

Appendix G

to the

**Guadalupe Blanco River Authority
And
Upper Guadalupe River Authority
Clean Rivers Program
FY 2002-03**

**Investigation of impact of oil field activities on
the San Marcos River and Plum Creek in Caldwell County**

Quality Assurance Project Plan

Prepared in Cooperation with the Guadalupe-Blanco River Authority and the Texas Natural Resource Conservation Commission Under the Authorization of the Texas Clean Rivers Act

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LIST OF ACRONYMS

BMP	Best Management Practices
COC	Chain-of Custody
CRP	Clean Rivers Program
DMP	Data Management Plan
DQO	Data Quality Objective
FY	Fiscal Year
GBRA	Guadalupe-Blanco River Authority
LCRA	Lower Colorado River Authority
MDMA	Monitoring Data Management & Analysis
PAH	Polynuclear Aromatic Hydrocarbon
QA	Quality Assurance
QAM	Quality Assurance Manual
QAO	Quality Assurance Officer
QAPP	Quality Assurance Project Plan
QAS	Quality Assurance Specialist
QC	Quality Control
QMP	Quality Management Plan
RBP	Rapid Bioassessment Protocol
RL	Reporting Limits
RWA	Receiving Water Assessment
SOP	Standard Operating Procedure
SWQM	Surface Water Quality Monitoring
TMDL	Total Maximum Daily Load
TNRCC	Texas Natural Resource Conservation Commission
TPH	Total Petroleum Hydrocarbons
TRACS	Texas Regulatory and Compliance System
TSWQS	Texas Surface Water Quality Standards
VOA	Volatile Organic Analytes
WMT	Watershed Management Team

SS2-A3 DISTRIBUTION LIST

For distribution list, refer to Section A3 of the 2002-03 QAPP.

SS2-A4 PROJECT/TASK ORGANIZATION

Guadalupe-Blanco River Authority

Debbie Magin
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As described in the basin-wide QAPP, Revision 6, Section A4.

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Org chart

SS2-A5 PROBLEM DEFINITION/BACKGROUND

The Clean Rivers Program monitoring efforts and water quality assessments in the Guadalupe River Basin are described in Section A5 of the 2002-03 QAPP. In addition to those monitoring efforts, a special study will be conducted to investigate the impact of oil field activities on the water quality of the San Marcos River and Plum Creek in Caldwell County. Active oil wells and storage tanks are heavily concentrated in Caldwell County. These tanks and wells are often unmanned and leaks may go for extended periods of time without detection. Rainfall events can carry contaminated soil and oil deposits to the tributaries that feed the San Marcos River and Plum Creek. In January 2001, an oil field storage tank was found to be leaking and slowly seeping into a small tributary of the San Marcos River in Caldwell County, and in May 1999, a TNRCC enforcement order required the removal of contaminated soil surrounding a petroleum transmission line near Plum Creek (TNRCC site no. 12640). The City of Luling is at the greatest risk. The city uses the San Marcos River as the raw water source for their surface water treatment plant located in Luling. GBRA has two routine monitoring sites, one on the San Marcos River and one on the Plum Creek. Total petroleum hydrocarbons (TPH), BTEX and polynuclear aromatic hydrocarbons (PAH) (collectively referred to as “organic compounds”) will be added quarterly to the list of routine chemical analysis. In addition, samples will be collected for the organic compounds after rainfall events that occur during the study period.

SS2-A6 PROJECT/TASK DESCRIPTION

The proposed study will consist of routine and rainfall event sampling at four sites, two on the San Marcos River and two on the Plum Creek. One site on each water body (referred to as “background site”) has been chosen to represent the natural background concentrations of the organic compounds and is located upstream of the area where the oil-related activities are concentrated. One site on each water body (referred to as “study site”) has been chosen because of its location within the area of heaviest oil field activities. The organic compounds will be sampled quarterly at all four sites for one year. These routine sampling events will be made after at least seven days of dry weather conditions in the respective watersheds. In addition to routine monitoring for the organic compounds, samples will be collected for the organic compounds after rainfall events that occur during the study period. Rainfall events must be of the intensity to cause measurable runoff. A maximum of four runoff related sampling events will be attempted.

Figure SS2-A6.1 is a map of the study area, with monitoring sites labeled.

Figure SS2

SS2-A7 DATA QUALITY OBJECTIVES AND CRITERIA

The purpose of the project is to investigate the impact of the activities associated with the oil field industry on the water quality of the San Marcos River and Plum Creek in Caldwell County. The measurement performance criteria to support the project objectives are specified in SS-Table A7.1 in this Appendix G of the 2002-2003 QAPP. Concentrations of the organic compounds measured at the study sites, at routine flow conditions and after rainfall events, will be compared to the concentrations at the respective background sites.

Question: Do any of the study site samples, routine or rainfall, exhibit higher concentrations of BTEX, TPH or PAH than the respective background site samples?

Decision Rule 1: If the concentration of any of the organic compounds monitored at a study site quarterly under routine conditions or collected after a rainfall event is greater than 25% relative percent difference of the upstream respective background site, then there may be a significant impact from oil field activities in that reach of the stream and will necessitate consideration of additional monitoring in the next biennium. If the organic compound has a drinking water standard, that concentration will be used as a screening concentration as well. Both the city of Luling and the Texas Railroad Commission will be notified of the results of the study in order to increase the attention and inspection of the oil field operations in Caldwell County and initiate better communications between the Railroad Commission and city of Luling's potable water operations.

SS-Table A7.1 Data Quality Objectives for Special Study for Oil Field Impacts

PARAMETER	UNITS	MATRIX	METHOD	STORET	RL	PRECISION	ACCURACY at RLS (% REC)	ACCURACY of lab matrix spikes (%REC)	LABORATORY PERFORMING ANALYSIS
<i>Organics</i>									
BTEX	ug/L	water	EPA 624		5	30	70-130	70-130	LCRA
TPH	mg/L	water	TX 1005		5	30	70-130	70-130	LCRA
PAH	ug/L	water	EPA 625		5-10	30	70-130	70-130	LCRA
Flow Severity	1-no flow, 2-low, 3-normal, 4-flood, 5-high, 6-dry	water	TNRCC SOP	01351	NA ¹	NA	NA	NA	GBRA
Rainfall past 24 hours	inches	water	TNRCC SOP	82553	NA	NA	NA	NA	GBRA
Rainfall past 7 days	inches	water	TNRCC SOP	82554	NA	NA	NA	NA	GBRA
Days since last significant rainfall	days	water	TNRCC SOP	70253	NA	NA	NA	NA	GBRA

¹ Reporting to be consistent with the SWQM guidance and based on measurement capability.

Precision

As described in Section A7 of the basin-wide QAPP.

Accuracy

As described in Section A7 of the basin-wide QAPP.

Representativeness

Representativeness of the project and selected sampling sites are based on oil field activities in Caldwell County and their proximity to the surface water in the county.

Quarterly sampling for one year will be conducted at all the study and background sampling sites in order to account for variations in variables such as season, temperature, and flow. Sampling after rainfall events will occur as quickly as possible after it is determined that the event is significant enough to cause runoff to occur.

Comparability

As described in Section A7 of the basin-wide QAPP.

Completeness

As described in Section A7 of the basin-wide QAPP.

SS2-A8 SPECIAL TRAINING/CERTIFICATION

No special training or certifications are required for this project. Training on field techniques, quality assurance, data management, etc., is provided by the TNRCC for the Planning Agencies as part of the Clean Rivers Program.

SS2-A9 DOCUMENTS AND RECORDS

The documents that describe, specify, report, or certify activities are listed in Table A9.1 in Section A9 of the 2002-03 QAPP.

SS2-B1 SAMPLING PROCESS DESIGN

Sample Design Rationale

The sample design rationale is based on the intent of the study to investigate the impact of oil field activities on water quality of the San Marcos River and Plum Creek in the Caldwell County as defined in SS2-A7. The monitoring during routine conditions will be tied to the routine monitoring done at the study sites currently. Rainfall monitoring will be done when the laboratory is notified of significant rainfall in the study area by either the National Weather Service or the city of Luling water plant personnel.

Site Selection Criteria

Quarterly monitoring for TPH, BTEX and PAH will occur at the four locations. The study site located on the San Marcos River is located at the potable water intake at the city's water treatment plant (12646). The study site located on the Plum Creek is at CR 135 southeast of Luling, (12640). The background site on the San Marcos River is a TNRCC monitoring location, Lower San Marcos River at county road immediately below the confluence of the San Marcos and Blanco Rivers (12628). The background site on Plum Creek is located at the GBRA systematic site, Plum Creek at Plum Creek Road (17406).

SS2-B2 SAMPLING METHODS

Field Sampling Procedures

The field sampling procedures are documented in the TNRCC *Surface Water Quality Monitoring Procedures Manual* (1999, or subsequent editions).

Sample volume, container types, minimum sample volume, preservation requirements, and holding time requirements

Table SS-B2.1 Sample Storage, Preservation and Handling Requirements

Parameter	Matrix	Container	Preservation	Sample Volume	Holding Times
TPH	Water	Glass	Ice, 4°C	40 mL	7 days
BTEX	Water	Glass	Ice, 4°C	40 mL	7 days
PAH	Water	Glass	Ice, 4°C	1 L	7 days

Sample Containers

Bottles for organic sampling are purchased pre-cleaned and certified for organic constituents.

Processes to Prevent Contamination

Samples collected for organics analyses are collected and stored on ice as described above and shipped by common carrier, along with the chain of custody, to the Lower Colorado River Authority Laboratory in Austin, Texas.

Trip blanks will be necessary when samples are collected for organic analyses. Trip blanks accompany samples to the LCRA Laboratory.

Documentation of Field Sampling Activities

As prescribed in the 2002-03 QAPP, Section B2.

Recording Data

As prescribed in the 2002-03 QAPP, Section B2.

Failures in Sampling Methods Requirements and/or Deviations from Sample Design and Corrective Action

As prescribed in the 2002-03 QAPP, Section B2.

SS2-B3 SAMPLING HANDLING AND CUSTODY PROCEDURES

Chain of Custody

As prescribed in the 2002-03 QAPP, Section B3.

Sample Labeling

As prescribed in the 2002-03 QAPP, Section B3.

Sample Handling

Samples collected for organics analyses are collected and stored on ice as described above and shipped by common carrier, along with the chain of custody, to the Lower Colorado River Authority Laboratory in Austin, Texas. Trip blanks will be necessary when samples are collected for organic analyses. Trip blanks accompany samples to the LCRA Laboratory.

Failures in Chain-of-Custody and Corrective Action

As prescribed in the 2002-03 QAPP, Section B3.

SS2-B4 ANALYTICAL METHODS

The analytical methods, associated matrices, and performing laboratories are listed in Table A.7.1 of Section A7 of the 2002-03 QAPP. The authority for analysis methodologies under the Clean Rivers Program is derived from the TSWQS (307.1-307.10) in that data generally are generated from comparison to those standards and/or criteria. The Standards state that a procedure for laboratory analysis will be in accordance with the most recently published edition of *Standard Methods for the Examination of Water and Wastewater*, the latest version of the *TNRCC Surface Water Quality Monitoring Procedures Manual*, 40 CFR 136 or other reliable procedures acceptable to the executive director. Copies of laboratory SOPs are retained by GBRA and are available for review by the TNRCC. Laboratory SOPs are consistent with EPA requirements as specified in the method.

Standards Traceability

As prescribed in the 2002-03 QAPP, Section B4.

Alternative Method Modification

As prescribed in the 2002-03 QAPP, Section B4.

Failures or Deviations in Analytical Method Requirements and Corrective Actions

As prescribed in the 2002-03 QAPP, Section B4.

SS2-B5 QUALITY CONTROL

Sampling Quality Control Requirements and Acceptability Criteria

As prescribed in the 2002-03 QAPP, Section B5.

Laboratory Measurement Quality Control Requirements and Acceptability Criteria

As prescribed in the 2002-03 QAPP, Section B5.

Failures in Field and Laboratory Quality Control and Corrective Action

As prescribed in the 2002-03 QAPP, Section B5.

SS2-B6 INSTRUMENT/EQUIPMENT TESTING, INSPECTION AND MAINTENANCE

As prescribed in the 2002-03 QAPP, Section B6.

SS2-B7 INSTRUMENT CALIBRATION AND FREQUENCY

As prescribed in the 2002-03 QAPP, Section B7.

SS2-B8 INSPECTION/ACCEPTANCE OF SUPPLIES AND CONSUMABLES

As prescribed in the 2002-03 QAPP, Section B8.

SS2-B9 NON-DIRECT MEASUREMENTS

Historical data collected under approved Clean Rivers Program QAPPs beginning in 1996 will be used for comparison to special sampling site data.

SS2-B10 DATA MANAGEMENT

The data collected will be managed according to the Data Management Plan, Appendix E of the 2002-03 QAPP. The data will not be collected under ambient conditions therefore it will not be sent to TNRCC for loading into SWQM database. All data collected will be kept on file by the GBRA and available upon request by TNRCC.

SS2-C1 ASSESSMENTS AND RESPONSE ACTIONS

As appropriate, the Table C1.1 in Section C1 of the 2002-03 QAPP will be followed. In addition to the responses listed there, there will be a report of findings submitted to the TNRCC and to the Guadalupe River Basin CRP Steering committee. Corrective actions described in Section C1 of the 2002-03 QAPP will apply to the oil field impacts study as well.

SS2-C2 REPORTS TO MANAGEMENT

Reports to GBRA Project Management, and TNRCC Project Management

Deliverables and their dates of completion for the special study can be found in the work plan, under Task 3. Only data that has been validated and verified will be reported in the report of findings.

SS2-D1 DATA REVIEW, VERIFICATION, AND VALIDATION

As prescribed in the 2002-03 QAPP, Section D1.

SS2-D2 VERIFICATION AND VALIDATION METHODS

As prescribed in the 2002-03 QAPP, Section D2.

SS2-D3 RECONCILIATION WITH USERS REQUIREMENTS

The relative percent difference between background and study sites will be used to assess the impacts. Additional statistical evaluations may be used in the evaluation process.

SS2-ATTACHMENT 1 TABLE OF SPECIAL STUDY MONITORING LOCATIONS