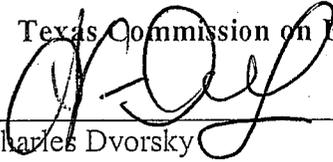


TEXAS COMMISSION ON ENVIRONMENTAL QUALITY
DEVILS RIVER DOWNSTREAM OF BAKER'S CROSSING
CONTINUOUS WATER QUALITY MONITORING
PROJECT PLAN

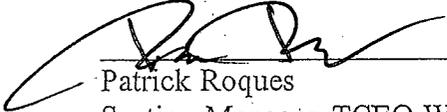
A1 APPROVAL PAGE

Texas Commission on Environmental Quality, Central Office



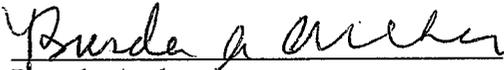
Charles Dvorsky
CWQMN Network Coordinator, TCEQ

2/14/2008
Date



Patrick Roques
Section Manager, TCEQ WQM&A Program

2/14/08
Date



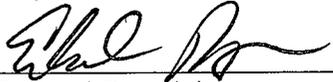
Brenda Archer
Team Leader, TCEQ SWQM Program

2/14/2008
Date



Christine Kolbe
Project Lead, TCEQ SWQM Program

2/14/2008
Date



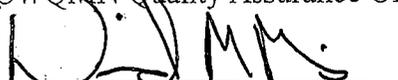
Edward Ragsdale
CWQMN Quality Control Officer, TCEQ SWQM Program

2/14/2008
Date



Sharon Coleman
CWQMN Quality Assurance Officer

2/14/2008
Date



David Manis
Section Manager, TCEQ Data Management and
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2/14/08
Date

A1 APPROVAL PAGE

Texas Commission on Environmental Quality, Regional Office


Rose Luna-Pirtle
Section Manager, TCEQ Region 16

01/23/2008
Date


Lorinda Gardner
Regional Director, TCEQ Region 16

23 Jan 08
Date

A1 APPROVAL PAGE

International Boundary and Water Commission



Richard Peace
Supervisory Engineer,
Operations and Maintenance Division

3/5/08

Date

The Devils River downstream of Baker's Crossing Continuous Water Quality Monitoring (CWQM) project plan documents specific details for this site. Please see the CWQMN QAPP for additional project requirements. CWQMN SOPs are available via the internet at www.texaswaterdata.org.

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Appendix A: Standard Operating Procedure for Validation of Continuous Water Quality Monitoring Data Collected by Multi-parameter Sonde

LIST OF ACRONYMS

CAMS	Continuous Ambient Monitoring Station
CVS	Calibration Verification Sample
CWQMN	Continuous Water Quality Monitoring Network
DO	Dissolved Oxygen
DM&QA	Data Management and Quality Assurance
EC	Electrical Conductance (Reported as Specific Conductance)
FOD	Field Operation Division
FY	Fiscal Year
LEADS	Leading Environmental Analysis and Display System
MDL	Method Detection Limit
mg/L	Milligram per Liter
MOPs	TCEQ Monitoring Operation Division
NA	Not Applicable
NIST	National Institute of Standards and Technology
NTU	Nephelometric Turbidity Units
ppmv	parts per million by volume
QA	Quality Assurance
QAO	Quality Assurance Officer
QAPP	Quality Assurance Project Plan
QC	Quality Control
RPD	Relative Percent Difference
SC	Specific Conductance
SOP	Standard Operating Procedure
SWQM	Surface Water Quality Monitoring Team
T	Temperature
TBD	To Be Determined
TCEQ	Texas Commission on Environmental Quality
TDS	Total Dissolved Solids
TMDL	Total Maximum Daily Load
RPE	Relative Percent Error
TSWQS	Texas Surface Water Quality Standards
µS/cm	micro Siemens per centimeter
WQM&A	Water Quality Monitoring & Assessment Section
°C	Degrees Centigrade

A3 DISTRIBUTION LIST

INTERNATIONAL BOUNDARY AND WATER COMMISSION

4171 N. Mesa, C-100
El Paso, TX 79902

Mr. William Finn, Supervisory Hydrologist, Water Accounting Department

THE NATURE CONSERVANCY OF TEXAS

P.O. Box 2078
Fort Davis, TX 79734

Mr. John Kargess, Director

P.O. Box 420757
Del Rio, TX 78842-0757

Mr. Scott McWilliams, Dolan Falls Preserve Manager

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Mr. Patrick Roques, Section Manager, Water Quality Monitoring & Assessment Section, Monitoring Operations Division

Ms. Sharon Coleman, CWQMN Quality Assurance Officer, Compliance Support Division

Mr. David Manis, Section Manager, Data Management & Quality Assurance Section, Monitoring Operations Division

Mr. Larry Lehman, System Planning and Implementation Team, Ambient Monitoring Section, Monitoring Operations Division

Ms. Anne Panko, Quality Assurance & Audit Team, Data Management & Quality Assurance Section, Monitoring Operations Division

Ms. Brenda Archer, Surface Water Quality Monitoring Team Leader, Monitoring Operations Division

Ms. Christine Kolbe, Surface Water Quality Monitoring Team, Water Quality Monitoring & Assessment Section

Mr. Edward Ragsdale, Surface Water Quality Monitoring Team, Water Quality Monitoring & Assessment Section

Mr. Lloyd Lawrence, Ambient Monitoring Section, Monitoring Operations Division

Ms. Rebecca Ross, Data Management Technology Team, Data Management & Quality Assurance Section, Monitoring Operations Division

Ms. Nancy Ragland, Data Management Technology Team, Data Management & Quality Assurance Section, Monitoring Operations Division

Ms. Gail Rothe, Categorical 106 Grant Project Manager

Mr. Cory Horan, Clean Rivers Program, Water Quality Monitoring & Assessment Section

A4 PROJECT/TASK ORGANIZATION

This section is intended to identify individuals and organizations that will be responsible for developing and/or supporting this project. For a list of additional project/task and responsibilities please refer to section A4 of the CWQMN QAPP.

A4.1 TCEQ CWQMN Network Coordinator (Charles Dvorsky)

- Provides overall support for coordination, development, and installation of new Continuous Ambient Monitoring Station (CAMS)

A4.2 TCEQ SWQM Project Lead (Christine Kolbe)

- Develop Project Plan
- Responsible for coordination of the overall project
- Plan and participate in site reconnaissance; coordinate with appropriate internal and external parties to accomplish objectives of site visits
- Participate in deployment of station as appropriate

A4.3 TCEQ Systems Planning and Implementation Team (Larry Lehmann)

- Provides overall support and logistics for deployment of monitoring stations
- Provides training to operate and maintain station infrastructure

A4.4 TCEQ Region 16 (Elsa Hull)

- Site Operation and Maintenance
- Participate in station development

A4.5 TCEQ Data Validation (to be named)

- Provides data validation for two field parameter sites.
- Train operators on data validation software and procedures when applicable including Manual validation.
- Provide training for Site Operator on the data display system.
- Contacts Site Operator and Project Lead to when potential data issues arise.

A4.6 International Boundary and Water Commission (to be named)

- Coordinate with appropriate internal and external parties to accomplish objectives of site visits.
- Provide access to monitoring site location and approve location of TCEQ traffic box and monitoring equipment.

A4.7 The Nature Conservancy of Texas (Scott Williams)

- Facilitate communication with local land owners.

A5 PROBLEM DEFINITION/BACKGROUND

The Devils River, a spring fed stream, is one of the most pristine water bodies in Texas. A great deal has been done to protect the quality of the river by protecting the watershed. However, increasing oil and gas production in the watershed pose a threat to water quality. The total dissolved solids concentrations are increasing so that they are very near the water quality standard. The purpose of this site is to collect dense temporal water quality data to document status and trends in the Devils River and to screen water quality conditions for possible impact from oil and gas exploration development.

A6 PROJECT/TASK DESCRIPTION

In cooperation with the International Boundary and Water Commission, the TCEQ will establish a continuous water quality monitoring (CWQM) site on the Devils River downstream of Baker's Crossing, north of Comstock, Texas. The site will be located on Segment 2309, SWQM station number 13238, latitude 29.9638888889°N, longitude 101.14444444°W, at IBWC gauging station number 08-4490.00.

Monitoring equipment for the site will include In-situ Level TROLL 500 water level sensor and Greenspan CS4-1200 multiparameter water quality instrument. Site installation is expected to be completed March-April 2008 with in-situ water quality sampling beginning immediately upon installation and continuing for a period of at least (but not limited to) two years. All water quality and water level data will be transmitted and stored in the Leading Environmental Analysis and Display System (LEADS) database. All data will be available to the public via the internet.

Figure 1: Map of proposed monitoring location (light blue square)

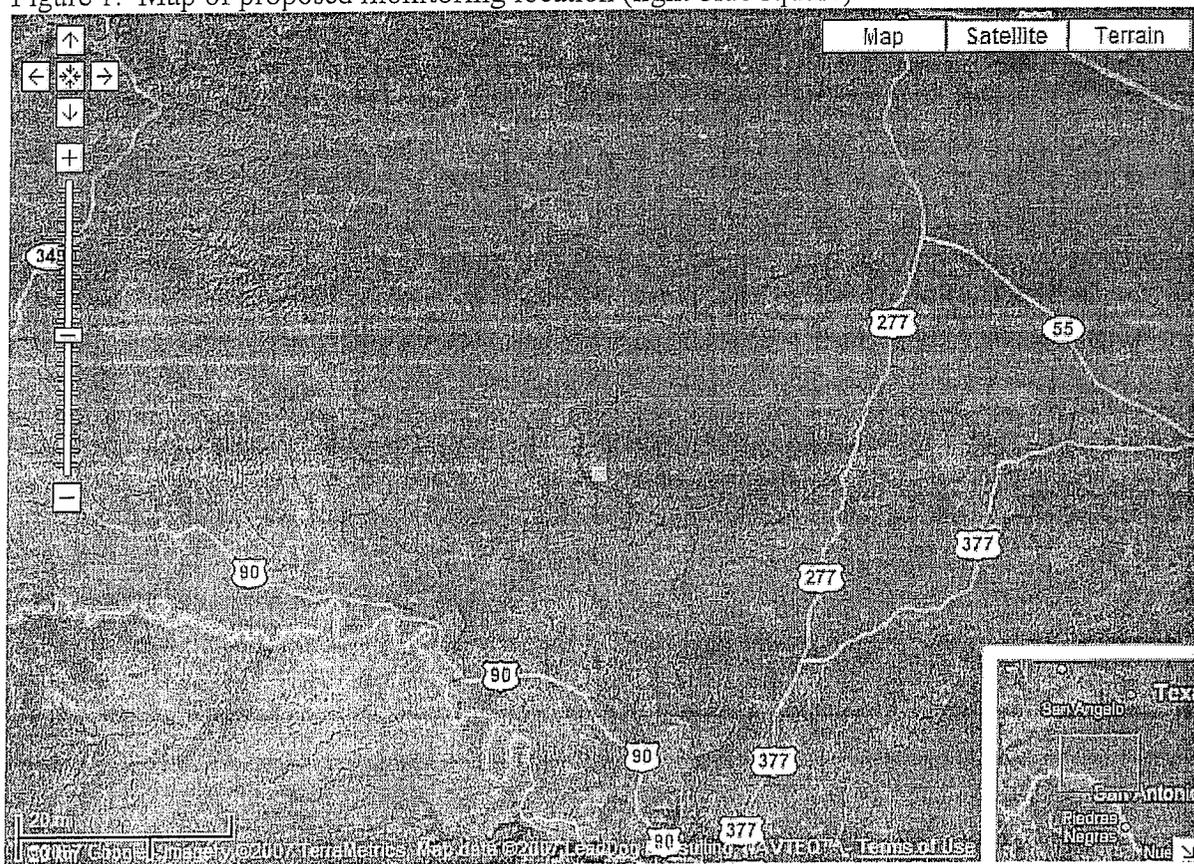


Figure 2: Map of proposed monitoring location (light blue square)



A7 QUALITY OBJECTIVES AND CRITERIA

The measurement performance specifications to support the project objectives are specified in Table(s) A7.1 and A7.2.

Methods used are based on *Standard Methods for the Examination of Water and Wastewater*, 20th Edition, 1998 unless otherwise noted.

Table A7.1—Greenspan CS4-1200 Measurement Performance Specifications

Parameter	Parameter Code	Units	Method	Calibration Verification Sample Acceptance Limit**
pH	10400	pH / units	Glass electrode, Standard Method 4500-H+B	±0.50 pH unit
DO	10300	mg/L	Galvanic membrane electrode, Standard Method 4500-O-G	% Saturation ≤6.0% ±0.50 mg/L
SC	10094	µS/cm	Toroidal*	≤5.0% RPE
TDS	10294	mg/L	Calculated by LEADS. SC measurements are multiplied by 0.65	≤5.0% RPE (SC CVS)
Temperature	10010	°C	Standard Method 2550 B	0.2°C ± 0.5°C

*Method not based on *Standard Methods for the Examination of Water and Wastewater*, 20th Edition, 1998

**Criteria for use in the 305(b) assessment and 303(d) List per SWQM DQOs and SWQM QAPP.

Table A7.2—In-Situ TROLL 500 Performance Specifications

Parameter	Parameter Code	SOP	Units	Range	Method	Acceptance Criteria
Water level Depth	10079	AMPM -008	Feet	0 -33.0 Feet	Vented Pressure Transducer	±6.0 inches*

* If sensor does not meet acceptance criteria, sensor corrective action and/or sensor re-calibrated is performed. Data is not invalidated as a result of not meeting acceptance criteria.

Ambient Water Reporting Limits (AWRLs)

N/A

Precision

N/A

Bias

As described in Section A7.1 of the CWQMN QAPP.

Representativeness

As described in Section A7.2 of the CWQMN QAPP.

Comparability

As described in Section A7.3 of the CWQMN QAPP.

Completeness

A general requirement of 75 percent data completeness goal has been set for the CWQM network. Periods of no flow or other conditions that necessitate the shutdown of any or all instrumentation during these times are not considered in the calculation for data completeness. See Section A7.5 CWQM QAPP.

A8 SPECIAL TRAINING/CERTIFICATION

TCEQ Region 16 staff will be the lead for site operation and maintenance for the CWQM station. Region staff received initial training for sonde setup and calibration of the Greenspan CS4-1200 multi-parameter sonde in October 2007 by SWQM Central Office (SWQM CO) staff. A follow-up training

including the sonde and In-situ Level TROLL 500 will be conducted by SWQM CO staff upon instrument installation at the stations.

Region 16 staff will have the opportunity to attend a LEADS Data management training in the near future.

A9 DOCUMENTS AND RECORDS

As described in sections A9 of the CWQMN QAPP.

B1 SAMPLING PROCESS DESIGN

Site Selection Criteria

Site selection is based on the accessibility of the site which will be through the IBWC flow monitoring station (IBWC gage 08-4490.00). The site will be located at the IBWC flow gage station using all TCEQ provided equipment including the traffic box, solar panel, communication equipment, and instruments. The site will be located in position that will not interfere with the existing IBWC equipment.

Monitoring Station Design

Monitoring and Support Equipment

Devils River Downstream of Baker's Crossing (Station ID 13238, IBWC gage 08-4490.00)
Water quality monitoring equipment at this site will include:

- One In-Situ Level TROLL 500 level sensor, communications cables and support structure
- Two Greenspan CS4-1200 multi-parameter water quality instruments with communication cables and support structure
- Sutron SatLink Data Logger

Monitoring Equipment Configuration and Measurement Frequencies

The Greenspan multi-parameter instrument will monitor water temperature, dissolved oxygen, pH, and specific conductance. The In-situ Level TROLL 500 sensor will monitor water level. Water quality measurements and water level will be logged once every 15-minutes by the data logger.

Site Development

The sonde will be housed in a length of 4 in. diameter PVC pipe installed on the river bank. The lower three feet of pipe will be perforated to allow water flow across the sensors. The pipe will be secured to the bank and the river bed with extruded aluminum channel. The water level sensor will be secured to the aluminum channel.

A traffic box containing a Sutron data logger and telemetry will be mounted on an aluminum pole. Solar panels will provide power to the equipment.

B2 SAMPLING METHODS

In-situ water quality and water level measurements are logged once every 15 minutes by the data logger. The data is then transmitted to the MeteoStar/LEADS system in Austin, Texas where the data is ingested, archived, and posted to the appropriate TCEQ internet site.

Sampling/Measurement System Corrective Action

Corrective action measures in the CWQMN will be taken to ensure the Data Quality Objectives are attained. The site operator is responsible for monitoring the performance of the measurement and support equipment and identifying problems or potential problems. When problems are identified that cannot be resolved by the site operator, the site operator notifies the project lead responsible for coordination with appropriate personnel to resolve the problem.

The site operator is responsible for documenting problems and corrective actions in the appropriate logbook(s). When problems could affect data quality, the site operator is also responsible for making entries in the MeteoStar/LEADS Operator Log to provide information to the data validators for data assessment purposes.

The project lead is responsible for coordinating the necessary supply and parts shipments to the site operator. When necessary, personnel from the Ambient Monitoring Team will travel to a particular site to repair or replace support equipment that cannot be repaired or replaced by the site operator. Monitoring equipment that cannot be repaired by TCEQ staff is sent to the manufacturer for repair.

CWQMN sites in or near flood plains have the potential to be damaged by flood waters during severe floods. Potential flooding is a consideration in the site development process. In-situ components are secured to the stream banks and have proved capable of surviving a given flood. However, it is accepted that the support systems and components will need periodic replacement and repair.

B3 SAMPLING HANDLING AND CUSTODY

As described in Section B3 of the CWQMN QAPP.

B4 ANALYTICAL METHODS

Analytical methods are listed in Section A.7.

B5 QUALITY CONTROL

As described in Section B5 of the CWQMN QAPP.

Greenspan CS4-1200 Sonde

Refer see Table A7.1 for QC criteria.

Analytical SOPs are under development for sonde and water level sensor operation and quality control procedures.

Sonde DO, pH, and conductivity parameters are calibrated at a minimum once monthly. DO, SC, and pH Calibration Verification Samples (CVSs) are analyzed monthly.

In-Situ TROLL 500 Level Sensor

For QC procedures please see SOP AMPM -008, *Measurement of Water Level and Sensor Depth in Surface Water using the In-Situ Level TROLL 500*

Corrective Action Related to Quality Control

As described in Section B5 of the CWQMN QAPP.

B6 INSTRUMENT/EQUIPMENT TESTING, INSPECTION AND MAINTENANCE

Greenspan Sonde

The Greenspan sonde maintenance SOP is under development. TCEQ Austin staff will provide sonde maintenance support.

Water level Sensor

Refer to the In-Situ TROLL level sensor instruction manual.

B7 INSTRUMENT CALIBRATION AND FREQUENCY

Greenspan Sonde

The site operator will calibrate sonde parameters once monthly at a minimum.

Water level Sensor

For Calibration procedures please see SOP AMPM-008, *Measurement of Water Level and Sensor Depth in Surface Water using the In-Situ Level TROLL 500*.

B8 INSPECTION/ACCEPTANCE OF SUPPLIES AND CONSUMABLES

MOPs ambient monitoring section keeps an inventory of common spare parts. Parts can be mailed via United Parcels Service and will usually arrive the next day (if mailed before noon on the mailing day). The project lead will be responsible for the coordination of parts replacement.

Greenspan Sonde

Common Greenspan sonde spare parts are stocked by MOPs.

The site operator will contact the project lead to obtain pH calibration standards. Greenspan specific conductance is calibrated by a calibration loop that will be supplied with the unit.

Water level Sensor

Water level sensors and communication cables are stocked by MOPs.

B9 NON-DIRECT MEASUREMENTS

There are no non-direct measurements used in this project.

B10 DATA MANAGEMENT

As described in CWQMN QAPP.

Data validation will be performed by TCEQ DM&QA staff as noted in Section A4.4.

Project water temperature, pH, dissolved oxygen, specific conductance, water level, and precipitation data will be stored in TCEQ's Leading Environmental Analysis and Display System (LEADS).

C1 ASSESSMENTS AND RESPONSE ACTIONS

As described in CWQMN QAPP.

Corrective Action

As described in Section C1 of the CWQMN QAPP.

C2 REPORTS TO MANAGEMENT

As described in Section C2 of the CWQMN QAPP.

Reports to TCEQ Project Management

As described in Section C2 of the CWQMN QAPP.

D1 DATA REVIEW, VERIFICATION, AND VALIDATION

As described in Section D1 of the CWQMN QAPP.

Data validation will be conducted by Data Management Technology staff at TCEQ Central Office in Austin, Texas.

Sonde data validation is described in Section D1 of the CWQMN QAPP. Refer to SOP DQRP-015, *Validation of Continuous Water Quality Monitoring Data Collected by Multi-parameter Sonde* (Appendix A).

D2 VERIFICATION AND VALIDATION METHODS

As described in Section D2 of the CWQMN QAPP.

D3 RECONCILIATION WITH DATA QUALITY OBJECTIVES

As described in Section D3 of the CWQMN QAPP.