Guidance for the Analysis and Reporting

of

Tap Water Samples under the Lead and Copper Rule

Addendum #2

(Revision 1)

to the

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

(Revision 12 – QTRAK #16-449)

Effective Date:
12/20/2017

List of Acronyms

Acronym	Definition
CA	corrective action
CFR	Code of Federal Regulations
COC	chain of custody
DQO	data quality objective
DWW	Texas Drinking Water Watch
EDD	electronic data deliverable
EPA	Environmental Protection Agency
ID	identification
L	liter
LCR	Lead and Copper Rule
LCRMF	Lead and Copper Rule Monitoring Form
MB	method blank
MCLADW	Manual for the Certification of Laboratories Analyzing Drinking Water (EPA), 5th Ed.
MDL	method detection limit
mg/L	milligrams per liter
mL	milliliter
MRL	method reporting limit
NTU	nephelometric turbidity units
TNI	The NELAC Institute
PDF	portable document format
PWS	public water system
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
TCEQ	Texas Commission on Environmental Quality

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
Region 6
1445 Ross Avenue, Suite 1200
Dallas, Texas 75202 - 2733

December 20, 2017

Ms. Sharon Coleman
Quality Assurance Manager
TX Commission on Environmental Quality
P.O. Box 13087
Austin, TX 78711-3087

Dear Ms. Coleman:

I am pleased to inform you that EPA Region 6 has reviewed and approved the TCEQ QAPP for the Public Water Supply Supervision Program (QTRAK#16-449). This approval is the first annual review of this three-year QAPP, effective period being 11/04/2016 through 11/04/2019 and therefore for the second year of its usage. The next review and approval would occur in SFY 2019 and therefore around this time next year.

EPA Region 6 was pleased to read that the updates included revisions covering Lead and Copper Rule water quality parameters and that TCEQ also made changes in response to feedback received from laboratories even though they were minor amendments.

Thank you for your commitment to QA/QC measures for water quality monitoring that are to be undertaken to ensure and that the drinking water in Texas is as safe as sustainably possible for public consumption. If you have any questions, I can be reached at balli.javier@epa.gov or (214) 665-7261.

Sincerely,

Javier M. Ballí
DWSRF Coordinator and Project Officer

Enclosure.

Annual Review Certification
of the Quality Assurance Project Plan for the
Public Water Supply Supervision Program (PWSSP)
Relating to the Safe Drinking Water Act
of the Texas Commission on Environmental Quality

QTRAK #16-449

Original QAPP Effective Period: 11/04/2016 – 11/04/2019

Year – 2 of 3

Signatures below document certification of the annual review of the PWSSP QAPP by the TCEQ Quality Assurance Specialist. The original QAPP was approved by the Environmental Protection Agency on November 4, 2016. This is the first annual review.

The TCEQ Quality Assurance Specialist has verified that the original QAPP accurately reflects current project requirements. Revisions to Addenda 2, 3 and 4 that were approved in the last year are provided in attachments to this certification. The QAPP is currently approved until November 4, 2019.

The next revision (13) of the PWSSP QAPP will be submitted to EPA in 2019. Amendments that are necessary in the interim will be approved before their provisions are implemented.

10/10/17
Gary Regner, QA Specialist Date
Water Supply Division, TCEQ

10/10/2017
Gary Chauvin, Program Manager Date
PWSSP, TCEQ

10/10/17
Matthew Dodge, Grant Manager Date
Water Supply Division, TCEQ

10/10/17
Cari-Michel La Caille, Director Date
Water Supply Division, TCEQ

Enclosures: QAPP Revisions – Addenda 2, 3, and 4

Approval Page – PWSSP QAPP, Addendum #2

The following TCEQ individuals listed on this page are signatories to this document because they are responsible for TCEQ oversight and quality assurance of the work described.

Gary Regner, Public Water System Supervision Program Quality Assurance Manager

Texas Commission on Environmental Quality /Office of Water/Water Supply Division

Signature: _____ Date: 10/10/17

Gary Chauvin, Manager

Texas Commission on Environmental Quality /Office of Water/Water Supply Division/ Drinking Water Standards Section

Signature: _____ Date: 10/10/2017

Jessica Hoch, Team Leader

Texas Commission on Environmental Quality /Office of Water/Water Supply Division/ Drinking Water Standard Section/Drinking Water Assessment Team

Signature: _____ Date: 10/10/2017

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Introduction

The Texas Commission on Environmental Quality (TCEQ) regulates lead and copper based on levels detected in drinking water at public water system (PWS) taps. Laboratories that generate data for this project will assist the TCEQ in implementing the Safe Drinking Water Act (SDWA) by analyzing drinking water samples for lead and copper and reporting results according to defined protocols. The TCEQ uses the data to make compliance determinations, identify violations, and take assistance actions, thereby protecting public health.

To submit tap water lead and copper data to the TCEQ Public Water System Supervision (PWSS) Program for compliance purposes, laboratories must be accredited to analyze lead and copper in drinking water. Laboratories must also follow US Environmental Protection Agency (EPA) allowable drinking water methods. In addition, they must comply with the criteria and procedures described in this document.

The following sections establish program–specific requirements for tap water sample handling, analysis, quality control (QC), data validation, and reporting. These requirements are written to be consistent with federal regulations and state rules including 40 Code of Federal Regulations (CFR) Part 141, Subpart I, and 30 Texas Administrative Code (TAC) §290.117.

This document is included in the TCEQ PWSS Program Quality Assurance Project Plan (QAPP) which is reviewed and approved by the EPA. Laboratories that submit data to TCEQ for use in compliance under the PWSS Program are subject to both the TNI Standard as well as the EPA *Manual for the Certification of Laboratories Analyzing Drinking Water* (5th Ed.). The TCEQ may refuse to accept data and analyses from laboratories in order to maintain compliance with programmatic requirements and specifications.

Requirements in this document are not intended to supersede other requirements which apply to environmental laboratories. Requirements for training, supplies, equipment maintenance, internal assessments, analysis, etc. are addressed in quality manuals and standard operating procedures and are reviewed by the TCEQ as part of the laboratory accreditation process.

Note: *PWSs that exceed the lead and copper action levels are required to monitor lead and copper at entry points to the distribution system. These entry points involve different locations and different sample point ID numbers in order to report the analytical results. Laboratories should contact the Lead and Copper Program for information regarding these results. In addition, all large PWSs, and all small and medium-size PWSs that exceed the lead or copper action levels are required to monitor water quality parameters in addition to lead and copper. The analyses of these parameters are addressed in a similar document, entitled Guidance for the Analysis and Reporting of Water Quality Parameters under the Lead and Copper Rule (LCR).*

The current version of this document is located on the TCEQ web site at: <https://www.tceq.texas.gov/drinkingwater/chemicals/lead_copper/lead-copper.html>. For information on the TCEQ's Lead and Copper Program, refer to

this web page. For specific information related to this QAPP Addendum, contact the TCEQ at (512) 239-4691 and ask for the PWSS Program QA Manager.

Quality Objectives and Criteria

The lead and copper data collected for the TCEQ Lead and Copper Program are used to determine the compliance status of PWSs. As a result, the TCEQ can provide better protection of the health of all Texas citizens currently served by a PWS and all those who consume water from such systems.

The data quality objectives (DQOs) described below apply to all laboratories using this guidance document. They ensure that the type and quality of the generated analytical data meet the goals of the SDWA and support defensible compliance decisions and actions by the TCEQ.

DQOs

Sensitivity

Sensitivity refers to the ability of an instrument or method to discriminate between different levels of an analyte by producing a different response. Sensitivity requirements specific to the analysis of drinking water include method detection limits (MDL) and method reporting limits (MRL). MDLs and MRLs for are defined in this document in the Section - *Lead and Copper Analysis*.

Bias

Bias refers to the systematic distortion of a measurement which makes it different from the true value. A measurement is considered unbiased when the value reported does not differ from the true value. Bias is controlled by the use of blanks, proficiency testing samples, calibration standards, quality control samples, etc. To control for bias, acceptance criteria and corrective actions for specific quality control samples listed in the approved analytical methods are implemented by the laboratory. Results are compared against criteria defined in the methods and procedures and are used during the evaluation of analytical performance.

Precision

Precision is the degree to which a set of observations or measurements of the same property, obtained under similar conditions, conform to themselves. It is a measure of agreement among replicate measurements and is an indication of random error.

Precision is controlled by the use of split and/or duplicate samples. To control for precision, acceptance criteria and corrective actions for specific quality control samples listed in the approved analytical methods are implemented by the laboratory. Results are compared against criteria defined in the methods and procedures and are used during the evaluation of analytical performance.

Representativeness

Representativeness refers to the degree to which the data accurately represents the frequency distribution of a specific variable in the population. Sample site selection, the appropriate sampling protocols, adherence to the sampling schedule, and use of approved analytical methods as defined in this document and all referenced

documents ensure that the measurement data represents the conditions at the sampling site.

Comparability

Comparability refers to the degree in which methods or data sets are considered to be similar. Confidence in the comparability of data sets for drinking water compliance is based on approved sampling and analysis methods, and quality assurance protocols in accordance with requirements described in this document, and all referenced documents. Comparability is also guaranteed by standard reporting protocols as described in this document.

Completeness

The completeness of the data refers to the relationship of how much of the data is available for use compared to the total potential data. To determine compliance, 99.9% of samples must be collected and analyzed as enforcement may be necessary when results are not reported. Results may not be reported when a sample is not collected or there are sample or data losses due to insufficient sample volume, broken or lost samples, laboratory issues, etc. As described in this document, the processes in place for these situations require these occurrences be reported to the PWS and/or the TCEQ so replacement samples can be recollected as soon as possible.

Data Integrity

Data collected and reported to the TCEQ Lead and Copper Program are managed in such a way to ensure the confidentiality, integrity, and availability of data and information. Data management policies and procedures ensure data and information are recoverable and only used for their intended purposes.

Compliance

All rules, regulations, and requirements associated with this guidance document have been developed to be consistent with state rules and federal regulations pursuant to the SDWA. Adherence to this document will ensure data are collected, analyzed, and reported according to statute.

Sample Handling and Custody

Sample Collection

Homeowner Tap Sample Collection Procedures are located on the TCEQ website at <http://www.tceq.texas.gov/drinkingwater/chemicals/lead_copper/lead-copper.html>. The PWS is responsible for (1) obtaining sample containers from an accredited laboratory, (2) providing the procedures and the sample bottles to the homeowners, (3) coordinating the sample collection event, (4) arranging for sample pick-up, (5) making sure the samples were collected correctly (e.g., from an inside sink at least six hours after the last time it was used, etc.), (6) submitting the sample(s) to an accredited laboratory for analysis, and (7) ensuring the laboratory reports results to the TCEQ.

Sample Label

A sample label is provided with the *Homeowner Tap Sample Collection Procedures*. These labels should be affixed to the bottles by the PWS at the time of collection. Laboratories may also provide their own labels. Alternatively, the PWS may write the sample label information directly on the bottle. All of these alternatives are acceptable as long as the required information (at a minimum) is included on the bottle/label, legibly written, with indelible ink, as follows:

- sample point identification number and location address
- date and time water was last used
- date and time sample was collected
- which inside sink was used

LCR Monitoring Form

PWSs are required to complete and submit a LCR Monitoring Form (LCRMF) with their lead and copper samples. The TCEQ LCRMF Form 20683 and instructions are located on the TCEQ web page at <https://www.tceq.texas.gov/drinkingwater/chemicals/lead_copper/lead-copper.html.

The TCEQ LCRMF may replace the laboratory's chain of custody (COC) form at the laboratory's discretion, to avoid multiple forms. In this case, the receipt and relinquish information at the bottom of the form must be completed. If a laboratory utilizes a separate COC, they must submit both documents at the time of reporting as described in the Section-*Reporting Data to the TCEQ*.

Requirements for Laboratory-designed LCR Monitoring Forms

The TCEQ designed its LCRMF 20683 to meet federal and state reporting and quality control requirements specific to the SDWA. It captures certain information (especially related to sampling) that laboratories might not routinely include on their own COC forms. Laboratories have asked the TCEQ on numerous occasions to add and/or omit information from its form. If laboratories want add information to the LCR Monitoring form, they can modify their own forms (rather than use the TCEQ LCRMF 20683), and provide them to sampling personnel with their sampling containers. Laboratory-designed forms must capture the mandatory information defined below related to both the PWS and the laboratory. Laboratory forms must also resemble the TCEQ form (to aid the TCEQ in manual data entry and data validation) and be approved by the TCEQ ***prior to use***.

The TCEQ can provide laboratories with the Microsoft Excel version of 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 own forms. Laboratories should direct requests and questions about modifying forms to the PWSS Program QA Manager.

<u>PWS Information</u>

- PWS name, PWS ID number, PWS Address, PWS (or agent) contact name and

phone number

- Sampling acknowledgement statement and check boxes indicating proper collection technique, and name/signature/date of authorized PWS (or agent) representative
- Individual Sample Information including:
    - compliance sample indicator (Y or N)
    - sample point ID Number (Ex. LCR001)
    - sample location - Address and location of sample faucet (123 Main St, bathroom sink)
    - date (MMDDYY) sample faucet last used
    - time (24 hour – HHMM) sample faucet last used
    - date (MMDDYY) and time (24 hour –HHMM) of sample collection
    - replacement indicator (for previously rejected samples)
    - original sample ID Number (for previously rejected samples)
    - original sample collection date (for previously collected samples)
- Relinquish by signature line(s) – if form is used for documenting COC

Laboratory Information

- Laboratory name and address
- TCEQ Laboratory ID number
- Laboratory contact name and phone number
- Sample condition records (e.g. check boxes) to document:
    - sample collected in a 1L container
    - sample filled to the 1L fill line
    - sample delivered unpreserved
    - actual sample temperature
    - corrected sample temperature
    - thermometer ID number
    - rejection code
- Laboratory Sample ID of each sample
- Date (MMDDYY) of preservation and date (MMDDYY) of analysis of each sample
- Laboratory comments/Rejection Code (if applicable)
- Received by signature line(s) – if form is used for documenting COC

Note: *The TCEQ Laboratory ID Number is a laboratory specific, ten-digit number associated with the Safe Drinking Water Information System (SDWIS). It is usually, but not always, the same as the NELAP Accreditation Certificate Number, minus the last 4 digits. Email addresses are not included on TCEQ forms for privacy reasons.*

Sample Point Identification Numbers

Texas Drinking Water Watch (DWW) <http://dww2.tceq.texas.gov/DWW/> has

the PWS sample sites listed under SAMPLE POINTS. The sample point ID numbers always begin with LCR followed by a three digit number (beginning with 001) depending on the size of the public water system. Sample locations (addresses) are not available on the DWW website; PWSs should contact TCEQ for sample locations.

Examples
BOTTLE 1 =LCR001 = 123 Main Street
BOTTLE 2 =LCR002 = 456 Sugar Street

Preservation, Containers, and Sample Holding Time

Sample Preservation

For the determination of total recoverable elements in aqueous samples, samples are not filtered, but acidified with (1:1) nitric acid (HNO_3) to pH less than 2 (<2) {normally, 3 mL of (1:1) acid per liter (L) of sample is sufficient for most drinking water samples}. To avoid the hazards of handling strong acids in the field, transport restrictions, and possible contamination, samples must be returned to the laboratory as soon as possible (no later than 14 days of collection), and acid preserved upon receipt in the laboratory. Following acidification, the sample must be mixed, held for at least 16 hours, and then verified to be pH <2 prior to withdrawing an aliquot for processing or "direct analysis." If for some reason, such as high alkalinity, the sample pH is verified to be greater than 2, more acid must be added and the sample held for an additional 16 hours until verified to be pH <2.

Table 2 summarizes preservation and container requirements for lead and copper samples.

Table 2 Preservation and Containers for Lead and Copper Samples

Parameter	Preservation	Preservation Time	Sample Size[1]	Type of Container[2]
Lead (Analyte Code 1030)	HNO_3, pH<2	Up to 14 days from collection date	1 L	Wide-mouth, 1 L lab grade plastic with fill line
Copper (Analyte Code 1022)	HNO_3, pH<2	Up to 14 days from collection date.	1 L	Wide-mouth, 1 L lab grade plastic with fill line

1 If both lead and copper are to be analyzed concurrently, then a single 1 L sample is sufficient for both analytes.

2 Containers must be provided by the laboratory without preservative. Containers must be free from the analytes of interest. This can achieved by using pre-certified containers, or those that are lot tested by the laboratory.

Sample Holding Time

Holding time refers to the maximum time that samples may be held after sample collection until they are analyzed and still be considered valid or not compromised. The regulatory analysis holding time for preserved lead and copper samples is six months. To help facilitate the TCEQ requirements for data

processing, reporting, and maintaining PWS compliance, the TCEQ requests that samples be analyzed as soon as possible after receipt and no later than 28 days from the time of collection. When implementing this request, laboratories should be mindful that the monitoring periods end each year on June 30, September 30, and December 31. Federal and state rules require that all data be received by the TCEQ (reporting period) no later than 10 days after the end of the monitoring period. If samples are submitted to the laboratory late in the monitoring period, the available holding time may be cut short. To avoid this situation, the TCEQ requests that PWSs coordinate with property owners to ensure samples are submitted early in the reporting period.

Sample Receipt

Addressing Issues with Incomplete or Incorrect Sample Documentation

It is extremely important for the laboratory to check the sample documentation (i.e., LCRMF and sample label) very carefully at the time of receipt because both incorrect and insufficient documentation may result in monitoring or reporting violations for the PWS. The laboratory can use some discretion assisting PWS sample delivery personnel with "fixing" errors in the documentation at the time of receipt in order to avoid the unnecessary recollection of samples. For example, if the PWS ID # is not filled in at the time of sample receipt, the laboratory can inform the PWS delivery person and he/she can add the information before samples are relinquished.

If documentation errors or omissions cannot be fixed, or are not fixed at the time of sample receipt, laboratories must reject samples, document the reason on the LCRMF, and request a replacement. Reasons for rejecting samples due to documentation errors correspond to rejection codes listed in Table 6. They include, but are not limited to:

- Insufficient information
  - handwriting not legible
  - PWS side of form incomplete
  - LCRMF not included with samples at time of laboratory receipt
  - not the current version of the LCRMF
- Discrepancies between the completed LCRMF and sample label
- Missing PWS representative signature
- Invalid dates or times
- Missing dates or times

The laboratory custodian (or designee) cannot correct or complete the LCRMF. It is the responsibility of PWS personnel to fill out the form (and correct it, if necessary), sign, and date it. Also, under no circumstances can the laboratory modify the form after it has been received, signed, and dated by the laboratory. If there is a question about modifying sample documentation after samples are received, the

laboratory should contact the PWSS Program QA Manager for guidance.

Addressing Issues with Samples

It is also very important for the laboratory custodian (or designee) to check the samples very carefully at the time of receipt to determine if any need to be rejected outright. Reasons for rejecting samples outright at the time of sample receipt include, but may not be limited to the reasons listed below. These reasons also correspond to rejection codes listed in Table 6.

- Broken container
- Leaking container
- Invalid container (i.e., wrong size or missing fill line)
- Insufficient sample volume
- Exceeded holding time
- Improperly preserved

If a laboratory rejects a sample outright at the time of receipt, the custodian should document the reason on the LCRMF and request a replacement sample while the PWS personnel/courier is still on the premises.

Lead and Copper Analysis

Allowable Methods

All drinking water tap samples collected for LCR compliance must be analyzed using TCEQ accredited methods which are allowed by the EPA under the SDWA. Table 3 lists the allowable methods for both lead and copper for which the TCEQ currently maintains accreditation. These methods are subject to change at any time. Laboratories are responsible for maintaining accreditation ***under the drinking water matrix*** for the methods they use. For the most updated information on EPA allowed methods and versions, refer to: <https://www.epa.gov/dwanalyticalmethods>.

Table 3 Allowable Analytical Methods for LCR Compliance Samples

Analyte Name & Code	EPA	ASTM	Standard Methods for the Examination of Water and Wastewater
Copper, milligram per liter (mg/L) (Analyte code 1022)	200.5, Rev. 4.2 200.7, Rev. 4.4 200.8, Rev. 5.4 200.9, Rev. 2.2	D1688-07 A D1688-02 A D1688-95 A D1688-90 A D1688-07 C D1688-02 C D1688-95 C D1688-90 C	3111 B - 18th, 19th, 21st, 22nd eds. 3111 B-99 (online ed.) 3113 B - 18th, 19th, 21st, 22nd eds. 3113 B-99, B-04, B-10 (online eds.) 3120 B - 18th, 19th, 20th, 21st, 22nd eds. 3120 B-99 (online ed.)

Table 3 Allowable Analytical Methods for LCR Compliance Samples

Analyte Name & Code	EPA	ASTM	Standard Methods for the Examination of Water and Wastewater
Lead, mg/L (Analyte code 1030)	200.5, Rev. 4.2 200.8, Rev. 5.4 200.9, Rev. 2.2	D3559-15 D D3559-08 C D3559-08 D D3559-03 D D3559-96 D D3559-90 D	3113 B - 18th, 19th, 21st, 22nd eds. 3113 B-99, B-04, B-10 (online eds.)

Sample Preparation—Total Recoverable Analytes

For the "direct analysis" of total recoverable analytes in drinking water samples containing turbidity less than one nephelometric turbidity unit (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 (1030 for lead and 1022 for copper).

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 and reporting limits, and blanks. Aspects of sensitivity as they apply to the PWSS Program are described below.

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 prepared and analyzed according to method requirements.

MRLs and MRL Verifications

The TCEQ PWSS Program does not use J flagged (i.e., estimated) data to make compliance determinations; therefore the laboratories must comply with MRL requirements defined below and later in the document under the Section, *Reporting Results*.

MRLs are equivalent to the lowest non-zero calibration standard in a multi-point calibration curve. Per federal rule, the MRLs for lead and copper are 0.005 mg/L and 0.050 mg/L, respectively (40 CFR §141.89); therefore, the laboratory MRL must be equal to or less than 0.005 mg/L for lead and 0.050 mg/L for copper. Laboratories must run a laboratory fortified blank with every preparation batch and not report lead and copper at levels less than the level at which they routinely analyze their lowest standard. For the purpose of the Lead and Copper Program, 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 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 the MRL verification before continuing, if results are out of control.

Method Blank

A method blank (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 one per preparation batch. A preparation batch is composed of one to 20 environmental samples of the same quality systems matrix, meeting the above-mentioned criteria and with a maximum time between the start of processing of the first and last sample in the batch to be 24 hours. The MB is used to document contamination from the analytical process. Results of MB analyses must be less than the MDL, be less than or equal to 1/10th of the concentration measured in the sample, or conform to method-specific requirements. For example, EPA Method 200.8 has a method blank requirement of <2.2 x MDL.

Reporting Data to the TCEQ

Lead and copper results are reported to the TCEQ as explained in the following sections; this includes (1) the monitoring forms and the analytical test reports in portable document format (PDF) for TCEQ Central Records, and (2) the electronic data deliverable (EDD).

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.

Submission of Completed LCRMFs and Analytical Test Reports to the TCEQ

The TCEQ retains all analytical data and associated information in its central records for a period of time according to 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 LCRMFs
- Completed Laboratory COCs (if applicable)
- Analytical test reports given to the PWS.

Laboratories must package data and information according to each PWS, to facilitate its management at the TCEQ. (e.g. one LCRMF, one Lab COC, and one analytical report per package). Please note that when the documents are scanned, the LCRMF

should be on top of the associated laboratory COC (if applicable) and the analytical test report. This helps manage the large number of documents received by the TCEQ.

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

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

- Series Code: PWS
- Primary ID: County Code # and Identification #: 7 digits 3+4 (PWS ID #)
- Document Type: AC
- Document Date: YYYYMMDD (Collection Date)
- Document Name: LCR Analysis Report

Example 1:

PWS_1010014_AC_20150928_LCR Analysis Report

(printed on the top right corner of the LCRCOC before scanning)

Example 2:

PWS_1010014_AC_20150928_LCR Analysis Report.PDF

(electronic file name of the PDF)

Note that there must be a space between "LCR" and "Analysis" and "Report."

All PDFs should be emailed to the TCEQ's dedicated mail box at <lcrdata@tceq.texas.gov>.

In the event that the laboratory does not have PDF scanning capabilities, the laboratory must send hardcopy data reports and associated information to the following postal address. Laboratories should coordinate with the TCEQ Lead and Copper Program 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

Test reports from the laboratory must document the test results clearly and accurately. Test reports should include the information necessary for the interpretation and validation of data by the TCEQ and the PWS. At the very minimum, lead and copper analytical test reports should include the following even if the laboratory is reporting within its own organization.

- Laboratory name, address, Laboratory ID number, and phone number
- PWS name, address, PWS ID number, and phone number

- Sample point name, address, and sample point ID number
- Report date
- Laboratory Sample ID
- Date and time of sample collection
- Date and time of sample receipt
- Results with units, dilution factors (if applicable), and relevant data flags
- 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
- Identification of the analytical methods used
- Indication that the result was generated by an accredited laboratory
- Quality control results
- 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

Electronic Data Deliverable (EDD)

The EDD must be in a format compatible with SDWIS requirements. Data must be submitted electronically in a TCEQ-approved format (typically MS ACCESS) using two separate files-Sample and Result. The Sample and Result files should be submitted together to the TCEQ at least weekly.

The field structures and requirements for each file are included in this addendum. The TCEQ can provide the laboratory with a “test” database if requested.

Laboratories should validate analyte codes, units, methods, and sampler names against SDWIS prior to submission. If fields are incorrect or missing, the TCEQ will reject the files.

All listed fields in Tables 4 and 5 must be included in the respective tables in the order listed even if a particular field is not used.

Pass-through laboratories should be noted in [B_SAMPLE_COMMENTS] in the sample file.

Electronic File Naming Convention

Electronic data deliverables (EDD) should be submitted to the TCEQ with the following file naming convention.

Lab Name_LCR_ date of submittal

An example of this naming convention’s use is as follows:
LCRLAB_LCR_19MAR2017

Sample Table

Table 4 contains information about the sample, including collection date and time, the collector, laboratory ID, sample point IDs, and the corresponding addresses where the lead and copper tap samples were taken. There is always only 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 (letters or numbers), as designated in field descriptions. Those fields marked as "N/A" must be left blank. All fields are mandatory, even if blank, and must be in the order listed. Do not use special characters since they may cause errors in the migration process.

An EDD must be generated for all rejected samples and results. See later section on *Reporting Rejected Samples and Results*.

SDWIS uses three identifiers to describe the sample location:

- Facility [B_WSF_STATE_ASSGN_ID] which for lead and copper tap samples is always DS01.
- Sample Point [B_SAMPLING_POINT] which for lead and copper tap samples starts with "LCR" (LCR001, LCR002, LCR003, etc.). These can be found in DWW. The PWS is required to fill out the LCRCOC with the sampling points when submitting samples.
- Sample Location [B_SAMPLING_LOCATION] which for lead and copper tap samples is always an address or inside tap like kitchen sink or bathroom sink.

Table 4 Sample Table File Structure

No.	Field Name	Description	Data Type	Field Size
1	FILE_NAME	Default to "sample"	Text	6
2	B_RECORD_ID	Auto number, unique	AutoNumber	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 by TCEQ, "Federal" if certified by EPA	Text	7
8	B_LABORATORY_CERTIFICATION_ID	TCEQ Laboratory ID Number. Check with TCEQ for laboratory unique number	Text	10
9	B_WSF_STATE_ASGN_ID	Water System Facility, always use "DS01" for lead and copper tap samples	Text	12

Table 4 Sample Table File Structure

No.	Field Name	Description	Data Type	Field Size
10	B_SAMPLING_POINT	Sample Point, LCR001, LCR002, LCR003, etc. Sample point should match label on bottle and what is in SDWIS. This is provided to the lab by the PWS	Text	12
11	B_SAMPLING_LOCATION	Address and location of Sample Point i.e., kitchen sink, bathroom sink, 123 Main Street = should correspond to LCR001, LCR002, LCR003, and what is in SDWIS (Note: no special characters, like commas, periods, number signs, etc. should be included in this field.)	Text	40
12	B_SAMPLE CATEGORY	Default to "PB" for Lead and Copper	Text	2
13	B_COMPLIANCE INDICATOR	"Y" for yes or "N" for no	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 in the following format – HHMM	Text	4
16	B_SAMPLE_TYPE	"RT" = routine for lead and copper	Text	2
17	B_REPEAT_LOCATION	N/A		
18	B_LAB_RECEIPT_DATE	The date the lab received the bottles formatted – MMDDYYYY	Text	8
19	B_COLLECTOR_NAME	First and last name of sample collector if known	Text	40
20	B_SAMPLE_VOLUME	N/A		
21	B_LEAD_COPPER_SAMPLE_TYPE	"FSD" always, means First Draw	Text	10
22	B_SAMPLE_REJECTION_REASON	Rejection Code if applicable=see table of Rejection Codes	Text	2
LCRA	B_COLLECTION_METHOD_CODE	N/A		
24	B_ORIGINAL_LAB_SAMPLE_NUMBER	Original lab sample ID number (if replacing a previously rejected sample)	Text	11
25	B_ORIGINAL_COLLECTION_DATE	Original collection date (if replacing a previously rejected sample) - MMDDYYYY	Text	8
26	B_LAB_COMPOSITE_NUMBER	N/A		
27	B_COMPOSITE_DATE	N/A		
28	B_FREE_CHLORINE_RESIDUAL	N/A		
29	B_TOTAL_CHLORINE_RESIDUAL	N/A		
30	B_SAMPLE_WATER_TEMPERATURE	N/A		
31	B_TEMPERATURE_UNIT_MEASURE	N/A		
32	B_TURBIDITY_MEASURE	N/A		

Table 4 Sample Table File Structure

No.	Field Name	Description	Data Type	Field Size
33	B_PH_MEASURE	N/A		
34	B_FLOW_RATE	N/A		
35	B_SAMPLE_PURPOSE	N/A		
36	B_STATE_CLASSIFICATION_CODE	"LC" = Lead and Copper default	Text	2
37	B_ORIGINAL_LABORATORY_CERTIFYING_AGENCY	Original laboratory accrediting or certifying agency (if replacing a previously rejected sample). "State" = default	Text	8
38	B_ORIGINAL_LABORATORY_CERTIFICATION_ID	Original TCEQ Laboratory ID Number located on the LCRCOC (if replacing a previously rejected sample)	Text	10
39	B_SAMPLE_COMMENTS	Comments related to the entire sample (pass thru lab information)	Text	255
40	B_COLLECTION_ADDRESS	Address or description of sample Site. This is a repeat of what was placed in table B_SAMPLING_LOCATION	Text	200

Result Table

The result table contains the individual analyte results. See Table 5. There may be multiple records depending on how many constituents were analyzed in the particular water sample (two for lead and copper). A result record should only be created if a result is available. If an entire sample is rejected and not analyzed, no result records should be reported; the laboratory should only report the single sample record. Unit concentrations for lead and copper must be reported in mg/L.

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. Those fields marked as "N/A" should be left blank. All fields are mandatory, even if blank, and must be in the order listed.

Table 5 Result File 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 in the following format - MMDDYYYY	Text	8
5	B_PWS_NUMBER	PWS ID number, preceded with "TX"	Text	9

Table 5 Result File Structure

No	Field Name	Description	Data Type	Field Size
6	B_LABORATORY_CERTIFYING_AGENCY	"State" if accredited by TCEQ, "FEDERAL" if certified by EPA	Text	7
7	B_LABORATORY_CERTICATION_ID	TCEQ Laboratory ID number; check with TCEQ	Text	10
8	B_ANALYTE_CODE	EPA analyte code, 1030=lead and 1022=copper	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 are reported to TCEQ as text in the following format: MMDDYYYY. If the data are rejected and returned for correction, use the current date when re-submitting.	Text	8
14	B_WATER_SYSTEM_NOTIFY_DATE	Date data are reported to the public water system as text in the following format - MMDDYYYY	Text	8
13	B_DATA_QUALITY	Default to "A" for acceptable	Text	1
16	B_DATA_QUALITY_REASON	N/A		
17	B_ANALYSIS_METHOD_CODE	Analysis method code-see lead and copper approved 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	Populate with "Y" if the result is less than the laboratory MRL. Populate with "N" if a concentration is reported.	Text	3
25	B_LESS_THAN_CODE	Populate with the term "MRL" if field 24 is "Y." Do not populate if field 24 is "N".	Text	3
26	B_DETECTION_LEVEL	Populate with the actual laboratory MRL.	Number	Double

Table 5 Result File Structure

No	Field Name	Description	Data Type	Field Size
27	B_DETECTION_LEVEL_UNIT_CODE	Populate with “mg/L” if field 24 = “Y.”	Text	10
28	B_CONCENTRATION	Populate with concentration if field 24 = “N”	Number	Double
29	B_CONCENTRATION_UNIT_CODE	Populate with concentration units (mg/L) if field 24 = “N”	Text	9
30	B_REPORTED_MEASURE	N/A		
31	B_REPORTED_MEASURE_COUNT _ERROR	N/A		
32	B_COMMENT	Comment specific to result	Text	254
33	B_STATE_SAMPLE_NUMBER	N/A		

Reporting Rejected Samples and Results

Each laboratory is responsible for the rejection of samples and invalidation of results that do not meet requirements according to TCEQ guidance. If a sample has been delivered to the laboratory, and subsequently determined to be unsatisfactory for analysis, the rejected samples/results must be reported to the TCEQ electronically via SDWIS in all cases. Table 6 lists description codes for rejecting both samples and results. The rejection “description” dictates whether it is reported on the SAMPLE table or the RESULT table.

For example, samples must be preserved within 14 days of collection (fourteen 24-Hour periods). If a sample is delivered in excess of that time period, the lab should reject the sample and request a replacement. The sample rejection is reported to the TCEQ electronically with the sample table completed but no results. The rejection code “EH” for “exceeds holding time” will be used in Line 22 of the Sample Table. When the replacement sample is resubmitted, Lines 24 and 25 of the sample table will be completed with the original sample number and the original collection date. This will “tie” the original sample to the replacement and ensure that the PWS get proper monitoring credit.

Table 6 Lead and Copper Rejection Codes

TEXT_VALUE	DESCRIPTION
BR	Broken container
EH	Exceeds holding time
EV	Excessive Volume
FZ	Frozen sample
HS	Excessive headspace
IC	Invalid container used
ID	Invalid date/time
IN	Insufficient information
IP	Invalid sampling protocol
LA	Lab accident
LE	Lab error / Lab QC failure
LT	Leaked in transit
MF	Submission form and chain of custody do not match
ND	No date/time (missing)
NR	No sample received
PR	Improperly preserved
PS	No PWS representative signature (missing)
QC	QA/QC issue
QI	Quantity insufficient
RL	Reporting limit not met
VO	Insufficient volume

Corrective Actions (CA)

Any person involved with work described in this document must initiate a CA if there is deviation from required protocols specified in it and/or referenced documents. The procedure for a CA following the identification of a deviation begins with an investigation to determine the root cause(s). The laboratory must select and implement the CAs that will eliminate the problem and prevent recurrence. Any CAs identified must be appropriate in degree to the magnitude and risk of the deviation. Laboratory QA Officers (or designees) are responsible for assuring that CAs are documented, reported, implemented, and tracked appropriately.

Deviations that require CA include, but are not limited to the following:

- Equipment failure
- Excursions from quality control limits
- Samples lost due to laboratory accidents
- Failure to meet acceptance limits when analyzing EPA Proficiency Test samples
- Holding time exceedances

Most CAs can be accomplished at the point of origin using an established procedure through some combination of the following: repair or replacement of faulty equipment; re-analysis of samples and standards; checking reagents for proper strength; etc. CA procedures/response actions are specified in laboratory SOPs that include required documentation, solutions, and follow-up.

Unique deviations/problems that cannot be corrected by the procedures listed

above will require CAs to be defined when the need arises.

The laboratory QA Officer must notify the PWSS Program QA Manager by phone or e-mail within 48 hours, draft a CA report, and submit it to the PWSS Program QA Manager within 14 days of the incident detection if the laboratory deviation(s):

- Call into question the integrity of sample analytical results which have been previously reported to the TCEQ
- Results in non-conformance with state or federal regulations
- Was associated with the intentional misrepresentation of data or information

CA Reports include the following components:

- Description of the problem - how it was identified and the date it was identified
- Root cause
- Description of the significance or consequences of the deviation– include sample ID number(s) affected
- CA(s) taken, including the timetable for implementation
- Actions implemented to prevent recurrence;
- Technicians/staff names (or job titles) involved
- Who prepared the report
- A review process with signatures and dates that includes a manager(s)

The TCEQ will review each CA report and respond within 30 days if (1) actions taken to resolve the deviation are unacceptable, or (2) the TCEQ needs more time to research the issue and make a determination. If CAs taken by a laboratory are unacceptable to the TCEQ, the TCEQ may not use sample results from the laboratory until such time that acceptable CA is achieved.

Corrected data must be submitted in a completely separate file from routinely submitted data. The laboratory must notify the TCEQ in advance in order to prevent duplication in the database of record.

Maintenance of Records

The laboratory must maintain easily accessible records on its premises or at a convenient location near its premises for five years. Adequate information should be available to allow an auditor to reconstruct the final results for compliance purposes. Changes in ownership, mergers, or closures of laboratories do not eliminate these maintenance requirements for data. The laboratory must notify the PWS before disposing of records < five years old so they may request copies if needed. This includes all raw data, calculations, and QC information. If the laboratory changes its computer hardware or software, it should make provisions for transferring existing data <five years old to be retrievable in the timeframe listed above.

Falsification and Fraud

Falsification of the LCRMF 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 LCRMF, 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.