

**Clean Rivers Program  
Quality Assurance Project Plan**

**Lower Neches Valley Authority  
P.O. Box 5117  
Beaumont, Texas 77726-5117**

**Clean Rivers Program  
Monitoring Operations Division  
Texas Commission on Environmental Quality  
P.O. Box 13087, MC 165  
Austin, Texas 78711-3087**

**Effective Period: FY 2006 to FY 2007**

**Questions concerning this quality assurance project plan should be directed to:**

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## **A1 APPROVAL PAGE**

### **TEXAS COMMISSION ON ENVIRONMENTAL QUALITY**

#### **Monitoring Operations Division**

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Steve Spaw, Director                      Date  
Technical Analysis Division

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Patrick Roques, Manager                      Date  
Water Quality Monitoring & Assessment Section

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Laurie Curra                      Date  
Program Manager, Clean Rivers Program

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Greg Bryant                      Date  
Project Manager, Clean Rivers Program

#### **Compliance Support Division**

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Jose A. Franco, Director                      Date  
Compliance Support Division

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Stephen Stubbs                      Date  
TCEQ Quality Assurance Manager

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Sharon Coleman                      Date  
Acting CRP Quality Assurance Specialist  
Quality Assurance Section

#### **Lower Neches Valley Authority**

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Jesse Caillier                      Date  
LNVA Project Manager

---

Dawn Pilcher                      Date  
LNVA Manager of Engineering

The Lower Neches Valley Authority will secure written documentation from each sub-tier project participant (e.g., subcontractors, other units of government, laboratories) stating the organization's awareness of and commitment to requirements contained in this quality assurance project plan and any amendments or added appendices of this plan. The Lower Neches Valley Authority will maintain this documentation as part of the project's quality assurance records, and will ensure that the documentation will be available for review. (See sample letter in Attachment 1 of this document.)

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## LIST OF ACRONYMS

|              |   |
|--------------|---|
| <b>AWRL</b>  | <b>Ambient Water Reporting Limit</b>                    |
| <b>BMP</b>   | <b>Best Management Practices</b>                        |
| <b>CAR</b>   | <b>Corrective Action Report</b>                         |
| <b>COC</b>   | <b>Chain-of Custody</b>                                 |
| <b>CRP</b>   | <b>Clean Rivers Program</b>                             |
| <b>DOC</b>   | <b>Demonstration of Capability</b>                      |
| <b>DQO</b>   | <b>Data Quality Objective</b>                           |
| <b>FY</b>    | <b>Fiscal Year</b>                                      |
| <b>MDMA</b>  | <b>Monitoring Data Management &amp; Analysis</b>        |
| <b>QA</b>    | <b>Quality Assurance</b>                                |
| <b>QM</b>    | <b>Quality Manual</b>                                   |
| <b>QAO</b>   | <b>Quality Assurance Officer</b>                        |
| <b>QAPP</b>  | <b>Quality Assurance Project Plan</b>                   |
| <b>QAS</b>   | <b>Quality Assurance Specialist</b>                     |
| <b>QC</b>    | <b>Quality Control</b>                                  |
| <b>QMP</b>   | <b>Quality Management Plan</b>                          |
| <b>RBP</b>   | <b>Rapid Bioassessment Protocol</b>                     |
| <b>RL</b>    | <b>Reporting Limit</b>                                  |
| <b>RWA</b>   | <b>Receiving Water Assessment</b>                       |
| <b>SOP</b>   | <b>Standard Operating Procedure</b>                     |
| <b>SWQM</b>  | <b>Surface Water Quality Monitoring</b>                 |
| <b>TMDL</b>  | <b>Total Maximum Daily Load</b>                         |
| <b>TCEQ</b>  | <b>Texas Commission on Environmental Quality</b>        |
| <b>TRACS</b> | <b>TCEQ Regulatory Activities and Compliance System</b> |
| <b>TSWQS</b> | <b>Texas Surface Water Quality Standards</b>            |
| <b>VOA</b>   | <b>Volatile Organic Analytes</b>                        |
| <b>WMT</b>   | <b>Watershed Management Team</b>                        |

## **A3 DISTRIBUTION LIST**

**Texas Commission on Environmental Quality**  
**P.O. Box 13087**  
**Austin, Texas 78711-3087**

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Clean Rivers Program  
MC-165  
(512) 239-6941

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**P.O. Box 5117**  
**Beaumont, Texas 77726-5117**

Jesse Caillier, Project Manager  
(409) 898-0561

Dawn Pilcher, Manager of Engineering  
(409) 892-4011

The Lower Neches Valley Authority will provide copies of this project plan and any amendments or appendices of this plan to each person on this list and to each sub-tier project participant, e.g., subcontractors, other units of government, laboratories. The Lower Neches Valley Authority will document distribution of the plan and any amendments and appendices, maintain this documentation as part of the project's quality assurance records, and will ensure that the documentation will be available for review.

## **A4 PROJECT/TASK ORGANIZATION**

### **Description of Responsibilities**

#### **TCEQ**

##### **Laurie Curra CRP Program Manager**

Responsible for TCEQ activities supporting the development and implementation of the Texas Clean Rivers Program. Responsible for verifying that the QMP is followed by CRP staff. Supervises TCEQ CRP staff. Reviews and responds to any deficiencies, nonconformances, or findings related to the area of responsibility. Oversees the development of QA guidance for the CRP. Reviews and approves all QA audits, corrective actions, reviews, reports, work plans, contracts, QAPPs, and program QMP. Enforces corrective action, as required, where QA protocols are not met. Ensures CRP personnel are fully trained.

##### **Sharon Coleman Acting CRP Lead Quality Assurance Specialist**

Participates in the development, approval, implementation, and maintenance of written quality assurance standards (e.g., Program Guidance, SOPs, QAPPs, QMP). Assists program and project manager in developing and implementing quality system. Serves on planning team for CRP special projects. Coordinates the review and approval of CRP QAPPs. Prepares and distributes annual audit plans. Conducts monitoring systems audits of Planning Agencies. Concurs with and monitors implementation of corrective actions. Conveys QA problems to appropriate management. Recommends that work be stopped in order to safeguard programmatic objectives, worker safety, public health, or environmental protection. Ensures maintenance of QAPPs and audit records for the CRP.

##### **Greg Bryant CRP Project Manager**

Responsible for the development, implementation, and maintenance of CRP contracts. Tracks deliverables. Participates in the development, approval, implementation, and maintenance of written quality assurance standards (e.g., Program Guidance, SOPs, QAPPs, QMP). Assists CRP Lead QA Specialist in conducting Planning Agency audits. Verifies QAPPs are being followed by contractors and that projects are producing data of known quality. Coordinates project planning with the Planning Agency Project Manager. Reviews and approves data and reports produced by contractors. Notifies QA Specialists of circumstances which may adversely affect the quality of data derived from the collection and analysis of samples. Develops, enforces, and monitors corrective action measures to ensure contractors meet deadlines and scheduled commitments.

**Eric Reese**  
**CRP Data Manager**

Responsible for coordination and tracking of CRP data sets from initial submittal through CRP Project Manager review and approval. Performs automated data validation routines and coordinates error correction. Provides quality assured data sets to TCEQ Information Resources in compatible formats for uploading to the statewide database. Generates reports to assist CRP Project Managers' data review. Provides training and guidance to CRP and Planning Agencies on technical data issues. Reviews and approves data-related portions of program QMP and project-specific QAPPs. Develops and maintains Standard Operating Procedures for CRP data management.

**Laurie Curra**  
**CRP Project Quality Assurance Specialist**

Serves as liaison between CRP management and TCEQ QA management. Participates in the development, approval, implementation, and maintenance of written quality assurance standards (e.g., Program Guidance, SOPs, QAPPs, QMP). Serves on planning team for CRP special projects. Coordinates documentation and implementation of corrective action for the CRP.

**Lower Neches Valley Authority**

**Jesse Caillier**  
**LNVA Project Manager**

Responsible for implementing and monitoring CRP requirements in contracts, QAPPs, and QAPP amendments and appendices. Coordinates basin planning activities and work of basin partners. Ensures monitoring systems audits are conducted to ensure QAPPs are followed by LNVA participants and that projects are producing data of known quality. Ensures that subcontractors are qualified to perform contracted work. Ensures CRP project managers and/or QA Specialists are notified of deficiencies and nonconformances, and that issues are resolved. Responsible for validating that data collected are acceptable for reporting to the TCEQ.

**Jesse Caillier**  
**LNVA Quality Assurance Officer/Laboratory Manager**

Responsible for coordinating the implementation of the QA program. Responsible for writing and maintaining the QAPP and monitoring its implementation. Responsible for maintaining records of QAPP distribution, including appendices and amendments. Responsible for maintaining written records of sub-tier commitment to requirements specified in this QAPP. Responsible for identifying, receiving, and maintaining project quality assurance records. Responsible for coordinating with the TCEQ QAS to resolve QA-related issues. Notifies the LNVA Project Manager of particular circumstances which may adversely affect the quality of data. Coordinates and monitors deficiencies, nonconformances and corrective action. Coordinates and maintains records of data verification and validation. Coordinates the research and review of technical QA material and data related to water quality monitoring system design and analytical techniques. Conducts monitoring systems audits on project participants to determine compliance with project and program specifications, issues written reports, and follows through on findings. Ensures that field staff are properly trained and that training records are maintained.

**Jeannie Mahan**  
**LNVA Data Manager**

Responsible for ensuring that field data are properly reviewed and verified. Responsible for the transfer of basin quality-assured water quality data to the TCEQ in a format compatible with the SWQM portion of the TRACS database. Maintains quality-assured data on LNVA internet sites.

**Douglas M<sup>c</sup>Clendon**  
**Mary Beth Distefano**  
**LNVA Water Quality Analyst**

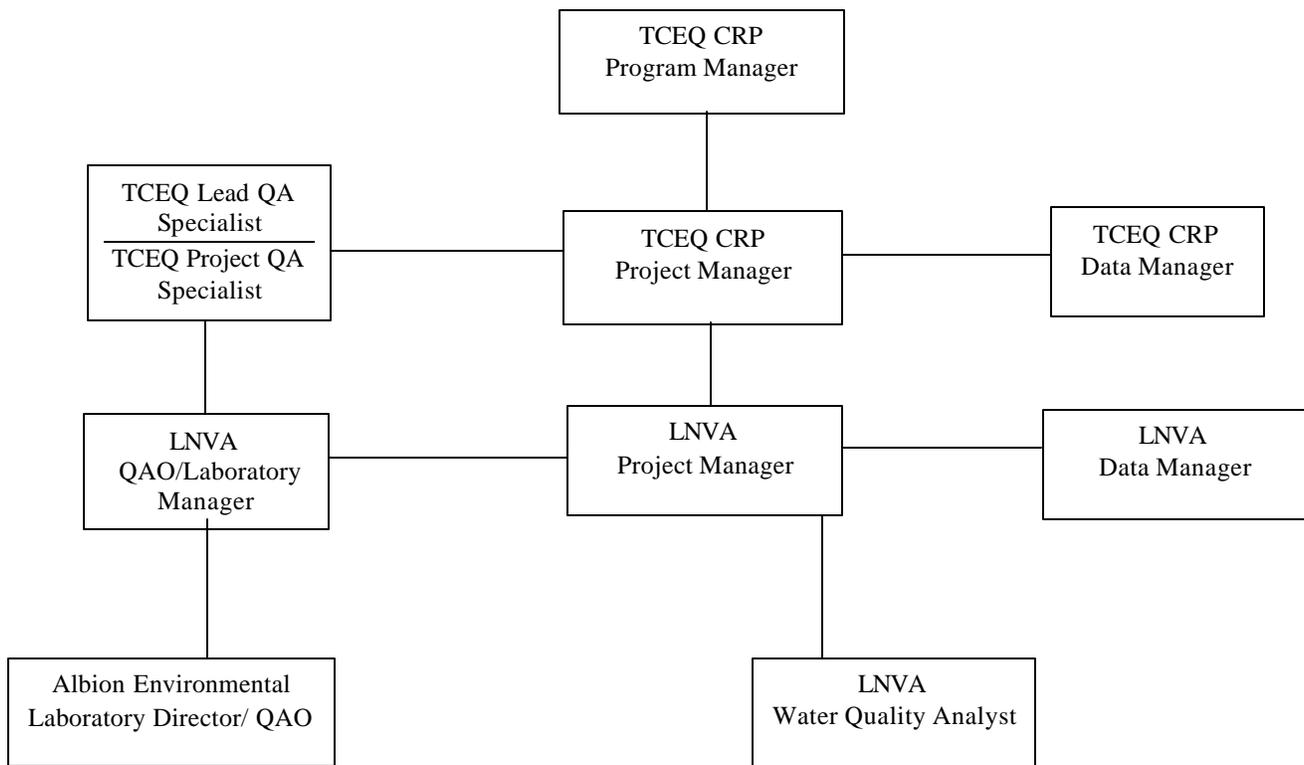
Responsible for collecting water, sediment, and biological samples in the field in accordance with the TCEQ SWQM manual. Responsible for assuring proper sampling techniques and maintaining credible chain-of-custody records. Water Quality Analysts are responsible for the samples being analyzed in the lab within required holding times and maintaining thorough Quality Assurance records. Water Quality Analysts also provide a link between quality assurance issues and the LNVA QAO.

**Dr. Paul Boothe**  
**Albion Environmental Lab Director/Quality Assurance Officer**

Responsible for performing analyses for metals in water. Responsible for providing the accurate, reliable, and scientifically dependable service required by LNVA. Responsible for scheduling the arrival of samples for analysis, providing sample containers, chain-of-custody forms, or any essentials necessary to properly sample and transport samples for analysis. Responsible for quality control and providing quality assurance documentation to LNVA upon request.

# PROJECT ORGANIZATION CHART

Figure 1: A4.1 LNVA Organization Chart - Lines of Communication



## A5 PROBLEM DEFINITION/BACKGROUND

In 1991, the Texas Legislature passed the Texas Clean River Act (Senate Bill 818) in response to growing concerns that water resource issues were not being pursued in an integrated, systematic manner. The act requires that ongoing water quality assessments be conducted for each river basin in Texas, an approach that integrates water quality issues within the watershed. The CRP legislation mandates that “each river authority (or local governing entity) shall submit quality-assured data collected in the river basin to the commission.” “Quality-assured data” in the context of the legislation means “data that comply with commission rules for surface water quality monitoring programs, including rules governing the methods under which water samples are collected and analyzed and data from those samples are assessed and maintained.” This QAPP addresses the program developed between the Lower Neches Valley Authority and the TCEQ to carry out the activities mandated by the legislation. The QAPP was developed and will be implemented in accordance with provisions of the *Quality Management Plan for the Clean Rivers Program* (most recent version).

The purpose of this QAPP is to clearly delineate LNVA QA policy, management structure, and procedures which will be used to implement the QA requirements necessary to verify and validate the surface water quality data collected. The QAPP is reviewed by the TCEQ to help ensure that data generated for the purposes described above are scientifically valid and legally defensible. This process will ensure that data collected under this QAPP and submitted to the statewide database have been collected and managed in a way that guarantees its reliability and therefore can be used in water quality assessments and other programs deemed appropriate by the TCEQ. Project results will be used to support the achievement of Clean Rivers Program objectives as contained in the *Clean Rivers Program Guidance and Reference Guide* FY 2006 -2007.

In the past, water quality monitoring efforts in the lower Neches River and Neches-Trinity Coastal basins were primarily conducted by the TCEQ and the United States Geological Survey (USGS). During the last decade LNVA has also joined the Clean Rivers Program monitoring efforts. LNVA’s water quality monitoring program was designed to complement TCEQ’s surface water quality monitoring. In addition to LNVA’s routine monitoring the authority has also conducted systematic monitoring, targeted monitoring (to assist TCEQ permitting processes), and special studies.

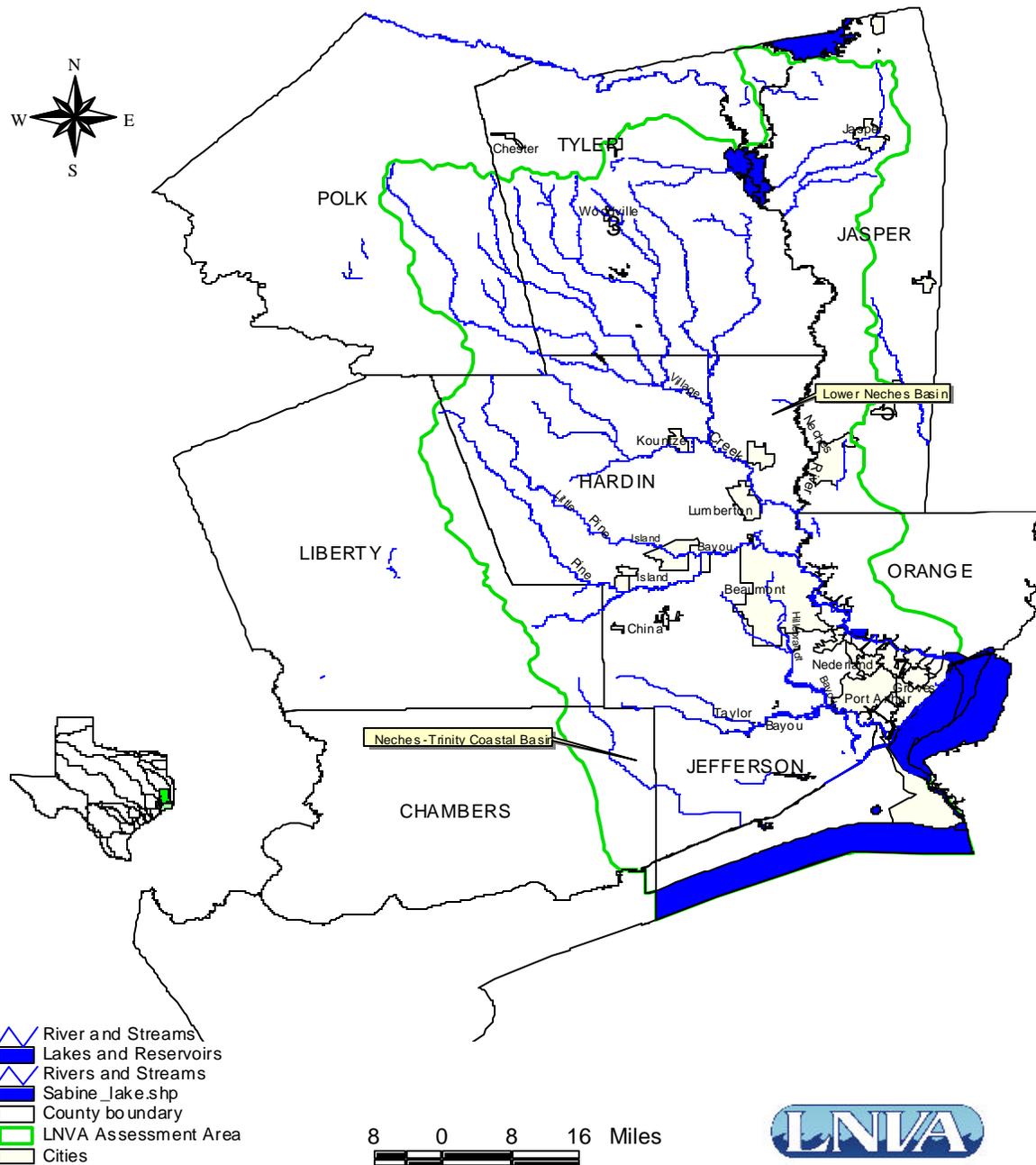
During the FY 2006-2007 biennium, LNVA will utilize assessment reports based on historical data generated by LNVA and the TCEQ to insure its routine and systematic monitoring efforts address identified impairments and/or concerns based on TCEQ water quality standards and screening criteria. Other factors influencing LNVA’s monitoring program include public input through LNVA’s Basin Steering Committee process, and input from TCEQ SWQM, TMDL, and Regional Office Staff during the annual Coordinated Monitoring process. No permit support, biological, or special study monitoring is currently planned. LNVA may assist the TECQ with Use Attainability (UAA) activities but the data collected outside their planned routine monitoring activities will be addressed under the TCEQ SWQM QAPP.

See Appendix B for complete details of LNVA’s current monitoring plan.

A map of the lower Neches River and Neches-Trinity Coastal Basin follows (Figure A5.1).

**Figure 2: A5.1 lower Neches River and Neches-Trinity Coastal Basin**

LNVA Clean Rivers Program Assessment Area



## **A6 PROJECT/TASK DESCRIPTION**

See Appendix A for the project-related work plan tasks and schedule of deliverables for a description of work defined in this QAPP.

See Appendix B for sampling design and monitoring pertaining to this QAPP.

### **Amendments to the QAPP**

Revisions to the QAPP may be necessary to address incorrectly documented information or to reflect changes in project organization, tasks, schedules, objectives, and methods. Requests for amendments will be directed from the Lower Neches Valley Authority Project Manager to the CRP Project Manager electronically. They are effective immediately upon approval by the LNVA Project Manager, the LNVA QAO, the CRP Project Manager, the CRP Lead QA Specialist, and the CRP Project QA Specialist. They will be incorporated into the QAPP by way of attachment and distributed to personnel on the distribution list by the Planning Agency Project Manager

### **Special Project Appendices**

Projects requiring QAPP appendices will be planned in consultation with the Lower Neches Valley Authority and the TCEQ Project Manager and TCEQ technical staff. Appendices will be written in an abbreviated format and will reference the Basin QAPP where appropriate. Appendices will be approved by the LNVA Project Manager, the LNVA QAO, the CRP Project Manager, the CRP Project QA Specialist, the CRP Lead QA Specialist and other TCEQ personnel as appropriate. Copies of approved QAPPs appendices will be distributed by the Lower Neches Valley Authority to project participants before data collection activities commence.

## **A7 QUALITY OBJECTIVES AND CRITERIA**

The purpose of routine water quality monitoring is to collect surface water quality data needed for conducting water quality assessments in accordance with TCEQ's *Guidance for Assessing Texas Surface and Finished Drinking Water Quality Data*. These water quality data, and data collected by other organizations (e.g., USGS, TCEQ, etc.), will be subsequently reconciled for use and assessed by the TCEQ.

Systematic watershed monitoring is defined by sampling that is planned for a short duration (1 to 2 years) and is designed to: screen waters that would not normally be included in the routine monitoring program, monitor at sites to check the water quality situation, and investigate areas of potential concern. Due to the limitations regarding these data (e.g., not temporally representative, limited number of samples), the data will be used to determine whether any locations have values exceeding the TCEQ's water quality criteria and/or screening levels (or in some cases values elevated above normal). The Lower Neches Valley Authority will use this information to determine future monitoring priorities.

The measurement performance specifications to support the project objectives for a minimum data set are specified in Table A7.1 and in the text following.

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

| PARAMETER                            | UNITS   | MATRIX | METHOD                     | Parameter Code | 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, V1 | 00400          | NA*  | NA                       | NA              | NA                             | NA                  | Field |
| DO                                   | mg/L  | water  | EPA 360.1 and TCEQ SOP, V1 | 00300          | NA*  | NA                       | NA              | NA                             | NA                  | Field |
| Conductivity                         | uS/cm   | water  | EPA 120.1 and TCEQ SOP, V1 | 00094          | NA*  | NA                       | NA              | NA                             | NA                  | Field |
| Water Temperature                    | ° C   | water  | EPA 170.1 and TCEQ SOP V1  | 00010          | NA*  | NA                       | NA              | NA                             | NA                  | Field |
| Secchi Depth                         | meters  | water  | TCEQ SOP V1                | 00078          | NA*  | NA                       | NA              | NA                             | NA                  | Field |
| Days since last significant rainfall | days  | NA     | TCEQ SOP V1                | 72053          | NA*  | NA                       | NA              | NA                             | NA                  | Field |
| Maximum pool width***                | meters  | water  | TCEQ SOP V2                | 89864          | NA*  | NA                       | NA              | NA                             | NA                  | Field |
| Maximum pool depth**                 | meters  | water  | TCEQ SOP V2                | 89865          | NA*  | NA                       | NA              | NA                             | NA                  | Field |
| Pool length**                        | meters  | water  | TCEQ SOP, V2               | 89869          | NA*  | NA                       | NA              | NA                             | NA                  | Field |
| % pool coverage**                    | %   | water  | TCEQ SOP V2                | 89870          | NA*  | NA                       | NA              | NA                             | NA                  | Field |
| Total water depth                    | meters  | water  | TCEQ SOP V2                | 82903          | NA*  | NA                       | NA              | NA                             | NA                  | Field |
| Flow                                 | cfs   | water  | TCEQ SOP V1                | 00061          | NA*  | NA                       | NA              | NA                             | NA                  | Field |
| Flow measurement method              | 1-gage<br>2-electric<br>3-mechanical<br>4-weir/flume<br>5-doppler | water  | TCEQ SOP V1                | 89835          | NA*  | NA                       | NA              | NA                             | NA                  | Field |
| Flow severity                        | 1-no flow,<br>2-low,<br>3-normal,<br>4-flood,<br>5-high,<br>6-dry | water  | TCEQ SOP V1                | 01351          | NA*  | NA                       | NA              | NA                             | NA                  | Field |
| TDS, calculated                      | mg/L  | water  | calculation                | 70294          | NA   | NA                       | NA              | NA                             | NA                  | LNVA  |
| Present Weather                      | 1-clear<br>2-partly cloudy<br>3-cloudy<br>4-rain                  | NA     | NA                         | 89966          | NA*  | NA                       | NA              | NA                             | NA                  | Field |
| Wind Intensity                       | 1-calm<br>2-slight<br>3-moderate<br>4-strong                      | NA     | NA                         | 89965          | NA*  | NA                       | NA              | NA                             | NA                  | Field |
| Days since last significant rainfall | Days  | NA     | TCEQ SOP                   | 72053          | NA*  | NA                       | NA              | NA                             | NA                  | Field |
| Air Temperature                      | ° C   | NA     | NA                         | 00020          | NA*  | NA                       | NA              | NA                             | NA                  | Field |
| Wind Direction                       | 1-North<br>2-South<br>3-East<br>4-West                            | NA     | TCEQ SOP                   | 89010          | NA*  | NA                       | NA              | NA                             | NA                  | Field |
| Water Color                          | 1-Brown<br>2-Reddish<br>3-Green<br>4-Black<br>5-Clear             | NA     | TCEQ SOP                   | 89969          | NA*  | NA                       | NA              | NA                             | NA                  | Field |

| PARAMETER  | UNITS  | MATRIX | METHOD         | Parameter Code | AWRL  | Lab Reporting Limit (RL)  | RECOVERY AT RLs | PRECISION (RPD of LCS/LCS dups) | BIAS %Rec. of LCS | Lab                  |
|--|--|--------|----------------|----------------|---|---|-----------------|---------------------------------|-------------------|----------------------|
| Water Odor   | 1-Sewage<br>2-Oily/<br>Chemical<br>3-Rotten<br>Eggs 4-Musty<br>5-Fishy | NA     | TCEQ SOP       | 89971          | NA*   | NA  | NA              | NA                              | NA                | Field                |
| <b>Conventional and Bacteriological Parameters</b> |  |        |                |                |   |   |                 |                                 |                   |                      |
| TSS  | mg/L   | water  | EPA 160.2      | 00530          | 4   | 4   | NA              | 20                              | NA                | LNVA                 |
| Sulfate  | mg/L   | water  | EPA 300.0      | 00945          | 10  | 10  | 75-125          | 20                              | 80-120            | LNVA                 |
| Chloride   | mg/L   | water  | EPA 300.0      | 00940          | 10  | 10  | 75-125          | 20                              | 80-120            | LNVA                 |
| Turbidity  | NTU  | Water  | SM 2130B       | 82079          | 0.5   | 0.5   | 75-125          | 20                              | 80-120            | LNVA                 |
| Alkalinity,total                                   | mg/L   | Water  | EPA 310.1      | 00410          | 10  | 10  | NA              | 20                              | NA                | LNVA                 |
| E. coli, IDEXX Colilert                            | MPN/100 mL   | water  | SM 9223-B      | 31699          | 1   | 1   | NA              | .5***                           | NA                | LNVA                 |
| Ammonia-N, total                                   | mg/L   | water  | EPA 350.1      | 00610          | 0.02  | 0.02  | 75-125          | 20                              | 80-120            | LNVA                 |
| Hardness, total (as CaCO3)                         | mg/L   | water  | EPA 130.2      | 00900          | 5   | 5   | NA              | 20                              | 80-120            | LNVA                 |
| Nitrate/nitrite-N, total                           | mg/L   | water  | EPA 353.3      | 00630          | 0.04  | 0.04  | 75-125          | 20                              | 80-120            | LNVA                 |
| Total phosphorus                                   | mg/L   | water  | EPA 365.3      | 00665          | 0.06  | 0.06  | 75-125          | 20                              | 80-120            | LNVA                 |
| <b>TSWQS Metals</b>                                |  |        |                |                |   |   |                 |                                 |                   |                      |
| Aluminum, dis.                                     | ug/L   | water  | EPA 1638/200.7 | 01106          | 200   | 2.0   | 75-125          | 10                              | 75-125            | Albion Environmental |
| Arsenic, dis.                                      | ug/L   | water  | EPA 1632/200.8 | 01000          | 5   | 1.0   | 75-125          | 10                              | 75-125            | Albion Environmental |
| Cadmium, dis.                                      | ug/L   | water  | EPA 1638/200.8 | 01025          | .1 for waters <50 mg/L hardness<br>—<br>.3 for waters ≥50 mg/L hardness | .1 for waters <50 mg/L hardness<br>—<br>.3 for waters ≥50 mg/L hardness | 75-125          | 10                              | 75-125            | Albion Environmental |
| Chromium, dis.                                     | ug/L   | water  | EPA 1638/200.8 | 01030          | 10  | 1.0   | 75-125          | 10                              | 75-125            | Albion Environmental |
| Copper, dis.                                       | ug/L   | water  | EPA 1638/200.8 | 01040          | 1 for waters <50 mg/L hardness<br>—<br>3 for waters ≥50 mg/L hardness   | 0.3 for waters <50 mg/L hardness<br>—<br>3 for waters ≥50 mg/L hardness | 75-125          | 10                              | 75-125            | Albion Environmental |

| PARAMETER  | UNITS | MATRIX | METHOD                | Parameter Code | AWRL   | Lab Reporting Limit (RL)   | RECOVERY AT RLs | PRECISION (RPD of LCS/LCS dups) | BIAS %Rec. of LCS | Lab                  |
|--|-------|--------|-----------------------|----------------|--|--|-----------------|---------------------------------|-------------------|----------------------|
| Lead, dis.   | ug/L  | water  | EPA 1638/200.8        | 01049          | .1 for waters <85 mg/L hardness<br>1 for waters ≥ 85 mg/L hardness | .1 for waters <85 mg/L hardness<br>1 for waters ≥ 85 mg/L hardness | 75-125          | 10                              | 75-125            | Albion Environmental |
| barium, dis.   | ug/L  | water  | EPA 1638/200.8        | 01005          | 1000   | 1000   | 75-125          | 10                              | 75-125            | Albion Environmental |
| Nickel, dis.   | ug/L  | water  | EPA 1638/200.8        | 01065          | 10   | 1.0  | 75-125          | 10                              | 75-125            | Albion Environmental |
| Selenium, total  | ug/L  | water  | EPA 1632/200.8        | 01147          | 2.0  | 0.1  | 75-125          | 10                              | 75-125            | Albion Environmental |
| Silver, dis.   | ug/L  | water  | EPA 1638/200.8        | 01075          | .5   | .1   | 75-125          | 10                              | 75-125            | Albion Environmental |
| Zinc, dis.   | ug/L  | water  | EPA 1638/200.8        | 01090          | 5  | 0.5  | 75-125          | 10                              | 75-125            | Albion Environmental |
| <b>24-Hour Dissolved Oxygen(DO) Summary Statistics</b> |       |        |                       |                |  |  |                 |                                 |                   |                      |
| 24-hr DO avg.  | mg/L  | water  | TCEQ SOP/ Calculation | 89857          | NA   | NA   | NA              | NA                              | NA                | Field                |
| Max Daily DO   | mg/L  | water  | TCEQ SOP/ Calculation | 89856          | NA   | NA   | NA              | NA                              | NA                | Field                |
| Min Daily DO   | mg/L  | water  | TCEQ SOP/ Calculation | 89855          | NA   | NA   | NA              | NA                              | NA                | Field                |
| 24-hr DO # of Measurements                             | #     | water  | TCEQ SOP/ Calculation | 89858          | NA   | NA   | NA              | NA                              | NA                | Field                |
| 24-hr avg. water temperature                           | °C    | water  | TCEQ SOP/ Calculation | 00209          | NA   | NA   | NA              | NA                              | NA                | Field                |
| Max daily water temperature                            | °C    | water  | TCEQ SOP/ Calculation | 00210          | NA   | NA   | NA              | NA                              | NA                | Field                |
| Min daily water temperature                            | °C    | water  | TCEQ SOP/ Calculation | 00211          | NA   | NA   | NA              | NA                              | NA                | Field                |
| 24-hr water temperature # of measurements              | #     | water  | TCEQ SOP/ Calculation | 00221          | NA   | NA   | NA              | NA                              | NA                | Field                |
| 24-hr avg. conductivity                                | uS/cm | water  | TCEQ SOP/ Calculation | 00212          | NA   | NA   | NA              | NA                              | NA                | Field                |
| Max daily conductivity                                 | uS/cm | water  | TCEQ SOP/ Calculation | 00213          | NA   | NA   | NA              | NA                              | NA                | Field                |
| Min daily conductivity                                 | uS/cm | water  | TCEQ SOP/ Calculation | 00214          | NA   | NA   | NA              | NA                              | NA                | Field                |
| 24-hr conductivity # of measurements                   | #     | water  | TCEQ SOP/ Calculation | 00222          | NA   | NA   | NA              | NA                              | NA                | Field                |
| Max daily pH   | s.u.  | water  | TCEQ SOP/ Calculation | 00215          | NA   | NA   | NA              | NA                              | NA                | Field                |
| Min daily pH   | s.u.  | water  | TCEQ SOP/ Calculation | 00216          | NA   | NA   | NA              | NA                              | NA                | Field                |
| 24-hr pH# of measurements                              | #     | water  | TCEQ SOP/ Calculation | 00223          | NA   | NA   | NA              | NA                              | NA                | Field                |

- \* 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, "Quality Assurance/Quality Control - Intralaboratory Quality Control Guidelines. This criterion applies to bacteriological duplicates with concentrations >10 MPN/100mL or 10 organisms/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. (Note: The 21<sup>st</sup> edition may be cited if it becomes available.)  
 TCEQ SOP, V1 - TCEQ Surface Water Quality Monitoring Procedures, Volume 1: Physical and Chemical Monitoring Methods for Water, Sediment, and Tissue, 2003 (RG-415).  
 American Society for Testing and Materials (ASTM) Annual Book of Standards, Vol. 11.02

*Note: CRP laboratories may use Standard Methods for the Examination of Water and Wastewater," 20<sup>th</sup> Edition, 1998. 10200 H for chlorophyll a and pheophytin analysis as long as their SOP incorporates the information in the chlorophyll SOP on the CRP Web site*

**Ambient Water Reporting Limits (AWRLs)**

The AWRL establishes the reporting specification at **or below** which data for a parameter must be reported to be compared with freshwater screening criteria. The AWRLs specified in Table A7.1 are the program-defined reporting specifications for each analyte and yield data acceptable for routine water quality monitoring. The reporting limit is the lowest concentration at which the laboratory will report quantitative data within a specified recovery range. The laboratory will meet two requirements in order to report meaningful results to the Clean Rivers Program:

- \$ The laboratory's reporting limit for each analyte will be at **or below** the AWRL.
- \$ The laboratory will demonstrate and document on an ongoing basis the laboratory's ability to quantitate at its reporting limits.

Acceptance criteria and an explanation of how the AWRL requirement applies to water, sediment, and tissue sample matrices are provided in Section B5.

**Precision**

Precision is a statistical measure of the variability of a measurement when a collection or an analysis is repeated and includes components of random error. It is strictly defined as the degree of mutual agreement among independent measurements as the result of repeated application of the same process under similar conditions.

Field splits are used to assess the variability of sample handling, preservation, and storage, as well as the analytical process, and are prepared by splitting samples in the field. Control limits for field splits are defined in Section B5.

Laboratory precision is assessed by comparing replicate analyses of laboratory control standards in the sample matrix (e.g., deionized water, sand, commercially available tissue) or sample/duplicate pairs in the case of bacterial analysis. Precision results are plotted on quality control charts which are based on historical data and used during evaluation of analytical performance. Program-defined measurement performance specifications for laboratory control standard/laboratory control standard duplicate pairs are defined in Table A7.1.

## **Bias**

Bias is a statistical measurement of correctness and includes multiple components of systematic error. A measurement is considered unbiased when the value reported does not differ from the true value. Bias is determined through the analysis of laboratory control standards prepared with verified and known amounts of all target analytes in the sample matrix (e.g., deionized water, sand, commercially available tissue ) and by calculating percent recovery. Results are plotted on quality control charts which are calculated based on historical data and used during evaluation of analytical performance. Program-defined measurement performance specifications for laboratory control standards are specified in Table A7.1.

## **Representativeness**

Site selection, the appropriate sampling regime, the sampling of all pertinent media according to TCEQ SOPs, and use of only approved analytical methods will assure that the measurement data represents the conditions at the site. Routine data collected under the Clean Rivers Program for water quality assessments are considered to be spatially and temporally representative of routine water quality conditions. At a minimum, samples are collected over at least two seasons (to include inter-seasonal variation) and over two years (to include inter-year variation) to include some data collected during an index period (March 15- October 15). Although data may be collected during varying regimes of weather and flow, the data sets will not be biased toward unusual conditions of flow, runoff, or season. The goal for meeting total representation of the water body will be tempered by the potential funding for complete representativeness.

## **Comparability**

Confidence in the comparability of routine data sets for this project and for water quality assessments is based on the commitment of project staff to use only approved sampling and analysis methods and QA/QC protocols in accordance with quality system requirements and as described in this QAPP and in TCEQ SOPs. Comparability is also guaranteed by reporting data in standard units, by using accepted rules for rounding figures, and by reporting data in a standard format as specified in Section B10.

## **Completeness**

The completeness of the data is basically a relationship of how much of the data is available for use compared to the total potential data. Ideally, 100% of the data should be available. However, the possibility of unavailable data due to accidents, insufficient sample volume, broken or lost samples, etc. is to be expected. Therefore, it will be a general goal of the project(s) that 90% data completion is achieved.

## **A8 SPECIAL TRAINING/CERTIFICATION**

New field personnel receive training in proper sampling and field analysis. Before actual sampling or field analysis occurs, they will demonstrate to the QA Officer (or designee) their ability to properly calibrate field equipment and perform field sampling and analysis procedures. Field personnel training is documented and retained in the personnel file and will be available during a monitoring systems audit.

Laboratory analysts have a general knowledge of laboratory operations, test methods, and quality assurance. They also have a combination of education, experience, skill, and training to perform their specific function. Laboratory management maintains records of qualifications and training on each employee.

## A9 DOCUMENTS AND RECORDS

The documents and records that describe, specify, report, or certify activities are listed.

**Table 2: A9.1 Project Documents and Records**

| Document/Record                              | Location   | Retention (yrs) | Format     |
|--|--|-----------------|------------|
| QAPPs, amendments and appendices             | TCEQ/Lower Neches Valley Authority                       | 7               | Paper      |
| QAPP Commitment Letters                      | TCEQ/Lower Neches Valley Authority                       | 7               | Paper      |
| Field SOPs                                   | Lower Neches Valley Authority                            | 7               | Paper      |
| Laboratory QA Manuals                        | Lower Neches Valley Authority / Albion Env.Laboratories  | 7               | Paper      |
| Laboratory SOPs                              | Lower Neches Valley Authority / Albion Env. Laboratories | 7               | Paper      |
| QAPP distribution documentation              | Lower Neches Valley Authority                            | 7               | Paper      |
| Laboratory staff training records            | LNVA/Albion Env. Laboratories                            | 5               | Paper      |
| Field staff training records                 | Lower Neches Valley Authority                            | 5               | Paper      |
| Field equipment calibration/maintenance logs | Lower Neches Valley Authority                            | 5               | Paper      |
| Field instrument printouts                   | Lower Neches Valley Authority                            | 5               | Paper      |
| Field notebooks or data sheets               | Lower Neches Valley Authority                            | 5               | Paper      |
| Chain of custody records                     | Lower Neches Valley Authority                            | 5               | Paper      |
| Laboratory calibration records               | LNVA/ Albion Env. Laboratories                           | 5               | Paper      |
| Laboratory instrument printouts              | LNVA/ Albion Env. Laboratories                           | 5               | Paper      |
| Laboratory data reports/results              | LNVA/ Albion Env. Laboratories                           | 5               | Paper      |
| Laboratory equipment maintenance logs        | LNVA/ Albion Env. Laboratories                           | 5               | Paper      |
| Corrective Action Documentation              | LNVA/ Albion Env. Laboratories                           | 5               | Paper      |
| Data Files                                   | Lower Neches Valley Authority                            | 5               | Electronic |

## Laboratory Test Reports

Test reports from the laboratory will document the test results clearly and accurately. The test report will include the information necessary for the interpretation and validation of data and will include the following:

- \$ title of report and unique identifiers on each page
- \$ name and address of the laboratory
- \$ name and address of the client
- \$ a clear identification of the sample(s) analyzed
- \$ date and time of sample receipt
- \$ identification of method used
- \$ identification of samples that did not meet QA requirements and why (e.g., holding times exceeded)
- \$ sample results
- \$ clearly identified subcontract laboratory results (as applicable)
- \$ a name and title of person accepting responsibility for the report
- \$ project-specific quality control results to include field split results (as applicable); equipment, trip, and field blank results (as applicable); and RL confirmation (% recovery)
- \$ narrative information on QC failures or deviations from requirements that may affect the quality of results or is necessary for verification and validation of data.

## Electronic Data

Data will be submitted electronically to the TCEQ in the Event/Result file format described in the CRP Guidance. A completed Data Summary (see example in Appendix E) will be submitted with each data submittal.

## B1 SAMPLING PROCESS DESIGN

See Appendix B for sampling process design information and monitoring tables associated with data collected under this QAPP.

## B2 SAMPLING METHODS

### Field Sampling Procedures

Field sampling will be conducted according to procedures documented in the *TCEQ Surface Water Quality Monitoring Procedures Volume 1: Physical and Chemical Monitoring Methods for Water, Sediment, and Tissue, 2003 (RG-415)* and *Volume 2: Methods for Collecting and Analyzing Biological Community and Habitat Data (RG-416)*. Additional aspects outlined in Section B below reflect specific requirements for sampling under the Clean Rivers Program and/or provide additional clarification.

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

**Table 3: B2.1 Sample Storage, Preservation and Handling Requirements**

| Parameter        | Matrix | Sample Volume | Container | Preservation   | Holding Time |
|------------------|--------|---------------|-----------|--|--------------|
| Alkalinity       | Water  | 100           | C         | Cool @ 4° C*   | 14 days      |
| Chloride         | Water  | 50            | C         | Cool @ 4° C*   | 28 days      |
| <i>E. coli</i>   | Water  | 100           | PP        | Cool @ 4° C*   | 6 hours      |
| Hardness, Total  | Water  | 100           | C         | H <sub>2</sub> SO <sub>4</sub> to pH < 2, Cool @ 4° C* | 6 months     |
| Aluminum, dis.   | Water  | 50            | PCP       | Filter on site, Cool @ 4° C*, acidified by Albion Env. | 6 months     |
| Arsenic, dis.    | Water  | 50            | PCP       | Filter on site, Cool @ 4° C*, acidified by Albion Env. | 6 months     |
| Barium, dis.     | Water  | 50            | PCP       | Filter on site, Cool @ 4° C*, acidified by Albion Env. | 6 months     |
| Chromium, dis.   | Water  | 50            | PCP       | Filter on site, Cool @ 4° C*, acidified by Albion Env. | 6 months     |
| Copper, dis.     | Water  | 50            | PCP       | Filter on site, Cool @ 4° C*, acidified by Albion Env. | 6 months     |
| Nickel, dis.     | Water  | 50            | PCP       | Filter on site, Cool @ 4° C*, acidified by Albion Env. | 6 months     |
| Cadmium, dis.    | Water  | 50            | PCP       | Filter on site, Cool @ 4° C*, acidified by Albion Env. | 6 months     |
| Lead, dis.       | Water  | 50            | PCP       | Filter on site, Cool @ 4° C*, acidified by Albion Env. | 6 months     |
| Selenium , Total | Water  | 125           | PCP       | Cool @ 4° C*, acidified by Albion Env.                 | 6 months     |

|                          |       |     |     |  |          |
|--------------------------|-------|-----|-----|--|----------|
| Silver                   | Water | 50  | PCP | Filter on site, Cool @ 4° C*, acidified by Albion Env. | 6 months |
| Zinc                     | Water | 50  | PCP | Filter on site, Cool @ 4° C*, acidified by Albion Env. | 6 months |
| Nitrogen, Ammonia        | Water | 50  | C   | H <sub>2</sub> SO <sub>4</sub> to pH < 2, Cool @ 4° C* | 28 days  |
| Nitrogen Nitrate/Nitrite | Water | 50  | C   | H <sub>2</sub> SO <sub>4</sub> to pH < 2, Cool @ 4° C* | 28 days  |
| Phosphorous, Total       | Water | 50  | C   | H <sub>2</sub> SO <sub>4</sub> to pH < Cool @ 4° C*    | 28 days  |
| Sulfate                  | Water | 100 | C   | Cool @ 4° C*   | 28 days  |
| Total Suspended Solids   | Water | 100 | C   | Cool @ 4° C*   | 7 days   |
| Turbidity                | Water | 100 | C   | Cool @ 4° C*   | 48 hours |

\* preservation performed immediately upon collection (within 15 minutes)

Container Key:

C = Cubitainer

PP = Polypropylene

PCP = PreCleaned HDPE

### Sample Containers

Sample containers (cubitainers) are purchased pre-cleaned for conventional parameters and are disposable. The sample containers for total and dissolved metals are provided by Albion Environmental as part of their ACMSL Albion Clean kits and are certified as pre-cleaned by Albion Environmental. Metals in water sample containers are double bagged to avoid contamination. Polypropylene containers used for bacteriological bottles are pre-sterilized and have a fill line which meets U.S. EPA tolerance requirements. Certificates are maintained on file by the Lower Neches Valley Authority laboratory.

### Processes to Prevent Contamination

Procedures outlined in the *TCEQ Surface Water Quality Monitoring Procedures* outline the necessary steps to prevent contamination of samples. These include: direct collection into sample containers, when possible; clean sampling techniques for metals; and certified containers for organics. Field QC samples (identified in Section B5) are collected to verify that contamination has not occurred.

### Documentation of Field Sampling Activities

Field sampling activities are documented on field data sheets as presented in Appendix C. The following will be recorded for all visits:

1. Station ID
2. Sampling Date
3. Location
4. Sampling depth
5. Sampling time
6. Sample collector's name/signature
7. Values for all field parameters
8. Detailed observational data, including:

- \$ water appearance
- \$ weather
- \$ biological activity
- \$ unusual odors
- \$ pertinent observations related to water quality or stream uses (e.g., exceptionally poor water quality conditions/standards not met; stream uses such as swimming, boating, fishing, irrigation pumps, etc.)
- \$ watershed or instream activities (events impacting water quality, e.g., bridge construction, livestock watering upstream, etc.)
- \$ specific sample information (number of sediments grabs, type/number of fish in a tissue sample, etc.)
- \$ missing parameters (i.e., when a scheduled parameter or group of parameters is not collected)

## **Recording Data**

For the purposes of this section and subsequent sections, all field and laboratory personnel follow the basic rules for recording information as documented below:

1. Legible writing in indelible ink with no modifications, write-overs or cross-outs;
2. Correction of errors with a single line followed by an initial and date;
3. Close-out on incomplete pages with an initialed and dated diagonal line.

## **Deficiencies, Nonconformances and Corrective Action Related to Sampling Requirements**

Deficiencies are defined as unauthorized deviations from procedures documented in the QAPP or other applicable documents. Nonconformances are deficiencies which affect data quantity and/or quality and render the data unacceptable or indeterminate. Deficiencies related to sampling methods requirements include, but are not limited to, such things as sample container, volume, and preservation variations, improper/inadequate storage temperature, holding-time exceedances, and sample site adjustments.

Deficiencies are documented in logbooks, field data sheets, etc. by field or laboratory staff and reported to the Lower Neches Valley Authority Project Manager/QAO/Laboratory Manager. The Lower Neches Valley Authority Project Manager/QAO/Laboratory Manager will initiate a Nonconformance Report (NCR) to document the deficiency.

The Lower Neches Valley Authority Project Manager/QAO/Laboratory Manager (and other affected individuals/organizations), will determine if the deficiency constitutes a nonconformance. If it is determined the activity or item in question does not affect data quality and therefore, is not a valid nonconformance, the NCR will be completed accordingly and the NCR closed. If it is determined a nonconformance does exist, the Lower Neches Valley Authority Project Manager/QAO/Laboratory Manager will determine the disposition of the nonconforming activity or item and necessary corrective action(s); results will be documented by the Lower Neches Valley Authority Project Manager/QAO/Laboratory Manager by completion of a Corrective Action Report.

Corrective Action Reports (CARs) document: root cause(s); impact(s); specific corrective action(s) to address the deficiency; action(s) to prevent recurrence; individual(s) responsible for each action; the timetable for completion of each action; and the means by which completion of each corrective action will be documented. CARs will be included with quarterly progress reports. In addition, significant

conditions (i.e., situations which, if uncorrected, could have a serious effect on safety or on the validity or integrity of data) will be reported to the TCEQ immediately both verbally and in writing.

## **B3 SAMPLE HANDLING AND CUSTODY**

### **Chain-of-Custody**

Proper sample handling and custody procedures ensure the custody and integrity of samples beginning at the time of sampling and continuing through transport, sample receipt, preparation, and analysis.

A sample is in custody if it is in actual physical possession or in a secured area that is restricted to authorized personnel. The COC form is used to document sample handling during transfer from the field to the laboratory and among subcontract laboratories. The following information concerning the sample is recorded on the COC form (See Appendix D). The following list of items matches the COC form in Appendix D.

1. Date and time of collection
2. Site identification
3. Sample matrix
4. Number of containers
5. Preservative used or if the sample was filtered
6. Analyses required
7. Name of collector
8. Custody transfer signatures and dates and time of transfer
9. Bill of lading (if applicable)

### **Sample Labeling**

Samples are labeled on the container (or on a label for the metals sample bottles) with an indelible marker. Label information includes:

1. Site identification
2. Date and time of sampling
3. Preservative added, if applicable
4. Designation of "field-filtered" (for metals) as applicable
5. Sample type (i.e., conventional water parameters, organics, etc. as defined in the monitoring schedule in Appendix B)

### **Sample Handling**

For samples to be analyzed by LNVA, the Water Quality Analyst(s) log receipt of the sample into the sample login book and confirm receipt by signing the Field Sheet/Chain of Custody(See Appendix C). The login book information includes sample location, date and time of receipt, date and time collected, a sample id number, the number and type of sample containers, preservation and the requested analysis. The Water Quality Analyst carries out any pretreatment procedures at this time. Samples are stored in a refrigeration unit and are only handled by the Water Quality analyst.

Before analysis commences, the Water Quality Analyst removes the samples from storage and records the station identification on the appropriate bench sheet. Additional information includes the date and

time the analysis began, analyst initials, volume used for analysis and required QA samples. (This information documents and ensures that holding times for a particular analysis are met)

Samples for analysis of metals in water are shipped by LNVA laboratory staff to Albion Environmental. The samples are shipped by Greyhound bus that relinquishes the samples directly to Albion staff. Receipt of samples by Albion staff is documented with signatures on LNVA's WQMP Field Sheet/Chain of Custody and the Albion COC form (See Appendices C and D).

### **Deficiencies, Nonconformances and Corrective Action Related to Chain-of-Custody**

Deficiencies are defined as unauthorized deviations from procedures documented in the QAPP or other applicable documents. Nonconformances are deficiencies, which affect data quantity and/or quality and render the data unacceptable or indeterminate. Deficiencies related to chain-of-custody include but are not limited to delays in transfer, resulting in holding time violations; incomplete documentation, including signatures; possible tampering of samples; broken or spilled samples, etc.

Deficiencies are documented in logbooks, field data sheets, etc. by field or laboratory staff and reported to the Lower Neches Valley Authority Project Manager/QAO/Laboratory Manager. The Lower Neches Valley Authority Project Manager/QAO/Laboratory Manager will initiate a Nonconformance Report (NCR) to document the deficiency.

The Lower Neches Valley Authority Project Manager/QAO/Laboratory Manager (and other affected individuals/organizations), will determine if the deficiency constitutes a nonconformance. If it is determined the activity or item in question does not affect data quality and therefore, is not a valid nonconformance, the NCR will be completed accordingly and the NCR closed. If it is determined a nonconformance does exist, the Lower Neches Valley Authority Project Manager/QAO/Laboratory Manager will determine the disposition of the nonconforming activity or item and necessary corrective action(s); results will be documented by the Lower Neches Valley Authority Project Manager/QAO/Laboratory Manager by completion of a Corrective Action Report.

Corrective Action Reports (CARs) document: root cause(s); impact(s); specific corrective action(s) to address the deficiency; action(s) to prevent recurrence; individual(s) responsible for each action; the timetable for completion of each action; and the means by which completion of each corrective action will be documented. CARs will be included with quarterly progress reports. In addition, significant conditions (i.e., situations which, if uncorrected, could have a serious effect on safety or on the validity or integrity of data) will be reported to the TCEQ immediately both verbally and in writing.

## **B4 ANALYTICAL METHODS**

The analytical methods, associated matrices, and performing laboratories are listed in Table A7.1 of Section A7. 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 for comparison to those standards and/or criteria. The Standards state that "Procedures 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 *TCEQ Surface Water Quality Monitoring Procedures*, 40 CFR 136, or other reliable procedures acceptable to the Agency."

Laboratories collecting data under this QAPP are compliant with ISO/IEC Standard 17025, at a minimum. Copies of Laboratory QMs and SOPs are available for review by the TCEQ.

## **Standards Traceability**

All standards used in the field and laboratory are traceable to certified reference materials. Standards preparation is fully documented and maintained in a standards log book. Each documentation includes information concerning the standard identification, starting materials, including concentration, amount used and lot number; date prepared, expiration date and preparer's initials/signature. The reagent bottle is labeled in a way that will trace the reagent back to preparation.

## **Analytical Method Modification**

Only data generated using approved analytical methodologies as specified in this QAPP will be submitted to the TCEQ. Requests for method modifications will be documented on form TCEQ-10364, the TCEQ Application for Analytical Method Modification, and submitted for approval to the TCEQ Quality Assurance Section. Work will begin only after the modified procedures have been approved.

## **Deficiencies, Nonconformances and Corrective Action Related to Analytical Methods**

Deficiencies are defined as unauthorized deviations from procedures documented in the QAPP or other applicable documents. Nonconformances are deficiencies which affect quantity and/or quality and render the data unacceptable or indeterminate. Deficiencies related to field and laboratory measurement systems include but are not limited to instrument malfunctions, blank contamination, quality control sample failures, etc.

Deficiencies are documented in logbooks, field data sheets, etc. by field or laboratory staff and reported to the Lower Neches Valley Authority Project Manager/QAO/Laboratory Manager. The Lower Neches Valley Authority Project Manager/QAO/Laboratory Manager will initiate a Nonconformance Report (NCR) to document the deficiency.

The Lower Neches Valley Authority Project Manager/QAO/Laboratory Manager (and other affected individuals/organizations), will determine if the deficiency constitutes a nonconformance. If it is determined the activity or item in question does not affect data quality and therefore, is not a valid nonconformance, the NCR will be completed accordingly and the NCR closed. If it is determined a nonconformance does exist, the Lower Neches Valley Authority Project Manager/QAO/Laboratory Manager will determine the disposition of the nonconforming activity or item and necessary corrective action(s); results will be documented by the Lower Neches Valley Authority Project Manager/QAO/Laboratory Manager by completion of a Corrective Action Report.

Corrective Action Reports (CARs) document: root cause(s); impact(s); specific corrective action(s) to address the deficiency; action(s) to prevent recurrence; individual(s) responsible for each action; the timetable for completion of each action; and, the means by which completion of each corrective action will be documented. CARs will be included with quarterly progress reports. In addition, significant conditions (i.e., situations which, if uncorrected, could have a serious effect on safety or on the validity or integrity of data) will be reported to the TCEQ immediately both verbally and in writing.

The TCEQ has determined that analyses associated with the remark codes "holding time exceedance," "sample received unpreserved," "estimated value," etc. may have unacceptable measurement uncertainty associated with them. This will immediately disqualify analyses from submittal to TRACS. Therefore, data with these types of problems should not be reported to the TCEQ.

## B5 QUALITY CONTROL

### Sampling Quality Control Requirements and Acceptability Criteria

The minimum Field QC Requirements are outlined in the *TCEQ Surface Water Quality Monitoring Procedures*. Specific requirements are outlined below. Field QC sample results are submitted with the laboratory data report (see Section A9).

Field blank - Field blanks are required for total metals-in-water samples when collected without sample equipment (i.e., as grab samples). A field blank consists of deionized water that is taken to the field and poured into the sample container. Field blanks are used to assess the contamination from field sources such as airborne materials, containers, and preservatives. Field blanks will be collected on a frequency of at least one per day, when metals-in-water samples are collected.

Field equipment blank - Field equipment blanks are required for metals-in-water samples when collected using sampling equipment. A field equipment blank is a sample of reagent water poured into or over a sampling device or pumped through a sampling device. It is collected in the same type of container as the environmental sample, preserved in the same manner and analyzed for the same parameter. Field equipment blanks will be collected on a frequency of at least one per day, when metals-in-water samples are collected.

The analysis of field equipment blanks should yield values lower than the reporting limit, or, when target analyte concentrations are very high, blank values must be less than 5% of the lowest value of the batch, or corrective action will be implemented.

Field Split - A field split is a single sample subdivided by field staff immediately following collection and submitted to the laboratory as two separately identified samples according to procedures specified in the *SWQM Procedures*. Split samples are preserved, handled, shipped, and analyzed identically and are used to assess variability in all of these processes. Field splits apply to conventional samples only. Field split samples will be collected on a frequency of at least one for every tenth sample or once a month, whichever is greater. The precision of field split results is calculated by relative percent difference (RPD) using the following equation:

$$RPD = (X1 - X2) / ((X1 + X2) / 2)$$

A 30% RPD criteria will be used to screen field split results as a possible indicator of excessive variability in the sample handling and analytical system. If it is determined that elevated quantities of analyte (i.e., > RL) were measured and analytical variability can be eliminated as a factor, then variability in field split results will primarily be used as a trigger for discussion with field staff to ensure samples are being handled in the field correctly. Some individual sample results may be invalidated based on the examination of all extenuating information. Professional judgement during data validation will be relied upon to interpret the results and take appropriate action. The qualification (i.e., invalidation) of data will be documented on the Data Summary. Deficiencies will be addressed as specified in this section under Deficiencies, Nonconformances, and Correction Action related to Quality Control.

## Laboratory Measurement Quality Control Requirements and Acceptability Criteria

Detailed laboratory QC requirements and corrective action procedures are contained within the individual laboratory quality manuals (QMs). The minimum requirements that all participants abide by are stated below. Lab QC sample results are submitted with the laboratory data report (see Section A9.).

### AWRL/Reporting Limit Verification-Water Samples

The laboratory's reporting limit for each analyte will be at or below the AWRL. To demonstrate the ongoing ability to recover at the reporting limit, the laboratory will analyze a calibration standard (if applicable) at or below the reporting limit on each day Clean Rivers Program samples are analyzed. Two acceptance criteria will be met or corrective action will be implemented. First, calibrations including the standard at the reporting limit will meet the calibration requirements of the analytical method. Second, the instrument response (e.g., absorbance, peak area, etc.) for the standard at the reporting limit will be treated as a response for a sample by use of the calibration equation (e.g., regression curve, etc.) in calculating an apparent concentration of the standard. The calculated and reference concentrations for the standard will then be used to calculate percent recovery (%R) at the reporting limit using the equation:

$$\%R = CR/SA * 100$$

where CR is the calculated result and SA is reference concentration for the standard. Recoveries must be within 75-125% of the reference concentration.

When daily calibration is not required (e.g., Solid Waste Method 8260), or a method does not use a calibration curve to calculate results, the laboratory will analyze a check standard at the reporting limit on each day Clean Rivers Program samples are analyzed. The check standard does not have to be taken through sample preparation, but must be recovered within 75-125% of the reference concentration for the standard. The percent recovery of the check standard is calculated using the following equation in which %R is percent recovery, SR is the sample result, and SA is the reference concentration for the check standard:

$$\%R = SR/SA * 100$$

If the calibration (when applicable) or the recovery of the calibration or control standard is not acceptable, corrective actions (e.g., re-calibration) will be taken to meet the specifications before proceeding with analyses of CRP samples.

The laboratory will report results of quantitation checks with the data.

Laboratory Control Standard (LCS) - A LCS consist of a sample matrix (e.g. deionized water, sand, commercially available tissue ) free from the analytes of interest spiked with verified known amounts of analyte. The LCS is spiked into the sample matrix at a level less than the mid-point of the calibration curve for each analyte. In cases of test methods with very long lists of analytes, LCSs are prepared with all the target analytes and not just a representative number. The LCS is carried through the complete preparation and analytical process. The LCS is used to document the bias of the analytical process. LCSs are run at a rate of one per batch. A batch is defined as a set of environmental samples that are prepared and/or analyzed together within the same process using the same lot of reagents.

Results of LCSs are calculated by percent recovery (%R), which is defined as 100 times the measured concentration, divided by the true concentration of the spiked sample.

The following formula is used to calculate percent recovery, where %R is percent recovery; SR is the measured result; and SA is the true result:

$$\%R = SR/SA * 100$$

Performance limits and control charts are used to determine the acceptability of LCS analyses. Project control limits are specified in Table A7.1.

Laboratory Duplicates - A laboratory duplicate is prepared in the laboratory by splitting aliquots of an LCS. Both samples are carried through the entire preparation and analytical process. LCS duplicates are used to assess precision and are performed at a rate of one per batch. A batch is defined as a set of environmental samples that are prepared and/or analyzed together within the same process using the same lot of reagents.

For most parameters, precision is calculated by the relative percent difference (RPD) of LCS duplicate results as defined by 100 times the difference (range) of each duplicate set, divided by the average value (mean) of the set. For duplicate results,  $X_1$  and  $X_2$ , the RPD is calculated from the following equation:

$$RPD = (X_1 - X_2)/\{(X_1+X_2)/2\} * 100$$

A bacteriological duplicate is considered to be a special type of laboratory duplicate and applies when bacteriological samples are run in the field as well as in the lab. Bacteriological duplicate analyses are performed on samples from the sample bottle on a 10% basis. Results of bacteriological duplicates are evaluated by calculating the logarithm of each result and determining the range of each pair.

Performance limits and control charts are used to determine the acceptability of duplicate analyses. Project control limits are specified in Table A7.1. The specifications for bacteriological duplicates in Table A7.1 apply to samples with concentrations > 10 org./100mL.

Laboratory equipment blank - Laboratory equipment blanks are prepared at the laboratory where collection materials for metals sampling equipment are cleaned between uses. These blanks document that the materials provided by the laboratory are free of contamination. The QC check is performed before the metals sampling equipment is sent to the field. The analysis of laboratory equipment blanks should yield values less than the reporting limit. Otherwise, the equipment should not be used.

Matrix spike (MS) - A matrix spike is an aliquot of sample spiked with a known concentration of the analyte of interest. Percent recovery of the known concentration of added analyte is used to assess accuracy of the analytical process. The spiking occurs prior to sample preparation and analysis. Spiked samples are routinely prepared and analyzed at a rate of 10% of samples processed, or one per batch whichever is greater. A batch is defined as a set of environmental samples that are prepared and/or analyzed together within the same process using the same lot of reagents. The MS is spiked at a level less than or equal to the midpoint of the calibration or analysis range for each analyte. Percent recovery (%R) is defined as 100 times the observed concentration, minus the sample concentration, divided by the true concentration of the spike.

The percent recovery of the matrix spike is calculated using the following equation in which %R is percent recovery, SSR is the observed spiked sample concentration, SR is the sample result, and SA is the reference concentration of the spike added:

$$\%R = (SSR - SR)/SA * 100$$

MS recoveries are plotted on control charts and used to control analytical performance. Measurement performance specifications for matrix spikes are not specified in this document.

Method blank - A method blank is an analyte-free matrix to which all reagents are added in the same volumes or proportions as used in the sample processing and analyzed with each batch. The method blank is carried through the complete sample preparation and analytical procedure. The method blank is used to document contamination from the analytical process. The analysis of method blanks should yield values less than the reporting limit. For very high-level analyses, the blank value should be less than 5% of the lowest value of the batch, or corrective action will be implemented.

Additional method-specific QC requirements - Additional QC samples are run (e.g., sample duplicates, surrogates, internal standards, continuing calibration samples, interference check samples) as specified in the methods. The requirements for these samples, their acceptance criteria, and corrective actions are method-specific.

### **Deficiencies, Nonconformances and Corrective Action Related to Quality Control**

Deficiencies are defined as unauthorized deviations from procedures documented in the QAPP. Nonconformances are deficiencies which affect data quantity and/or quality and render the data unacceptable or indeterminate. Deficiencies related to quality control include but are not limited to field and laboratory quality control sample failures.

Deficiencies are documented in logbooks, field data sheets, etc. by field or laboratory staff and reported to the Lower Neches Valley Authority Project Manager/QAO/Laboratory Manager. The Lower Neches Valley Authority Project Manager/QAO/Laboratory Manager will initiate a Nonconformance Report (NCR) to document the deficiency.

The Lower Neches Valley Authority Project Manager/QAO/Laboratory Manager (and other affected individuals/organizations), will determine if the deficiency constitutes a nonconformance. If it is determined the activity or item in question does not affect data quality and therefore, is not a valid nonconformance, the NCR will be completed accordingly and the NCR closed. If it is determined a nonconformance does exist, the Lower Neches Valley Authority Project Manager/QAO/Laboratory Manager will determine the disposition of the nonconforming activity or item and necessary corrective action(s); results will be documented by the Lower Neches Valley Authority Project Manager/QAO/Laboratory Manager by completion of a Corrective Action Report.

Corrective Action Reports (CARs) document: root cause(s); impact(s); specific corrective action(s) to address the deficiency; action(s) to prevent recurrence; individual(s) responsible for each action; the timetable for completion of each action; and, the means by which completion of each corrective action will be documented. CARs will be included with quarterly progress reports. In addition, significant conditions (i.e., situations which, if uncorrected, could have a serious effect on safety or on the validity or integrity of data) will be reported to the TCEQ immediately both verbally and in writing.

## **B6 INSTRUMENT/EQUIPMENT TESTING, INSPECTION AND MAINTENANCE**

All sampling equipment testing and maintenance requirements are detailed in the *TCEQ Surface Water Quality Monitoring Procedures*. Sampling equipment is inspected and tested upon receipt and is assured appropriate for use. Equipment records are kept on all field equipment and a supply of critical spare parts is maintained.

All laboratory tools, gauges, instrument, and equipment testing and maintenance requirements are contained within laboratory QM(s). Testing and maintenance records are maintained and are available for inspection by the TCEQ. Instruments requiring daily or in-use testing include, but are not limited to, water baths, ovens, autoclaves, incubators, refrigerators, and laboratory-pure water. Critical spare parts for essential equipment are maintained to prevent downtime. Maintenance records are available for inspection by the TCEQ.

## **B7 INSTRUMENT CALIBRATION AND FREQUENCY**

Field equipment calibration requirements are contained in the *TCEQ Surface Water Quality Monitoring Procedures*. Post-calibration error limits and the disposition resulting from error are adhered to. Data not meeting post-error limit requirements invalidate associated data collected subsequent to the pre-calibration and are not submitted to the TCEQ.

Detailed laboratory calibrations are contained within the QM(s). The laboratory QM identifies all tools, gauges, instruments, and other sampling, measuring, and test equipment used for data collection activities affecting quality that must be controlled and, at specified periods, calibrated to maintain bias within specified limits. Calibration records are maintained, are traceable to the instrument, and are available for inspection by the TCEQ. Equipment requiring periodic calibrations include, but are not limited to, thermometers, pH meters, balances, incubators, turbidity meters, and analytical instruments.

## **B8 INSPECTION/ACCEPTANCE OF SUPPLIES AND CONSUMABLES**

All supplies and consumables are inspected upon receipt by the Water Quality Analyst. Any container(s) or materials with special criteria, such as sterility, are checked prior to use. The results of all inspections are recorded and kept on file at the LNVA office. All reagents used are certified by the manufacturer to meet or exceed the requirement for their applications. Albion Environmental will follow guidelines outlined in their purchasing manual as applicable to inspection of supplies and consumables.

## **B9 NON-DIRECT MEASUREMENTS**

This QAPP does not include the use of routine data obtained from non-direct measurement sources.

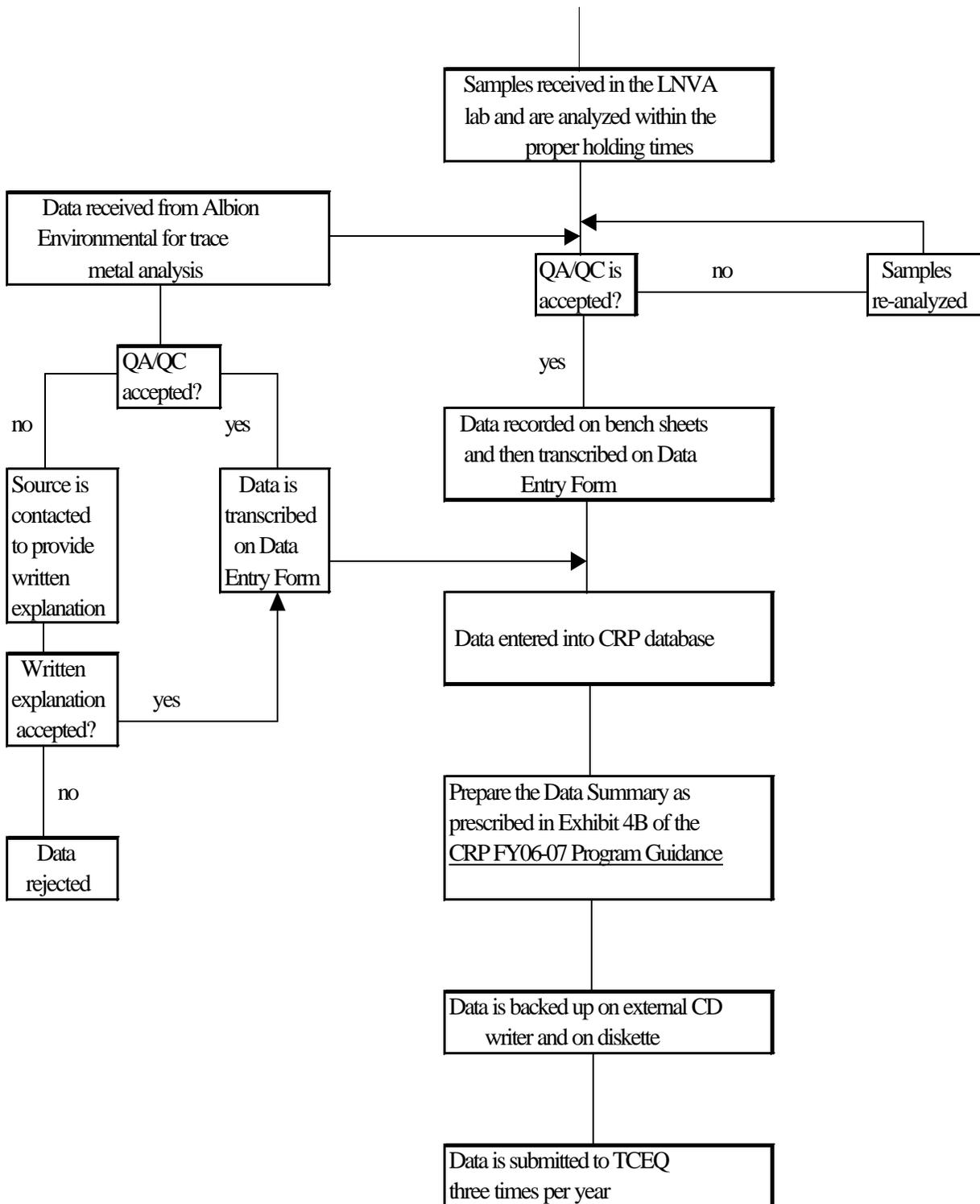
## **B10 DATA MANAGEMENT**

### **Data Management Process**

With funds provided by CRP, LNVA uses PC equipment configured to meet the anticipated data management needs for several years. The hardware and software resources and data handling procedures will be re-evaluated as the data input and output requirements change.

Please see data management plan implementation flowchart on following page.

**Figure 3: B10.1 Data Management Plan Implementation Flow Chart**



## **Data Errors and Loss**

All data sheets will be copied and the originals archived. LNVA staff enters data from the copies directly into the CRP database. The data entered into the database monthly after all sampling activities are completed. Data are stored in batches of three-year increments. Batches of data other than the current one are archived. Data to be transferred out of the database system will be either copied in its Paradox database form or converted to delimited ASCII file.

## **Record Keeping and Data Storage**

There is a backup onto the LNVA network and two CDs after each monthly data entry. All software application programs along with all data backups are kept in a fireproof container and are stored in the office vault. In the event of a disaster, both programs and data backup files can be retrieved and re-installed.

## **Data Handling, Hardware, and Software Requirements**

LNVA has upgraded its computers to a Pentium/200 MHZ, 64 MB RAM and three AMD Athlon/1200mHz, 512 MB RAM IBM compatible PCs with internal CD writers that meet CRP requirements for data submitted to TCEQ. Other hardware and software include a modem and Windows 2000 and Windows Office 2000 software, enabling our staff to query and assemble data necessary to assess water quality, as well as communicate with LNVA's CRP project manager and TCEQ web site. Software used for this project are Paradox and Word Perfect, which are consistent with CRP Data Management requirements. LNVA also utilizes a Hewlett-Packard Color Laser Jet 5 and a HP Laser Jet 2500n.

Data and reports are backed up to LNVA's server, a Dell™ Power Edge 2650 with 120 GB storage capacity, and an internal CD writer.

## **Information Resource Management Requirements**

Data will be managed in accordance with the TCEQ Surface Water Quality Monitoring Data Management Reference Guide and applicable Planning Agency information resource management policies.

The Clean Rivers Program grantees do not create TCEQ certified locational data using Global Positioning System (GPS) equipment. GPS equipment may be used as a component of the information required by the Station Location (SLOC) request process, but TCEQ staff are responsible for creating the certified locational data that will ultimately be entered into the TCEQ's Surface Water Quality Monitoring database. Any information developed by Clean Rivers Program grantees using a Geographic Information System (GIS) will be used solely to meet deliverable requirements and will not be submitted to the TCEQ as a certified data set. Because the Clean Rivers Program grantees do not create certified locational data, TCEQ's OPP 8.11 and 8.12 do not apply

## **C1 ASSESSMENTS AND RESPONSE ACTIONS**

The following table presents the types of assessments and response actions for data collection activities applicable to the QAPP.

**Table 4: C1.1 Assessments and Response Requirements**

| Assessment Activity                         | Approximate Schedule               | Responsible Party             | Scope   | Response Requirements   |
|---|------------------------------------|-------------------------------|---|---|
| Status Monitoring Oversight, etc.           | Continuous                         | Lower Neches Valley Authority | Monitoring of the project status and records to ensure requirements are being fulfilled   | Report to TCEQ in Quarterly Report                                      |
| Monitoring Systems Audit of Planning Agency | Dates to be determined by TCEQ CRP | TCEQ                          | Field sampling, handling and measurement; facility review; and data management as they relate to CRP  | 30 days to respond in writing to the TCEQ to address corrective actions |
| Laboratory Inspection                       | Dates to be determined by TCEQ     | TCEQ Laboratory Inspector     | Requirements appearing in lab SOPs and QAPP, ISO/IEC <b>ISO/IEC Standard 17025</b> , applicable EPA methods and Standard Methods, 40 CFR 136, and other documents applicable to CRP programs including portions of the Texas Administrative Code and the Code of Federal Regulations. | 30 days to respond in writing to the TCEQ to address corrective actions |

**Corrective Action**

The Lower Neches Valley Authority Project Manager is responsible for implementing and tracking corrective action resulting from audit findings outlined in the audit report. Records of audit findings and corrective actions are maintained by both the CRP and the Lower Neches Valley Authority Project Manager. Audit reports and corrective action documentation will be submitted to the TCEQ with the Progress Report.

If audit findings and corrective actions cannot be resolved, then the authority and responsibility for terminating work are specified in the CRP QMP and in agreements in contracts between participating organizations.

**C2 REPORTS TO MANAGEMENT**

**Reports to Planning Agency Project Management**

In the event that QA issues are encountered during the sample collection process or during sample analysis, LNVA’s water quality analysts will report these issues to the **LNVA CRP Quality Assurance Officer/ Laboratory Manager/Project Manager**. The **CRP Quality Assurance Officer/Laboratory Manager/Project Manager** will then decide what actions should be taken to address these issues. All

QC information will be included in the laboratory data reports and any discrepancy in the data will be noted along with required QC information.

### **Reports to TCEQ Project Management**

All reports detailed in this section are contract deliverables and are transferred to the TCEQ in accordance with contract requirements.

Progress Report - Summarizes the Lower Neches Valley Authority activities for each task; reports monitoring status, problems, delays, and corrective actions; and outlines the status of each task's deliverables.

Monitoring Systems Audit Report and Response - Following any audit performed by the Lower Neches Valley Authority, a report of findings, recommendations and response is sent to the TCEQ in the quarterly progress report.

### **Reports by TCEQ Project Management**

Contractor Evaluation - The Lower Neches Valley Authority participates in a Contractor Evaluation by the TCEQ annually for compliance with administrative and programmatic standards. Results of the evaluation are submitted to the TCEQ Financial Administration Division, Procurement and Contracts Section.

## **D1 DATA REVIEW, VERIFICATION, AND VALIDATION**

All field and laboratory will be reviewed and verified for integrity and continuity, reasonableness, and conformance to project requirements, and then validated against the project objectives and measurement performance specifications which are listed in Section A7. Only those data which are supported by appropriate quality control data and meet the measurement performance specifications defined for this project will be considered acceptable, and will be reported for entry into the SWQM portion of TRACS.

## **D2 VERIFICATION AND VALIDATION METHODS**

All field and laboratory data will be reviewed, verified and validated to ensure they conform to project specifications and meet the conditions of end use as described in Section A7 of this document.

Data review, verification, and validation will be performed using self-assessments and peer and management review as appropriate to the project task. The data review tasks to be performed by field and laboratory staff are listed in the first two sections of Table D.2, respectively. Potential errors are identified by examination of documentation and by manual (*or computer-assisted*) examination of corollary or unreasonable data. If a question arises or an error is identified, the manager of the task responsible for generating the data is contacted to resolve the issue. Issues which can be corrected are corrected and documented. If an issue cannot be corrected, the task manager consults with higher level project management to establish the appropriate course of action, or the data associated with the issue are rejected. Field and laboratory reviews, verifications, and validations are documented.

After the field and laboratory data are reviewed, another level of review is performed once the data are combined into a data set. This review step as specified in Table D.2 is performed by the Lower Neches Valley Authority Data Manager and QAO. Data review, verification, and validation tasks to be performed on the data set include, but are not limited to, the confirmation of lab and field data review, evaluation of field QC results, additional evaluation of anomalies and outliers, analysis of sampling and analytical gaps, and confirmation that all parameters and sampling sites are included in the QAPP.

Another element of the data validation process is consideration of any findings identified during the monitoring systems audit conducted by the TCEQ CRP Lead Quality Assurance Specialist. Any issues requiring corrective action must be addressed, and the potential impact of these issues on previously collected data will be assessed. After the data are reviewed and documented, the Lower Neches Valley Authority Project Manager validates that the data meet the data quality objectives of the project and are suitable for reporting to TCEQ.

If any requirements or specifications of the CRP are not met, based on any part of the data review, the responsible party should document the nonconforming activities and submit the information to the Lower Neches Valley Authority Data Manager with the data. This information is communicated to the TCEQ by the Lower Neches Valley Authority in the Data Summary.

**Table 5: D2.1 Data Review Tasks**

| <b>Field Data Review</b>  | <b>Responsibility</b>                      |
|---|--|
| Field data reviewed for conformance with data collection, sample handling and chain of custody, analytical and QC requirements  | LNVA QAO                                   |
| Post-calibrations checked to ensure compliance with error limits  | LNVA Water Quality Analyst                 |
| Field data calculated, reduced, and transcribed correctly   | LNVA Water Quality Analyst                 |
| <b>Laboratory Data Review</b>   |  |
| Laboratory data reviewed for conformance with data collection, sample handling and chain of custody, analytical and QC requirements to include documentation, holding times, sample receipt, sample preparation, sample analysis, project and program QC results, and reporting | LNVA QAO/Albion Environmental QAO          |
| Laboratory data calculated, reduced, and transcribed correctly  | LNVA QAO/Albion Environmental QAO          |
| Reporting limits consistent with requirements for Ambient Water Reporting Limits.   | LNVA Data Manager/Albion Environmental QAO |
| Analytical data documentation evaluated for consistency, reasonableness and/or improper practices   | LNVA QAO/Albion Environmental QAO          |
| Analytical QC information evaluated to determine impact on individual analyses  | LNVA QAO/Albion Environmental QAO          |
| All laboratory samples analyzed for all parameters  | LNVA Water Quality Analyst                 |

|  |   |
|--|---|
| <b>Data Set Review</b>   |   |
| The test report has all required information as described in Section A9 of the QAPP                      | LNVA Data Manager                             |
| Confirmation that field and lab data have been reviewed  | LNVA Data Manager                             |
| Data set (to include field and laboratory data) evaluated for reasonableness and if corollary data agree | LNVA Data Manager/Albion Environmental QAO    |
| Outliers confirmed and documented  | LNVA Data Manager                             |
| Field QC acceptable (e.g., field splits and trip, field and equipment blanks)                            | LNVA QAO                                      |
| Sampling and analytical data gaps checked and documented   | LNVA QAO                                      |
| Verification and validation confirmed. Data meets conditions of end use and are reportable               | Lower Neches Valley Authority Project Manager |

### **D3 RECONCILIATION WITH USER REQUIREMENTS**

Data produced in this project, and data collected by other organizations (e.g., USGS, TCEQ, etc.), will be analyzed and reconciled with project data quality requirements. Data meeting project requirements will be used by the TCEQ for the *Texas Water Quality Inventory and 303(d) List* in accordance with TCEQ's *Guidance for Assessing Texas Surface and Finished Drinking Water Quality Data*, and for TMDL development, stream standards modifications, and permit decisions as appropriate. Data which do not meet requirements will not be submitted to the SWQM portion of TRACS nor will be considered appropriate for any of the uses noted above.

## Appendix A

### TASK 3: WATER QUALITY MONITORING

**Objectives:** Data collection efforts will focus on providing information to support:

- temporal and spatial analysis of water quality
- knowledge of water quality and flow for unclassified streams
- evaluation and development of state-wide, regional, and site-specific water quality standards
- permit criteria related to the flow status of receiving streams
- priority monitoring
- use attainability assessments
- special studies
- planning and coordination of basin-wide monitoring

#### Task

##### **Description: Monitoring Description**

In FY 2006 and FY 2007, LNVA will monitor a minimum of 18 sites quarterly (4 times per year) for conventional, bacteria (E. coli), flow, and field parameters. In FY2006 Metals will be monitored at a minimum of 12 sites at least once per year. LNVA will also collect 24 hour dissolved oxygen data at a minimum of 5 sites twice per year (total of 10 events) during the FY 2006 index period.

In FY 2007 LNVA will monitor at a similar level of effort as FY 2006. The final number of sites, location, frequency, and parameters collected for FY 2007 will be based on priorities identified at the basin Steering Committee and Coordinated Monitoring meetings and included in the amended Appendix B schedule of the QAPP. LNVA, will also assist TCEQ staff with data collection efforts for the Use Attainability Analysis (UAA) project scheduled to be conducted by TCEQ on Pine Island Bayou during the index period in FY2006 and FY 2007.

All monitoring procedures and methods will follow the guidelines prescribed in the LNVA FY06-07 CRP QAPP, the TCEQ *Surface Water Quality Monitoring Procedures, Volume 1: Physical and Chemical Monitoring Methods for Water, Sediment, and Tissue (RG-415)* and the TCEQ *Surface Water Quality Monitoring Procedures, Volume 2: Methods for Collecting and Analyzing Biological Community and Habitat Data (RG-416)*.

**Coordinated Monitoring Meeting** - The Lower Neches Valley Authority will hold an annual coordinated monitoring meeting. Qualified monitoring organizations will be invited to attend the working meeting in which monitoring needs and purposes will be discussed segment by segment and station by station. Information from participants and stakeholders will be used to select stations and parameters that will enhance overall water quality monitoring coverage, eliminate duplication of effort, and address basin priorities. The changes to the monitoring schedule will be entered into the statewide database on the Internet and communicated to meeting attendees. Changes to monitoring that occur during the course of the year will be entered into the statewide database on the Internet and communicated to meeting attendees.

##### **Progress Report**

Each Progress Report will indicate the number of sampling events and the types of monitoring conducted in the quarter, to include all types of monitoring.

**Equipment:** No new equipment will be purchased to accomplish the work in this task.

##### **Deliverables**

**& Dues Dates:** September 1, 2005 through August 31, 2006

- A. Conduct water quality monitoring, summarize activities, and submit with Progress Report - December 15, 2005; March 15 and June 15, 2006

- B. Coordinated Monitoring Meeting - between March 15 and April 30, 2006
- C. Email notification to the CRP Project Manager that statewide coordinated monitoring schedule updates have been completed - May 31, 2006

**September 1, 2006 through August 31, 2007**

- A. Conduct water quality monitoring, summarize activities, and submit with Progress Report - September 15 and December 15, 2006; March 15 and June 15 and August 31, 2007
- B. Coordinated Monitoring Meeting - between March 15 and April 30, 2007
- C. Email notification to the CRP Project Manager that statewide coordinated monitoring schedule updates have been completed - May 31, 2007

## **Appendix B Sampling Process Design and Monitoring Schedule (plan)**

### **Sample Design Rationale**

The sample design is based on the legislative intent of the Clean Rivers Program. Under the legislation, the Basin Planning Agencies have been tasked with providing data to characterize water quality conditions in support of the 305(b) assessment, and to identify significant long-term water quality trends. Based on Steering Committee input, achievable water quality objectives and priorities and the identification of water quality issues are used to develop work plans which are in accord with available resources. As part of the Steering Committee process, the Lower Neches Valley Authority coordinates closely with the TCEQ and other participants to ensure a comprehensive water monitoring strategy within the watershed.

LNVA began fixed station monitoring of routine sites in 1997. Little or no data existed for much of the lower Neches and Neches-Trinity Coastal Basins before CRP monitoring. LNVA will monitor 18 fixed station sites to determine the status, trends, and temporal variance of water quality and determine surface water quality standards compliance. Data collected for routine monitoring is used in screenings for assessment reports. Data assessments have shown concerns for low dissolved oxygen concentrations in the Pine Island Bayou watershed (segment 607). Due to this concern LNVA will continue to collect 24 hr. dissolved oxygen data in this segment along with the use attainability analysis scheduled by TCEQ.

### **Site Selection Criteria**

This data collection effort involves monitoring routine water quality, using procedures that are consistent with the TCEQ SWQM program, for the purpose of data entry into the statewide database maintained by the TCEQ. To this end, some general guidelines are followed when selecting sampling sites, as basically outlined below, and discussed thoroughly in the *TCEQ Surface Water Quality Monitoring Procedures, Volume 1* (RG-415). Overall consideration is given to accessibility and safety. All monitoring activities have been developed in coordination with the CRP Steering Committee and with the TCEQ.

1. Locate stream sites so that samples can be safely collected from the centroid of flow. Centroid is defined as the midpoint of that portion of stream width which contains 50 percent of the total flow. If few sites are available for a stream segment, choose one that would best represent the water body, and not an unusual condition or contaminant source. Avoid backwater areas or eddies when selecting a stream site.
2. At a minimum for reservoirs, locate sites near the dam (reservoirs) and in the major arms. Larger reservoirs might also include stations in the middle and upper (riverine) areas. Select sites that best represent the water body by avoiding coves and back water areas. A single monitoring site is considered representative of 25 percent of the total reservoir acres, but not more than 5,120 acres.
3. Routine monitoring sites are selected to maximize stream coverage or basin coverage. Very long segments may require more stations. As a rule of thumb, stream segments between 25 and 50 miles long require two stations, and longer than 50 miles require three or more depending on the existence of areas with significantly different sources of contamination or potential water quality concerns. Major hydrological features, such as the confluence of a major tributary or an instream dam, may also limit the spatial extent of an assessment based on one station.

4. Because historical water quality data can be very useful in assessing use attainment or impairment, it may be best to use sites that are on current or past monitoring schedules.
5. All classified segments (including reservoirs) should have at least one routine monitoring site that adequately characterizes the water body., and should be coordinated with the TCEQ or other qualified monitoring entities reporting routine data to TCEQ.
6. Routine monitoring sites may be selected to bracket sources of pollution, influence of tributaries, changes in land uses, and hydrological modifications.
7. Sites should be accessible. When possible, stream sites should have a USGS or IBWC stream flow gauge. If not, it should be possible to conduct flow measurement during routine visits.

### **Monitoring Sites for FY2006**

Monitoring Tables specifying the sample design for surface water quality monitoring for fiscal year 2006 are presented shown in Table B1.1 on the following page.

Table 6: B1.1:Monitoring Sites and Parameters for FY 2006

| Segment | Region | Basin ID | Station Id | Start Date | End Date | SC1/ SC2 | Monitoring Type | Comments   | 24 hr. DO | TSWQS Metals Water | Conv.* | Bact. | Inst Flow | Field** |
|---------|--------|----------|------------|------------|----------|----------|-----------------|--|-----------|--------------------|--------|-------|-----------|---------|
| 0602    | 10     | 6        | 10581      | 09/01/05   | 08/31/06 | LV/LV    | RT              | NECHES R AT FM 1013 E OF SPURGER, TX                               |           | 2                  | 4      | 4     | 4         | 4       |
| 0602    | 10     | 6        | 15343      | 09/01/05   | 08/31/06 | LV/LV    | RT              | NECHES R NEAR LAKEVIEW, 14.5 KM UPSTREAM OF PINE ISLAND BAYOU      |           | 2                  | 4      | 4     | 4         | 4       |
| 0603    | 10     | 6        | 10484      | 09/01/05   | 08/31/06 | LV/LV    | RT              | SANDY CREEK AT FM 777 SW OF JASPER                                 |           | 2                  | 4      | 4     | 4         | 4       |
| 0603    | 10     | 6        | 15344      | 09/01/05   | 08/31/06 | LV/LV    | RT              | WOLF CREEK AT FM 256, 6.1 KM UPSTREAM OF B.A. STEINHAGEN RESERVOIR |           | 2                  | 4      | 4     | 4         | 4       |
| 0607    | 10     | 6        | 15346      | 09/01/05   | 08/31/06 | LV/LV    | RT              | LITTLE PINE ISLAND BAYOU AT FM 326 N OF SOUR LAKE, TX              |           | 2                  | 4      | 4     | 4         | 4       |
| 0607    | 10     | 6        | 15346      | 09/01/05   | 08/31/06 | LV/LV    | DI              | LITTLE PINE ISLAND BAYOU AT FM 326 N OF SOUR LAKE, TX              | 4         |                    |        |       | 2         |         |
| 0607    | 10     | 6        | 10599      | 09/01/05   | 08/31/06 | LV/LV    | RT              | PINE ISLAND BAYOU AT LNVA NECHES FIRST LIFT STATION AT BMT, TX     |           | 2                  | 4      | 4     | 4         | 4       |
| 0607    | 10     | 6        | 10607      | 09/01/05   | 08/31/06 | LV/LV    | RT              | PINE ISLAND BAYOU AT OLD SOUR LAKE ROAD SOUTH OF SOUR LAKE, TX     |           | 2                  | 4      | 4     | 4         | 4       |
| 0607    | 10     | 6        | 10607      | 09/01/05   | 08/31/06 | LV/LV    | DI              | PINE ISLAND BAYOU AT OLD SOUR LAKE ROAD SOUTH OF SOUR LAKE, TX     | 4         |                    |        |       | 2         |         |
| 0607    | 10     | 6        | 15367      | 09/01/05   | 08/31/06 | LV/LV    | RT              | PINE ISLAND BAYOU AT SH 105/FM 770 NEAR BATSON, TX                 |           | 2                  | 4      | 4     | 4         | 4       |
| 0607    | 10     | 6        | 15367      | 09/01/05   | 08/31/06 | LV/LV    | DI              | PINE ISLAND BAYOU AT SH 105/FM 770 NEAR BATSON, TX                 | 4         |                    |        |       | 2         |         |
| 0607    | 10     | 6        | 10602      | 09/01/05   | 08/31/06 | LV/LV    | RT              | PINE ISLAND BAYOU AT US 69/US 96/US 287 AT VOTH                    |           | 2                  | 4      | 4     | 4         | 4       |
| 0607    | 10     | 6        | 10602      | 09/01/05   | 08/31/06 | LV/LV    | DI              | PINE ISLAND BAYOU AT US 69/US 96/US 287 AT VOTH                    | 4         |                    |        |       | 2         |         |
| 0607    | 10     | 6        | 10606      | 09/01/05   | 08/31/06 | LV/LV    | DI              | PINE ISLAND BAYOU AT SH 105 8 MI. E OF SOUR LAKE                   | 4         |                    |        |       | 2         |         |
| 0607    | 10     | 6        | 15345      | 09/01/05   | 08/31/06 | LV/LV    | RT              | WILLOW CREEK AT UNNAMED ROAD NEAR NOME, TX                         |           | 2                  | 4      | 4     | 4         | 4       |

| Segment | Region | Basin ID | Station Id | Start Date | End Date | SC1/ SC2 | Monitoring Type | Comments  | 24 hr. DO | TSWQS Metals Water | Conv.* | Bact. | Inst Flow | Field ** |
|---------|--------|----------|------------|------------|----------|----------|-----------------|---|-----------|--------------------|--------|-------|-----------|----------|
| 0608    | 10     | 6        | 15355      | 09/01/05   | 08/31/06 | LV/LV    | RT              | BEECH CREEK AT FM 1943 NEAR FRED, TX                              |           | 2                  | 4      | 4     | 4         | 4        |
| 0608    | 10     | 6        | 15353      | 09/01/05   | 08/31/06 | LV/LV    | RT              | BIG SANDY CREEK AT US 190 AT ALABAMA COUSHATTA INDIAN RESERVATION |           | 2                  | 4      | 4     | 4         | 4        |
| 0608    | 10     | 6        | 15349      | 09/01/05   | 08/31/06 | LV/LV    | RT              | HICKORY CREEK AT US 69, S OF WARREN, TX                           |           | 2                  | 4      | 4     | 4         | 4        |
| 0608    | 10     | 6        | 15356      | 09/01/05   | 08/31/06 | LV/LV    | RT              | TURKEY CREEK AT FM 1013 NEAR HILLISTER, TX                        |           | 2                  | 4      | 4     | 4         | 4        |
| 0608    | 10     | 6        | 13625      | 09/01/05   | 08/31/06 | LV/LV    | RT              | VILLAGE CREEK AT FM 418 NEAR KOUNTZE, TX                          |           | 2                  | 4      | 4     | 4         | 4        |
| 0609    | 10     | 6        | 10610      | 09/01/05   | 08/31/06 | LV/LV    | RT              | ANGELINA RIVER AT SH 63 NW OF JASPER, TX                          |           | 2                  | 4      | 4     | 4         | 4        |
| 0701    | 10     | 7        | 10669      | 09/01/05   | 08/31/06 | LV/LV    | RT              | TAYLOR BAYOU AT LABELLE ROAD E OF PORT ARTHUR, TX                 |           | 2                  | 4      | 4     |           | 4        |
| 0704    | 10     | 7        | 10687      | 09/01/05   | 08/31/06 | LV/LV    | RT              | HILLEBRANDT BAYOU AT SH 124                                       |           | 2                  | 6      | 6     |           | 6        |

\* conventional parameters= alkalinity, total hardness, chloride, sulfates, total phosphates, turbidity, nitrates, ammonia, total suspended solids

\*\* field parameters = water temperature, pH, DO, total dissolved solids, conductivity, flow measurements, secchi depth, total water depth, pool data, weather and physical observations.

\*\*\* TSWQS Metals Water= Aluminum, Arsenic, Cadmium, Chromium, Copper, Lead, Barium, Nickel, Silver, Zinc, total Selenium

\*\*\*\* Bacteria= E. coli

\*\*\*\*\* 24hr DO= Dissolved Oxygen, Water Temperature, Conductivity, pH

Figure 4: B10.2 LNVA Routine (RT) Monitoring Sites

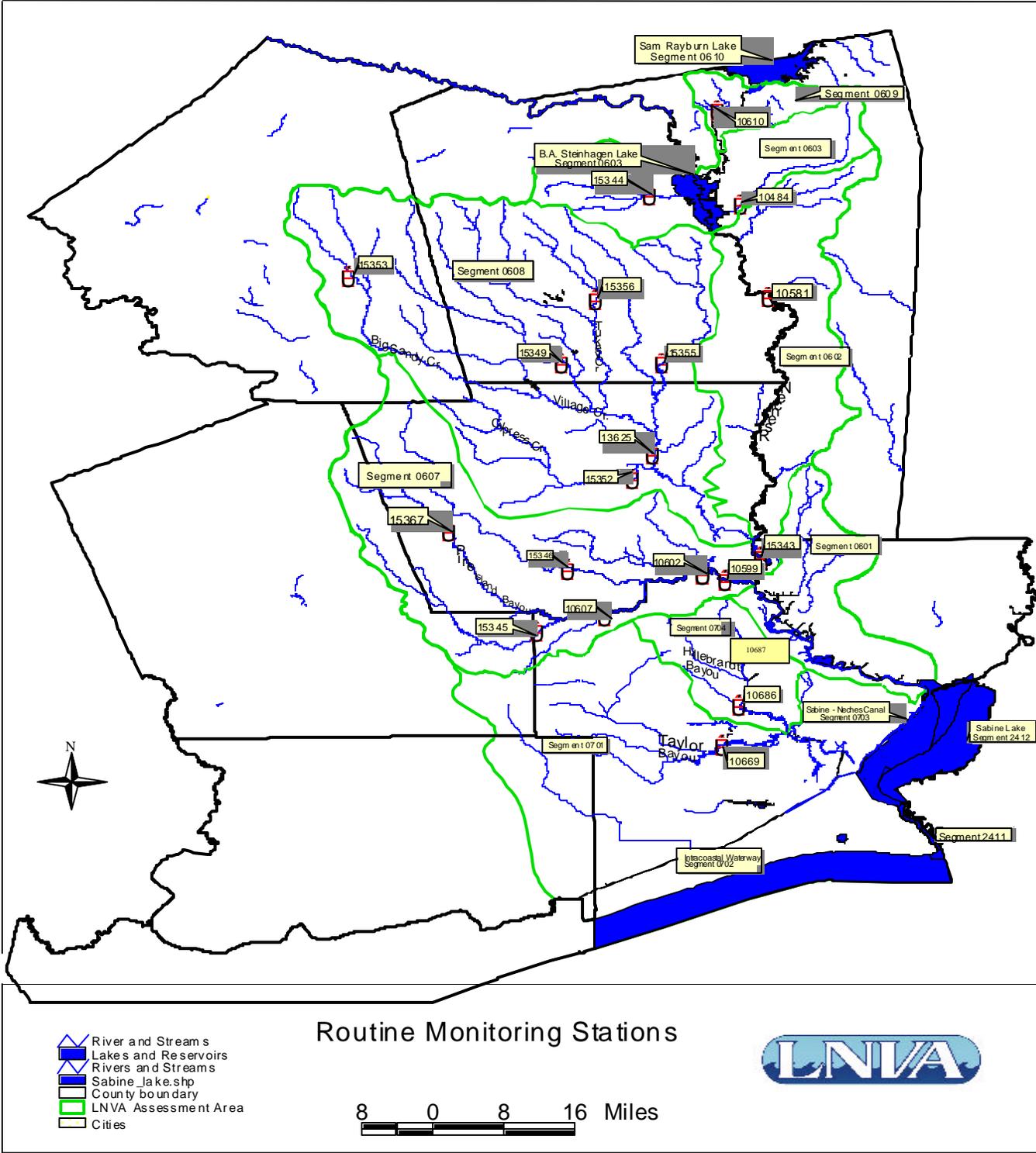
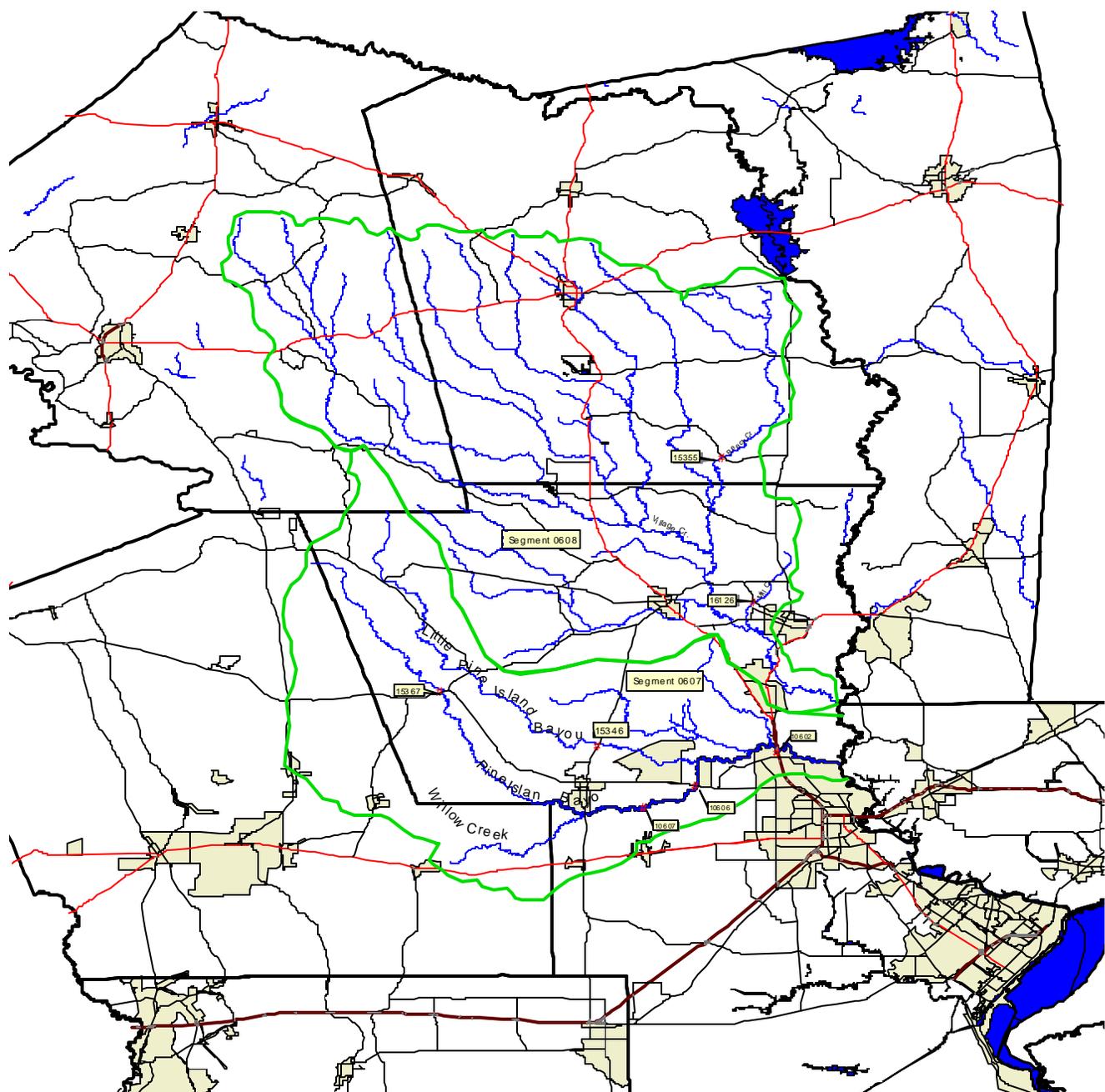


Figure 5: B10.3 LNVA 24 Hour Dissolved Oxygen (DI) Monitoring Sites



Segments 0607-Pine Island Bayou and 0608-Village Creek  
24 hour Dissolved Oxygen Monitoring Stations

- Lnvarsd.shp
- Primary road with limited access
- Primary road
- Secondary and connecting road
- Access ramp
- Ferry crossing
- H2o\_pll
- H2o\_linell
- Countiesll



4 0 4 8 Miles



**APPENDIX C - WQMP Field Sheet/Chain of Custody Form**

**Lower Neches Valley Authority  
Field Data Sheet/Chain of Custody**

|               |                 |                |  |               |
|---------------|-----------------|----------------|--|---------------|
| Location      |                 | Weather        |  | Observations: |
| Station ID    | Secchi(m)       | Wind Intensity |  |               |
| Observer(s)   | Flow(cfs)       | Wind Direction |  |               |
| Date          | Flow Method     | Water Color    |  |               |
| Time          | Days Since Rain | Water Odor     |  |               |
| Air Temp (°C) |                 | Flow Severity  |  |               |

|                    |              |  |
|--------------------|--------------|--|
| Water Profile Data | Meter Number |  |
|--------------------|--------------|--|

| Sample | Depth (m) | Temp (°C) | pH (units) | D.O. (mg/L) | % SAT | Cond (uS/cm) | TDS (mg/L) | SAL (ppt) |
|--------|-----------|-----------|------------|-------------|-------|--------------|------------|-----------|
|        |           |           |            |             |       |              |            |           |
|        |           |           |            |             |       |              |            |           |
|        |           |           |            |             |       |              |            |           |
|        |           |           |            |             |       |              |            |           |
|        |           |           |            |             |       |              |            |           |

|                   |         |  |        |  |    |  |
|-------------------|---------|--|--------|--|----|--|
| Sample Containers | Surface |  | Bottom |  | QA |  |
|-------------------|---------|--|--------|--|----|--|

|              |  |  |  |  |  |  |  |
|--------------|--|--|--|--|--|--|--|
| Quantity     |  |  |  |  |  |  |  |
| Matrix Type  |  |  |  |  |  |  |  |
| Container    |  |  |  |  |  |  |  |
| Volume       |  |  |  |  |  |  |  |
| Preservation |  |  |  |  |  |  |  |
| Analysis     |  |  |  |  |  |  |  |
| Released No. |  |  |  |  |  |  |  |

|             |  |      |  |
|-------------|--|------|--|
| Released By |  | Date |  |
|             |  | Time |  |
| Received By |  | Date |  |
|             |  | Time |  |
| Released By |  | Date |  |
|             |  | Time |  |
| Received By |  | Date |  |
|             |  | Time |  |





**ATTACHMENT 1**  
**Example Letter to Document Adherence to the QAPP**

TO: (name)  
(organization)

FROM: (name)  
(organization)

Please sign and return this form by (date) to:

(address)

I acknowledge receipt of the referenced document(s). I understand the document(s) describe quality assurance, quality control, data management and reporting, and other technical activities that must be implemented to ensure the results of work performed will satisfy stated performance criteria.

\_\_\_\_\_  
Signature

Date

*Copies of the signed forms should be sent by the Basin Planning Agency to the TCEQ CRP Project Manager within 60 days of TCEQ approval of the QAPP.*