Laboratory Guidance for the Analysis and Reporting

of

Water Quality Parameters
Under the Lead and Copper Rule

Addendum #3

(Revision 0)

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

(Revision 12)

Effective

November 4, 2016

List of Acronyms

Acronym	Definition
CA	corrective action
CFR	Code of Federal Regulations
COC	chain of custody
DWQT	Drinking Water Quality Team
EDD	electronic data deliverable
EPA	Environmental Protection Agency
HNO_3	nitric acid
ID	identification
L	liter
LCP	Lead and Copper Program
LCR	Lead and Copper Rule
LCRCOC	Lead and Copper Rule Chain of Custody
MB	method blank
MDL	method (minimum) detection limit
mg/L	milligrams per liter
MRL	method (minimum) reporting limit
NELAP	National Environmental Laboratory Accreditation Program
OW	Office of Water
PDF	portable document format
PDWS	Public Drinking Water Section
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
TAC	Texas Administrative Code
TCEQ	Texas Commission on Environmental Quality
TDS	total dissolved solids
WQP	water quality parameters

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 6
1445 ROSS AVENUE, SUITE 1200
DALLAS TX 75202-2733

NOV 0 4 2016

Mr. Sharon Coleman
QA Manager
P. O. Box 13087
Austin, Texas 78711-3087

Dear Mr. Coleman:

We have completed our review of the Quality Assurance Project Plan (QAPP) for the Texas Commission on Environmental Quality Public Water System Supervision Program Related to the Safe Drinking Water Act which was received in this office September 16, 2016.

Enclosed are the completed QAPP signature pages for your records. In future correspondence relating to this QAPP, please reference QTRAK #16-449. If you have questions, please contact me at (214) 665-6586.

As a reminder, any updates required to this QAPP, prior to expiration, should be submitted to EPA, to my attention, at least **60 days** prior to the expiration of this plan, or by September 04, 2019. Your assistance in ensuring that we receive an updated plan prior to the expiration of the approved plan is greatly appreciated.

Sincerely,

Gregory Parrish
PWSS Project Officer
Community Infrastructure Section

Enclosure

cc: Mark McCasland, 6WQ-SD
Gary Regner, TCEQ

Approval Page – PWSSP QAPP, Addendum #3

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/Public Drinking Water Section/Drinking Water Quality Team

Signature: _____ Date: 8/25/16

Jonathan Haynes, Team Leader

Texas Commission on Environmental Quality /Office of Water /Water Supply Division/Public Drinking Water Section/Drinking Water Technical Review Team

Signature: _____ Date: 8/25/2016

Gary Chauvin, Manager

Texas Commission on Environmental Quality /Office of Water /Water Supply Division/Public Drinking Water Section/Drinking Water Technical Review Team

Signature: _____ Date: 8/25/2016

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Purpose

The TCEQ implements the Lead and Copper Rule based on the corrosivity of the water throughout the distribution system, including public water system (PWS) homeowner taps. All new systems; all large water systems; and any size system that exceeds the lead or copper action levels are required to monitor water quality parameters (WQPs) in addition to lead and copper. WQP results are used to determine the corrosivity of drinking water, and if needed, to help the TCEQ and the PWS determine the type of corrosion control that a system should implement. WQP samples are collected at raw water points, entry points to the distribution system, and at representative sampling locations throughout the distribution system; usually at the same places the PWS collects their bacteriological samples.

Initial and reduced monitoring parameters include (analyte codes in parenthesis):

- Total alkalinity (1927)
- calcium (1016)
- chloride (1017)
- conductivity (1064)
- total hardness (1915)
- iron (1028)
- manganese (1032)
- pH (1925) [field measured]
- sodium (1052)
- sulfate (1055)
- temperature (1996) [field measured]
- total dissolved solids [TDS] (1930).

In addition, silica must be analyzed if an inhibitor containing silica (1049) is used and orthophosphate (1044) must be analyzed if an inhibitor containing phosphate is used.

Laboratories analyzing data for this project will assist the TCEQ in implementing the Safe Drinking Water Act (SDWA) by analyzing WQP according to defined protocols. This document describes the program-specific requirements of the TCEQ PWSS Program for analysis of WQP samples and the reporting of data. Laboratories must analyze samples according to US Environmental Protection Agency (EPA)-designated methods and be either “approved” or accredited by the TCEQ to analyze these parameters. The TCEQ approval process is described in this document. The TCEQ may refuse to accept data and analyses from laboratories to maintain compliance with programmatic requirements and specifications.

The following sections establish program–specific requirements for sample handling, analysis, quality control, data validation, and reporting. These requirements are consistent with federal and state regulations and rules pertaining to the LCR, 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’s quality assurance project plan (QAPP) which is reviewed and approved by the EPA. The TCEQ may refuse to accept data and analyses from

laboratories in order to maintain compliance with programmatic requirements and specifications.

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

For questions or comments regarding this document, contact the PWSS Program QA Manager at (512) 239-4528 or the TCEQ Lead and Copper Program at (512) 239-4691. The current version of this document is located on the TCEQ web site at: <https://www.tceq.texas.gov/drinkingwater>.

Note: Requirements for the analysis of tap water and entry point lead and copper samples are addressed in a similar document, entitled *Laboratory Guidance for the Analysis and Reporting of Lead and Copper Tap Water Samples.*

Laboratory Approval to Analyze Water Quality Parameters

Laboratory accreditation is not required for the analysis of the WQPs under the Lead and Copper Rule. The analysis of these parameters may be conducted in either an accredited or an "approved" laboratory. In lieu of accreditation, laboratory "approval" is required [30 TAC §290.117(h)(4)(B)] to assure consistent results and high quality data. The requirements for TCEQ-approved laboratories are not the same as for TCEQ National Environmental Laboratory Accreditation Program (NELAP)-accredited laboratories. PWS laboratories, water treatment facilities, or other laboratories that are not accredited for any or all WQPs must complete a *Drinking Water Lab Approval Form* to submit results of WQPs to the TCEQ. The form must be signed by the individual with responsibility for laboratory operations and submitted to the TCEQ. The TCEQ will review the form and contact the laboratory regarding approval. If an entity is seeking laboratory "approval" to submit WQP results to the TCEQ, it should contact the TCEQ Lead and Copper Program for assistance.

Sample Handling and Custody

Sample Collection

Water Quality Parameter Sample Collection Procedures are located on the TCEQ website at <https://www.tceq.texas.gov/drinkingwater/chemicals/lead_copper/lead-copper.html>. The PWS is responsible for the collection of WQP at entry points and representative locations within the distribution system at a frequency based on system size.

Lead and Copper Water Chain of Custody Form 20679

PWS samplers/operators are required to complete a Lead and Copper Water Quality Parameter Report Form #20679 (Exhibit 1) when they collect WQP samples. Directions for completing the form are included on the form.

Temperature and pH must be measured in the field, as soon as possible after collection, but within 15 minutes. When samples are delivered to the laboratory, the results of these two parameters and the analysis methods must be marked on the form in the cells corresponding to pH and temperature according to the sample address. Form #20679 may also be used as a chain-of-custody (COC) at the laboratory's discretion. In this case, the receipt and relinquish information at the bottom of the form must be completed. If samples are sub-contracted, then the form must be transmitted with the sample.

Sample Labels

All bottles must be marked with the PWS ID number, the date and time of collection, and the address/location where the sample was taken. The addresses always begin with DSTWQP for distribution sampling, EP for entry point sampling, and RW for raw water.

Example Label

Public Water System ID No.			
Collection Date:		Collection Time:	
Sampling Address:			

Sample Handling - Preservation, Holding Time, and Containers

Sample Preservation

Samples for calcium, iron, manganese, sodium, and hardness analyses are preserved immediately upon receipt at the laboratory.

For the determination of metals in aqueous samples, samples are not filtered, but acidified with (1:1) nitric acid to pH less than 2. Normally, 3 milligrams per liter (mL) of (1:1) acid per liter of sample is sufficient for most drinking water samples). **To avoid the hazards of strong acids in the field, transport restrictions, and possible contamination, samples must be returned to the laboratory as soon as possible after collection and acid-preserved upon receipt in the laboratory.** Following acidification, the sample should be mixed, held for 16 hours, and then verified to be pH less than 2 just 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 16 hours until verified to be pH less than 2.

Sample preservation is summarized in Table 1.

Sample Holding Time

Holding time refers to the maximum time that samples may be held after the

sample is taken until analysis and still be considered valid. Sample hold times are summarized in Table 1. The regulatory holding times for the WQPs are as follows:

- calcium, iron, manganese, sodium, and hardness—6 months
- chloride, sulfate—28 days
- alkalinity—14 days
- TDS—7 days.

The regulatory holding times for inhibitory residues is 28 days for silicate and 48 hours for orthophosphate.

Holding times cannot exceed the time frames specified above; however, when implementing this request, laboratories should be mindful that the applicable monitoring periods end each year on June 30 and December 31. Federal and state rules require that all data be received by the TCEQ 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 limited. To avoid this situation, PWSs should collect samples as early as possible in the monitoring period. 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 longer than 48-hours for orthophosphate and seven days for the rest of the WQPs.

The measurements taken by the sample collector *in situ* or immediately upon collection (field measured) are pH and temperature.

Sample Containers

Samples are collected in 1-liter (L) laboratory grade plastic and provided by the laboratory. Two 1-liter of sample are sufficient for all analyses. Laboratory containers must be provided by the laboratory without preservative and be either pre-certified or lot tested by the laboratory to be free from the analytes of interest.

Table 1.Table 1. Sample Handling-Preservation and Containers

Parameters	Preservative	Container
pH	None	Field measurement
temperature	None	Field measurement
conductivity	Cool, 4°C	1-L plastic
calcium	Conc. HNO_3 to pH<2	1-L plastic
manganese	Conc. HNO_3 to pH<2	1-L plastic
iron	Conc. HNO_3 to pH<2	1-L plastic
sodium	Conc. HNO_3 to pH<2	1-L plastic
hardness	Conc. HNO_3 to pH<2	1-L plastic
alkalinity	Cool, 4°C	1-L plastic
chloride	Cool, 4°C	1-L plastic
sulfate	Cool, 4°C	1-L plastic

Table 1.Table 1. Sample Handling-Preservation and Containers

Parameters	Preservative	Container
orthophosphate	Cool, 4°C	1-L plastic
silica	Cool, 4°C	1-L plastic
total dissolved solids (TDS)	Cool, 4°C	1-L plastic

Rejecting Samples at Time of Laboratory Receipt

Laboratories should reject samples at the time of receipt if samples and/or paperwork do not comply with requirements defined in this document. Reasons for rejecting samples correspond to the rejection codes in the Table of WQP Rejection Codes later in this document. They include but are not limited to:

- Form #20679 and/or label not provided with sample(s)
- Handwriting not legible
- Form #20679 does not match the bottle label
- Form #20679 unsigned by the PWS official
- Incomplete or missing information
- Not the most current TCEQ Form #20679
- Incorrect date
- Temperature and/or pH not recorded on Form #20679
- Holding time exceeded
- Wrong containers
- Leaking or broken container

A laboratory is not allowed to make corrections to forms or labels unless authorized by the the Lead and Copper Program. If there is a question regarding sample rejection, the laboratory or the PWS should contact the Lead and Copper Program for guidance. In no case can changes be made to documentation after the PWS representative has signed the submission form unless the TCEQ has been consulted and grants permission. Under these circumstances, all copies must be corrected identically by the laboratory, initialed, and dated.

WQP Sample Analysis

Approved Methods

All WQP samples must be analyzed using methods designated by the EPA under the SDWA, as indicated in the Table 2. 40 CFR Part 141 is the ultimate reference for approved methods and takes precedence over the table below. The information in the table is subject to change at any time. For definitive method information, particularly regarding method editions, refer to: <https://www.epa.gov/dwanalyticalmethods/approved-drinking-water-analytical-methods>.

Table 2. Approved Methods for WQP Sample Analysis

Parameter	Units	EPA	ASTM[3]	SM[2]	Other
alkalinity	mg/L		D1067-11 B D1067-06 B D1067-02 B D1067-92 B	2320 B 2320 B-97	I-1030-85[1]
calcium (Ca)	mg/L	200.5 Rev 4.2[4] 200.7 Rev 4.4[5]	D511-09 A D511-03 A D511-93 A D511-09 B D511-03 B D511-93 B D6916-03 D6919-09	3111 B 3120 B 3500-Ca B 3500-Ca D 3111 B-99 3120 B-99 3500-Ca B-97	
conductivity	µmhos/cm		D1125-97 A D1125-91 B	2510 B 2510 B-97	
chloride	mg/L	300.0 Rev 2.1[5] 300.1 Rev 1.0[6]	D4327-03 D4327-97 D512-04 B D512-89 B	4110 B 4500-Cl B 4500-Cl D 4110 B-00 4500 Cl B-97 4500 Cl D-97	D6508 Rev.2[8]
hardness as $CaCO_3$	mg/L	130.1	D1126 D1293	2340 C	I-1586-85[1]
iron	mg/L	200.5 Rev 4.2[4] 200.7 Rev 4.4[5] 200.9 Rev 2.2[5]		3111 B 3113 B 3120 B 3111 B-99 3113 B-04 3113 B-99 3120 B-99	
orthophosphate-P	mg/L	300.0 Rev 3.0[5] 300.1 Rev 1.0[6] 365.1 Rev 2.0[5]	D4327-03 D4327-97 D6508-00 D515-88A	4110 B 4500-P E 4500-P F 4110 B-00 4500-P B-99 4500-P F-99	I-1601-85[1] I-2598-85[1] I-2601-90[1]
manganese	mg/L	200.5 Rev 4.3[4] 200.7 Rev 4.4[5] 200.8 Rev 5.4[5] 200.9 Rev 2.2[5]		3111 B 3113 B 3120 B 3111 B-99 3113 B-04 3113 B-99 3120 B-99	
pH	pH units	150.1[7] 150.2[7]	D1293-12 D1293-99 D1293-95 D1293-84	4500-H B 4500-H B-00	
silica	mg/L	200.5 Rev 4.2[4] 200.7 Rev 4.4[5]	D859-10 D859-05 D859-00 D859-94 D859-88	3120 B 4500-Si D 4500-Si E 4500-Si F 4500-SiO_2 C 4500-SiO_2 D 4500-SiO_2 E 4500-SiO_2 F 3120 B-99	I-1700-85[1] I-2700-85[1]

Table 2. Approved Methods for WQP Sample Analysis

Parameter	Units	EPA	ASTM[3]	SM[2]	Other
				4500-SiO_2 C-97 4500-SiO_2 D-97 4500-SiO_2 E-97	
sodium	mg/L	200.5 Rev 4.2[4] 200.7 Rev 4.4[4]	D6919-00 D6919-03	3111B 3111 B-99	
sulfate	mg/L	300.0 Rev 2.1[5] 300.1 Rev 1.0[6] 375.2 Rev 2.0[5]	D4327-03 D4327-97 D516-11 D516-07 D516-02 D516-90	4110 B 4500-SO_4^{2-} C 4500-SO_4^{2-} D 4500-SO_4^{2-} E 4500-SO_4^{2-} F 4110 B-00 4500-SO_4^{2-} C-97 4500-SO_4^{2-} D-974500-SO_4^{2-} E-974500-SO_4^{2-} F-97	D6508[8]
temperature	degrees C			2550 2550-00	
TDS (dried at 180 C)	mg/L			2540 C	

1. Methods for determination of Inorganic Substances in Water and Fluvial Sediments, USGS Series: Techniques of Water- Resources Investigations 05-A1<http://pubs.er.usgs.gov/>
2. Multiple editions of Standard Methods for the Examination of Water and Wastewater may be used. Copies may be obtained from the American Public Health Association, 1015 Fifteenth Street NW, Washington, DC 20005. Refer to <https://www.epa.gov/dwanalyticalmethods>
3. Multiple editions of Annual Book of ASTM Standards, Volume 1 may be used. Refer to <https://www.epa.gov/dwanalyticalmethods>
4. Determination of Trace Elements in Drinking Water by Axially Viewed Inductively Coupled Plasma-Atomic Emission Spectrometry <http://www.epa.gov/nerlcwww/ordmeth.htm>
5. Methods for the Determination of Metals in Environmental Samples, Supplement 1<http://www.nemi.gov>
6. Methods for the Determination of Organic and Inorganic Compound in Drinking Water, Volume 1 <https://www.epa.gov/dwanalyticalmethods>
7. Methods for Chemical Analysis of Water and Wastes <http://www.nemi.gov>
8. Test Methods for Determination of Dissolved Inorganic Anions in Aqueous Matrices Using Capillary Ion Electrophoresis and Chromate Elecrolyte . Annual Book of ASTM Standards, Section 11, Water and Environmental Technology, Volume 11.01, Water (I) <https://www.nemi.gov/methods/method_summary/5442>

Analytical Sensitivity

Analytical sensitivity refers to the ability of an analytical instrument and/or method to detect or analyze small quantities of analyte. This is numerically characterized by the determination of detection and reporting limits, and blanks. Aspects of sensitivity as they apply to the analysis of water quality parameters are described below.

Method Detection Limit

The Method Detection Limit (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

It is the policy of the TCEQ PWSS Program to not use "J flagged" (i.e., estimated) data to make compliance determinations; therefore, laboratories must comply with MRL requirements defined below.

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 WQPs at levels less than the level at which they routinely analyze their lowest 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 the MRL verification before continuing if results are out of control.

Method Blank

A method blank (MB) is 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 conform to method specific requirements, whichever is more stringent.

Reporting Data

The results of drinking water analyses conducted on the behalf of the TCEQ are reported to the TCEQ (1) at least once per month, in a PDF format for the TCEQ Central File Room (as explained below), and (2) at least weekly, as an electronic data deliverable (EDD) (also explained below). All compliance data should be reported to the TCEQ. Sample results should never be changed from compliance to non-compliance or vice versa after they have been submitted to the laboratory.

Note: The TCEQ PWSS Program does not use "J flagged" (i.e., estimated) data to make compliance determinations. Therefore, laboratories must not report "J flagged" data to the PWSS Program. Rather, laboratories must comply with the MRL requirements defined in the previous section.

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. The requirements for reporting data and the procedures are provided below. At the very minimum, water quality parameter analytical test reports should include the following even if the laboratory is reporting within its own organization.

- The PWS number, name, and address

- The sample point address
- The date and time of collection
- The name and address of the laboratory
- The Laboratory ID numbers
- The date and time of sample receipt, the date(s) and time(s) of analysis, and the name of analyst
- Identification of the analytical method used
- A note of any deviations from a standard method and any environmental conditions which may bear upon the results
- The test results with relevant data flags
- Numerical values for the MDL and MRL
- Quality control results
- Data comments or case narrative

Submission of Form #20679, Analytical Reports, and COC

The TCEQ retains all analytical data and information in its central files for a period of time according to federal and state record retention regulations. Therefore, all laboratories are required to submit the following data and information at least once a month electronically in portable document format (PDF).

- Original PWS Form #20679
- Copy of the laboratory COC (if applicable)
- Copy of all analytical test reports given to the PWS.

Please note that when the douments are scanned, Form #20679, should be on top. This helps manage the large number of documents received at the TCEQ.

When the PDFs are transmitted to the TCEQ, the analytical report should be transmitted to the PWS at the same time, or within the same timeframe. This helps to ensure that the TCEQ and the PWS have the same information within a reasonable timeframe.

The following metadata is needed 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: Analysis Report

Example 1:

PWS_1010014_AC_20150928_LCR Analysis Report (prinited on paper before scanning, top right corner)

Example 2:

PWS_1010014_AC_20150928_LCR Analysis Report.PDF (electronic file name)

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 postal address to send hardcopy data reports and associated information is:

Texas Commission on Environmental Quality
Attn: Lead and Copper Program
MC 155
PO Box 13087
Austin, TX 78711-3087

Laboratories should coordinate with the TCEQ LCP before mailing data and information to the TCEQ.

Electronic Data

SDWIS was designed to enable electronic submissions of data using Lab to State and XML Sampling Application. Electronic data submitted via Lab to State must be in eXtensible Markup Language (XML), Open Database Connection-Structured Query Language (ODBC-SQL), or Comma Separated Value (CSV). Lab to State then converts the submitted file to XML for submission to XML Sampling. XML Sampling validates or rejects the submitted electronic data prior to migration into SDWIS. Lab to State and XML Sampling require electronic data to be submitted as two separate files: a sample file and a result file. The sample and result files should be submitted together to the TCEQ as soon as the samples are analyzed and at least weekly. The field structures and requirements for each file are included in this addendum. T he 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 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 should be submitted to the TCEQ with the following file naming convention.

Lab Name_WQP_the date of submittal.

An example of this naming convention’s use is as follows:
CHEMLAB_WQP_19FEB2015

Sample Table

The sample table file structure contains information about the sample, including collection date and time, the collector, laboratory, sample point IDs, and the corresponding addresses where the lead and copper tap samples were taken. The

sample table file structure is outlined in Table 3.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 numeric or alpha characters, as designated in field descriptions. Those fields marked as "N/A" should be left blank.

An EDD must be generated for all rejected samples and results. See section below on Sample and Result Rejection.

SDWIS uses three identifiers to describe the sample location:

- Facility [B_WSF_STATE_ASSGN_ID] for Water Quality Parameters will always reflect either a sampling location in the distribution system (i.e., DS01) or entry point (e.g., EP001, EP002, or EP003).
- Sample Point [B_SAMPLING_POINT] which for WQPs will typically be "TRT-TAP" for entry points or "RAW-TAP" for raw water sources. (These can be found in Drinking Water Watch). The PWS is required to fill out Form 10679 and provide the laboratory with the sampling points when presenting bottles.
- Sample Location [B_SAMPLING_LOCATION] for WQP samples will always be an address.

Table 3. Sample Table File Structure

#	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, precede with "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	Lab Accreditation or approval ID Number	Text	15
9	B_WSF_STATE_ASGN_ID	Examples: DS01= Samples taken in distribution system EP001, EP002, etc. = samples taken at entry points	Text	12

Table 3. Sample Table File Structure

#	Field Name	Description	Data Type	Field Size
10	B_SAMPLING_POINT	Examples: "RAW-TAP" = raw water "TRT-TAP" = entry point DSTWQP = distribution system	7	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) astext in the following format – HH:MM:SS	Text	8
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 bottles formatted – MMDDYYYY	Text	8
19	B_COLLECTOR_NAME	Sample collector name	Text	40
20	B_SAMPLE_VOLUME	N/A		
21	B_LEAD_COPPER_SAMPLE_TYPE	"ATS" if WQPs are sampled at raw water sampling points "FLS" if WQPs are sampled at entry points or from the distribution system		
22	B_SAMPLE_REJECTION_REASON	Reject Code if applicable=see list of rejection codes. Reject Codes	Text	2
23	B_COLLECTION_METHOD_CODE	N/A		
24	B_ORIGINAL_LAB_SAMPLE_NUMBER	N/A		
25	B_ORIGINAL_COLLECTION_DATE	N/A	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_TEMPERATUR	Field measured temperature		
31	B_TEMPERATURE_UNIT_MEASURE	"F" or "C"		
32	B_TURBIDITY_MEASURE	N/A		
33	B_PH_MEASURE	Field measured pH		
34	B_FLOW_RATE	N/A		
35	B_SAMPLE_PURPOSE	N/A	Text	2
36	B_STATE_CLASSIFICATION_CODE	WQP	Text	3

Table 3. Sample Table File Structure

#	Field Name	Description	Data Type	Field Size
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	Lab certification or approval Accreditation ID Number (if replacing a previously rejected sample)	Text	7
39	B_SAMPLE_COMMENTS	Comments related to the entire sample (e.g.,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. The result table file structure is outlined in Table 4. There may be multiple records depending on how many constituents were analyzed in the particular water sample. 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 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. Those fields marked as "N/A" should be left blank.

Table 4. Result Table File Structure

#	Field Name	Description	Data Type	Field Size
1	B_FILE_NAME	Default to "result"	Text	6
2	B_RECORD_ID	Auto-number, unique	Auto Number	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, 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	Lab certification or approval Accreditation ID Number, check with TCEQ for laboratory unique number	Text	15

Table 4. Result Table File Structure

#	Field Name	Description	Data Type	Field Size
8	B_ANALYTE_CODE	Alkalinity (1927), calcium (1016), chloride (1017), conductivity (1064), hardness (1915), iron (1028), manganese (1032), pH (1925), sodium (1052), sulfate (1055), temperature (1996), TDS (1930), orthophosphate (1044), calcium carbonate (1919), and 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: HH:MM:SS	Text	8
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: HH:MM:SS	Text	8
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 current 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
13	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 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_INDICATO	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 such as mg/L if field=“Y”	Text	10

Table 4. Result Table File Structure

#	Field Name	Description	Data Type	Field Size
28	B_CONCENTRATION	Populate with concentration if field 24="N"	Number	Double
29	B_CONCENTRATION_UNIT_CODE	Populate with concentration units such as mg/L or umho/cm if field 24 ="N"if field 24 = "N"	Text	9
30	B_REPORTED_MEASURE	N/A		
31	B_REPORTED_MEASURE_COUNT_ER	N/A		
32	B_COMMENT	Comment specific to result	Text	254
33	B_STATE_SAMPLE_NUMBER	N/A		

Sample and Result Rejection

Laboratories may reject samples or results in coordination with the TCEQ and the PWS. If the sample is delivered to the laboratory, the rejected samples/results must still be reported to the TCEQ electronically. The table below lists description codes for rejecting both samples and results. The rejection "description" will dictate whether it is reported on the SAMPLE table or the RESULT table.

For example, if a sample is delivered in excess of the holding times described in this document, the lab should reject the sample, request a resample, and notify the TCEQ LCP. The sample rejection will be reported to the TCEQ in an EDD with just the sample table completed with no results. The rejection code "EH" for "exceeds holding time" will be used. When the 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 resample and document the intent to sample The rejection codes and descriptions are listed in Table 5.

Table 5. Sample Rejection Codes and Descriptions

CODE	DESCRIPTION
AR	Agency Rejected (TCEQ Use Only)
BR	Broken In Transit
BP	Invalid sample Point
CA	Cancel Test
CI	Can't ID
CL	Chlorine Present
CP	Cancelled (Payable)
EH	Exceeded Hold Time
FZ	Sample Frozen
HS	Excess Head Space
IC	Invalid Container
ID	Invalid Date/Time
IN	Insufficient Sample 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
MP	Missing pH (when required)
MT	Multiple Tests Requested

Table 5. Sample Rejection Codes and Descriptions

CODE	DESCRIPTION
NC	No Chlorine Residual
ND	No Date/Time
NM	Not Measured
NR	No Sample Received
NS	No Sampler Signature
NT	No Test Specified
PH	pH Out of Range
PR	Improperly Preserved
PS	No PWS Representative Signature
QC	QA/QC
QI	Quantity Insufficient
RS	Redundant Sample
SB	Custody Seal Broken/Tampered
SE	Shipping Error
SM	Custody Seal Missing
TH	Temperature Too High
TN	Test Not Available
VO	Insufficient Volume

Analytical Records Maintained by the Laboratory

The laboratory should maintain easily accessible records 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 requirements. The laboratory must notify the PWS before disposing of records which are less than five years old so they may request copies if needed. This includes all raw, data, calculations, and quality control information. If the laboratory changes its computer hardware or software, it should make provisions for transferring old data to be retrievable in the timeframe listed above.

Corrective Actions (CA)

Any person involved with work described in this document may initiate a CA if there is deviation from required or standard 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 CA(s) 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.

If laboratory deviations involve the following list, the laboratory QA Officer must notify the PWSS Program QA Manager by phone or email within 48 hours, draft a CA report, and submit it to TCEQ within 14 days of the incident detection.

- Jeopardizes the integrity of sample analysis 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.

- Definition of problem-how it was identified and the date it was identified
- Root cause
- Description of the consequences–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 to determine if actions taken resolve the deviation are acceptable. 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 an acceptable CA is achieved.

If corrected data need to be submitted to the TCEQ, they must be submitted in a completely separate file from routinely submitted data. The PWSS Program QA Manager should be contacted in advance for instructions 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 less than 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 less than five years old to be retrievable in the timeframe listed above.

Exhibit 1: WQP Chain of Custody Form #20679

WATER QUALITY PARAMETER CHAIN OF CUSTODY FORM 20679

Section I (PWS Information)		Section II (Completed by Laboratory)
PWS Name **PWS ID #:** **PWS Contact Name** **PWS Contact Number**	**PWS Type:** ☐ Community ☐ NTNC **Population:** ☐ <50,000 ☐ 50,001 to 100,000 ☐ >100,000	**Lab Name:**
☐ Initial ☐ Annual ☐ Triennial	☐ Tap Copper Exceedance ☐ Tap Lead Exceedance	**Laboratory Address:**
☐ Distribution System ☐ Entry Point	# DS Samples Required: # DS Samples Submitted: # EP Samples Required:…… # EP Samples Submitted:	**Laboratory Contact Name:**
Inhibitor or stabilizer used: ☐ Phosphate ☐ Calcium carbonate ☐ Silica		**Lab Phone:** **Parameters Requested:** *Analyses are required for the parameters checked. If inhibitors containing PO4 or silicate are used, then these parameters should also be tested depending on which is used..

Sample Point ID (e.g. RWQP, EWQP, DSTWQP)	Source ID (e.g. DS01, EP001)	Sample Location	Sample Collection Date (MMDDYY)	Sample Collection Time (HHMM)	pH (1925)	pH method	Temp (°C) (1996)	Temp Method	Lab Sample ID	Alkalinity (1927)	Calcium (1016)	Chloride (1017)	Conductivity((1064)	Hardness (1915)	Iron (1028)	Manganese(1032)	Sodium (1052)	Sulfate ((1055)	TDS (1930)	O-phosphate (1044)	Silica ((1049)
										✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	*	*
										✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	*	*
										✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	*	*
										✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	*	*
										✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	*	*
										✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	*	*

I acknowledge that the information on this form is true and correct and sites selected for sampling following TCEQ instructions including but not limited to the measurement of pH and temperature according to approved methods immediately upon collection (within 15 minutes)

____

Name **Signature** **Date**

Containers

☐ **2 L plastic bottles**

☐ **1 L preserved upon receipt**

Conditions Upon Receipt

☐ **Ice** ☐ **Ambient**

Temp Upon Receipt:

Corrected Temp Upon Receipt:

Comments:

Relinquished By (Name, Signature)	Date	Time	Received By: (Name, Signature)	Date	Time

(For TCEQ use only) ☐ **Disapproved** ☐ **Accepted** **Comments:**