

## **Attachment G**

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### **Aquatic Life Justification Supplemental Information Study Plan**



June 15, 2009

Mr. Steve Drown, Chief  
Water Division  
Arkansas Department of Environmental Quality  
5301 Northshore Drive  
North Little Rock, AR 72118

Re: Aquatic Life Support Justification Study Plan to Address EPAs Mineral ROD  
Associated with Loin Oil Company (Lion Oil), in Union County, Arkansas  
NPDES AR0000647, AFIN 70-00016  
GBMc No. 2160-06-070

Dear Mr. Drown:

On behalf of Lion Oil, please find the attached Study Plan developed to address issues that led to EPAs denial of modifications to Regulation No. 2 implementing the dissolved mineral criteria adopted by the Arkansas Department of Pollution Control and Ecology Commission (the Commission). The 3<sup>rd</sup> party rulemaking modified the sulfate, chloride and total dissolved solids criteria in the Lion Oil Outfall 001 receiving stream (Loutre Creek), and in Bayou de Loutre in Union County, Arkansas.

In their ROD of April 14, 2009 and during the subsequent conference call on April 29, 2009, EPA provided guidance as to the rationale leading to their denial and suggested additional actions to provide documentation EPA perceived as lacking. EPA concerns regarding the potential for instream aquatic toxicity from the adopted criteria were the basis for its decision as stipulated in the ROD. The ROD specifically stated that:

"EPA disapproves all proposed site specific criteria revisions for chloride, sulfate and TDS in all submissions on the grounds that current documentation provided by ADEQ does not clearly demonstrate adequate protection of aquatic life uses for the receiving streams and associated waterbodies."

The proposed Study Plan seeks to provide additional information to clearly demonstrate that the approved criteria are adequate for the protection of aquatic life uses for the receiving streams. The approach proposed in the Study Plan focuses on those efforts identified by EPA during the conference call that would reasonably provide the additional information EPA requires.

It is our understanding that this proposed Study Plan will be forwarded to EPA for their review and comment. However, Lion Oil wishes to proceed with the proposed activities to have the documentation available prior to the expiration of the current consent administrative order (December 2009) authorizing the current dissolved mineral

Mr. Steve Drown  
June 15, 2009  
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discharge conditions. Therefore, Lion Oil intends to proceed with the implementation of the proposed study plan after consideration of any comments and/or edits provided by ADEQ.

Lion Oil looks forward to the resolution of the rulemaking issues and appreciates the efforts of ADEQ in their review and comments provided related to the proposed plan. If you have any questions, please do not hesitate to contact me or Vince Blubaugh at (501) 847-7077.

Respectfully submitted,  
GBM<sup>c</sup> & ASSOCIATES



Roland McDaniel  
Principal/Senior Scientist

Enclosure

CC: Sarah Clem, Water Division ADEQ  
Chuck Hammock, Lion OIL  
Mitch Colvin, Lion OIL  
Steve Cousins, Lion Oil  
Chuck Nestrud, CN&J

# **Aquatic Life Support Justification Study Plan Dissolved Minerals Rulemaking Lion Oil Company**

## **Background**

In the Record of Decision (ROD) dated April 14, 2009 (Attachment A), EPA informed ADEQ that EPA was unable to approve the site-specific criteria revisions for dissolved minerals (sulfate, chloride and total dissolved solids) previously approved by Arkansas Department of Pollution Control & Ecology (ADPC&E) Commission in response to the 3<sup>rd</sup> party rulemaking initiated by Lion Oil Company (Lion Oil). In the justification for the ROD, EPA stated that:

".... EPA has determined that supporting documentation remains insufficient to demonstrate that the site-specific minerals criteria for the waterbodies..... are appropriately protective of aquatic life."

EPA implicated that lingering concerns regarding the potential for instream aquatic toxicity from the adopted criteria was the basis for its decision as stipulated in the ROD. The ROD specifically stated that "EPA disapproves all proposed site specific criteria revisions for chloride, sulfate and TDS in all submissions on the grounds that current documentation provided by ADEQ **does not clearly demonstrate** adequate protection of aquatic life uses for the receiving streams and associated waterbodies [emphasis added]." The ROD does offer that ADEQ could pursue the site specific revisions for minerals in these waterbodies by providing adequate scientific documentation to show that the Gulf Coastal seasonal and perennial fishery aquatic life uses will be protected.

Subsequent to receiving the ROD, EPA, ADEQ and representatives for the 3<sup>rd</sup> party petitioners participated in a conference call on April 29, 2009. The purpose of the call was to clarify EPA concerns that resulted in the decision and to determine what information EPA might require to address those perceived information deficiencies. During the conference call, approaches to address EPA concerns were discussed including:

1. an effort to more clearly identify mineral concentrations during historical WET testing as data exist;
2. a literature review of current research related to dissolved mineral toxicity;
3. modeling using GRI salinity model to predict the potential for toxicity at the concentrations adopted by the ADEQ rulemaking;

4. additional chronic WET testing on a simulated effluent and other water samples developed to mimic the receiving stream segments downstream of the discharge from LION OIL which were the subject of the 3<sup>rd</sup> party rulemaking and approved by ADEQ and the Commission; and
5. speciation of the dissolved minerals at Lion Oil during routine WET testing over the next 12 months to characterize the current dissolved mineral complex of the effluent;

EPA indicated that items 2, 4 and 5 would be of most interest and could provide the additional information allowing further evaluation of the potential for instream toxicity and the support of aquatic life in the receiving streams.

In addition, the Study Plan proposes to document the dissolved mineral concentrations of the Outfall 001 effluent and from the receiving streams (Loutre Creek and Bayou de Loutre) during the period that routine WET testing is being completed.

EPA requested that a "Study Plan" be developed to set forth the process by which the additional information would be presented and to establish a decision process that would document maintenance of the aquatic life uses.

Based on the information presented in the ROD and the additional discussion during the conference call, it was determined that the following approach would be implemented to address the EPA concerns related to the protection of the aquatic life uses of the receiving streams.

### **Plan Objective**

The objective of the Dissolved Minerals Use Support Study Plan is to develop and provide additional documentation addressing issues identified by EPA as those most likely to address the deficiencies stipulated in the Dissolved Mineral ROD related to the potential for instream toxicity.

The proposed approach includes four tasks including:

1. develop additional information through an updated literature review on dissolved mineral toxicity;
2. conduct additional WET testing utilizing spiked samples to simulate the concentrations proposed in the rulemakings;
3. complete modeling using GRI model; and

4. speciation of the dissolved minerals at Lion Oil during routine WET testing over the next 12 months to characterize the current dissolved mineral complex of the Outfall 001 effluent.

**Task 1. Develop additional information through an updated literature review of dissolved mineral toxicity**

This task will review and summarize the current scientific literature related to the toxicity of dissolved minerals with a focus on Cl, SO<sub>4</sub> and TDS. The research will implicate a range of concentrations at which the target dissolved minerals present a toxicity potential. The research data will be compared to the criteria approved by ADEQ and the Commission.

The goal of this task is to supplement the information presented during the rulemaking process and clarify the existing scientific data related to dissolved mineral toxicity.

The potential for toxicity associated with the concentrations adopted in the recent rulemaking will be evaluated in light of the current scientific literature.

**Schedule**

Complete 30 days after the Study Plan has been accepted by ADEQ and EPA.

**Task 2. Conduct additional WET testing utilizing spiked samples to simulate the concentration of dissolved minerals proposed in the rulemakings**

Chronic WET tests will be completed on a series of synthetic matrices developed to mimic the dissolved mineral complex of the Lion Oil discharge and that of the three downstream segments as identified in the 3<sup>rd</sup> party rulemaking. The synthetic matrix will be developed to represent the maximum dissolved mineral concentrations of the Lion Oil outfall and of the downstream receiving segments based on the concentrations approved by ADEQ and the Commission in the 3<sup>rd</sup> party rulemaking.

The synthetic matrices will be developed based on the results of analyses completed on water samples from each stream segment. A chemical balance of the synthetic matrix will be developed to characterize the matrix. The analytical suite will include:

- Chloride,
- Fluoride,
- Sulfate,
- Total dissolved solids,
- Nitrite-N,
- Bicarbonate alkalinity,
- Total alkalinity,
- Carbonate alkalinity,

- Specific conductance,
- Total organic carbon,
- Total inorganic carbon,
- Boron,
- Calcium,
- Iron,
- Magnesium,
- Manganese,
- Potassium,
- Silicon,
- Sodium,
- Aluminum,
- Barium,
- Heavy metals ( As, Cu, Ni, Cd, Cr, Pb, & Zn),
- Total Suspended Solids,
- Hardness

EPA methods will be used for the analyses and NPDES detection levels will be attained. The analyses will be completed before and after the WET tests to verify the analytical targets for the dissolved minerals were attained in the 100% exposures.

### **Schedule**

Complete 90 days after the Study Plan has been accepted by ADEQ and EPA.

### **Task 3. Complete modeling using GRI model**

The toxicity potential of the adopted dissolved mineral criteria as presented in the 3<sup>rd</sup> party rulemaking will be determined through a modeling effort using the salinity model developed by the Gas Research Institute. The model (A salinity/toxicity relationship to predict acute toxicity of Saline waters to freshwater organisms, D. Gulley and D.R. Mount, 1996) was developed to predict acute toxicity based on mineral concentration and mineral imbalances of seven major ions (Na, K, Ca, Mg, Cl, SO<sub>4</sub> HCO<sub>3</sub>). The model is a simplistic acute toxicity predictor. In addition to modeling the Lion Oil effluent, the model will be developed for the four (4) additional stream segments included in the 3<sup>rd</sup> party rulemaking. Mineral concentrations representing the 95<sup>th</sup> percentile of the historical discharge will be utilized as the baseline modeling to demonstrate the toxicity potential at the maximum possible effluent concentrations. Additional modeling for each subsequent downstream segment will be completed based on the proposed criteria.

The known concentrations of the seven major ions will be developed from analyses of water samples collected from four stream segment identified in the rulemaking as provided in the table below. The selected segments represent the range of criteria

approved by ADEQ and the Commission. The selected segments include those four highlighted below:

Summary of dissolved mineral WQS Modifications. Lion Oil 3<sup>rd</sup> party rulemaking. (Selected segments indicated in highlighted sections)

|  |  |   |
|--|--|---|
| <b>Loutre Creek – from Hwy 15 South to the confluence of Bayou de Loutre</b>                               | <b>Bayou de Loutre – from Loutre Creek to the discharge for the City of El Dorado South facility</b>   | <b>Bayou de Loutre – from the discharge from the City of El Dorado-South downstream to the mouth of Gum Creek</b> |
| Chloride from 14 mg/L to 256 mg/L,<br>Sulfate from 31 mg/L to 997 mg/L &<br>TDS from 123 mg/L to 1756 mg/L | Chloride from 250 mg/L to 264,<br>Sulfate from 90 mg/L to 635 mg/L &<br>TDS from 500 mg/L to 1236 mg/L | Chloride : NO CHANGE<br>Sulfate from 90 mg/L to 431 mg/L<br>& TDS from 500 mg/L to 966 mg/L                       |

|  |  |   |
|--|--|---|
| <b>Bayou de Loutre – from the mouth of Gum Creek downstream to the mouth of Boggy Creek</b>  | <b>Bayou de Loutre – from the mouth of Boggy Creek downstream to the mouth of Hibank Creek</b> | <b>Bayou de Loutre – from the mouth of Hibank Creek downstream to the mouth of Mill Creek</b> |
| Chloride: NO CHANGE<br>Sulfate from 90 mg/L to 345 mg/L<br>and TDS from 750 mg/L to 780 mg/L | Chloride: NO CHANGE<br>Sulfate from 90 mg/L to 296 mg/L &<br>TDS: NO CHANGE                    | Chloride: NO CHANGE<br>Sulfate from 90 mg/L to 263 mg/L<br>&<br>TDS: NO CHANGE                |

|  |   |
|--|---|
| <b>Bayou de Loutre - from the mouth of Bear Creek to the final segment of Bayou de Loutre.</b> | <b>Bayou de Loutre (Final Segment) to the Arkansas/Louisiana State Line</b> |
| Chloride : NO CHANGE<br>Sulfate from 90 mg/L to 198 mg/L &<br>TDS: NO CHANGE                   | Chloride: NO CHANGE<br>Sulfate from 90 mg/L to 171 mg/L<br>TDS: NO CHANGE   |

Baseline model runs will be completed utilizing known concentrations of the seven target ions. In addition, a matrix of modeling projections will be completed to bracket those concentrations projected to generate a potential for instream toxicity. The model projections will then be compared to the individual criterion in each segment identified during the rulemaking process.

The GRI modeling will project the concentrations at which toxicity, due to the dissolved minerals, can be expected given the complex of mineral ions specific to the discharge from Lion Oil and the receiving streams. A decision related to the potential for instream toxicity can be made based on the modeling projections as they compare to the adopted dissolved mineral criteria for each individual segment.

## Schedule

Complete 120 days after the Study Plan has been accepted by ADEQ and EPA.



#### **Task 4. Speciation of the dissolved minerals during routine WET testing over the next 12 months**

The concentrations of dissolved minerals (SO<sub>4</sub>, Cl and TDS) will be monitored in the discharge through Outfall 001, and downstream in Loutre Creek and Bayou de Loutre during the next 12 month period. This routine monitoring will be completed during the same period that routine quarterly chronic WET tests are conducted on Lion Oil Outfall 001 effluent. The characterization of the dissolved mineral concentrations of the receiving stream will be completed at the same four segments as the GRI model will be developed. (Indicated as the highlighted sections in the table above). This information will be used to:

- determine if the ADEQ and Commission approved criteria are maintained in the receiving streams, and
- demonstrate that the approved criteria are protective of aquatic life as reflected in the chronic WET tests.

#### **Schedule**

Complete 12 months after the Study Plan has been accepted by ADEQ and EPA.

#### **Task 5. Reporting**

A draft final report providing the results of the additional documentation will be developed and presented to ADEQ for their review and comment. Comments received from ADEQ will be addressed and a final report for submission to EPA will be submitted through ADEQ. The decision to pursue EPA approval of the proposed criteria would be determined based on the results of the additional documentation allowing EPA to make a determination related to the potential for toxicity of the proposed mineral criteria and the maintenance of the designated fishery and aquatic life uses.

#### **Schedule**

Quarterly status reports will be submitted to ADEQ. Draft final report complete 13 months after the Study Plan has been accepted by ADEQ and EPA.

## **Attachment A**

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UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

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

APR 14 2009

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

Dear Ms. Marks:

I would like to provide you with the Environmental Protection Agency's (EPA) findings concerning the review of additional supporting information related to several site-specific water quality standards revisions to Regulation No. 2, *Regulation Establishing Water Quality Standards for Surface Waters of the State of Arkansas* originally submitted by your letters, dated September 17, 2007. These site-specific revisions were for three separate submissions: El Dorado Chemical Company, Great Lakes Chemical Corporation, and Lion Oil Company.

Your original September 17, 2007, letters included a request for EPA's approval of the removal of the domestic water supply designated uses, along with revised site-specific aquatic life criteria for chloride, sulfate, and total dissolved solids (TDS). EPA previously approved the removal of the domestic water supply uses from the waters associated with the El Dorado Chemical Company (EDCC) and four of five requested waterbodies for Great Lakes Chemical Corporation (GLCC), but was not able to approve the use removals associated with the fifth GLCC waterbody segment or the three waterbody segments associated with Lion Oil. In today's action, EPA approves the removal of the domestic water supply use for these four waters, given that they are not currently used as a source of supply for a public water system, nor are they being considered for such use and are intermittent in nature.

As you know, EPA was not able to approve the site-specific criteria revisions for the three separate submissions from EDCC, GLCC and Lion Oil as detailed in our January 3, 2008, letters to you. EPA was not able to take action on these submissions because they lacked specific supporting information necessary for EPA approval. EPA requested specific additional information for these provisions in the January 3, 2008 letter. Your August 14, 2008, response included some, but not all of the requested information. EPA staff requested the remaining supporting information via e-mail on November 11, 2008. Additional data were forwarded to EPA via email on November 19, 2008.

EPA again reviewed the submissions from EDCC, GLCC and Lion Oil taking into consideration the additional supporting information that was made available. Based on that subsequent review, EPA has determined that supporting documentation remains insufficient to demonstrate that the site-specific minerals criteria for the waterbodies

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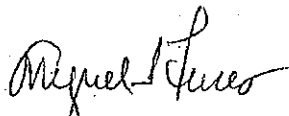
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associated with EDCC, GLCC, and Lion Oil are appropriately protective of aquatic life. Therefore, EPA disapproves the site-specific chloride, sulfate, and TDS criteria for the EDCC, GLCC, and Lion Oil submissions. A detailed basis for EPA's determination and a description of the specific issues regarding the adequacy of these studies and supporting documentation are identified in the enclosed Record of Decision. As described in 40 CFR §131.21(c), new and revised standards do not go into effect for CWA purposes until approved by EPA. Therefore, the previously approved numeric criteria under Regulation No. 2 (April 23, 2004) remain in effect for CWA purposes for all waters identified in the EDCC, GLCC and Lion Oil submissions.

I would like to acknowledge the efforts of the Pollution Control and Ecology Commission, and particularly Arkansas Department of Environmental Quality (ADEQ). We encourage the Commission and ADEQ to work with the third parties, EDCC, GLCC, and Lion Oil, in responding to the issues identified here and detailed in the enclosed Record of Decision.

We look forward to the continuation of our work with you on these water quality standards revisions and encourage early coordination on any future proposed water quality standards revisions to facilitate EPA's review of State-adopted water quality standards submitted for approval. If you have any questions or concerns, please contact me at (214) 665-7101, or have your staff contact Russell Nelson at (214) 665-6646 or Matt Hubner at (214) 665-9736.

Sincerely yours,



Miguel I. Flores  
Director  
Water Quality Protection Division

Enclosure

cc: Steve Drown, Chief, Water Division, ADEQ  
Sarah Clem, Technical Assistance Manager, ADEQ

Enclosure

**RECORD OF DECISION:  
EPA APPROVAL AND DISAPPROVAL OF SITE-SPECIFIC REVISIONS  
TO THE  
ARKANSAS WATER QUALITY STANDARDS**

**Site Specific Domestic Water Supply Use Removal and Minerals Criteria Revisions for  
Great Lakes Chemical Company (GLCC), El Dorado Chemical Company (EDCC),  
and Lion Oil  
Union County, Arkansas**

**U.S. Environmental Protection Agency – Region 6**

**March 2009**

**RECORD OF DECISION:  
EPA APPROVAL AND DISAPPROVAL OF SITE-SPECIFIC REVISIONS  
TO THE  
ARKANSAS WATER QUALITY STANDARDS**

**Site Specific Domestic Water Supply Use Removal and Minerals Criteria Revisions for  
Great Lakes Chemical Company (GLCC), El Dorado Chemical Company (EDCC),  
and Lion Oil  
Union County, Arkansas**

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**RECORD OF DECISION:  
EPA APPROVAL AND DISAPPROVAL OF SITE-SPECIFIC REVISIONS  
TO THE  
ARKANSAS WATER QUALITY STANDARDS**

**Site Specific Domestic Water Supply Use Removal and Minerals Criteria Revisions for  
Great Lakes Chemical Company (GLCC), El Dorado Chemical Company (EDCC),  
and Lion Oil  
Union County, Arkansas**

**I. INTRODUCTION**

*Purpose*

As described in §303(c) of the Clean Water Act (CWA) and in the standards regulation (40 CFR §131.20), States and authorized Tribes have primary responsibility to develop and adopt water quality standards to protect their waters. Authority to approve or disapprove new and/or revised standards submitted to EPA for review has been delegated to the Water Quality Protection Division Director, in Region 6. Tribal or State water quality standards are not considered effective under the CWA until approved by EPA.<sup>1</sup>

The purpose of this record of decision is to provide the basis for the Environmental Protection Agency's (EPA) approval of domestic drinking water use removals and disapproval of site-specific water quality criteria revisions to Regulation No. 2: *Regulation Establishing Water Quality Standards for Surface Waters of the State of Arkansas* adopted by the Arkansas Pollution Control and Ecology Commission (APC&EC) in Minute Order 07-18. The drinking water use removals and site-specific revisions for chloride, sulfate, and total dissolved solids (TDS) are associated with three separate submissions: El Dorado Chemical Company (EDCC), Great Lakes Chemical Corporation (GLCC) and Lion Oil Company.

*Chronology of Events*

August 31, 2006

Three individual third parties, EDCC, GLCC, and Lion Oil, filed a petition with the APC&EC to amend Regulation No. 2.

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<sup>1</sup> "Alaska rule" [Federal Register: April 27, 2000 (Volume 65, Number 82)]

|                       |   |
|-----------------------|---|
| September 22, 2006    | The APC&EC's Regulations Committee met to review the petition and recommended that the Commission institute a rule-making proceeding to consider adopting the proposed revisions to Regulation No. 2.   |
| September 22, 2006    | The APC&EC accepted the Regulations Committee recommendation and initiated the rulemaking proceeding via Minute Order 06-37.  |
| September 27-28, 2006 | Public notice of the proposed rule-making was published.  |
| November 13, 2006     | Public hearing on the proposed rule-making was held in El Dorado, Arkansas.   |
| November 29, 2006     | Public comment period ended on the proposed changes to Regulation No. 2.  |
| January 19, 2007      | Responsiveness summary was filed with the APC&EC.   |
| June 22, 2007         | Teresa Marks, Director, Arkansas Department of Environmental Quality (ADEQ), signed Minute Order 07-18 adopting changes to Regulation No. 2.  |
| September 17, 2007    | Miguel I. Flores, Director, Water Quality Protection Division, EPA Region 6, received letter from Teresa Marks, Director, ADEQ, requesting EPA approval of the adopted revisions and transmitting the water quality standards submission package. |
| November 9, 2007      | EPA approves removal of domestic drinking water uses for EDCC and the majority for GLCC. No action is taken on all segments for Lion Oil and 1 for GLCC.  |
| January 3, 2008       | EPA issues no action letter to Teresa Marks (ADEQ) concerning site specific criteria and drinking water use removals.   |
| August 14, 2008       | Miguel I. Flores receives letter from Teresa Marks responding to the issues raised by EPA in the January 3, 2008 no action letter.  |
| November 11, 2008     | EPA requests additional material not included in previous letter from Teresa Marks.   |
| November 19, 2008     | ADEQ forwards additional materials to EPA staff.  |

### ***Background***

In separate letters dated August 17, 2007, from Teresa Marks, ADEQ, to Miguel Flores, EPA Region 6, ADEQ requested EPA approval of several site-specific water quality



standards revisions to Regulation No. 2 for twelve streams and multiple segments in the Gulf Coastal ecoregion of Arkansas. These streams are the receiving waterbodies for discharges from EDCC, GLCC and Lion Oil, in Union County, Arkansas.

The letter included a request for EPA approval of the removal of the domestic water supply designated uses for eleven of the twelve waterbodies associated with the facilities identified above, along with site-specific criteria for chloride, sulfate, and total dissolved solids (TDS) for all twelve waterbodies and segments. EPA took no action in relation to the site-specific minerals criteria for all waterbodies and for four waterbodies concerning drinking water use removal. This record of decision applies to the site-specific criteria revisions and remaining domestic water supply designated use removals for the waterbodies for which such action was requested. The general details of each request are addressed individually in the following text.

### ***Summary of Revised Provisions***

#### ***A. El Dorado Chemical Company***

Table 1 below provides a detailed description of the four streams to which the site-specific minerals revisions apply for EDCC. EPA previously approved the removal of the domestic water supply use from UTB, UTA, Flat Creek, and Haynes Creek. Table 2 depicts the proposed site-specific criteria for chloride, sulfate, and TDS, for the four waterbodies.

**Table 1.** Description of stream segments for which the proposed site-specific criteria revisions apply.

| <b>Stream Segment Descriptions</b>  |
|---|
| 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) |
| Unnamed tributary to Flat Creek (UTA) from the confluence of UTB to the confluence with Flat Creek  |
| Flat Creek from the mouth of UTA tributary to the mouth of Haynes Creek   |
| Haynes Creek from the confluence of Flat and Salt Creeks downstream to the confluence with Smackover Creek  |

**Table 2.** Proposed site-specific water quality criteria revisions for chloride, sulfate, and TDS, for four waterbodies submitted by ADEQ to EPA for review and approval.

| <b>Stream Segment Name</b> | <b>Chloride (mg/L)</b> |                | <b>Sulfate (mg/L)</b> |                | <b>TDS (mg/L)</b> |                |
|----------------------------|------------------------|----------------|-----------------------|----------------|-------------------|----------------|
|                            | <b>Previous</b>        | <b>Revised</b> | <b>Previous</b>       | <b>Revised</b> | <b>Previous</b>   | <b>Revised</b> |
| UTB                        | 14                     | 23             | 31                    | 125            | 123               | 475            |
| UTA                        | 14                     | 16             | 31                    | 80             | 123               | 315            |

| Stream Segment<br>Name | Chloride (mg/L) |         | Sulfate (mg/L) |         | TDS (mg/L) |         |
|------------------------|-----------------|---------|----------------|---------|------------|---------|
|                        | Previous        | Revised | Previous       | Revised | Previous   | Revised |
| Flat Creek             | 14              | 165     | 31             | 67      | 123        | 560     |
| Haynes Creek           | 14              | 360     | 31             | 55      | 123        | 855     |

### B. Great Lakes Chemical Corporation

Table 3 below provides a detailed description of the six streams for which the proposed site-specific minerals revisions and drinking water use removal apply for GLCC. EPA previously approved the removal of domestic water supply use from UT002, UT004, UT003, and UTLCB-2. Bayou de Loutre was not approved for drinking water use removal and is addressed later in the document. Table 4 depicts the proposed site-specific criteria for chloride, sulfate, and TDS, for the six waterbodies.

**Table 3.** Description of stream segments for which the proposed site-specific criteria revisions and one drinking water use removal apply.

| Stream Segment Descriptions   |
|---|
| Unnamed tributary into which Great Lakes Chemical Corporation outfall 002 discharges (UT002) to the confluence with Bayou de Loutre |
| Unnamed tributary into which Great Lakes Chemical Corporation outfall 004 discharges (UT004) to the confluence with Bayou de Loutre |
| Bayou de Loutre from the mouth of Outfall 004 tributary downstream to the mouth of Gum Creek <sup>2</sup>                           |
| Unnamed tributary to an unnamed tributary of Little Cornie Bayou (UT003)  |
| Unnamed tributary of Little Cornie Bayou (UTLCB-2) to Little Cornie Bayou   |
| Little Cornie Bayou from the confluence of UTLCB-2 to the Arkansas/Louisiana State line <sup>3</sup>                                |

**Table 4.** Proposed site-specific water quality criteria revisions for chloride, sulfate, and TDS, for six waterbodies submitted by ADEQ to EPA for review and approval.

| Stream Segment<br>Name | Chloride (mg/L) |         | Sulfate (mg/L) |         | TDS (mg/L) |         |
|------------------------|-----------------|---------|----------------|---------|------------|---------|
|                        | Previous        | Revised | Previous       | Revised | Previous   | Revised |
| UT002                  | 14              | 65      | 31             | 35      | 123        | 141     |
| UT004                  | 14              | 239     | —              | —       | 123        | 324     |
| Bayou de Loutre        | 250             | 278     | —              | —       | —          | —       |
| UT003                  | 14              | 538     | 31             | 35      | 123        | 519     |

<sup>2</sup> Bayou de Loutre – No action taken by EPA (January 3, 2008) on removal of domestic water use

<sup>3</sup> Little Cornie Bayou – Not identified for drinking water use removal

| Stream Segment Name | Chloride (mg/L) |         | Sulfate (mg/L) |         | TDS (mg/L) |         |
|---------------------|-----------------|---------|----------------|---------|------------|---------|
|                     | Previous        | Revised | Previous       | Revised | Previous   | Revised |
| UTLCB-2             | 14              | 305     | --             | --      | 123        | 325     |
| Little Cornie Bayou | 200             | 215     | 20             | 25      | --         | --      |

### C. Lion Oil

Table 5 below provides a detailed description of the three streams for which the proposed drinking water use removal apply for Lion Oil. EPA previously took no action in the removal of the domestic water supply use for Loutre Creek and two of the nine segments of Bayou de Loutre upstream of Gum Creek. Table 4 depicts the proposed site-specific criteria for chloride, sulfate, and TDS, for the six waterbodies.

**Table 5.** Description of stream segments for which the proposed domestic water supply designated use removals apply.

| Stream Segment Descriptions   |
|---|
| Loutre Creek from Highway 15 South to the confluence of Bayou de Loutre                                   |
| Bayou de Loutre from Loutre Creek to the discharge for the City of El Dorado South facility*              |
| Bayou de Loutre from the discharge for the City of El Dorado South downstream to the mouth of Gum Creek** |

**Table 6.** Proposed site-specific water quality criteria revisions for chloride, sulfate, and TDS, for Loutre Creek and nine segments of Bayou de Loutre 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 |
| Loutre Creek                 | 14              | 256     | 31             | 997     | 123        | 1756    |
| Bayou de Loutre*             | 250             | 264     | 90             | 635     | 500        | 1236    |
| Bayou de Loutre**            | --              | --      | 90             | 431     | 500        | 966     |
| Bayou de Loutre <sup>4</sup> | --              | --      | 90             | 345     | 750        | 780     |
| Bayou de Loutre <sup>5</sup> | --              | --      | 90             | 296     | --         | --      |
| Bayou de Loutre <sup>6</sup> | --              | --      | 90             | 263     | --         | --      |

<sup>4</sup> Bayou de Loutre – from the mouth of Gum Creek downstream to the mouth of Boggy Creek

<sup>5</sup> Bayou de Loutre – from the mouth of Boggy Creek downstream to the mouth of Hibank Creek

<sup>6</sup> Bayou de Loutre – from the mouth of Hibank Creek downstream to the mouth of Mill Creek

| Stream Segment Name           | Chloride (mg/L) |         | Sulfate (mg/L) |         | TDS (mg/L) |         |
|-------------------------------|-----------------|---------|----------------|---------|------------|---------|
|                               | Previous        | Revised | Previous       | Revised | Previous   | Revised |
| Bayou de Loutre <sup>7</sup>  | --              | --      | 90             | 237     | --         | --      |
| Bayou de Loutre <sup>8</sup>  | --              | --      | 90             | 216     | --         | --      |
| Bayou de Loutre <sup>9</sup>  | --              | --      | 90             | 198     | --         | --      |
| Bayou de Loutre <sup>10</sup> | --              | --      | 90             | 171     | --         | --      |

## II. REVISED PROVISIONS EPA IS DISAPPROVING

### *Site-Specific Criteria for Chloride, Sulfate, and TDS*

Supporting documentation remains insufficient to demonstrate that the site-specific minerals criteria for the waterbodies associated with EDCC, GLCC, and Lion Oil are appropriately protective of aquatic life. Although Section 3.6.2 – “Whole Effluent Toxicity (WET) Testing” of the August 17, 2007 submissions provided the results of outfall biomonitoring for the water flea and fathead minnow, it remains unclear 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 effluent receiving streams.

The evidence included in the reports and subsequent materials requested by EPA do not include a general evaluation or review of the site-specific criteria for associated waterbodies 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 documentation is important for providing a clear demonstration that the proposed site-specific criteria are appropriately protective of the aquatic life uses (Gulf Coastal seasonal or perennial fishery) in these waterbodies. Such information may also be useful to supplement the biomonitoring information, 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 receiving waterbodies (UTB - EDCC; UT002, UT003, UT004 - GLCC; and Loutre Creek - Lion Oil)

Literature (Mount and Gulley)<sup>11</sup> cited in ADEQ's August 14, 2008 response, proposes that the development of the salinity/toxicity relationship (STR) model supports higher

<sup>7</sup> Bayou de Loutre – from the mouth of Mill Creek downstream to the mouth of Buckaloo Branch

<sup>8</sup> Bayou de Loutre – from the mouth of Buckaloo Branch downstream to the mouth of Bear Creek

<sup>9</sup> Bayou de Loutre – from the mouth of Bear Creek to the final segment of Bayou de Loutre

<sup>10</sup> Bayou de Loutre (Final Segment) to the Arkansas/Louisiana state line

<sup>11</sup> Mount, D.R. and D.D. Gulley. 1992. Development of a salinity/toxicity relationship to predict acute toxicity of saline waters to freshwater organisms. GRI-92/0301. Gas research Institute, Chicago, IL, USA

acute lethality concentrations than those proposed in the criteria. EPA's review of this study indicates lower concentrations of ions in combination can adversely affect sensitive aquatic species, yet other combinations may ameliorate such effects. Thus, the necessity for documentation and identification of specific mineral concentrations is critical to supporting that protection of aquatic life uses will be met by the proposed criteria.

EPA disapproves all proposed site-specific criteria revisions for chloride, sulfate, and TDS in all submissions on the grounds that current documentation provided by ADEQ does not clearly demonstrate adequate protection of aquatic life uses for the receiving and associated waterbodies. Under 40 CFR §131.21(c), new and revised standards do not go into effect for CWA purposes without EPA approval. EPA does not intend to propose or promulgate criteria for the previously identified waters. Therefore, previous approved numeric criteria under Regulation No. 2 (April 23, 2004) remain in effect.

If the State decides to pursue site-specific revisions for minerals in these waterbodies, adequate supporting scientific documentation must be provided to show that the Gulf Coastal seasonal or perennial fishery aquatic life uses will be protected. The previously requested mineral concentration data associated with outfall WET testing are necessary to support that effluent being tested reflect proposed criteria values. If these values are not available, use of STR modeling as well as background literature searches on ecoregion species' salinity tolerances would provide a minimal level of support to the revision.

### III. REVISED PROVISIONS EPA IS APPROVING

#### *Domestic Water Supply Use Removals*

EPA previously took no action concerning the removal of domestic drinking water uses for the waterbodies listed above for GLCC and Lion Oil. Documentation, in the form of a letter from Arkansas Department of Health (ADH), showing that there were no current or proposed public drinking water considerations for these waterbodies was missing or inadequate and therefore did not support the revision.

- Two letters, dated July 24, 2006 and May 12, 2008, from ADH were submitted by ADEQ on EPA's request subsequent to the study report. The letters respectively state that Bayou de Loutre upstream of Gum Creek and Loutre Creek are not currently used as a source of supply for a public water system, nor are they being considered for such use.

In addition, the UAA study cites two reasons (see 40 CFR §131.10(g)(2) and (5)) for why the domestic water supply use is not an attainable use in Loutre Creek and the three segments of Bayou de Loutre. Specifically, the report cites the intermittent nature of these streams and lack of consistent base flow, along with the presence of shallow pools and run areas that would not support the intake and storage areas necessary for the development of a domestic water supply system.

Enclosure

EPA agrees with the conclusions of the study and approves the removal of the domestic water supply use from Bayou de Loutre from the confluence of UT004 downstream to the confluence of Loutre Creek for the GLCC submission. For Lion Oil, EPA approves the removal of the domestic water supply use from Loutre Creek and two segments of Bayou de Loutre between the confluence with Loutre Creek and confluence with Gum Creek.



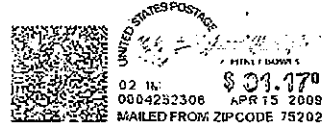
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