TASK 2: QUALITY ASSURANCE

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See CRP web site for QAPP Shell and related documents at https://www.tceq.texas.gov/waterquality/clean-rivers/index.html (select *Resources for Clean Rivers Partners* then *Quality Assurance & Monitoring Procedures*).

TASK 2: QUALITY ASSURANCE

INTRODUCTION

Quality assurance (QA) is an integrated system of management activities involving planning, implementation, assessment, reporting, and quality improvement to ensure a process is of the type and quality needed and expected by the customer. The focus on this definition provides this task's rationale as it relates to project planning, oversight, and corrective action.

Systematic project planning is central to an integrated quality assurance approach and is fundamental to the success of water quality monitoring projects conducted under the Clean Rivers Program (CRP). It is a process that considers:

- project objectives,
- measurement performance specifications,
- appropriate methods,
- field and laboratory quality control,
- data management,
- verification and validation of data,
- oversight, and
- corrective action.

The CRP uses QAPPs to plan, organize, and define quality assurance processes so data is collected with the level of reliability needed for decision-making. QAPPs for the CRP do not require Environmental Protection Agency (EPA) approval. The TCEQ requires CRP data collection to be comparable to other data collected by the TCEQ, and to be consistent with EPA requirements

CRP QAPPs do not apply to and should not be used for data collection for federally funded programs or projects.

CONTRACT PROVISIONS

QA components are essential to collect valid data and ensure its usability. Certain critical components related to quality assurance are essential to ensure that data produced by the CRP will be of the type and quality necessary for its intended use. These critical components represent the three key aspects of quality assurance: planning, implementation, and oversight. As of the FY2018-2019 biennium, the CRP contracts incorporate the following provisions:

> **All work performed under this Contract must be complete and satisfactory in the reasonable judgment of the TCEQ. All materials and equipment shall be handled in accordance with instructions of the applicable supplier, except as otherwise provided in the Contract.**

All work performed under this Contract that involves the acquisition of environmental data will be performed in accordance with a TCEQ-approved Quality Assurance Project Plan (QAPP) meeting all applicable TCEQ and EPA requirements. Environmental data includes any measurements or information that describe environmental processes, location, conditions, ecological or health effects and consequences. Environmental data includes information collected directly from measurements, produced from models, and compiled from other sources such as databases or literature. No data collection or other work covered by this requirement will be implemented prior

to Performing Party's receipt of the QAPP signed by TCEQ and, if necessary, the EPA. Without prejudice to any other remedies available to TCEQ, TCEQ may refuse reimbursement for any environmental data acquisition performed prior to approval of a QAPP by TCEQ and, if necessary, the EPA. Also, without prejudice to any other remedies available to TCEQ, Performing Party's failure to meet the terms of the QAPP may result in TCEQ's suspension of associated activities and non-reimbursement of expenses related to the associated activities.

Any laboratory data or analyses provided under this Contract must be prepared by a laboratory that is accredited by TCEQ according to 30 Texas Administrative Code Chapter 25, subchapters A and B, unless TCEQ agrees in writing.

The Performing Party will conduct oversight of sub-participants (including contractors and in-kind participants) who conduct field monitoring under their basin QAPP. The assessment will be performed once during the contract cycle in the case of on-going projects, or once during a project's lifetime in the case of short-lived special studies.

APPROVAL TO CONDUCT WORK

Implement all work funded by the contract in accordance with an approved QAPP, including; acquisition of environmental data generated from direct measurement activities, data collected from other sources, data compiled from computerized data bases and information systems, or the analysis and manipulation of any of this data. Limited exceptions may be granted under the conditions described below.

QAPP EXTENSIONS

Time constraints may cause lapses in Basin-wide QAPP coverage at the beginning of a new two-year contract cycle. If no significant changes are planned in the next QAPP, and the new monitoring schedule is approved, the Planning Agency may request a temporary authorization to conditionally proceed with the monitoring plan under the existing QAPP.

The Planning Agency Project Manager must submit an e-mail request for conditional approval to the TCEQ CRP Project Manager before the existing QAPP expires. The TCEQ CRP Project Manager, with the concurrence of the TCEQ CRP Program Manager and the Lead Quality Assurance Specialist (QAS) may grant approval for a maximum of 90 days beyond the expiration date of the existing QAPP.

QUALITY ASSURANCE PROJECT PLANS

The development and implementation of a QAPP helps to ensure:

- projects use a planned approach;
- objectives, roles, and responsibilities of participants are defined;
- measurement systems are defined and appropriate;
- adequate project oversight;
- data verification and validation procedures are specified, thus enabling reconciliation with data quality objectives.

BIENNIAL SUBMITTAL OF BASIN-WIDE QAPPS

SHELLS FOR all CRP QAPP documents ***CAN BE ACCESSED ELECTRONICALLY AT*** HTTPS://WWW.TCEQ.TEXAS.GOV/WATERQUALITY/CLEAN-RIVERS/QA/INDEX.HTML**.** The use of shell documents streamlines QAPP preparation, review, and approval.

Much of the shell language represents CRP and/or TCEQ requirements. Language in standard text format is provided as an example. If actual activities differ from the shell language, discuss these differences with the TCEQ CRP Project Manager and edit the QAPP draft(s) as necessary. Information to be provided by the Planning Agency is highlighted. Italicized instructions and instructions in the comment review layer are provided for the various sections and should be followed and deleted from the document before the QAPP draft is submitted to the TCEQ.

DATA COLLECTION PROCEDURES

The TCEQ *Surface Water Quality Monitoring Procedures* (*Volume I, RG-415* and *Volume II, RG-416*) describes field procedures used for surface water sampling and biological collection for the purpose of submitting data to TCEQ. The QAPP states that the most recent version of the *Surface Water Quality Monitoring Procedures* must be used, including any updates made between revisions. If other SOPs apply, they should be referenced in the QAPP, as appropriate. Do not submit SOPs with the QAPP for TCEQ review unless specifically requested. Make SOPs available to sampling staff for use and to TCEQ staff during an audit.

QAPP MAPS

Include maps in the QAPP and in any amendments involving changes to sampling sites. QAPP maps need to label sampling sites covered under the QAPP, streams, reservoirs, major roads, and cities, as appropriate. The maps are for illustrative purposes only and should include the recommended disclaimer, found in the QAPP shell.

DRAFT QAPPS

Send draft basin-wide QAPPs to the TCEQ CRP Project Manager electronically by June 15 of odd-numbered years. The TCEQ CRP Project manager compiles TCEQ reviewer comments and returns the comments to the Planning Agency Project Manager within 30 days of QAPP receipt. Respond to all TCEQ comments, note how the comment was addressed, or explain why the comment was not addressed. Resubmit a revised amended draft QAPP with all comments addressed within 30 days. QAPP drafts that do not address all reviewer comments may not be accepted by the TCEQ CRP Project manager. Submission of a complete draft that undergoes internal review before submission to TCEQ is essential for a streamlined review. Please be aware that when new content is added in subsequent drafts, the review process may become protracted. Contact the TCEQ CRP Project manager if there are any issues addressing comments to QAPP drafts. The final basin-wide

QAPP is due by August 15 of odd-numbered years. More than one exchange of comments and responses may be necessary to achieve approval to proceed from all parties at the Planning Agency and the TCEQ. **Do not collect signatures or letters of adherence until the TCEQ CRP Project manager indicates the QAPP is complete and ready for final approval.**

Approval, Signature, and Distribution of Basin-Wide QAPPs

After the TCEQ has given approval of the QAPP, submit a searchable .pdf, .doc or .docx version of the QAPP, an .xls or .xlsx version of Appendix A7, and any other additional documents to the TCEQ CRP Project Manager. Email searchable .pdf copies of Planning Agency, Laboratory, and sub-participant signature pages. After Planning Agency, Laboratory, and sub-participant signature pages are received by the TCEQ CRP Project Manager, the TCEQ staff will route a copy for TCEQ signatures. The TCEQ retains one signed copy of the QAPP. The TCEQ Data Management and Assessment staff uploads a final copy of the QAPP to SWQMIS (the Surface Water Quality Monitoring Information System database maintained by the TCEQ), where it is available to users in addition to the electronic data.

Required signatures are designated on the Basin-wide QAPP shell document. Additional signatures can be added as needed (e.g. sub-participants). Laboratory sign off on all QAPPs is to ensure laboratories are involved in the development of QAPPs. Distribute the final, signed QAPP to all appropriate Planning Agency staff, Laboratory staff, and sub-participants. The TCEQ Lead QA Specialist distributes copies to the TCEQ personnel indicated on the distribution list. Secure an acknowledgement of receipt of the QAPP from all signatories. If an entity participates in CRP sample collection and/or analysis and is not a signatory to the QAPP, an adherence letter is required stating the sub-participants' receipt of the document and commitment to requirements contained in the QAPP. **Adherence letters are not required for entities who sign the QAPP.** An example adherence letter is provided in the QAPP shell document. Maintain copies of all acknowledgements of receipt and all adherence letters as part of the project's quality assurance records. **Copies of all adherence letters must be forwarded to the TCEQ no later than 60 days after TCEQ approval of the QAPP, and prior to any monitoring event.**

QAPP Amendments

Project changes requiring QAPP amendments include changes to:

- analytical procedures,
- Table A.7,
- LOQs,
- NELAP Accreditation,
- sampling sites,
- sampling schedule,
- anything that would affect the data generated by the project, or
- project organization, etc.

QAPP amendments are contract deliverables. Submit amendments to the TCEQ on an "as needed" basis but before the changes are implemented. Provide a justification and summary of the changes as specified in the QAPP amendment shell. Also provide the amended QAPP Sections. **Do not implement changes until the amendment is fully executed.** In some cases, a data correction request may also be necessary to correct previously submitted data.

Many QAPP amendments involve changes to address existing activities which have been consistent with program requirements all along and therefore correct information that was not included or was incorrect in the original QAPP. **Do not "backdate" these amendments.** The

QAPP amendment serves as a portion of the corrective action process and should be documented as a part of the corrective action plan (CAP).

Note: If the changes made are funded by Federal programs, you may be required to create a stand-alone QAPP document. Please contact your TCEQ CRP Project Manager about these changes.

Required signatures are designated on the QAPP shell document. Add signatures as needed (e.g., sub-participants).

Signatures may be provided by hand, either by mailed or scanned searchable .pdf files sent from participants to the TCEQ CRP Project Manager, or by electronic review. To streamline the amendment process, there is a procedure for electronic review and approval of some QAPP amendments. The steps for the process are as follows:

1. The Planning Agency e-mails the TCEQ CRP Project Manager an amendment.
2. The TCEQ reviews the amendment. Reviewers at TCEQ include, but are not limited to, the TCEQ CRP Project Manager, the Project QA Specialist, and the Lead CRP QA Specialist review the amendment.
3. TCEQ CRP Project Manager provides comments to the Planning Agency Project Manager or indicates that the amendment can be approved. Steps 1 and 2 may be repeated multiple times before an amendment is approved.
4. If an amendment is ready to be approved, the TCEQ Lead CRP QA Specialist initiates an e-mail “signature page” and sends the e-mail to all signatories.
5. Each signatory "replies to all" for the most recent email indicating approval, providing an email "trail" to show all approvals on a single email thread.

When the TCEQ Lead CRP QA Specialist receives the final approvals, they add a TCEQ approval cover letter with the approval date of the final amendment and e-mails the completed signature page and amendment to the Planning Agency Project Manager or QAO, and TCEQ CRP Project Manager.

The Planning Agency secures adherence letters from affected sub-participants of its QAPP stating the sub-participants’ commitment to requirements contained in the QAPP amendment. An example letter is provided in the QAPP shell document. QAPP adherence documentation should be maintained as part of the project’s quality assurance records. **Forward copies of all adherence letters to the TCEQ no later than 60 days after TCEQ approval of the QAPP amendment, but prior to any monitoring event.** Adherence letters are not required for entities who sign the QAPP amendment.

The Planning Agency distributes QAPP amendments to all personnel on the distribution list. The TCEQ Lead QA Specialist distributes copies to the TCEQ personnel indicated on the distribution list. The TCEQ CRP Project Manager emails a text-recognized copy of the amendment to TCEQ DM&A for upload to SWQMIS.

ANNUAL QAPP UPDATES, INCLUDING APPENDIX B: MONITORING SCHEDULE UPDATE

Because the basin-wide QAPP is effective for two years, the monitoring schedule in Appendix B of the basin-wide QAPP needs to be updated for the second year of the biennium after the annual coordinated monitoring meeting. The Amendment should include a summary of changes to the monitoring schedule, revised maps, and any additional changes to the QAPP that are required at that time. Send the mid-biennium amendment via e-mail to the TCEQ CRP Project Manager by June 15, in the even numbered years. Review comments will be sent to the Planning Agency

Project Manager within 30 days of QAPP receipt. The Planning Agency must modify and resubmit the document within 30 days. The final revision is due by August 15 of even numbered years.

PROJECT OVERSIGHT

A process of oversight and evaluation is necessary to ensure data collection is conducted as planned, and that environmental monitoring projects are successful. Adequate oversight and evaluation of projects ensure:

- work is accomplished in accordance with planning documents;
- data submitted meets programmatic data quality objectives;
- necessary corrective actions are implemented effectively.

Document project oversight requirements in the QAPP, Section C1, Assessment and Response Actions.

PLANNING AGENCY OVERSIGHT REQUIREMENTS

Basin Planning Agencies are also tasked with conducting status monitoring which involves the continual evaluation of programs or projects to ensure they are being conducted as planned and documented. Oversight activities are described in the following sections.
Document oversight activities in quarterly progress reports.

STATUS MONITORING

Status monitoring involves the continual evaluation of programs or projects to ensure they are conducted as planned in the QAPP. This type of oversight is specified in the QAPP to ensure that TCEQ CRP Project Managers perform a continual review of quality assurance activities over the course of the biennium. This type of monitoring may be a formal management review or a less formal review of QA activities. At a minimum, the Planning Agency Project Manager should request a written status of QA activities from staff on a quarterly basis. This includes, but is not limited to Laboratory NELAC Accreditation Status, Deficiencies, and Corrective Actions.

LABORATORY OVERSIGHT

The Planning Agency Project manager is responsible for ensuring any laboratory generating data for the CRP is audited by its laboratory quality assurance staff for conformance to laboratory SOPs, applicable methods, and other specific requirements defined in the applicable QAPP and in its quality system standard. At a minimum, conduct a limited review of laboratory operations associated with verifying that the laboratory is following the QAPP specifications and is providing the needed information for verifying and validating data on a regular basis. Perform this limited-scope review/audit so laboratory-client communications remain open, and the laboratory understands client requirements under the CRP.

SUB-PARTICIPANT OVERSIGHT REQUIREMENTS

Basin Planning Agencies are required to oversee the activities addressed in their QAPPs and must conduct formal audits of all sub-participants who conduct field monitoring. If all work is performed by the Planning Agency (i.e. there are no sub-participants participating in the Basin's CRP program), these audits are not required. Negotiate the timing and scope of oversight activities, and document in the QAPP.

There are two acceptable types of sub-participant field monitoring audits: 1) readiness reviews, and 2) monitoring systems audits. Perform at least one audit at the sub-participant's office, field

station, or other appropriate location at least once during each contract cycle (biennium), in the case of on-going projects; or once during a project's lifetime, in the case of short-lived special studies. A readiness review is appropriate when a new sub-participant or a new contractor is joining the project; it allows project management to assess their understanding of and adherence to applicable guidance for the Clean Rivers Project prior to the initiation of data collection. Readiness Reviews may also be useful in cases of high staff turnover or prior to beginning a special project. Monitoring Systems Audits are appropriate to assess the ongoing conformance of established CRP partners and participants to the CRP guidance.

The Monitoring Systems Audit Checklist is available electronically on the CRP web page at https://www.tceq.texas.gov/waterquality/clean-rivers/qa/index.html . Modify the checklist as needed to accommodate readiness reviews. The Planning Agency reviewer must be familiar with the QAPP, field standard operating procedures, and data management protocols. The individual responsible for ensuring readiness reviews are completed is identified in the QAPP, Section A4 Description of Responsibilities.

READINESS REVIEW

A readiness review is an evaluation to determine if all components of the project are in place before work begins. Readiness reviews are the preferred assessment activity to evaluate a sub-participant's ability to adhere to QAPP requirements and implement any necessary corrective actions before data collection commences. The process is designed to evaluate performance and effectiveness of sampling processes from collection through final result reporting, including (as applicable);

- minimum documentation,
- adequacy of facilities and equipment,
- instrument calibration procedures and logs,
- field measurement procedures,
- sample collection procedures,
- biological sampling procedures,
- sample handling and analysis procedures,
- data verification and validation procedures,
- records handling and retention, and
- data management procedures.

MONITORING SYSTEMS AUDIT

Monitoring systems audits (MSAs) can be performed at any time during the lifetime of a monitoring program or project and are required at least once per biennium. A monitoring systems audit is a thorough and systematic technical systems audit involving an on-site qualitative review of monitoring activities. The auditor examines facilities, equipment, personnel, training procedures, data management, and record keeping for conformance with the QAPP. The goal of a monitoring systems audit is to verify that applicable elements of the quality system are developed, appropriate, documented, and implemented in accordance with project and program specifications. Audits add value to a quality system by promoting and supporting continuous improvement. The audit process is designed to evaluate the sampling process from collection through final result reporting. The Monitoring Systems Audit Checklists can be found on the CRP web page (please see link above). Adapt the checklist as necessary based on the audit scope.

DATA TRACEABILITY EXERCISES

Data traceability exercises document the completion of the quality process from sampling collection through data review and final reporting. Data traceability reviews can be conducted during an MSA to provide oversight of sub-participants that complete any portion of data review and validation. Data traceability exercises may also be performed at any point during the contract period to evaluate data management performance. The data traceability/file review form is on the CRP web page at https://www.tceq.texas.gov/waterquality/clean-rivers/qa/index.html.

REPORT AND RESPONSE

Provide the audited organization with a report within 30 days of a readiness review or monitoring systems audit. The report should state if no negative findings were identified. If negative findings are identified, they must be reported. Reference specific requirement(s) in a primary reference source (the QAPP, SOPs, SWQM Procedures Manual, the CRP Guidance, the CRP Contract and Workplan, etc.), and document the evidence that led to the negative finding. Include additional information regarding the negative findings along with observations. The audited organization must respond to the report in writing within 30 days. Minimum responses require:

- the root cause of the deficiency,
- the effect, if any, on any previously completed or current work,
- proposed corrective action(s) to correct the deficiency,
- action(s) planned to prevent recurrence of the deficiency, and
- date that each action will be or was completed.

A template for the audit response is available at the CRP website here and in the exhibits section of this chapter. Audit reports and responses are deliverables to the TCEQ CRP Project Manager with the quarterly progress report no later than the quarter following the one in which the audit was conducted.

CORRECTIVE ACTION PROCESS FOR DEFICIENCIES

Address issues that may affect data quality. Procedures are in place to help Planning Agencies track, address, and report deficiencies effectively without imposing unnecessary requirements.

Any deviation from the QAPP, SWQM Procedures, SOPs, or Data Management Reference Guide is a deficiency. Deficiencies may invalidate resulting data and may require corrective action. If the deficiency is caught in time to collect replacement samples or reanalyze existing samples, that would be the ideal scenario. Deficiencies are documented in logbooks, field data sheets, etc. by field or laboratory staff. It is the responsibility of the Planning Agency Project Manager, in consultation with the Planning Agency QAO, to ensure that the actions and resolutions to the problems are documented and that records are maintained in accordance with the QAPP. In addition, the TCEQ CRP Project Manager will be notified of these actions and resolutions in the quarterly project progress reports and by completion of a corrective action plan (CAP). In instances where data quality is affected by the deficiency, notify the TCEQ CRP Project Manager within 72 hours.

Planning Agencies must address deficiencies associated with:

- sampling method or design (e.g. samples not preserved in the field);
- sample tracking procedures (e.g. hold times for bacteria samples expired, bacteria samples not collected in sterile bottles);
- analytical method requirements (e.g. post calibrations not performed or laboratory methods changed without QAPP amendment);
- quality control requirements (e.g. blank contamination)
- data traceability (documentation)

Corrective Action Plans should:

- Identify the problem, nonconformity, or undesirable situation;
- Document any immediate remedial actions taken;
- Identify the underlying cause(s) of the deficiency;
- Identify whether the problem is systematic; likely to recur, or occur in other areas;
- Identify personnel responsible for completing corrective actions;
- Establish timelines and provide a schedule for implementation of corrective actions;
- Identify any effected data and determine appropriate data correction procedures; and
- Document the corrective actions completed.

The flow chart in Exhibit 2A: Corrective Action Process for Deficiencies illustrates the CAP process. A basic CAP form is available electronically here (https://www.tceq.texas.gov/waterquality/clean-rivers/qa/index.html) and in Exhibit 2C of this document. Planning Agencies may choose to use the forms provided or devise their own system and set of forms.

Periodic status monitoring ensures CAPs effectively address previous deficiencies and prevent their recurrence.

CAP status is a part of the quarterly progress report deliverable (see Exhibit 2B: Status of Corrective Actions Table). Document deficiencies leading to data loss on Data Summaries when submitting data sets.

DATA REVIEW, VERIFICATION, AND VALIDATION

A well-defined and documented system of data review ensures the validity of data submitted to the TCEQ. The CRP defines and recognizes the two terms **verification** and **validation** as they are part of NELAC terminology. Verification is confirmation by examination and provision of evidence that specified requirements have been met. It refers to the data review processes used to determine data completeness, correctness, and compliance with technical specifications contained in applicable documents (e.g. QAPPs, SOPs, QAMs, analytical methods, NELAC Accreditation). Validation is the confirmation by examination and provision of objective evidence that the particular requirement for a specific intended use is fulfilled. It refers to a specific review process that extends the evaluation of a data set beyond method and procedural compliance (i.e., data verification) to determine the quality of a data set specific to its intended use.

Review all data obtained from field and laboratory measurements, verify for conformance to technical criteria, and validate against performance specifications. Only data supported by appropriate QC data and which meet applicable project specifications are considered acceptable for reporting to the TCEQ and entry into SWQMIS.

Describe the specifics of data review in Section D1 of the QAPP and specify responsible parties in Section A4. Generally speaking, there are levels of review to be performed by field staff and by laboratory staff. Field staff usually review field data, and laboratory staff review laboratory data. Sub-participant Data Managers or QAOs, and Planning Agency Data Managers or QAOs review data after field and laboratory data are combined into a data set.

Develop and use checklists that facilitate data review and address the various levels of review (see Table 1: Verification and Validation Tasks). Develop checklists for field data review that incorporate the various requirements defined in the *Surface Water Quality Monitoring Procedures (RG-415)* and in the QAPP so that the data review tasks associated with field data can be accomplished. Develop a lab data review checklist to facilitate data review, analogous to the checklists used for field data review. Similarly, the Planning Agency should prepare a checklist for use in reviewing the data after the data set is assembled that speaks to data usability.

Document QAPP deficiency or non-conformance s and submit the information to the TCEQ CRP Project manager with any affected data. The Data Summary is the appropriate communication tool between the Planning Agency and the TCEQ CRP Project Manager.

Task 4 discusses data formatting, report generation, and data validation topics.

Table 1: Verification and Validation Tasks*

*** *Insert the position of the person responsible for each task in the table. This table may not contain all the data review tasks being conducted. Please provide all appropriate information for your program.*

Data to be Verified	Field Task	Laboratory Task	QA Task	Lead Organization Data Manager Task
Sample documentation complete; samples labeled, sites identified				
Field QC samples collected for all analytes as prescribed in the TCEQ SWQM Procedures Manual				
Standards and reagents traceable				
Chain of custody complete/acceptable				
NELAP Accreditation is current				
Sample preservation and handling acceptable				
Holding times not exceeded				
Collection, preparation, and analysis consistent with SOPs and QAPP				
Field documentation (e.g., biological, stream habitat) complete				
Instrument calibration data complete				
QC samples analyzed at required frequency				
QC results meet performance and program specifications				
Analytical sensitivity (LOQ/AWRL) consistent with QAPP				
Results, calculations, transcriptions checked				
Laboratory bench-level review performed				
All laboratory samples analyzed for all scheduled parameters				
Corollary data agree				
Nonconforming activities documented				
Outliers confirmed and documented; reasonableness check performed				
Dates formatted correctly				
Depth reported correctly and in correct units				
TAG IDs correct				
TCEQ Station ID number assigned				
Valid parameter codes				
Codes for submitting entity(ies), collecting entity(ies), and monitoring type(s) used correctly				
Time based on 24-hour clock				
Check for transcription errors				

Data to be Verified	Field Task	Laboratory Task	QA Task	Lead Organization Data Manager Task
Sampling and analytical data gaps checked (e.g., all sites for which data are reported are on the coordinated monitoring schedule)				
Field instrument pre- and post-calibration results within limits				
10% of data manually reviewed				

TCEQ OVERSIGHT REQUIREMENTS

TCEQ LABORATORY AND MONITORING SYSTEMS AUDITS

The TCEQ performs audits of Planning Agencies as determined by a risk-based assessment.

Participant and CRP-Associated laboratories are assessed once every two years by their laboratory accrediting body. The audits assess compliance with the NELAC Institute (TNI) standards, and include reviews of facilities, equipment, record-keeping, chain-of-custody records, adherence to approved QA planning documents, and SOPs. The TCEQ CRP Project Manager, Project QA Specialist, and/or Lead QA Specialist may provide input into this process if deemed appropriate by the Laboratory Inspector. Checklists are used to guide the conduct of the audits. Audit findings are reported to TCEQ upper management (Section Manager and above) if significant corrective action is needed. Otherwise, audit reports are maintained by the TCEQ Quality Assurance Team.

Monitoring Systems Audits conducted by the TCEQ will be determined after a risk assessment has been conducted and results ranked. Audits by the TCEQ will be conducted systematically so that all Planning Agencies and laboratories performing work for CRP will be assessed within a three-to-five year period, or more frequently, depending upon several factors (e.g., number of requests for audits, risk factors, findings from previous audits).

SPECIFIC CRP LABORATORY REQUIREMENTS

AMBIENT WATER REPORTING LIMITS (AWRLS)

For surface water to be evaluated for compliance with Texas Surface Water Quality Standards (TSWQS) (30 TAC §307.1 - 307.10) and screening levels, reporting limits for analytical data must be set at or **below** specified levels. To ensure data are analyzed at or below these levels, required reporting specifications (AWRLs) were established by the CRP. The parameters for which AWRLs have been established are available electronically (see https://www.tceq.texas.gov/waterquality/clean-rivers/qa/index.html).

While the AWRL is the program-defined reporting specification for each analyte, most laboratories report data based on the concept of a limit of quantitation (LOQ). A limit of quantitation (is the minimum level, concentration, or quantity of a target variable (e.g., target analyte) that can be reported with a specified degree of confidence. The following requirements must be met to report results to the CRP:

- **The laboratory's LOQ for each analyte must be at or below the AWRL as a matter of routine practice, unless an exception has been granted;**
- **The laboratory must demonstrate its ability to quantitate at its LOQ for each analyte by running an LOQ check sample; and**
- **The requirements for lab control check samples are described in Section B5 of the QAPP shell.**

For certain parameters that are routinely reported close to the LOQ, Laboratory Control Samples (LCS) should be run at the LOQ. These parameters include nutrients and metals in water.

AUTHORIZED LABORATORY METHODS

Analytical methodologies under the CRP are specified in the TSWQS. The TSWQS mandate that procedures for laboratory analysis will be in accordance with:

- The latest version of the *Surface Water Quality Monitoring Procedures (RG 415 and RG 416),*
- 40 Code of Federal Regulations (CFR) Part 136, or
- other reliable procedures acceptable to the TCEQ.

Changes to 40 CFR §136 became effective August 28, 2017. These changes modify the testing procedures approved for analysis and sampling by the Clean Water Act; more information on the most recent changes promulgated may be found at https://www.epa.gov/cwa-methods/methods-update-rule-2017. Requirements for analytical methodologies are specified in the QAPP shell document.

STATISTICAL CONTROL OF PRECISION AND BIAS

Analytical laboratories must have a statistical process in place to review results as applicable to control on-going performance. To generate data for the CRP, the laboratories' control limits must be set and controlled within the bounds set by the measurement performance specifications as defined in Table A7 of the QAPP. Precision is determined by analyzing duplicate samples, which can be either a LCSD, MSD, or sample duplicate; the type of duplicate selected is usually determined by the method. See specifications as defined in Table A7 of the QAPP. The most common method of statistical process control involves the use of control charts as described in *Standard Methods for the Examination of Water and Wastewater* or the EPA *Handbook for Analytical Quality Control in Water and Wastewater Laboratories*. (Computer-generated lists or databases with values, limits, and trends may be used as an alternative to control charts.)

LABORATORY TEST REPORTS

Laboratory test reports (if applicable for routine water quality data analysis) should be clear, unambiguous and, at a minimum, contain the information specified in the TNI Standards. The information required by TNI with test reports is required even if the data are transmitted from the laboratories in event/result format unless the laboratory has valid reasons for not doing so. In addition to the specified information, test reports for the CRP should include project-specific quality control results such as equipment and trip blank results, and bacteria holding time, as applicable. It is important for laboratories to provide narrative information about why results were not compliant with specifications as stated in the "Laboratory Data Review" section of this guidance document. Without this information, Planning Agency data management staff cannot verify and validate data and provide required information on the Data Summary when data are submitted to the TCEQ. Copies of test reports are reviewed during monitoring systems audits. Information regarding standard test report format is contained in the QAPP shell document. Additional information may be requested.

LABORATORY DATA REVIEW

The laboratory's role in the review of CRP data is very important. At a minimum, all laboratory data must be reviewed as described under **"Data Review, Verification and Validation"** in this Task. Laboratories should have SOPs in place to ensure data are free from transcription and calculation errors, all quality control measures are reviewed and evaluated, and project specifications are met. Laboratory data review records must be signed and dated by the analyst reviewer(s) and/or the Laboratory QA Officer.

The use of data review checklists by the laboratory is encouraged. If any requirements or specifications are not met, based on the data review, the laboratory should document the deficiencies and submit the information in the report narrative to the Planning Agency with the data. In turn, this information must be communicated to the TCEQ Project Manager by the Planning Agency in the Data Summary.

WEB SITE DELIVERABLE

Post certain sections of QAPPs on the Planning Agency's CRP Web page to enable the public to know and understand the water quality monitoring being conducted in their basin. Include:

- monitoring programs,
- project objectives,
- measurement performance specifications (i.e., Table A7),
- a link to the coordinated monitoring schedule (CMS) website with disclaimer that states that the CMS includes stations monitored by other entities,
- QAPP amendments, and
- special study appendices.

QUALITY ASSURANCE TRAINING

The CRP encourages all applicable Planning Agency personnel and in-kind contributors to obtain training on topics associated with this task. This is especially critical to ensuring data are collected using TCEQ-approved policies and procedures. Special accommodations may need to be made to ensure in-kind contributors get appropriate training. All non-CRP training events require prior approval to be considered for reimbursement for both training fees and any associated travel expenses. **Itemize all training on quarterly progress reports and include on reimbursement requests accordingly.**

SPECIAL PROJECT PLANNING

All applicable parties, including TCEQ staff, should thoroughly discuss special study and permit support monitoring projects before workplans are finalized. If Basin Planning Agencies intend to conduct multiple special projects under subcontract, they should carefully consider staggering projects over the biennium, with consideration of variable funding. Allocate sufficient time to properly plan and execute the QAPP before data collection and reporting. Adequate data collection, report writing, or other project components may necessitate project components being carried into the next biennium. Determine this before executing the work plan. Considerations for designing monitoring plans are in Task 3 – Monitoring.

The formal project planning process has many benefits. It:

- Promotes communication and input from all involved parties to optimize data collection efforts.

- Ensures data collected are of the type and quality appropriate to their intended use and may support decision making.
- Maximizes existing data use.
- Defines data management conditions, such as data coding, verification and validation, manipulation, and transfer.
- Determines information to be documented in the QAPP appendix to expedite review and approval so projects can begin in a timely manner.

Contact TCEQ CRP Project Managers to indicate intent and desire to conduct a planning meeting. Conduct the planning meeting at least 90 days before the planned sampling date. The TCEQ CRP Project Manager will include appropriate TCEQ staff in planning activities if additional specialized knowledge will aid in the planning process.

The project planning meeting objective is to implement a systematic planning process based on standard QAPP sections. The decisions made during the planning meeting will be incorporated into a Special Study QAPP Appendix.

The Planning Agency Project Manager will play the lead role in respect to planning projects and is responsible for:

- establishing the planning team in consultation with the TCEQ,
- scheduling meetings,
- distributing meeting materials before meetings,
- facilitating meetings, and
- preparation and distribution of meeting minutes.

Include a proposed scope of work with maps of the study area in meeting preparation materials. **Do not begin drafting the QAPP before the meeting**. You may conduct meetings in Austin, at the Planning Agency, or via conference call. The outcome of the planning meeting should be a set of project goals and objectives, and appropriate SWQMIS data codes. Develop a QAPP within 30 days of the meeting. Detailed meeting minutes are a Task 2 deliverable.

QAPP APPENDICES

Appendices are prepared to itemize additional work or projects not initially described in the original QAPP. Planning Agency Project Managers develop appendices in coordination with TCEQ CRP Project Managers, the Project QA Specialist, the Lead QA Specialist and other technical specialists (laboratories, consultants, other agency water programs, etc.), as appropriate. **The CRP QAPP shell does not apply to and should not be used for data collection for federally funded programs or projects.**

SPECIAL STUDY OR PERMIT SUPPORT MONITORING

These QAPP appendices are designed to incorporate special study or permit support monitoring projects into the QAPP as they are planned. Although QAPP appendices are designed to be attachments to the basin-wide QAPP and reference applicable parts, they do need to have specific information addressed that is unique to a project such as: problem definition, task description, project objective, measurement performance specifications, sample design rationale, sampling methods requirements, data management, etc. Include enough information in the QAPP appendix that it functions as a stand-alone document. This information will be addressed during the project planning meeting.

The TCEQ CRP Project Manager tracks the deliverables and forwards QAPP appendices to the Lead QA Specialist for review. After the document has been reviewed by the TCEQ, the TCEQ CRP Project Manager compiles and sends comments to the Planning Agency. The TCEQ is committed

to an expeditious review and approval of these documents and retains the right to review all submissions for up to 30 days. Draft QA documents are not considered approved or completed until all parties have signed the final QAPP appendix.

USE OF ACQUIRED DATA

Data which are not newly generated as part of a project are called “existing,” “historical,” “secondary,” “non-measurement,” “non-direct,” or “acquired” data. Section B9 of the basin-wide QAPP shell document addresses non-direct measurement data sources and specifies, " Non-directly measured data, secondary data, or acquired data involves the use of data collected under another project and collected with a different intended use than this project. The acquired data still meets the quality requirements of this project and is defined [*in this section*]." Historical routine data should not be submitted through the CRP.

In some cases, acquired data will be co-mingled with new data collected under a QAPP. Acquiring data can allow data needs to be met despite time and resource constraints. The use of acquired data may also provide more detailed and exhaustive information than the project could produce otherwise, allowing for a better understanding of the situation. Sources of data include: other projects, databases, reports, etc. The sources and characteristics of acquired data must be specified in Section B9 of the QAPP.

To include acquired data, the Planning Agency should consider and describe the following of the data collection:

- Quality Objectives and Criteria - The original purpose of the data and what QAPP the data were collected under (if applicable) and measurement performance specifications.
- Sampling and Process Design - Sampling locations, dates and times; limitations associated with the data and how these may impact their intended use relative to the project objectives.
- Sampling Methods, Handling and Custody - Chain-of-custody procedures, sample preservation, holding times.
- Analytical Methods - Type of analytical equipment, maintenance, and calibration procedures; laboratory analyst training and capability; sample preparation and methods of analysis.

For CRP projects, it is important to verify that data are consistent with TCEQ requirements, and therefore, comparable to other data, allowing for comparisons. The EPA Guidance document *EPA QA/G-5* provides additional information regarding the use of acquired data and can be found here (https://www.epa.gov/quality/guidance-quality-assurance-project-plans-epa-qag-5).

EXHIBIT 2A

CORRECTIVE ACTION PROCESS FLOW CHART

Corrective Action Process for Deficiencies

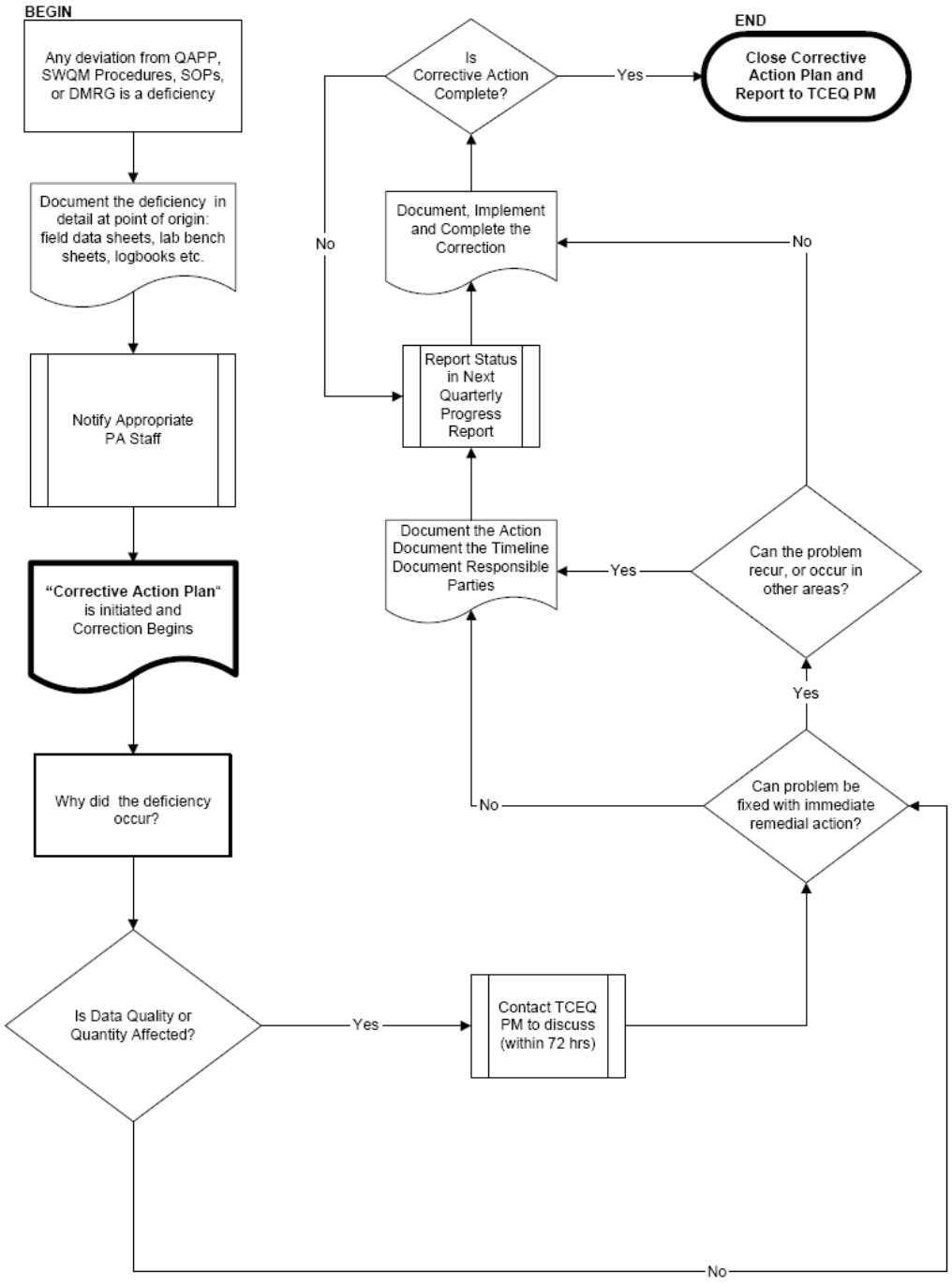

EXHIBIT 2B

CORRECTIVE ACTION STATUS TABLE

EXHIBIT 2B - CORRECTIVE ACTION STATUS TABLE

Corrective Action #	Date Issued	Description of Deficiency	Action Taken	Date Closed

EXHIBIT 2C

CORRECTIVE ACTION PLAN FORM

EXHIBIT 2C - CORRECTIVE ACTION PLAN FORM

Corrective Action Plan
Issued by:_____ Date Issued_____ Report No._____
Description of deficiency *[Clearly describe the deficiency or non-conformance .]*
Root Cause of deficiency *[Clearly state the root cause for the deficiency or non-conformance .]*
Programmatic Impact of deficiency *[Describe the evidence reviewed to determine the impact of the deficiency or non-conformance on the program and/or data. What timeframe was reviewed?* *Was data reviewed for anomalies or step changes? Did the deficiency or non-conformance result in the program not meeting customer requirements?* *Note: A statement of "no impact" to reported data must be supported with a statement that describes exactly what was reviewed and how it was reviewed.]*
Does the seriousness of the deficiency require immediate reporting to the TCEQ? If so, when was it?
Corrective Action to address the deficiency and prevent its recurrence *[What will be done to correct the deficiency or non-conformance ? Were all parts of the finding addressed? Who is responsible for implementation?* *Will procedures or forms be created or revised? Will training be given? (Training is required if procedures/forms are created or revised.)]*
Proposed Completion Date for Each Action *[When will the Corrective Action be completed? If multiple Corrective Actions are proposed, a timeframe (month/year) must be included for each action.* *Is the timeframe reasonable? (Generally speaking, 30-90 days is reasonable. An explanation must be given when more than 90 days are needed.)]*
Individual(s) Responsible for Each Action *[Clearly describe who will do what to address the Corrective Action.]*
Method of Verification *[How will the Corrective Action be documented? If multiple Corrective Actions are proposed, the means to document each action must be included.* *(This corrective action plan is not documentation of the Corrective Action(s). This section must identify the specific document(s) used to document the action, e.g., revised SOP, forms, calendar, training records, etc.)]*

Date Corrective Action Plan Closed?
[This is the date when the Corrective Action Plan has been completed. This cannot be recorded until the Corrective Action Plan is closed.]

EXHIBIT 2D

CLEAN RIVERS PROGRAM AUDIT CHECKLIST

CLEAN RIVERS PROGRAM AUDIT CHECKLIST

This checklist can be used to conduct Clean Rivers Program on-site project oversight and assessment activities. It is designed to evaluate the entire data collection process through final reporting of results, and to detect deficiencies and non-conformances so corrective actions can be taken. Formal oversight, including readiness reviews and monitoring systems audits, of all basin planning agency sub-tier participants is required under the Clean Rivers Program. The checklist is provided in sections and should be modified to fit the scope of either a readiness review, or a monitoring systems audit. Sections can be used by themselves to do an audit targeted towards a very specific function. Following the assessment, the completed checklist should be used to generate a report for use by the auditor and auditee.

Clean Rivers Program Audit Checklist	
Auditing Agency	
Name of Auditor(s)	
Subparticipant	
Date	
QAPP (including amendment number) in effect at time of audit	
Other QAPPs reviewed	

Operation	Yes	No	Comments
Section 1 - Documents (This section requires the examination of completed records. The auditor should record documented evidence in the comment section)			
Is there documentation of QAPP distribution, as required by the basin-wide QAPP?			
Is there documentation of QAPP amendment and appendix distribution, if applicable?			
Are there copies of QAPP adherence letters on record for all sub-tier participants? Or, have sub-tier participants signed the QAPP and amendments?			
Does the Quality Assurance Officer keep a non-conformance record and supervise corrective action procedures as described in the QAPP?			
Have any corrective action reports been generated associated with the current QAPP?			
Has the Quality Assurance Officer verified that training of field staff is documented?			

Operation	Yes	No	Comments
Section 2 - Facility and Equipment (This section requires the examination of completed records. The auditor should record documented evidence in the comment section)			
Does the facility have adequate storage for field sampling equipment?			
What field equipment is available? (specify)			
Are multi-probe instruments stored in temperature controlled environments?			
Are probes and field equipment stored dry, with connectors separated, and open to the air?			
Are multi-probe sensors rinsed upon return from the field, and kept moist during storage?			
Are there thermometers in ovens, incubators, and refrigerators?			
Are thermometer temperatures checked and documented daily (or as required), and are units adjusted?			
Are thermometers calibrated annually?			
Is deionized or other laboratory pure water available? (describe)			
Is DI water conductivity checked and documented daily?			
Are balances and weights calibrated, annually?			

Operation	Yes	No	Comments
Section 3 - Calibration and Maintenance of Field Instruments (This section requires the examination of completed records. The auditor should record documented evidence in the comment section)			
Where are instrument calibrations documented?			
Are calibrations performed in a temperature-controlled environment?			
Are calibration standards stored in temperature-controlled environments?			
Are commercial or prepared standards used for conductivity calibration?			
Are commercial or prepared standards used for pH calibration?			
Are calibration standards used before their expiration date?			
Are buffers and standards dated upon receipt, and when opened?			
What calibration sequence is followed? (Answer - specific conductance, pH, DO)			
Is each sensor allowed to equilibrate for 2 minutes, or until stable, before calibrating?			
Is the multi-probe instrument calibrated with a standard in the range of the specific conductance of water to be sampled?			
Are pH buffers of 4.0 and 7.0 used to calibrate when measuring pH in naturally acidic water?			

Operation	Yes	No	Comments
Are pH buffers of 7 and 10 used to calibrate when measuring pH in naturally basic waters?			
Is DO calibration performed by % saturation?			
Is DO calibration performed by mg/L?			
How is the local barometric pressure determined? (specify)			
Except for coastal areas, how is the local altitude obtained so barometric pressure may be decorrected? (specify)			
During DO sensor calibration:			
a. Is the water level just below the O-ring?			
b. Are water droplets on the membrane removed with a tissue?			
c. Is a lid or cap placed over the calibration cup to limit breezes?			
Are post-calibration checks performed after every sampling run?			
Are post-calibration check limits adhered to?			
Based on the examination of calibration log books, are post-calibration checks acceptable?			
Are records of maintenance documented? Where?			
Explain the routine maintenance conducted on field equipment.			
Are spare parts and/or backup equipment maintained?			

Operation	Yes	No	Comments
Section 4 - Documentation (This section requires the examination of completed records. The auditor should provide documented evidence in the comment section)			
Is field training documented?			
Does the QAO have records of field staff training?			
Are project staff members those documented in the QAPP?			
Is a QAPP distribution list maintained?			
Are documents retained and handled in accordance with the current QAPP?			
Is documentation citing sub-participant commitment to the QAPP maintained?			
Are the TCEQ SWQM procedures Manual, its interim updates, and QAPP available to staff?			
Is there a non-conformance report to log deficiencies?			
Are corrective action reports prepared to address non-conformances?			
Is the monitoring plan in the QAPP followed?			
Are field notebook or log entries made in permanent ink?			
Are field notebook or log errors corrected with a single line strike-out, dated, and initialed?			
Is the field data sheet, or field log used the one specified in the QAPP?			

Operation	Yes	No	Comments
Are the following sample collection activities documented on data sheets, or in field logs:			
a. Station ID?			
b. Location?			
c. Date & time & depth?			
d. Sample collector's name/signature?			
e. Values for all measured field parameters?			
f. Detailed observational data (water appearance, weather, etc.)?			
g. Other observational data, as applicable (biological activity, stream uses, unusual odors, missing parameters, etc.)?			
Is the COC form used consistent with the form in the QAPP?			
Is the following information documented on COCs:			
a. Date and time of collection?			
b. Site identification?			
c. Sample matrix?			
d. Number of containers?			
e. Preservative used?			
f. Analyses required?			
g. Name of collector?			
h. Custody transfer signatures?			
Is each sample transfer documented with a signature on the COC form?			
Are labels affixed to containers, or bottles marked with indelible ink?			
Is the following information labeled on each sample:			
a. Site identification?			
b. Date and time of sampling?			
c. Preservative?			
d. Designation of field-filtered?			
e. Analysis requested?			

Operation	Yes	No	Comments
Section 5 - Field Analysis			
Are in situ or bucket measurements performed on DO, temperature, pH, and conductivity? (In situ measurements should be taken when possible. The auditee should explain why bucket samples are taken.)			
If buckets are used for field measurements, is the bucket shaded from sunlight, and temperature recorded immediately after collection, before the sample warms?			
When measuring conductivity, is the probe placed carefully in the water to avoid the entrapment of air?			
Is salinity reported for estuarine or marine water bodies?			
When measuring field parameters, are sensors allowed to equilibrate for at least two minutes before taking readings?			
At what depth are field measurements taken in water bodies less than 1.5 ft deep?			
At what depth are field measurements taken in water bodies between 1.5 ft and 5 ft in depth?			
Are vertical profiles taken in water bodies >5 ft deep?			
Are DO, temperature, pH, and salinity reported to the nearest tenth place?			
Is conductivity reported to 3 significant figures?			
Is transparency measured using secchi disk? If yes, then:			

Operation	Yes	No	Comments
a. When measuring secchi disk transparency, is the mathematical average computed from the depth at which the disk disappeared and the depth to which it reappeared?			
b. In cases of shallow, clear water bodies, is the secchi disk transparency reported as > the depth of the water body?			
Is transparency measured using secchi tube? If yes, then:			
a. In cases of shallow, clear water bodies, is the secchi tube transparency reported as > the length of the tube?			
Is transparency reported to 2 significant figures?			
Is flow severity reported correctly? (Answer - 1=no flow, 2=low flow, 3=normal flow, 4=flood, 5=high flow, 6=dry)			
When a flow severity of 1 is reported, is the instantaneous measurement of flow reported as “0.0” cfs?			
If the stream bed holds no water and the flow severity reported as 6 (dry) is any value reported for flow? (Answer-no)			
Are days since last significant precipitation recorded? How is this determined?			
If it is raining when samples are collected, what is reported for days since last significant precipitation? (Answer - <1day)			

Operation	Yes	No	Comments
Section 6 - Flow Monitoring			
Are flow measurements performed?			
Is a visual flow estimate made prior to performing the flow measurement?			
What type of flow meter is used?			
Discuss selection of flow measurement sites. Is laminar flow considered?			
If an ideal site is not available, is the cross section modified to provide acceptable conditions?			
How is stream width measured?			
If the stream is <10ft side, how many cross sections are required?(10)			
If the stream >10 ft wide, how many cross sections are required? (20)			
Are velocity measurements made at the mid-point of each cross section?			
Is depth of each cross section determined with a wading rod?			
Where in the cross section is velocity determined?			
How much time is allotted for each velocity determination?			
Are flow calculations correct? (Review computations)			

Operation	Yes	No	Comments
Section 7 - Field Bacteriological Analysis			
Are bacteriological samples collected? E. coli or Enterococcus?			
Are bacteriological samples placed on ice immediately upon collection?			
Are bacteriological samples collected at a depth of 1 foot in a direction away from the sampler?			
What containers are used for bacteriological sample collection?			
Are sample bottles for bacteriological analyses not pre-rinsed?			
Is there head space in the sample container, so that samples may be shaken prior to analysis?			
How and when is sodium thiosulfate added to bacteriological containers?			
Are sample analyzed within the 8 hour hold time?			
Are incubators maintained at 35º ± 0.5º C for Colilert analysis?			
For bacteriological analysis performed in the field:			
a. Are dilutions performed to bracket the concentration?			
b. Is a complete log kept with sample location, dilution, counts, analyst, etc.			
c. Is the initial and final incubator temperature checked and recorded?			
d. Is time in and time out of the incubator checked and recorded?			

Operation	Yes	No	Comments
Section 8 - Sample Collection			
Describe types of samples collected (analyses to be performed).			
Are water samples for parameters collected consistently with the parameters specified in the QAPP, Table A7? (Auditee should itemize samples collected)			
Are samples collected directly from the centroid of flow whenever possible, or is sampling equipment used? (describe)			
Is the sample bucket (if applicable) rinsed 3 times between sites?			
Are sampling containers used, as specified in the QAPP? (describe)			
Are chlorophyll samples collected in amber bottles?			
Is sample preservation, including icing, performed in the field, immediately upon collection?			
If field splits are collected, are they collected for all samples on a 10% basis, at a frequency of no less than once per week?			
Are field equipment blanks collected for metals-in-water samples once per day, or on a 10% basis if more than 10 sample are collected in one week?			
Is quality-assured sample equipment used for metals-in-water samples?			
Are pre-cleaned, certified containers used for metals-in-water samples?			
Is a clean hand/dirty hand approach used for dissolved metals-in-water sample collection and filtration?			

Operation	Yes	No	Comments
Are dissolved metals-in-water samples filtered in the field in a clean room (e.g. box) atmosphere?			
Are dissolved metals-in-water samples preserved in the field? What amount and type of acid is used?			
What type of equipment is used for sediment analysis?			
In cases where wading is possible, is the dredge mounted on a pole rather than on a rope?			
After the dredge has accepted the sediment sample, is the dredge gently tipped to one side, and the overlying water decanted?			
Is the sediment sample deposited in a clean plastic pan for inspection, prior to be put in a container?			
Is only the top aerobic layer or two subsampled and put into the sample container?			

Operation	Yes	No	Comments
Section 9 - Biological Sampling			
Describe the type of biological monitoring performed.			
Describe training of biological monitors.			
Are appropriate staff members included on a current TPWD scientific collection permit?			
Is the field staff in possession of the current permit?			
Are electric shocking and seining employed during all fish surveys?			
Is electroshocking performed for a minimum 15 minutes?			
Are a minimum of 6 seine hauls performed?			
Describe the level of taxonomic identification for fish in comments.			
Describe how voucher specimens are maintained, and questionable specimens are verified in comments.			
Are 100 organism subsamples routinely counted for benthic data if kicknets are used to collect?			
Describe level of taxonomic identification for benthic data in comments.			
Are habitat surveys conducted during each biological event?			
Is instantaneous flow measured and recorded for each biological event?			

Operation	Yes	No	Comments
Section 10 - Sample Receipt/Sample Control			

Does a system exist for logging in samples, and assigning sample ID numbers?			
Is the chain-of-custody record checked to ensure it matches sample labels?			
Are sample containers checked to be sure they are intact?			
Are specified holding times adhered to?			
How are samples stored?			
Is sample access controlled?			
Are samples and standards stored separately?			
Are samples returned to storage at the end of the day?			
Is the temperature monitored in storage units?			
Are samples stored at the temperatures described in the QAPP?			

Operation	Yes	No	Comments
Section 11 - Data Management, verification, and validation			
Who is the Data Manager? What is this person's role in respect to data management?			
Does the data manager keep electronic or physical logs of database activities?			
Who is the QAO? What is this person's role in respect to data management?			
How are field data entered into the planning agency database?			
Who reviews field data for conformance with the TCEQ SWQM Procedures Manual, and QC requirements? How is this review documented?			
Who performs a review of pre-calibration records and post calibration error checks to ensure they comply with error limits? How is this review documented?			
Who checks field data calculations, reductions, and transcriptions? How is this check documented?			
How are lab data entered into the planning agency database?			
Who reviews laboratory data for conformance with QAPP requirements, including sample handling, 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? How is this review documented?			

Operation	Yes	No	Comments
Who checks lab data calculations, reductions, and transcriptions? How is this check documented?			
Who checks to ensure reporting limits are consistent with CRP requirements? How is this documented?			
Who evaluates analytical QC information to determine its impact on individual analyses? How is this documented?			
Who checks to be sure all laboratory samples analyzed for all parameters? How is this documented?			
Who evaluates data sets (field and laboratory) for reasonableness, and for corollary data agreement? How is this documented?			
Who confirms outliers? How is this done? How is this documented?			
Who checks field QC sample results to see they were analyzed, and the results are acceptable? How is this review documented?			
Are sampling and analytical data gaps checked to ensure data are from sites on the coordinated monitoring schedule?			
What role does the project manager play in confirming the reportability of data to the TCEQ?			
What are the verification and validation procedures for entering data from a cooperating partner?			
Does the data manager have review protocols that check for the following: (Explain)			

Operation	Yes	No	Comments
a. Data formatting errors?			
b. Record inconsistencies?			
c. Parameter code violations?			
d. Spelling errors?			
e. Duplicate records?			
f. Key fields lacking information?			
g. Missing values?			
h. Outliers?			
i. Orphans?			
j. Reporting limits not in QAPP?			
k. Stations not in QAPP			
l. Parameter codes not in QAPP?			
Does the laboratory report contain all elements required by the QAPP?			
Are quality-assured data maintained on the planning agency's web site?			
Describe the data correction process.			

EXHIBIT 2E

AUDIT RESPONSE TEMPLATE

AUDIT RESPONSE TEMPLATE

Guidance for the corrective action response is included with each element of the template below to assist the auditee with preparation of a corrective action response. The auditee is not required to submit a corrective action response on this template, but the response must contain the elements presented in the template.

Finding Number:	
Finding:	*(Restate finding from audit report.)*
Root Cause(s):	*(Clearly state the root cause(s) for the deficiency or non-conformance .)*
Programmatic/Data Impact:	*(Describe the evidence reviewed to determine the impact of the deficiency or non-conformance on the program and/or data. What timeframe was reviewed?* *Was data reviewed for anomalies or step changes? Did the deficiency or non-conformance result in the program not meeting customer requirements?* *Note: A statement of "no impact" to reported data must be supported with a statement that describes exactly what was reviewed and how it was reviewed.)*
Corrective Action(s) (CA) to Address the Finding:	*(What will be done to correct the deficiency or non-conformance? Were all parts of the finding addressed? Who is responsible for implementation?* *Will procedures or forms be created or revised? Will training be given? (Training is required if procedures/forms are created or revised.))*
Timetable(s) for Implementation of CA:	*(When will the CA be completed? If multiple CAs are proposed, a timeframe (month/year) must be included for each action.* *Is the timeframe reasonable? (Generally speaking, 30-90 days is reasonable. An explanation must be given when more than 90 days are needed.))*
Means to Document CA:	*(How will the CA be documented? If multiple CAs are proposed, the means to document each action must be included.* *(This corrective action plan is not documentation of the CA(s). This section must identify the specific document(s) used to document the action, e.g., revised SOP, forms, calendar, training records, etc.))*
Action(s) to Prevent Recurrence (APR) of the Finding:	*(What will be done to prevent the deficiency or non-conformance from occurring again?* *Does the APR address the deficiency or non-conformance globally? (e.g., across all similar activity areas, SOPs, equipment, forms, procedures, etc.)* *Is the APR distinctly different than the corrective action to address the finding?*

	Who is responsible for implementation? *Will procedures or forms be created or revised? Will training be given? (Training is required if procedures/forms are created or revised.))*
Timetable(s) for Implementation of APR:	*(When will the APR be completed?* *If multiple APRs are proposed, a timeframe must be included for each action.)*
Means to Document APR:	*(How will the APR be documented? If multiple APRs are proposed, the means to document each action must be included.)*
Verification of Effectiveness:	*(How will the CA and APR be verified for effectiveness?* *Who will verify that the CA and APR are completed? Effective?* *When will verification be completed? How will verification be documented?)*