, and a doubling of the discharged load from Huntsville would cause only slightly higher concentrations of dissolved minerals in War Eagle Creek at Hindsville (upstream of Beaver Lake). The results of the USGS study support the finding that the requested change in the Water Quality Standards will have insignificant to no effect on Beaver Lake.

7. **The following are Beaver Water District comments and responses to those comments.**

(1) BWD believes that the proposed changes to the WQC for War Eagle Creek are unnecessary and unsupported. Instead of focusing on an analysis of the mathematical equations and projections related to War Eagle Creek in the Huntsville Study, BWD believes that a review of the twenty (20) plus years of

ADEQ and United States Geological Survey ambient water quality monitoring data on minerals in War Eagle Creek is sufficient to show that the proposed changes are not needed. Out of almost four hundred samples taken since 1993, the current WQC for sulfate has never been exceeded. The current WQC for TDS has been exceeded only twice, and those values were much lower than Huntsville's proposed WQC for TDS on the upper reach of War Eagle Creek. ADEQ's assessment protocol for minerals currently allows a ten percent exceedence rate, and ADEQ informed the Minerals Subcommittee of the APCEC that it is considering raising the allowable exceedence rate to twenty-five percent for site-specific WQC for minerals. Approximately twenty percent of the chloride samples have exceeded the current WQC for TDS, but the proposed WQC for chloride on the upper reach of War Eagle Creek is still more than two and a half times the maximum concentration of chloride detected in War Eagle Creek in over twenty years of monitoring. The actual concentrations of chloride, sulfate, and TDS in War Eagle Creek measured by Huntsville during July 2011- June 2012 corroborate that the proposed changes are unnecessary (see Tables 5.1 and 5.2 and Appendix B of the Study).

The purpose of a study pursuant to Reg. 2.306 is to develop WQC that reflect site-specific conditions based on an investigation of those conditions. As the measured concentrations of chloride, sulfate, and TDS in War Eagle Creek demonstrate, the WQC proposed for War Eagle Creek do not reflect actual site-specific conditions. As a consequence, even though the biological field data in the Study may show that the aquatic life in War Eagle Creek is acceptable at the existing level of minerals in the stream, the impact on aquatic life if the in-stream concentrations of minerals are allowed to increase to the proposed levels is unknown. Because the proposed WQC for minerals for War Eagle Creek are much, much higher than historical and existing in-stream concentrations, the impact on aquatic life at the proposed levels must be addressed.

BWD understands the need to allow Huntsville's existing wastewater discharge in a manner consistent with the regulations and based on sound science. The proposed changes to the WQC for minerals for War Eagle Creek, however, go well beyond what is necessary to accommodate Huntsville's discharge, would potentially provide for new and increased discharges of minerals to War Eagle Creek, and are not scientifically justifiable.

Response – The criteria amendments are now based upon 95th percentile calculations from data collected during the study. This reduced the site specific criteria amendments for War Eagle Creek substantially.

8. **The following are comments of Mary Cameron, Bureau of Legislative Research, and responses to those comments.**

(1) For the Huntsville rule that is currently pending for Regulation No. 2, I have the following question: Are there any federal limitations for the discharge of chloride, sulfate, and total dissolved minerals into streams such as Town Branch, Holman Creek, and War Eagle Creek?

Response –There are no solely federal limitations for the discharge of chloride, sulfate, and total dissolved solids into the listed streams, although the domestic water supply criteria are taken from the national secondary (non-enforceable) drinking water regulations. Arkansas Water Quality Standards are both state and federal rules that are applied to NPDES discharge permits. If the criteria amendments, and removal of domestic water supply uses from Town Branch and Holman Creek, are approved by EPA, the criteria would be used for assessment and permitting processes. Chloride, sulfate, and total dissolved solids criteria for domestic water supply would remain in place for War Eagle Creek.

9. **The following are comments of Ross Noland and responses to those comments.**

First, the City of Huntsville improperly seeks to remove the drinking water designated use from Town Branch, Holman Creek, and War Eagle Creek. The City contends in its Petition to Initiate Rulemaking that the drinking water designated use for these streams is "designated, but not existing." Existing uses cannot be removed. Designated, but not existing, uses can only be removed in limited circumstances. The drinking water designated use on these stream portions cannot be removed for the following reasons:

(1) The receiving streams meet the water quality criteria for drinking water and their ecoregion found in APCEC Reg. 2.511. Because the criteria are met, the use is existing, and cannot be removed.

Response – The data provided in the study report show that criteria for the domestic water supply are not maintained in Town Branch and Holman Creeks. Holman Creek is on the Arkansas 303(d) list for total dissolved solids in excess of the domestic water supply use. Existing uses are those that are actually attained in the water body on or after November 28, 1975 (*See 40 C.F.R. §131.3).* There are no existing drinking water uses in Town Branch or Holman Creek.

(2) The receiving streams flow into Beaver Lake, which is used for domestic water supply. Thus, the drinking water designated use is existing, and cannot be removed.

Response – Beaver Lake does have an actual, existing domestic water supply use. Therefore, the domestic water supply use is "existing" as that term is used in *40 C.F.R. §131.3,* and is not being removed. The tributaries (Town Branch and Holman Creek) do not have existing domestic water supply uses and the designated domestic water supply use can be, and is being removed. Although there is no existing domestic water supply use in War Eagle Creek, the domestic water supply use is not being removed in War Eagle Creek.

(3) *Designated uses can only be removed when one of six specific conditions are present. See 40 C.F.R. §131.10(g)(1)-(6). The documents submitted by the City of Huntsville do not demonstrate that one of those conditions is met. Huntsville contends that 40 C.F.R. § 131.10 requires a UAA to remove a fishable/swimmable use. This ignores the plain language of 40 C.F.R. § 131.10, which requires a UAA to remove any "designated use which is not an existing use." This language is not limited to the fishable/swimmable uses. Thus, the drinking water designated use cannot be removed unless one of the 40 C.F.R. § 131.10(g)(1)-(6) conditions are met.*

Response – A Use Attainability Analysis is required when removing Clean Water Act section 101(a)(2) uses, or adopting use subcategories of section 101(a)(2) uses which require less stringent criteria. The domestic water supply use is not a section 101(a)(2) use. No section 101(a)(2) uses are being removed in this rulemaking, and no section 101(a)(2) use subcategories are being designated as a part of this rulemaking. The section 101(a)(2) uses and criteria remain intact through this rulemaking. A UAA is not required for domestic water supply use removal, or for a minerals criteria amendment that does not remove a fishable/swimmable use, through ADPCE Reg. 2.306. (See also ADPCE Reg. 2.303 which specifies that a UAA must be conducted when removing a fishable/swimmable use or to identify a subcategory of a fishable/swimmable use which requires less stringent criteria and Reg. 2.306 which establishes the procedures for removal of the domestic water supply use.)

(4) *Second, the City of Huntsville utilizes four cubic feet per second for its median flow in calculating mineral loads. This number is not based in science or fact. This practice must end due to its arbitrary application and lack of scientific or rational basis.*

Response – As described above, the criteria amendments are now based upon 95th percentile calculations from data collected during the study.

10. **The following are comments of the Arkansas Department of Health and responses to those comments.**

(1) *The Arkansas Department of Health (ADH) reiterates its previously submitted comments that the domestic water supply use designation should remain in place for Town Branch Creek, Holman Creek, and War Eagle Creek. It is*

the ADH's position that it is appropriate for streams within the Beaver Lake watershed to retain domestic water supply use designations considering that Beaver Lake is the source of drinking water for approximately 390,000 Arkansans.

Response – ADPCE Reg. 2.306 describes procedures for removal of any designated use other than fishable/swimmable, Extraordinary Resource Water, Ecologically Sensitive Waterbody, or Natural and Scenic Waterway. EPA regulations at *40 C.F.R. § 131.10* provide that States may remove designated uses that are not existing uses. These two regulations are the basis for removal of domestic water supply uses from waterbodies where those uses do not actually exist. *40 C.F.R. § 131.3* states that "existing uses are those uses actually attained in the water body on or after November 28, 1975, whether or not they are included in the water quality standards." Town Branch and Holman Creeks do not have existing domestic water supply uses. Beaver Lake has an existing domestic water supply use; that use cannot be removed and any discharge that reaches the lake is required to maintain the domestic water supply criteria. The existing discharge from the City of Huntsville maintains the domestic water supply criteria in War Eagle Creek immediately downstream from the Holman Creek confluence which is approximately 28 miles upstream from the headwaters of Beaver Lake.

On August 3, 2017 the Arkansas Department of Health submitted a letter to ADEQ confirming that the domestic water supply use is not an existing use on either Town Branch or Holman Creek, stating in particular that there are no existing drinking water supply intake structures on either Town Branch or Holman Creek and that there are no current proposals to locate drinking water intake structures on either Town Branch or Holman Creek. A copy of the Health Department letter is attached as Exhibit A. Additionally, a copy of the updated letter from the Arkansas Natural Resources Commission is attached as Exhibit B.

(2) *The Water Quality Study posted August 1, 2013 utilizes an assumed background flow of 4 cfs for determination of site specific criteria (sections 7.2.2, 7.2.3, and 7.2.4). ADH disagrees with the assumption that this is representative of stream conditions at the outfall. In reality, Holman Creek and Town Branch Creek are intermittent losing streams and Holman Creek is listed as an impaired stream on the 2008 303(d) list for impairments resulting from the City of Huntsville WWTP discharge of Total Dissolved Solids. Furthermore, assuming 4 cfs of background flow is contrary to the EPA approved Continuing Planning Process.*

Response – As described above, the criteria amendments are now based upon 95th percentile calculations from data collected during the study.

(3) *The national secondary MCLs for TDS, chlorides, and sulfates in drinking water are 500, 250, and 250 mg/l, respectively. The effluent discharge from the Huntsville Waste Water Treatment Plant (WWTP) flows into Beaver Lake which is a drinking water source for much of northwest Arkansas. Any effluent from the Huntsville WWTP should include concentration limits on TDS, chlorides, and sulfates that meet these MCLs in the effluent.*

Response – The national secondary standards are intended as non-enforceable guidelines to assist public water systems in managing finished drinking water for aesthetic purposes. The drinking water standards are not designed as end of pipe NPDES permit limits for wastewater treatment plants. In Arkansas, the secondary standards for chlorides, sulfates, and TDS have been adopted as Reg. 2 criteria for the domestic water supply use. As such they are considered for water quality based limits in NPDES permits. The critical flow for their permitting is 7Q10. This means that for Town Branch and Holman Creeks, both of which are assumed to have a 7Q10 flow of zero, the domestic water quality criteria would be applied at end of pipe. This issue, in addition to there being no economically feasible technology to remove dissolved minerals led to the need to conduct the study and culminated in this rulemaking. The 7Q10 flow of War Eagle Creek is sufficient such that the current discharge will not adversely impact maintenance of the domestic water supply criteria in Beaver Lake.

(4) *The report did not address the feasibility and cost of any modification of the manufacturing processes used in the Butterball facility in order to reduce the level of contaminants in the wastewater effluent. Please discuss these potential changes beyond what was mentioned in Section 8.4 of the site-specific water quality study (dated March 2013 as revised on July 26, 2013).*

Response – Butterball performed calculations to simulate the complete removal of all calcium chloride brine and sodium hypochloride brine associated with the chiller freeze system. This has been done twice, once reflecting the period of January - October 2010 and again January - October 2016. To accomplish the calculations Butterball determined pounds of calcium chloride and sodium hypochloride purchased and used in the chiller system, and the average TDS concentration sent to the Huntsville WWTP during the period. Butterball then determined the pounds per day of calcium chloride and sodium hypochloride added to the wastewater effluent, and then converted the pounds per day to concentration. In the final step the concentration of calcium chloride and sodium hypochloride added to the wastewater effluent (assumed that these compounds made up TDS) was subtracted from the average TDS concentration sent to the Huntsville WWTF. For the 2010 period Butterball estimated that average TDS could be reduced from 1,047 mg/L to 685 mg/L, which is a 35% reduction. For 2016 Butterball estimated that average TDS could be reduced from 1,078 mg/L to 845 mg/L,

which is a 22% reduction. In the original report this reduction was inaccurately described as minimal, however even with these reductions (potentially achieved at a cost $15 million to replace the chiller system) discharge concentrations would remain well above permit limits needed to achieve the current water quality criteria.

In addition, Butterball has evaluated their facility to determine each area of the plant and the processes that use salts. Butterball identified 20 potential points of loss of salts to the sewer system. Once identified, Butterball investigated management practices designed to reduce salt (brine) losses to the sewer system that are ultimately piped to the Huntsville WWTF. Meetings were held with employees at each area with the intent of educating the employees on the importance of preventing salt loss to the sewer system. Monitoring programs were established and estimates of percentage reductions were established for each of the potential points of salt loss to the sewer system as shown in the following table.

Plant Area	Description	Est. Gal/Day Loss	Est. Annual Gal. Loss (260 days/year)	Action Taken	Status	Est. Reduction Percent
Spice Room	Area where all spices are weighed out prior to use in brine formulas.	Not Measurable	NA	Meeting held with employee responsible, to dispose of in the trash.	Implemented	Not Estimated
Stunner	Salt used in stunner and in holding tank outside Kill room.	Not Measurable	NA	Meeting held with employees concerning issues of TDS, discussed way of reduction.	Implemented	Not Estimated
Packaging Brine Mixer	Consists of mixing system, holding tank, plate chiller.	Not Measurable	NA	Minimize batch sizes at shift end to reduce what is dumped daily.	Implemented	Not Estimated
Basters	Overhead piping system, basters, and 2 belts after baster.	428	111,360	Monitor basters, pumps and piping for leaks and report to maintenance. Establish PM's on equipment.	Implemented	50%
Sodium Hypochloride Brine	Salt system to chill BRT/BIB.	High Conc.	NA	Not feasible. Would require new Freezing System to eliminate.	Not Implemented	NA
Calcium Chloride Brine	Calcium chloride system to chill WB.	High Conc.	NA	Not feasible. Would require new Freezing System to eliminate.	Not Implemented	NA
Blenders	Spices added to MST blending, Prague and Salt.	Not Measurable	NA	Improve process for adding ingredients to reduce spills.	Implemented	Not Estimated
Mixing Tank	Mixing system for formulation of brine (tanks, piping).	Not Measurable	NA	Minimize batch sizes at shift end to reduce what is dumped daily.	Implemented	Not Estimated
Injectors	Injecting of product, including saddle tanks and returns	70	18,200	Monitor basters, pumps and piping for leaks and report to maintenance. Establish PM's on equipment.	Implemented	50%

Plant Area	Description	Est. Gal/Day Loss	Est. Annual Gal. Loss (260 days/year)	Action Taken	Status	Est. Reduction Percent
Mixing Tank	Mixing system for formulation of brine. Consists of tanks, piping.	Not Measurable	NA	Minimize batch sizes at shift end to reduce what is dumped daily.	Implemented	Not Estimated
Injectors	Injecting of product, included saddle tanks and returns.	35	9,100	Monitor basters, pumps and piping for leaks and report to maintenance. Establish PM's on equipment.	Implemented	50%
Mixing Tank	Mix gravy spice, includes 2 tanks and pipe.	Not Measurable	NA	Meeting held with employees to minimize spills, and run gravy until tanks emptied to eliminate draining at shift end.	Implemented	Not Estimated
Gravy Machine	Injection of Gravy into packets.	Not Measurable	NA	Insure process is stopped when leaks detected. Minimize rejected packets so not to enter sewer system.	Implemented	Not Estimated
Mixing Tank	Mixing system for formulation of brine. Consists of tanks, piping.	Not Measurable	NA	Minimize batch sizes at shift end to reduce discarded brine volume.	Implemented	Not Estimated
Injectors	Injecting of product, included saddle tanks and returns.	70	18,200	Monitor basters, pumps and piping for leaks and report to maintenance. Establish PM's on equipment. Catch purge on table prior to placing on racks.	Implemented	75%
Rack Loss	Time from injection to loading into oven, brine drainage from birds.	168	33,600	Not feasible. Would require moving cook operations to another Butterball facility.	Not Implemented	0%
Ovens	Purge from highly injected cooked whole birds, BIB's and drums on open racks.	Not Measurable	NA	Not feasible. Would require moving cook operations to another Butterball facility.	Not Implemented	NA
Cook side	Drainage of birds from chill.	Not Measurable	NA	Not feasible. Would require moving cook operations to another Butterball facility.	Not Implemented	Not Estimated
Cajun spice (HBH)	Floor loss by adding topical spice.	145	3,625	Make sure spills are cleaned up with broom and disposed of in trash vs. washing down the drain	Implemented	75%
Spice area	Floor loss by adding topical spice.	Not Measurable	NA	Make sure spills are cleaned up with broom and disposed of in trash	Implemented	Not Estimated

Plant Area	Description	Est. Gal/Day Loss	Est. Annual Gal. Loss (260 days/year)	Action Taken	Status	Est. Reduction Percent
				vs. washing down the drain.		

(5) *The report did not address the feasibility and cost of any modification to the pretreatment processes of the wastewater flow from the Butterball facility so that the concentration of these contaminants can be reduced prior to entering the Huntsville WWTP. Please describe the current pretreatment process at the Butterball facility, including the specific function of each lagoon, and please detail the proposed pretreatment process changes (and costs) that could be made specifically at the Butterball facility to reduce the levels of these contaminants.*

Response –There are no conventional pretreatment process changes that could be made at the Butterball facility that would appreciably reduce the levels of dissolved minerals. Due to the characteristics of the Butterball effluent and the membrane technologies required to reduce dissolved minerals, secondary treatment levels that occur in the Huntsville WWTP must be attained before considering advanced minerals removals technologies due to their susceptibility to fouling.

(6) *There does not appear to be any active coagulation/flocculation/filtering of the wastewater in the pretreatment or treatment process. Was adding coagulation/flocculation/filtration considered at either the Butterball facility and/or Huntsville WWTP?*

Response – Traditional coagulation/flocculation/filtration are not treatment technologies for reduction of dissolved minerals and were not considered.

(7) *Please discuss the potential costs/benefits of flow equalization and stormwater management at the Butterball facility and/or Huntsville WWTP.*

Response – Stormwater is not known to be a source of dissolved minerals at the Butterball facility nor Huntsville WWTP. Flow equalization would not impact the total daily load of dissolved minerals discharged from Butterball or Huntsville WWTP.

(8) *Please discuss the potential costs/benefits of land application of wastewater from the Butterball facility and/or Huntsville's WWTP effluent.*

Response – Land application requires significant areas of suitable (slope, soil characteristics, remote location, etc.) land. Because Huntsville is situated in the Ozark

Highlands, adequate nearby land having characteristics compatible with ADEQ restrictions for land application of treated effluent is not available.

(9) Please clarify the design basis being used for Reverse Osmosis (RO). The report appears to be using a flow rate of 1.25 MGD and reduction of 3.4 g/l by 95% which would be approximately 170 PPM TDS. What is the discharge target for TDS post RO?

Response – The statement in question refers to an unrelated equipment cost estimate and should have been omitted from the Supplemental Report. The basis of the estimate was:

1.01 MGD Filtration/Reverse Osmosis/Concentrated Reject Crystallization/Ground Storage Tanks -

Max/Avg Effluent TDS =	1300/922 mg/l
Discharge limit TDS =	500 mg/l
Reject flow =	0.27 MGD

(10) As a historical reference, please provide a copy of the $10- 15 million RO cost estimate report prepared by McGoodwin, Williams & Yates cited in pages 3 and 9 of the Fact Sheet for Huntsville WWTP's NPDES Permit No. AR0022004.

Response – There was no formal engineering estimate prepared and no report developed. The figure cited in the Fact Sheet was a ballpark estimate of minerals removal costs.

(11) The RO cost estimate appears to be inflated from 1996 twice. Also, it is not clear whether the ultrafiltration + carbon filter was meant to be included in the 2012Q4 values. Were more current cost data not available? This office obtained an ultrafiltration + RO vendor cost estimate of $3.5- 5.0/gallon/day (for 1.25 MGD with 1,300 mg/L TDS) including equipment and installation (not including a building or other infrastructure costs).

Response – The inflation factor adjustment was improperly applied to the capital cost estimate for ultrafiltration+reverse osmosis treatment. Ultrafiltration+carbon filtration would be necessary to remove materials in the effluent that would foul RO membranes. The basis of the cost estimation was Perry's Chemical Engineering Handbook (1996 ed.), adjusted using the implicit price deflator index values. The corrected Capital cost for RO and ancillary equipment is $31.497 million, with annual O&M costs of $4.239 million.

(12) Please provide more itemization detail on the purpose of the proposed $158,470 in annual labor costs for the proposed RO system (by itself)?

Response – Labor cost estimates were derived from p. 22-52 from Perry's Chemical Engineering Handbook. The Supplemental Report labor cost estimate was incorrectly adjusted using the implicit price deflator. The correct estimated annual labor cost is $127,660.

(13) Please clarify the design basis being used for Electrodialysis (ED). The report appears to be using a flow rate of 1.0 MGD and does not indicate the expected TDS reduction. What is the discharge target for TDS post ED?

Response – The basis of the cost estimate is 1.01 MGD with effluent TDS 325 mg/l.

(14) The cost estimate for ED appears to be inflated from 1993. Were more current cost data not available?

Response – The most recent cost basis available was used and adjusted using the implicit price deflators.

(15) Please clarify the design basis being used for Capacitive Deionization Technology (CDT) cost (e.g., modules initially needed, expected module replacement frequency, etc.). The report appears to be using a flow rate of 1.0 MGD and does not indicate the expected TDS reduction.

Response – The CDT cost estimate is based on the 1 MGD system described in the *Reclamation: Multibeneficial Use of Produced Water Through High-Pressure Membrane Treatment and Capacitive Deionization Technology* paper. Two systems were described in that paper: one with a CDT train flow rate of 0.7 L/min and another with a 3.0 L/min flow rate. The 0.7 L/min system requires 3,760 trains utilizing 22,556 modules (6 modules per train) to produce 1 MGD product water. The 3.0 L/min system requires 876 trains utilizing 6,132 modules (7 modules per train) to produce 1 MGD product water. The given module lifetime is 10 years. The system was designed remove 4,520 mg/L TDS from water with an initial TDS concentration of 5,520 mg/L TDS. The technology loses efficiency at lower initial TDS concentrations. No adjustment was made to the treatment train configuration from that listed in the paper due to the unproven nature of the technology and the lack of information presented in the paper to properly scale the CDT trains to lower initial concentrations of TDS.

(16) The cost estimate for CDT appears to be inflated from 2005. Were more current cost data not available?

Response – The most recent cost basis available was used and adjusted using the implicit price deflators.

(17) Please provide more itemization detail for the projected annual operating costs for filtration, crystallization, and equipment replacement.

Response – Labor cost estimates were derived from p. 22-52 from Perry's Chemical Engineering Handbook. The equipment replacement cost was based on equal amortization of the initial capital cost over a twenty-year period.

(18) Please include the costs to transport and land apply the reject water at a permitted site and/or dispose of the reject water in a permitted disposal well as an alternative to crystallization.

Response – It is not feasible to land apply the RO reject stream due to more concentrated TDS/chlorides/sulfates (estimated >4,000 mg/l). Underground injection of the reject stream would require identifying an injection zone with adequate physical properties (non-productive for oil/gas, permeable, porous, etc.) and was not considered because of known geological impediments in the region.

11. **The following are comments of James Metzger and responses to those comments.**

(1) Mr. Metzger opposes regulations supporting Act 954.

Response – Act 954 was repealed by the legislature and was not considered in this rulemaking.

12. **The following are comments of Justin Leflar and responses to those comments.**

(1) Mr. Leflar is concerned that Act 954 does not protect drinking water supplies.

Response – Act 954 was repealed by the legislature and was not considered in this rulemaking.

13. **The following are comments of Butterball, LLC and responses to those comments.**

(1) Butterball supports the Third-Party Rulemaking effort.

Response – The comment is noted.

14. **On May 19, 2016, after the close of the comment period, the United States Environmental Protection Agency (EPA) submitted comments on the Petition to ADEQ. Although the comments were not timely filed, attached hereto as Exhibit C are EPA's comments, and the following are responses to those comments.**

(1) *EPA expressed two major concerns regarding the City of Huntsville Section 2.306 Site Specific Water Quality Study of Town Branch, Holman Creek and War Eagle Creek. The two stated major concerns were that (1) inappropriate input values were utilized to conduct the mass balance calculations used to develop the proposed criteria and (2) that aquatic life use protection was not demonstrated for all the proposed criteria values. These concerns are associated with the use of 4 cfs as upstream flow and ecoregion values for background concentrations in the criteria calculations.*

Response: These concerns were addressed by changing the criteria calculation process to use the 95th percentile from data collected during the study.

(2) *There are numerous specific comments closely associated with these major concerns in the enclosure to the EPA May 19, 2016 comment letter. These concerns and specific comments are no longer pertinent as the City of Huntsville has been working with ADEQ since 2014 to base criteria calculations on site specific data collected during the study. EPA comments 2, 12, 23, 25, 26, 27, 29, 35, and 36 fall into this category.*

Response: The responses to these comments are reflected in the Revised Report.

(3) *The comment letter points out several typos and other editorial or informational suggestions. EPA comments 1, 4, 5, 11, 13, 16, 19, 21, and 24 fall into this category.*

Response: The response to these comments are reflected in the Revised Report.

(4) **Response to Comment 3.**[2] EPT Taxa proportions are found for all sites in Tables 5.16 and 5.17 of the Report. The manner in which the proportion of EPT taxa at the reference sites compared to the downstream sites was discussed and data were presented in Section 5.4 of the report. However, in response to this comment the table below summarizes EPT proportions for both seasons that macroinvertebrates were collected. The study conducted included an aquatic life component with locations upstream and downstream of the permit holder's discharge as the 'Interim Strategy for Minerals Permit Limits' describes. As shown in the table each of the downstream sites contained a higher percentage of EPT species during the fall. All percent EPT species were lower in the spring than in the fall with

[2] EPA's comment numbering is used for reference purposes.

Town Branch sites virtually the same, Holman Creek downstream lower, and War Eagle Creek downstream higher with respect to EPT species.

Parameter	Season	TB-1	TB-2	HC-1	HC-2	WEC-1	WEC-2
EPT % Abundance	Fall 2011	59.0	67.7	47.1	56.6	52.4	65.1
	Spring 2012	33.9	32.8	42.9	33.3	48.1	55.5

No changes to the Report were made in response to this comment.

(5) **Response to Comment 6.** The data presented in Table 4.1 was collected monthly by GBMc & Associates and weekly by the City of Huntsville. The Revised Report includes this information.

(6) **Response to Comment 7.** These values were checked and the Revised Report includes this information.

(7) **Response to Comment 8.** Whole effluent toxicity tests reviewed as part of the study were those required by NPDES permit AR0022004. The critical dilution for the WET tests is 100% and the dilution series required by the permit is 32%, 42% 56%, 75%, and 100%. The Revised Report includes this information.

Several references for conversion of specific conductance (SC) to TDS are available. Hem (USGS, 1989) reports a common range of SC to TDS conversion from 0.55 – 0.75 depending upon the levels of conductivity measured. For our conversion, we used TDS = SC x 0.65 to estimate TDS based upon In-situ, Inc. (2005). Measured specific conductance and TDS from effluent samples taken during the study ranged from TDS = 0.57 – 0.69 x SC. The mean from our study data was TDS = 0.67 x SC.

(8) **Response to Comment 9.** Minerals toxicity has long been known to vary depending on which ions are contributing the most to the TDS. Generally, K is more toxic than HCO_3 which is more toxic than Mg>Cl>SO_4, etc. Recent research on minerals toxicity at Colorado State University (Clements and Kotalik, 2016) using mesocosms found that of the families tested, Heptageniidae, Baetidae, and Ephemerellidae were the most sensitive families to high specific conductance. Since TDS and conductivity are directly related, these families were evaluated in the samples from the Huntsville study. A table is provided below that summarizes upstream versus downstream abundances of the most sensitive families according to the Colorado State's recent publication.

Family	TB-1	TB-2	HC-1	HC-2	WC-1	WC-2
Baetidae	129	120	275	316	66	93
Heptageniidae	12	0	91	20	35	91

Ephemerellidae was not present in any of the stream reaches. Heptageniidae abundance was higher at the downstream station in War Eagle Creek. At Town Branch, there were no Heptadeniids downstream of the discharge, however, since abundance was also low upstream they may have been present downstream just not captured in our sample. In Holman Creek, the Heptageniidaes were present in reasonable numbers downstream of the discharge, but were more abundant upstream. Baetidae abundances were higher downstream of the effluent at Holman and War Eagle Creeks and slightly lower in Town Branch.

Clements and Kotalik also found that of the three salts tested, MgSO4, NaHCO3, and NaCl, macroinvertebrates had a higher tolerance for NaCl than the other two salts. They measured the differences between the control and experimental mesocosms with an EC20 endpoint, which was the specific conductance that reduced one or all twelve macroinvertebrate metrics (Heptageniidae, EPT abundance, Total Diptera, etc.) by 20% compared to the control mesocosms. The effect that NaCl had on macroinvertebrate communities collected from the river with lower background conductivity (60-72 µS/cm) was greater than those collected at the river with higher background conductivity (200-250 µS/cm). The EC20 value for all macroinvertebrate metrics was 42% lower in the river with lower background conductivity compared to the river with higher background conductivity. This finding indicates that macroinvertebrates that have been historically exposed to higher conductivities or elevated TDS and chlorides are less sensitive to dissolved minerals than those that have not been exposed. The study found that in the river with lower background conductivity, macroinvertebrate abundance was not effected by NaCl until the specific conductance reached over 1,000 µS/cm. Over 1,000 µS/cm specific conductance was not achieved until 300 mg/L of NaCl was added to the lower background conductivity water (60-72 µS/cm). Data from TB-2, just downstream from the City of Huntsville discharge had an average conductivity of 673 µS/cm, with a maximum of 1070 µS/cm. Chloride concentrations averaged 120 mg/L with a maximum of 250 mg/L from September 2010 to June 2012. According to the study findings, conductivity was not sufficiently high to negatively impact macroinvertebrates, even assuming they were not acclimated to high conductivity (which they are). Therefore, it is unlikely that the mineral levels discharged by the Huntsville Waste Water Treatment Plant (WWTP) are having a negative impact on the macroinvertebrate community, especially since the organisms have been well accumulated to higher conductivity for decades. The Revised Report includes this information.

(9) **Response to Comment 10.** The purpose of measuring temperature, pH, specific conductance, and dissolved oxygen in an effluent is to obtain data to assist in determining if the treatment plant is functioning normally. These data are routinely collected and reported by those completing scientific studies but routinely not discussed in detail unless some problem is encountered. No changes were made to the Report in response to this comment.

(10) **Response to Comment 14**. When the study was initiated development of a site specific criterion for sulfate was not contemplated as sulfate was not a known issue based upon ADEQ's ambient monitoring. Therefore, sulfate was only collected during the study on four occasions in Town Branch below the outfall (TB-2). However, after study completion it was determined that sulfate concentration had increased at ADEQ's Holman Creek monitoring station. The increase in sulfate was caused by Huntsville WWTP's use of aluminum sulfate to meet a phosphorus permit limit. It was determined that the sulfate issue would be addressed in the proposed rulemaking.

TDS and chloride were collected at TB-2 during the study and can be used to predict the sulfate concentrations present during the biological study. In order to have the minimum of ten in-stream data point to use in criterion development, other data collected during the study by GBMc, the City, and ADEQ were analyzed to determine how sulfate levels at TB-2 could best be calculated. The following statistical analyses were completed with the outcome noted in the second column.

Regression analysis of effluent TDS to sulfate	Weak correlation – $R^2 = 0.008$
Regression analysis of effluent TDS to chloride	Strong Correlation – $R^2 = 0.78$
Regression analysis of Holman Creek downstream of discharge TDS to sulfate	Strong Correlation – $R^2 = 0.90$
Percentage of TDS composed of sulfate in effluent	9.4% (95%CI = 8.6 - 10.2)
Percentage of TDS composed of sulfate at TB-2	9.1% (95%CI – n/a)
Percentage of TDS as sulfate at HC-2	10.7% (95%CI = 10.0 - 11.5)

The two most reasonable methods were tested to predict sulfate level at TB-2 on the same days that TDS were collected. The regression equation from the HC-2 analysis was used for one method, and a conservative 9% of TDS was used for the other method. The

resulting analysis, along with the projected criteria (95%tile), is provide in the table below.

Date	Chloride (mg/L)	Sulfate (mg/L)	TDS (mg/L)	Predicted SO4 from HC-2 Correlation	Actual Measured % of TDS	9% of TDS	9% of TDS (with measured values inserted)	Predicted SO4 (with measured values inserted)
7/7/2011	250	40	900	80.3	4.4	81.0	40.0	40.0
8/24/2011	150	62.0	530	50.9	11.7	47.7	62.0	62.0
9/14/2011	200	--	680	63.1		61.2	61.2	63.1
10/12/2011	130	50.0	620	58.3	8.1	55.8	50.0	50.0
11/17/2011	80	--	270	28.5		24.3	24.3	28.5
12/8/2011	42	--	250	26.7		22.5	22.5	26.7
1/18/2012	100	--	380	38.3		34.2	34.2	38.3
2/2/2012	41	--	240	25.8		21.6	21.6	25.8
3/27/2012	30	--	220	23.9		19.8	19.8	23.9
4/10/2012	79	52	420	41.7	12.4	37.8	52.0	52.0
5/9/2012	150	--	540	51.8		48.6	48.6	51.8
6/21/2012	190	--	570	54.2		51.3	51.3	54.2
			Mean	**45.3**	**9.1**	**42.2**	**40.6**	**43.0**
			95%tile	**70.9**		**70.1**	**61.6**	**62.5**

The recommended site specific criterion for sulfate based upon the four-sample 95 percentile calculation is 61 mg/L. The most conservative outcome of the from the additional statistical analysis is 61.6 mg/L resulting from the 9% of TDS method. The range of values from the additional statistical analysis was 61.6 mg/L to 70.9 mg/L. Based on the results of the analyses we recommend that a site specific criteria of 61 mg/L be used in Town Branch downstream of the effluent discharge. The Revised Report includes this information.

(11) **Response to Comment 15.** Any misleading language was unintentional has been edited in the Revised Report. Comment 15 is correct as Hilsenhoff 1987 states that "a "biotic index" was proposed for evaluating the water quality of streams through the study of their fauna". The scale for biotic indices categorize the quality of water in which macroinvertebrates inhabit. The opposite could be implied, because the water quality is fair, the macroinvertebrate community could be described as fair. Our use of the word fairly was meant to imply a middle range since the fair category is in the middle of the scale.

(12) **Response to Comment 17.** An additional reference stream was added to the study at the request of ADEQ. Three upstream reference sites were used in the

study as specified in the final QAPP for the project. The Administrative Guidance Document specifies that studies conducted pursuant to Reg. 2.306 be conducted using an upstream-downstream study configuration.

Although Town Branch Creek is the most "urbanized" area of the study urbanized is a relative term in a town with a population of approximately 2,300 residents. From the perspective of dissolved minerals, (the focus of this study), TB-1 contains a large percentage of EPT species, including species sensitive to elevated TDS (conductivity). Holman Creek does have a completed TMDL, however HC-1 is upstream of the stream reach associated with the TMDL. Therefore, both TB-1 and HC-1 are suitable references and were approved for use via the QAPP.

(13) **Response to Comment 18.** A reference to ADEQ community similarity index was added and the scoring index was added to Appendix G of the Revised Report.

(14) **Response to Comment 22.** Key and Indicator species were miscounted because of an excel spreadsheet formula error at 3 stations. Below is a table summarizing the differences in what was reported in the original report and what the Revised Report contains for key and indicator species. The Revised Report includes this information.

Parameter		Station					
COMMUNITY MEASURES		TB-1	TB-2	HC-1	HC-2	WEC-1	WEC-2
Number of Key & Indicator Species Taxa	March 2013 report	6	6	6	7	8	7
	Corrected for revised report	6	7	7	6	8	7

(15) **Response to Comment 28.** Attached as Exhibits A and B are letters from the Arkansas Department of Health and the Arkansas Natural Resources Commission addressing the lack of a domestic water supply use.

(16) **Response to Comment 30.** A turkey processing facility has discharged wastewater to the City of Huntsville's Waste Water Treatment Facility for the past 40 plus years, since 1973. Dissolved minerals (specifically TDS) became a known issue with publication of the Arkansas 2008 303(d) list. Huntsville's WWTP is well suited to treat the Butterball wastewater for pollutants such as BOD, ammonia, and nutrients. It would be impractical for Butterball to obtain its

own NPDES permit. First, the facility would need to build a separate advanced wastewater treatment plant (assuming they would be required to meet similar limits as the City). Second, they would be faced with the same dissolved minerals issue as the City, which an advanced waste water treatment facility would not remove. In addition, removal of the Butterball wastewater from the Huntsville WWTP would be devastating to the City financially, and a poor idea from a treatment perspective as an under loaded activated sludge plant would not function properly, causing Huntsville to violate their NPDES permit for some period of time.

(17) **Response to Comment 31.** This comment requests reference to EPA's "Interim Economic Guidance for Water Quality Standards Workbook." The workbook is designed to address economic considerations associated with designated uses, variances, and antidegradation. Specifically, the workbook is aimed at obtaining information associated with substantial and widespread economic and social impact which is one of the six factors that can be used to remove a designated, but not existing use, within the context of a use attainability analysis (UAA). 40 CFR §131.10 provides the regulations that specify when a UAA is required and when it is not. 40 CFR §131.10(j) lists the circumstances where a UAA must be conducted including when "the state wishes to remove a designated use that is specified in section 101(a)(2) of the Act, to remove a sub-category of such a use, or to designate a sub-category of such a use that requires criteria less stringent than previously applicable."

40 CFR §131.10(k) provides the circumstances under which a state is not required to conduct a use attainability analysis, including when "the state wishes to remove or revise a designated use that is a non-101(a)(2) use. Toward this end, Arkansas has an established an EPA approved program to remove non-101(a)(2) uses and establish less stringent water quality criteria without affecting a fishable/swimmable use pursuant to Arkansas Pollution Control and Ecology Commission Regulation 2.306. In fact, modification of Ecoregion Reference Stream Minerals Values can only be accomplished in accordance with Regulation 2.306. Regulation 2.306 excludes modification of criteria associated with fishable/swimmable uses. Studies conducted pursuant to Regulation 2.306 are not UAA studies.

(18) **Response to Comment 32.** Butterball performed calculations to simulate the complete removal of all calcium chloride brine and sodium hypochloride brine associated with the chiller freeze system. This has been done twice, once reflecting the period of January - October 2010 and again January - October 2016. To accomplish the calculations Butterball determined pounds of calcium chloride

and sodium hypochloride purchased and used in the chiller system, and the average TDS concentration sent to the Huntsville WWTP during the period. Butterball then determined the pounds per day of calcium chloride and sodium hypochloride added to the wastewater effluent, and then converted the pounds per day to concentration. In the final step the concentration of calcium chloride and sodium hypochloride added to the wastewater effluent (assumed that these compounds made up TDS) was subtracted from the average TDS concentration sent to the Huntsville WWTP. For the 2010 period Butterball estimated that average TDS could be reduced from 1,047 mg/L to 685 mg/L, which is a 35% reduction. For 2016 Butterball estimated that average TDS could be reduced from 1,078 mg/L to 845 mg/L, which is a 22% reduction. In the original report this reduction was inaccurately described as minimal, however even with these reductions (potentially achieved at a cost $15 million to replace the chiller system) discharge concentrations would remain well above permit limits needed to achieve the current water quality criteria.

(19) **Response to Comment 33.** Butterball evaluated their facility to determine each area of the plant and the processes that use salts. Butterball identified 20 potential points of loss of salts to the sewer system. Once identified, Butterball investigated management practices designed to reduce salt (brine) losses to the sewer system that are ultimately piped to the Huntsville WWTP. Meetings were held with employees at each area with the intent of educating the employees on the importance of preventing salt loss to the sewer system. Monitoring programs were established and estimates of percentage reductions were established for each of the potential points of salt loss to the sewer system as shown in the following table.

Plant Area	Description	Est. Gal/Day Loss	Est.Annual Gal. Loss (260 days/year)	Action Taken	Status	Est. Reduction Percent
Spice Room	Area where all spices are weighed out prior to use in brine formulas.	Not Measurable	NA	Meeting held with employee responsible, to dispose of in the trash.	Implemented	Not Estimated
Stunner	Salt used in stunner and in holding tank outside Kill room.	Not Measurable	NA	Meeting held with employees concerning issues of TDS, discussed way of reduction.	Implemented	Not Estimated
Packaging Brine Mixer	Consists of mixing system, holding tank, plate chiller.	Not Measurable	NA	Minimize batch sizes at shift end to reduce what is dumped daily.	Implemented	Not Estimated
Basters	Overhead piping system, basters,	428	111,360	Monitor basters, pumps and piping for leaks	Implemented	50%

Plant Area	Description	Est. Gal/Day Loss	Est.Annual Gal. Loss (260 days/year)	Action Taken	Status	Est. Reduction Percent
	and 2 belts after baster.			and report to maintenance. Establish PM's on equipment.		
Sodium Hypochloride Brine	Salt system to chill BRT/BIB.	High Conc.	NA	Not feasible. Would require new Freezing System to eliminate.	Not Implemented	NA
Calcium Chloride Brine	Calcium chloride system to chill WB.	High Conc.	NA	Not feasible. Would require new Freezing System to eliminate.	Not Implemented	NA
Blenders	Spices added to MST blending, Prague and Salt.	Not Measurable	NA	Improve process for adding ingredients to reduce spills.	Implemented	Not Estimated
Mixing Tank	Mixing system for formulation of brine (tanks, piping).	Not Measurable	NA	Minimize batch sizes at shift end to reduce what is dumped daily.	Implemented	Not Estimated
Injectors	Injecting of product, including saddle tanks and returns	70	18,200	Monitor basters, pumps and piping for leaks and report to maintenance. Establish PM's on equipment.	Implemented	50%
Mixing Tank	Mixing system for formulation of brine. Consists of tanks, piping.	Not Measurable	NA	Minimize batch sizes at shift end to reduce what is dumped daily.	Implemented	Not Estimated
Injectors	Injecting of product, included saddle tanks and returns.	35	9,100	Monitor basters, pumps and piping for leaks and report to maintenance. Establish PM's on equipment.	Implemented	50%
Mixing Tank	Mix gravy spice, includes 2 tanks and pipe.	Not Measurable	NA	Meeting held with employees to minimize spills, and run gravy until tanks emptied to eliminate draining at shift end.	Implemented	Not Estimated
Gravy Machine	Injection of Gravy into packets.	Not Measurable	NA	Insure process is stopped when leaks detected. Minimize rejected packets so not to enter sewer system.	Implemented	Not Estimated
Mixing Tank	Mixing system for formulation of brine. Consists of tanks, piping.	Not Measurable	NA	Minimize batch sizes at shift end to reduce discarded brine volume.	Implemented	Not Estimated
Injectors	Injecting of product, included saddle tanks and returns.	70	18,200	Monitor basters, pumps and piping for leaks and report to maintenance. Establish PM's on equipment. Catch purge on table prior to placing on racks.	Implemented	75%
Rack Loss	Time from injection to	168	33,600	Not feasible. Would require moving cook	Not Implemented	0%

Plant Area	Description	Est. Gal/Day Loss	Est.Annual Gal. Loss (260 days/year)	Action Taken	Status	Est. Reduction Percent
	loading into oven, brine drainage from birds.			operations to another Butterball facility.		
Ovens	Purge from highly injected cooked whole birds, BIB's and drums on open racks.	Not Measurable	NA	Not feasible. Would require moving cook operations to another Butterball facility.	Not Implemented	NA
Cook side	Drainage of birds from chill.	Not Measurable	NA	Not feasible. Would require moving cook operations to another Butterball facility.	Not Implemented	Not Estimated
Cajun spice (HBH)	Floor loss by adding topical spice.	145	3,625	Make sure spills are cleaned up with broom and disposed of in trash vs. washing down the drain	Implemented	75%
Spice area	Floor loss by adding topical spice.	Not Measurable	NA	Make sure spills are cleaned up with broom and disposed of in trash vs. washing down the drain.	Implemented	Not Estimated

(20) **Response to Comment 34.** The City of Huntsville uses liquid aluminum sulfate at a feed rate of 0.394 liters/min. This equates to 150 gallons of liquid aluminum sulfate per day. No formal studies have been conducted but the City has used a series of trials to determine the feed rate needed to remain in compliance with the phosphorus effluent limit. It is the City's intent to use the minimum amount of aluminum sulfate necessary to remain in compliance with its phosphorus permit limit, both from a financial perspective and an ecological perspective.

(21) **Response to Comment 37.** The Revised Report contains the macroinvertebrate equations.

(22) **Response to Comment 38.** Whole effluent toxicity testing reported was conducted as required by NPDES Permit No. AR0022004. The study report contained only a summary of those tests in accordance with the approved QAPP. Any information requested (including the Laboratory WET Test Reports) can be found on ADEQ's website.

For Ceriodaphnia, a control failure invalidated the 2-2-2010 test. The test was redone and reported in the summary information at 3-16-2010. Likewise, a control failure invalidated the 1-31-2012 test, which was redone and reported in

the summary information at 2-28-2012. Pimephales was not tested on 8-18-2008 as that test was a retest following Ceriodaphina control failure. Pimephales was not tested on 3-16-2010 because that date was a Ceriodaphnia retest (following control failure) only. Pimephales was not tested on 2-28-2012 because that date was a Ceriodaphnia retest (following control failure) only.

The permit in effect at the time only required the City to complete retests after sublethal test failure during the first four quarters of testing. The test failures were not within the first four quarters of testing; therefore, the City was not required to retest. NPDES Permit No. AR0022004 is available on ADEQ's website.

The test results for Fathead minnow for the 1-31-2012 test were accurately reported.

(23) **Response to Comment 39.** The information provided in two feasibility assessments is consistent with information provided in EPA approved rulemaking conducted pursuant to Reg. 2.306. To date all Reg. 2.306 studies conducted have determined that minerals removal technology has not been a feasible alternative in Arkansas.

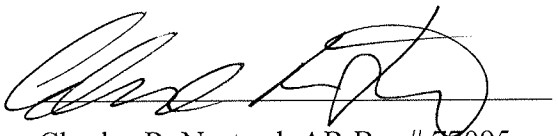
(24) **Response to Comment 40.** The referenced study was draft at the time the Report was prepared. A link to the final USGS study report follows: https://pubs.usgs.gov/sir/2013/5019/

(25) **Response to Comment 41.** The capital cost estimates reviewed by EPA were prepared prior to initiation of the supplemental study requested by the Commission. The Revised Report includes this information from the supplemental study.

15. For clarity of the record, the Report has been edited to reflect the responses to comments on the Petition, and is attached hereto as Exhibit D (Revised Report).

Respectfully submitted,

BARBER LAW FIRM
425West Capitol, Suite 3400
Little Rock, AR 72201
Telephone: 501-372-6175
Facsimile: 501-375-2802

By: 
Charles R. Nestrud, AR Bar # 77095

CERTIFICATE OF SERVICE

I, Charles R. Nestrud, state that I have, on this 15 day of August, 2017, hand-delivered a copy of the foregoing Response to Comments:

Mr. Basil Hicks
Arkansas Department of Environmental Quality
5301 Northshore Drive
North Little Rock, AR 72118.


Charles R. Nestrud

EXHIBIT A

August 3, 2017 Letter from
Arkansas Department of Health

Arkansas Department of Health

4815 West Markham Street • Little Rock, Arkansas 72205-3867 • Telephone (501) 661-2000
Governor Asa Hutchinson
Nathaniel Smith. MD. MPH. Director and State Health Officer

August 3, 2017

Mr. Robert E. Blanz. PhD, P.E.
Chief Technical Officer
Office of the Director
Arkansas Department of Environmental Quality
5301 Northshore Drive
North Little Rock, AR 72118

RE: Drinking Water Sources
Town Branch, Holman Creek, and War Eagle Creek

Mr. Blanz:

This letter is in response to your correspondence to me dated July 27, 2017, concerning domestic drinking water source use for Town Branch and Holman Creek.

Town Branch, Holman Creek, and also War Eagle Creek are located within the watershed of Beaver Lake, a source of drinking water to over 400,000 Arkansans. The Arkansas Department of Health has consistently maintained that the drinking water use designation is appropriate and necessary for all streams within the Beaver Lake watershed. Pollution that enters the lake from Town Branch and Holman Creek will have a direct effect upon water quality in this drinking water supply lake. The drinking water supply intake structures themselves are not located on either Town Branch or Holman Creek but are never the less vulnerable from any pollution that might occur on those reaches. There are currently no proposals to locate drinking water intake structures on these two reaches.

Originally, the Secondary Drinking Water Standards for chlorides, sulfates, and total dissolved solids were included in the federal Safe Drinking Water Act based upon issues relating to palatability. However, recent events in Flint, Michigan have clearly demonstrated that dissolved chlorides can have deleterious effects upon plumbing corrosion rates even when concentrations are below the secondary standards. This complicates drinking water systems efforts to minimize consumer exposure to lead and copper and can also increase drinking water treatment costs.

If water sources like Beaver Lake are to remain high quality drinking water sources, it will require all relevant governmental bodies to include an awareness of and concern for drinking

water protection as part of their decision making processes. The Arkansas Department of Health will continue to be a voice for drinking water source protection and will continue to encourage all stakeholders to remain cognizant of drinking water source protection during their decision making processes.

Sincerely,

Jeff Stone, PE
Director Engineering Section
Arkansas Department of Health

Cc: Beaver Water District

Benton-Washington Regional Public Water Authority

Carroll-Boone Water District

Madison County Regional Water

EXHIBIT B

July 26, 2017 Letter from
Arkansas Natural Resources Commission

Arkansas Natural Resources Commission

Bruce Holland
Executive Director

101 East Capitol, Suite 350
Little Rock, Arkansas 72201
http://www.anrc.arkansas.gov/

Phone: (501) 682-1611
Fax: (501) 682-3991
E-mail: anrc@arkansas.gov

Asa Hutchinson
Governor

July 26, 2017

Mr. Shon Simpson
GBM^c & Associates
219 Brown Lane
Bryant, AR 72022

RE: Domestic Water Supply Determination
GBM^c No. 4450-11-070

Dear Mr. Simpson:

In accordance with the State of Arkansas Continuing Planning Process and APCEC Regulation #2 requirements, Commission staff reviewed the proposed removal of the Designated Domestic Water Supply Use from reaches of Town Branch and Holman Creek near Huntsville, Arkansas in 2013 and identified no conflict with the Arkansas Water Plan. It is noted that Holman Creek is a tributary to War Eagle Creek which is a tributary to Beaver Lake. Another review confirms no existing or planned public water supply uses for these reaches of Town Branch and Holman Creek are documented. Therefore, the removal of the domestic water supply use designation does not conflict with any identified domestic use projects in the Arkansas Water Plan at this time.

If you have questions, don't hesitate to contact us at 501-682-3830.

Sincerely,

Kenneth W. Brazil, P.E.
Engineer Supervisor, Water Management

EXHIBIT C
May 19, 2016 EPA Comments

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 6
1445 ROSS AVENUE, SUITE 1200
DALLAS TX 75202-2733

May 19, 2016

Sarah Clem
ADEQ Branch Manager
Arkansas Department of Environmental Quality
5301 Northshore Drive
Little Rock, AR 72118-5317

Re: Environmental Protection Agency comments on the Proposed 3rd party rule by the City of Huntsville

Dear Ms. Clem:

The Arkansas Pollution Control and Ecology Commission (APC&EC) held a public hearing on October 28, 2013 to receive comments on a 3rd party proposal by the City of Huntsville regarding changes to APC&EC Regulation No. 2. The proposed amendments to Regulation No. 2 include modification of the water quality criteria for Town Branch and Holman Creek to: Cl, 185 mg/l; SO4, 41 mg/l; and TDS, 525 mg/l. For War Eagle Creek, from its confluence with Holman Creek downstream to its confluence with Clifty Creek, the proposed new standards would be: Cl, 130 mg/l; SO4, 30 mg/l; and TDS, 407 mg/l. For War Eagle Creek, from its confluence with Clifty Creek downstream to its confluence with Beaver Lake, the proposed new standards would be: Cl, 97 mg/l; SO4, 24 mg/l; and TDS, 337 mg/l. In addition, Huntsville's proposal would remove the designated domestic water supply use for the affected sections of Town Branch and Holman Creek. The Environmental Protection Agency Region 6 (EPA) would like to offer the following general and enclosed detailed comments for the ADEQ's consideration.

The supporting site specific water quality study document for the proposed rulemaking states that the purpose of this study was to propose site specific minerals criteria that would reflect the current discharge concentration, support the designated fishery use, and support the existing domestic water supply use of Beaver Lake.

EPA Region 6 has some concerns about the supporting material presented in the study document. Our two major concerns are that inappropriate input values were utilized to conduct the mass-balances that were used to determine the proposed criteria and that aquatic life use protection was not demonstrated for all the proposed criteria values. The mass-balance utilized an assumed flow of 4 cfs for Town Branch and Holman Creek and utilized ecoregion values for background minerals concentrations. It would be more accurate to use actual site specific data for minerals concentrations and flow. In addition, the 4 cfs flow value that was utilized for Town Branch and Holman Creek is not appropriate since Act 954 has been repealed. Since the proper inputs were not utilized in these equations, the proposed criteria may be inappropriate as well. The protection of aquatic life use was demonstrated by assessing the current biotic community in each of these reaches and comparing upstream and downstream communities. While this is useful information for determining what species are currently in these streams and whether the current effluent

discharge is impacting those species, the proposed criteria for some of these reaches are higher than the current conditions the species are experiencing. This is particularly true for War Eagle Creek where the TDS values measured at WEC-2 ranged from 72 mg/L to 270 mg/L. The TDS criterion proposed for this section of War Eagle Creek is 407 mg/L, higher than the maximum TDS value measured in this reach. Further demonstration beyond the biotic studies needs to be included to show these species are protected at these higher criteria values. Additional concerns about the current study and proposed criteria are included in the attached enclosure.

EPA appreciates the opportunity to comment on the proposed 3rd party proposal. If you have any questions, please contact me at (214) 665-3185.

Sincerely,

Karen Kesler
Water Quality Standards Coordinator
Watershed Management Section

Enclosure

Enclosure

Technical Comments on:

Second Amendment to Exhibit F to Huntsville Petition
City of Huntsville, Arkansas Section 2.306 Site Specific Water Quality Study: Town Branch, Holman Creek, and War Eagle Creek (Revised July 26, 2013)

These comments are being provided to the Arkansas Department of Environmental Quality (ADEQ) in response to the document titled *City of Huntsville, Arkansas Section 2.306 Site Specific Water Quality Study: Town Branch, Holman Creek, and War Eagle Creek.* This study was intended to support the modification of Arkansas water quality standards (water quality criteria) by establishing site specific criteria for chloride, sulfate, and total dissolved solids (TDS) in Town Branch, Holman Creek, and War Eagle Creek. In addition, this study was intended to support the removal of the domestic water supply designated use for Town Branch and Holman Creek.

Technical Comments

1.0 Introduction

1.1 Background

1. Figure 1.1 needs to identify the location of the discharge outfall clearly on this map.

2.0 Significant Findings and Recommendations

2.1 Recommendations

2. 4.0 cfs is not an appropriate background flow for Town Branch and Holman Creek as Act 954 has been repealed. The critical background flow should be based on actual flow data and values.

2.2 Significant Findings

3. In 4.a. it is stated that a significant proportion of each downstream community is comprised of EPT taxa. So that it can be determined how this compares to reference sites, please specify what EPT taxa proportion was present in upstream sites and in ecoregion reference sites.

3.0 Background

3.1 Introduction

4. War Eagle Creek is also currently on the Arkansas 2008(d) list for Beryllium due to an unknown source (category 5d). This information should be added into the background information about this creek.

3.2 Designated Uses – Water Quality Criteria

5. The ecoregion reference stream values rather than the calculated ecoregion reference stream values should be presented here and throughout the document. Please refer to the current version of Regulation No. 2 for these values.

4.0 Outfall 001 Characterization

4.1 Chloride, TDS, Sulfate and Discharge

6. The source of the data presented in Table 4.1 need to be clarified. While some of this data does come from the monthly sampling records of the Huntsville WWTF outfall, this only accounts for 12 lines of this table. The source of the rest of these data are unaccounted for. While the text states that some of these data are from the DMR reports, the attached DMR reports present monthly averages and do not account for the individual dates that are presented. The DMR reports also do not report sulfate or chloride values, so it needs to be made clear from what sampling events these values were attained. In addition, there appears to be a typo for the 12/8/2011 entry; chloride should be 110 mg/L not 10 mg/L. This change would also adjust the summary values at the end of this table, with the minimum chloride value being 22 mg/L.

7. Some values need to be verified for Table 4.2. For January 2012 the daily maximum flow should be 2.52 mgd and for April 2012 the monthly average flow should be 1.06 mgd. In addition, the two summary values are incorrect. The highest monthly average flow was 1.46 mgd and the highest daily maximum flow was 3.63 mgd.

4.3 Whole Effluent Toxicity Testing

8. The dilutions that were conducted for WET testing need to be stated, particularly in places where NOEC concentrations were determined. In addition the choice of conversion factor used for the TDS conversion needs to be justified.

9. A more in depth discussion of how minerals cause toxicity needs to be incorporated here. Toxicity is effected not only by the absolute TDS value, but also by the ratio of the individual ions and the hardness of the water. Given this, the correlation between TDS and reproductive NOEC is not the best predictor of toxicity. In addition, *C. dubia* have not been found to be the most sensitive species to minerals, with some EPT taxa demonstrating greater sensitivity. Given this the WET testing is part of the picture, but does not assure that impacts from the minerals will not be experienced by other more sensitive species.

4.4 Effluent *In-situ* Measurements

10. Explain what the purpose of this sampling was and include discussion of its significance.

5.0 Field Study

5.2 Ambient Water Quality

11. In figure 5.1, the discharge outfall needs to be clearly marked. Also would be useful to trace over the path of the streams so that it can be clearly seen on the map. It would also be useful to include a map that highlights the 4 reaches for which changes in criteria are proposed.

5.2.1 Total Dissolved Solids and Chloride Data

12. The City of Huntsville is requesting criteria revisions for chloride and TDS for War Eagle Creek to values that are much higher than the values that are currently being attained in that creek. The City of Huntsville has proposed the chloride criterion be revised to 130 mg/L for War Eagle Creek from the confluence with Holman Creek to Clifty Creek and for the criterion to be revised to 97 mg/L for War Eagle Creek downstream from the confluence with Clifty Creek to Beaver Lake. These values are much higher than the 15.4 mg/L that was measured as the average chloride level at WEC-2, which is the site downstream of the current effluent impact. It is also more than twice the value of the maximum value measured at WEC-2, 42 mg/L. On average, WEC-2 is meeting the chloride standard (17.3 mg/L) and has exceeded it 4 times out of 12 samples during the course of the year study. This seems to indicate that a criteria change for War Eagle Creek is not actually necessary, or if so, only by a small amount, not the large criteria revision that is being requested. This same situation is also present for TDS. A revision to the TDS criterion has been requested for War Eagle Creek to a value of 407 mg/L for the reach from the confluence with Holman Creek to Clifty Creek and to a value of 337 mg/L from the confluence with Clifty Creek to Beaver Lake. These values are much higher than the values that are actually being achieved in this stream, which on average is 145.6 mg/L for WEC-2, with a maximum value of 270 mg/L. The current criterion is 250 mg/L, which is being met on average at WEC-2 and was only exceeded once during the course of the study.

13. There is also a typo in table 5.1. The average chloride value for Outfall 001 is 199 mg/L, not 209 mg/L.

14. Table 5.2 presents the results of several parameters that were sampled at 4 times through the course of the study period. Included amongst these parameters is sulfate, one of the parameters that the City of Huntsville would like to create site-specific criteria for. This is not sufficient sampling to accurately describe sulfate levels in the four reaches

considered and more data would need to be collected before a decision about the sulfate criteria could be determined. Ideally 12 months of data would be necessary for review, as has been presented for TDS and chloride. If data has been collected in these streams by another entity over this time frame that would also be acceptable.

5.4 Benthic Macroinvertebrate Community

5.4.2 Results

15. The description of the biotic index result is misleading in this section. The scores were said to indicate a fairly sensitive macroinvertebrate community when the scores actually fell into the fair category of water quality as defined in Hilsenhoff 1987. Fair and fairly sensitive have two different connotations, with fairly sensitive implying that the community status is better than what is actually present. In addition, when scores fell into the fairly poor water quality category, only the score was reported and a narrative about the water quality level was not.

5.4.3 Summary and Discussion

16. The y-axis of figure 5.13 needs to be labeled. Also the name Shackleford is misspelled in the figure legend.

17. Need to include a comparison of the sampling data with a reference site in order to be able to classify how conditions vary from a minimally disturbed site. Given the presence of a TMDL on Holman Creek and the urbanization surrounding Town Branch, it is unlikely that the upstream sites for these streams are at least minimally disturbed.

5.5 Fish Community

18. A reference for the ADEQ ecoregion based community similarity index needs to be provided as well as the equations used to calculate this index and the reference for the score classifications for this index.

19. For figure 5.14, the y-axis needs to clarify to what taxonomic level fish were identified.

20. For figure 5.15, two family names are missing from the z-axis label. Either need to reformat the figure to show the names or include the colors and corresponding family names in the figure legend. Also, the figure needs to be reformatted so that the full site names can be read on the x-axis for WE-1 and WE-2.

21. For figure 5.17, the y-axis label needs to be corrected to clearly state what information is represented by that axis.

22. Need to recalculate the number and percent of Key and Indicator species, as the values that EPA calculated for this metric were different than the results presented in the study for several stations.

23. As the proposed criteria in some of these streams are higher than the minerals conditions that are typically experienced, further demonstration of tolerance of those fish and benthic species to the proposed criteria is needed. The question is whether the use will be attained with the proposed criteria, not if it is currently being attained with the current criteria.

6.0 Watershed Description

24. At the top of page 61, the first full paragraph states that Holman Creek is categorized as 4a on the 2008 Arkansas 303(d) list; this appears to be a typo and should be 5a.

7.0 Existing Loadings of Dissolved Minerals

7.2 Mass Balance

25. Act 954 was repealed from AR WQS and therefore 4.0 cfs is not the appropriate background flow to use for Town Branch or Holman Creek. If the goal of the mass-balance is to determine the criteria for critical flow conditions than the 7Q-10 value should be used for background flow.

26. Ecoregion values may not be the best values to use as background concentrations for the mass balance. Using a concentration from site-specific monitoring data would be more appropriate.

27. Input values into the mass balance seem inappropriate as they did not seem to account for the concentration of the minerals in the upstream water entering the downstream water body. The effluent should only be considered as an input once, into Town Branch, and then the input should be the concentrations from the upstream water bodies.

7.3 Drinking Water Use Water Quality Criteria

7.3.1 Drinking Water Use Removal

28. Additional support needs to be provided that demonstrates that Town Branch and Holman Creek are not existing domestic water supplies, and that this use is not attainable for these streams. Things that would be useful would be verification of the intermittent nature of the streams and letters from the Arkansas Natural Resources Commission and Arkansas Department of Health verifying that these water bodies are not used for/ will not be used for a domestic water supply.

29. Same concern as stated in comment #27. The mass balance does not appear to have the correct input values for the minerals concentrations, since it is not using the input from the upstream mass balance.

8.0 Alternative Analyses

8.3 Treatment

30. Discuss the difficulties with Butterball obtaining its own NPDES permit and being responsible for correcting the minerals discharge issue that is largely generated by their facility. Discuss why it is a better option for Huntsville to continue to treat this discharge, which it appears to currently not have the resources to do.

31. Need to demonstrate more thoroughly how the cost is overly burdensome. Need to describe what impact would be passed cost wise to the public and what the actual chance is of the Butterball plant moving if this criteria revision is not approved. Please reference EPA guidance on how to demonstrate economic impacts, http://www2.epa.gov/wqs-tech/economic-guidance-water-quality-standards.

8.4 Source Reduction/Pollution Prevention

32. When discussing the replacement of the current freeze system with a new blast system, it states that TDS will be minimally reduced. What are the actual reduction numbers and how does that compare to the current effluent?

33. The study also states that Butterball has conducted engineering studies on chloride and TDS reduction that have only found minor reductions. What were the reduction measures considered, what were their costs, and what were the TDS and chloride reduction amounts?

34. The study also discusses the use of aluminum sulfate to reduce the amount of total phosphorus in the effluent. How much aluminum sulfate is used and have studies been conducted to determine if this is the minimum needed to attain the desired reduction in phosphorus levels?

10.0 Selected Alternative

35. What is the watershed size that was used to adjust the average flow of War Eagle Creek at its confluence with Holman Creek?

36. Does not appear that the mass balance equation is using the most appropriate input values for determining the mineral levels in War Eagle Creek.

Appendices

37. Need an appendix that presents the equations that were used to calculate the biotic index, quantitative similarity index, and indicator assemblage index.

Appendix D Whole Effluent Toxicity

38. Limited information was provided about the process undertaken to perform the WET testing and the data that were presented as the results of the WET testing are unclear at times. The methods that were used to conduct this testing should be included (dilutions used, control water used, source of organisms, etc.) along with information about the company that performed this testing and the chain of custody forms confirming the time frame of the transport of the samples. In addition, the reason why no data were provided for *Ceriodaphnia dubia* testing on 2/2/2010 and 1/31/2012 needs to be included, and the reason why no data were provided for the fathead minnow testing on 8/18/2009, 3/16/2010, and 2/28/2012 needs to be included. Also, it looks like according to the permit that when a failure occurs monthly testing should be conducted for the next three months after that failure. Was this testing performed and if so what were the results? If not, what was the justification for not completing the repeat testing? Also, the table summarizing the WET results is unclear in several instances. First, the units and response variables need to be defined for each column. Second, the acronyms that are used need to be defined. CNTL is not defined in the report. Lastly, why is the survival NOEC for the Fathead Minnow 100% when the survival for the 1/31/2012 test was 77.5% (I'm assuming the metric is % here). That seems to be a large impact on survival, and the NOEC does not appear to be 100% effluent.

Appendix J Alternative Analysis

39. More information needs to be provided in this cost estimate. How does this compare to the overall operating budget of the plant, of the Butterball facility, and the larger Butterball Corporation? Need to demonstrate how this would be an undue burden.

Appendix K USGS Report

40. Please reattach this report with the figures included. Only the figure legends are present in this version.

Technical Comments on:

City of Huntsville, Arkansas Supplemental Report: Feasibility of Treatment Alternative for Total Dissolved Solids and Chloride

These comments are being provided to the Arkansas Department of Environmental Quality (ADEQ) in response to the document titled *City of Huntsville, Arkansas Supplemental Report:*

Feasibility of Treatment Alternatives for Total Dissolved Solids and Chloride. This supplemental report is intended to support the modification of Arkansas water quality standards (water quality criteria) by further describing the alternatives for addressing the high chloride, sulfate, and TDS levels in Town Branch, Homan Creek, and War Eagle Creek.

Technical Comments

3.0 Electrodialysis

41. The capital cost for the electrodialysis treatment is estimated at $22 million and the annual operating cost were estimated to be $2.89 million. These costs are less than the costs estimated for reverse osmosis, which are $30.8 million capital cost and $4.59 million annual operating cost. However, the costs for reverse osmosis are the ones that are presented in the discussion of treatment options in the alternative analyses section of the study. This $30.1 million (this is the value stated in study which is slightly different from the $30.8 million stated in the supplemental report) capital cost and $4.6 million annual cost are also argued as overly burdensome, however these are not the lowest cost treatment options by the applicant's own estimation. The burden of this treatment process should be more thoroughly discussed and evaluated with the lowest cost option before it is dismissed as a viable option. The burden needs to be demonstrated not just stated.

EXHIBIT D
Revised Report