Sampling, Analysis, and Reporting of Chemical Compliance Data

Addendum #1
(Revision 0)

to the

Quality Assurance Project Plan for the Texas Commission of Environmental Quality Public Water System Supervision Program Relating to the Safe Drinking Water Act
(Revision 12)

Effective
November 4, 2016
<table>
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<tr>
<th>Acronym</th>
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<td>DWQT</td>
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<td>DWSG</td>
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<td>TNI</td>
<td>The NELAC Institute</td>
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<td>VOC</td>
<td>volatile organic chemical</td>
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<tr>
<td>WSD</td>
<td>Water Supply Division</td>
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</tbody>
</table>
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
A1 Title and Approval Page – PWSSP QAPP, Addendum #1

The following individuals listed on this page and those following are signatories on this Programmatic Quality Assurance Project Plan (QAPP) Addendum because they are responsible for the direct oversight, implementation, and quality assurance of the work described in this addendum. Other individuals involved with the oversight of this project are signatories on the Programmatic QAPP for which this addendum is a part.

Texas Commission on Environmental Quality (TCEQ)

Gary Regner, Public Water System Supervision (PWSS) Program Quality Assurance (QA) Manager, and TCEQ Drinking Water Compliance Sampling Contract (Sampling Contract) Manager

TCEQ/Office of Water (OW)/Water Supply Division (WSD)/Public Drinking Water Section (PDWS)/Drinking Water Quality Team (DWQT)

Signature: [Signature] Date: 01/25/16

Steven Swierenga, Team Leader

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

Signature: [Signature] Date: 8/26/2016
A1 Title and Approval Page – PWSSP QAPP, Addendum #1

Texas Department of State Health Services (DSHS)

Grace Kubin, Director
DSHS, Laboratory Services Section (LSS), Environmental Services Branch (ESB)

Signature: ___________________________ Date: 08/24/2016

Carl Hogberg, Manager
DSHS, LSS, ESB

Signature: ___________________________ Date: 8/24/16

Robert Morris, QA Officer
DSHS, LSS, ESB

Signature: ___________________________ Date: 8/25/16
A1 Title and Approval Page – PWSSP QAPP, Addendum #1

Crisp Analytical Laboratory (Asbestos Analysis)

Chad Lytle, Director
Crisp Analytical Laboratory

Signature: ___________________________ Date: 8-25-16

Leslie Crisp, Laboratory QA Officer
Crisp Analytical Laboratory

Signature: ___________________________ Date: 8-25-16
Drinking Water Compliance Sampling Contractor–Antea USA, Inc.

Eric W. Muehlberger, P.G., Program Manager

Signature: [Signature] Date: 8/23/16

Colin Crawford, QA Manager

Signature: [Signature] Date: 8-23-2016
A1 Title and Approval Page – PWSSP QAPP, Addendum #1

Lower Colorado River Authority Environmental Laboratory Services (LCRA-ELS)

Alicia Gill, Manager
LCRA-ELS

Signature: [Signature]
Date: 08/25/2016

Jennifer Blossom, Laboratory QA Officer
LCRA-ELS

Signature: [Signature]
Date: 08/25/2016

Sampling, Analysis, & Reporting Chemical Data
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## A3 Distribution List

Individuals who will receive a final copy of this Programmatic QAPP Addendum and any subsequent revisions, the TCEQ *Drinking Water Sampling Guide (DWSG)*, current edition, and the *Sampling Contract Management Plan (SCMP)*, current edition, include the individuals listed in the table below. Division directors, section managers, and the TCEQ QA Manager will receive this addendum with the Programmatic QAPP as specified in its distribution list.

### QAPP Recipients—TCEQ

<table>
<thead>
<tr>
<th>QAPP Recipients</th>
<th>Title</th>
<th>Organization</th>
<th>Contact Information</th>
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</thead>
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### QAPP Recipients—DSHS

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<th>Title</th>
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<tbody>
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### QAPP Recipients—LCRA-ELS

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### QAPP Recipients—Crisp Analytical

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<tr>
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<td>Laboratory Manager, Crisp Analytical</td>
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### QAPP Recipients—Antea USA, Inc.

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<tr>
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<td>Program Manager</td>
<td>Antea USA, Inc.</td>
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<td>QA Manager</td>
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A4 Project/Task Organization

The following individuals participate directly in the sampling, analysis, and reporting of chemical compliance data for the PWSS Program. This section includes a description of their roles and responsibilities. Roles for other individuals (e.g., Division Director, Section Manager, TCEQ QA Manager) are described in the Programmatic QAPP. The project Organization and Communication Flow Chart is presented in Exhibit 1. Names and contact information for additional TCEQ staff are included in Appendix L of the Drinking Water Sampling Guide (DWSG).

Gary Regner, PWSS Program QA Manager and Sampling Contract Manager

In role of PWSS Program QA Manager, coordinates development and implementation of the QA program for the PWSS Program. Responsible for development and management of the QAPP, coordinating, monitoring, and reporting on corrective actions, and providing assistance and communication to project staff in areas of QA and quality-control (QC).

In role of Sampling Contract Manager, oversees the Sampling Contract and acts as agency liaison for the contract sample collectors. Audits sample collectors, coordinates organic chemical compliance, and communicates and coordinates with the laboratories on issues related to data acquisition and data quality.

Eric W. Muehlberger, P.G., (Sampling Contract Program Manager) and Colin Crawford (QA Manager), Antea USA, Inc.

Supervises sample collectors and subcontractors, manages scheduling and is responsible for sample collection QA. Contract staff or their subcontracted staff conducts all routine chemical compliance sampling of public water systems (PWS). The Austin office is responsible for sample collection in the Central Texas area.

Note: The Antea USA, Inc. Sampling Contract Management Plan (SCMP) (provided as a separate document) describes additional roles for the Project Managers, sample collectors, and the Database Specialist. Antea USA, Inc.’s Standard Operating Procedure (SOP) No. COMMUNICATION contains specific detail on how the Group communicates internally within the organization and externally with the TCEQ and PWS.

Carl Hogberg, ESB Manager & Robert Morris ESB QA Officer, Texas DSHS LSS

Manages workload and personnel. Responsible for overseeing QA activities for the analysis of public drinking water samples. Responsible for implementing QC programs and maintaining verification of the procedures establishing the level of quality.

Alicia Gill (Manager) & Jennifer Blossom (Laboratory QA Officer), LCRA-ELS

Manages workload and personnel. Responsible for overseeing QA activities for the analysis of public drinking water samples. Responsible for implementing QC programs and maintaining verification of the procedures establishing the level of quality.
Chad Lytle (Director) and Leslie Crisp (QA Officer), Crisp Analytical Laboratory

Manages workload and personnel. Responsible for overseeing QA activities for the analysis of public drinking water samples for asbestos. Also responsible for implementing QC programs and maintaining verification of the procedures establishing the level of quality.

A5 Problem Definition/Background

The Safe Drinking Water Act (SDWA) was passed by Congress in 1974 to protect public health by regulating the nation’s public drinking water supply. The SDWA authorizes the US Environmental Protection Agency (EPA) to set national health-based standards for drinking water to protect against both naturally-occurring and man-made contaminants that may be found in drinking water. The EPA also sets secondary drinking water regulations, which are non-enforceable guidelines for contaminants that may cause cosmetic effects (such as skin and tooth discoloration) or aesthetic effects (such as taste or odor). The federal regulations that address the SDWA include 40 Code of Regulations (CFR) Part 141 National Primary Drinking Water Regulations (NPDWR); 40 CFR Part 142, NPDWR Implementation; and 40 CFR Part 143 National Secondary Drinking Water Regulations (NSDWR).

The State of Texas retains primary enforcement authority for the 1974 SDWA and its amendments, by maintaining a PWSS Program consistent with federal regulations. These regulations include, but are not limited to requirements for water systems to test for contaminants to make sure standards are achieved. As one part of its primacy agreement with the EPA, the TCEQ Water Supply Division (WSD) is responsible for determining compliance of public water systems (PWS) with requirements related to water quality (chemical) standards contained in the NPDWR and NSDWR (40 CFR Part 141 and 143) as well as 30 Texas Administrative Code (TAC) §290 Subchapter F Drinking Water Standards Governing Drinking Water Quality and Reporting Requirements for PWSs. These rules require the collection and analysis of drinking water samples to determine whether chemicals contaminants are present in the public’s drinking water above the limits set by regulation.

Under this Programmatic QAPP Addendum, chemical samples are collected for laboratory testing and reported to the TCEQ to verify that the water they provide to the public meets all federal and state standards. According to the TCEQ QMP, these activities are defined by the EPA and the TCEQ as environment data operations (See EPA Requirements for QAPPs, EPA QA/R-5). As such, the related QA processes regarding organization, planning, implementation, and assessment must be addressed in a QAPP which is reviewed and approved by the EPA. This document is written as an addendum to the Programmatic QAPP as referenced on the title page of this document. Other environmental data operations of the PWSS Program such as Source Water Assessments; sanitary surveys; the collection, analysis, and acquisition of microbial data; etc. are addressed in other Programmatic QAPP addendums.
A6 Project/Task Description

Under this Programmatic QAPP Addendum, chemical drinking water samples are collected, analyzed, and reported to the TCEQ WSD to ensure compliance with federal drinking water standards per the SDWA as described in Section A5. The regulated and unregulated contaminant types collected, analyzed, and reported under this Programmatic QAPP Addendum include:

- Inorganic contaminants
- Volatile organic contaminants
- Synthetic organic contaminants
- Disinfection byproducts
- Radionuclides
- Secondary constituents

Funding for activities described in this Programmatic QAPP Addendum is provided by a combination of local and state funds as well as federal State Revolving Fund Grants.

For the field portion of this project, the TCEQ specifies its requirements in this Programmatic QAPP Addendum pursuant to those defined in the Sampling Contract including:

- The DWSG, Current Edition (provided as a separate document)
- TCEQ QMP (most recent edition) <https://www.tceq.texas.gov/field/qa>
- PWSSP Programmatic QAPP
- PWS Water Analysis Form (included in the DWSG; or approved Electronic Data Collection format)
- COC (included in the DWSG)
- Field Report (included in the DWSG)
- Electronic Data Reporting Format (included in the DWSG)
  - Reports: Monthly Sample Collection Report (electronic)
  - Monthly Field Reports (electronic)
- DWQT—SOP # 12-06: Authorization to Collect Chemical Compliance Water Samples

The sampling contractor adopts and incorporates guidance and requirement documents above into their documents. The sampling contractor reviews their documents on an annual basis and any updates are incorporated into their program.
documents which are reviewed and approved by the TCEQ contract manager. The following are a list of these documents.

**SCMP (provided as a separate document) which includes:**

- **Quality Assurance Plan (QAP)**
- **SOPs**
  - Office, Vehicle and Sampler Auditing *SOP No. AUDITING*
  - Internal/External Communication *SOP No. COMMUNICATION*
  - Sample Collection Data Entry QA/QC *SOP No. DATA ENTRY QA/QC*
  - Field Instrumentation *SOP No. FIELD INSTRUMENTATION*
  - USB GPS Device on the Tablet *SOP No. EDC GPS*
  - Sample Collection *SOP No. SAMPLING*
  - Sampling and Appointment Scheduling *SOP No. SCHEDULING*
  - Sampler Training *SOP No. TRAINING*
- **Health and Safety Plan**

For the laboratory portion of this project, the TCEQ specifies its requirements for analysis and reporting in this Programmatic QAPP Addendum pursuant to federal regulations, state rules, approved analytical methods, laboratory standards and procedures, and project specific-TCEQ requirements pertaining to this project including:

- National Drinking Water Regulations, 40 CFR Parts 141, 142, 143
- Rules and Regulations for Public Water Systems, 30 TAC §290
- TCEQ Environmental Laboratory (NELAP) Accreditation Requirements, 30 TAC §5 <https://www.tceq.texas.gov/field/qa/env_lab_accreditation.html>
- **PWSSP Programmatic QAPP**
- **TCEQ QMP**
- **TCEQ DWSG, Current edition (Provided as a separate document)**
- The NELAC Institute, *National Environmental Laboratory Accreditation Program Standard*, <http://www.nelac-institute.org/content/CSDP/standards.php>
- EPA and TCEQ approved analytical test methods (See Section B4)
- Laboratory quality manuals or quality system manuals (however named) and standard operating procedures
TCEQ project-specific data management and reporting requirements as included or referenced in this document

Description of Tasks
The processes described below to manage, collect, analyze, report, and use chemical compliance data are a joint effort of the TCEQ, its sampling contractor, Antea USA, Inc. and the laboratories. This Programmatic QAPP Addendum addresses Steps 2 and 3 and reflects the activities of the sampling contractor and the laboratories. Steps 1, 4, and 5 are the responsibility of the TCEQ and associated activities are described in the Programmatic QAPP. An overview of these work activities is included in the flow chart in Exhibit 2 of this Programmatic QAPP Addendum.

1. The TCEQ PWSS Program staff oversees sampling, analysis, and reporting; develops applicable requirements; and provides them to Antea USA, Inc. and the laboratories.
   - Develops Sampling Contract Scope of Work (Exhibit 3) and maintains requirements and forms for chemical sampling and analysis, including but not limited to this Programmatic QAPP Addendum.
   - Generates routine sampling schedule based on available data contained within SDWIS.
   - Certifies and audits samplers to ensure the sampling contractor and authorized subcontractors comply with all QA practices for the collection of compliance drinking water samples.
   - Coordinates with designated, accredited laboratories to ensure data of known and acceptable quality.

2. The sampling contractor collects samples per TCEQ requirements and provides them to a designated accredited laboratory.
   - Maintains SCMP including QAP and SOPs consistent with TCEQ requirements.
   - Manages, trains, and evaluates samplers on sample collection activities, required documentation, and communication procedures.
   - Conducts field sampling and submits samples to designated laboratories.
   - Maintains and reports all sampling and associated data and information to the TCEQ, as required.
   - Meets with the TCEQ and subcontractors as required in the sampling contract.
   - Participates in TCEQ audits.

3. Laboratories analyze samples and provide electronic and hard copy results to the TCEQ.

The DSHS Bureau of Laboratories, the LCRA-ELS, and Crisp Analytical receive, analyze, and report samples according to protocols defined within this Programmatic QAPP Addendum and referenced documents. The LCRA analyzes organic, minerals, metals, and disinfection byproduct compliance samples. The DSHS laboratory also analyzes organics, minerals, metals, disinfection byproduct
compliance samples; and all radiochemical, free cyanide, endothall, glyphosate, diquat and PCB samples. All asbestos samples are analyzed by Crisp Analytical.

4. TCEQ PWSS Program staff receives, QAs, migrates, and manages data; and determines compliance.
   - Maintains sampling records on all water systems. Ensures required chemical data are submitted.
   - Receives, evaluates, and records sample analysis results.
   - Updates schedules to reflect changes in sample sites, system status, or performance.
   - Maintains NPDWR compliance data in the Safe Drinking Water Information System (SDWIS).
   - Determines compliance with maximum contaminant level (MCL) requirements and generates appropriate compliance documentation.

5. TCEQ PWSS Program staff takes appropriate actions.
   - Notifies affected systems and regional field offices if a system is in violation.
   - Maintains NPDWR compliance data in SDWIS.
   - Determines compliance with public notification requirements; generate appropriate compliance documentation.
   - TCEQ Office of Compliance and Enforcement (OCE) takes appropriate legal action against PWSs that violate state rules, consistent with federal regulations.

A7 Quality Objectives and Criteria

The chemical data collected under this PWSS Programmatic QAPP Addendum are used to determine the chemical compliance status of public drinking water systems. As a result, the TCEQ can provide better protection of the health of all Texas citizens currently served by a public water system and all those who consume water from such systems.

The data quality objectives described below and measurement performance criteria in Exhibit 4 ensure that the type and quality of the analytical data generated meet the goals of the SDWA and support defensible compliance decisions and actions by the TCEQ.

Data Quality Objectives

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 the method detection limit (MDL) and the method reporting limit (MRL). Most drinking water methods require MDL calculations for all analytes.
**Note:** MDL calculations do not apply to the analysis of disinfection byproducts for drinking water analyses. However, very specific requirements regarding MRLs apply.

MDL and MRL requirements are defined and explained in Section B5 of this document.

**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 field and laboratory blanks, proficiency testing samples, calibration standards, quality control samples, etc. To control for bias, this project includes acceptance criteria and corrective actions for specific quality control samples as listed in Exhibit 4 and further defined in Section B5. Otherwise, all applicable procedures in rules, regulations, and requirements (e.g., analytical methods, SOPs, etc.) are followed. Results are compared against criteria defined in the methods and 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 duplicate samples for all analyses. To control for precision, this project includes acceptance criteria and corrective actions for specific quality control samples as listed in Exhibit 4 and further defined in Section B5. Otherwise, all applicable procedures in the rules, regulations, and requirements (i.e., analytical methods, SOPs) are followed. Results are compared against criteria defined in the methods and 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 the Sampling Contract, the *DWSG* and this Programmatic QAPP Addendum (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 sampler training, approved sampling and analysis methods and quality assurance protocols in accordance with requirements described in the Sampling Contract, the *DWSG*, and this Programmatic QAPP Addendum (and all referenced documents). Comparability is also guaranteed by standard reporting protocols described in Section B10 of the document.
Completeness
The completeness of the data is basically a relationship of how much of the data are available for use compared to the total potential data. To determine compliance, 99.9% must be collected and analyzed as enforcement may be necessary when results are not reported. This may occur when a sample is not collected because a PWS cannot be contacted, refuses sampling, or when a sampling site is unavailable. Additionally, the possibility of sample or data loss due to accidents, insufficient sample volume, broken or lost samples, laboratory issues, etc. is to be expected. The processes in place for these situations are described in the Sampling Contract, the sampling contractor’s SCMP, the DWSG, and this Programmatic QAPP Addendum so that these occurrences can be reported to the TCEQ and samples recollected (See Section C1).

Data Integrity
Data collected and reported under this Programmatic QAPP Addendum 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 used for their intended purposes.

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

A8 Special Training/Certification
All sampling and laboratory staff have the necessary training and certifications needed to meet the requirements of the work defined in this Programmatic QAPP Addendum. Appropriate supervision is provided for employees undergoing training. Personnel performing specific tasks are qualified on the basis of appropriate education, training, experience and/or demonstrated skills, as required. Continued competence is monitored and, where this is not achieved, the need to retrain personnel is considered. Training and certification requirements for this project are summarized below.

Sample Collector/Sampler Personnel Training and Verification
The Sampling Contract and the DWSG specify the TCEQ training and certification requirements for sampling staff. Additional detail, specific to TCEQ training requirements, is provided in DWQT SOP #12-06: Authorization to Collect Chemical Compliance Samples. This SOP describes the process for TCEQ evaluation and certification of sample collection staff by written and/or practical examination. It also describes mandatory monthly contractor performance evaluations, TCEQ-led and contractor-led field audits, and requirements for training documentation.
The sampling contractor has developed and maintains an SCMP which addresses training and includes a Sampler Training SOP No. TRAINING that is summarized below.

After the sampling contractor completes training and testing of new samplers, he/she is tested by TCEQ and authorized to collect samples. The sampler is issued an authorization letter from the TCEQ which is good through the end of the fiscal year or the end of the contract, whichever comes first.

On an annual basis, the TCEQ and/or the sampling contractor conducts sampler refresher training and evaluation on all samplers. This training is held in Austin, Texas. Besides being a general refresher training effort, the goal is to address any recurring and/or significant sampling issues or problems that have arisen during the previous year, and to train the samplers relative to any new sampling methods and/or protocols that will be added to the Sampling Contract. The contractor also conducts quarterly meetings via teleconference to discuss topics that arise between annual meetings.

The sampling contractor’s QA manager monitors sample rejection rates on a monthly basis. Samplers that do not meet contract deliverables are subject to remedial training and disciplinary action, up to and including termination.

The TCEQ also evaluates sampler performance monthly (statistical) and yearly (field audits) to ensure continued compliance with collection requirements.

In addition to sample collection training, sampling staff must attend a 40 hour Hazardous Waste Operations and Emergency Response (HAZWOPER) Training and obtain a TCEQ Class D Operator’s License within 90 days of the hire date. All training records are submitted to the TCEQ for verification.

**Laboratory Staff Training and Verification**

Laboratory training requirements are specified in both the TNI Standard and the Certification Manual and include Data Integrity Training. In general, laboratory personnel possess adequate experience and knowledge to perform all technical tasks assigned. Laboratory quality manuals contain functional job descriptions of project personnel and describe training to keep personnel updated on regulations and methodologies and require that they have demonstrated proficiency for the methods they perform (e.g., Initial Demonstrations of Capability).

Laboratory management authorizes specific personnel to operate particular types of equipment, to perform particular types of testing, to evaluate results and to issue test reports. Records of the relevant competence, educational and professional qualifications, training, skills and experience of all technical personnel and contracted personnel are maintained by the laboratory. This information, including initial and ongoing demonstrations of capabilities is readily available and includes the date on which authorization and competence was confirmed and the confirming authority.

**Laboratory Accreditation and Certification**

Laboratories performing work under this QAPP are required to be accredited for the chemical analysis of drinking water, consistent with 30 TAC §25 Environmental...
Testing for Laboratory Accreditation and Certification. The DSHS Bureau of Laboratories is the principal state laboratory for Texas and thus is also certified by the EPA as required by federal primacy requirements in 40 CFR Part 142.10(b)(4).

Independent of the laboratories’ certification status noted above, the laboratories that generate data under this Programmatic QAPP Addendum are subject to the applicable provisions of both Quality Standards – the *TNI Standard and the EPA Certification Manual*.

In general, the *TNI Standard* and the *EPA Certification Manual* contain equivalent provisions. However, the *TNI Standard* does not specify promulgated analytical methods and/or contain provisions specific to the DWP. In order to analyze data under this Programmatic QAPP Addendum, laboratories must comply with the additional requirements in the *EPA Certification Manual* specific to the PWSS Program and incorporate relevant practices into their operations. The use of the word “must” in the *EPA Certification Manual* includes elements that are required by the federal drinking water regulations.

**Proficiency Testing (PT) Samples**

Both the *TNI Standard* and the *EPA Certification Manual* also require successful analysis of initial and on-going PT samples. Both Programs require (1) PT samples be handled as routine samples, (2) PT samples be obtained from an approved provider, and (3) PT sample results be within the acceptable limits established by 40 CFR Part 141. Acceptance limits are specified on the TNI web site <http://www.nelac-institute.org/content/NEPTP/fopt.php#>.

**A9 Documents and Records**

The documents and records that describe, specify, report, or certify field and laboratory activities are listed in Table A9.

**Table A9. Documents and Records**

<table>
<thead>
<tr>
<th>Document/Record</th>
<th>Description</th>
<th>Location/Distribution</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sampling, Analysis and Reporting of Chemical Compliance Data - QAPP Addendum and Revisions</td>
<td>QAPP Addendum to PWSS Program QAPP documenting QA/QC practices related to chemical compliance sampling, analysis and reporting.</td>
<td>Distributed to each person/organization on the List in Section A3</td>
</tr>
<tr>
<td>Sampling Contract</td>
<td>Contract between the TCEQ and the sampling contractor authorizing chemical sampling of drinking water to ensure protection of public health.</td>
<td>Signed and retained by the TCEQ and the sampling contractor</td>
</tr>
<tr>
<td>Sampling Schedule and Amendments</td>
<td>List of PWS samples for collection compiled by the TCEQ from PWS data in SDWIS.</td>
<td>The TCEQ provides to the sampling contractor and laboratories at the beginning of the year with monthly updates thereafter</td>
</tr>
<tr>
<td>SCMP and associated SOPs</td>
<td>Document developed by sampling contractor detailing processes to ensure TCEQ sample collection requirements are executed</td>
<td>Sampling contractor provides to the TCEQ within 90 days of contract</td>
</tr>
<tr>
<td>Document/Record</td>
<td>Description</td>
<td>Location/Distribution</td>
</tr>
<tr>
<td>-----------------</td>
<td>-------------</td>
<td>-----------------------</td>
</tr>
<tr>
<td>correctly. Includes SOPs related to communication, auditing, scheduling, sample collection, data entry, training, as well as acquisition of equipment and supplies.</td>
<td>Sampling contractor QAP Sampling contractor document detailing quality assurance measures to ensure all elements of the Drinking Water Compliance Contract Scope of Work are carried out correctly.</td>
<td>Sampling contractor provides to the TCEQ within 90 days of contract execution</td>
</tr>
<tr>
<td></td>
<td>Plan developed by the sampling contractor to outline health and safety practices to protect sampling staff including how to determine if a material is contaminated and how to protect one’s self from contamination.</td>
<td>Sampling contractor provides to the TCEQ within 90 days of contract execution</td>
</tr>
<tr>
<td>Announcements and minutes of meetings between the Sampling Contractor and its subcontractor</td>
<td>Records completed by the contractor to document regular (no fewer than quarterly) meetings with its subcontractor to provide information from the TCEQ, performance feedback, and ongoing training on sampling, sampling protocols, and customer service.</td>
<td>Sampling contractor provides meeting notices and agenda to the TCEQ at least 10 working days prior to the meeting. The sampling contractor provides meeting minutes to the TCEQ with 5 days after the meeting.</td>
</tr>
<tr>
<td>Sampling Contractor PWS Contact Database</td>
<td>Database developed by the TCEQ and maintained by the sampling contractor. Contains names of PWSs and responsible officials, addresses, and phone numbers.</td>
<td>Maintained by the sampling contractor and surrendered to the TCEQ upon request</td>
</tr>
<tr>
<td>Sample collection data</td>
<td>Data collected by sampling contractor for the TCEQ to update the sampling schedule. Includes but is not limited to TCEQ ID#, PWS ID#, PWS collection site, sample type, collection date and time, etc.</td>
<td>The sampling contractor submits weekly to the TCEQ.</td>
</tr>
<tr>
<td>DWSG</td>
<td>Primary TCEQ sampling guidance based on state and federal rules, regulations, and requirements, including analytical method requirements.</td>
<td>TCEQ document distributed to sampling personnel</td>
</tr>
<tr>
<td>Water Analysis Form (or electronic equivalent)</td>
<td>Sample submission form to be submitted with the COC with every sample shipment. Contains but is not limited to PWS ID#, TCEQ ID#, Date and Time collected, Sampling Location, Sampler’s signature, analysis type, chlorine residual, pH, etc.</td>
<td>The sampling contractor submits completed forms or data with each sample shipment to the laboratory. The sampling contractor submits COC forms to the TCEQ with invoice.</td>
</tr>
<tr>
<td>Field Reports</td>
<td>Report required to be filled out by sampling contractor when there are PWS changes, the inability to contact a PWS after 3 attempts, and/or the inability to collect scheduled samples.</td>
<td>The sampling contractor submits completed forms to the TCEQ monthly as applicable.</td>
</tr>
</tbody>
</table>
### Table A9. Documents and Records

<table>
<thead>
<tr>
<th>Document/Record</th>
<th>Description</th>
<th>Location/Distribution</th>
</tr>
</thead>
<tbody>
<tr>
<td>COC Form (or electronic equivalent)</td>
<td>Form required for all samples collected by the sampling contractor to ensure sample integrity as well as legally and technically defensible data.</td>
<td>The sampling contractor submits completed COC with each sample shipment to the laboratory. The sampling contractor submits completed COC records to the TCEQ with invoice.</td>
</tr>
<tr>
<td>TCEQ SOP #12-06 Authorization to Collect Chemical Compliance Water Samples</td>
<td>TCEQ procedure used to demonstrate proficiency of samplers in sample collection and site identification techniques, basic PWS information, etc.</td>
<td>TCEQ document detailing training and certification of samplers</td>
</tr>
<tr>
<td>Field Staff Training/Certification Records</td>
<td>The sampling contractor documents sample collection training records, 40 hour HAZWOPER and refresher training, and proof of Class D Operator Certification to the TCEQ as proof of meeting TCEQ training and certification requirements. New sampler training records include (1) names of trainer and trainees (2) trainer qualifications (3) training date(s) (4) list of PWSs visited during training (5) list of TCEQ IDs collected during training, and (6) trainer comments.</td>
<td>The sampling contractor submits training records to the TCEQ within 30 days of completing training events.</td>
</tr>
<tr>
<td>Contractor QA Report</td>
<td>Report developed by the sampling contractor which documents QA activities the preceding month including training and audits.</td>
<td>The sampling contractor submits to the TCEQ monthly</td>
</tr>
<tr>
<td>Field equipment maintenance/calibration logs</td>
<td>Records documenting maintenance and calibration were performed as required by contractor SOPs.</td>
<td>The sampling contractor field samplers maintain. Surrendered upon request to the TCEQ.</td>
</tr>
<tr>
<td>Sample Collection Analysis Record (SCAR)</td>
<td>Electronic version of the Water Analysis Form which is completed by sampling contractor field samplers. Contains TCEQ required information on the Analysis Form.</td>
<td>The sampling contractor fills out on tablet in the field, saves, and prints. Sampler and PWS official both sign. Sampler maintains one copy and gives another to PWS official.</td>
</tr>
<tr>
<td>Change Log</td>
<td>Documents changes to SCARs to track field sampler typographical and transcription errors. Used to document situations when sampler detects errors after the SCARs are printed but before the information has been transmitted to the laboratory. This allows for mistakes to be corrected and prevents the need to collect another sample.</td>
<td>The sampling contractor maintains Change Log and submits to the TCEQ on a monthly basis.</td>
</tr>
<tr>
<td>Sample collection records/field notes</td>
<td>Notes taken by individual samplers of each sample collected.</td>
<td>The sampling contractor field samplers maintain. Surrendered upon request to the TCEQ.</td>
</tr>
</tbody>
</table>
### Table A9. Documents and Records

<table>
<thead>
<tr>
<th>Document/Record</th>
<th>Description</th>
<th>Location/Distribution</th>
</tr>
</thead>
<tbody>
<tr>
<td>Laboratory quality manuals</td>
<td>Manuals that document (or reference) the laboratories’ policies, systems, program, procedures, and instructions to the extent necessary to assure the quality of analytical results.</td>
<td>Laboratories develop and maintain according to laboratory policy. Submitted to the TCEQ upon request.</td>
</tr>
<tr>
<td>Laboratory SOPs</td>
<td>Documents that accurately reflect phases of laboratory activities such as analytical methods, handling customer complaints, corrective action procedures, verification and validation of data, etc.</td>
<td>Laboratories develop and maintain according to laboratory policy. Submitted to the TCEQ upon request.</td>
</tr>
<tr>
<td>Laboratory staff qualification/training records</td>
<td>Records of relevant authorizations, competence, educational and professional qualifications, experience, training (including data integrity training) required per the laboratory quality system standards to verify laboratory compliance.</td>
<td>Laboratories maintain according to laboratory policy. Submitted to the TCEQ upon request.</td>
</tr>
<tr>
<td>Chain of custody records</td>
<td>Record required for all samples collected by the sampling contractor to document submittal and receipt by laboratory. Ensures sample integrity as well as legally and technically defensible data.</td>
<td>Laboratories and the sampling contractor maintain according to laboratory policy. Submitted to the TCEQ monthly.</td>
</tr>
<tr>
<td>Laboratory analytical records including but not limited to person responsible for performing analysis; date and time of analysis; results of sample and QC analyses; calibration/maintenance records; proficiency testing and DOC documentation</td>
<td>Records documenting the performance of laboratory activities and requirements including this QAPP Addendum.</td>
<td>Laboratories develop and maintain. Maintained at the laboratories for 5 years. Available for review during TCEQ audits or upon request.</td>
</tr>
<tr>
<td>Laboratory data reports/results</td>
<td>Analytical results reported to the TCEQ in electronic and hard copy formats according to Appendix J of the DWSG so the TCEQ can use the data for compliance determinations. (See information below on Analysis Reports).</td>
<td>Laboratories submit to the TCEQ weekly (electronic data) or monthly (PDF reports) after analysis is complete.</td>
</tr>
<tr>
<td>Maximum Contaminant Limit (MCL) Exceedance Report</td>
<td>Laboratory report required from laboratories when individual analytical results exceed the MCL.</td>
<td>Laboratories submit to the TCEQ as needed when an analytical result rounds up to the next digit above the MCL (i.e., if an MCL= 10 an exceedance report should not be sent to TCEQ until result reached 10.5 or higher).</td>
</tr>
</tbody>
</table>
Table A9. Documents and Records

<table>
<thead>
<tr>
<th>Document/Record</th>
<th>Description</th>
<th>Location/Distribution</th>
</tr>
</thead>
<tbody>
<tr>
<td>Corrective Action Documentation</td>
<td>Provided by sampling and analytical staff to document the identity and correction of identified deficiencies in a timely manner.</td>
<td>Laboratories and the sampling contractor develop and submit to the TCEQ per Section C2 of this document.</td>
</tr>
</tbody>
</table>

**Maintenance of Sampling Records by the Sampling Contractor**

Sampling records (paper and electronic) which are developed and/or maintained by the sampling contractor under the Sampling Contract belong to the State of Texas. These include but are not limited to the Sample Collection Database, COCs, Sample Submission Forms, PWS contact information, etc. The dispensation of these records is addressed in the Sampling Contract. They must be relinquished upon request or at the completion or termination of the contract.

**B1 Sampling Process Design**

The sampling processes for chemical compliance samples have been designed by the TCEQ according to requirements specified in 40 CFR Parts 141,142 and 143 of the federal drinking water regulations and 30 TAC §290 of the state’s drinking water rules.

The TCEQ sampling process design requirements are documented within the Sampling Contract and the DWSG which is the TCEQ primary guidance for chemical compliance sampling procedures. The Sampling Contract and the DWSG include requirements related to sample schedules, analyte groups, sample sites, rates of sample collection, sampling protocols, quality control procedures, documentation, training, audits, etc.

Annual sample schedules are developed by the TCEQ based on data contained in SDWIS pursuant to federal and state drinking water regulations and rules. Consistent with the monitoring framework, the contractor sampling staff collects all samples per the annual sampling schedule and any updates provided by the TCEQ. The Sampling Contract requires that sample collection be spread out evenly around the state throughout the year so the sample flow to the laboratories is consistent and all samples are collected. Most drinking water quality chemical monitoring is conducted at sample sites representing entry points to the water distribution system. These locations provide the most representative data for water quality that has been treated and is available for human consumption. The TCEQ Sampling Contract Manager works closely with the sampling contractor to ensure elements of the Sampling Contract and the DWSG are followed. The sampling contractor’s SOP No. SCHEDULING incorporates TCEQ requirements and is used by sampling staff to implement sample processes related to sample and appointment scheduling.

**B2 Sampling Methods**

TCEQ sampling method requirements are consistent with 40 CFR Parts 141,142 and 143 of the federal drinking water regulations and 30 TAC §290 of the state’s
drinking water rules. As noted in Section B1, the TCEQ primary document containing requirements for drinking water sampling methods is the DWSG. The sampling contractor is required by the Sampling Contract to follow the field measurement and sampling procedures described in the DWSG.

TCEQ requirements related to field measurements and sample collection (e.g., planning, supplies, sampling equipment, collection techniques, sample volumes, preservation, forms, chain of custody, holding times, shipping, etc.) are included in Chapters 8, 9 and 10 of the DWSG. The tables in Chapter 9 of the DWSG summarize sampling requirements by analyte and/or analyte group. The sampling contractor’s SOP No. SAMPLING incorporates all applicable TCEQ sampling requirements as indicated above.

Following sample collection, field samplers deliver or ship samples to the laboratory in a manner described in the Sampling Contract so they arrive at the laboratories Monday through Friday. Prior approval must be received from the TCEQ for samples shipped on the weekend or holidays.

Established processes to address and document sampling anomalies are defined in both the Sampling Contract and the DWSG. These include processes to address the inability to collect a sample, rejected samples, sample invalidation, etc.

When sampling deficiencies and non-conformances are identified by the sampling contractor or the TCEQ, they are corrected and documented in a timely manner according to Section C1 of this document.

B3 Sample Handling and Custody

The sample handling and custody requirements for chemical compliance data are designed by the TCEQ according to requirements specified in 40 CFR Parts 141,142 and 143 of the federal drinking water regulations and 30 TAC §290 of the state’s drinking water rules. Specific TCEQ requirements for sample handling and custody are contained within the Sampling Contract and the DWSG. These documents address requirements for holding times and how samples should be handled, transported, and received by the laboratory. They also indicate how sample information and custody should be documented. Procedural deficiencies and non-conformances are addressed in Section C1 of this document. A summary of TCEQ field and laboratory requirements is provided below. The sampling contractor’s SCMP and sampling SOP (i.e., No. SAMPLING) provides additional detail on how the contractor implements the TCEQ requirements.

Sample Custody Summary

The documentation for sample custody for all events up to the arrival of the sample at the laboratory is the chain-of-custody (COC) form. Every shipment of samples must be accompanied by a completed COC.

Each COC lists custody information including: unique sample ID numbers (TCEQ ID), date and time of collection, number of containers, required analyses, PWS ID, and sampler name. The COC is signed by the sampler when released to the shipper, and then by the laboratory when received by the laboratory’s sample custodian.
If any information blanks, signature blanks, or the official change of possession signatures and times are not completed on the COC, a gap will exist in the documentation of sample custody prior to arrival at the laboratory. In such an event, the laboratory custodian will reject the sample(s) or contact the PWSS Program QA Manager for guidance.

Sample integrity is protected by preventing sample contamination, whether intentional or accidental, after the sample is placed in a container. The cleanliness of shipping containers used by the sampling contractor is the sampling contractor’s responsibility.

The receiving laboratories have sample custodians who examine all arriving samples for complete and proper documentation, intact security packing tape, and proper preservation. The custodians examine samples upon receipt and make sure samples are intact, and that hold times, temperature, and preservation are within specifications. Samples that arrive at the laboratory within 24 hours of sample collection, due to the close proximity of a PWS to the laboratory, may not yet have reached the appropriate temperature by the time they arrive at the laboratory. These samples should be considered acceptable ONLY if packed on ice or with frozen gel/ice packs immediately after sample collection and delivered while the samples were in the process of reaching an appropriate equilibrium temperature. Invalid samples are rejected. An exception to this pertains to the analysis of nitrate/nitrite group (NO₃⁻) samples. When these samples are ordered, and the hold time has been exceeded for the nitrite analysis, the lab should process and analyze the sample for nitrate and report the nitrite result as exceeding hold time.

Requirements for sample invalidation are included in Chapter 12 of the DWSG. The laboratories will provide the TCEQ and/or the sampling contractor with a list of rejected samples at least weekly by email. The sampling contractor is responsible for rescheduling rejected samples during the same period in which they were originally scheduled.

The laboratory custodian accepts delivery of properly collected samples by signing the final portion of the official COC. The sample custodian attaches a special laboratory sample number to the COC and the same number to the sample container and enters the receipt of the sample into a laboratory sample inventory database. This database notes the date of receipt and the date of completion. Any possible information that could identify the source of the sample is then traceable by using the inventory database maintained by the sample custodian, or by the PWS ID on the sample container. The laboratory also has a protocol limiting entry of non-staff. The limited access to samples in the entire inventory allows for sample security at the laboratory. It is assumed that samples in tape-sealed shipping containers are secure whether being transported by staff vehicle, by common carrier, or by commercial package delivery.

**B4 Analytical Methods**

**Field Measurements**

The TCEQ requirements for field measurements as listed in the DWSG, Section 11 were developed pursuant to state and federal regulations. Section 11 includes
information for parameters which must be measured in the field by the sample collectors. These parameters include chlorine residual, temperature, pH, and location information. The sampling contractor Program/QA Manager is responsible for adherence to these methods, including training, calibration, maintenance, documentation, etc. the sampling contractor uses various SOPs to collect field measurement data including SOP No. INSTRUMENTATION; SOP No. DATA ENTRY QA/QC; and SOP No. EDC GPS.

Laboratory Methods

The promulgated laboratory methods for analysis of samples under the Safe Drinking Water Act NPDWRs are listed in 40 CFR Part 141 Subpart C at <http://www.ecfr.gov/cgi-bin/text-idx?SID=5c39f0b0f6139cd1bbb183601df5d464&mc=true&node=pt40.25.141&rgn=div5#sp40.25.141.c>.

The methods for analysis of samples under the NSDWRs are listed in 40 CFR Part 143 <http://www.ecfr.gov/cgi-bin/text-idx?SID=5c39f0b0f6139cd1bbb183601df5d464&mc=true&node=se40.25.143_14&rgn=div8>.

Note: Only the methods listed in Exhibit 4 of this document for which the laboratories are accredited/certified are used to analyze drinking water samples. These methods reflect those in Chapter 9 of the DWSG. The laboratories and the TCEQ have agreed on the use of these methods. Method changes must be discussed with the TCEQ and approved prior to implementation.

Adherence to the method requirements is the responsibility of the QA Officers of each individual laboratory. Laboratory QA Officers ensure that the essential elements of each method are incorporated into their SOPs and project specific requirements are followed. Laboratory personnel verify the correct use of methods during sample/result QC and migration and refer method failure to their respective QA Officer or designee. Corrective action procedures are addressed in Section C1 of this document.

If the PWSS Program QA Manager becomes aware of analytical procedure changes mandated by the EPA, the laboratory QA Officers are immediately notified. Usually, the laboratory QA Officers receive this information directly from the EPA.

B5 Quality Control

The technical QC activities which are implemented to control the quality of chemical data reported to the TCEQ PWSS Program is a function of both field sampling and laboratory analysis.

The DWSG, Chapters 5 and 9 specify and define the field QC samples that must be collected with each sample type or group and include requirements for field blanks, trip blanks, method blanks, and duplicate samples.

Laboratory QC requirements include initial demonstrations of capability, method detection limit determinations, and the analysis of blanks, fortified blanks and matrices, and other samples as a continuing check on performance. Minimum, program-specific QC requirements, acceptance criteria, and corrective actions for
QC samples are defined and the calculations are specified in this section. Other QC samples are run as required by the methods, quality standards, laboratory Quality Manuals, and SOPs.

**Field Quality Control Definitions and Evaluation**

Quality control samples associated with the collection of chemical drinking water samples are discussed in the *DWSG* and include requirements for field blanks (for VOCs and EPA method 504.1), trip blanks, method blanks, and duplicate and triplicate samples. The definitions and required frequency of these samples are addressed in Chapters 5 and 9 of the *DWSG*. They are summarized below and include information on acceptability criteria. The sampling contractor’s SOPs *No SAMPLING; No. FIELD INSTRUMENTATION;* and *No. EDC GPS* incorporate these requirements. They also address the QC requirements and required documentation for field measurements including accuracy checks, calibration tolerance checks, etc.

**Field Blanks or Field Reagent Blanks (FB)**

FBs are collected with all VOCs and EPA Method 504.1 drinking water samples to rule out air contamination in the event of detection. VOC FBs are only analyzed by the laboratory if there are sample detections. In general, FB concentrations should be below the MDL for a regulated or significant monitored compound. **Note:** EPA Method 504.1 requires the ongoing analysis of FBs. In the event that a chemical is detected in a water sample and its associated FB at approximately the same level, air contamination is a possibility and the result is reported to the TCEQ with the data.

**Trip Blanks (TB)**

The *DWSG*, Chapter 9 requires that TBs be prepared prior to the sampling event in the actual sample containers and kept with the samples throughout the sampling event. They are then packaged for shipment with the other samples and sent for analysis. TBs are not routinely collected unless specifically requested by the PWSS Program QA Manager.

**Method Blanks for Asbestos Samples (MB)**

The *DWSG*, Chapter 9 requires one (1) MB (an empty container) for every 20 asbestos samples to confirm the absence of background levels of asbestos. An acceptable bottle blank level is defined as 0.01 MFL >10 µm. Results of all asbestos blanks are reported with asbestos data.

**Duplicate and Triplicate Samples**

Antea USA, Inc. collects additional samples for some analytes and/or some analyte groups as specified in the *DWSG*, Chapters 5 and 9. These samples are collected and analyzed per the approved methods and are used to rerun samples if a target analyte concentration needs to be confirmed due to elevated concentrations as defined in Exhibit 4 and explained in under Sample Result Confirmation later in this section.
Laboratory Measurement Quality Control Requirements and Acceptability Criteria

Adherence to the laboratory QC procedures defined in this section will ensure that analyses meet the QC requirements of the PWSS Program. As specified previously, the QC samples defined below are the minimum criteria and apply specifically to analysis of regulated contaminants performed for the PWSS Program. The interpretation of individual QC samples is considered within the context of multiple factors as indicated in the following sections. There are a number of data qualifiers specific to the data collected under this QAPP that are used if they apply. These qualifiers are needed for the TCEQ to validate the data and properly code the results in SDWIS. Otherwise laboratories follow internal protocols to qualify data/ before submitting it to the TCEQ. A table of specific qualifier codes required by the TCEQ PWSS Program is included in Table B5.1. Unsatisfactory data rejected by the laboratory due to QC failures is addressed in Section B10.

Table B5.1. Data Qualifier Codes

<table>
<thead>
<tr>
<th>Qualifier Code</th>
<th>Text for the qualifier or sample comment.</th>
<th>Notes for Analysts on the Application of these Comments in the Analytical Report and in the EDD</th>
</tr>
</thead>
<tbody>
<tr>
<td>B</td>
<td>Target analyte detected in laboratory reagent blank at or above method acceptance criteria.</td>
<td>Qualifier applied to all corresponding analyte results in the sample set.</td>
</tr>
<tr>
<td>F</td>
<td>Target analyte detected in associated field blank at or above minimum reporting level.</td>
<td>Used for 524.2 and 504.1 to inform water systems of the issue. Water systems do not receive the field blank results.</td>
</tr>
<tr>
<td>Not prescribed. Use laboratory specific qualifier</td>
<td>The associated laboratory fortified blank recovery outside (above or below) method acceptance limits.</td>
<td>Qualifier applied to all corresponding analyte results in the associated samples.</td>
</tr>
<tr>
<td>Not prescribed. Use laboratory specific qualifier</td>
<td>The laboratory fortified matrix recovery outside (above or below) method acceptance limits due to either suspect matrix or “bad acting ” compounds.</td>
<td>Qualifier applied to its corresponding analyte results in the associated sample set. Add note to explain high or low bias if information not contained within code.</td>
</tr>
<tr>
<td>X</td>
<td>The Minimum Reporting Limit (MRL) verification check did not meet the acceptance limits.</td>
<td>Qualifier applied to all corresponding analyte results in the associated sample set.</td>
</tr>
<tr>
<td>Not prescribed. Use laboratory Specific qualifier</td>
<td>Duplicate RPDs exceeded the method acceptance limit.</td>
<td>For sample duplicates, qualifier applied to its corresponding analyte result. Use only if target analytes are &gt;4x reporting level so that the statistic is meaningful. For LFB/LFB duplicates, qualifier applied to all corresponding analyte results in the associated sample set. For LFM/LFM duplicates, qualifier applied to the affected analyte results in the sample that was spiked.</td>
</tr>
<tr>
<td>Not applicable</td>
<td>Sample result confirmed by reanalysis</td>
<td>Note or comment applied to the affected analyte(s) in the sample.</td>
</tr>
</tbody>
</table>

Method Detection Limit (MDL)

The MDL (also known as the limit of detection) is the minimum concentration of a substance that can be measured and reported with confidence that the analyte concentration is greater than zero. Initial MDL calculations for all regulated
contaminants analyzed under this QAPP are required, except for disinfection byproducts (Analyte Group DBP2) as indicated in Exhibit 4. MDL calculations are required even though laboratories do not report concentrations below the MRL. If there are no requirements in the analytical methods for computing the MDL, the procedure given in 40 CFR Part 136, Appendix B is followed. **Note:** MDL requirements included in any applicable EPA Method Update Rules that become effective will be followed.

For the purpose of monitoring radioactivity concentrations in drinking water, the MDL is that concentration which can be counted with a precision of plus or minus 100 percent at the 95 percent confidence level ($1.96\sigma$ where $\sigma$ is the standard deviation of the net counting rate of the sample).

MDLs must be less than the minimum reporting limit (MRL) for every analyte.

**Minimum Reporting Limits (MRL) and MRL Verifications**

It is the policy of the PWSS Program not to use J flagged (i.e., estimated) data for compliance purposes; therefore the laboratories must comply with the MRL requirements defined in this section and Section B10 regarding reporting.

MRLs are equivalent to the lowest non-zero calibration standard in a multi-point calibration curve, as adjusted for dilution factors, when applicable. MRL concentrations must be below the maximum contaminant level (MCL) or secondary contaminant level (SCL) for any given analyte.

The MRLs for the organic compounds are listed in Appendix I of the DWSG and are hard coded in SDWIS. **Note:** Detection limits listed in Appendix I are the MRLs for the purpose of reporting under this QAPP. It is understood that for a small sub-set of synthetic organic chemicals the EPA MDLs can be met, however, the SDWIS required MRL reporting requirements may be higher than the labs actual quantitation limit. In these cases applicable results should be “J flagged” in the result associated comment to indicate the detection is estimated.

The MRLs for all other regulated analytes reported under this Programmatic QAPP Addendum must be below the MCL or SCL as defined in Exhibit D of the DWSG.

In accordance with the EPA *Certification Manual for Laboratories Analyzing Drinking Water, 5th edition*, laboratories must run a LFB at their MRL every analysis day and not report contaminants at levels less than the level at which they routinely analyze their lowest standard. The process of running a LFB at the MRL every analysis day is known as a MRL Verification in this QAPP.

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 percent recovery of the MRL verification is calculated using the following equation in which $%R$ is percent recovery, $S_r$ is the sample result, and $S_A$ is the reference concentration for the verification sample:

$$%R = \frac{S_r}{S_A} \times 100$$
Acceptance criteria are used to determine the acceptability of the MRL verification samples as defined in the analytical methods or laboratory protocols. The laboratory will locate and fix problems before continuing if MRL verification samples are out of control. **Note:** For methods involving long lists of analytes, (e.g., EPA 524.2 and 525.2) the laboratory may evaluate marginal MRL verification exceedances according the TNI Standard EL-V1M4-2009, page 13.)

If laboratory actions do not bring the system into compliance before continuing the analysis, then the data may need to be qualified and reported to the TCEQ with the appropriate qualifier code. If the MRL verification is “high” but all sample results are below the MRL, the applicable sample results are reported to the TCEQ with a qualifier code as indicated in Table B5.1 with a note indicating “high” bias in the result comment field of electronic data deliverable and in the analytical report. If the MRL verification is “low” and applicable sample results are below the MRL, or the MRL verification is “high” and applicable sample results are above the MRL, the laboratory should contact the TCEQ before reporting the data. Sample results may need to be rejected and samples recollected as described in Section B10.

**Note:** For disinfection byproducts (DBP), the laboratory must verify the accuracy of the calibration curve at the MRL concentration by analyzing an MRL verification with a concentration less than or equal to 110% of the MRL with each batch of samples. The measured concentration for the MRL verification must be ±50% of the expected value, if any field sample in the batch has a concentration less than 5 times the regulatory MRL. Method requirements to analyze higher concentration check standards and meet tighter acceptance criteria for them must be met in addition to the MRL check standard requirement.

**Laboratory Reagent Blank (LRB)**

An LRB is a sample of reagent water which is processed simultaneously with and under the same conditions as the samples through all steps of the analytical procedures. LRBs are analyzed at a rate of one per preparation batch. The LRB is used to document the absence of contamination from the laboratory equipment, the reagents, and/or the apparatus.

Acceptance criteria are used to determine the acceptability of the LRB as defined in the analytical methods and listed in Exhibit 4. In general, LRBs should yield values for individual analytes less than the MRL (or values that do not impact the sample analysis results) or corrective action will be implemented before continuing with the analysis. Samples associated with a contaminated blank are evaluated by the laboratory as to the best corrective action for the samples (e.g. reprocessing, result qualification, result rejection). In all cases, the corrective actions are documented; and, if applicable, a qualifier code is reported with the individual sample results as specified in the Table B5.1.

**Laboratory Fortified Blank (LFB)**

An LFB is an aliquot of reagent water to which known quantities (per the method) of the analyte(s) are added in the laboratory. The LFB applies to batches of up to 20 samples and is analyzed exactly like a sample. Its purpose is to determine whether the analytical system is in control and whether the laboratory is capable of making accurate measurements.
The percent recovery of the LFB is calculated using the following equation in which \( %R \) is percent recovery, \( C_s \) is the measured LFB concentration, and \( S \) is the actual concentration of analyte added to the reagent blank:

\[
%R = \frac{C_s}{S} \times 100
\]

Acceptance criteria are used to determine the acceptability of the LFB as defined in the analytical methods and listed in Exhibit 4. The laboratory will locate and fix problems before continuing if LFBs are out of control. **Note:** For methods involving long lists of analytes (e.g., EPA 524.2 and 525.2), the laboratory may evaluate marginal LFB exceedances according the TNI Standard EL-V1M4-2009, page 13.

If laboratory actions do not bring the system into compliance before continuing the analysis, then the data may need to be qualified and reported to the TCEQ with a data qualifier as noted in Table B5. If LFBs are “high” but all sample results are below the MRL (or other appropriate reporting limit) the applicable sample results are reported to the TCEQ with a qualifier code as indicated in Table B5 with a note indicating “high” bias in both the electronic data deliverable and in the analytical report. If the LFB is “low” and applicable sample results are below the MRL (or other appropriate reporting limit) or the LFB is “high” and applicable sample results are above the MRL, the laboratory should contact the TCEQ before reporting the data. Sample results may need to be rejected and samples recollected as described in Section B10.

**Laboratory Duplicates**

A laboratory duplicate is an aliquot taken from the same (or second) container as an original sample under laboratory conditions and processed and analyzed independently. Laboratory duplicates are prepared in the laboratory either by splitting aliquots of a sample, LFBs, or LFM. The sample, the LFB, or the LFM and their duplicates are carried through the entire preparation and analytical process. Laboratory duplicates are used to assess precision of all analyses and are performed at a rate of one per preparation batch or per the method, whichever is more stringent.

Precision is evaluated using the relative percent difference (RPD) between duplicate results as defined by 100 times the difference (range) of each duplicate set, divided by the average value (mean) of the set. For duplicate results, \( S_1 \) and \( S_2 \), the RPD is calculated from the following equation:

\[
RPD = \frac{|S_1 - S_2|}{\frac{S_1 + S_2}{2}} \times 100
\]

Acceptance criteria are used to determine the acceptability of laboratory duplicates as defined in the analytical methods and listed in Exhibit 4. The laboratory will locate and fix problems before continuing if laboratory duplicates are out of control. **Note:** Sample duplicate pairs may yield very high RPDs when sample concentrations are very low, (e.g., when concentrations are very close to the lower limits of detection or quantitation). In these circumstances, laboratories should follow internal procedures to address the issue. The lab may use the absolute difference (\(|S_1 - S_2|\)) to evaluate the results and determine/document acceptance.
Alternatively, duplicates may be reanalyzed using a fortified blank or fortified matrix. If laboratory actions do not bring the system into compliance before continuing the analysis, then the affected data may need to be submitted with a qualifier code as described in Table B5.

**Laboratory Fortified Matrix (LFM)**

An LFM is an aliquot of a sample to which known quantities of the method analyte(s) is/are added in the laboratory. The LFM is analyzed exactly like a sample, and its purpose is to determine whether the sample matrix contributes bias to the analytical results. The background concentration of the analytes in the sample matrix must be determined in a separate aliquot and the measured value in the LFM corrected for background concentrations. LFMs are prepared according to method requirements.

The percent recovery of the LFM is calculated using the following equation in which \( \% R \) is percent recovery, \( C_s \) is the measured fortified sample concentration, \( C \) is the measured sample background concentration, and \( S \) is the actual concentration of analyte added to the reagent blank:

\[
\% R = \left( \frac{C_s - C}{S} \right) \times 100
\]

Acceptance criteria are used to determine the acceptability of LFMs as defined in the analytical methods and listed in Exhibit 4. If the recovery of any analyte falls outside the designated LFM recovery range and the laboratory performance for that analyte is shown to be in control (i.e., the LRBs and the LFB are in control), the recovery problem encountered with the LFM is judged to be either matrix- or solution-related, not system-related. In these situations, the applicable sample result(s) must be reported to the TCEQ with a qualifier code as described Table B5.1.

**Sample Result Confirmation**

After the laboratory analyst reviews the data during the Tier 1 laboratory review (as described in Section D2), laboratories may repeat analyses (if sufficient sample volume and holding times are available) as “unexpected” or “elevated” results are observed as defined in Exhibit 4. If the results of reanalyzed samples corroborate the results of the first sample, the laboratory reports the results of the first sample and provides a qualifier with the applicable data on the electronic data deliverable and analytical report that the result was confirmed by re-analysis.

If the results of the second sample do not corroborate the first sample’s results, the sample should be analyzed a third time if holding time and sample volume allow. If the results of reanalyzed samples support the results of the second sample, the laboratory reports the results of the second sample and provides a comment on the electronic data deliverable and analytical report that the result was confirmed by reanalysis. If consistencies cannot be resolved, the laboratory should contact the TCEQ before data are validated and reported to the TCEQ. Sample results may need to be rejected and samples recollected.

**Note:** Dilutions and or previously extracted samples may be analyzed to meet this requirement. Some PWSs routinely produce drinking water with “unexpected” or
“elevated” results of some contaminants. This may be confirmed by consulting the Drinking Water Watch website. Documentation of this occurrence on the analytical report is sufficient to confirm results and reanalysis is not necessary.

**B6 Instrument/Equipment Testing, Inspection, and Maintenance**

**Field Instruments and Equipment**

TCEQ requirements for field equipment testing, inspection, and maintenance are specified in the Sampling Contract and the *DWSG*. The Sampling Contract requires that, for consistency all equipment used by sampling staff must be of the same make and model. Additional detail regarding maintenance, including preventive maintenance, is contained within the sampling contractor's *SCMP* and the associated SOP No. *INSTRUMENTATION*. The sampling contractor's Program/QA Manager is responsible for oversight of maintenance including development of procedures and maintenance schedules, equipment lists, inspection and routine maintenance, maintenance of spare parts, etc. Individual maintenance activities are assigned to sample collectors. Chemical sampling equipment is inspected and tested upon receipt and is assured appropriate for use. In the event of an instrument failure, the sampling contract Project Managers are responsible for assuring that the instrument is tagged and proper maintenance is performed and documented in the instruments maintenance log book. Tags are removed once instruments are repaired.

**Laboratory Instruments and Equipment**

Requirements for testing, inspection, and maintenance of laboratory instruments and support equipment are specified in the *TNI Standard* and the EPA *Certification Manual* (see Equipment Checklist, Chapter IV, pages 44 -50); as well as the approved analytical methods, individual laboratory quality manuals, and all relevant SOPs. In general, laboratory equipment and its software are properly maintained, comply with the test method concerned, and are checked and calibrated before being put into use. The laboratory QA Officer (or designee) is responsible for verification of maintenance requirements including development of procedures and maintenance schedules, equipment lists, inspection and routine maintenance, maintenance of spare parts, etc. Individual maintenance activities are assigned to laboratory analysts.

**B7 Instrument/Equipment Calibration and Frequency**

**Field Instruments and Equipment**

TCEQ requirements for field instrument/equipment calibration are consistent with 30 TAC §290.46 and specified in the Sampling Contract and the *DWSG*.

Instruments/equipment requiring calibration includes, but is not limited to:

- equipment for disinfectant residual analysis
- thermometers
- pH meters
- conductivity meters

Further detail regarding calibration of field instruments/equipment is included in the sampling contractor’s SCMP and the associated field instrumentation SOP No. INSTRUMENTATION. The sampling contractor’s QA Manager is responsible for the control of field calibrations including staff training on proper procedures, maintenance of associated SOPs, review of calibration results, the accuracy and stability of calibration standards, record maintenance, etc.

**Laboratory Instruments and Equipment**

Relative to laboratory instruments and support equipment, requirements in the TNI Standard and the EPA Certification Manual (see Equipment Checklist, Chapter IV, pages 44-50 of the Manual) apply, as well as the approved analytical methods, individual laboratory quality manuals and any relevant SOPs.

Calibration methods and documentation for all laboratory analytical equipment and instruments used to analyze drinking water compliance samples are the responsibility of the respective laboratory QA manager (or designee). In general, laboratory equipment/instruments and their software are properly maintained, comply with the test method concerned, and are checked and calibrated before being put into use. Every piece of equipment/instrument has a specialized procedure for calibration and a special type of standard used to verify calibration. Calibrations are documented by the person performing the calibration. Records are accessible for verification during either a laboratory audit or upon request.

**B8 Inspection/Acceptance of Supplies and Consumables**

**Field Supplies and Consumables**

TCEQ requirements for inspection/acceptance of field supplies and consumables are specified in the Sampling Contract and the DWSG. The sampling contractor is responsible for procuring all supplies used in the field including, but not limited to: sample collection containers, chemical reagents, and reagent grade water for field blanks, including those obtained from the DHL Laboratory in Round Rock, Texas. Containers used for collection meet requirements to ensure that analysis results are reliable and consistent. Chemical reagents are properly labeled and used within their respective expiration dates. Supplies are inspected by sampling contract staff to ensure they meet criteria and standards. Further detail regarding the quality assurance of supplies and consumables are provided in the sampling contractor’s SCMP.

**Laboratory Supplies and Consumables**

Supplies and consumables used in the analytical laboratories are the responsibility of the individual branch supervisor, group manager, team leader or QA officer. Requirements documented in quality standards (including both the TNI Standard and the EPA Certification Manual) individual laboratory quality manuals, analytical methods, and SOPs are followed.
B9 Non-direct Measurements
Not applicable

B10 Data Management
The field and laboratory data that are managed and reported under this Programmatic QAPP Addendum are summarized in the Flow Chart in Exhibit 5 and described below. These data management processes are consistent with federal and state drinking water rules and regulations and facilitate EPA reporting and TCEQ enforcement as necessary. The sampling contractor and the laboratories maintain internal computer hardware and software systems which are compatible with TCEQ systems; as such they are able to provide data and documentation in the necessary formats. In addition, data integrity policies and procedures are in place which ensure the protection of data and information, as needed (e.g., recoverable and used for its intended purpose, etc.).

Maintenance and Reporting of Field Data
Field sampling data include, but are not limited to: PWS ID #, TCEQ ID #, date and time collected, sampling location, sampler’s initials, water system representative’s signature, Analysis Type, chlorine residual, pH, GPS coordinates, etc. The TCEQ requirements for managing field data are included in the Sampling Contract and the DWSG. Additional detail regarding data management is provided in the sampling contractor’s SCMP and their SOPs for electronic data collection (EDC) No. DATA ENTRY QA/QC and No. EDC GPS. Sampling data/records as listed in Section A9 of this document are collected and/or managed in the formats below and submitted weekly or monthly to the TCEQ:

- Sample Collection Database File
- Sample Collection Analysis Report PDF Files
- Chain of Custody Records PDF Files

The sampling contractor implemented an EDC system on July 8, 2013. The PWS Water Analysis forms and COC forms are generated electronically on a hand held field tablet capable of running the required software (RfGen and Microsoft Access) and a portable printer. The tablets operate in a mobile mode that allows the device to work offline while still validating and saving data. Pertinent information about drinking water samples (TCEQ sample ID, sample location, containers, preservatives, comments, etc.) provided in the TCEQ Annual Sample Schedule are displayed on the mobile device during collection for reference, with fields generally formatted like PWS Analysis Forms. Instead of one form per sample, a sample collection analysis report (SCAR) form is given to the PWS representative. These SCAR forms have valid sampler and PWS representative signatures contained on the document, and contain all samples collected during that particular site visit.

During sample collection, minor typographical or transcription errors may occur due to the nature of use of a mobile device, stylus, or manual data entry. See Section D2—Verification and Validation Methods. Once data entry is complete and the sampler has chosen “COLLECT SAMPLE,” no changes can be made on the mobile device. If the electronic data requires a correction that is significant enough to
merit a database change (such as typing in an address “2521 Main Street” that should have been “2512 Main Street”), the following steps are taken:

1. The sampler notifies the home office immediately of the correction to be made.
2. The sampler marks through the incorrect data with a single line and initials on both printed copies of the SCAR.
3. The sampler handwrites the correct information in the correct field and gives the corrected form to the PWS.
4. The sampler sends a corrected copy to the home office, so that the correction can take place prior to data transmittal to the labs. This means before 4:30PM CST or if data transmittal occurs after 4:30, prior to 6AM CST for data transmittals going out the next day. **Note:** If data is transmitted to the labs before the correction is made, the sample(s) will be rejected for Invalid Sampling Protocol (IP). The sampling contractor will not send corrected data to the labs if the requests and corrections were not made before regularly scheduled transmittal times.
5. When a correction is made, the sampling contractor must enter a comment into the “CONTRACTOR_COMM” field of the SCHEDULE indicating what field was corrected and who the correction was made by.
6. The sampling contractor sends a copy of the original SCAR with correction(s) to TCEQ along with the regular monthly invoice documentation. The copy must be legible, with all parts of the report visible. Any report with missing information will not be accepted.
7. Any changes made to the EDC are documented on a Change Log maintained at the sampling contractor’s office and on the SCAR form(s). This Change Log is transmitted to TCEQ on a monthly basis.

**Maintenance and Reporting of Laboratory Data**

Laboratory data collected under this Programmatic QAPP Addendum are maintained within the laboratory in accordance with each laboratory’s quality manual and relevant SOPs. The sampling contractor submits a COC to the laboratories with each collected sample.

Laboratories that provide data to the TCEQ for use in compliance are required to submit data as described below. The names of TCEQ individuals to who the data are reported are listed in Appendix L of the DWSG. Electronic sample and result data must be reported to the TCEQ as described below under *Electronic Data Deliverable Requirements* no later than one week after analysis is completed. PWSs are subject to monitoring/reporting violations if data are received more than ten days after the end of the compliance period.

PDFs of analytical reports and COCs must be submitted to the TCEQ and each PWS on a monthly or more frequent basis. Analytical reports in PDF format must meet TNI reporting requirements. Specific analyte requirements related to MCL violations are provided below.

- Inorganic Chemicals (other than Nitrate and Nitrite) and Radiochemical Sample Analysis Data MCL exceedances must be faxed and emailed to the
Inorganic/Organic Compliance Officer within 72 hours after samples are analyzed.

- Nitrate and nitrite data follow the protocol described above under Inorganic Chemicals, with one notable exception. The TCEQ evaluates exceedance reports as soon as possible the same day to determine the need for an acute Notice of Violation and immediate public notice. This special attention is required due to the acute nature of nitrate and nitrite health effects, and the resulting EPA requirements for rapid follow-up. The laboratories are required to fax and e-mail results of nitrate or nitrite analyses that exceed the maximum contaminant level to the Inorganic/Organic Compliance Officer within 24 hours of sample analysis.

- Result reports for organic and disinfection byproducts (total trihalomethanes and haloacetic acids) must be organized into groups of regulated chemicals, monitored chemicals, screened chemicals, other chemicals, and tentatively identified compounds. The laboratories are required to fax and e-mail results of inorganic chemical analyses that exceed the maximum contaminant level to the Inorganic/Organic Compliance Officer within 72 hours after samples are analyzed.

**Electronic Data Deliverable Requirements**

Laboratories must submit analytical results to the TCEQ electronically. TCEQ requires data to be submitted as described in the *DWSG*, Appendix J using two separate files (tables): *Sample* and *Result*. The *Sample* file must be submitted to TCEQ as soon as possible after samples are received. *Result* files must be submitted to the TCEQ as soon as the samples are analyzed and no later than 1 week after analysis. Pass through laboratories (if applicable) must be noted in [B_SAMPLE_COMMENTS] field of the *Sample* file.

**Sample**

The *Sample* file contains information about the sample itself, including: collection date / time, collector, laboratory, sample point ID’s (EP001, etc.) and the corresponding addresses where the samples were collected.

**Result**

The *Result* file contains the individual analytical results. The collection date must match what is reported in the associated *Sample*.

**Note:** Samples and/or results may be invalidated and rejected at the laboratory due to issues with samples, containers, documentation, holding time, unresolvable QC sample issues, insufficient sample volume, etc. Laboratories handle sample rejections according to the *DWSG*. Sample and result rejections are reported to the TCEQ utilizing an appropriate rejection code as listed in Appendix F of the *DWSG* with no corresponding results. The laboratory is responsible for notifying the sampling contractor and the TCEQ daily of rejected samples and results so they can be recollected when possible. All sample rejection occurrence must be reported electronically to the TCEQ.

**Laboratory Analysis Report and COC Reporting Requirements**

The TCEQ retains copies of laboratory analysis reports, and COCs in the TCEQ Central File Room for a period of time in accordance with state and federal record
retention requirements. Therefore, all laboratories are required to submit scanned PDFs of the following on CD once a month:

- Laboratory’s COCs
- Laboratory Analytical reports provided to the PWS

Laboratory analysis reports are consistent with requirements contained with the *TNi Standard*, Volume 1, Module 2, Section 5.10 and include at a minimum the information necessary for the TCEQ interpretation and validation of data as well as the information needed for records maintenance as follows:

- Sample results
- Units of measurement
- Collection site information
- Date and time of collection
- MRL and MDL (LOD)
- The person responsible for performing the analysis
- The analytical technique/method used
- Available quality control sample results (e.g. recoveries or percent deviations of MRL check samples, LFBs, LFM, blanks, and laboratory duplicates)
- Data qualifiers with definitions
- Comments or case narratives

**Laboratory Analysis Report and COC Coding**

Appendix J of the DWSG specifies coding requirements for electronic data. The following metadata is needed to successfully code PDFs of analysis reports and COCs being submitted to the TCEQ Central File Room. Coding criteria must be entered in the following order with an underscore separating the data.

1. **Series Code:** PWS
2. **Primary ID:** County Code # and Identification # 7 digits 3 + 4(PWS ID #)
3. **Document Type:** AC
4. **Document Date:** YYYYMMDD (Collection Date)
5. **Document Name:** Analysis Report

**Example 1:** PWS_1010014_AC_20150928_Analysis Report (printed on paper, top right corner)

**Example 2:** PWS_1010014_AC_20150928_Analysis Report.PDF (electronic file name)

**Note:** There must be a space between “Analysis” and “Report.”

**C1 Assessments and Response Actions**

**Field Assessment and Response Actions**

TCEQ requirements for field assessments are specified in the Sampling Contract and the TCEQ SOP #12-06: *Authorization to Collect Chemical Compliance Samples,*
Section 6.0 Audits. Additional detail regarding assessment and response is provided in the Antea USA, Inc. SCMP and associated training SOP No. AUDITING.

Assessments of field activities are divided between internal and external audits. Internal audits are conducted by the sampling contractor’s QA Manager and external audits are conducted by the TCEQ. Internal audits are further divided between technical audits of field samplers (on staff offices, vehicles, and data management practices) and Management Quality Reviews. These activities are summarized below.

**Technical Audits**

The sampling contractor’s QA Manager audits all samplers at least once each year to ensure compliance with established SOPs. The process includes pulling sample reports from each collector for review and verifying that they are correctly completed, and compares them to associated field notes. Field audits are also conducted to ensure adherence to established drinking water sample collection procedures as documented in the DWSG. The audit reports for each sampler are submitted with the monthly invoice, and are reviewed by the TCEQ Contract Manager. The sampling contractor also conducts field sampler office audits. This process is discussed in Section D2.

Sample collectors also participate in field audits conducted by the TCEQ to confirm that the collectors are following all required processes and guidelines. The TCEQ Contract Manager investigates public water system concerns with specific samples or the sampling process to ensure that established SOPs and quality controls are followed. The TCEQ audits sample collectors on a rotating basis. All samplers are audited at least once every two years. The results of these performance audits are reviewed by TCEQ management, approved, and then shared with the sampling contractor. The sampling contractor is required to reply in writing detailing changes made to correct any noted non-conformances and if applicable, retraining is conducted.

**Management Quality Reviews**

Management quality review meetings are conducted as needed by the sampling contractor’s project managers to discuss technical audit results, examine handling of PWS officials, laboratory complaints, conflicting data issues, and general project performance. The meetings are attended by the sampling contractor’s Program Manager, Project Managers, and the Database Specialist and those in attendance brainstorm solutions to issues.

**TCEQ Programmatic and Financial Oversight of Sampling Contractor**

According to provisions in the Sampling Contract, the TCEQ Contract Manager monitors the sampling contractor’s programmatic and financial performance. The TCEQ may perform evaluations of performance which may be a factor for selection in future contracts. In addition, the Sampling Contract allows the TCEQ to inspect all financial records, data, and facilities. Financial records must be maintained according to generally accepted accounting principles and be available for review during the term of the contract and three years thereafter.
Laboratory Assessment and Response Actions

QA Officers and Laboratory Managers conduct internal assessment and implement response actions for their respective organizations according to quality standards, laboratory quality manuals, and SOPs. Laboratory accreditation audits are conducted by the TCEQ per 30 TAC §25 – *Environmental Testing Laboratory Accreditation and Certification*. The TCEQ LQAS audits laboratories in accordance with the TNI Standard. In addition, during the audits of drinking water laboratories, the auditors will discuss the requirements of the PWSS Program as specified in the EPA *Certification Manual*. The LQAS maintains a list of accredited laboratories and their fields of accreditation. A list of accredited laboratories is maintained on the TCEQ website: <http://www.tceq.texas.gov/assets/public/compliance/compliance_support/qa/txnelap_lab_list.pdf>

Corrective Actions (CA)

Any person involved with work described this QAPP Addendum may initiate a CA if there is deviation from required protocols specified in it and/or referenced documents (e.g., Sampling Contract, the DWSG, SOPs, laboratory manuals, etc.). The field QA manager and the Laboratory QA officers (or designees) are responsible for assuring that CAs are documented, reported, implemented, and tracked appropriately.

Deviations may be identified through:

- Routine quality control procedures (internal or external)
- Internal or external audits
- Management reviews
- Feedback from customers
- Staff observations (internal or external)

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

- Sample collection errors
- Equipment failure
- Samples arriving at the laboratory with incomplete or incorrect sample submission form or COCs, or with sample integrity in doubt
- Samples lost in transit or in laboratory accidents
- Failure to meet acceptance limits when analyzing EPA Proficiency Test samples
- Reporting data in wrong units
- Data calculations using incorrect formulas.

The CA procedure following the identification of a deviation begins with an investigation to determine the root cause(s). 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; or contacting the TCEQ PWSS Program QA Manager for advice. CA procedures/response actions are specified in...
field and laboratory SOPs that include required documentation, solutions, resolution implementation, and follow-up.

Unique deviations that cannot be corrected by the procedures listed above will require CAs to be defined when the need arises. These include deviations that (1) jeopardize the integrity of sample analysis results; (2) result in non-conformance with state or federal regulations; (3) result in significant recollection of samples, or (4) are associated with the intentional misrepresentation of data or information.

If unique deviations occur, the field QA manager or the laboratory QA officers (or designees) must notify the TCEQ by phone or email within 24 hours by phone or email, draft a CA report, and submit it to TCEQ within 14 days of the incident detection.

When a unique deviation is identified, the field QA manager or the laboratory QA officers (or designee) will identify potential CAs. The field QA manager or laboratory QA officers (or designees) should select and implement the CAs that will most likely eliminate the problem and prevent recurrence. CAs should be appropriate in degree to the magnitude and risk of the deviation. Appropriate staff may be designated to investigate unique deviations, draft the report, and implement and track the CAs to ensure effectiveness.

CA reports related to unique deviations are submitted to the TCEQ within 14 days of detection; however, implementation and follow-up of the CAs may exceed 14 days.

CA reports include the following:
- Description of the problem - how it was identified, the date identified and by whom
- Description of the consequences – include sample ID number(s) affected
- CA taken, including the timetable for implementation;
- Root cause analysis
- Actions implemented to prevent recurrence
- Technicians/staff names (or job titles) involved
- Who prepared the report
- Review process with signatures and dates that includes manager(s), the field QA Manger or laboratory QA officer, and Field Manager or Lab Director

The TCEQ will review each CA report to determine if actions taken to resolve the deviation are acceptable. If CAs taken by a laboratory are unacceptable to the TCEQ, the TCEQ may withhold samples from the laboratory until such time that an acceptable CA is achieved.

Whenever the laboratory is required to issue an amended analysis report as part of a CA, they are required to submit a copy to TCEQ in both printed and electronic form. All corrected reports and data must be clearly marked to identify them as “corrected” or “amended” and should 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.
Authorization to Stop Work
TCEQ management will authorize work stoppage if conditions are identified that indicate significant compliance is in jeopardy or if primacy requirements are not being met. The TCEQ QA Manager, PWSS Program QA Manager, or the TCEQ federal grant manager may also request a work stoppage. Conditions include the intentional misrepresentation of data or information.

C2 Reports to Management
Sampling Contractor Reporting
TCEQ requirements for sampling contractor reports are specified in the Sampling Contract and the DWSG, Chapter 10. Additional detail regarding sample reports is provided in the SCMP.

In addition to billing requirements in the General Conditions of the Sampling Contract, the sampling contractor is required to submit the following reports to the TCEQ with the monthly invoice. These reports are described in Section A9 of this document. The following list does not include data and associated records described in Section B10.

- Monthly field reports
- QA reports (including internal audit reports)
- Meeting announcements and minutes
- Reports on field staff training and certification

Laboratory Reporting
There are no laboratory reports required by the TCEQ for this project. Forms (COCs and Analysis forms) are submitted with the data (as described in Section B10) but these are not considered to be reports for the purpose of this Programmatic QAPP Addendum.

D1 Data Review, Validation, and Verification
The purpose of this section is to define the requirements that are used to review, accept, reject or qualify data in an objective and consistent manner. Data Review involves both verification and validation as defined below. The implementation of associated activities provide a way to decide the degree to which each data item has met its quality specifications as described in this document. Verification and validation of data generated for this project are a shared responsibility of the sampling contractor, the laboratories, and the TCEQ staff. The methods discussed in Section D2 are those conducted by the sampling contractor and the laboratories. The activities conducted by the TCEQ staff are discussed in the Programmatic QAPP.

- Verification: Evaluating the completeness, correctness, and conformance/compliance of a specific data set against method, procedural, or contractual requirements.
Validation: A sample and analyte specific process that extends the evaluation of data beyond method, procedural, or contractual compliance (i.e., data verification) to determine the quality of a specific data set.

D2 Verification and Validation Methods

This section describes the sampling contractor’s and the laboratories’ methods for verifying and validating data as well as how any issues are conveyed to the TCEQ.

Verification Methods

The primary goal of verification is to document that applicable methods, procedures, and contractual requirements were met during field measurements/sampling and laboratory analysis. In general, verification checks to see if sampling and analysis matched QAPP requirements, if SOPs were followed, and project specific DQOs were met. Verification involves the comparison of data and information to applicable requirements and identifying exceptions and missing documentation.

Verification of field and laboratory data prior to reporting is the responsibility of the sample collectors and laboratory analysts as well as the both field and laboratory QA Officers as described below.

Verification of Field Data

Field data are verified to ensure they are correct, complete, and comply with standards in this QAPP Addendum. Field data receive two levels of review before they are submitted to the laboratories. In addition, field data are reviewed by the TCEQ after they are submitted. Data are also reviewed during field sampler office audits. These multiple levels of review ensure that the data are accurate, complete, and comply with programmatic requirements. Potential issues are identified by both the manual examination of data and documentation, and electronically using data queries. Mistakes are corrected and documented whenever possible before the data are transferred to the laboratories. If an issue cannot be corrected before the data are transmitted, the sample associated with the issue is invalidated and the sample recollected.

The first level of review is performed by field samplers who carefully enter data and information on their mobile devices prior to choosing “COLLECT SAMPLE” and printing the SCAR. After the field sampler prints the SCAR, he/she reviews it for typographical and transcription errors. If the electronic data requires a correction, the process described in the next section under validation of field data is followed.

After the field samplers load the data to the server, they are electronically queried and verified to detect any errors prior to submitting the data to the laboratories. Electronic data verifications include units, decimal places, date, time, completeness, and reasonableness. In addition, the sampling contractor’s project managers verify GPS data against Google Earth on a daily basis to determine if any measurement is 50 meters or more from the original measurement. The sampling contractor may cancel samples if GPS discrepancy is identified before samples are analyzed by the laboratories. If errors are detected before the data are transferred to the
laboratories, the corrections can be made. Otherwise, the samples must be recollected.

Field sampling staff and project managers verify field data as part of field sampler office audits. Field sampler office audits involve the review of the following items:

- Use of properly maintained instruments
- Use of instruments that have verified calibration
- Proper use of supplies (e.g., unexpired reagents)
- Following appropriate SOPs
- Making careful and complete records of field activities
- Completeness and correctness of field records
- Review of QC measures performed in the field
- Identification of anomalous field test data

Field sampler office audits are used by sampling contract management to verify compliance with procedures which could have an impact on the validity of data. The sampling contractor’s SOP No. AUDITING describes this process and provides the checklists used to verify and document practices related to equipment maintenance and calibration, supplies, compliance with SOPs, data management, documentation, etc.

The TCEQ further verifies field data upon receipt using MS Access database queries, SDWIS Lab to State software, and XML Sampling software. In addition, the TCEQ verifies five (5) percent of printed reports against the electronic data received from the labs. Any errors that are identified will be reported to the originating entity for correction. The percentage of reports verified for accuracy is subject to increase if a pattern of errors is identified. Detailed information related to the TCEQ review of data is contained in the Programmatic QAPP and the TCEQ SOP: Chemical Data Migration and Quality Control Work Instruction.

Verification of Laboratory Data

All laboratory data are verified to ensure they are correct, complete, and comply with standards in this QAPP Addendum. All laboratory data receive three levels of review before they are submitted to the TCEQ. These three levels of review ensure that the data are accurate, complete, and traceable, and that all quality control measures are reviewed and evaluated prior to reporting. Potential issues are identified by both by the manual examination of data and documentation, and electronically using special software and electronic queries. Issues which can be corrected using established procedures are corrected and documented. If an issue cannot be corrected, then associated data are qualified or rejected and reported to the TCEQ as described in the section below related to the validation of data.

Laboratory quality manuals and SOPs include processes for verifying laboratory data as follows.

Once analytical data and quality control data are generated by the instrument/analysis, the analyst reviews the data per laboratory and project requirements, including but not limited to the use of correct methods/procedures and analyte list, list of consumables and reagents used, correct use of MDL and
MRL, documentation of interference, proper transcriptions and calculations, compliance with holding times, correct preservatives and containers, etc. The analyst also reviews and evaluates all quality control data and determines if the data are acceptable to report or if any or all of the samples must be re-analyzed. The analyst and/or team leader is also responsible for determining if any results need to be rerun/confirmed per Section B5 of this document. Any deviations or anomalies are documented, including whether they apply to the entire batch of samples or just to one or more samples.

The data receive a secondary review by a laboratory supervisor or another designated qualified data reviewer. The second level review also ensures that the data are free from transcription and calculation errors. The reviewer evaluates all quality control data and confirms whether data are acceptable to report or if any or all of the samples must be re-analyzed. Upon approval, the reviewer documents any additional comments or instructions.

Upon completion of the first and second tiers of data review, the team leader, the laboratory manager (or designee) or the laboratory project manager (or designee) closely scrutinizes the data as part final report package. He/she will review the final reports for completeness, clarity, and unusual conditions. Elevated results are critically reviewed to verify they were calculated correctly, confirmed, and rerun, if needed as indicated in Exhibit 5. The third tier reviewer may check with supervisors and analysts to verify information and ensure that any discrepancies or notations are properly documented in the comments or case narrative that is part of the final report package.

As described in the section above on the verification of field data, the TCEQ further verifies laboratory data upon receipt using MS Access database queries, SDWIS Lab to State software, and XML Sampling software. In addition, the TCEQ verifies five (5) percent of printed reports against the electronic data received from the labs. Any errors that are identified will be reported to the originating laboratory for correction. The percentage of reports verified for accuracy is subject to increase if a pattern of errors is identified. Detailed information related to the TCEQ review of data is contained in the Programmatic QAPP which includes the SOP: Chemical Data Migration and Quality Control Work Instruction.

**Validation Methods**

Data validation extends the process of verification to determine whether the data sets meet the requirements of the project-specific intended use as described in this QAPP Addendum. That is, if the data results are of the right type, quality, and quantity to support their intended use. Data validation also attempts to give reasons for sampling and analysis anomalies, and the effect that these anomalies have on the overall value of the data. For example, determining if out of control results from out of control LFMs apply to individual samples or the analytical system is a validation step. The application and reporting of rejection codes is also part of validation. The correction of data, when needed is also discussed in this section.

**Validation and Correction of Field Data**

Field data are validated by the sampling contractor at the time of reporting as described in the section above on the verification of field data. **Note:** During
sample collection, minor typographical or transcription errors may occur due to the nature of use of a mobile device, stylus or manual data entry. Once the data entry is completed and the sampler has chosen “COLLECT SAMPLE” no changes can be made on the mobile device. If the electronic data requires a correction that is significant enough to merit a database change (such as typing in an address “2521 Main Street” that should have been “2512 Main Street”, etc.), the following process must take place:

- The sampler must notify the home office immediately of the correction to be made.
- The sampler is to mark through the incorrect data with a single line and initials on both printed copies of the SCAR. The correct data must then be handwritten in the correct field, and the PWS given the corrected form.
- The sampler is to then send a corrected copy to the home office, so that the correction can take place prior to transmittal to the labs. This means before 4:30PM CST or if data transmittal occurs after 4:30, prior to 6AM CST for data transmittals going out the next day. If the data are transmitted to the labs before the correction is made, the sample(s) will be rejected for Invalid Sampling Protocol (IP). The sampling contractor will not send corrected data to the labs if the requests and corrections were not made before regularly scheduled transmittal times.
- When a correction is made, the sampling contractor must enter a comment into the “CONTRACTOR_COMM” field of the SCHEDULE indicating what field was corrected and who the correction was made by.
- The sampling contractor is to send a copy of the original SCAR with correction(s) to TCEQ along with the regular monthly invoice documentation. The copy must be legible, with all parts of the report visible. Any report with missing information will not be accepted.

Any changes made to the EDC will be documented in a Change Log maintained at the sampling contractor’s office and on the SCAR form(s). This Change Log will be transmitted to TCEQ on a monthly basis with the invoice.

Field sampling anomalies are sometimes detected “after the fact” during the field sampling office audits. Preprinted labels and automatically uploaded data on the field tablets (i.e. date and time of sampling) help to preclude errors and to facilitate the tracking of the samples through the analyses and the data documentation processes so that errors are minimized. If an issue is detected, the sampling contractor in coordination with the TCEQ will determine what effect it has on the overall value of the reported data including the possibility of invalidating previously reported data. For example, inaccurate and/or incomplete forms and documentation may call into question the true nature of the sampling point, the analyses requested, the use of appropriate sampling methodologies and/or the overall sampling protocol. As such, the quality of the sample may be suspect and both the field and laboratory data may be invalidated.

In the event that the discovery of a field issue that (1) jeopardizes the integrity of previously reported result, (2) results in a non-conformance of a state or federal regulation, or (3) results in the significant recollection of samples, the sampling
contractor must contact the TCEQ within 24 hours of detection and submit a CA Report within 14 days which may involve the resubmittal of data and information. (See Section C1). In addition, the sampling contractor must re-submit the data.

**Validation of Laboratory Data**

All data are validated as needed by the laboratories prior to reporting in accordance with the QA/QC requirements specified in the analytical methods, internal SOPs, and the technical specifications outlined in this QAPP Addendum. In the first, second, and third levels of data review described previously, to validate data, reviewers give reasons for analysis anomalies, and the effect that these anomalies have on the overall value of the data. The comments associated with the validations are used by the laboratory manager or project manager (or designee) to confirm if data qualifiers or rejection codes are applicable.

The rationale for any anomalies in the QA/QC of the laboratory data are documented in the comments or case narrative which is provided to the TCEQ Project Manager with the analytical test report. Laboratory qualifier codes or rejection codes are provided in the comment field on the sample or result table to explain the anomalies. Unacceptable data (i.e., data that do not meet the QC criteria) are reported and the proper qualifier code is submitted to the TCEQ with the sample results as described in Section B5.

**Corrections to Laboratory Data**

Corrections to handwritten errors are made using a single horizontal line drawn through the error, with the correction clearly written next to the original and the initials of the person making the correction and the date of the correction.

Corrections to electronic data in LIMS can be made only by personnel given specific security rights to do so. Changes to work order or sample information may be made after the login review process is completed only by authorized personnel. After the data validation step has been completed, only authorized personnel are allowed to make changes to analytical data and a reason for the change must be provided.

In the event a laboratory analytical report must be revised or amended, the laboratory project manager will contact the TCEQ within 24 hours of discovery and regenerate the entire report with the revision date and original report date along with a CA Report. See Section C1 of this document. Corrected electronic data must also be submitted to TCEQ.

**D3 Reconciliation with User Requirements**

The sampling contractor and laboratories verify and validate data against the Project’s defined objectives prior to final reporting stages. If there are any problems with sampling and analysis, these issues are addressed immediately to ensure that data quality objectives are met. If the issue cannot be resolved, the sample and/or results will be qualified or rejected and reported to the TCEQ as such. Only data that have been validated with appropriate qualifiers and/or rejection codes are provided to the TCEQ PWSS Program.

Further data review and reconciliation with user requirements are conducted by the TCEQ as discussed in the Programmatic QAPP. Data meeting project requirements
will be used by the TCEQ PWSS Program to determine PWS compliance with chemical drinking water standards. Data which do not meet requirements will not be used for this purpose. The TCEQ may revise past compliance determinations in the event invalid data are discovered after the fact.
Exhibit 1: Organization and Communication Flow Chart
Exhibit 2: Flow chart of Work Activities

**External Elements**

**Contractor**
Sampling contract and samples audited by TCEQ/PDW

**Laboratories**
Labs accredited by TCEQ

**TCEQ PWSS Program staff**
Develops routine sampling schedule and provides to Contractor

Sample Contractor collects samples, provides data and samples to accredited lab

Lab analyzes samples and reports data

Electronic Data Deliverable

TCEQ PDW Drinking Water Quality Team (DWQT) reviews and migrates data

DWQT determines compliance

DWQT performs appropriate actions for violations, modifies schedules if needed

PDFs of analytical reports/COC

PWS and TCEQ retain data to comply with records retention requirements
Exhibit 3: DW Compliance Sampling Contract Work Plan

1. Background: TCEQ is authorized to conduct chemical sampling of public drinking water to ensure compliance with the sanitary standards of drinking water and to ensure protection of public water supplies and bodies of water. Texas Water Code 5.103; Texas Health and Safety Code, Chapter 341, Subchapter C; Safe Drinking Water Act of 1991, as amended (SDWA).

Water samples are collected and submitted to environmental laboratories for analysis. The analysis results are then used by the TCEQ to perform compliance monitoring of public water systems under Title 30 Texas Administrative Code Chapter 290 Subchapter F: Drinking Water Standards Governing Drinking Water Quality and Reporting Requirements for Public Drinking Water Systems. The CONTRACTOR is responsible for collecting public drinking water compliance samples under the chemical monitoring program for the Drinking Water Sampling Program.

The CONTRACTOR will collect entry point, distribution system, and source water samples from TCEQ-selected Public Water Systems (PWSs) for compliance with the SDWA. Close coordination between the TCEQ and the CONTRACTOR is required. The TCEQ will provide the CONTRACTOR with an annual Sampling Schedule (SS) that lists each sample to be collected during the calendar year.

Current projections estimate approximately 44,000 samples will be scheduled state-wide for calendar year 2014, approximately 45,000 samples for calendar year 2015, and approximately 47,000 samples for calendar year 2016. Approximately 16,000 samples will be remaining on the 2013 calendar year schedule that will require collection during September through December of 2013. These projections are estimates only, and are subject to change as water systems are added or deleted, as rules change, and as schedules change due to results of monitoring. There is no guarantee to the number of samples that will be scheduled for collection in a particular year, and the numbers may significantly increase or decrease.

The CONTRACTOR is responsible for developing internal work plans, assigning personnel, and acquiring necessary equipment and materials to ensure compliance with and completion of this contract.

The CONTRACTOR shall review all Guidance Documents listed in the Scope of Work (SOW) to ensure it understands and can meet project objectives.

2. Contractor Responsibilities: During the term of contract, the CONTRACTOR is responsible for the following:

a. **Staff:** The CONTRACTOR shall provide the TCEQ Contract Manager (CM) with a current list of all managers, sample collectors, and administrative staff working on this Contract. This list must include names, e-mail addresses, office and cell phone numbers. This list must be kept current and must be re-submitted to the TCEQ CM within 48 hours every time it is amended. The TCEQ CM must be notified in writing within 48 hours when samplers are terminated or are separated from employment.

b. **Annual Sample Schedule:** The CONTRACTOR will collect all samples as indicated per the Annual Sampling Schedule (SS). The TCEQ will provide the CONTRACTOR with an electronic copy of the current SS within (10) working days of the execution of this contract. The SS will be in the form of a table within an Access 2010 database. The SS is generated for one annual calendar year and will list the sample type, number, location, and frequency of samples to be collected. A new SS will be provided during the month of December, for the following calendar year. The TCEQ shall routinely make additions, deletions, or changes to the SS during the term of the contract through monthly updates to the SS.

c. **Emergency and Priority Sample Requests:** TCEQ will provide the CONTRACTOR Emergency and Priority Sample requests on an as-needed basis by email and/or by phone.

d. **New Site Samples:** Unless prior authorization is granted in writing by the TCEQ CM, the CONTRACTOR shall collect all scheduled and/or requested new water well, new entry point, and/or new water system samples within 8 weeks of written request or receipt of monthly schedule update. The CONTRACTOR will be compensated at a rate 50% less than the bid item price for all new well, entry point or water system samples that are not collected within the time designated.
e. **Rate of Sample Collection**: The CONTRACTOR will collect:

- Approximately 1/12 of the annually scheduled samples of each sample type on the SS each month,
- Approximately 1/3 of the quarterly scheduled samples of each sample type on the SS each month of that quarter, and
- Approximately 1/5 of the summer scheduled samples of each sample type on the SS each month during the summer months, May through September.
- Other sample frequency types will require that the contractor spread the collection of these types of samples over the particular period.

This will ensure that all scheduled samples are collected on time and that an even flow of samples is delivered to the laboratories, preventing laboratory capacity issues. The laboratories’ storage and/or analysis capacities may require adjustments to the number of samples collected weekly or monthly during a calendar year. The TCEQ Contract Manager (CM) and/or laboratories will notify the CONTRACTOR in the event of these changes.

f. **Regional Sample Coverage**: Unless prior authorization is granted in writing by the TCEQ CM, the CONTRACTOR shall ensure that its sample collectors’ coverage in each TCEQ Region is adequate to meet the sample collection rates above. The contractor is expected to reallocate staff as needed to provide state-wide coverage. Failure to provide 100% geographic coverage of the State of Texas for a period greater than 30 days will be deemed as failure to execute the deliverables of this contract, and is deemed grounds for immediate termination of this contract. CONTRACTOR’s performance under this item will be assessed on a monthly basis.

g. **Field Reports**: The CONTRACTOR must complete Field Reports for the following circumstances:

- Public Water System (PWS) Changes. Notify TCEQ of collection site status changes, name and phone number changes of water system or water system officials.
- Inability to make contact with a PWS after at least three attempts.
- Inability to collect scheduled sample. Includes change in entry point or other collection site status, inactive systems, water systems refusing sample collection, and any other information related to why a sample was not collected.

The CONTRACTOR will enter field report data into a database and will be required to submit that data to TCEQ on a monthly basis with the invoice, along with a paper copy and an electronic copy (scanned PDF). Field reports will be verified by TCEQ staff. If data from a field report regarding an uncollected sample is deemed inaccurate by TCEQ, the associated sample(s) will be counted as uncollected and will count against the CONTRACTOR’s performance measures.

h. **Sampling Contract Management Plan (SCMP) and Quality Assurance Plan (QAP)**: Quality assurance is of the utmost importance to the TCEQ. The CONTRACTOR is responsible for developing sufficient procedures and guidelines to ensure that all aspects of sample collection are carried out correctly and in a timely manner. Within 14 calendar days after TCEQ executes the contract, the CONTRACTOR must provide TCEQ one draft copy of their SCMP and QAP. The SCMP shall include internal Standard Operating Procedures and methodologies for carrying out the Scope of Work, processes for hiring, assignment, and training of personnel, and the acquisition of necessary equipment and materials. The QAP shall include quality control measures to ensure that all aspects of this scope of work are carried out correctly. The CONTRACTOR is expected to have at least one individual assigned to quality assurance (QA/QC manager), and the QA/QC manager must complete at least one (1) field audit of each sampler every year.

Within 90 calendar days after TCEQ executes the contract, the CONTRACTOR shall provide to TCEQ one copy of the final SCMP and QAP. The SCMP and QAP shall be maintained by the CONTRACTOR. Updates to the SCMP or QAP shall be provided to TCEQ within 30 days of the TCEQ approved change.

i. **Contact and Location Information for Water Systems**: The CONTRACTOR must make every
attempt to obtain and update any contact information that may have changed. TCEQ will provide the CONTRACTOR with a current list of all public water systems in Texas including the name, address, phone number, and responsible official at the execution of the contract and through monthly electronic updates. CONTRACTOR will make every attempt to obtain updated information by contacting the appropriate TCEQ regional office, using online searches, and/or visiting the TCEQ website. A database of sample contact information must be maintained by the CONTRACTOR, and the information contained therein along with any associated paper records, is the property of the state and must be surrendered to the TCEQ CM or designee upon request.

3. Conducting Sampling:

a. **Scheduled Sample Coverage:** Samples that are not collected result in a monitoring and reporting violation for the public water system; it is therefore extremely important that CONTRACTOR collect ALL scheduled samples. Unless prior authorization is granted in writing by the TCEQ CM, failure to collect at least 99.9% of scheduled samples is considered a breach of material obligation by CONTRACTOR. A missed sample is defined as a sample that remains uncollected at the end of a sample period, and for which there has been no valid field report submitted. CONTRACTOR performance under this item will be assessed on a minimum of a quarterly basis.

b. **Scheduling:** The CONTRACTOR will provide advance notification to PWSs prior to collecting samples. The CONTRACTOR must give prior notice at least five (5) business days before scheduling sample collection events. The CONTRACTOR must arrange for a qualified PWS representative to accompany the sampler when collecting all samples.

c. **Sampling Protocol:** CONTRACTOR must collect drinking water samples listed in the TCEQ annual SS, monthly updates to the SS, and emergency and/or priority requests. The CONTRACTOR shall collect the water samples at the location(s) specified on the SS, monthly update, or special sample request, unless directed otherwise by a water system official (this must be documented in a field report). Specific sample site locations should be documented in the PWS’s Monitoring Plan. In the event that any discrepancy exists between a TCEQ requested sample, sample site, or sample source, and a representative of the water system, the CONTRACTOR must direct the water system representative to contact the TCEQ to clarify the issue. The CONTRACTOR is not to determine sample locations for water systems, but must defer to the direction provided by the TCEQ, and/or the water system.

The CONTRACTOR will collect samples in accordance with the specific written sampling protocols contained in the Guidance Documents 1 through 14. Guidance Document 1: *Drinking Water Sampling Guide (DWSG)* is the primary guidance for sampling procedures. This document is based on rules and regulations contained in Guidance Documents 2 through 7, and on approved EPA drinking water methods. The DWSG will be updated annually (if needed) based on current state and federal regulations. Failure to follow procedures outlined in the current DWSG or any of its annual updates will be considered a breach of material obligation of the contract.

d. **Sample Shipment and Laboratories:** The CONTRACTOR shall ship samples to the NELAC-certified environmental laboratory(ies) designated in writing by the TCEQ CM. These laboratories have been certified by the TCEQ and/or the USEPA for chemical analysis of drinking water. The TCEQ current primary compliance laboratory is the Texas Department of State Health Services (DSHS) Bureau of Laboratories located in Austin, TX. TCEQ may have several other backup laboratories as required to ensure all scheduled samples are analyzed by NELAC accredited facilities.

The CONTRACTOR will collect samples in a manner that assures that they will arrive at the laboratories on Monday through Friday only. Samples shall not be shipped to arrive on weekends or holidays, unless prior approval has been received from the TCEQ and the laboratory performing the analysis. Shipments of samples to the laboratories should be made at least twice weekly to insure an even flow and avoid exceeding the laboratories’ capacity. Some sample types may require daily overnight shipping. Samples that are held before shipment must be maintained so that they meet preservation guidelines.
Samples must be shipped in accordance with regulations included in Guidance Documents 1 through 14, in a manner that will ensure they meet preservation and holding time requirements. The CONTRACTOR is responsible for selecting and using qualified shippers, and will be held responsible for samples that are rejected because of actions by the shipper.

e. **Sample Collection Data:** The CONTRACTOR will collect electronic data on the samples submitted by the CONTRACTOR including, but not limited to, the TCEQ ID number, PWS ID number, PWS name, site, sample type, collection date, sampler name, lab submitted to, chlorine residual and type, collection and flushing times, temperature, pH, GPS location and data entry date. This data will be submitted monthly to TCEQ through a digital file. Verified sample collection data will be appended to the SS by the TCEQ. Under no circumstance will the CONTRACTOR make any changes to the SS directly. Within two business days after receipt of the digital file, the TCEQ CM or designee will notify the CONTRACTOR of any discrepancies requiring correction, or of approval for submitting an invoice for the services. After the data is deemed acceptable, the CONTRACTOR will be provided with an updated Sample Schedule with which to prepare the monthly invoice.

f. **Rejected Samples and Recollection:** In the event that samples are rejected by the laboratory, the laboratory will provide e-mail notification to the TCEQ and the CONTRACTOR. The reason for the laboratory’s rejection will be provided in the notification. The number of samples that must be resubmitted due to laboratory rejection will not be counted toward the total samples per month requirement. The CONTRACTOR will not be paid for samples that are rejected, except when the rejection is due to laboratory error.

The CONTRACTOR shall recollect all samples rejected by the laboratories. Samples rejected due to sample collection or shipping errors and samples rejected by the TCEQ as a result of CONTRACTOR error, will be recollected at no cost to the TCEQ. The cost of recollecting samples not analyzed by the laboratories due to laboratory error will be paid by the TCEQ at the standard rate.

The CONTRACTOR shall reschedule, assign new TCEQ ID numbers from a range of numbers provided by the TCEQ, and recollect all samples that have been rejected during the same period (quarter, summer or annual) in which they were originally specified in the SS. Rejected Emergency and/or Priority samples must be collected within the original time requested after notification of invalidation by the laboratory.

g. **Sample Invalidation:** An invalidation rate of greater than 2% of collected samples may be considered a breach of material obligation under this contract. CONTRACTOR performance under this item will be assessed on a monthly running total of all samples collected. Greater than a 2% invalidation rate for any one sampler, and/or sub-contractor’s sampler, for any single month, shall be deemed grounds for remedial training for the sampler(s). A greater than 2% invalidation rate for two consecutive months constitutes reasonable grounds for objection of a subcontractor. The TCEQ CM reserves the right to request replacement of any sampler that exceeds these requirements.

h. **Supplies:** The CONTRACTOR must provide all supplies necessary to collect, preserve, and ship all samples. All supplies must meet specifications stated in Guidance Documents 1 through 14. The TCEQ reserves the right to verify the specification compliance of all sampling supply items.

i. **PWS Water Analysis and Chain of Custody Forms:** The CONTRACTOR must use the TCEQ-approved PWS Water Analysis sample submission forms and Chain of Custody forms (or electronic equivalent) for submitting all samples to the laboratories. The CONTRACTOR is responsible for printing copies of these forms. The TCEQ maintains the right to make any changes to the sample submission and chain of custody forms deemed necessary to meet state and federal regulations. Any changes to any forms proposed by the CONTRACTOR must be approved in writing by the TCEQ CM. Any changes made to submission forms or chain of custody forms without the written consent of the TCEQ will be considered a breach of material obligation of the contract.

Electronic (scanned PDF) copies must be saved as individual files named by the associated
j. **GPS Recording:** The CONTRACTOR must record and/or verify sample locations by GPS at each individual sample site. Locations must be recorded in decimal degree format (DD.DDDDDº).

k. **Duplicate and Quality Assurance/Quality Control (QA/QC):** The CONTRACTOR shall collect duplicate and field QA/QC samples as directed by the TCEQ or as required by the laboratories. Duplicate and QA/QC samples are not billable.

l. **Field Instrumentation:** For purposes of quality and consistency, the CONTRACTOR must provide all of its samplers with the same make and model of each field instrument used. This includes, but is not limited to, instruments used to measure chlorine residual, pH, location by GPS, and temperature.

m. **Duplicated Samples:** The CONTRACTOR must keep track of all samples collected to avoid collecting a sample more than once, or using a TCEQ ID more than once. The TCEQ will not pay for the collection of duplicated or any other unauthorized samples. The TCEQ may provide a tracking tool to the CONTRACTOR to aid in the tracking of samples. If the contractor collects a sample more than once, it will be responsible for notifying the laboratory to cancel the sample before it is analyzed. If the duplicated sample is analyzed, then the CONTRACTOR will be responsible for reimbursing the PWS or laboratory for the associated lab analysis fees. The TCEQ will not release retainage until the CONTRACTOR has provided proof that reimbursement for these lab fees either by direct payment to the PWS or by payment on the PWS’s laboratory account.

4. **Guidance Documents:** All activities associated with drinking water sampling, completion of field reports, monthly data submittal, and monthly reports must be conducted in accordance with the following documents, which are available on request:

1. **Drinking Water Sampling Guide (DWSG),** by the Drinking Water Quality Program, TCEQ
2. TCEQ Quality Management Plan (QMP)
3. **Quality Assurance Project Plan for the Public Water Supply Sampling and Survey Program (QAPP PWSSSP),** by the Public Drinking Water Section, TCEQ
4. **Manual for the Certification of Laboratories Analyzing Drinking Water,** EPA
5. **National Primary Drinking Water Regulations,** 40 CFR Parts 141, 142, 143
7. **Drinking Water Standards Governing Drinking Water Quality and Reporting Requirements for Public Water Systems,** 30 TAC Chapter 290, Subchapter F
8. Annual Sampling Schedule (electronic; format included in DWSG, Appendix B)
9. Public Water System Water Analysis Form (included in DWSG, Section 10)
10. Chain of Custody Form (included in DWSG, Section 10)
11. Field Report (included in DWSG, Section 10)
12. Electronic Data Reporting Format
13. Example Reports:
   b. Monthly Field Reports (paper and electronic)
14. Drinking Water Quality Team - SOP # 12-06: Authorization to Collect Chemical Compliance Water Samples

5. **Training:** Each sample collector must demonstrate proficiency in sample collection, basic PWS knowledge, and site identification techniques to the satisfaction of the TCEQ Contract Manager by
written and practical examination in accordance with Drinking Water Quality Team-SOP # 12-06: 
_Authorization to Collect Chemical Compliance Water Samples._ Demonstration of proficiency is 
required prior to collection of samples and for remedial training purposes as deemed necessary by 
the TCEQ Contract Manager. The TCEQ will provide samplers with a photo identification badge 
and/or letter of authorization upon successful completion of training and examination. The 
following applies to required training of personnel:

a. **TCEQ Orientation:** All CONTRACTOR and sub-contractor personnel performing under this 
contract shall attend a one day TCEQ Orientation prior to initiation of work under this 
contract. The TCEQ Orientation will take place in Austin at the TCEQ headquarters located 
at 12100 Park 35 Circle, or another location as designated by the TCEQ.

b. **Contractor-led Training:** The CONTRACTOR shall be responsible for the training of all 
sample collectors and sub-contractor’s sample collectors performing under this contract. 
Copies of all Standard Operating Procedures (SOPs) for Contractor or Subcontractor-led 
training must be provided to the TCEQ for review and approval. The CONTRACTOR must 
supply TCEQ with documentation of each sampler’s training and practical examination 
upon completion.

c. **Other Training:** Within ninety (90) days after onset of the contract term or first day of 
employment, all CONTRACTOR and Sub-contractor samplers and other key personnel must 
have completed the OSHA 40-Hour Hazardous Waste Worker (HAZWOPER) training, and 
shall have obtained a minimum Class D Water Operators License. Samplers who do not 
obtain a license, whose license lapses, or who do not complete HAZWOPER training within 
the allotted time period will be suspended from sampling until they do so. Any samples 
collected by an individual that does not meet these requirements will be rejected by TCEQ 
and will not be paid. Any extension to this time period must be approved by the TCEQ CM 
in writing.

d. **Health and Safety Plan:** The CONTRACTOR shall be responsible for the development of and 
compliance with a health and safety plan for site visits. The health and safety plan 
(including 40-hour OSHA training requirements) must comply with all requirements of the 
Government Code §2166.303, and with all other applicable Laws and Regulations. The 
Health and Safety Plan must include plan for determining if items are contaminated and 
precautions for handling contaminated materials, including documents. The CONTRACTOR 
must provide evidence of each sampler’s training to the TCEQ within 30 days of 
completing the training.

6. **Regular and Annual Meetings:** CONTRACTOR and sub-contractors must meet regularly, at 
least quarterly. Meetings may be held at a location designated by the CONTRACTOR or by 
teleconference. All samplers and personnel involved in the contract must attend. An agenda 
should include updated information from the TCEQ, feedback on performance, remedial training 
on sampling and sampling protocols, and customer service. The CONTRACTOR shall provide the 
TCEQ CM with a 10 working day notice and draft agenda prior to each meeting. The CONTRACTOR 
shall document meeting minutes and shall provide these to the TCEQ CM within 5 working days 
after each meeting. The TCEQ CM reserves the right to attend these meetings along with any 
other TCEQ staff approved by the TCEQ CM.

All samplers and key CONTRACTOR personnel are required to attend an annual mandatory 
meeting at the TCEQ headquarters in Austin. This meeting will discuss previous performance and 
changes to operating procedures, as well as provide additional training related to sampling 
activities. Samplers that fail to attend the annual meeting are subject to suspension or termination 
at the sole discretion of the TCEQ CM.

7. **Invoicing and Payment:** In addition to billing requirements outlined in the General 
Conditions, the CONTRACTOR must include the following in its monthly invoices:

- The number of valid samples (samples accepted by laboratory for analysis and/or those 
  invalidated by laboratory due to laboratory error) collected in a single calendar month 
since the previous monthly invoice;
- Any other applicable deliverables; and
• A subtotal dollar amount billed for samples and a subtotal dollar amount billed for other applicable deliverables.

Materials to Accompany Invoices: The CONTRACTOR shall submit the following materials with each invoice:

• Monthly Sample Collection Data digital file: due no later than the 10th calendar day of the month following the month in which the sampling was performed.

• Monthly Field Reports

• PWS Water Analysis and Chain of Custody Forms: Invoice approval will be based upon review of electronically reported monthly collection report numbers, and data received from the laboratories. Review of monthly collection reports will be completed within 2 weeks of submission.

• Quality Assurance Reports: The CONTRACTOR must submit a monthly report to the TCEQ that summarizes the quality assurance activities (eg. audits, training, etc.) that occurred during the preceding month. This includes any field audits of sampler performance.

Final Invoice: The CONTRACTOR must submit the final invoice within 60 days of the end of the Contract Period.

8. Standard Reports and Compatibility: The CONTRACTOR shall submit all written reports with the monthly invoice unless otherwise directed otherwise by the TCEQ CM. The CONTRACTOR’s software and technology shall conform and be completely compatible with TCEQ software and technology. TCEQ uses Windows 7 Professional platform personal computers, and Microsoft Office 2010, including Access 2010. The CONTRACTOR is responsible for obtaining proper training for its staff. The TCEQ will NOT any provide computer or software training to the CONTRACTOR.

9. Sub-Contractors: Any sub-contractor utilized by the CONTRACTOR is also bound by all conditions set forth in this scope of work and contract. Failure of sub-contractors to abide by conditions in this contract will be deemed as grounds for a reasonable objection of that subcontractor by TCEQ, and TCEQ may request immediate dismissal of that sub-contractor.

10. Audits: The CONTRACTOR must be available upon notification for on-site audits by the TCEQ Program Representative, TCEQ HUB Coordinator, TCEQ Fiscal Monitor and/or other TCEQ designee. The CONTRACTOR will make themselves available for office audits and/or field audits on performance of sample collectors as requested by the TCEQ. CONTRACTOR staff will not be permitted to accompany a sampler during a TCEQ field audit unless authorized to do so by the TCEQ CM. The TCEQ Program Representative and/or other TCEQ designee, reserves the right to conduct unannounced office or field audits for review of regulatory and contractual specifications.

11. Expert Witness: If requested by the TCEQ, the CONTRACTOR shall identify and direct the appropriate personnel to appear and testify in enforcement or other legal actions regarding samples collected by the CONTRACTOR. In such event, travel and per diem expenses for such employee shall be paid by the TCEQ. Travel and per diem for court appearances hereunder shall be based on current state laws.

12. Records and Data: Any and all paper records and/or electronic files created and/or maintained by the CONTRACTOR under this contract are considered the property of the State of Texas and must be surrendered to the TCEQ upon request or at the completion or termination of this contract. This includes, but is not limited to, sample collection records including sample submission forms and chain of custody forms, PWS contact information, maps, GPS data, images, quality assurance records, sample schedules, field reports and any other paper or electronic records or data created and used in the execution of this contract.
<table>
<thead>
<tr>
<th>Analytes</th>
<th>Code</th>
<th>Method</th>
<th>Minimum Reporting Limit (MRL) Verification</th>
<th>Laboratory Reagent Blanks (LRB)</th>
<th>Lab duplicate (RPD of LD)</th>
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<th>Laboratory Fortified Matrix (% Recovery of LFM)</th>
<th>Confirmation of Sample Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>Asbestos</td>
<td>1094</td>
<td>EPA 100.2</td>
<td>NA</td>
<td>$&lt;0.01\text{MFL}&gt;10 \text{um}$</td>
<td>See EPA 100.2 Table 2</td>
<td>See EPA 100.2 Table 2</td>
<td>NA</td>
<td>Confirm/rerun if &gt;MCL</td>
</tr>
<tr>
<td>Gamma Radiochemical</td>
<td></td>
<td></td>
<td></td>
<td>Recount if target analytes &gt; required detection limit/required MDA</td>
<td>Recount if RPD &gt;20. If still exceeds, qualify data</td>
<td>Recount if recovery is outside 90 – 110%</td>
<td>N/A</td>
<td></td>
</tr>
<tr>
<td>Beta Radiochemicals</td>
<td></td>
<td>EPA 905.1</td>
<td></td>
<td>Recount if blank &gt; RDL (Required Detection Limit). If still exceeds, rerun batch. If target analyte is not detected in associated samples, no rerun required</td>
<td>Recount if RPD &gt;20 or RER &gt;2. If still exceeds, rerun batch</td>
<td>Recount if recovery is outside 90 -110%. If still exceeds, rerun batch</td>
<td>Recount if recovery is outside 80 - 120%. If still exceeds, rerun batch</td>
<td></td>
</tr>
<tr>
<td>Beta Radiochemicals</td>
<td></td>
<td>EPA 906.0</td>
<td></td>
<td>Recount if blank &gt; RDL (Required Detection Limit). If still exceeds, rerun batch. If target analyte is not detected in associated samples, no rerun required</td>
<td>Recount if RPD &gt;20 or RER &gt;2. If still exceeds, rerun batch</td>
<td>Recount if recovery is outside 90 -110%. If still exceeds, rerun batch</td>
<td>Recount if recovery is outside 80 - 120%. If still exceeds, rerun batch</td>
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<tr>
<td></td>
<td></td>
<td>EPA 200.7</td>
<td></td>
<td>Locate/correct problem before continuing if any target analyte &gt;MRL</td>
<td>Locate/correct problem before continuing if outside control charts limits not to exceed 20%</td>
<td>Locate/correct problem before continuing if any outside 85-115%</td>
<td>If any outside 70 - 30% compare results to LRB and LFBs to determine matrix specific effects (MSE).</td>
<td></td>
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</tbody>
</table>

This group of methods is analyzed as follow up to samples that exceed 50 pCi/L for gross beta radioactivity. The analytical results are used to convert the beta/photon emitter pCi/L to mrem/yr.
<table>
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</thead>
<tbody>
<tr>
<td>Radionuclides (RAD)</td>
<td>EPA 200.8</td>
<td>Locate/correct problem before continuing if any target analyte outside method or laboratory acceptance limits</td>
<td>Rerun if any target analyte &gt;MRL</td>
<td>Locate/correct before continuing if over 20%</td>
<td>Rerun if any recovery not with 85-115%</td>
<td>If outside 70 - 130% compare results to LRB and LFBs to determine MSE.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Radionuclides (RAD)</td>
<td>EPA 900.0</td>
<td>NA</td>
<td>Recount if &gt;RL. If still exceeds, rerun batch. If target analyte is not detected in associated samples, no rerun is required.</td>
<td>Recount if RPD &gt;20 or RER &gt;2. If still out of control, rerun batch</td>
<td>Recount if outside 80 – 120%. If still out of control, rerun batch</td>
<td>Recount if outside 70 – 130%. If still out of control, rerun batch</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Radionuclides (RAD)</td>
<td>SM 7500-RAD</td>
<td>NA</td>
<td>Recount if &gt;RDL. If still exceeds, rerun batch. If target analyte is not detected in associated samples, no rerun is required.</td>
<td>Recount if RPD &gt;20 or RER &gt;2. If still out of control, rerun batch</td>
<td>Recount if outside 80 – 120%. If still out of control, rerun batch</td>
<td>Recount if outside 70 – 130%. If still out of control, rerun batch</td>
<td>Confirm/Rerun if any regulated contaminant &gt;2x MCL</td>
<td></td>
</tr>
<tr>
<td>Radionuclides (RAD)</td>
<td>SM 7500-RAC</td>
<td>NA</td>
<td>Recount if &gt;RL. If still exceeds, rerun batch. If target analyte is not detected in associated samples, no rerun is required.</td>
<td>Recount if RPD &gt;20 or RER &gt;2. If still out of control, rerun batch</td>
<td>Recount if outside 90 – 110%. If still out of control, rerun batch</td>
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<tr>
<td>Radionuclides (RAD)</td>
<td>SM 7500-UC</td>
<td>NA</td>
<td>Recount if &gt;RL. If still exceeds, rerun batch. If target analyte is not detected in associated samples, no rerun is required.</td>
<td>Recount if RPD &gt;20 or RER &gt;2. If still out of control, rerun batch</td>
<td>Recount if outside 90 – 110%. If still out of control, rerun batch</td>
<td>Recount if outside 80 – 120%. If still out of control, rerun batch</td>
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</tr>
<tr>
<td>Cyanide</td>
<td>1024</td>
<td>EPA 335.4</td>
<td>Locate/correct problem before continuing if any target analyte outside method or laboratory acceptance limits</td>
<td>Locate/correct problem before continuing if any target analyte &gt;MDL</td>
<td>Locate/correct problem before continuing if over 20%</td>
<td>Locate/correct problem before continuing if outside 80 - 120%</td>
<td>If not within 80 - 120% compare results to LRB and LFBs to determine MSE.</td>
<td>Confirm/rerun if &gt;1/2 MCL</td>
</tr>
<tr>
<td></td>
<td></td>
<td>SM 4500-CN</td>
<td>Locate/correct problem before continuing if any target analyte outside method or laboratory acceptance limits</td>
<td>Locate/correct problem before continuing if &gt;1/2 MRL</td>
<td>Locate/correct problem before continuing if over 20%</td>
<td>Locate/correct problem before continuing if outside control charts limits</td>
<td>If not within control limits compare results to LRB and LFBs to determine MSE.</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Quickchem 10-204-00-1-X</td>
<td>Locate/correct problem before continuing if any target analyte outside method or laboratory acceptance limits</td>
<td>Locate/correct problem before continuing if &gt;1/2 MRL</td>
<td>Locate/correct problem before continuing if over 20%</td>
<td>Locate/correct problem before continuing if recovery outside control charts limits</td>
<td>If not within control limits compare results to LRB and LFBs to determine MSE.</td>
<td></td>
</tr>
<tr>
<td>Disinfection Byproducts</td>
<td>DBP2</td>
<td>EPA 524.2¹</td>
<td>Locate/correct problem if any target analyte outside ±50% of the expected value, if any field sample in the batch has a concentration less than 5 times the regulatory MRL</td>
<td>Locate/correct problem before continuing if LRB peak within the RT window of any analyte which prevents the quantitation of the analyte</td>
<td>Locate/correct problem before continuing if over 20%</td>
<td>Locate/correct problem if outside 80 -120% Note: LFB criteria established for continuing calibration evaluated as LFB</td>
<td>If not within 80 - 120% compare results to LRB and LFBs to determine MSE. If MSE, report applicable sample with high or low bias qualifier.</td>
<td>NA</td>
</tr>
<tr>
<td></td>
<td></td>
<td>EPA 552.2</td>
<td>Locate/correct problem if any target analyte outside ±50% of the expected value, if any field sample in the batch has a concentration less than 5 times the regulatory MRL</td>
<td>Locate/correct problem if LRB interference in excess of MDL for that analyte</td>
<td>Locate/correct problem before continuing if over 30%</td>
<td>Locate/correct problem if outside 70 – 130% Note: LFB criteria established for continuing calibration evaluated as LFB</td>
<td>If not within 70 - 130% compare results to LRB and LFBs to determine MSE. If MSE, report applicable sample with high or low bias qualifier.</td>
<td></td>
</tr>
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</tr>
<tr>
<td>Diquat (and Paraquat)</td>
<td>2032</td>
<td>EPA 549.2</td>
<td>Locate/correct problem before continuing if any target analyte outside method or laboratory acceptance limits</td>
<td>Locate/correct problem if LRB produces a peak that prevents the determination of target analyte</td>
<td>Locate/correct problem before continuing if over 30%</td>
<td>Locate/correct problem before continuing if outside 70-130%</td>
<td>If not within 70 - 130% compare results to LRB and LFBs to determine MSE</td>
<td>Confirm/Rerun extract if detected</td>
</tr>
<tr>
<td>EDB/DBCP</td>
<td>504</td>
<td>EPA 504.1</td>
<td>Locate/correct problem before continuing if any target analyte outside method or laboratory acceptance limits</td>
<td>Locate/correct problem before continuing if &gt;MDL</td>
<td>Locate/correct problem before continuing if over 30%</td>
<td>Locate/correct problem before continuing if outside 70-130%</td>
<td>If not within 65 - 135% compare results to LRB and LFBs to determine MSE</td>
<td>Confirm/Rerun 2nd sample if detected</td>
</tr>
<tr>
<td>Endothall</td>
<td>2033</td>
<td>EPA 548.1</td>
<td>Locate/correct problem before continuing if any target analyte outside method or laboratory acceptance limits</td>
<td>Locate/correct problem before continuing if LRB produces a peak that prevents the determination of endothall</td>
<td>Locate/correct problem before continuing if over 30%</td>
<td>Locate/correct problem before continuing if outside control chart 75 – 115%</td>
<td>If not within control limits compare results to LRB and LFBs to determine MSE</td>
<td>Confirm/Rerun extract if detected</td>
</tr>
<tr>
<td>Glyphosate</td>
<td>2034</td>
<td>EPA 547</td>
<td>Locate/correct problem before continuing if any target analyte outside method or laboratory acceptance limits</td>
<td>Locate/correct problem before continuing if LRB produces a peak that prevents the determination of glyphosate</td>
<td>Locate/correct problem before continuing if over 30%</td>
<td>Locate/correct problem before continuing if outside control chart limits</td>
<td>If not within control limits compare results to LRB and LFBs to determine MSE</td>
<td>Confirm/Rerun extract if detected</td>
</tr>
<tr>
<td>Haloacetic Acids</td>
<td>2456</td>
<td>EPA 552.2</td>
<td>Locate/correct problem if any target analyte outside ±50% of the expected value, if any field sample in the batch has a concentration less than 5 times the regulatory MRL</td>
<td>Locate/correct problem before continuing if LRB interference in excess of MDL</td>
<td>Locate/correct problem before continuing if over 30%</td>
<td>Locate/correct problem before continuing if outside 70 - 130% (LFB = CCV)</td>
<td>If not within control limits compare results to LRB and LFBs to determine MSE. If MSE, report applicable sample with high or low bias qualifier.</td>
<td>NA</td>
</tr>
</tbody>
</table>
### Sampling, Analysis, & Reporting Chemical Data

<table>
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<tr>
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<th>Laboratory Fortified (% Recovery Matrix of LFM)</th>
<th>Confirmati0n of Sample Results</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Metals</strong> (Applies to contaminants listed under EPA's NPDWRs)</td>
<td></td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>Metals</td>
<td>MTL</td>
<td>EPA 200.7</td>
<td>Locate/correct problem before continuing if any target analyte outside method or laboratory acceptance limits</td>
<td>Locate/correct problem before continuing if any target analyte &gt; MRL</td>
<td>Locate/correct problem before continuing if over 20%</td>
<td>Locate/correct problem before continuing if any recovery outside 85-115%</td>
<td>If not within 70 - 130% compare results to LRB and LFBs to determine MSE</td>
<td>Confirm/Rerun if any regulated contaminant &gt; MCL</td>
</tr>
<tr>
<td></td>
<td></td>
<td>EPA 200.8</td>
<td>Locate/correct problem before continuing if any target analyte outside method or laboratory acceptance limits</td>
<td>Locate/correct problem before continuing if any target analyte &gt; MRL</td>
<td>Locate/correct problem before continuing if over 20%</td>
<td>Locate/correct problem before continuing if any recovery outside 85-115%</td>
<td>If not within 70 - 130% compare results to LRB and LFBs to determine MSE</td>
<td>Confirm/Rerun if any regulated contaminant &gt; MCL</td>
</tr>
<tr>
<td></td>
<td></td>
<td>EPA 245.1</td>
<td>Locate/correct problem before continuing if any target analyte outside method or laboratory acceptance limits</td>
<td>Rerun if &gt; 2.2 x MDL or &gt; 10% of determined sample concentration whichever is greater</td>
<td>Locate/correct problem before continuing if over 20%</td>
<td>Locate/correct problem before continuing if any recovery outside 85-115%</td>
<td>If not within 70 - 130% compare results to LRB and LFBs to determine MSE</td>
<td>Confirm/Rerun if mercury concentration is detected</td>
</tr>
<tr>
<td><strong>Minerals</strong> (Applies to contaminants listed under EPA's NPDWRs)</td>
<td>MIN</td>
<td>EPA 300.0</td>
<td>Locate/correct problem before continuing if any target analyte outside method or laboratory acceptance limits</td>
<td>&lt; MDL</td>
<td>Locate/correct problem before continuing if over 20%</td>
<td>Locate/correct problem if any recovery outside 90 - 110%</td>
<td>If outside Method A 80 - 120% Method B 75 - 125% compare results to LRB and LFBs to determine MSE</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>EPA 353.2</td>
<td>Locate/correct problem before continuing if any target analyte outside method or laboratory acceptance limits</td>
<td>Locate/correct problem before continuing if &gt; 1/2 MRL</td>
<td>Locate/correct problem before continuing if over 20%</td>
<td>Locate/correct problem if any recovery outside 90 - 110%</td>
<td>If not within 90 - 110% compare results to LRB and LFBs to determine MSE</td>
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</tr>
<tr>
<td></td>
<td></td>
<td>SM 2320B</td>
<td>Locate/correct problem before continuing if any target analyte outside method or laboratory acceptance limits</td>
<td>Locate/correct problem before continuing if &gt; 1/2 MRL</td>
<td>Locate/correct problem before continuing if over 20%</td>
<td>Locate/correct problem before continuing if outside control chart limits</td>
<td>If outside control chart limits compare results to LRB and LFBs to determine MSE</td>
<td>Confim/Rerun if any target analyte is &gt; MCL</td>
</tr>
<tr>
<td></td>
<td></td>
<td>SM 2510 B</td>
<td>Locate/correct problem before continuing if any target analyte outside method or laboratory acceptance limits</td>
<td>Locate/correct problem before continuing if &gt; 1/2 MRL</td>
<td>Locate/correct problem before continuing if over 20%</td>
<td>Locate/correct problem before continuing if outside control chart limits</td>
<td>If outside control chart limits compare results to LRB and LFBs to determine MSE</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>SM 2540C</td>
<td>Locate/correct problem before continuing if any target analyte outside method or laboratory acceptance limits</td>
<td>Locate/correct problem before continuing if &gt; 1/2 MRL</td>
<td>Locate/correct problem before continuing if over 20%</td>
<td>Locate/correct problem before continuing if outside control chart limits</td>
<td>If outside control chart limits compare results to LRB and LFBs to determine MSE</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>SM 4500 HB</td>
<td>Locate/correct problem before continuing if any target analyte outside method or laboratory acceptance limits</td>
<td>Locate/correct problem before continuing if &gt; 1/2 MRL</td>
<td>Locate/correct problem before continuing if over 20%</td>
<td>Locate/correct problem before continuing if outside control chart limits</td>
<td>If outside control chart limits compare results to LRB and LFBs to determine MSE</td>
<td></td>
</tr>
<tr>
<td>Analytes</td>
<td>Code</td>
<td>Method</td>
<td>Minimum Reporting Limit (MRL) Verification</td>
<td>Laboratory Reagent Blanks (LRB)</td>
<td>Lab duplicate (RPD of LD)</td>
<td>Lab Fortified Blank (% Recovery of LFB)</td>
<td>Laboratory Fortified Matrix (% Recovery of LFM)</td>
<td>Confirmation of Sample Results</td>
</tr>
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</tr>
<tr>
<td>PCBs</td>
<td>2383</td>
<td>EPA 508A</td>
<td>Locate/correct problem before continuing if any target analyte outside method or laboratory acceptance limits</td>
<td>Locate/correct problem before continuing if any target analyte outside method or laboratory acceptance limits</td>
<td>Locate/correct problem before continuing if DCB ( \geq 0.025 \text{ng/ul} )</td>
<td>Locate/correct problem before continuing if DCB ( \geq 0.025 \text{ug/l} )</td>
<td>Locate/correct problem before continuing if DCB ( \geq 0.025 \text{ng/ul} )</td>
<td>If outside 70 - 130% compare results to LRB and LFBs to determine MSE.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>EPA 508.1 (Test used as a qualitative screen)</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
<td>Confirm/Rerun if any regulated analyte &gt;MRL.</td>
</tr>
<tr>
<td>Nitrate/Nitrite</td>
<td>NO32</td>
<td>EPA 300.0</td>
<td>Locate/correct problem before continuing if any target analyte outside method or laboratory acceptance limits</td>
<td>Locate/correct problem before continuing if any target analyte outside method or laboratory acceptance limits</td>
<td>Locate/correct problem before continuing if DCB ( \geq 0.025 \text{ng/ul} )</td>
<td>Locate/correct problem before continuing if DCB ( \geq 0.025 \text{ug/l} )</td>
<td>Locate/correct problem before continuing if DCB ( \geq 0.025 \text{ng/ul} )</td>
<td>If outside 70 - 130% compare results to LRB and LFBs to determine MSE.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>EPA 353.2</td>
<td>Locate/correct problem before continuing if any target analyte outside method or laboratory acceptance limits</td>
<td>Locate/correct problem before continuing if any target analyte outside method or laboratory acceptance limits</td>
<td>Locate/correct problem before continuing if DCB ( \geq 0.025 \text{ng/ul} )</td>
<td>Locate/correct problem before continuing if DCB ( \geq 0.025 \text{ug/l} )</td>
<td>Locate/correct problem before continuing if DCB ( \geq 0.025 \text{ng/ul} )</td>
<td>If outside 70 - 130% compare results to LRB and LFBs to determine MSE.</td>
</tr>
<tr>
<td>Nitrate</td>
<td>1040</td>
<td>EPA 300.0</td>
<td>Locate/correct problem before continuing if any target analyte outside method or laboratory acceptance limits</td>
<td>Locate/correct problem before continuing if any target analyte outside method or laboratory acceptance limits</td>
<td>Locate/correct problem before continuing if DCB ( \geq 0.025 \text{ng/ul} )</td>
<td>Locate/correct problem before continuing if DCB ( \geq 0.025 \text{ug/l} )</td>
<td>Locate/correct problem before continuing if DCB ( \geq 0.025 \text{ng/ul} )</td>
<td>If outside 70 - 130% compare results to LRB and LFBs to determine MSE.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>EPA 353.2</td>
<td>Locate/correct problem before continuing if any target analyte outside method or laboratory acceptance limits</td>
<td>Locate/correct problem before continuing if any target analyte outside method or laboratory acceptance limits</td>
<td>Locate/correct problem before continuing if DCB ( \geq 0.025 \text{ng/ul} )</td>
<td>Locate/correct problem before continuing if DCB ( \geq 0.025 \text{ug/l} )</td>
<td>Locate/correct problem before continuing if DCB ( \geq 0.025 \text{ng/ul} )</td>
<td>If outside 70 - 130% compare results to LRB and LFBs to determine MSE.</td>
</tr>
<tr>
<td>Analytes</td>
<td>Code</td>
<td>Method</td>
<td>Minimum Reporting Limit (MRL) Verification</td>
<td>Laboratory Reagent Blanks (LRB)</td>
<td>Lab duplicate (RPD of LD)</td>
<td>Lab Fortified Blank (% Recovery of LFB)</td>
<td>Laboratory Fortified Matrix (% Recovery of LFM)</td>
<td>Confirmation of Sample Results</td>
</tr>
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</tr>
<tr>
<td>Nitrite</td>
<td>1041</td>
<td>EPA 300.0</td>
<td>Locate/correct problem before continuing if any target analyte outside method or laboratory acceptance limits</td>
<td>Locate/correct problem before continuing if &gt; MDL</td>
<td>Locate/correct before continuing if over 20%</td>
<td>Locate/correct before continuing if outside 90 - 110%</td>
<td>If Method A outside 80 - 120% and Method B 75 - 125% compare results to LRB and LFBs to determine MSE.</td>
<td>Confirm/Rerun if &gt; MCL</td>
</tr>
<tr>
<td></td>
<td></td>
<td>EPA 353.2</td>
<td>Locate/correct problem before continuing if any target analyte outside method or laboratory acceptance limits</td>
<td>Locate/correct problem before continuing if &gt;½ MRL</td>
<td>Locate/correct before continuing if over 20%</td>
<td>Locate/correct before continuing if outside control chart limits (not to exceed 90 - 110%)</td>
<td></td>
<td>If outside 90 - 110%. Compare results to LRB and LFBs to determine MSE.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>EPA 200.8</td>
<td>Locate/correct problem before continuing if any target analyte outside method or laboratory acceptance limits</td>
<td>Locate/correct problem before continuing if any target analyte &gt; MRL</td>
<td>Locate/correct before continuing if over 20%</td>
<td>Locate/correct before continuing if any recovery outside 85-115%</td>
<td></td>
<td>If outside 70 - 130% compare results to LRB and LFBs to determine MSE.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>EPA 200.7</td>
<td>Locate/correct problem before continuing if any target analyte outside method or laboratory acceptance limits</td>
<td>Locate/correct problem before continuing if any target analyte &gt; MRL</td>
<td>Locate/correct before continuing if over 20%</td>
<td>Locate/correct before continuing if any recovery outside 85-115%</td>
<td></td>
<td>If outside 70 - 130% compare results to LRB and LFBs to determine MSE.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>EPA 300.0</td>
<td>Locate/correct problem before continuing if any target analyte outside method or laboratory acceptance limits</td>
<td>Locate/correct problem before continuing if any target analyte &gt; MDL</td>
<td>Locate/correct before continuing if over 20%</td>
<td>Locate/correct before continuing if any recovery outside 90 - 110%</td>
<td></td>
<td>If recovery for Method A outside 80 - 120% orMethod B outside 75 - 125% compare results to LRB and LFBs to determine MSE.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>SM2540C</td>
<td>Locate/correct problem before continuing if any target analyte outside method or laboratory acceptance limits</td>
<td>Locate/correct problem before continuing if any analyte &gt; 1/2 MRL</td>
<td>Locate/correct before continuing if over 20%</td>
<td>Locate/correct problem before continuing if any recovery outside control charts</td>
<td></td>
<td>If outside control chart limits compare results to LRB and LFBs to determine MSE</td>
</tr>
<tr>
<td>Analytes</td>
<td>Code</td>
<td>Method</td>
<td>Minimum Reporting Limit (MRL) Verification</td>
<td>Laboratory Reagent Blanks (LRB)</td>
<td>Lab duplicate (RPD of LD)</td>
<td>Lab Fortified Blank (% Recovery of LFB)</td>
<td>Laboratory Fortified Matrix (% Recovery of LFM)</td>
<td>Confirmation of Sample Results</td>
</tr>
<tr>
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</tr>
<tr>
<td>SOC Group 5</td>
<td>SOC5</td>
<td>EPA 525.21</td>
<td>Locate/correct problem before continuing if any target analyte outside method or laboratory acceptance limits</td>
<td>Locate/correct problem before continuing if any target analyte &gt;MRL</td>
<td>Locate/correct problem before continuing if over 30%</td>
<td>Locate/correct problem before continuing if any recovery outside 70 - 130%</td>
<td>If any recovery not within 70 - 130% compare results to LRB and LFBs to determine MSE</td>
<td>Correct/Rerun if any regulated analyte &gt;MCL</td>
</tr>
<tr>
<td></td>
<td>EPA 508.1</td>
<td></td>
<td>Locate/correct problem before continuing if any target analyte outside method or laboratory acceptance limits</td>
<td>Locate/correct problem before continuing if any target analyte &gt;MRL</td>
<td>Locate/correct problem before continuing if over 30%</td>
<td>Locate/correct problem before continuing if any recovery outside 70 - 130%</td>
<td>If any recovery not within 65-135% compare results to LRB and LFBs to determine MSE</td>
<td>Run 2nd sample if any regulated analyte &gt;MCL</td>
</tr>
<tr>
<td>SOC Method 515.4</td>
<td>515</td>
<td>EPA 515.4</td>
<td>Locate/correct problem before continuing if any target analyte outside method or laboratory acceptance limits</td>
<td>Locate/correct problem before continuing if peak RT window of any analyte that prevents the quantitation of a target analyte</td>
<td>Locate/correct problem before continuing if over 30%</td>
<td>NA</td>
<td>If any recovery not within 70 - 130% compare results to LRB and LFBs to determine MSE</td>
<td>Rerun if any regulated analyte &gt;MCL</td>
</tr>
<tr>
<td>SOC Method 531.1</td>
<td>531</td>
<td>EPA 531.1</td>
<td>Locate/correct problem before continuing if any target analyte outside method or laboratory acceptance limits</td>
<td>Locate/correct problem before continuing if LRB produces a peak that prevents the determination of target analyte</td>
<td>Locate/correct problem before continuing if over 30%</td>
<td>Locate/correct problem before continuing if outside control chart limits</td>
<td>If any recovery not within 65 - 135% compare results to LRB and LFBs to determine matrix specific effects</td>
<td>Rerun if any regulated analyte &gt;MCL</td>
</tr>
<tr>
<td>Trihalomethanes</td>
<td>2950</td>
<td>EPA 524.21</td>
<td>Locate/correct problem if any target analyte outside ±50% of the expected value, if any field sample in the batch has a concentration less than 5 times the regulatory MRL</td>
<td>Locate/correct problem before continuing if any target analyte &gt;MRL</td>
<td>Locate/correct problem before continuing if over 30%</td>
<td>Locate/correct problem if any recovery not within 70 - 130%</td>
<td>NA</td>
<td>NA</td>
</tr>
<tr>
<td>Volatile Organic Chemicals</td>
<td>VOC</td>
<td>EPA 524.21</td>
<td>Locate/correct problem before continuing if any target analyte outside method or laboratory acceptance limits</td>
<td>Locate/correct problem before continuing if any target analyte &gt;MRL</td>
<td>Locate/correct problem before continuing if over 30%</td>
<td>Locate/correct problem if any recovery not within 70 - 130%</td>
<td>NA</td>
<td>Run duplicate sample if any regulated analyte &gt;MCL, Field blanks are analyzed when there are detections of regulated compounds, MTBE or natural gases.</td>
</tr>
</tbody>
</table>

1. For EPA Methods 524.2 and 525.2 the laboratory may evaluate marginal LFB exceedances according to the TNI Standard EL-V1M4-2009, page 13.
Exhibit 5: Data Management Flow Chart

1. **Electronic Data**
2. **Field Measurement and Sample Analysis Data**
3. **Hard Copy Data**

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**SDWIS**

**Compliance Determination** (Performed by PDW Section)

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**Enforcement Review Process**

**OCE Enforcement Division** Generates Agreed Order (AO) or Corrective Action (CA)

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**PWS Actions Trigger Enforcement Action Referral (EAR)**

**PDW Section Data** Mgr Receives Data (in correct format) and processes

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**SDWIS**

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**Violation Data**