

**AMENDMENT NUMBER ONE**

**TO THE**

**RED RIVER AUTHORITY OF TEXAS**  
**CLEAN RIVER PROGRAM**  
**QUALITY ASSURANCE PROJECT PLAN**  
**FY 2006 – FY 2007**

*Prepared by the Red River Authority of Texas  
In Cooperation with the  
Texas Commission on Environmental Quality  
Under the Authorization of the Texas Clean Rivers Act*

Clean Rivers Program  
Technical Analysis Division  
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*Amended May 2006*

**Justification:** This document details the modification made to the basin-wide Quality Assurance Project Plan to update Table A7.1, Measurement Performance Specifications, to reflect additional EPA methods used in laboratory analyses by the Red River Authority of Texas Regional Laboratory and to update certain parameters and EPA methods performed by the CRMWA and LCRA laboratories.

**Summary of Changes:** The following information in Amendment I is amended to add the following changes:

- Revision of Table A7.1 – Measurement Performance Specifications
- Addition of Chemical Water Analysis and *E. Coli* Bacteria Log Forms to QAPP Appendices

**Detail of Changes:** The addition of Red River Authority’s Regional Laboratory conducting analysis of Chlorophyll *a* and Pheophytin by EPA Method 446.0; the analysis of Ortho Phosphate-P, Nitrite-N, Nitrate-N, Sulfate, Chloride, and Fluoride by EPA method 300.0; and the analysis of Ammonia-N by EPA method 350.3. In addition, Fecal Coliform will be added back to Table A7.1 and Total Hardness, Storet Codes 00900 and 82394 will be removed from the table for RRA. Also included in the update of Table A7.1 is the addition of EPA method 300.0 for the analysis of Ortho Phosphate-P, Nitrate-N, Sulfate, and Chloride, and Fluoride by the storet code 00950 has been removed from the table for the Canadian River Municipal Water Authority (CRMWA) Laboratory. In addition SM 9223-B for the analysis of *E. coli* by CRMWA has been added. A change in the EPA method number for Nitrite/Nitrate-N from 353.3 to 353.2 and changes to the method numbers for Chlorophyll *a* and Pheophytin to EPA Method 446.0, with a back-up method of SM 10200H, as performed by the Lower Colorado River Authority laboratory has also been made to Table A7.1. In addition, a newly developed storet code of 20424 has been added for Water Clarity to Table A7.1 under Field Parameters. Additionally, Chemical Water Analysis and *E. coli* Bacteria Log forms to be submitted by CRMWA have been added to Appendix C (see attached).

These changes will be incorporated into the Quality Assurance Project Plan for the Red and Canadian River Basins for FY 2004 – FY 2005. The Texas Commission on Environmental Quality and the Red River Authority of Texas will acknowledge and accept these changes by signing this amendment.

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Curtis W. Campbell, RRA Project Manager \_\_\_\_\_ Date

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David L. Holub, RRA Quality Assurance Officer \_\_\_\_\_ Date

\_\_\_\_\_  
Laurie Curra, CRP Project Manager \_\_\_\_\_ Date

\_\_\_\_\_  
CRP Lead Quality Assurance Specialist \_\_\_\_\_ Date

\_\_\_\_\_  
Laurie Curra, CRP Project Quality Assurance Specialist \_\_\_\_\_ Date

**Table A7.1 - Measurement Performance Specifications**

PARAMETER	UNITS	MATRIX	METHOD	STORET	AWRL	LAB REPORTING LIMIT (RL)	RECOVERY AT RLS	PRECISION (RPD OF LCS / LCS DUPS)	BIAS %REC. OF LCS	LAB
<b>FIELD PARAMETERS</b>										
Conductivity	uS/cm	Water	EPA 120.1, TCEQ SOP	00094	NA*	NA	NA	NA	NA	Field
Days Since Last Significant Rain	Days	NA	TCEQ SOP	72053	NA*	NA	NA	NA	NA	Field
DO	mg/L	Water	EPA 360.1, TCEQ SOP	00300	NA*	NA	NA	NA	NA	Field
Flow Measurement Method	1 - gage 2 - electric 3 - mechanical 4 - weir/flume	Water	TCEQ SOP	89835	NA*	NA	NA	NA	NA	Field
Flow Estimate	cfs	Water	TCEQ SOP	74069	NA*	NA	NA	NA	NA	Field
Flow	cfs	Water	TCEQ SOP	00061	NA*	NA	NA	NA	NA	Field
Flow Severity	1 - no flow 2 - low 3 - normal 4 - flood 5 - high 6 - dry	Water	TCEQ SOP	01351	NA*	NA	NA	NA	NA	Field
pH	pH/units	Water	EPA 150.1, TCEQ SOP	00400	NA*	NA	NA	NA	NA	Field
Present Weather	1 - clear 2 - ptly cloudy 3 - cloudy 4 - rain	NA	NA	89966	NA	NA	NA	NA	NA	Field
Salinity	ppt. marine only	Water	SM 2520, TCEQ SOP	00480	NA*	NA	NA	NA	NA	Field
Secchi Depth	meters	Water	TCEQ SOP	00078	NA*	NA	NA	NA	NA	Field
Temperature	°C	Water	EPA 170.1, TCEQ SOP	00010	NA*	NA	NA	NA	NA	Field
Turbidity	NTU	Water	SM 2130-B	82079	.5	.5	75-125	20	80-120	Field

**Table A7.1 - Measurement Performance Specifications**

PARAMETER	UNITS	MATRIX	METHOD	STORET	AWRL	LAB REPORTING LIMIT (RL)	RECOVERY AT RLS	PRECISION (RPD OF LCS / LCS DUPS)	BIAS %REC. OF LCS	LAB
<b>FIELD PARAMETERS (continued)</b>										
Water Odor	1 - sewage 2 - chemical 3 - rotten egg 4 - musky 5 - fishy 6 - none 7 - other	NA	NA	89971	NA	NA	NA	NA	NA	Field
Water Clarity	1 - excellent 2 - good 3 - fair 4 - poor	NA	NA	20424	NA	NA	NA	NA	NA	Field
Water Color	1 - brownish 2 - reddish 3 - greenish 4 - blackish 5 - clear 6 - other	NA	NA	89969	NA	NA	NA	NA	NA	Field
<b>CONVENTIONAL AND BACTERIOLOGICAL PARAMETERS</b>										
Ammonia-N, Total	mg/L	Water	EPA 350.1	00610	.02	.02	75-125	20	80-120	RRA
Ammonia-N, Total	mg/L	Water	EPA 350.3	00610	.02	.02	75-125	20	80-120	RRA
Chloride	mg/L	Water	EPA 300.0	00940	10	10	75-125	20	80-120	CRMWA
Chloride	mg/L	Water	EPA 300.0	00940	10	10	75-125	20	80-120	RRA
Chlorophyll- <i>a</i> , Fluorometric Method	ug/L	Water	SM 10200-H	70953	5	5	75-125	20	NA	LCRA
Chlorophyll- <i>a</i> , Spectrophotometric Method	ug/L	Water	EPA 446.0	32211	5	5	75-125	20	NA	RRA
Chlorophyll- <i>a</i> , Spectrophotometric Method	ug/L	Water	EPA 446.0	32211	5	2	75-125	20	NA	LCRA
E. coli, IDEXX Colilert	MPN/100 mL	Water	SM 9223-B	31699	1	1	NA	.5 **	NA	CRMWA

**Table A7.1 - Measurement Performance Specifications**

PARAMETER	UNITS	MATRIX	METHOD	STORET	AWRL	LAB REPORTING LIMIT (RL)	RECOVERY AT RLS	PRECISION (RPD OF LCS / LCS DUPS)	BIAS %REC. OF LCS	LAB
<b>CONVENTIONAL AND BACTERIOLOGICAL PARAMETERS (continued)</b>										
E. coli, IDEXX Colilert	MPN/100 mL	Water	SM 9223-B	31699	1	1	NA	.5 **	NA	RRA
Fecal Coliform	cfu / 100 mL	Water	SM 9222-D	31616	1	1	NA	.5 **	NA	RRA
Fluoride, Total	mg/L	Water	EPA 300.0	00951	.5	.5	75-125	20	80-120	CRMWA
Fluoride, Total	mg/L	Water	EPA 300.0	00951	.5	.5	75-125	20	80-120	RRA
Pheophytin, Fluorometric Method	ug/L	Water	SM 10200-H	32213	3	3	NA	20	NA	LCRA
Pheophytin, Spectrophotometric Method	ug/L	Water	EPA 446.0	32218	3	2	NA	20	NA	LCRA
Pheophytin, Spectrophotometric Method	ug/L	Water	EPA 446.0	32218	3	3	NA	20	NA	RRA
Sulfate	mg/L	Water	EPA 300.0	00945	10	10	75-125	20	80-120	RRA
Sulfate	mg/L	Water	EPA 300.0	00945	10	10	75-125	20	80-120	CRMWA
TDS, Calculated	mg/L	Water	Calculation	70294	NA	NA	NA	NA	NA	RRA
TDS, Dried at 180 Degrees C	mg/L	Water	EPA 160.1	70300	10	10	NA	20	NA	RRA
TSS	mg/L	Water	EPA 160.2	00530	4	4	NA	20	NA	RRA
<b>FIELD, CONVENTIONAL AND BACTERIOLOGICAL PARAMETERS; NON-TSWQS METALS</b>										
Alkalinity, Total	mg/L	Water	EPA 310.1	00410	10	10	NA	20	80-120	RRA
Alkalinity, Total	mg/L	Water	EPA 310.1	00410	10	10	NA	20	80-120	CRMWA
Calcium, Total	mg/L	Water	EPA 215.2	00916	.5	.5	75-125	20	80-120	RRA
COD	mg/L	Water	EPA 410.2	00335	10	10	75-125	20	80-120	RRA

**Table A7.1 - Measurement Performance Specifications**

PARAMETER	UNITS	MATRIX	METHOD	STORET	AWRL	LAB REPORTING LIMIT (RL)	RECOVERY AT RLS	PRECISION (RPD OF LCS / LCS DUPS)	BIAS %REC. OF LCS	LAB
<b>FIELD, CONVENTIONAL AND BACTERIOLOGICAL PARAMETERS; NON-TSWQS METALS (continued)</b>										
Magnesium, Dissolved	mg/L	Water	SM 3500-Mg-B	00925	0.5	0.5	75-125	20	75-125	CRMWA
Nitrate/Nitrite-N, Total	mg/L	Water	EPA 353.2	00630	.04	.04	75-125	20	80-120	LCRA
Nitrate-N	mg/L	Water	EPA 300.0	00620	.02	.02	75-125	20	80-120	CRMWA
Nitrate-N	mg/L	Water	EPA 300.0	00620	.02	.02	75-125	20	80-120	RRA
Nitrite-N	mg/L	Water	EPA 300.0	00615	.02	.02	75-125	20	80-120	CRMWA
Nitrite-N	mg/L	Water	EPA 300.0	00615	.02	.02	75-125	20	80-120	RRA
Ortho Phosphate-P, Field Filtered	mg/L	Water	EPA 300.0	00671	.04	.04	75-125	20	80-120	RRA
Ortho Phosphate-P, Field Filtered	mg/L	Water	EPA 300.0	00671	.04	.04	75-125	20	80-120	CRMWA
Ortho Phosphate-P, Field Filtered	mg/L	Water	EPA 365.3	00671	.04	.04	75-125	20	80-120	RRA
TOC	mg/L	Water	SM 5310-B	00680	2.0	2.0	75-125	20	80-120	RRA
Total Phosphorus-P	mg/L	Water	EPA 365.3	00665	.06	.06	75-125	20	80-120	RRA
VSS	mg/L	Water	EPA 160.4	00535	4	4	NA	20	80-120	RRA

\* Reporting to be consistent with SWQM guidance and based on measurement capability.

\*\* Based on a range statistic as described in Standard Methods, 20<sup>th</sup> Edition, 1998, Section 9020-B, "Quality Assurance/Quality Control - Intra laboratory Quality Control Guidelines. This criterion applies to bacteriological duplicates with concentrations >10 org./100mL.

References for Table A7.1:

United States Environmental Protection Agency (USEPA) "Methods for Chemical Analysis of Water and Wastes," Manual #EPA-600/4-79-020

American Public Health Association (APHA), American Water Works Association (AWWA), and Water Environment Federation (WEF), "Standard Methods for the Examination of Water and Wastewater," 20<sup>th</sup> Edition, 1998.

TCEQ SOP - Surface Water Quality Monitoring Procedures Manual, most recent version.

American Society for Testing and Materials (ASTM) Annual Book of Standards, Vol. 11.02

**APPENDIX C**  
**FIELD DATA SHEETS**

**CANADIAN RIVER MUNICIPAL WATER AUTHORITY  
CHEMICAL WATER ANALYSIS FORM**

**Station/Sample Location**

	Station/Sample Location				
<b>Date Sample Collected:</b>					
<b>Sample Caught At (Time):</b>					
<b>Air Temp: (°F)</b>					
<b>Wind Speed: (mph)</b>					
<b>Wind Direction:</b>					
<b>Ph (Standard Units)</b>					
<b>Specific Conductance (µµs/cm)</b>					
<b>Water Temperature: (°C)</b>					
<b>P. Alkalinity</b>					
<b>T. Alkalinity</b>					
<b>Fluoride</b>					
<b>Chloride</b>					
<b>Nitrate (as N)</b>					
<b>Phosphate</b>					
<b>Sulfate</b>					
<b>Sodium</b>					
<b>Potassium</b>					
<b>Calcium</b>					
<b>Magnesium</b>					
<b>Total Hardness</b>					
<b>Latitude N</b>					
<b>Longitude W</b>					
<b>Water Color</b>					
(1-brown 2-red 3-green 4-black 5-clear 6-other*)					
<b>Water Odor</b> (1-Sewage 2-oily/chem					
3-rottin eggs 4-musky 5-fishy 6-none 7-other*)					
<b>Weather</b>					
(1-clear 2-partly cloudy 3-cloudy 4-rain)					
<b>Water Clarity</b>					
(1-excellent 2-good 3-fair 4-poor 5-other*)					
<b>Flow (CFS):</b>					
<b>Collected By:</b>					
<b>Analyzed By:</b>					
<b>Date Analyzed:</b>					
<b>Sample Depth:</b>					
<b>Lake Depth:</b>					
All values given as parts per million with the exception of pH and Specific Conductance.					
ND = Not Detected					
*** Value taken in field					
<b>*Comments:</b>					

# CANADIAN RIVER MUNICIPAL WATER AUTHORITY

## *E. Coli* BACTERIA LOG

<b>Exp. Date of Media:</b>	<b>Collector(s):</b>
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<b>Date on:</b>	<b>Time on:</b>	<b>Start Temp: (°C)</b>
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	Sample Location	Sample ID No.	mL Used	Dilution Factor	<i>E. coli</i>		
					Small Cells	Large Cells	MPN/ mL
1			100	None			
2			100	None			
3			100	None			
4			100	None			
5			100	None			
6			100	None			
7			100	None			
8			100	None			
9			100	None			
10			100	None			
11			100	None			
12			100	None			
13			100	None			
14			100	None			
15			100	None			
16			100	None			
17			100	None			
18			100	None			
19			100	None			
20			100	None			

<b>Date off:</b>	<b>Time off:</b>	<b>End Temp: (°C)</b>
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**Method Used to Determine Counts:**     *E. coli* Idexx MPN Chart

**Comments:**