

**Amendment # 3  
to the  
Sulphur River Basin Authority  
Clean Rivers Program FY 2004/2005 QAPP**

**Prepared by the Sulphur River Basin Authority  
In Cooperation with the  
Texas Commission on Environmental Quality (TCEQ)**

Questions concerning this QAPP should be directed to:

**Michael Burke  
Sulphur River Basin Authority  
911 N. Bishop, Suite C-104  
Wake Village, Texas 75501  
(903) 223-7887  
mburkesrba@cableone.net**

Effective: September 17, 2004

**Distribution:** QAPP Amendments will be distributed to all personnel on the distribution list maintained by the Planning Agency.

These changes will be incorporated into the QAPP document and TCEQ and the Sulphur River Basin Authority will acknowledge and accept these changes by signing this amendment.

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Michael Burke, Sulphur River Basin Authority Project Manager Date

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Mike Buttram, Sulphur River Basin Authority QAO Date

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Patricia Wise, CRP Project Manager Date

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Sharon Coleman, CRP Lead QAS Date

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Laurie Curra, CRP Project QAS Date

**Justification:** Amendment # 3 to the basin-wide QAPP is necessary because the update to Table A7.1, Measurement Performance Specifications, in Amendment #1 did not use the correct version of Table A7.1 that was originally approved in the QAPP. This amendment provides the correct Table A7.1 and incorporates the changes noted and justified in Amendment # 1.

**Summary of Changes:**

This document provides the correct Table A7.1, Measurement Performance Specifications, that incorporates the changes that were to be made with Amendment #1, and replaces the Table A7.1 currently in place for the basin-wide QAPP.

**Detail of Changes:**

- **Amendment #1 Changes to Table A7.1 Measurement Performance Specifications:**

TDS, 70300, change method from SM 18<sup>th</sup> 1030F to EPA 160.1

TDS calculated, 70294, change lab entity from Ana-Lab to TC

Chlorophyll a, 32211, change method from EPA 446.0 to EPA 445.0, changes made to parameter code (70953) and description to reflect EPA 445.0

Pheophytin, 32218, change method from EPA 446.0 to EPA 445.0, changes made to reflect parameter code (32213) and description to reflect EPA 445.0, NA applies because no standard is available for commercial laboratories.

Total Phosphate, 00665, change EPA 365.3 to EPA 365.2

Sulphur River Basin Systematic Sampling Station FY 2004
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**Table A7.1 - Measurement Performance Specifications**

PARAMETER	UNITS	MATRIX	METHOD	STORET	AWRL	Lab Reporting Limit (RL)	RECOVERY AT RLs	PRECISION (RPD of LCS/LCS dup)	BIAS (%Rec. of LCS)	Lab
<b>Field Parameters</b>										
pH	pH/ units	water	EPA 150.1 and TCEQ SOP	00400	NA*	NA	NA	NA	NA	Field
DO	mg/L	water	EPA 360.1 and TCEQ SOP	00300	NA*	NA	NA	NA	NA	Field
Conductivity	uS/cm	water	EPA 120.1 and TCEQ SOP	00094	NA*	NA	NA	NA	NA	Field
Temperature	°C	water	EPA 170.1 and TCEQ SOP	00010	NA*	NA	NA	NA	NA	Field
Secchi Depth	meters	water	TCEQ SOP	00078	NA*	NA	NA	NA	NA	Field
Days since last significant rainfall	days	NA	TCEQ SOP	72053	NA*	NA	NA	NA	NA	Field
Maximum pool width***	meters	water	TCEQ RWA SOP	89864	NA*	NA	NA	NA	NA	Field
Maximum pool depth***	meters	water	TCEQ RWA SOP	89865	NA*	NA	NA	NA	NA	Field
Pool length***	meters	water	TCEQ RWA SOP	89869	NA*	NA	NA	NA	NA	Field
% pool coverage***	%	water	TCEQ RWA SOP	89870	NA*	NA	NA	NA	NA	Field
Total water depth	meters	water	TCEQ RWA SOP	82903	NA*	NA	NA	NA	NA	Field
Flow	cfs	water	TCEQ SOP	00061	NA*	NA	NA	NA	NA	Field
Flow measurement method	1-gage 2-electric 3-mechanical 4-weir/flume 5-doppler	water	TCEQ SOP	89835	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
Flow estimate	cfs	water	TCEQ SOP	74069	NA*	NA	NA	NA	NA	Field
Present Weather	1-clear 2-partly cloudy 3-cloudy 4-rain 5-other	NA	NA	89966	NA	NA	NA	NA	NA	Field
Wind Intensity	1-calm 2-slight 3-moderate 4-strong	NA	NA	89965	NA	NA	NA	NA	NA	Field
Water Surface	1-calm 2-ripples 3-waves	NA	NA	89968	NA	NA	NA	NA	NA	Field
DO 24-hr Average	ppm	water	TCEQ SOP	89857	NA	NA	NA	NA	NA	Field
24-hr DO Maximum	ppm	water	TCEQ SOP	89856	NA	NA	NA	NA	NA	Field
24-hr DO Minimum	ppm	water	TCEQ SOP	89855	NA	NA	NA	NA	NA	Field
Temperature 24-hr Average	°C	water	TCEQ SOP	00209	NA	NA	NA	NA	NA	Field
Temperature 24-hr Maximum	°C	water	TCEQ SOP	00210	NA	NA	NA	NA	NA	Field
Temperature 24-hr Average	°C	water	TCEQ SOP	00211	NA	NA	NA	NA	NA	Field
Conductivity 24-hr Average	microsiemen	water	TCEQ SOP	00212	NA	NA	NA	NA	NA	Field
Conductivity 24-hr Maximum	microsiemen	water	TCEQ SOP	00213	NA	NA	NA	NA	NA	Field
Conductivity 24-hr Average	microsiemen	water	TCEQ SOP	00214	NA	NA	NA	NA	NA	Field
24-hr pH Maximum	pH units	water	TCEQ SOP	00215	NA	NA	NA	NA	NA	Field
24-hr pH Minimum	pH units	water	TCEQ SOP	00216	NA	NA	NA	NA	NA	Field
24-hr DO # of Measurements	#	water	TCEQSOP	89858	NA	NA	NA	NA	NA	Field
24-hr DO # of Measurements	#	water	TCEQSOP	00221	NA	NA	NA	NA	NA	Field
24-hr DO # of Measurements	#	water	TCEQSOP	00222	NA	NA	NA	NA	NA	Field
24-hr DO # of Measurements	#	water	TCEQSOP	00223	NA	NA	NA	NA	NA	Field

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</b>										
TSS	mg/L	water	EPA 160.2	00530	4	4	NA	20	NA	ANA-LAB
TDS, dried at 180 degrees C	mg/L	water	EPA 160.1	70300	10	10	NA	20	NA	ANA-LAB
TDS, calculated	mg/L	water	calculation	70294	NA	NA	NA	NA	NA	TC
Sulfate	mg/L	water	EPA 300.0	00945	10	10	75-125	20	80-120	ANA-LAB
Chloride	mg/L	water	EPA 300.0	00940	10	10	75-125	20	80-120	ANA-LAB
Chlorophyll-a, spectrophotometric method	ug/L	water	EPA 445.0	70953	5	5	75-125	20	NA	ANA-LAB
Pheophytin, spectrophotometric method	ug/L	water	EPA 445.0	32213	NA	NA	NA	NA	NA****	ANA-LAB
E. coli, IDEXX Colilert	MPN/100 mL	water	SM 9223-B	31699	1	1***	NA	.5***	NA	TC
Ammonia-N, total	mg/L	water	EPA 350.1	00610	.02	0.02	75-125	20	80-120	ANA-LAB
Nitrate-N	mg/L	water	EPA 300.0	00620	.02	0.02	75-125	20	80-120	ANA-LAB
Nitrite-N	mg/L	water	EPA 300.0	00615	.02	0.02	75-125	20	80-120	ANA-LAB
Total phosphate-P	mg/L	water	EPA 365.2	00665	.06	0.06	75-125	20	80-120	ANA-LAB

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

\*\* To be routinely reported when collecting data from perennial pools.

\*\*\* Based on a range statistic as described in Standard Methods, 20th Edition, Section 9020-B, A Quality Assurance/Quality Control - Intralaboratory Quality Control Guidelines. This criterion applies to bacteriological duplicates with concentrations >10 MPN/100mL or 10 organisms/100mL.

\*\*\*\* NA applies because there is no available standard for commercial laboratories

**Benthics- Freshwater - RBA (Qualitative)**

PARAMETER	UNITS	MATRIX	METHOD	STORET	LAB
Biological Data Reporting Units	1= number of individuals from sub-sample; 2 = number of individuals/ft <sup>2</sup> ; 3 = number of individuals/m <sup>2</sup> ; 4 = total number in kicknet	Water	TCEQ RWA SOP	89899	NA
Kicknet Effort, area kicked	m <sup>2</sup>	Water	TCEQ RWA SOP	89903	NA
Kicknet Effort, minutes kicked	Minutes	Water	TCEQ RWA SOP	89904	NA
Snags and Shoreline Sampling Effort, minutes picked	Minutes	Water	TCEQ RWA SOP	89905	NA
Number of individuals in benthic RBA sub-sample (± 100)	#	Water	TCEQ RWA SOP	89906	NA
Benthic Sampler	1=Surber, 2=Ekman, 3=kicknet, 4=Petersen, 5=Hester-Dendy	Water	TCEQ RWA SOP	89950	NA
Undercut bank at sample point	%	Water	TCEQ RWA SOP	89921	NA
Overhanging brush at sample point	%	Water	TCEQ RWA SOP	89922	NA
Gravel substrate at sample point	%	Water	TCEQ RWA SOP	89923	NA
Sand substrate at sample point	%	Water	TCEQ RWA SOP	89924	NA
Soft bottom at sample point	%	Water	TCEQ RWA SOP	89925	NA
Macrophyte bed at sample point	%	Water	TCEQ RWA SOP	89926	NA
Snags and brush at sample point	%	Water	TCEQ RWA SOP	89927	NA
Bedrock at sample point	%	Water	TCEQ RWA SOP	89928	NA
Benthic Organisms, None Present	NA	Water	TCEQ RWA SOP	90005	NA
Mesh Size, any net or sieve, average bar (diagonal measurement) for benthic collection	Cm	NA	TCEQ RWA SOP	89946	NA
Stream Order	#	NA	TCEQ SOP	84161	NA
Ecoregion (Texas Ecoregion Code)	#	NA	TCEQ SOP	89961	NA
Total Taxa Richness, Benthos	#	Water	TCEQ RWA SOP	90055	NA
EPT Index, Abundance	#	Water	TCEQ RWA SOP	90008	NA
Biotic Index (HBI)	NA	Water	TCEQ RWA SOP	90007	NA
Chironomidae	%	Water	TCEQ RWA SOP	90062	NA
Dominant Taxon, Benthos	%	Water	TCEQ RWA SOP	90042	NA
Dominant FFG	%	Water	TCEQ RWA SOP	90010	NA
Predators	%	Water	TCEQ RWA SOP	90036	NA
Ratio of Intolerant:Tolerant taxa, Benthos	NA	Water	TCEQ RWA SOP	90050	NA
Total Trichoptera as Hydropsychidae	%	Water	TCEQ RWA SOP	90069	NA
Non-insect taxa	#	Water	TCEQ RWA SOP	90052	NA
Collector-gatherers	%	Water	TCEQ RWA SOP	90025	NA
Total number as Elmidae	%	Water	TCEQ RWA SOP	90054	NA

### Nekton- Freshwater

PARAMETER	UNITS	MATRIX	METHOD	STORET	LAB
Nekton, none captured	NA	Water	TCEQ RWA SOP	98005	NA
Electrofishing effort, duration of shocking	Seconds	Water	TCEQ RWA SOP	89944	NA
Seining effort	# of Hauls	Water	TCEQ RWA SOP	89947	NA
Combined length of seine hauls	Meters	Water	TCEQ RWA SOP	89948	NA
Seining effort, duration	Minutes	Water	TCEQ RWA SOP	89949	NA
Seine Minimum Mesh Size, net average bar, Nekton	In	Water	TCEQ RWA SOP	89930	NA
Seine Maximum Mesh Size, net average bar, Nekton	In	Water	TCEQ RWA SOP	89931	NA
Net length	Meters	Water	TCEQ RWA SOP	89941	NA
Electrofishing method	1 = boat 2 = backpack 3 = tote barge	Water	TCEQ RWA SOP	89943	NA
Area seined	m <sup>2</sup>	Water	TCEQ RWA SOP	89976	NA
Stream Order	#	NA	TCEQ SOP	84161	NA
Ecoregion (Texas Ecoregion Code)	#	NA	TCEQ SOP	89961	NA
Total number fish species	#	Water	TCEQ RWA SOP	98003	NA
Total darter species	#	Water	TCEQ RWA SOP	98004	NA
Total sunfish species (except bass)	#	Water	TCEQ RWA SOP	98008	NA
Total sucker species	#	Water	TCEQ RWA SOP	98009	NA
Total intolerant fish species	#	Water	TCEQ RWA SOP	98010	NA
Tolerant individuals, fish	%	Water	TCEQ RWA SOP	98016	NA
Omnivore individuals, fish	%	Water	TCEQ RWA SOP	98017	NA
Insectivore individuals, fish	%	Water	TCEQ RWA SOP	98021	NA
Piscivore individuals, fish	%	Water	TCEQ RWA SOP	98022	NA
Total individuals, fish	#	Water	TCEQ RWA SOP	98023	NA
Hybrid individuals	%	Water	TCEQ RWA SOP	98024	NA
Individuals w/ disease/anomalies	%	Water	TCEQ RWA SOP	98030	NA



### Physical Habitat

PARAMETER	UNITS	METHOD	STORET	LAB
Streambed slope over evaluated reach (from USES map)	NA	TCEQ RWA SOP	72052	NA
Approximate drainage area above the most downstream transect from USES map	km <sup>2</sup>	TCEQ RWA SOP	89859	NA
Stream Order	#	TCEQ RWA SOP	84161	NA
Length of stream	Km	TCEQ RWA SOP	89860	NA
Lateral transects made	#	TCEQ RWA SOP	89832	NA
Average stream width	Meters	TCEQ RWA SOP	89861	NA
Average stream depth	Meters	TCEQ RWA SOP	89862	NA
Instantaneous stream flow	Cfs	TCEQ RWA SOP	00061	NA
Flow measurement method	1=gage 2= electric 3= mechanical 4=weir/flume	TCEQ RWA SOP	89835	NA
Channel Flow Status	1=no flow 2= low 3= moderate 4=high	TCEQ RWA SOP	89848	NA
Maximum pool width at time of study	Meters	TCEQ RWA SOP	89864	NA
Maximum pool depth in study area	Meters	TCEQ RWA SOP	89865	NA
Total stream bends	#	TCEQ RWA SOP	89839	NA
Well-defined stream bends	#	TCEQ RWA SOP	89840	NA
Moderately defined stream bends	#	TCEQ RWA SOP	89841	NA
Poorly defined stream bends	#	TCEQ RWA SOP	89842	NA
Riffles	#	TCEQ RWA SOP	89843	NA
Dominant substrate	1 = clay, 2 = silt, 3 = sand, 4 = gravel, 5 = cobble, 6 = boulder, 7 = bedrock, 8 = other	TCEQ RWA SOP	89844	NA
Avg. % of substrate gravel >2mm	%	TCEQ RWA SOP	89845	NA
Avg. % instream cover	%	TCEQ RWA SOP	84159	NA
Stream Cover Types	#	TCEQ RWA SOP	89929	NA
Avg. % stream bank erosion potential	%	TCEQ RWA SOP	89846	NA
Avg. stream bank angle	Degrees	TCEQ RWA SOP	89847	NA
Avg. width natural riparian vegetation	Meters	TCEQ RWA SOP	89866	NA
Avg. % trees as riparian vegetation	%	TCEQ RWA SOP	89849	NA
Avg. % shrubs as riparian vegetation	%	TCEQ RWA SOP	89850	NA
Avg. % grasses and forbes as riparian vegetation	%	TCEQ RWA SOP	89851	NA
Avg. % cultivated fields as riparian vegetation	%	TCEQ RWA SOP	89852	NA
Avg. % other as riparian vegetation	%	TCEQ RWA SOP	89853	NA
Avg. % tree canopy coverage	%	TCEQ RWA SOP	89854	NA
Overall Aesthetics	1= wilderness 2= natural 3= common 4= offensive	TCEQ RWA SOP	89867	NA
Texas Ecoregion Code	#	TCEQ RWA SOP	89961	NA
Land development impact	1= unimpacted 2= low 3= moderate 4=high	TCEQ RWA SOP	89962	NA

- \* Reporting to be consistent with SWQM guidance and based on measurement capability
- \*\* Based on range statistic as described in Standard Methods, 20th Edition, Section 9020-B, "Quality Assurance/Quality Control - Intralaboratory Quality Control Guidelines." This criterion applies to bacteriological duplicates with concentrations > 10org/100 mL.
- \*\*\* Laboratory should be specified where applicable.

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. (Note: (The 21<sup>st</sup> edition may be cited if it becomes available.)  
 TCEQ SOP - Surface Water Quality Monitoring Procedures Manual, Volume 1: Physical and Chemical Monitoring Methods for Water, Sediment and Tissue, 2003 or subsequent editions.  
 American Society for Testing and Materials (ASTM) Annual Book of Standards, Vol. 11.02

