



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

REGION 6
1445 ROSS AVENUE, SUITE 1200
DALLAS, TX 75202-2733

JAN - 3 2008

Teresa Marks
Director
Arkansas Department of Environmental Quality
5301 Northshore Drive
North Little Rock, AR 72118-5317

RE: Site-specific Water Quality Standards Revisions Associated with El Dorado Chemical Company in Union County, Arkansas

Dear Ms. Marks:

Thank you for your recent letter, dated August 17, 2007, requesting review and approval of several site-specific water quality standards revisions to Regulation No. 2, *Regulation Establishing Water Quality Standards for Surface Waters of the State of Arkansas* for four streams in the gulf coastal ecoregion of Arkansas: unnamed tributary to the unnamed tributary to Flat Creek (UTB), unnamed tributary to Flat Creek (UTA), Flat Creek, and Haynes Creek. These streams are also the receiving waterbodies for discharges from El Dorado Chemical Company in Union County, Arkansas.

Your letter included a request for U.S. Environmental Protection Agency (EPA) approval of the removal of the domestic water supply designated uses, along with site-specific criteria for chloride, sulfate, and total dissolved solids (TDS), for these four waterbodies. EPA approved the removal of the domestic water supply designated uses for these four waterbodies on November 9, 2007. This letter responds to your request for EPA approval of site-specific criteria for chloride, sulfate, and TDS, for the four waterbodies as described in Table 1 below.

Table 1. Site-specific water quality criteria revisions for chloride, sulfate, and TDS, for four waterbodies submitted by ADEQ to EPA for review and approval.

Stream Segment Name	Chloride (mg/L)		Sulfate (mg/L)		TDS (mg/L)	
	Previous	Revised	Previous	Revised	Previous	Revised
UTB ¹	14	23	31	125	123	475
UTA ²	14	16	31	80	123	315
Flat Creek ³	14	165	31	67	123	560
Haynes Creek ⁴	14	360	31	55	123	855

¹ Unnamed tributary to the unnamed tributary to Flat Creek (UTB) – from the El Dorado Chemical Company outfall 001 discharge to the confluence with unnamed tributary of Flat Creek (UTA)

² Unnamed tributary to Flat Creek (UTA) – from the confluence of UTB to the confluence with Flat Creek

³ Flat Creek – from the mouth of UTA tributary to the mouth of Haynes Creek

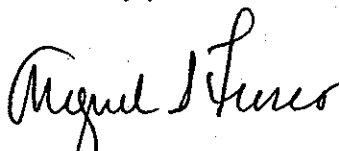
⁴ Haynes Creek – from the confluence of Flat and Salt Creeks downstream to the confluence with Smackover Creek

The Arkansas Pollution Control and Ecology Commission adopted the site-specific chloride, sulfate, and TDS criteria for the four waterbodies identified in Table 1 above as amendments to the Arkansas surface water quality standards via a third party rulemaking in Minute Order 07-19 on June 22, 2007. In accordance with the *Code of Federal Regulations* (CFR) at 40 CFR §131.20, the Arkansas Department of Environmental Quality (ADEQ) then submitted the water quality standards revisions and supporting documentation to EPA for review and approval. The submittal package was received by EPA on September 17, 2007, and included a statement dated August 17, 2007, from Ellen Carpenter, chief counsel for ADEQ, certifying that the amendments were duly adopted pursuant to State law.

We have completed our review of your request to approve the site-specific criteria for chloride, sulfate, and TDS for the four waterbodies as identified in Table 1 above. However, for the reasons described below, EPA is unable to take action on these site-specific criteria revisions. Arkansas' water quality standards submission does not provide adequate supporting documentation to demonstrate that the revised site-specific criteria are appropriately protective. Because a clear demonstration of protection in the supporting documentation is lacking, this submission does not meet the minimum requirements of a water quality standards submission as described in 40 CFR §131.6. Therefore, EPA is unable to take action on these site-specific criteria revisions. Specific issues of concern regarding the adequacy of the supporting documentation for this submission are identified in the enclosure to this letter. We encourage ADEQ to work with the third party, El Dorado Chemical Company, in responding to the issues identified in the enclosure to this letter so that EPA may have the necessary supporting documentation to take action on the adopted revisions.

I would also like to acknowledge the efforts of the Pollution Control and Ecology Commission, and particularly ADEQ, in the development of these revised standards. We look forward to continue working with you on this water quality standards revision and encourage early and up-front coordination on any future proposed water quality standards revisions to facilitate EPA's review of State-adopted water quality standards revisions submitted for approval. If you have any questions or concerns, please contact me at (214) 665-7101, or have your staff contact Melinda McCoy at (214) 665-8059.

Sincerely yours,



Miguel I. Flores
Director
Water Quality Protection Division

Enclosure

cc: Steve Drown, Chief, Water Division, Arkansas Department of Environmental Quality

**Issues of Concern - Supporting Documentation for
Site-specific Water Quality Standards Revisions Associated with
El Dorado Chemical Company in Union County, Arkansas**

A third party, El Dorado Chemical Company, contracted with GBM^c & Associates in order to complete a use attainability analysis (UAA)¹ for four streams in the gulf coastal ecoregion of Arkansas: unnamed tributary to the unnamed tributary to Flat Creek (UTB), unnamed tributary to Flat Creek (UTA), Flat Creek, and Haynes Creek. These streams are the receiving waterbodies for discharges from El Dorado Chemical Company in Union County, Arkansas. The UAA study served as the supporting documentation for the site-specific water quality standards revisions associated with these four waterbodies, which included removal of the domestic water supply use and site-specific criteria for chloride, sulfate and total dissolved solids (TDS).

By letter dated August 17, 2007, the Arkansas Department of Environmental Quality (ADEQ) submitted the water quality standards revisions, along with supporting documentation (the UAA report), to EPA for review and approval. EPA approved the removal of the domestic water supply designated uses for these four waterbodies on November 9, 2007. The information provided below describes specific issues of concern regarding the adequacy of the supporting documentation to demonstrate that the site-specific minerals criteria are appropriately protective, as referenced in the letter accompanying this enclosure.

SITE-SPECIFIC MINERALS CRITERIA

Toxicity Testing

As it pertains to toxicity testing and analyses, supporting documentation to demonstrate that the site-specific minerals criteria for UTB, UTA, Flat Creek, and Haynes Creek are appropriately protective of aquatic life is generally lacking.

UTB

Although Section 3.6.2 – “Whole Effluent Toxicity (WET) Testing” of the UAA report provides the results of outfall 001 biomonitoring for the water flea and fathead minnow from September 2002 to April 2006 for lethal endpoints and from March 2003 to June 2006 for sublethal endpoints, it is not clear what minerals concentrations (chloride, sulfate, and TDS) were associated with each of these tests and whether or not the minerals concentrations during WET testing were representative of the adopted site-specific minerals criteria under review for UTB.

Additionally, although a statement is provided on page 16 of the UAA report to indicate that minerals concentrations in the outfall 001 effluent were not likely responsible for the negative results demonstrated in the biomonitoring conducted prior to April 2005, this statement is not accompanied by supporting details/rationale. Please provide the necessary details/rationale to support the statement that the minerals concentrations in the outfall 001 effluent were not likely responsible for the negative results demonstrated in the biomonitoring.

¹ GBM^c & Associates. 2006. *Section 2.306 Site Specific Water Quality Study for Chloride, Sulfate, and TDS*. Prepared for El Dorado Chemical Company, El Dorado, Arkansas.

UTA, Flat Creek, and Haynes Creek

The supporting documentation in the UAA report does not include a general evaluation or review of the site-specific criteria for UTA, Flat Creek, and Haynes Creek in light of the available scientific literature concerning the toxicity effects of chloride, sulfate, and TDS to aquatic organisms. Supporting documentation from the literature or other appropriate supporting documentation is important for providing a clear demonstration that the site-specific criteria for UTA, Flat Creek, and Haynes Creek are appropriately protective of the aquatic life uses (Gulf Coastal seasonal or perennial fishery) in these waterbodies. This is particularly important for Haynes Creek given the fact that biological community analyses for this waterbody are not included in the UAA report. Such information may also be useful to supplement the biomonitoring information provided for outfall 001, especially if the minerals concentrations present during the biomonitoring testing referenced above are not available or were not representative of the adopted site-specific minerals criteria under review for UTB.

Supporting Documentation for Benthic Macroinvertebrate Community Analyses and Conclusions

Two issues of concern (described below) were noted regarding the adequacy of the supporting documentation as it related to the analyses and conclusions presented in Section 4.4 – “Benthic Macroinvertebrate Community” of the UAA report. Given these issues of concern, a complete review of and general agreement with the benthic macroinvertebrate results and conclusions presented in Section 4.4.3 – “Results and Discussion” were not possible.

First, it was noted that for all sites (except UTC1) the reported abundance values for several different taxa in Table 4.5 were not consistent with the results presented in the macroinvertebrate community “Rapid Bioassessment Field Sheets” within Appendix E of the UAA report. Please clarify whether the “Rapid Bioassessment Field Sheets” in Appendix E sheets are associated with the identification of macroinvertebrates in the field or identification in the laboratory. Also, please explain why the individual taxa abundance results in the sheets in Appendix E do not always match the corresponding individual taxa abundance results in Table 4.5 of the UAA report. Because the various metric and diversity scores upon which the benthic macroinvertebrate community analyses and conclusions are based are dependent upon a clear knowledge concerning the composition of the benthic community collected from each site, clarification (and correction, if necessary) is requested concerning the differences noted between the sheets in Appendix E and Table 4.5 of the UAA report. Also, please provide a copy of the quality assurance/quality control results for the benthic macroinvertebrate data collected.

Second, utilizing only the benthic macroinvertebrate data presented in Table 4.5 (not the data presented in the macroinvertebrate community field sheets in Appendix E), it was noted that the Shannon-Weiner diversity index scores for all sites appear to have been miscalculated in Table 4.5. Utilizing the following equation, EPA calculated the Shannon-Weiner diversity index scores shown in Table 1 below:

$$H' = - [\sum(p_i)(\ln p_i)]$$

where,

- "H" represents the symbol for the amount of diversity in an ecosystem. H' will be the greatest if the species are all equally abundant.
- "p_i" represents the proportion, or relative abundance, of each individual species to the total (measured from 0 to 1).
- "ln p_i" represents the natural logarithm of p_i

Table 1. Comparison of Shannon-Weiner diversity index scores for benthic macroinvertebrates for each site as calculated in the UAA report and by EPA in reviewing the UAA report.

	UTC1	UTB1	UTB2	UTB2*	UTA1	UTA2	UTA3	FC1	FC2
UAA Report	2.89	3.60	3.03	2.78	3.41	3.67	4.18	3.05	3.22
EPA	2.30	2.49	2.67	2.47	2.36	2.62	2.94	2.29	2.52

As demonstrated in Table 2 below, the differences between the Shannon-Weiner diversity index scores calculated in the UAA report and EPA's score calculations also result in changes with regard to site index rankings. Because the Shannon-Weiner diversity index scores play a large role in the UAA report for site-comparisons and drawing conclusions about the condition of the macroinvertebrate community at each site, clarification (and correction, if necessary) is requested concerning what appears to be miscalculations of the Shannon-Weiner diversity index scores presented for all sites in the UAA report.² (Also, please note that if the individual taxa abundance results presented in Table 4.5 are revised based upon the first issue of concern noted above (consistency between Appendix E and Table 4.5), this would, in turn, also affect the final Shannon-Weiner diversity index scores.)

Table 2. Comparison of Shannon-Weiner diversity index rankings for benthic macroinvertebrates by site (highest index value to lowest) as determined in the UAA report and by EPA in reviewing the UAA report.

Index Rankings by Site - Highest (far left) to Lowest (far right)									
UAA Report	UTA3	UTA2	UTB1	UTA1	FC2	FC1	UTB2	UTC1	UTB2*
EPA	UTA3	UTB2	UTA2	FC2	UTB1	UTB2*	UTA1	UTC1	FC1

Further, if the Shannon-Weiner diversity index scores were miscalculated in the UAA report, review (and revision, if necessary) of the previous conclusions drawn in Section 4.4 of the UAA report and in other sections of the report based upon the miscalculated scores/site index rankings is requested. This is especially important since benthic macroinvertebrate communities are generally considered to be more sensitive to the effects of elevated minerals concentrations than fish communities.

Given the two concerns described above about the supporting documentation for the benthic macroinvertebrate community analyses and conclusions, review (and correction, if necessary) of the information in Table 4.6 is also requested.

² EPA also noted apparent miscalculations in the Shannon-Weiner diversity index scores for the fish assemblages for each site in the UAA report. However, use of either the diversity index scores in the UAA report or EPA's recalculations of the diversity index scores resulted in the same site index rankings.

Exclusion of Outfalls (other than Outfall 001) from Mass Balance Calculations Utilized in the Derivation of Site-Specific Minerals Criteria

Because the site-specific minerals criteria apply to the entire reach of UTB and downstream waterbodies (not just to outfall 001), additional flows and minerals contributions (where applicable) from the other El Dorado Chemical Company outfalls should also be included in the mass balance calculations utilized to derive the 16 site-specific minerals criteria. While general statements are provided on page 7 within Section 3.1 – “Introduction” to describe why outfalls other than 001 were excluded from the mass balance calculations, for reasons described further below, additional clarification is requested concerning the specific rationale for excluding each of the other six El Dorado Chemical Company outfalls from the mass balance calculations.

A review of available data from EPA’s Permit Compliance System (PCS) database for the year 2007 (see Table 3 below) demonstrates that monthly average flows are present for outfalls 003, 006, and 007, as well as for outfall 001. TDS discharges were also noted from outfalls 006 and 007 during 2007. Please clarify and provide specific rationale for why each of these outfalls (003, 006, and 007) were excluded from the mass balance calculations, as these exclusions could have altered the ultimate site-specific criteria that were derived for the four waterbodies.

Also, please confirm whether or not discharges occurred in 2007 or are anticipated to occur in the future from outfalls 002, 004, and 005. If no discharges are anticipated from these three outfalls (002, 004, and 005), then we agree with the approach in the UAA report to exclude these outfalls from the mass balance calculations used to derive the site-specific minerals criteria.

Table 3. Presence/absence of discharge (flow) and minerals in seven El Dorado Chemical Company outfalls in 2007 (Source: EPA’s PCS database; Period of Record: 1/1/07-8/31/07 for outfalls 001, 002, 003, 006, and 007, and 1/1/07-3/31/07 for outfalls 004 and 005).

Outfall	Discharge (Flow) Present?	Chloride Present in Discharge?	Sulfate Present in Discharge?	TDS Present in Discharge?
001	Yes	Yes	Yes	Yes
002	No*	No	No*	No*
003	Yes	No	No	No
004	No*	No	No	No*
005	No*	No	No	No*
006	Yes	No	No	Yes
007	Yes	No	No	Yes

*Historical occurrences of discharge prior to January 1, 2007.