Comment No. 1 (c.): Quality Assurance of the field data as not dismissed in the UAA.

Response:

A QA/AC summary is provided as an attachment herein (Attachment "A").

Comment No. 2:

The hardness value used in calculating the proposed TDS and chloride site specific criteria is 150 mg/L as $CACO_3$. Data collected by the Department in 2006 - 2007 (N=5) at Highway 82 bridge, shows an average hardness value of 60 mg/ L as $CACO_3$. The cited literature suggests an ameliorative effect on chloride toxicity as hardness increases. The Divisions request Clean Harbors to discuss potential TDS and chloride toxicity using a more relevant upstream hardness value of 60 mg/L as $CACO_3$.

Response:

FTN documented significant dilution of the effluent downstream of the outfall even during low flow conditions. This dilution suggests that lower hardness at Highway 82 is therefore associated with lower TDS and chloride as well. Conditions of low hardness and high TDS/chlorides are not likely to occur. Part of the information that contributed to the calculation of the proposed criteria was toxicity data from laboratory reference tests conducted at an average hardness of 90 mg/L. This information was averaged with the toxicity data collected at the higher hardness (150 mg/L) to obtain the proposed criteria. Therefore the calculation of the proposed TDS and chloride criteria did not include only consideration of high hardness.

Comment No. 3:

Significant instream fluctuations in TDS and chloride concentrations, though not acutely toxic, may create an acute condition where aquatic life can not avoid the change. This condition becomes more important considering the 7Q 10 for Boggy Creek is 0 cfs. There is no discussion of the potential effects of significant instream TDS and chloride fluctuations on aquatic organisms. The Divisions request a discussion on the potential effects of significant instream fluctuations in TDS and chloride on aquatic life.

Response:

The study did not specifically address the toxic effects of fluctuations in TDS and chloride concentrations. We are not aware of studies that address this possibility. However, the standard toxicity test protocol involves transferring test organisms directly from laboratory water (typically having a TDS of approximately 220 mg/L) to the sample with no acclimation to the sample (ambient sample or reference test solution). Therefore the protocol already incorporates a certain degree of shock to the test organisms which should be reflected in the overall response of the test organisms to the sample.

Comment No. 4:

The discussion of the toxicity of selenium does not take into account the higher concentrates of TDS.

Response:

The concern, as we understand it, is that elevated TDS might result in increased bioaccumulation of selenium or lower toxic thresholds of resident species. Selenium bioaccumulation can depend on the form of the metal present in the environment. The literature discusses factors such as redox potential and the source of the metal (e.g. mine tailings, fly ash, seleniferous soils) that affect speciation and the forms of selenium present in the aquatic environment. However, there are no studies in the literature surveyed at this time that identify ionic composition as an important factor in selenium speciation. In addition, the monitoring data from Boggy Creek and Bayou de Loutre do not indicate bioaccumulation in fish above background levels. Therefore it seems unlikely that elevated TDS in Boggy Creek results in higher rates of bioaccumulation.

There are studies in the literature (e.g. Lemly 1993) indicating that environmental conditions such as reduced temperature result in lower toxic thresholds for selenium in fish. This information has been incorporated into EPA's draft selenium criterion. However, there is no evidence in the literature surveyed that elevated TDS results in lower toxic thresholds in fish or other biota. Patterns and dynamics of bioaccumulation and toxic effects in high-TDS systems such as estuaries can result in differences in exposure and effects among species, but these processes are thought to be driven by the properties of the food web (e.g. high rates of accumulation in bivalves, lower rates in zooplankton) with no mention given to factors such as ionic strength or salinity (Stewart et al 2004). Studies of selenium in estuaries (e.g. Luoma and Presser 2000) make no mention of higher rates of bioaccumuation or lower toxic thresholds for biota in those environments compared to freshwater systems.

Nonetheless, it is still possible that elevated TDS in a freshwater system might provide an added incremental stress to biota such that the toxic threshold for selenium is lowered. However, given the very low tissue concentrations measured in the Boggy Creek fish, this effect would have to result in a substantial increase in sensitivity in order for adverse effects to occur. That is, elevated TDS would have to lower the toxic threshold of resident species from 4 - 7.9 ug/L to < 2ug/g. There are no examples of toxic threshold levels this low in the literature surveyed to date as part of this UAA. Therefore it seems unlikely that elevated TDS in Boggy Creek should result in lower toxic thresholds of selenium in fish tissues.

Comment No. 5:

The UAA contains several scientific nomenclature errors, specifically in various tables included in the benthic macro invertebrate and fish community sectors.

Response:

Corrected tables have been prepared and are attached herein (Attachment "B").

Comment No. 6:

Page 4-13 of the UAA refers to Se concentrations in mg/L. These concentrations are exceedingly high and most likely should be in ug/L.

Response:

The indication of selenium concentration in mg/L is incorrect and should be in ug/L.

Comment No. 7:

The alternatives analysis does not adequately examine many available, and less costly alternatives. Other alternatives, such as dilution or an increased flow of cooling tower water may be less costly than the alternatives rejected in the UAA, while also protecting the water quality of Boggy Creek

Response:

Based on discussions with ADEQ in a meeting on April 9, 2007 where this comment was specifically addressed, it is our understanding that the ADEQ now agrees that an appropriate number of alternatives were examined as part of this analysis. The complete alternatives analysis in Section 8.0 of the UAA was covered during this meeting. The analysis did cover the specific alternative mentioned in this comment - i.e. dilution of the effluent due to increasing cooling tower flow using City water from the Sparta Aquifer. This alternative is not feasible and is more costly than the recommended alternatives. It is worth noting that Clean Harbors continues to investigate alternatives to discharging the cooling tower blowdown as part of their company goal of implementing ongoing pollution prevention measures.

WHEREFORE, Petitioner Clean Harbors hereby submits to the Commission the Statement of Basis and Purpose and Responsiveness Summary and respectfully requests the Adoption by Minute Order of the proposed change to APC&E Commission Regulation No. 2.

Respectfully submitted,

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William A. Eckert III
Arkansas Bar No. 78045

Certificate of Service

I, William A. Eckert III, state that I have on this 3rd day of May, 2007, mailed a copy of the foregoing Request For Adoption of Proposed Change To Regulation No. 2 to Ms. Ellen Carpenter, Arkansas Department of Environmental Quality, 8001 National Drive, Little Rock, Arkansas 72219.

William A. Eckert III

QA/AC Summary - Clean Harbors UAA, El Dorado, AR Facility

Critical measurement for this project were:

1. chloride,
2. total dissolved solids (TDS),
3. total selenium in water and sediment,
4. total selenium in whole body fish tissues, and
5. toxicity

QA/AC activities were performed for both laboratory and field analyses. Laboratory QA/AC procedures were carried out per the most recent version of the QA Plan for American Interplex Laboratory (8600 Kanis Rd. Little Rock, AR 72211). For water quality analyses, these activities included, where appropriate, analysis of laboratory control samples, matrix spikes, duplicates and blanks for every batch of ten samples analyzed. For toxicity testing data quality was evaluated by assessing performance criteria (survival and reproduction) in laboratory controls associated with each toxicity test, through routine reference toxicant testing, and by reference toxicity tests run concurrently with each test.

Results of QA/AC sample analyses are presented in Tables 1 - 5. Laboratory and field QC results were within control limits for all critical parameters. QC control parameters were outside of control limits for some dissolved oxygen (DO) and pH measurements on 5/18/06. These parameters are not critical parameters. Because the DO post calibration check deviation is not large, DO data are suitable for purposes of the project. Large post calibration pH deviations for the hand held field sonde indicate that pH data collected in conjunction with water chemistry sample should be used with caution. Field collected pH measurements are not crucial measurements for this project.

Control performance in toxicity tests and the results of associated concurrent and routine reference tests were all well within QC control limits. Therefore all toxicity date are suitable for purposes of this project.

ATTACHMENT "A"

Table 1. QC control limits for water, sediment and tissue analyses.

Analyte	QA/QC Control Parameter					
	Percent Spike Recovery Limits				Sample Duplicate	Blank Result
	Laboratory Control Sample		Matrix Spike			
	% Recovery	RPD	% Recovery	RPD	RPD	
Total Dissolved Solids	85-115	10	NA	NA	10	<10 mg/L
Total organic carbon	85-115	10	80-120	10		<1 mg/L
Total selenium (water)	85-115	20	75-125	20	20	<1 µg/L
Total selenium (sediment)	85-115	20	75-125	20	20	<1 mg/kg*
Total selenium (fish tissue)	85-115	20	75-125	20	20	<2 mg/kg
Chloride	90-110	10	80-120	10	10	<0.2 mg/L
Oil and Grease	79-114	18	NA	NA	18	<5 mg/L
Sulfate	90-110	10	80-120	10	10	<0.2 mg/L

*Reporting limit for samples collected in May was 2 mg/L