Water Quality Parameter Sample Collection, Analysis, and Data Reporting under the Lead and Copper Rule

Addendum 3

(Revision 4)

to the

Quality Assurance Project Plan for the Texas Commission on Environmental Quality Public Water System Supervision Program Relating to the Safe Drinking Water Act

Effective

November 10, 2022

List of Acronyms

CFR	Code of Federal Regulations
COC	chain of custody
DQI	data quality indicator
DQO	data quality objective
DWW	Texas Drinking Water Watch
EDD	electronic data deliverable
ID	identification
L	liter
LCR	Lead and Copper Rule
MB	method blank
MDL	method detection limit
MRL	method reporting limit
NTNC	nontransient, noncommunity
NTU	nephelometric turbidity units
TNI	The NELAC Institute
OW	Office of Water
PWSS	Public Water System Supervision
QA	quality assurance
QAPP	quality assurance project plan
QC	quality control
SDWA	Safe Drinking Water Act
SDWIS	Safe Drinking Water Information System
SOP	Standard Operating Procedure
TAC	Texas Administrative Code
WQP	Water Quality Parameter
WQPMF	Water Quality Parameter Monitoring Form
WSD	Water Supply Division

(A) Project Management

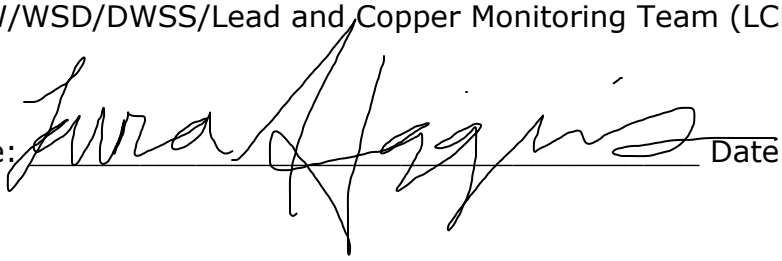
A1 Approval

A1.1 TCEQ

The following individuals are signatories on this Addendum because they are responsible for the management and assurance of quality of the work described.

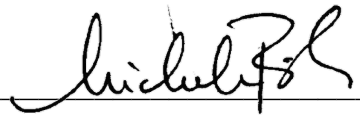
Laura Higgins, Team Leader

TCEQ/OW/WSD/DWSS/Lead and Copper Monitoring Team (LCMT)

Signature:  Date: 09/16/2022

Michele Risko, Section Manager

TCEQ/OW/WSD/Drinking Water Standards Section (DWSS)

Signature:  Date: 09/16/2022

Jessica Hoch, Program Lead Quality Assurance Specialist

TCEQ/Office of Water (OW)/Water Supply Division (WSD)

Signature:  Date: 09/16/2022

A1.2 Laboratory Acknowledgment and Agreement

All laboratories participating in the Public Water System Supervision (PWSS) Program must submit Laboratory Acknowledgement and Agreement documentation. The current version can be obtained on the TCEQ PWSS Program[1] webpage or directly by request to PWSQA@tecq.texas.gov.

[1] www.tceq.texas.gov/drinkingwater/pwss.html

A2 Table of Contents

A3 Distribution

The PWSS Program Lead Quality Assurance Specialist (QAS) ensures the individuals on the distribution list in Section A3 of the Programmatic QAPP document receive a copy of the Programmatic QAPP and Addenda. Redistribution occurs when amendments or revisions are approved and published.

The Team Leader of the Lead and Copper Monitoring Team (LCMT) ensures the QAPP is distributed to the participants specified in Section A4 of this Addendum.

The current, approved version of the PWSS Program QAPP is maintained on the TCEQ PWSS Program[2] webpage.

Note: References to the PWSS Program QAPP include all addenda as a whole document. References to the Programmatic QAPP, for the purposes of the addenda, is a reference to the main QAPP document.

A4 Project Organization

The LCMT oversees activities related to Water Quality Parameter (WQP) sample collection, analysis, and data reporting under the Lead and Copper Rule (LCR). This team is organized within the Drinking Water Standards Section (DWSS) of the Water Supply Division (WSD). Section A4 of the Programmatic QAPP describes roles and responsibilities of key individuals in WSD.

The individuals/groups listed below administer and/or participate directly in activities related to WQP sample collection, analysis, and data reporting.

A4.1 Drinking Water Standards Section

A4.1.1 Lead and Copper Monitoring Team

- Maintains a working knowledge of LCR rules and regulations.
- Issues and maintains standardized requirement documents, procedures, instructions, TCEQ webpages, and forms related to WQP sample collection, analysis, and data reporting.
- Coordinates sample site selection and priorities with Public Water Systems (PWS).
- Provides support and oversees PWS and participating laboratories to ensure adherence to this Addendum.
- Coordinates receipt, QC, and migration of data reported by laboratories. Staff coordinates with accredited laboratories for any corrections needed for data reported.
- Notifies Team Leader if there are deviations from required protocols specified in this Addendum and/or referenced documents and initiates corrective action as required.
- Performs applicable personnel responsibilities per the TCEQ Quality Management

[2] www.tceq.texas.gov/drinkingwater/pwss.html

Plan[3] (QMP), Appendix C.

In addition to the activities described above, the LCMT Team Leader is responsible for maintaining lines of communication with WSD Management related to activities specified in this Addendum, and elevating issues when identified.

Contact information for the Lead and Copper Monitoring Team is located on the TCEQ Lead and Copper Program[4] webpage. A proxy email box is available for all LCR questions at PWSLCR@tceq.texas.gov.

A4.1.2 Drinking Water Quality Team

The Laboratory Approval Coordinator provides guidance to the regulated community regarding the laboratory approval process, maintains the laboratory approval database, and edits, maintains, and publishes the forms and instructions PWSs use to apply for and maintain laboratory approval.

The requirements and process for getting laboratory approval is described on the TCEQ webpage about Public Water System Monitoring Plans[5]. For specific questions about laboratory approval contact the TCEQ at (512) 239-4691 and ask for the Laboratory Approval Coordinator.

A4.2 Public Water Systems (PWS)

- Maintains knowledge and adheres to applicable requirements described in this Addendum.
- Coordinates with the analytical laboratory/facility to ensure it adheres to applicable requirements in this Addendum.
- Ensures proper sample containers and applicable forms and labels from laboratories are provided to samplers.
- Ensures laboratory approval form is on file with the TCEQ prior to collecting WQP samples.
- Provides procedures and training to samplers on how to collect WQP samples, measure pH and temperature in the field, and submit samples to the laboratory per this Addendum and referenced documents.
- Reviews sample documentation after sample collection and verifies forms and labels are filled out accurately and completely; and samples were collected correctly.
- Ensures the laboratory reports results to the TCEQ in the formats, and within required turnaround times, defined in this Addendum.
- Immediately reports deviations from this Addendum to the TCEQ. Works with the TCEQ to address, as applicable.
- Maintains testing records per Section A9 of this Addendum.

Note: In this document "samplers" refers to any person who collects, handles, transports,

[3] www.tceq.texas.gov/agency/qa
[4] www.tceq.texas.gov/drinkingwater/chemicals/lead_copper/lead-copper.html
[5] www.tceq.texas.gov/drinkingwater/monitoring_plans

and relinquishes WQP samples to the laboratory. Depending on the PWS, a single employee may perform all the sample collection and handling steps described. Alternatively, multiple people may be involved, including contracted samplers working on behalf of the PWS. In these instances, samplers act as representatives for the PWS. PWS management is responsible for ensuring all individuals perform work in accordance with this Addendum and applicable rules.

A4.3 Laboratories

A laboratory performing work under this addendum is responsible for implementing the following requirements.

- Maintains TNI accreditation with TCEQ in the drinking water matrix or TCEQ laboratory approval (as applicable) for approved methods.
- Adheres to laboratory requirements described in the approved methods, 5th Edition EPA *Manual for the Certification of Laboratories Analyzing Drinking Water* (MCLADW), and this Addendum.
- Signs and submits adherence documentation.
- Receive, analyze, and report WQP sample results per this Addendum.
- Reports deviations from this Addendum to TCEQ immediately and initiates corrective actions as required.
- Maintains WQP testing records per Section A9 of this Addendum.

A5 Problem Definition/Background

Congress passed the SDWA in 1974 to protect public health by regulating the nation's public drinking water supplies. The SDWA authorizes the EPA to set national health-based water quality standards for drinking water to protect against both naturally-occurring and man-made contaminants. The EPA issued the LCR in 1991 and most recently published the LCR Revisions (LCRR) in 2021 with an initial compliance date of 2024. WQP monitoring is a component of the LCR with the most recent list of parameters published in state rule in 2017. These LCR WQP requirements increase public health protection by identifying potential corrosivity of water that could affect lead and copper results within the distribution system. The TCEQ implements the SDWA via a primacy agreement with the EPA to maintain a PWSS Program consistent with federal regulations.

The LCR sets action levels for lead of 0.015 mg/L and copper of 1.3 mg/L at consumer taps. Exceedances are based on the 90th percentile of sample results. Following the identification of lead or copper action level exceedances by the TCEQ, PWS are required to collect WQP samples from entry points and the distribution system. Note that this is not the only reason for collection of WQP samples.

As warranted, PWS use the WQP sample results (and/or those from initial routine and reduced monitoring) to submit a source water treatment recommendation, an optimal corrosion control treatment designation, a corrosion control study, and/or an optimal water quality parameter recommendation. Forms and guidance documents related to

action level exceedances are located on the TCEQ Lead and Copper Program[6] webpage.

As one part of its primacy agreement, the TCEQ WSD is responsible for determining PWS compliance with requirements related to drinking water standards contained in 30 TAC §290 Subchapter F: Drinking Water Standards Governing Drinking Water Quality and Reporting Requirements for Public Water Systems. This Addendum describes the technical and quality related activities related to the sample collection, analysis, and reporting of water quality parameter compliance data.

A6 Project/Task Description

Under this Addendum, water quality parameter samples are collected, analyzed, and data is reported to the TCEQ's WSD to determine if data is in compliance with regulations. TCEQ implements the LCR in accordance with 30 TAC §290.117: Regulation of Lead and Copper and WQP monitoring under this project includes the parameters (and analyte codes) listed below.

- total alkalinity (1927)
- calcium (1919)
- conductivity (1064)
- pH (field measured) (1925)
- temperature (field measured) (1996)
- chloride (1017)
- total hardness (1915)
- iron (1028)
- manganese (1032)
- sodium (1052)
- sulfate (1055)
- total dissolved solids (TDS) dried at 180° C (1930)
- silica - if a corrosion inhibitor containing silica is used (1049)
- orthophosphate - if a corrosion inhibitor containing phosphate is used (1044)

WQP monitoring is a component of the LCR and is implemented in accordance with Texas state rule 30 TAC §290.117: Regulation of Lead and Copper. WQP results are used to determine the corrosivity of water, and if needed, to help determine what corrosion control measures are needed. For most systems that require treatment, corrosion control is the primary mechanism for reducing lead and copper levels.

All new PWS, all large PWS (>50,000 population), and any size PWS that exceeds a lead or copper action level are required to conduct WQP monitoring. There may be additional circumstances in which a system would be required to collect WQP samples. For example, systems must notify the TCEQ if there is a change in treatment or source water. TCEQ may require additional monitoring to ensure changes do not result in the production of corrosive water.

[6] www.tceq.texas.gov/drinkingwater/chemicals/lead_copper/lead-copper.html

Systems may also be required to perform optimal water quality parameter (OWQP) monitoring after the installation of corrosion control treatment. This Addendum will be used to guide the collection, analysis, and reporting of all WQP monitoring described in this addendum, including:

- after installation of corrosion control treatment
- after the designation of OWQP ranges
- after the sampling frequency for OWQP monitoring is reduced

The TCEQ notifies the PWS (who will inform the laboratories) when this monitoring is required and outlines the required analytes, sample locations, and monitoring frequency.

WQP samples collected for compliance are delivered to TCEQ accredited laboratories who have agreed to adhere to the requirements of this QAPP (See Section A4.3). Some WQP analytes are not required to be analyzed at accredited laboratories and instead are analyzed by TCEQ approved entities (See Section A8.2). Laboratories and/or TCEQ approved entities analyze the samples according to approved methods and report the results to TCEQ. TCEQ staff manage data reported, make compliance determinations, and communicate requirements that must be taken based on results reported.

This Addendum specifies requirements for WQP sample collection, sample analysis, and data reporting by project participants described in Section A4 of this Addendum. To use WQP data collected under the LCR, all participants must comply with the requirements and specifications described.

A7 Quality Objectives and Criteria for Measurement Data

The TCEQ's objective for implementation of the Lead and Copper Rule is consistent with the overall objective of the SDWA to protect drinking water and public health. Consequently, as the state's environmental agency, TCEQ can provide better protection of the health of all Texas citizens currently served by PWS and all those who consume water from the systems. The specific objectives related to water quality parameter sample data as described below reflect the objectives specified in the Programmatic QAPP document.

Objectives and Project Decisions

The following data quality objectives apply to the sample collection, analysis, reporting, and use of lead and copper water quality parameter data. A combination of management oversight, peer review, staff training, experience, staff coordination, standardized review processes, data and documentation quality control checks, and strict adherence to monitoring timeframes ensure the data quality objectives described below are met.

PWS use the WQP data generated under this Addendum to implement corrosion treatments as needed, to control drinking water concentrations of lead and copper. TCEQ uses the data generated under this Addendum to determine PWS compliance with the LCR for water quality parameter monitoring, and, if warranted, require treatment technique actions or public notification in order to safeguard public health. To meet this objective, the requirements (i.e., methods, procedures, specifications, etc.) in this Addendum are followed to ensure the water quality parameter data produced for this project possess the attributes (i.e., Data Quality Indicators (DQIs)) listed below. These terms are defined in

Section A7.1 of the Programmatic QAPP document.

- sensitivity
- bias
- precision
- comparability
- completeness
- representativeness
- data integrity
- compliance

In order for the TCEQ to accurately evaluate and use WQP data for the purposes described above, they must be of known and verifiable quality as determined by the DQIs listed Section A7.1 of the Programmatic QAPP document (i.e., accuracy, representative, etc.). Measurement performance and acceptance criteria are addressed in Section B5 of this Addendum.

A8 Special Training Requirements/Certification

A8.1 Personnel Training/Certification

Staff on the TCEQ Lead and Copper Monitoring Team possess the experience and training necessary to perform the tasks listed in Section A4 of this Addendum. The TCEQ maintains staff training documentation as specified in Section A8 of the Programmatic QAPP document.

The TCEQ provides training to PWS and laboratories on various aspects of lead and copper compliance and sample collection, analysis, and data reporting at training events throughout the year including the TCEQ Public Drinking Water Conference[7]. Following these events, the TCEQ makes the training materials/presentations available on the TCEQ Lead and Copper Program[8] webpage.

Additional training resources can be found through TCEQ's YouTube channel and the Drinking Water Advisory Workgroup (DWAWG)[9] webpage.

PWS management ensures that samplers are trained to collect and handle WQP samples and measure field parameters in accordance with applicable rules and this Addendum. PWS management also ensures samplers possess the necessary license and laboratory approvals, as applicable.

A8.2 Laboratory Approval / Accreditation

Laboratories and PWS facilities that analyze and report WQPs (including field measurements of pH and temperature) are either accredited or approved for the methods

[7] www.tceq.texas.gov/drinkingwater/conference.html
[8] www.tceq.texas.gov/drinkingwater/chemicals/lead_copper/lead-copper.html
[9] www.tceq.texas.gov/drinkingwater/dwawg

they use in accordance with 30 TAC §290.117(h)(4) and §290.119. PWS must ensure the analytical laboratories/facilities they use meet these criteria.

All PWS and laboratories (as applicable) must obtain approval from the TCEQ to ensure appropriate, approved methods are used when collecting WQP samples. The requirements and process for getting laboratory approval is described on the TCEQ webpage about Public Water System Monitoring Plans[10].

Information on laboratory accreditation is provided in Section A8 of the Programmatic QAPP document and on the TCEQ Laboratory Accreditation[11] webpage.

Procedures related to laboratory accreditation are not addressed within the PWSS Program QAPP.

A9 Documents and Records

Documents that specify quality-related instructions and requirements of the PWSS Program are consistent with regulatory requirements and are designed to serve their intended use per the TCEQ QMP, Chapter 5. Records also fulfill regulatory requirements and are prepared and maintained to reflect the required quality described in Section A7 of the Programmatic QAPP.

Section A9 of the Programmatic QAPP describes the TCEQ quality-related documents and records, by environmental data operation and in general, related to the PWSS Program QAPP.

A9.1 QA Project Plan Distribution

The process for distributing the QAPP is described in Section A3 of this Addendum.

A9.2 PWS Documents and Records

PWS documents and records associated with LCR WQP monitoring may include, but are not limited to, the items below.

- Monitoring Plan
- Drinking Water Laboratory Approval Form, Form 10450
- WQP Monitoring Form, TCEQ Form 20679 (WQPMF)

PWS samplers are highly encouraged to utilize a WQP Sampling SOP for collection of compliance samples. The LCMT has developed an example SOP that can be found on the TCEQ Drinking Water Lead and Copper Program[12] website.

PWS samplers complete the label and forms listed above as part of the water quality parameter sample collection process and submit them with the samples when

[10] www.tceq.texas.gov/drinkingwater/monitoring_plans
[11] www.tceq.texas.gov/agency/qa/env_lab_accreditation.html
[12] www.tceq.texas.gov/drinkingwater/chemicals/lead_copper/lead-copper.html

relinquishing them to their laboratory. These processes are described in Section B3 of this Addendum.

PWS maintain records associated with WQP monitoring. PWS maintain copies of documents and completed records, as well as results/ reports per 30 TAC §290.46(f).

A9.3 Laboratory Documents and Records

Laboratory documents and records specific to WQP analysis include, but are not limited to, the items listed below.

- Laboratory QA manuals and SOPs.
- Sample receipt documentation and records (including those listed in Section B3).
- Sample preparation and analysis bench sheets.
- Data review and verification records.
- Analytical test reports.

Accredited laboratories maintain laboratory documentation and records per the TNI Standard and other internal procedures. At a minimum, the laboratory maintains related accessible records for a minimum of five years from generation of the last entry in the record. Adequate information is available to reconstruct the final results for compliance purposes. Changes in ownership, mergers, or closures of laboratories do not eliminate these requirements.

The laboratory will notify the PWS before disposing of records which are less than five years old so they may request copies, if needed. This includes all records pertaining to data produced and reported. If the laboratory changes its computer hardware or software, it must make provisions as required by the TNI standard, for ensuring prior data is retrievable. Approved laboratories/facilities and PWS maintain documentation and records related to WQP monitoring and analysis as specified in 30 TAC §290.46(f).

(B) Data Generation and Acquisition

B1 Sampling Design

The LCR requires that all community and nontransient, noncommunity PWS collect WQP samples at entry points to the distribution system and/or at representative points throughout the distribution system as specified in 30 TAC 290.117. WQP monitoring includes the analytes listed in Section A6 of this Addendum.

Information about WQP sample designs (i.e., monitoring locations and sample frequency is located on the TCEQ Lead and Copper Program[13] webpage. WQP samples are collected at sites described in PWS monitoring plan.

The TCEQ communicates to PWS notifying them of specific WQP monitoring requirements following action level exceedances, after the designation of optimal water quality

[13] www.tceq.texas.gov/drinkingwater/chemicals/lead_copper/lead-copper.html

parameter ranges, and after the requirement for OWQP monitoring is reduced. The communication outlines the required analytes, sample locations, and monitoring frequency. Sample schedules, including the number of samples required and timing of sampling, are always available on Texas Drinking Water Watch[14].

B2 Sampling Methods

The PWS is responsible for collecting WQP samples at entry points to the distribution system and at representative sampling locations throughout the distribution system.

Initial and routine WQP samples, including field measurements, must be collected in the presence of an individual holding a valid water operator's license. Optimal WQP samples, including field measurements for pH and temperature, must be collected by an individual holding a valid water operator's license.

Sample collection instructions are included in the TCEQ document *Public Water System Guidance for Water Quality Parameter Monitoring and Sample Collection*[15] located on the Lead and Copper webpage. The instructions contain information that samplers need to:

- properly collect a sample with sufficient volume for all analyses.
- Laboratories may supply a multiply containers to ensure adequate volume.
- measure pH and temperature in the field.
- fill out the required WQPMF.

Samples are collected in laboratory-grade plastic containers provided by the laboratory. A volume of water sufficient for the laboratory to conduct analysis of all necessary parameters is required. This may require more than one container for each sample site. Containers must be provided by the laboratory without preservative.

Two sample containers may be used for each sample site. When collecting two containers, together they count as one sample. The laboratory may provide a single sample container of sufficient volume for all analyses. The laboratory will then split the sample in-house, preserving a portion of the sample for metals analysis.

The TCEQ has developed an example Sampling SOP to assist PWS with documentation of their procedures that is titled Water Quality Parameter Sampling Example Standard Operating Procedure[16] and located on the Lead and Copper webpage.

This SOP contains the information that samplers should follow to properly measure pH and temperature in the field, collect samples in the proper containers (Section B8), handle samples, complete required documentation, and submit samples to the laboratory.

B3 Sample Handling and Custody

This section of the QAPP provides specific sample custody requirements related to WQP

[14] www.tceq.texas.gov/goto/dww
[15] www.tceq.texas.gov/drinkingwater/chemicals/lead_copper/lead-copper.html
[16] www.tceq.texas.gov/drinkingwater/chemicals/lead_copper/lead-copper.html

sample collection and includes information on standardized forms, signature requirements, sample labels, preservation, sample acceptance, rejection, etc.

B3.1 Sample Handling

Proper sample handling and custody is a joint responsibility of PWS and laboratories to ensure sample integrity and allow samples to be traced from the time of collection until reporting. Samplers handle WQP samples and release custody to the laboratory. This section of the QAPP specifies field preservation and laboratory requirements for documentation and sample receipt.

Field Preservation

Immediately after sample collection, samplers thermally preserve WQP samples by placing them in coolers, on ice. This is described in the Water Quality Parameter Monitoring and Sample Collection Instructions and the example WQP Sampling SOP. Laboratories determine the acceptability of thermal preservation if the arrival temperature range is above freezing to 6°C.

B3.2 Sample Custody

B3.2.1 Sample Label

Laboratories or PWS may design sample labels and provide them with the sample containers. The PWS may also write the sample label information directly on the bottle.

Sample labels must contain the following information.

- PWS ID number
- Date and time of sample collection
- Address/location where the sample was collected
- Sampler signature (or initials)

Samplers legibly record the required information with indelible ink on each sample at the time of sample collection.

B3.2.2 WQP Monitoring Forms (WQPMF 20679 or OWQPMF 20955)

The TCEQ WQPMF may replace the laboratory's COC Form, to avoid multiple forms. In this case, the receipt and relinquish information and the sample condition upon receipt must be completed on the WQPMF / OWQPMF. If a laboratory utilizes a separate COC, they must submit both documents at the time of reporting as described in Exhibit 1.

Laboratories provide PWS samplers with a WQP Monitoring Form for them to complete after collecting their samples and measuring pH and temperature within 15 minutes of sample collection. PWS samplers are required to complete and submit a WQPMF with their samples. When samples are delivered to the laboratory, pH and temperature results for each sample must be included on the WQPMF. The TCEQ WQPMF and instructions are located on the TCEQ Lead and Copper Program[17] webpage.

Laboratories are encouraged to provide the instructions for the WQPMF that are found on page two of the TCEQ Form. The instructions guide the PWS and laboratory on the expected information in each field.

The TCEQ designed its WQP Monitoring Form to meet federal and state reporting requirements specific to the SDWA. It captures information required for compliance sampling that a laboratory might not routinely include on their own Chain of Custody (COC) forms. Laboratory-designed forms must resemble the TCEQ form's layout (for data validation purposes), include all information listed below, and be approved by the TCEQ prior to use. The TCEQ can provide laboratories with the TCEQ form to use as a template.

Laboratory-modified forms are not official TCEQ forms; therefore, laboratories must remove the TCEQ form number from their forms. Laboratories shall direct requests and questions about modifying forms to the PWSS Program Lead Quality Assurance Specialist.

[17] www.tceq.texas.gov/drinkingwater/chemicals/lead_copper/lead-copper.html

WQPMF Requirements:

PWS Information

- PWS name, PWS ID number, PWS Address, PWS contact name and phone number
- Sample type indicator – Compliance or non-compliance
- Sample Collector – The sampling entity and approved lab number (pH and temperature must be approved)
- Inhibitor or stabilizer indicator
  - WQP Form: orthophosphate, silica, calcium carbonate
  - OWQP Form: NA
- Sampling Information
  - Question – Are temperature and pH included on the sampling entity's laboratory approval form on file at the TCEQ? Y or N
  - Question – Were pH and temperature measured in the field upon sample collection (i.e., within 15 minutes of sample collection)? Y or N
  - Sampling acknowledgement statement and name/signature/organization/date/time of authorized PWS representative

Individual Sample Information:

- Facility ID Number
  - DS01 for distribution system
  - PBCU0## for entry point
- Sample Point ID
  - DSTWQP for distribution system
  - EWQP for entry point
- Sample location
- Collection date (MMDDYY)
- Collection time (24 hour – HHMM)
- Sample pH
- Sample temp (°C)
- Replacement indicator
- Original sample ID Number (for previously rejected samples)
- Original sample collection date (for previously rejected samples)
- Relinquish by signature lines

Laboratory Information

- Laboratory name and address
- TCEQ Laboratory ID number
  - This is the nine-digit Laboratory Accreditation ID number, minus the last four digits.
  - Example: T123456789, see note below
- Laboratory contact name and contact phone number
- Laboratory sample ID for each sample
- Parameters requested for each sample

- Sample condition records (e.g. check boxes) to document:
  - Sample collected in appropriate containers, unpreserved, iced or ambient
  - Actual/corrected sample temperature
  - Thermometer ID number
- Laboratory comments/Rejection Code (if applicable)
- Received by signature lines

Note: The TCEQ Laboratory ID Number on the top right-hand corner of the WQPMF is a laboratory specific, ten-digit ID number associated with SDWIS. It is the same as the NELAP Accreditation Number, minus the last four digits. Use of this TCEQ Laboratory ID for reporting will be required starting January 2023.

B3.3 Sample Acceptance

B3.3.1 Laboratory Sample Receipt

After completing the required documentation described above, PWS samplers deliver the WQP sample(s) to the laboratory and relinquish custody to a laboratory sample custodian or designee. The laboratory custodian carefully inspects the sample(s) and sample documentation at the time of receipt for any issues, which if unresolved, may necessitate sample rejection as described in the following sections. After the sample custodian inspects and approves the sample and sample documentation, the PWS and the laboratory custodian sign and date the WQP Monitoring Form and/or the COC with the date and time it was delivered.

If appropriate staff are not present to receive the samples, they are locked in a designated area of the laboratory to prevent tampering. Samplers make a log entry identifying the samples that were delivered, the date and time of delivery, and where and how the samples were delivered and secured. Laboratory staff may then receive custody by noting in a logbook the absence of evidence of tampering, unlocking the secured area, signing the logbook, and then receiving and inspecting the sample and documentation as described.

B3.3.2 Sample Rejection at the Time of Receipt

Samples that are improperly collected, handled, or documented are rejected by the laboratory as described in this section. The reasons a laboratory rejects samples at the time of receipt include the issues associated with rejection codes listed in Table 6.

- sample issues
- exceeds holding time
- insufficient sample volume
- invalid container
- frozen sample
- broken container
- leaked in transit
- Improper preservation (e.g., samples requiring thermal preservation, not delivered

to the laboratory in coolers on ice; or samples delivered to the laboratory already acid-preserved)
- Temperature or pH not measured in the field. (Use rejection code "IP", See Table 6)
- documentation issues
- insufficient information (missing or incomplete fields)
- PWS representative signature (missing)
- invalid date/time
- discrepancies between the completed WQPMF and sample label
- illegible

Laboratories should assign laboratory sample ID numbers to rejected samples and report them to TCEQ with rejection codes as described in Exhibit 1. This enables replacement samples to be tied back to the original sample. Replacement samples must be collected before the end of the assigned monitoring period.

Laboratories reject samples because of the sample issues listed above. However, PWS and laboratories should try to resolve documentation issues at the time of receipt, if possible, to avoid the unnecessary recollection of samples or PWS monitoring or reporting violations. If documentation issues cannot be resolved, as described, laboratories will reject the samples.

If laboratories request that PWS correct documentation issues at the time of sample receipt, the laboratory ensures that the PWS initials and dates the correction. Laboratories do not correct or complete PWS portions of documentation. It is the PWS' responsibility to complete each form, make corrections (as applicable), and sign and date the form. The form cannot be modified without TCEQ approval, after it has been received, signed, and dated by the laboratory. See section on WQPMF corrections below.

If a laboratory rejects a sample outright at the time of receipt, the laboratory custodian records the rejection code on the WQPMF and further explains the reason in the laboratory comments section, if needed. The laboratory requests a replacement sample while the PWS is still on the premises; if possible, or otherwise, as soon as possible to ensure samples are recollected within the monitoring period.

Laboratories must assign laboratory sample ID numbers to rejected samples and report them to TCEQ with rejection codes as described in Exhibit 1. This enables replacement samples to be tied back to the original sample. Replacement samples must be collected before the end of the assigned monitoring period.

WQPMF Corrections

Correction of documentation errors that are not identified at sample receipt must be approved by the TCEQ prior to making updates to the WQPMF.

WQPMF errors identified by TCEQ during data review will result in sample rejections using the Agency Rejected (AR) rejection code. TCEQ may contact the PWS with instructions on how to correct the WQPMF if the correction is allowed. TCEQ data review and correction approvals are performed in accordance with the "Monitoring Form Corrections" SOP for the Drinking Water Standards Section of the TCEQ Water Supply Division.

If instructed by TCEQ, the PWS representative will line out the incorrect information, initial and date the correction and write "corrected" at the top of the form. The corrected form will be resubmitted to the laboratory by the PWS. The laboratory will submit the corrected Electronic Data Deliverable (EDD) and Analytical Report to TCEQ as soon as possible.

WQPMF errors and documentation issues identified by the laboratory after sample receipt should be rejected and reported to TCEQ in accordance with this section, Table 6 and Exhibit 1.

The laboratory should notify the PWS as soon as possible if samples are rejected and recollection is required. Timely notification allows for successful recollection and reporting. Samples with WQPMF errors identified by the laboratory or TCEQ may be rejected with no opportunity to correct the WQPMF.

Some WQPMF corrections are not permitted after receipt. They include, but are not limited to:

- Missing Date/Time
- Missing Sample Location
- Missing PWS ID # and PWS Name
- Missing sample type
- Changes in sample type (compliance to noncompliance and vice versa)

B3.3.3 Sample Preservation

Thermal Preservation

Laboratories determine the acceptability of thermal preservation if the arrival temperature range is above freezing to 6°C. Samples delivered to the laboratory on the same day as collection may not meet the temperature requirements; however, if the samples are received in a cooler and on ice, they are considered acceptable.

Acid Preservation

Analysis of total hardness and metals (calcium, iron, manganese, and sodium) requires preservation (acidification) at the laboratory. Analysis of nonmetals (total alkalinity, chloride, conductivity, sulfate, total dissolved solids, and orthophosphate or silica (depending on the inhibitor used)) does not require acid preservation.

Procedures for acid preservation are further described in Section B4.

B3.3.4 Sample Holding Time

Holding time refers to the maximum time that samples may be held after the sample is collected until analysis and still be considered valid. Laboratories cannot report valid sample results in cases in which the regulatory holding times have been exceeded. The method or regulatory holding times for WQPs are listed below.

- calcium, iron, manganese, sodium, and hardness—6 months (after acid

preservation)

- chloride, sulfate, conductivity—28 days
- alkalinity—14 days
- TDS—7 days
- silica (analyzed only if PWS uses silica inhibitor)- 28 days
- orthophosphate (analyzed only if PWS uses a phosphate inhibitor) - 48 hours

Samplers are directed to submit samples immediately following collection, so that the laboratory can analyze all samples within each of their regulatory holding times. When receiving WQP samples, laboratories must be mindful of the regulatory hold times of all parameters. If the laboratory needs to reject a sample because one of the parameters exceeds the holding time, the laboratory must reject the entire sample and request a replacement. WQPs must be collected and run as a set to be able to use the results for corrosion control treatment and evaluation. Reporting deadlines and requirements are a determining factor when the laboratory accepts compliance samples for processing, analysis, and reporting to TCEQ. See Section B10 of this Addendum for required reporting information.

B3.3.5 Sample Volume

A volume of water sufficient for the laboratory to conduct analysis of all necessary parameters is required. This may require more than one container for each sample site.

WQPs involve fully flushed samples. Samplers are directed to collect these samples by filling each laboratory supplied container to approximately 1 inch of the container top. This allows the laboratory to (1) shake the sample(s) adequately prior to use and (2) ensures the laboratory has enough sample to run all analyses and required QCs.

If the sample is overfilled (no headspace), the laboratory has the option of pouring the sample into a bigger analyte-free container in order to shake it adequately before use. If the sample is underfilled (slightly), the laboratory can determine at the time of receipt, if there is adequate volume to run all the analyses; if not the laboratory must reject the sample and request a replacement.

B3.3.6 Sample Receipt when Single Samples are Analyzed by Multiple Laboratories

WQPs samples are often analyzed by multiple laboratories (i.e., pass-through, subcontracted, etc.). The process for transferring samples and reporting results from multiple laboratories is described in this section by way of the following example. Laboratory agreements regarding the process for acid preservation are further described in B4 Analytical Methods.

Example: Samplers collect samples and measure pH and temperature in the field. They take the sample to an initial receiving laboratory (sometimes in-house) where parameters such as alkalinity and conductivity are analyzed. The remaining sample with the original and new WQP Monitoring Form (see next paragraph) is then relinquished to a commercial laboratory to complete the required analyses.

To transfer a sample, the receiving laboratory generates a new WQPMF. The receiving laboratory strikes through the PWS portion of the new form and writes "Refer to original WQP Monitoring Form." The receiving laboratory gives the second laboratory both the original form and the new form with the sample(s). The second laboratory will record its laboratory-specific information on the new form, including its TCEQ laboratory ID Number, its sample ID number(s), and checks the analyses it will run. The second laboratory will transfer both the original WQPMF and the new WQPMF to the TCEQ with the PDF of the analytical test report package described in Exhibit 1.

All aspects of this document apply to both laboratories including, but not limited to, sample receipt, custody transfer, sample rejection, approved methods, reporting, records maintenance, and corrective action.

B4 Analytical Methods

WQP samples are analyzed using EPA approved methods specified in the PWS' Monitoring Plan and Laboratory Approval form(s). The sampler measures and documents temperature and pH in the field at the time of sample collection using approved methods.

Laboratory Analysis Methods

B4.1 Allowable Methods

Laboratories analyze samples in the laboratory using approved methods. All WQP samples collected for LCR compliance must be analyzed using TCEQ-accredited or TCEQ-approved methods (as applicable). Methods used must be approved by the EPA under the SDWA for LCR compliance. These methods are subject to change at any time as methodology and technology advance.

Samplers and laboratories are responsible for maintaining Laboratory Approval for the methods they use. Laboratories are responsible for maintaining accreditation under the drinking water matrix for the methods they use. A s applicable, laboratories are responsible for maintaining laboratory approval for the methods they use.

For current information on EPA approved methods for compliance with the LCR, refer to the Code of Federal Regulations (CFR) Title 40, Part 141[18]. A summary of EPA approved analytical methods[19] is available on EPA's website.

Methods accepted for LCR compliance under this addendum meet the following criteria. A summary of this information is available in Table 1.

- Approved by EPA for analysis under the LCR per https://www.ecfr.gov.
- Included in current TCEQ Fields of Accreditation[20] for Drinking Water listed on the TCEQ Laboratory Accreditation webpage.
- Included in the current TCEQ Laboratory Approval Form, as applicable.

[18] www.ecfr.gov/current/title-40/chapter-I/subchapter-D/part-141
[19] www.epa.gov/dwanalyticalmethods/approved-drinking-water-analytical-methods
[20] www.tceq.texas.gov/agency/qa/env_lab_accreditation.html

- Conform to the analytical sensitivity requirements

For any questions related to method acceptability, please reach out to PWSQA@tceq.texas.gov.

Table 1. Analysis Requirements

Parameter	**Units** [EDD Units]	**Approval/ Accreditation Requirement**
Temperature	°C [C]	Approval
pH	pH units [PH]	Approval
Alkalinity-$CaCO_3$	mg/L [MG/L]	Approval
Calcium-Ca	mg/L [MG/L]	Approval
Conductivity	umhos/cm [UMHO/CM]	Approval
Ortho phosphate-P	mg/L [MG/L]	Approval
Silica	mg/L [MG/L]	Approval
Chloride	mg/L [MG/L]	Accreditation
Hardness-$CaCO_3$	mg/L [MG/L]	Accreditation / Approval[1]
Iron	mg/L [MG/L]	Accreditation
Manganese	mg/L [MG/L]	Accreditation
Sodium	mg/L [MG/L]	Accreditation
Sulfate-SO4	mg/L [MG/L]	Accreditation
TDS (dried at 180°C)	mg/L [MG/L]	Accreditation

1. Hardness can be calculated using Standard Methods 2340 B. This requires TCEQ Laboratory Accreditation for magnesium and TCEQ Laboratory Approval for calcium and hardness.

If a laboratory is accredited for a method which requires "approval" as indicated in the last column above, then the accreditation substitutes for the TCEQ approval requirement.

B4.2 Analytical Requirements

Acid Preservation

PWS sampling staff submit samples to the laboratory for the analysis of calcium, iron, manganese, sodium, and hardness at the laboratory as soon as possible and within 14 days of sample collection. The laboratory acid preserves these samples (or aliquots of samples) for the analysis of calcium, iron, manganese, sodium, and hardness at the laboratory within 14 days of sample collection as specified in Table 2.

When multiple laboratories (i.e., pass-through, subcontracted, etc.) are performing WQP analyses, the initial receiving laboratory should acid preserve the sample to ensure the 14-day preservation requirement is met. If laboratories engage in routine subcontracting practices, they may establish a differing process for which laboratory will perform the acid preservation. The process should account for any time constraints that may be encountered by the subcontracted laboratory regarding the 14-day preservation

requirement. This agreed subcontracting process should be documented.

For most waters, 0.15% nitric acid ($HNO_{3)}$ will result in a pH <2. Therefore, a 500 mL sample can be automatically preserved in lab with 1.5 mL (with adjustments for other sample sizes) of 1+1 nitric acid. All standards must be made with the same acid concentration. In some extreme, high-alkalinity cases, more acid may be necessary.

Following acidification, the sample is mixed, held for 16 hours, and then verified to be pH <2 just prior to withdrawing an aliquot for processing or "direct analysis." If the sample pH is verified to be >2, more acid is added and the sample held for at least 16 hours until verified to be pH <2.

Table 2. Sample Containers and Preservation

Parameters	**Notes**	**Preservation**
pH and temperature	Field measurements	NA
Calcium, iron, manganese, sodium, hardness	Laboratory grade plastic	Conc. HNO_3 to pH<2 in laboratory
Alkalinity, conductivity, sulfate, TDS, and orthophosphate (if applicable) or silica (if applicable)	Laboratory grade plastic	Cool, 4°C
Chloride	Laboratory grade plastic	None required

Digestion of Metal samples

For the "direct analysis" of total recoverable metal analytes in drinking water samples containing turbidity of less than one nephelometric turbidity units (NTU), the laboratory must treat an unfiltered acid preserved sample aliquot using the sample preparation procedure described in the method while making allowance for sample dilution in the data calculation. For the determination of total recoverable analytes in aqueous samples where turbidity is greater than one NTU, sample digestion is required using the procedure described in the method. Samples processed in this way and those "directly analyzed" are reported to the TCEQ using the same analyte codes as those not digested. See Exhibit 1.

Hardness

Hardness can also be calculated according to Standard Methods 2340 B. This requires TCEQ Laboratory Accreditation for magnesium and TCEQ Laboratory Approval for calcium and hardness.

Analytical Sensitivity

Analytical sensitivity refers to the ability of an analytical instrument and/or method to detect and analyze small concentrations of analyte. This is numerically characterized by the determination of detection limits, reporting limits, and blanks. Laboratory quality control requirements are described in Section B5.

As applicable, laboratories report the results of analytical sensitivity determinations/checks (MDLs, blanks, and MRLs) to the TCEQ with their analytical test reports as specified in Exhibit 1.

B4.3 Rejecting Samples at the Time of Analysis

Laboratories may reject samples at the time of analysis if they encounter sample issues that do not allow them to begin or complete an analysis. The reasons are associated with rejection codes listed in Table 6.

Possible issues include, but are not limited to, the following issues:

- Exceeds holding time
- Lab accident
- Lab error/Lab QC failure
- QA/QC issue
- Reporting limit not met

The laboratory must notify the PWS on the day it detects the issue and rejects the sample or sample result (or the next business day, if after hours) so the PWS can collect another sample as soon as possible within the monitoring period. The laboratory reports "rejections" to the TCEQ at least weekly as described Exhibit 1.

B5 Quality Control

Laboratory Analysis Quality Control Requirements

Laboratories run QC checks with WQP samples and conform to the frequency requirements and acceptance criteria defined in analytical methods and other relevant laboratory standards and procedures. This includes the corrective actions for out-of-control data.

Method Detection Limit (MDL)

The MDL, which is also known as the Limit of Detection, is the minimum concentration of an analyte that can be identified, measured, and reported with confidence that the analyte concentration is greater than zero. MDLs are determined according to method requirements.

Minimum Reporting Limit (MRL) and MRL Verifications

MRLs are equivalent to the lowest non-zero calibration standard in a multi-point calibration curve, as applicable. Laboratories must run a laboratory fortified blank every analysis day and not report WQP results at levels less than the level at which they routinely analyze their lowest calibration standard.

This check is known as an MRL verification. An MRL verification consists of a sample of deionized water free from the analytes of interest spiked with verified known amounts of analytes or a material containing known and verified amounts of analytes at or near the MRL. It is used to assess the performance of the measurement system at the lower limits of analysis. The acceptance criteria for MRL verification checks must comply with internal laboratory criteria and be documented. The laboratory must locate and fix problems with MRL verifications before continuing, if results are out of control.

Method Blank (MB)

The MB is a sample of matrix similar to the batch of associated samples that is free from the analytes of interest and is processed simultaneously with the samples through all steps of the preparation and analytical procedures. MBs are analyzed at a rate of once per preparation batch. The MB is used to document contamination from the analytical process. Results of MB analyses must either be less than the MDL or be less than or equal to $1/10^{th}$ of the concentration measured in the sample.

B6 Instrument/Equipment Testing, Inspection, and Maintenance

B6.1 Field Measurement Instruments/Equipment

Samplers should maintain pH and temperature instruments/meters according to their internal WQP Monitoring SOP and in accordance with method and manufacturer

requirements. The LCMT has developed an example WQP Monitoring SOP[21] that is available on the TCEQ Lead and Copper webpage under the Water Quality Parameter heading.

B6.2 Laboratory Analysis Instruments/Equipment

Laboratories maintain instruments according to analytical methods, laboratory procedures, and as applicable, the TNI Standard.

B7 Instrument/Equipment Calibration and Frequency

B7.1 Field Measurement Instruments/Equipment

Samplers calibrate pH and temperature equipment/meters according to method requirements, manufacturer instructions, and internal procedures.

B7.2 Laboratory Analysis Instruments/Equipment

Laboratories calibrate instruments/equipment according to analytical methods, laboratory procedures, and as applicable, the TNI Standard.

B8 Inspection/Acceptance Requirements for Supplies and Consumables

B8.1 Field Sampling Supplies and Consumables

Sample Containers

Laboratories provide samplers with preservative-free, laboratory-grade plastic containers prior to sampling. Usually, laboratories provide two containers for each sample to be collected. This is because the analysis of total hardness and metals (calcium, iron, manganese, and sodium) requires acid preservation acidification at the time of laboratory receipt. Analysis of non-metals (total alkalinity, chloride, conductivity, sulfate, TDS, and orthophosphate and silica) does not require preservation. When collecting two containers, together they count as one sample.

In lieu of multiple containers, laboratories may provide a single sample container of sufficient volume for all analyses. Laboratories then split the sample in-house, preserving a portion of the sample for metals analysis.

Prior to distribution, laboratories ensure and document that all containers are free from the analytes of interest by providing either pre-certified containers or lot-tested sample containers.

[21] www.tceq.texas.gov/drinkingwater/chemicals/lead_copper/lead-copper.html

Other Field Supplies and Consumables

PWS inspect and accept supplies and consumables (other than the sample bottles described above) according to the analytical method and their WQP Sampling SOP.

B8.2 Laboratory Analyses Supplies and Consumables.

Laboratories inspect and accept supplies and consumables (other than the sample bottles described above) according to approved analytical methods and other relevant laboratory standards and procedures.

B9 Non-Direct Measurements

WQP monitoring does not include the acquisition of non-direct measurement data.

B10 Data Management

The management of WQP data from the time it is generated in the field until it is reported to the TCEQ and the PWS is a shared responsibility of the PWS and the laboratory. The sections below summarize the record keeping, document control, and data review and entry requirements of these two parties. The data management protocols described in this section ensure data are reported accurately and in a timely manner; as well as comply with regulatory and programmatic requirements.

TCEQ staff on the Lead and Copper Monitoring Team use the data after it is received from the laboratory to make corrosion control decisions. The steps TCEQ staff perform to process and analyze the data prior to use are described in Section B10 of the Programmatic QAPP document.

B10.1 PWS

Following the measurement of pH and temperature at each sample site (tap or entry point) and the collection of a sample at each site, samplers record (or finish recording) all required information (see Section B3) on the sample label, the WQPMF, and the laboratory COC (if applicable). Then they review all documentation to ensure all information is completely and accurately reported. Samplers then deliver the sample(s) and documentation to the laboratory for analysis and relinquish them, per the required holding time described in Section B3 of this Addendum.

B10.2 Laboratory

Upon receipt at the laboratory, the laboratory reviews the sample label, the WQPMF, and the COC, if applicable, per Section B3 of this Addendum and any other relevant laboratory sample receipt procedures. After analyzing the samples and performing QC on the data, the laboratory provides results to both the TCEQ and the PWS.

The laboratory compiles and reports the following results and data and information to the TCEQ in the following formats which are described in Exhibit 1.

- EDDs

- sample and result rejections
- data resubmittals
- analytical report data packages

The specifications and requirements for data reporting are included in Exhibit 1.

Laboratories must report data in a timely fashion to ensure compliance with the LCR. Samples must be analyzed as soon as possible after receipt and within 28 days of collection.

Sample and result files shall be submitted together to the TCEQ at least weekly.

B10.3 TCEQ

Compliance WQP data reported to the TCEQ under the LCR is managed within the Safe Drinking Water Information System (SDWIS) database. The database is used to determine compliance with monitoring requirements for each PWS.

All records associated with PWS compliance, including laboratory analysis reports, are submitted to the Central File Room in accordance with TCEQ Records Management and Retention policies described in the TCEQ QMP and Agency Operating Policies and Procedures.

B10.4 Falsification and Fraud

Falsification of the WQPMF or analytical results or tampering with water samples used for compliance with the SDWA is a crime punishable under state and/or federal law. [Texas Penal Code, Title 8, Chapter 37.10] By signing the WQPMF, the water system acknowledges that the water samples were collected according to the PWS' established sample collection procedures, and that all information on the form is accurate. Evidence of falsification or fraud is turned over to the TCEQ Environmental Crimes Unit for investigation.

(C) Assessment and Oversight

C1 Assessments and Response Actions

Assessments and oversight associated with lead and copper compliance monitoring are discussed in Section C1 of the Programmatic QAPP. Types of TCEQ audits and oversight applicable to this Addendum include the following activities.

- project oversight
- peer review and coordination
- laboratory accreditation audits

C1.1 Corrective Actions (CA)

All project participants (i.e., laboratory, TCEQ) involved with work associated with this QAPP are responsible for identifying deficiencies when there are nonconformances with

required procedures specified in it, including referenced documents. Deficiencies may be identified internally or externally during the performance of routine work or during audits and oversight, such as:

- Routine quality control procedures
- Observations
- Audits
- Management reviews
- Feedback from customers

Most nonconformances are not "deficiencies" as addressed in this section. Project participants routinely encounter, document, and correct technical or procedural nonconformances at the point of origin using established procedures. These nonconformances are documented at the point of origin and are maintained with the applicable project records.

However, the level of corrective action described in this section may be warranted if established procedures don't prevent a situation from recurring, if the error is a unique nonconformance, or if it is determined to be a significant deviation.

C1.1.1 Deficiencies Requiring a Corrective Action Plan (CAP)

Deficiencies are nonconformances that cannot be corrected by established procedures and will require actions to be defined and documented in a corrective action plan (CAP). Upon detection of a deficiency, project participants are responsible for notifying their management.

Deficiencies requiring a CAP may be identified and initiated by a project participant or a CAP may be requested by the PWSS Program Lead Quality Assurance Specialist, or designee.

When deficiencies are identified by the laboratory or contractor, the TCEQ must be notified of the circumstances by email within 24 hours. CAPs must be documented and submitted to PWSQA@tceq.texas.gov within 14 days of notification.

Deficiencies requiring a CAP may involve, but are not limited to, the following:

- Integrity of results are jeopardized
- Intentional misrepresentation of data or information
- Nonconformances with state or federal regulations
- Repeat nonconformances or deviations from standard practices
- Result in significant recollection of samples

The preparation of CAPs is assigned to appropriate staff by managers (e.g., laboratory, contractor, TCEQ) who are responsible for assuring that CAPS are:

- Appropriately prepared, reported, implemented, and verified effective.
- Implemented in ways that will most likely eliminate the problem and prevent recurrence.

- Forwarded to PWSQA@tceq.texas.gov within 14 days of initial notification.

The PWSS Program Lead Quality Assurance Specialist, or designee, receives and reviews CAPs to determine if actions planned to resolve the deficiency are acceptable, provides feedback on any items determined to be insufficient, tracks reported CAPs, and may monitor implementation. Appropriate staff may be designated to review and track corrective actions that are not deemed significant, as described in C1.1.3.

If CAPs submitted by a laboratory are determined to be unacceptable, the PWSS Program may withhold samples until such time that an acceptable CAP is submitted.

Note: If a laboratory is required to issue an amended analysis report as part of a CAP, they are required to submit a copy to TCEQ in electronic form. All corrected reports and data must be clearly marked to identify them as "corrected" or "revised" and shall include the reason for the correction. Electronic data must be clearly identified as corrected in order to avoid duplicated data in the database of record.

C1.1.2 Required Content for a CAP

The procedure for preparing a CAP following the identification of a deficiency begins with an investigation to determine the root cause(s). Procedures for CAPs are specified in laboratory, contractor, or PWSS Program SOPs. Management selects and implements CAPs that will most likely eliminate the problem, prevent recurrence, and are appropriate for the magnitude and degree of risk of the deficiency.

CAPs must include the following information:

- Description of the deficiency
    - What happened, how was it identified, and the date identified?
- Root cause
    - What was the underlying cause? Why did the deficiency occur?
- Programmatic or data impact(s)
    - How did the deficiency affect data or program decisions and what was reviewed (including timeframe) to determine the impact?
- Corrective action taken
    - What was done to correct the deficiency?
- Timeline for corrective action(s)
- Documentation
    - How will the corrective action(s) be documented?
- Actions to prevent recurrence
    - What actions will be taken to prevent the deficiency from occurring again? These must be distinctly different from the corrective actions.
- Timeline for action(s) to prevent recurrence
- Documentation
    - How will the preventative action(s) be documented?
- Verification of effectiveness
    - Who will verify effectiveness, when will verification occur, and how will verification be documented?

The TCEQ QA Program has developed a standardized template form that may be used,

TCEQ QAF-005. This template can be accessed through the TCEQ Quality Assurance[22] webpage under the Corrective Action Process section. The form is also available by request at PWSQA@tceq.texas.gov.

C1.1.3 Significant Deviations

The PWSS Program Lead Quality Assurance Specialist determines whether an identified or reported deficiency is a significant deviation as defined by, but not limited to, any of the following:

- It jeopardizes the integrity of results or conclusions.
- Results in non-conformance with state or federal regulations.
- Was associated with the intentional misrepresentation of data or information.

The Lead Quality Assurance Specialist will forward information related to CAPs for significant deviations as described within the Programmatic QAPP, Section C1.1.3.

C1.2 Authorization to Stop Work

TCEQ management will authorize work stoppage if conditions are identified that indicate compliance is in jeopardy or if primacy requirements are not being met. The PWSS Program Lead Quality Assurance Specialist, Grant Manager, or TCEQ QA Manager may also request a work stoppage.

C2 Reports to Management

This section documents how the TCEQ program staff keeps TCEQ management, and the EPA informed of project oversight and assessment activities and findings. This information is provided in Section C2 of the Programmatic QAPP document.

(D) Data Validation and Usability

D1 Data Review, Verification, and Validation

In order to use the data generated under this Addendum for corrosion control and treatment, they are reviewed at multiple levels to ensure they are of known and verifiable quality and adhere to the DQIs specified in Section A7. This involves both the verification and validation of data as described below.

Data verification involves the evaluation of completeness, correctness, and conformance of both field and laboratory data to the criteria and specifications defined in this Addendum and referenced procedures, methods, standards, etc.

Data validation extends the evaluation of data beyond method and procedural compliance (i.e., data verification) to determine the quality of each specific data set. The validation of WQP data is a responsibility of the TCEQ Lead and Copper Monitoring Team. The criteria

[22] www.tceq.texas.gov/agency/qa

TCEQ staff use to validate data are discussed in the Programmatic QAPP document.

D2 Verification and Validation Methods

Prior to relinquishing WQP samples to the laboratory, samplers inspect each individual sample to verify it was properly collected and handled, and is intact (i.e., not leaking, not broken, within prescribed holding times, properly filled, etc.). Samplers also review the sample documentation and verify the data and information on the sample label; the WQPMF; and the COC form, if applicable; is correct and complete. Samplers perform this process manually by checking each sample and documented item against the requirements defined in this Addendum (Section B3). PWS correct documentation issues prior to relinquishing samples and monitoring forms to the laboratory. This includes the recollection of samples, if necessary.

Laboratories review and verify proper documentation and sample collection at the time of receipt (Section B3) and the time of analysis (Section B4) to be sure they are intact, properly collected, and within holding times. Laboratories address issues as described in Sections B3 and B4.

Prior to reporting sample results, laboratories also verify and document the results and associated information against the criteria and requirements defined in this QAPP and referenced documents. Laboratories perform this process manually and/or electronically depending on the laboratory. Laboratories verify their data according to internal SOPs for reviewing and verifying data.

Following receipt of submissions, TCEQ validates water quality parameter data including EDDs and analytical test reports (See Exhibit 1) to determine their acceptability for compliance determinations and other uses. The procedures TCEQ staff follow to validate data are discussed in the Programmatic QAPP document.

D3 Reconciliation with User Requirements

The data and information collected under this Addendum conform to the user requirements defined by regulations, rules, and TCEQ requirements related to WQP sample collection, analysis, and reporting. Conformance to this Addendum ensures that the TCEQ can use the data for determinations related to corrosion control. Only data and information that have been validated by TCEQ staff as discussed in the Programmatic QAPP document is used for these determinations and EPA reporting. Qualified WQP data are not used for corrosion control decisions.

Exhibit 1 Reporting Requirements and Specifications

This exhibit contains the requirements and specifications for microbial compliance data quality control and reporting.

E1.1 Reporting Periods

All compliance data must be reported to the TCEQ. Compliance samples must never be changed to non-compliance samples once they have been submitted to the laboratory for analysis.

This exhibit summarizes the laboratory reporting requirements for WQP sample results. For the TCEQ to successfully receive and use the data, laboratories must comply with the requirements in this Exhibit related to the following data/reports.

- EDDs
- Sample rejections
- EDD resubmittals
- Analytical report data packages

Reporting Periods: Federal and state rules require that all data be received within the TCEQ reporting period (i.e., no less than 10 days after the end of the monitoring period). PWSs whose data is not received by the regulatory deadline will be subject to monitoring violations. All WQP data must be submitted to TCEQ by the deadlines specified in Table 3.

Table 3. Reporting Periods

Monitoring Period	Monitoring Date Range	Reporting Deadline
Annual	January 1 - December 31	January 10
6 Month Period 1	January 1 – June 30	July 10
6 Month Period 2	July 1 – December 31	January 10
Action Level Exceedance	June 1 – November 30	December 10

Sometimes the individual WQPs from a single facility are analyzed by different laboratories as described in Section B3.3.6 of this Addendum. The reporting deadlines apply to all of the data from all the required parameters. In addition, certain reporting requirements apply as described below in this Exhibit.

E1.2 EDD Reporting

The EDD is the primary reporting tool for laboratories to report WQP data (including pH and temperature) to the TCEQ for upload to SDWIS. Electronic data is submitted to TCEQ typically using MS Access, in two separate files – Sample and Result. Laboratories submit Sample and Results files together **at least weekly** to lcrdata@tceq.texas.gov. The Sample and Result file requirements are explained in the following sections. The TCEQ can provide the laboratory with a "test" database if requested.

Electronic File Naming Convention

Laboratories submit electronic data to the TCEQ using the following file naming convention.

Lab Name_WQP_date of submittal (formatted as ddMMMyyyy)

An example of this naming convention's use is as follows: LABNAME_WQP_19MAR2022

Submitting Multiple Files

If multiple submissions are reported from a laboratory in a single day, follow the examples below, as applicable.

Example of multiple submissions in one day submitted from a single location:

LABNAME_WQP_19MAR2020_A
LABNAME_WQP_19MAR2020_B

Example of multiple submissions in one day submitted from a single laboratory entity at multiple locations:

LABNAME_WQP_19MAR2020_EMPLOYEE INITIALS
LABNAME_WQP_19MAR2020_EMPLOYEE INITIALS_A

Sample Table

The Sample file contains information about the sample, including collection date and time, sample type, sample location, sample collector, etc. Table 4 specifies the contents, format, and structure for this file.

Laboratories should report one record per sample. Fields must be in the order listed in the table below and each field may or may not contain data. All fields (except those marked with an "N/A") must contain either a text or numeric value for every sample taken. Except for the "Comment" field, these fields must contain only alpha-numeric characters, as designated in field descriptions. Those fields marked as "N/A" shall be left blank. The laboratory must report the field measurement results of pH and temperature in this table. Capital letters must be used for all fields- the only exceptions are the Sample Collector's name, location address and comment fields.

An EDD must be generated for all rejected samples and results. Pass-through laboratories are indicated in [B_SAMPLE_COMMENTS] in the sample file.

Table 4. Sample File Contents, File, and Structure

No.	Field Name	Description	Data Type	Field Size
1	FILE_NAME	Default to "sample"	Text	6
2	B_RECORD_ID	Auto number, unique	Auto	7
3	B_LAB_SAMPLE_NUM	Laboratory sample ID number	Text	20
4	B_STATE_SAMPLE_NUMBER	N/A		
5	B_PWS_NUMBER	PWS ID number, preceded by "TX"	Text	9

6	B_REPLACEMENT_INDICATOR	"Y" if sample replaces a previously rejected sample, otherwise defaults to "N". If "Y," populate field 24, 25, 37, 38	Text	1
7	B_LABORATORY_CERTIFYING_AGENCY	"State" if accredited/approved by TCEQ, "Federal" if certified by EPA	Text	7
8	B_LABORATORY_CERTIFICATION_ID	TCEQ Laboratory ID Number	Text	10
9	B_WSF_STATE_ASGN_ID	Examples: DS01= Samples taken in distribution system PBCU001, PBCU002, etc. = samples taken at entry points	Text	12
10	B_SAMPLING_POINT	Examples: "EWQP" = entry point "DSTWQP" = distribution system	Text	12
11	B_SAMPLING_LOCATION	Address of sample point	Text	40
12	B_SAMPLE_CATEGORY	"GE" = General; default for water quality parameters	Text	2
13	B_COMPLIANCE_INDICATOR	"Y" for yes	Text	1
14	B_COLLECTION_DATE	Collection date as text in the following format – MMDDYYYY	Text	8
15	B_COLLECTION_TIME	Collection time (24 hour clock) as text HHMM	Text	4
16	B_SAMPLE_TYPE	"RT" = routine for WQPs	Text	2
17	B_REPEAT_LOCATION	N/A		
18	B_LAB_RECEIPT_DATE	The date the lab received the samples as text MMDDYYYY	Text	8
19	B_COLLECTOR_NAME	Sample collector name	Text	40
20	B_SAMPLE_VOLUME	N/A		
21	B_LEAD_COPPER_SAMPLE_TYPE	N/A		
22	B_SAMPLE_REJECTION_REASON	Rejection Code if applicable, see Table 6	Text	2
23	B_COLLECTION_METHOD_C	N/A		
24	B_ORIGINAL_LAB_SAMPLE_NUMBER	Populate with original laboratory sample ID number if sample is a replacement for a previously rejected sample	Text	11
25	B_ORIGINAL_COLLECTION_DATE	Populate with original collection date if sample is a replacement for a previously rejected sample	Text	8
26	B_LAB_COMPOSITE_NUMBER	N/A		

27	B_COMPOSITE_DATE	N/A		
28	B_FREE_CHLORINE_RESIDU	N/A		
29	B_TOTAL_CHLORINE_RESID	N/A		
30	B_SAMPLE_WATER_TEMPERATURE	Populate with *field measured* temperature in °C, whole numbers	Number	2
31	B_TEMPERATURE_UNIT_MEA	"C"	Text	1
32	B_TURBIDITY_MEASURE	N/A		
33	B_PH_MEASURE	Populate with *field measured* pH	Number	Doubl
34	B_FLOW_RATE	N/A		
35	B_SAMPLE_PURPOSE	N/A		
36	B_STATE_CLASSIFICATION_CODE	"WQP"	Text	3
37	B_ORIGINAL_LABORATORY_CERTIFYING_AGENCY	"State" if accredited by TCEQ or approved by the TCEQ,"Federal" if certified by EPA (if replacing a previously rejected sample)	Text	7
38	B_ORIGINAL_LABORATORY_CERTIFICATION_ID	TCEQ Laboratory Certification ID Number (if replacing a previously rejected sample)	Text	10
39	B_SAMPLE_COMMENTS	Comments related to the entire sample.	Text	255
40	B_COLLECTION_ADDRESS	Address of sample point. This is a repeat Line 11 - B_SAMPLING_LOCATION	Text	200

Result Table

The Result file contains the individual analyte results. Table 5 specifies the contents, format, and structure for this file.

In the case of WQP reporting, there are multiple result files for each sample file. A result file is only created if a result is available. If an entire sample is rejected and not analyzed, no result records shall be reported with the sample record.

Fields must be in the order listed in the table below and each field may or may not contain data. All fields (except those marked with an "N/A") must contain either a text or numeric value for every sample collected as designated in field descriptions. Text must utilize capital letters. Those fields marked as "N/A" shall be left blank.

Table 5. Result File Content, Format, and Structure

No.	Field Name	Description	Data Type	Field Size
1	B_FILE_NAME	Default to "result"	Text	6
2	B_RECORD_ID	Auto-number, unique	Auto	7
3	B_LAB_SAMPLE_NUM	Laboratory sample ID number, unique	Text	20
4	B_COLLECTION_DATE	Collection date as text MMDDYYYY	Text	8
5	B_PWS_NUMBER	PWS ID number, precede number with "TX"	Text	9

6	B_LABORATORY_CERTIFYING_AGENCY	"State" if accredited by TCEQ or approved by the TCEQ, "Federal" if accredited by EPA	Text	7
7	B_LABORATORY_CERTICATION_ID	TCEQ Laboratory ID Number, check with TCEQ for laboratory unique number	Text	10
8	B_ANALYTE_CODE	alkalinity (1927), calcium (1919), chloride (1017), conductivity (1064), hardness (1915), iron (1028), manganese (1032), sodium (1052), sulfate (1055), TDS (1930), orthophosphate (1044), silica (1049)	Text	4
9	B_ANALYSIS_START_DATE	Date analysis is started as text in the following format: MMDDYYYY	Text	8
10	B_ANALYSIS_START_TIME	Time analysis is started as text in the following format: HHMM	Text	4
11	B_ANALYSIS_COMPLETE_DATE	Date analysis ends as text in the following format: MMDDYYYY	Text	8
12	B_ANALYSIS_COMPLETE_TIME	Time analysis ends as text in the following format: HHMM	Text	4
13	B_STATE_NOTIFY_DATE	Date data is reported to TCEQ as text in the following format: MMDDYYYY. If the data is rejected and returned for correction, use the original submission date when re-submitting.	Text	8
14	B_WATER_SYSTEM_NOTIFY_DATE	Date data is reported to the PWS as text in the following format - MMDDYYYY	Text	8
15	B_DATA_QUALITY	Default to "A"	Text	1
16	B_DATA_QUALITY_REASON	N/A		
17	B_ANALYSIS_METHOD_CODE	Analysis method code-see WQP Allowable Methods	Text	30
18	B_VOLUME_ASSAYED	N/A		
19	B_LAB_REJECTION_REASON	Rejection reason specific to results (if applicable)	Text	2
20	B_MICROBE_PRESENCE_INDICATOR	N/A		
21	B_COUNT	N/A		
22	B_COUNT_TYPE	N/A		
23	B_COUNT_UNITS	N/A		
24	B_LESS_THAN_INDICATOR	If < MRL, mark field "Y", if not mark "N"	Text	1
25	B_LESS_THAN_CODE	Populate with "MRL" if field 24="Y"	Text	4
26	B_DETECTION_LEVEL	Populate with lab MRL if field 24="Y"	Number	Double

27	B_DETECTION_LEVEL_UNIT_CODE	Populate with units if field 24 ="Y" [C, MG/L, PH, or UMHO/CM. UG must be converted to MG/L]	Text	10
28	B_CONCENTRATION	Populate with concentration if field 24="N"	Number	Double
29	B_CONCENTRATION_UNIT_CODE	Populate with concentration units if field 24 ="N" [C, MG/L, PH, or UMHO/CM] UG must be converted to MG/L	Text	9
30	B_REPORTED_MEASURE	N/A		
31	B_REPORTED_MEASURE_CO	N/A		
32	B_COMMENT	Comment specific to result	Text	254
33	B_STATE_SAMPLE_NUMBER	N/A		

EDD Resubmittals

After laboratories submit WQP data, the TCEQ validates the results as described in the Programmatic QAPP document. If fields are incorrect or missing, the TCEQ rejects the data and may request it be corrected and resubmitted.

When resubmitting data, the laboratory includes an email making it clear that they are resubmitting updated data. The email should state why the data is being resubmitted and identify the PWS ID numbers.

In addition, the laboratory must rename EDD file to reflect that data was revised (e.g., LABNAME_WQP_19MAR2020revised). It is important that the original submission date in the naming convention be preserved. In addition, laboratories must not change the [B_STATE_NOTIFY_DATE]. This reflects when data was originally reported to the TCEQ. Changing this date can result in monitoring and reporting violations for PWS.

When the sample is resubmitted, Fields 24 and 25 of the sample table will be completed with the original laboratory ID number and the original collection date, which is included in the WQPMF 20679. This will "tie" the original sample to the replacement.

How to Report WQP Results to the TCEQ when Single Samples are Analyzed by Multiple Laboratories

WQPs samples are often analyzed by multiple laboratories (i.e., pass-through, subcontracted, etc.). In these cases, analytical results are reported to the TCEQ by the laboratory that performed the analysis, with the exception of pH and temperature. Field measurement results of pH and temperature are reported to the TCEQ by the initial receiving laboratory in the Sample file of EDD (but not in the analytical test report).

Each laboratory is responsible for submitting their own results to the TCEQ including the EDD and the analytical report data package. Each laboratory is also responsible for resubmitting any results as described in this Exhibit.

E1.3 Sample and Result Rejections

The laboratory is responsible for the rejection of samples that do not meet requirements according to this Addendum. All sample rejections must be reported to the TCEQ if a sample has been delivered to the laboratory.

Individual analyte results cannot be rejected as all required analytes must be reported for an initial or routine WQP sample to be considered for compliance. PWS submitting OWQP samples will only require analysis of a subset of analytes.

Table 6 lists codes and descriptions for rejection codes. Typically, these codes are assigned by laboratory staff at either the time of receipt or the time of analysis. The assignment and reporting of rejection codes is explained by way of the following example related to the exceedance of holding time.

Example – The PWS delivers a sample to the laboratory in excess of the holding times described in this document. The lab will reject the sample and request a replacement. The sample rejection occurrence will be reported to the TCEQ in an EDD with just the sample table completed with no results. The rejection code "EH" for "Exceeded Hold Time" will be used. When the sample is resubmitted, Lines 24 and 25 of the sample table will be completed with the original laboratory ID number and the original collection date, which is included in the WQPMF 20679. This will "tie" the original sample to the replacement.

Table 6. Rejection Codes and Description

Code	Name	Use
BR	Broken	Cracked or broken sample container.
EH	Exceeded Hold Time	When the sample has exceeded the hold time for any analyte requested.
FZ	Sample Frozen	Sample partially or completely frozen.
IC	Invalid container	When sample is received in an invalid container.
ID	Invalid date/time	When sample or WQPMF dates and time are not accurate or don't match each other. See note below.
IN	Insufficient information	Missing information on the WQPMF Form. Include comment stating what was insufficient. See note below.
IP	Invalid sampling protocol	Use when temperature or pH are not measured in the field and are missing on the WQPMF.
LA	Lab accident	When a sample cannot be analyzed due to a lab accident.
LE	Lab error	Error in analysis.
LR	Lab rejected	For other issues with samples and documentation not otherwise captured in this table. When using this code, include a laboratory comment on the WQPMF and EDD with additional information.
LT	Leaked in transit	Unsealed container or evidence of leakage.
MF	WQPMF and lab COC do not match	Conflicting information on either the WQP Monitoring Form or the laboratory COC, as applicable.
PR	Improperly preserved	When samples are preserved prior to laboratory receipt or improper thermal preservation occurred.
QC	QC failure	When a QC failure occurs during the processing or analysis of the sample and the sample cannot be reanalyzed.
RL	Reporting limit not met	When a preparation batch experiences an MRL verification failure.
TH	Temperature Too High	When sample is not in cooler/on ice and exceeds 6°C or does not meet the requirements in B3.3.3 "Thermal Preservation".
VO	Insufficient volume	When the sample volume is less than required for analysis.

Note: When data is rejected for circumstances that do not allow for reporting of EDDs, such as invalid dates, the laboratory should notify TCEQ for guidance on reporting the data.

E1.4 Submission of WQPMF and Analytical Test Reports

The TCEQ retains all analytical data and associated information in its central records for a period defined by federal and state records retention regulations. Therefore, all laboratories are required to submit the following data and information electronically, as PDFs, at least once a month.

- Completed WQPMF
- Completed Laboratory COCs (if applicable)
- Analytical test reports given to the PWS

Laboratories must package the records listed above according to each PWS to facilitate compliance with record retention requirements (e.g., one WQPMF, one Lab COC (if applicable), and one analytical report per package). Please note that when the documents are packaged the WQPMF, the associated laboratory COC (if applicable), and the analytical test report must be included.

When the PDFs are transmitted to the TCEQ, the analytical test report shall be transmitted to the PWS within the same timeframe to help ensure that the TCEQ and the PWS have the same information.

Data Package Naming Convention

The TCEQ requires the following information to successfully code documents which are submitted to the TCEQ Central File Room.

- Series Code: PWS
- Primary ID: County Code (3 digits) and Identification (4 digits) (This is the 7-digit PWS ID)
- Document Type: AC
- Document Date: YYYYMMDD (Earliest Collection Date)
- Document Name: WQP Analysis Report

Example 1: Electronic file name of the PDF

PWS_1010014_AC_20150928_WQP Analysis Report.PDF

Note: There must be a space between "WQP" and "Analysis" and "Report" in the file name.

Example 2: Printed on the top right corner of the first page of data package

PWS_1010014_AC_20150928_WQP Analysis Report

All PDFs shall be emailed to the TCEQ's dedicated email at lcrdata@tceq.texas.gov.

If the laboratory does not have PDF scanning capabilities, the laboratory must send hardcopy data reports and associated information to the following postal address. These documents shall be coded following example 2 above. Laboratories should notify the LCMT before mailing data and information via the postal service.

Texas Commission on Environmental Quality
Attn: Lead and Copper Program

MC 155
PO Box 13087
Austin, TX 78711-3087

Analytical Test Reports

Laboratory analytical test reports for WQP data are consistent with the TNI Standard and include information necessary for the interpretation and validation of data by the TCEQ and the PWS. The following information is included in each test report, even if the laboratory is reporting within its own organization.

- Laboratory name, address, TCEQ Laboratory ID number, and phone number.
- PWS name, address, PWS ID number, and phone number.
- Sample point address, and sample point ID number.
- Report date.
- Laboratory Sample ID.
- Date and time of sample collection.
- Date and time of sample receipt.
- Analytical results with units, dilution factors (if applicable), and relevant data flags. (Results of pH and temperature are not required on the laboratory analytical test report. These results are reported to the TCEQ on the WQPMF and in the field measurement portion of the EDD.)
- Numerical results for the MRL and MDL.
- Date and time of sample preparation, and analysis and initials of technicians or analysts who performed the work.
- Analytical methods.
- Indication whether the result was generated by an accredited or approved method
- Quality control sample results, including concentrations, units, recoveries and acceptance criteria for:
    - MRL check samples (spike concentration, result, % recovery, and % recovery limits)
    - LFBs (spike concentration, result, % recovery, and % recovery limits)
    - LFMs (original result, spike concentration, result, % recovery, and % recovery limits)
    - Blanks (result and reporting limit)
    - Laboratory duplicates (RPD and maximum RPD)
- Data qualifiers with definitions
- Definitions of any abbreviations or codes
- Data comments or case narrative, including information regarding deviations from methods or requirements
- Page numbers
- Name, function, date and signature (or electronic equivalent) of person authorized to approve report
- Statement that the report (or portions of the report) cannot be duplicated, except in whole