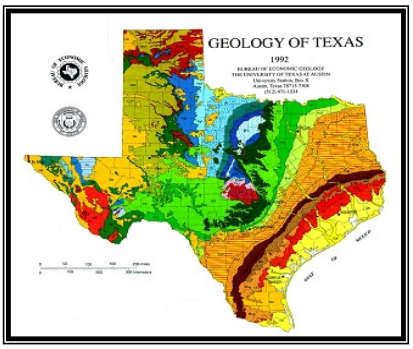
Texas Commission on Environmental Quality



Fiscal Year 2022
Quality Assurance Project Plan
For
Environmental Monitoring and Measurement Activities
Relating to the Resource Conservation and Recovery Act (RCRA)
&
Underground Injection Control (UIC)

U.S. EPA Approved: Date

QAPP QTRAK Number: Number

Effective: September 1, 2021 - August 31, 2022

P.O. Box 13087

Austin, Texas 78711-3087

FOREWORD

This document provides the Quality Assurance Project Plan (QAPP) requirements for the Texas Commission on Environmental Quality (TCEQ or Commission) conducting environmental data operations on behalf of the State of Texas and the United States Environmental Protection Agency (U.S. EPA) through contracts with commercial laboratories, permits, corrective action, enforcement and other regulated activities for the Resource Conservation and Recovery Act (RCRA) and Underground Injection Control (UIC) Programs.

The RCRA/UIC QAPP complies with U.S. EPA Order CIO 2105-P-01-0 to establish a mandatory Quality System. The U.S. EPA Order CIO 2105.0, *Policy and Program Requirements for the Mandatory Agency-wide Quality System*, provides requirements for the conduct of quality management practices, including quality assurance (QA) and quality control (QC) activities, for all environmental data collection and environmental technology programs performed by or for the U.S. EPA. The primary goal of the Order is to ensure that environmental programs and decisions are supported by data of the type and quality needed and expected for their intended use and that decisions involving the design, construction, and operation of environmental technology are supported by appropriate quality assured engineering standards and practices.

Texas Water Code (TWC), section 5.127, as added in 2001 by House Bill (HB) 2912, 77th legislature, and as amended in 2003 by Senate Bill (SB) 934, 78th Legislature requires the TCEQ to accept only environmental testing laboratory data generated by laboratories accredited under the Texas Laboratory Accreditation Program using National Environmental Laboratory Accreditation Conference (NELAC) standards when the data are used by the TCEQ for various decisions. Title 30 of the Texas Administrative Code (TAC) Chapter 25 (relating to Environmental Testing Laboratory Accreditation and Certification) describes requirements for accreditation of environmental testing laboratories and defines conditions under which a laboratory may qualify for an exception.

The TCEQ assesses laboratories using The NELAC Institute (TNI) 2016 TNI Standards. This includes requirements related to proficiency testing.

The RCRA/UIC QAPP complies with the quality assurance requirements stated in the TCEQ Quality Management Plan (QMP), most current revision (Revision 26).

LIST OF ABBREVIATIONS

EPA – Environmental Protection Agency

QAPP – Quality Assurance Project Plan

RCRA – Resource Conservation and Recovery Act

U.S. – United States

UIC – Underground Injection Control (UIC)

QA – Quality Assurance

QC – Quality Control

TWC – Texas Water Code

HB – House Bill

NELAC – National Environmental Laboratory Accreditation Conference

TCEQ – Texas Commission on Environmental Quality

TAC – Texas Administrative Code

TNI – The NELAC Institute

QMP – Quality Management Plan

PSEAD – Program Support and Environmental Assistance Division

RMD – Radioactive Materials Division

COC- Chain-of-Custody

RFA – Request for Analysis

DSHS – Department of State Health Services

IHW – Industrial and Hazardous Waste

OLRD – Occupational Licensing and Registration Division

PSEAD – Program Support Section and Environmental Assistance Division

VCP-CA – Voluntary Cleanup Program – Corrective Action

REM – Remediation Division

OOW – Office of Waste

OCE – Office of Compliance and Enforcement

MD – Monitoring Division

ENF – Enforcement Division

CID – Critical Infrastructure Division

WDP – Waste Permits Division

B&PS – Business and Program Services
SOP – Standard Operating Procedures
HSWA – Hazardous and Solid Waste Amendments
UST – Underground Storage Tank
CFR – Code of Federal Regulation
TSD – Treatment, Storage and Disposal
RRCT – Railroad Commission of Texas
TCLP – Toxicity Characteristic Leaching Procedure
MDP – Method–Defined Parameter
MACT - Maximum Achievable Control Technology
NESHAP - National Emission Standards for Hazardous Air Pollutants
TD – Toxicology Division
TRRP - Texas Risk Reduction Program
DQO – Data Quality Objective
IDA – Internal Data Applications
PARIS – Permitting and Registration Information Systems
MARLAP – Multi-Agency Radiological Laboratory Analytical Protocols
PDP – Professional Development Plan
EIC – Enforcement Initiation Criteria
LDEQ – Louisiana Department of Environmental Quality
QAM – Quality Assurance Manual
TAC – Texas Administrative Code
CCEDS – Consolidated Compliance and Enforcement Data Systems
LCS – Laboratory Control Sample
MS – Matrix Spike
MSD – Matrix Spike Duplicate
WAP – Waste Analysis Plans
VOC – Volatile Organic Compound
MACT – Maximum Achievable Control Technology
OVA – Organic Vapor Analyzer
NIST – National Institute of Standards and Technology

RPD – Relative Percent Difference

DQO – Data Quality Objectives

LOD – Limits of Detection

LOQ – Limits of Quantitation

PCL – Pollutants Concentration Limits

VOA – Volatile Organics Analysis

GC – Gas Chromatography

PARIS – Permitting and Registration Information Systems

RFA – Request for Analysis

LIMS – Laboratory Information Systems

PPG – Performance Partnership Grant

EAR – Enforcement Action Results

EI – Environmental Investigator

CPT – Comprehensive Performance Test

LCN – Laboratory Case Narrative

ICP – Inductively Coupled Plasma

MSA – Method of Standard Addition

A1 TITLE AND APPROVAL SHEETS

Enforcement Division

Name: Bryan Sinclair

Title: Deputy Director

Signature: _____ Date: 6/18/2021

Name: James Gradney

Title: Waste Section Manager

Signature: _____ Date: 6/18/2021

Monitoring Division

Name: Sharon R. Coleman, Laboratory and Quality Assurance Section

Title: TCEQ Quality Assurance Manager

Signature: _____ Date: 06/29/2021

Critical Infrastructure Division

Name: Kelly Cook

Title: Deputy Director

Signature: Kelly W. Cook Date: 06/08/2021

Name: Hoyt Henry

Title: Manager, Radioactive Materials Compliance and Chemical Reporting Section

Signature: Hoyt Henry Date: 06/08/2021

Name: Muhammadali Abbaszadeh, Radioactive Materials Compliance and Chemical Reporting Section

Title: Health Physicist, Work Leader

Signature: muhammadali abbaszadeh Date: 6/08/2021

Occupational Licensing & Registration Division

Name: Jaya Zyman, P.E.

Title: Deputy Director

Signature: _____ Date: 06/02/2021

Name: Anne Marie Callery, Registration and Reporting Section

Title: Section Manager

Signature: Anne Marie Callery Date: 6/11/21

Radioactive Materials Division

Name: Ashley Forbes

Title: Deputy Director

Signature: _____ Date: 6/7/2021

Name: Carol Dye, P.G., Underground Injection Control (UIC) Permits Section

Title: Section Manager

Signature: _____ Date: 6-7-2021

Name: Kathryn Ploch, Radioactive Materials Division

Title: UIC Grant Manager

Signature: _____ Date: 6/7/2021

Name: Tamara Young, Underground Injection Control Permits Section

Title: UIC Permits Section Program Coordinator, Lead UIC Program Quality Assurance Specialist

Signature: Tamara Young Date: 6/7/2021

Remediation Division

Name: Beth Seaton

Title: Deputy Director

Signature: Beth Seaton Date: 6/11/2021

Name: Merrie Smith, P.G., Voluntary Cleanup and Corrective Action (VCP-CA) Section

Title: Section Manager

Signature: Merrie Smith Date: 6/11/21

Waste Permits Division

Name: Charly Fritz
Title: Deputy Director
Signature: Charly Fritz Date: 6/2/2021

Name: Gulay Aki, P.E., Industrial and Hazardous Waste Permits Section
Title: Section Manager
Signature: Gulay Aki Date: 6/2/2021

Name: Megan Henson, Business & Program Services Section
Title: Section Manager
Signature: Megan Henson Date: 6/2/2021

Name: Brandon Greulich, Industrial and Hazardous Waste Section
Title: IHW Team Leader and RCRA QA Specialist
Signature: Brandon Greulich Date: 6/2/2021

Name: Sarah Schreier, Industrial and Hazardous Waste Section
Title: IHW Project Manager and RCRA QA Specialist
Signature: Sarah A. Schreier Date: 6/21/2021

Name: Anju Chalise, Business & Program Services Section
Title: Lead RCRA QA Specialist and Grant Manager
Signature: Anjusharmachalise Date: 6/2/2021

Office of Compliance & Enforcement Regional Areas

Name: Susan M. Jablonski, P.E., Central Texas Area
Title: Area Director
Signature: Susan M. Jablonski Date: 6/2/21

Name: David A. Ramirez, Border and Permian Basin Area
Title: Area Director
Signature: David A. Ramirez Date: 6/17/21

Name: Jonathan Walling, Coastal & East Texas Area
Title: Area Director
Signature: Cynthia Gandara for Jonathan Walling Date: 6/17/2021

Name: Randy J. Ammons, North Central & West Texas Area
Title: Area Director
Signature: [signature] Date: 6-17-21

Name: Kristi Mills-Jurach, P.E. Program Support and Environmental Assistance
Title: Deputy Director
Signature: Keith Sheedy Date: 6/17/21

United States Environmental Protection Agency, Region 6

Name: Althea C. Foster, RCRA Grants and Brownfields Section, Land, Chemicals, and Redevelopment Division

Title: Chief

Signature: ALTHEA FOSTER Digitally signed by ALTHEA FOSTER DN: c=US, o=U.S. Government, ou=Environmental Protection Agency, cn=ALTHEA FOSTER, 0.9.2342.19200300.100.1.1=68001003652663 Date: 2021.07.26 10:33:02 -05'00' Date: ***7/26/2021***

Name: Stephanie Cheaney, RCRA Grants and Brownfields Section, Land, Chemicals, and Redevelopment Division

Title: Texas/New Mexico RCRA Project Officer

Signature: STEPHANIE CHEANEY Digitally signed by STEPHANIE CHEANEY DN: c=US, o=U.S. Government, ou=Environmental Protection Agency, cn=STEPHANIE CHEANEY, 0.9.2342.19200300.100.1.1=68001003655629 Date: 2021.07.26 12:18:21 -05'00' Date: 7/26/2021

Name: Anhmai Pham, RCRA Grants and Brownfields Section, Land, Chemicals, and Redevelopment Division

Title: RCRA Technical Reviewer

Signature: AnhmaiPham Date: 7/26/2021

Contract Laboratories

In lieu of signatures from participating contract laboratories, contracts executed by the Program Support and Environmental Assistance Division (PSEAD) of the Central Texas Area and Radioactive Materials Division (RMD) staff contain the following language:

> CONTRACTOR or PERMITTEE shall perform all work in accordance with requirements and procedures set forth in the Quality Assurance Project Plan (QAPP) required by each program/project for which the particular analysis is requested and specified on the chain-of-custody (COC) document or the request for analysis (RFA) form. CONTRACTOR or PERMITTEE shall be solely responsible for ensuring that it has a copy of the current QAPP from the program/project which is requesting analysis prior to commencing any analysis. CONTRACTOR or PERMITTEE shall be responsible for obtaining copies of all applicable QAPPs from TCEQ.

Laboratories shall state in their standard operating procedures (SOPs) the sample and waste disposal procedures. The procedures shall ensure that all waste samples and by-products from the laboratories that meet the definition of a hazardous waste comply with the RCRA and UIC regulations.

Laboratories listed in the Distribution List are current as of April 29, 2021. If you have questions, please contact PSEAD Laboratory Contract Manager Katie Orr (512) 239-3262. The current list of contract laboratories can be found at OCE Contracted Labs. The Department of State Health Services Laboratory (DSHS) is contracted through the RMD.

TABLE OF CONTENTS

A3 DISTRIBUTION LIST

Office of Compliance & Enforcement: Craig Pritzlaff Director (512) 239-5150

Enforcement Division

Bryan Sinclair (512) 239-2171, James Gradney (512) 239-6549 – MC 219 and Kimberly Sladek (512) 239-1588 – MC 219

Critical Infrastructure Division

Kelly Cook (512) 239-0044, Hoyt Henry (512) 239-5062, and Muhammadali Abbaszadeh (512) 239-6078 – MC 177

Monitoring Division

Sharon R. Coleman (512) 239-6340 and Penny Sterling (512) 239-1617 - MC 165

Program Support and Environmental Assistance Division

Kristi Mills-Jurach, P.E. (512) 239-1261, John Shelton (512) 239-2563, Katie Orr (512) 239-3262, and Tom Heitman (512) 239-3257 MC 174

TCEQ Regional Area and Office Directors

Border and Permian Basin

Area Director David A. Ramirez (956) 430-6048 MC R-15

Regional Office Directors

Region 6 - El Paso, Lorinda Gardner (915) 834-4951

Region 7 – Midland, Lorinda Gardner (915) 834-4951

Region 15 - Harlingen, Jaime A. Garza (956) 430-6030

Region 16 - Laredo, Jaime A. Garza (956) 430-6030

Central Texas Area

Area Director Susan M. Jablonski, P.E. (512) 239-6731 MC/172

Regional Office Directors

Region 9 - Waco, David Van Soest (512) 239-0468

Region 11 - Austin, David Van Soest (512) 239-0468

Region 13 – San Antonio, Joel Anderson (210) 403-4010

Coastal and East Texas

Area Director Jonathan Walling (512) 239-2295 MC 172

Regional Office Directors

Region 5 - Tyler, Leroy Biggers (903) 535-5112

Region 10 - Beaumont, Kathryn B. Sauceda (409) 899-8747

Region 12 - Houston, Nicole Bealle (713) 767-3623

Region 14 – Corpus Christi, Susan Clewis (361) 825-3104

North Central and West Texas

Area Director Randy J. Ammons (806) 796-7092 MC R2

Regional Office Directors

Region 1 - Amarillo, Gary Shipp (acting) (806) 796-7604

Region 2 - Lubbock, Gary Shipp (806) 796-7604

Region 3 - Abilene, Winona L. Henry (325) 698-6120

Region 4 – Dallas/Fort Worth, Alyssa Taylor (817) 588-5928

Region 8 – San Angelo, Winona L. Henry (325) 698-6120

Office of Waste: Brent Wade, Director (512) 239-6566

Occupational Licensing & Registration Division

Jaya Zyman, P.E. (512) 239-2012 - MC 223 and Anne Marie Callery (512) 239-2154 – MC 129

Waste Permits Division

Charly Fritz (512) 239-2331 and Gulay Aki, P.E. (512) 239-2340 – MC 130, Megan Henson (512) 239-1165 and Anju Chalise (512)239-1529- MC-126, Sarah Schreier (512) 239- 5454 MC-130, and Brandon Greulich (512) 239-4660 MC-126

Radioactive Materials Division

Ashley Forbes (512) 239-0493, Carol Dye, P.G. (512) 239-1504, Kathryn Ploch (512) 239 6577, and Tamara Young (512) 239-6582 - MC 233

Remediation Division

Beth Seaton (512) 239-2526 – MC 225, Merrie Smith, P.G. (512) 239-5051 – MC 221, and Mark Maglitto (512) 239-3153 – MC 102

Contract Laboratories

A&B Environmental Services, Inc.
10100 East Freeway, Suite 100
Houston, Texas 77029
(713) 453-6060

ALS Group USA, Corp.
10450 Stancliff Rd., Suite 210
Houston, Texas 77099-4338
(281) 530-5656

Department of State Health Services
1100 West 49th Street
Austin, Texas 78756
(512) 458-7587

SGS North America Inc – Houston
10165 Harwin Drive, Suite 150
Houston, Texas 77036
(713) 271-4700

Lower Colorado River Authority
3505 Montopolis Drive
Austin, Texas 78744-1417
(512) 356-6022

Eurofins TEST AMERICA
32226 Commander Drive
Carrollton, TX 75006-2507
(214) 218-1894

Environmental Protection Agency, Region 6

1201 Elm Street, Suite 500

Dallas, Texas 75270 - 2102

Stephanie Cheaney MC: LCRPT (214)665-8057, E-mail: cheaney.stephanie@epa.gov

Anhmai Pham MC: LCRRB (214) 665-8438, E-mail: pham.anhmai@epa.gov

Althea Foster MC: LCRRB (214)665-2268, E-mail: foster.althea@epa.gov

An electronic copy of the QAPP will be provided by RCRA lead QA Specialist to all TCEQ staff listed on the distribution list for further distribution into the program areas as well as to each contracted laboratory. These areas will include but may not be limited to: Industrial and Hazardous Waste (IHW) Permits Section of the Waste Permits Division (WPD), the Radioactive Materials Division (RMD), IHW Team of the Occupational Licensing and Registration Division (OLRD) and Voluntary Cleanup Program - Corrective Action (VCP-CA) Section of the Remediation Division (REM) within the Office of Waste (OOW); waste programs of the 16 Regional Offices, Program Support Section and Environmental Assistance Division (PSEAD), and Laboratory and Quality Assurance Section within the Monitoring Division (MD), Enforcement Division (ENF), and Critical Infrastructure Division (CID) within the Office of Compliance and Enforcement (OCE).

An electronic copy is also available for use, viewing and printing on the TCEQ Home page URL http://www.tceq.texas.gov/and then typing in "RCRA/UIC QAPP" in the **Site Search** window.

A4 TCEQ PROJECT/TASK ORGANIZATION

The RCRA/UIC QAPP organization chart is included as Attachment A.

Charly Fritz – Deputy Director of WPD; responsible for overall implementation of RCRA permitting projects.

Gulay Aki, P.E. - Manager of IHW Permits Section of the WPD; responsible for the review of RCRA permitting activities.

Megan Henson - Section Manager of B&PS of WPD; responsible for the management of the WPD B&PS activities.

Brandon Greulich and Sarah Schreier - RCRA Quality Assurance Specialist of IHW; IHW Team Leader and the Project Manager are assigned as a role of RCRA QA specialist; responsible for development, approval, implementation, and maintenance of Standard Operating Procedures, conducting audits, assessments, reports and project plans; determine conformance with program quality systems; receive and maintain assessment records and monitor implementation of corrective actions; and provide technical expertise on quality services as consistent with agency's QMP.

Anju Chalise – Lead RCRA Quality Assurance Specialist and Grant Manager; RCRA Grant Manager is assigned as a role of Lead RCRA QA Specialist; responsible for planning and implementing strategies of the RCRA grant consistent with the agency's QMP. Monitoring the expenditures, commitments, development, and effectiveness of the RCRA Grant. Coordinating preparation and distribution of annual assessments, annual reports, QMPs and QAPPs; Coordinating and assisting IHW QA Specialists in developing and implementing quality management systems including program completeness review and assessments in WPD.

Ashley Forbes, - Deputy Director of RMD; responsible for the overall implementation of UIC permitting projects.

Carol Dye, P.G. - Section Manager of UIC Permits Section in the RMD; responsible for the review of UIC permitting activities as described in the QAPP.

Kathryn Ploch – UIC Grant Manager of the RMD; responsible for monitoring commitments and development of the UIC grant.

Tamara Young – Lead UIC QA Specialist of RMD; Program Coordinator for the UIC Permits Section in the RMD; responsible for development of UIC portions of the QAPP, conducting audits and assessments of the UIC quality systems including identifying, documenting, monitoring, implementing, and reporting of corrective action in RMD, and overall coordination with the RCRA QA Lead Specialist.

RCRA/UIC Central Office Staff - Responsible for the review and acceptance/rejection of environmental data submitted by a regulated entity as part of a permit application, corrective action plan, closure plan and/or trial burn plan, a waste audit or as mandated in an enforcement order or corrective action order.

Beth Seaton - Deputy Director of REM; responsible for oversight of all remediation and corrective action activities.

Merrie Smith, P.G. - Manager of VCP/Corrective Action Section of REM; responsible for the oversight of RCRA cleanup and closure activities.

REM Corrective Action Program Staff – Responsible for overseeing compliance with the RCRA requirements for corrective actions and closures.

Bryan Sinclair – Deputy Director of the Enforcement Division; responsible for implementation of the TCEQ's enforcement program (air, water, waste, and multi-media) and updating compliance history in the RCRA Information (RCRAInfo) database.

James Gradney - Manager of Waste Enforcement Section of the Enforcement Division; responsible for management of RCRA/UIC enforcement activities.

Enforcement Staff - Responsible for updating the RCRAInfo database from investigation reports sent from Regional Office staff, issuing agreed orders, technical requirements and calculating penalties for RCRA/UIC cases.

Sharon R. Coleman - QA Manager for the TCEQ; responsible for overall development of the TCEQ QMP, review and approval of program QAPPs, and for monitoring the implementation of the QMP and QAPPs.

Kristi Mills-Jurach, P. E. – Deputy Director of PSEAD in the Office of Compliance and Enforcement; responsible for central office and Regional administration area coordination of waste program field activities, including RCRA/UIC activities in each region; supports the four areas: North Central and West Texas, Coastal and East Texas, Border and Permian Basin, and Central Texas. Responsible for oversight of all contract laboratory administrative functions performed by staff.

Muhammadali Abbaszadeh – Radioactive Materials Compliance Team; Work Leader/Health Physicist in the Radioactive Materials Compliance and Chemical Reporting Section in the CID; responsible for the oversight and consistency of procedures for UIC Class III well activities as defined in the QAPP.

Kelly Cook – Deputy Director of CID; responsible for the oversight and consistency of procedures for UIC Class III well activities as defined in the QAPP.

Hoyt Henry – Manager, Radioactive Materials Compliance and Chemical Reporting Section in the CID; responsible for oversight and consistency of procedures for UIC Class III well activities as defined in this QAPP.

Jaya Zyman, P.E. – Deputy Director of OLRD; responsible for oversight of all IHW registration and reporting activities.

Anne Marie Callery – Manager of Registration and Reporting staff within OLRD; responsible for management of IHW registration and reporting activities.

Four Area Directors - Responsible for monitoring the activities of the Regional Directors and Regional Offices under their designated areas and regions.

Twelve Regional Directors - Responsible for monitoring the investigation and sample collection activities of all field investigators and conformance to SOPs as

referenced in the QAPP. Responsible for oversight of waste program field activities including RCRA/UIC activities in each region.

Regional Investigators - Responsible for performing investigations of RCRA and UIC facilities, conducting field sampling, preparing samples for laboratory analysis, developing investigation reports, and observing annual demonstrations of mechanical integrity testing of UIC facilities.

A5 PROBLEM DEFINITION/BACKGROUND

A5.1 Purpose/Background for RCRA

The passage of the RCRA in 1976 and the Hazardous and Solid Waste Amendments in 1984 (HSWA) provided the nation's primary law governing disposal of solid and hazardous and industrial waste in the United States. To achieve these goals, the RCRA established four distinct, yet interrelated programs:

- The solid waste program, under RCRA Subtitle D, requires comprehensive management of nonhazardous industrial solid waste and municipal solid waste.
- The underground storage tank (UST) program, under RCRA Subtitle I, regulates USTs containing hazardous substances and petroleum products.
- The hazardous waste program, under RCRA Subtitle C, establishes a system for controlling hazardous waste from the time it is generated until its ultimate disposal.
- Collection and analysis of air stack samples to determine compliance with the emission standards in 40 Code of Federal Regulations (CFR) Part 63, Subpart EEE.

This QAPP addresses requirements in RCRA Subtitle C only. To achieve the Subtitle C goals, Congress directed U.S. EPA to create regulations to manage hazardous waste. The first RCRA regulations, "Hazardous Waste and Consolidated Permit Regulations," published in the Federal Register on May 19, 1980 (45 FR 33066), established the basic "cradle to grave" approach to hazardous waste management that exists today. RCRA Subtitle C mandates strict controls over the treatment, storage and disposal (TSD) of hazardous and industrial waste generation and management in the U.S. and consequently in Texas. In addition to these federal requirements, states may develop more stringent requirements or requirements that are broader in scope than the federal regulations. Through the State Authorization rulemaking process, U.S. EPA delegates the primary responsibility of implementing RCRA to individual states in lieu of U.S. EPA. As the authorized agency in Texas for RCRA, the TCEQ has a continuing obligation to maintain a hazardous waste program equivalent to and consistent with the federal hazardous waste program.

In regulatory terms, a RCRA hazardous waste is a waste that appears on one of the four hazardous wastes lists (F-list, K-list, P-list or U-list) or exhibits at least one of four characteristics: (1) ignitability, (2) corrosivity, (3) reactivity, or (4) toxicity. The F-list identifies wastes from common manufacturing and industrial processes, also known as wastes from non-specific sources. The K-list includes certain wastes from specific industries, such as petroleum refining or pesticide manufacturing. The P-list and the U-list are discarded commercial chemical products. These lists include specific commercial chemical products in an unused form. All lists can be found in 40 CFR Part 261. Waste that does not meet any of the listings explained above may still be considered a hazardous waste if it exhibits one of the four characteristics, as listed above and, defined in 40 CFR Part 261, Subpart C.

A5.2 Purpose/Background for UIC

The passage of the Safe Drinking Water Act in 1974 provides the foundation for the regulation of underground injection in the United States. The Injection Well Act, which is Chapter 27 of the Texas Water Code, and Title 3 of the Texas Natural Resource Code provide the statuary authority for regulation of underground injection in Texas. The Injection Well Act (the Act) divides the regulatory responsibilities between the Railroad Commission of Texas (RRCT) and the TCEQ. Both state agencies have full authority for those underground injection wells within their own jurisdiction as defined in the Act.

The TCEQ has a continuing obligation to maintain a UIC Program. Specifically, injection wells are classified into six different types:

- Class I wells, which are used for deep injection, are regulated by the TCEQ. (The RRCT reviews and comments on these applications.);
- Class II wells, which are related to oil and gas production, are regulated by the RRCT.
- Class III wells, which are used to extract minerals other than oil and gas, are regulated by the TCEQ (i.e., in-situ uranium, sulphur, and sodium sulfate) or the RRCT (i.e., brine);
- Class IV wells, which are generally banned, but may be authorized by the TCEQ in certain environmental cleanup operations;
- Class V wells, which are used for many different activities, are regulated by either the TCEQ or the RRCT (i.e., geothermal energy production), depending on the type of well; and
- Class VI wells, which are used for injection of carbon dioxide (CO2) below Underground Sources of Drinking Water for long term storage (geologic sequestration), will be regulated by both TCEQ and the RRCT. TCEQ's jurisdiction will be limited to wells associated with clean energy projects that inject into formations that are not producing oil, gas, or geothermal energy. Neither agency has applied for federal authorization to regulate this newest class of injection well. Currently there are no Class VI wells in Texas.

A5.3 Testing and Monitoring Activities

RCRA and UIC program obligations translate into adhering to Title 40 CFR Chapters 260-270 for RCRA, 40 CFR Parts 144-148 for UIC, *Test Methods for Evaluating Solid Waste:- Physical/Chemical Methods* (SW-846) or other U.S. EPA approved methods, and the HSWA of 1984 Sections 3004 and 3005, during the following:

- Investigations of hazardous waste generators, transporters, and treatment, storage and disposal;
- Investigations of TSD facilities to ensure these entities are properly managing hazardous waste;
- Collection and analysis of soil and groundwater samples to determine the presence and extent of contamination;
- Review of environmental data provided from external sources in permit and compliance plan applications, reports required by rule for generators, reports required by permits and compliance plans, waste characterization plan, facility

investigations, corrective action plans, risk assessments, closure plans, and waste determinations to safeguard the environment and public health against releases/contamination, and to verify contamination is remediated to the appropriate level; and
- Establishment of appropriate field and laboratory analysis procedures for all applicable pollutants to ensure consistency and conformity with regulations and proven methods.

The U.S. EPA has amended a variety of testing and monitoring requirements in the RCRA hazardous waste regulations and certain Clean Air Act regulations that relate to hazardous waste combustors (SW-846 Final Update IIIB). These amendments allow more flexibility in performing RCRA-related sampling and analysis by removing from the regulations a requirement to use the methods in conducting various testing and monitoring and by limiting required uses of a SW-846 method.

The only required use of an SW-846 method is the measurement of method-defined parameters (MDPs). These are parameters having regulatory concentration limits based on the outcome of the specified method of analysis performed as prescribed in the method without deviation. For example, in order to determine whether the levels of hazardous constituents in a particular waste stream are equal to or greater than the toxicity characteristic (TC) levels specified in 40 CFR 261.24, waste generators must test their waste using SW-846 Method 1311: Toxicity Characteristic Leaching Procedure or TCLP. If concentrations of contaminants measured in the TCLP leachate are greater than or equal to the regulatory levels specified in 40 CFR 261.24 Table 1, the waste is a hazardous waste and is subject to RCRA Hazardous Waste regulation. The U.S. EPA has determined the TCLP is the only reliable method for demonstrating a waste does not exceed the maximum TC levels. The U.S. EPA describes the TCLP as a required method-defined parameter. The MDPs are discussed in more detail in Section B of the QAPP.

SW-846 Update IIIB includes revised chapter seven and eleven revised methods, including method revision to remove a requirement to use the SW-846 chapter nine Sampling Plan.

The U.S. EPA Methods Innovation Rule, published in the Federal Register as a Final Rule on June 14, 2005, removes unnecessary requirements in the RCRA regulations to use only SW-846. With the exception of approximately 25 MDPs incorporated by reference in the RCRA regulations at 40 CFR 250.11, SW-846 methods are now guidance.

The TCEQ will not accept an alternative method for RCRA/UIC MDP compliance. Modifications to methods used to demonstrate compliance to Maximum Achievable Control Technology (MACT) Standards must be approved by U.S. EPA Region 6 staff. Modifications to reference methods can be made for all other methods if QC measurement criteria, as designated in this QAPP, can be met and if the regulated entity is not restricted by a permit. When a regulated entity is operating under a permit, a modification to a method or use of an alternate method may require a modification to the permit.

Entities covered by this QAPP include:

- Anyone who generates, treats, stores, or disposes of hazardous solid waste is subject to RCRA Subtitle C sampling and analysis requirements;
- Entities subject to the National Emission Standards for Hazardous Air Pollutants (NESHAP) final standards for hazardous waste combustors (40 CFR Part 63, Subpart EEE);
- Anyone who owns or operates an in-situ recovery operation for uranium, sulfur, and sodium sulfate (Class III wells); and
- Anyone who owns or operates Class I, Class IV and V wells.

A5.4 Decision Makers

- U.S. EPA;
- TCEQ Executive Staff (Executive and Directors);
- TCEQ Deputy Directors, Section Managers, and staff of the WPD, OLRD, REM, CID, PSEAD, WQPD, RMD, ENF, and TD;
- TCEQ Area and Region Directors, Section Managers, and staff of the Regional Offices; and
- Regulated Community.

A5.5 Principal Data Users

- U.S. EPA;
- TCEQ Executive Staff;
- TCEQ Deputy Directors, Section Managers, and staff of the WPD, OLRD, REM, Regional Offices, PSEAD, CID (Radioactive Materials Compliance Team), WQPD, RMD, ENF, and TD;
- TCEQ Area and Region Directors, Section Managers, and staff of the Regional Offices; and
- Regulated Community.

A6 PROJECT/TASK DESCRIPTION

A6.1 Purpose/Background

The purposes of the RCRA and UIC programs are to ensure proper management of hazardous and nonhazardous waste and to prevent pollution of underground sources of drinking water in Texas, in accordance with 40 CFR Parts 144-148 (UIC) and 260-270 (RCRA). With respect to the RCRA and UIC programs, and depending on the activity being conducted, the TCEQ requires permits, authorizations or registrations, and corrective action procedures executed by the regulated community that are as stringent as federal requirements and in some cases more stringent to verify compliance with state and federal regulations. In addition, the regulated community engaging in RCRA/UIC program activities must comply with all state and federal regulations identified or referenced in this QAPP.

Specifically, nine divisions in two offices support the RCRA/UIC programs in the agency. The participating divisions are listed below along with a description of tasks unique to that division which supports activities detailed in this QAPP.

A6.2 TCEQ RCRA/UIC Participating Divisions

State implementation, management and oversight of the RCRA and UIC programs is a cooperative effort between nine divisions within TCEQ that work collectively to ensure compliance applicable to the RCRA or UIC activity being performed. In some instances divisions serve multiple programs since they provide compliance support services to water, waste and air program areas. The following divisions within the OCE and the OOW receive a portion of the RCRA/UIC grant monies and therefore have functions and responsibilities as defined in this QAPP. These functions and responsibilities are briefly described below.

A6.2.1 Waste Permits Division (WPD)

The WPD performs activities associated with the permitting and registration of facilities involved in the storing, processing or disposing of hazardous and nonhazardous industrial wastes and special wastes for RCRA. They contribute to implementation of the RCRA program through the following functions:

- Reviewing environmental data provided from external sources in permit applications;
- Verifying and validating sampling results provided by both commercial and in-house laboratories according to method/program and QAPP requirements;
- Reviewing environmental data submitted by RCRA facilities pursuant to permit requirements;
- Reviewing environmental data submitted with an application for a permit (new, renewal, amendments and modifications) by RCRA facilities;
- Reviewing waste classification data submitted by entities generating/managing hazardous waste and industrial solid wastes;

- Evaluating environmental data submitted by RCRA facilities related to Comprehensive (Confirmatory) Performance Test burns at Hazardous Waste Combustion units as required by 40 CFR Part 63, Subpart EEE;
- Evaluating the RCRA program for optimization purposes to meet the needs and requirements of the State of Texas legislature mandates;
- Performing technical analysis of submission from regulated entities; and
- Performing QA compliance audits of RCRA programs.

A6.2.2 Remediation Division (REM)

The REM oversees the investigation and cleanup associated with releases of hazardous waste and/or hazardous substances subject to the Texas Risk Reduction Program (TRRP) rules (30 TAC Chapter 350) or the 30 TAC Chapter 335 rules. These rules establish response action requirements for the corrective action program areas of the TCEQ. The REM utilizes the technical services of the Toxicology, Risk Assessment, and Research Division on reviewing risk assessments of toxicity to human health and environment, as needed. The REM role in implementing the RCRA/UIC programs includes:

- Reviewing environmental data submitted by RCRA facilities in the form of corrective action plans/reports to verify contamination is remediated at the appropriate level;
- Ensuring sites are assessed and remediated to levels that protect human health and the environment;
- Verifying waste management units or facilities are taken out of service and closed properly; and
- Overseeing post-closure care and monitoring.

In implementing the Forum on Environmental Measurement Directive 2012-02, the VCP-CA section manager will assess and document the competency of REM staff via the established performance evaluation process.

A6.2.3 Occupational Licensing and Registration Division (OLRD)

The OLRD supports various agency programs including the registration of IHW facilities. The OLRD contributes to the implementation of the RCRA and UIC programs by:

- Collecting information on hazardous waste generators, hazardous waste transporters, RCRA/UIC permitted facilities and TSD facilities including basic information on UIC units associated with hazardous and/or industrial waste.

A6.2.4 Program Support and Environmental Assistance Division (PSEAD) and Regional Offices

The Program Support and Environmental Assistance Division is responsible for central-office and regional coordination and supports the four areas: North Central and West Texas, Coastal and East Texas, Border and Permian Basin, and Central Texas. This field operations network, consisting of 16 Regional Offices, is responsible for the following as it relates to the RCRA/UIC programs:

- Investigating hazardous waste generators, transporters, TSD, and other facilities to ensure that these entities are properly managing solid and hazardous waste;
- Collecting and analyzing soil, sediment, surface water and groundwater samples to verify the presence of contamination;
- Collecting and analyzing waste samples to determine proper waste characterization;
- Observing demonstrations of mechanical integrity testing of Class I UIC wells;
- Performing investigations of Class I UIC wells;
- Developing enforcement action referrals for violations identified during investigations;
- Reviewing investigation progress and monitoring reports, including sampling analysis, to determine appropriate action; and
- Executing contracts with external laboratories for sample analyses (see page xiii).

A6.2.5 Critical Infrastructure Division (CID)

The Critical Infrastructure Division, Radioactive Materials Compliance and Chemical Reporting Section is responsible for the following as it relates to the UIC Program:

- Investigating uranium mining facilities (Class III wells, production areas) to determine compliance with permitting and regulatory requirements;
- Inspecting the on-site laboratories at the uranium mining facilities;
- Witnessing plugging activities of the Class III wells at the uranium mining facilities;
- Reviewing groundwater data submitted by uranium mining facilities;
- Reviewing plugging reports for the Class III wells submitted by uranium mining facilities;
- Coordinating with Radioactive Materials Division, UIC Permits Section on 7520 reports for semi-annual and federal fiscal year to U.S. EPA Region 6 related to the TCEQ UIC program; and
- Coordinating with the Radioactive Materials Division, UIC Permits Section on an annual report to U.S. EPA Region 6 related to the TCEQ UIC program.

A6.2.6 Enforcement Division (ENF)

The Enforcement Division is responsible for investigating violations of state environmental laws and, when necessary, developing formal enforcement cases in accordance with state statutes and agency rules. Their responsibility in implementation of the RCRA and UIC programs includes:

- Initiating enforcement actions from Enforcement Action Referrals;
- Tracking enforcement activities;

- Reviewing and responding to notices and disclosures submitted pursuant to the Texas Environment, Health, and Safety Audit Privilege Act; and
- Processing compliance history appeals.

A6.2.7 Monitoring Division (MD) Laboratory and Quality Assurance Section

TCEQ QA Management and the Texas Laboratory Accreditation Program reside in this section of the Monitoring Division. The Laboratory and Quality Assurance Section's supporting role for the RCRA/UIC programs includes:

- Auditing and issuing accreditations to environmental laboratories in accordance with 30 TAC Chapter 25;
- Reviewing the RCRA/UIC QAPP for completeness and correctness according to U.S. EPA QA/R-5 and TCEQ QMP current revision; and
- Assessing the compliance of requirements for quality systems.

Task components rely on guidance provided in the 40 CFR Parts 144-148 and 260-268, SW-846 and HSWA Sections 3004 and 3005 in order to maintain a consistent scientific basis for decision making. The management portion of these components uses guidance provided in the U.S. EPA Guidance for Quality Assurance Project Plans, (U.S. EPA QA/G-5), the Performance Partnership Grant (PPG), and agency policy and procedures.

A6.2.8 Radioactive Materials Division (RMD)

The RMD is responsible for:

- Permitting of Class I and Class III injection wells;
- Permitting subject to 30 TAC 335.47(c)(3)
- Authorization of production areas for *in situ* mining uranium;
- Authorization of Class IV injection wells used for environmental remediation at RCRA or Superfund Sites;
- Authorization of Class V injection wells for environmental remediation, stormwater management, aquifer storage and recovery, aquifer recharge, heating and cooling and other miscellaneous uses;
- Reviewing environmental data submitted by UIC facilities pursuant to permit requirements;
- Reviewing environmental data submitted with an application for permit (new, renewal, amendments, and minor modifications) by UIC facilities;
- Reporting annual UIC program information to U.S. EPA in accordance with federal UIC Rules (40 CFR §144.8(b)(2)) as well as grant-related reporting;
- Rulemaking in response to state and federal mandates; and
- Maintaining and updating of UIC Program federal authorization.

A7 QUALITY OBJECTIVES AND CRITERIA

A7.1 Purpose/Background

This section defines minimum criteria for all entities meeting regulatory compliance under this QAPP. The RCRA and UIC programs use a systematic process for planning data collection activities. The purpose of this element is to document the data quality objectives (DQOs) of a project and to establish performance criteria for the mandatory systematic planning process and measurement system to be used to generate data under this QAPP.

A7.2 Specifying the Quality Objectives

This section describes the quality of data needed for project decision making under the RCRA and UIC programs. The data submitted by the regulated entities as well as the data generated by this agency from its contract and agency laboratories must be of known, traceable, documented, and reported quality. The data must also be sufficient in its intended use which is to support the decision making process used to protect human health and the environment from mismanagement of hazardous and industrial solid wastes. The following qualitative and quantitative approaches define the RCRA and UIC program DQO processes.

A7.2.1 Intended Use of Data

Data generated for use in the RCRA/UIC programs may be used for the following purposes:

- Determining the presence and the extent of contamination in the environmental media of concern (i.e., soil, water, and air);
- Determining the concentration and/or classification of a waste through a hazardous waste determination;
- Determining regulatory compliance issues and initiating cleanup activities through enforcement actions, permitting procedures, or other applicable means, as necessary, to achieve cleanup of a site;
- Defining operating conditions for permitted units and interim status units; and
- Determining the compliance of an injection well facility with applicable state and federal regulations.

A7.2.2 Type of data needed to support agency decisions

The type of data needed to support TCEQ decisions includes the following:

- Representative waste and media samples analyzed by an environmental laboratory accredited by TCEQ (unless excepted by 30 TAC 25.6) according to requirements contained in the TWC 5.134 and 30 TAC Chapter 25 (Environmental Testing Laboratory Accreditation and Certification), Subchapters A and B, with appropriate laboratory analytical results in accordance with the procedures and protocols of SW-846, or other approved protocols of documented analytical methods from the U.S. EPA, the American Society for Testing and Materials, other organizations nationally

recognized as having scientifically valid methods, by the agency Executive Director, or a laboratory method completely documented in an appropriate standard;
- Data supported by documented sample collection and handling procedures;
- Site specific data on non-permitted facilities that manage hazardous waste;
- Trend analysis and planning;
- Qualified data in the databases such as the Internal Data Applications (IDA), the Permitting and Registration Information System (PARIS), and RCRA Information (RCRAInfo);
- Well operating and maintenance information including demonstrations of mechanical integrity; and
- Corrective action data that meet the appropriate regulatory requirements of 40 CFR Parts 260-270 and 30 TAC Chapters 335 (Subchapter S) and/or 350 (TRRP Rules) regarding applicable permits, enforcement agreements and approved plans or reports.

A7.2.3 Conditions under which the data should be collected

Sample collection procedures are outlined in the SW-846 and U.S. EPA protocols.

Data are also collected to determine whether generators, permittees, receivers and transporters have used proper or improper waste classification and waste management practices including disposal and recycling of waste. These samples may be taken any time an investigator needs to make these determinations or the generator is required to report this information.

Sample collection procedures that support data to demonstrate compliance with RCRA/UIC programs by the regulated community must be consistent with procedures outlined in SW-846 and U.S. EPA protocols and documented on Chain of Custody (COC) forms retained at the on-site laboratory or commercial laboratory for a minimum of 5 years.

A7.2.4 Tolerable limits on the probability of making a decision error due to uncertainty in laboratory data

The decision maker relies on state and federal regulations (40 CFR Parts 144-148 and 260-270 and 30 TAC Chapters 289, 305, 331, 335 and 350) in evaluating the allowable uncertainty in the data submitted by the regulated community.

The primary goal of this QA program is to ensure the accuracy and completeness of the data which ultimately will be used to determine the status of the sites investigated. To achieve this accuracy and completeness, all sampling, analysis, and data management activities will be conducted in accordance with pre-set standards, and these activities will be reviewed regularly to maintain full compliance with the standards. This program has been designed so that corrective action can be implemented quickly, if necessary, without causing undue expense or delay. The standards and review procedures the TCEQ will use to attain optimum accuracy and completeness of data are outlined in this plan.

All contractors, subcontractors, and permittees to the TCEQ will be required to follow these standards and procedures, at a minimum. All data submitted to the TCEQ, used

to demonstrate compliance with the RCRA and UIC programs, shall be of known and documented quality.

The minimum QC procedures a laboratory needs to follow are in the SW-846 Manual, other U.S. EPA methods, and the 2016 TNI Standards. However, as stated in Chapter 2 of SW-846, "the performance data included in these methods are for guidance purposes only, and are not intended to be and must not be used as absolute QC acceptance criteria…" Therefore, additional performance standard criteria have been added in this QAPP. For radiological data, the analytical data requirements including the quality control parameters and acceptance criteria must adhere to and comply with the U.S. EPA Multi-Agency Radiological Laboratory Analytical Protocols (MARLAP).

For more information regarding QA/QC criteria for methods used to meet compliance with the RCRA/UIC programs, refer to Section B5.

A7.3 Holding Times

Samples collected under this program will be analyzed within designated holding times specified by U.S. EPA protocols set for samples collected under this program to ensure better probability of sample integrity. Please refer to Section B.2.4 for more information and tables.

A8 SPECIAL TRAINING/CERTIFICATION

A8.1 Purpose/Background

Subsection A8.2 discusses the training which TCEQ regional environmental investigators must complete in order to conduct investigations of RCRA facilities, to collect samples, prepare the samples for analysis, and to develop investigation reports. General training requirements for TCEQ staff are discussed in Section 3 of the TCEQ QMP.

Training and education requirements for laboratory personnel are specified in each laboratory quality assurance manual (QAM) as part of their accreditation documentation. Training and education requirements may also be found in the 2016 TNI Standards.

Environmental data operations conducted for the RCRA and UIC programs by TCEQ staff and contractors are covered under documented quality systems. All personnel are deemed qualified to perform their work through educational credentials, specific job/task training, required demonstrations of competency, and internal and external assessments of their respective programs. All participating laboratories are NELAP-accredited. Records of educational credentials, training, demonstrations of competency, and assessments are retained within the respective divisions and laboratories, and are available for review.

A8.2 Investigator Training

Environmental Investigators are trained to conduct investigations of RCRA facilities, to collect samples, to prepare the samples for analysis, and to develop investigation reports in accordance with the Professional Development Plan Requirements for Environmental Investigators. There are separate PDPs for "Basic Investigators" and "Senior Investigators" which specify required reading, equipment proficiencies, training courses and investigations, activities, and reports. The maintenance of the investigator training and certification records is the responsibility of the investigator's manager.

A8.3 Mechanical Integrity Tests (MIT)

All Class I waste injection wells in Texas are required by 30 TAC 331.43(a) and 40 CFR 146.68(d) to undergo a demonstration of mechanical integrity. Regions 1 (Amarillo), and 14 (Corpus Christi) UIC Investigators review all annual MIT reports, and over a three-year period, physically observe mechanical integrity tests at active wells (i.e., about one-third of the annual MITs are observed by region staff each year). The dates for annual MITs are well-specific, based on the date of the last MIT performed. When possible, UIC Permits Section staff (Appendix B) and/or region office staff observe MITs conducted in association with new well construction and well closures, as schedules permit. Training of staff members for observing this testing includes familiarization with the above cited state and federal regulations. Training also includes studying the TCEQ's Basic Guidelines for MITs and Related Cased Hole Wireline Logging and becoming familiar with the MIT Report Form. Accompanying an experienced investigator on a MIT completes the staff members' initial training.

MITs on Class III wells are accomplished in part with a casing pressure test. This test

confirms the integrity of the casing. The second part of the MIT consists of a review of cementing records which documents the integrity of the casing - borehole annulus. CID UIC staff will witness some of the pressure tests and review the cement records during investigations.

A8.4 Well Constructions, Workovers and Plugging

When permittees notify TCEQ of new Class I injection well construction and well plugging, UIC Permits Section staff either observes aspects of the well construction and well plugging operations or coordinates with the permittee's field crews via phone and email to review and approve changes to procedures that may be warranted. The UIC staff coordinates with the Regional staff regarding new well construction and well plugging operations. Regional staff review and approve Class I well work-over plans and coordinate with permittees for actions related to well workovers and associated MITs. Initial training for these duties includes familiarization with state and federal rules, attending classes in well construction and well log interpretation when available, and accompanying an experienced UIC engineer, geologist, or investigator on a well construction and a well plugging operation.

A8.5 Laboratory Accreditation

The Texas Laboratory Accreditation Program in the Laboratory and Quality Assurance Section of the MD has responsibility for implementation and oversight of the accreditation program. The Texas Laboratory Accreditation Program also tracks the proficiency testing (PT) performance of each accredited laboratory.

Data generated by exempt on-site labs must meet the performance criteria of this QAPP and be documented using the analytical checklist and Case-Narrative supplied at the end of the QAPP.

A9 DOCUMENTS AND RECORDS

A9.1 Purpose/Background

This section defines the records critical to the project (records needed to complete the project), information to be included in the reports, data reporting format, and document control procedures. These records:

- Itemize the information and records included in the data report package and specify the reporting format for hard copy and electronic forms, when used;
- Identify any other records and documents applicable to the project such as audit reports, interim progress reports, and final reports; and
- Specify or reference all applicable requirements for the final disposition of records and documents.

A9.2 Information Included in the Reporting Packages

Data used for the demonstration of compliance (e.g., data collection in support of litigation or compliance with a permit) must be of known and documented quality. Records required for the data or reporting packages are specified in sections A9.2.1 through A9.2.5.

A9.2.1 Field Operations

Data contained in a reporting package varies depending on the type of investigation conducted and the purpose of the sampling activity. Field investigation reports with sample results include, at a minimum, sample collection records, COC records, analytical results, associated results from QC items (including blank, spike recovery, duplicate, and surrogate recovery data) and a written discussion of the sampling event. The retention places and times for this information are documented in the Field Operations Records Retention Schedule, which is part of the Agency Records Retention Schedule. The OCE Field Operations Standard Operating Procedures (FOSOP) Investigation Guidance Documents on the Sharenet website specify what information must be included in investigation reports.

Investigator training and certification records are maintained by the Regional Offices as described in Sections 1.0 and 3.0 of the Professional Development Plan (PDP) document.

OCE has written procedures in place for initiating enforcement as well as for tracking enforcement activity for all investigations conducted. The appropriate level of enforcement must be determined in accordance with the Enforcement Initiation Criteria (EIC) guidance (also available from the TCEQ Home Page: http://www.tceq.texas.gov/ then using the search window). Alleged violations will be addressed either by Notice of Violation (NOV) or Notice of Enforcement (NOE) for formal enforcement action. SOPs located on the internal OCE Field Operations website (FODWEB) specify how to conduct investigations and take enforcement action when appropriate.

A9.2.2 Laboratories

Accreditation and audits of the TCEQ contract laboratories are performed and documented by a laboratory auditor in the MD. The Sugar Land Laboratory is accredited through the Louisiana Department of Environmental Quality (LDEQ). Laboratory accreditation and audit documents are retained by the MD and LDEQ for a minimum of 5 years.

Contract laboratories analyze 90% of the RCRA samples collected by the TCEQ through contract with the MD. The other 10% is analyzed by the TCEQ Sugar Land Laboratory. The DSHS laboratory analyzes all of the TCEQ UIC groundwater samples that TCEQ field staff have taken at a UIC permitted *in-situ* uranium mining sites through the DSHS laboratory/RMD contract.

The contract laboratories maintain QAMs which are submitted to the TCEQ as part of receiving the contract. The manuals are also maintained by staff within the Accreditation Group of the MD. Each contract requires record retention. The contracted laboratories shall maintain all records associated with the analysis of the samples, including documentation of sample receipt, standard and reagent preparation logs, instrument run logs, sample preparation logs, instrument maintenance logs, and facility maintenance logs (e.g., temperature logs, balance calibration logs, etc.) for at least 5 years. Each final laboratory data report submitted to TCEQ will include the COC record, the sample results and associated QC including blank, spike recovery, duplicate, and surrogate recovery data so that the quality of the data is known and a determination of its usability can be made. The TCEQ Sugar Land Laboratory maintains similar records. These records are stored at the Sugar Land Laboratory for 5 years.

The TCEQ and contract laboratories reduce data according to the specific methods and to standard practices for rounding. All data is verified by the laboratories after input into a Laboratory Information Management System (LIMS). The specific procedures and responsibilities are discussed in each laboratory's QAM or SOPs.

Laboratories (contract, commercial, and on-site) performing analyses to demonstrate compliance with federal and state RCRA/UIC regulations must follow requirements as designated in 30 TAC Chapter 25 (relating to Environmental Testing Laboratory Accreditation and Certification) and the 2016 TNI Standards.

A9.2.3 IHW Permits Section

Laboratory data used by the IHW Permits Section for waste classification audits, variances or exclusions from the definition of solid waste, or from regulation as a certain classification of solid waste which include the following: process knowledge, custody documentation for the samples analyzed in a laboratory, QA/QC data for the samples (e.g., project specific matrix spikes, duplicates, etc.), analytical results for the samples and a description as to how these samples are representative of the waste as a whole.

There may be additional information provided (e.g., extenuating circumstances as to why a less stringent classification may be warranted). Data packages submitted for waste classification purposes will include, at a minimum, the requirements found in 30 TAC 335.509 - 335.514. Once the analysis is completed and a determination is made, the data package and decision documentation is combined and sent to the TCEQ Central

Records where it is maintained for 5 years, then stored at the Texas State Library and Archives Commission for 30 years.

A9.2.4 Hazardous Waste Compliance Review

Data reviewers at the agency rely on the information in reporting packages submitted by Regional Offices and the regulated community. The report packages are evaluated for administrative completeness and technical information as required by the governing rule, regulation, permit, order/judgment or approved plan or report. Refer to Section D2 (Verification and Validation Methods - Table D2.2.1) for a list of supporting data that the data reviewer looks for in the report package or may be requested by the data reviewer. Data requirements required for the management of hazardous waste as defined in this QAPP are determined on a site or unit basis through the DQO process with the regulated entity and may be permit specific. Documentation and retention of the data reviews are performed in accordance with the SOPs in the corresponding division and will include one of the following: completed checklists kept with the data, letters to the regulated entity regarding deficiencies and/or completeness, or memorandums to the file.

A9.2.5 Corrective Action Review

Corrective Action project managers review environmental data submitted by RCRA facilities in investigation and assessment reports, risk assessments, corrective action plans/reports, closure reports, and certifications. Project managers also review environmental data submitted by RCRA facilities with an application for a compliance plan (new, renewal, amendments and modifications) or pursuant to permit or compliance plan requirements. The content of these reports is specified under 40 CFR Parts 260-270, 30 TAC Chapter 335, and 30 TAC Chapter 350. The project managers review the reports to determine compliance with applicable rules and associated guidance documents.

The project managers ensure the regulated community follows applicable rules and the appropriate guidance documents when reviewing the data. The guidance documents applicable to environmental data include, but are not limited to, the TCEQ guidance document *Review and Reporting of COC Concentration Data under TRRP*, [RG-366 (TRRP 13)] and the July 23, 1998 memorandum *Implementation of the Existing Risk Reduction Rule*, also known as the Consistency Memo. The project manager documents the review in a corrective action review letter sent to the regulated entity which is tracked in IDA. The letter, which undergoes management and/or peer review prior to mail out, outlines deficiencies and/or compliance status based on the information provided in the report. The Corrective Action Program sends the report and the letter to the TCEQ Central Records where it is maintained for 5 years, then stored at the Texas State Library and Archives Commission for 30 years, in accordance with the TCEQ's *Record Retention Schedule*.

A9.3 Data Reporting Package Format and Documentation Control

This section discusses the various components assembled to document a concise and accurate record of all activities affecting data quality. The format of data reporting packages is consistent with the procedures used for data validation and data assessment.

A9.3.1 Field Operations Records

The PSEAD and the regional offices utilize a database, the Consolidated Compliance and Enforcement Data System (CCEDS), in which investigators document all investigations they conduct. Each regional office has access to CCEDS where investigation information is entered. After the field investigator completes the investigation report, it is approved by his or her manager and noted as "Approved" in the database. The data from CCEDS is uploaded into the RCRAInfo database.

A management report generated from CCEDS is used to verify that all investigation reports have been submitted promptly. Individual reports are reviewed by Regional supervisory personnel. Investigation information that is sent electronically to U.S. EPA from TCEQ's CCEDS database is verified at least annually. The U.S. EPA Region 6 can obtain reports on the number of investigations via the RCRAInfo database or by direct request to PSEAD or regional staff. The U.S. EPA Region 6 also conducts reviews under the RCRA grant during End of Year meetings.

A9.3.2 Laboratory Records

Laboratories will maintain all records associated with the analysis of the samples including documentation of sample receipt, standard and reagent preparation logs, instrument run logs, sample preparation logs, instrument maintenance logs and facility maintenance logs (e.g., temperature logs, balance calibration logs, etc.) for at least 5 years. Laboratories must also meet requirements in the 2016 TNI Standards regarding laboratory records management.

Where applicable or requested by agency staff, the following records will be included:

- Instrument detection and quantitation limits and relationship between the two;
- COC records;
- Sample identification cross-reference table that includes the laboratory and field IDs;
- Sample results with corresponding units;
- Laboratory blank results (method, instrument, etc.);
- Laboratory control sample (LCS) results;
- Matrix spike (MS) and matrix spike duplicate (MSD) results (when the sample used for the MS/MSD is from the site or project being evaluated);
- Surrogate results; and
- Verification/documentation that samples were extracted/digested and/or analyzed within appropriate holding times.

Laboratory data packages should also include discussions regarding any problems or anomalies. A laboratory review checklist or case-narrative should clearly document whether the laboratory has been accredited by TCEQ or other TCEQ-recognized

accrediting body for the matrices, analytical methods, and parameters relating to data included in the data package. The checklist or case-narrative should also document the QC parameters reviewed (e.g., calibration, continuing calibration, and other method-required parameters) against laboratory procedures, method specifications, and criteria specified in this QAPP to allow TCEQ data users to make a full determination as to the usability of the data. Please refer to Section D - Data Validation and Usability for complete instructions and additional information necessary for submitting laboratory data.

A9.3.3 IHW Permits Section

IHW Permits Section reviews data packages submitted for waste characterization purposes to ensure compliance with 30 TAC 335.509 - 511 and 335.513. The laboratory report must also include the COC record, the sample results and associated QC, including blank, spike recovery, duplicate, internal standards, results of interference check sample and surrogate recovery data, as applicable.

The IHW Permits Section consists of data validators, reviewers, and users of waste classification information. The data supplier is responsible for documenting that the waste classification DQOs are met and that the data supplied supports the specific classification assigned.

A9.3.4 UIC

UIC staff in CID enters data related to the investigations of Class III wells associated with *in situ* uranium mining projects, into the investigations tracking database CCEDS . UIC staff in Region 1 and Region 14 enters data into the investigations tracking database, CCEDS, including MIT inspections of waste disposal wells associated with *in situ* uranium mining projects and other components of the UIC program.

UIC Permits staff review data packages that are submitted as required in the UIC Class I Permit Application for waste characterization purposes to ensure compliance with 30 TAC 335.510, 335.511 and 335.513. The reviews are documented in a checklist which is kept with the permit application as long as the permit is in force.

The laboratory report must also include the COC record, the sample results and associated QC including blank, spike recovery, duplicate, internal standards, results of interference check sample and surrogate recovery data, as applicable.

Geologists and engineers are data validators, reviewers, and users of analytical information. The data supplier is responsible for documenting that the analytical DQOs are met and that the data supports the specific assigned purpose. Data reviewers rely on the information in reporting packages submitted by the regulated community as required by the governing rule, regulation, permit, order/judgment or approved plan or report.

A9.3.5 Hazardous Waste Compliance Review

Staff in applicable agency programs are primarily data users. The data users review and evaluate data packages submitted by the regulated community or the data supplier. The data supplier is responsible for ensuring that their compliance data package includes concise and accurate records of any activities that may impact data quality. Data are

reviewed utilizing the data review check list (Table D2.2.1 – Inputs from the Analytical Laboratory for Data Verification) in conjunction with the case-narrative, the state and federal rules and regulations (40 CFR Parts 260-270 and 30 TAC Chapter 335), and various guidance documents such as SW-846, RCRA Ground-Water Monitoring Technical Enforcement Guidance Document, RCRA Sampling Procedures Handbook, policies and procedures of the TCEQ as outlined in the Enforcement Standard Operating Procedures, RCRA Corrective Action Plan, Final U.S. EPA 520-R-94-004, May 1994, approved work plans and reports, and applicable permits, agreed orders and agreed judgments. Other U.S. EPA documents may be utilized during the review process in order to address site specific situations. Review documentation is maintained by the TCEQ Central Records section in accordance with the TCEQ Records Retention Schedule.

The compliance status of facilities is recorded in the RCRAInfo database. The data is available to U.S. EPA for pulling into various report formats as needed. The database provides the record of compliance with the TCEQ PPG for the current U.S. EPA fiscal year.

A9.3.6 Corrective Action Program Review

The data and reports submitted to the Corrective Action Program by the regulated entity conform to the requirements of 40 CFR Parts 260-270, 30 TAC Chapter 335, and 30 TAC Chapter 350. The regulated community is responsible for verifying the data package meets those requirements and the specifications in the TCEQ guidance document *Review and Reporting of COC Concentration Data under TRRP*, [RG-366 (TRRP 13)] or, when applicable, the July 23, 1998 memorandum *Implementation of the Existing Risk Reduction Rule*, also known as the consistency memo. The project manager documents the review of the data/reports in a corrective action review letter sent to the regulated entity which is tracked in IDA. The letter, which undergoes management and/or peer review prior to mail out, outlines deficiencies and/or compliance status based on the information provided in the report. The Corrective Action Program sends the report and the letter to the TCEQ Central Records where it is maintained for 5 years, then stored at the Texas State Library and Achieves Commission for 30 years, in accordance with the TCEQ's *Record Retention Schedule*.

A9.4 Official State Records

TCEQ OPP 13.02 specifies record management procedures necessary to safeguard the legal and financial rights of the State of Texas and any persons directly affected by activities of the TCEQ. Records produced by TCEQ and maintained as official records of the State of Texas are documented in the TCEQ Records Retention Schedule. Reports are maintained by the TCEQ Records Management Program in Austin, Texas. Some retention schedules are mandated by rule while others are based on historical need for the document type. An annual review of the schedule is conducted in January with modifications made as necessary. Project managers or designees shall maintain QA records relating to their respective projects and ensure these records are identified in the Records Retention Schedule.

B1 SAMPLING PROCESS DESIGN

B1.1 Purpose/Background

Sampling designs are not developed by the RCRA/UIC programs or TCEQ staff. The TCEQ staff in the WPD, REM, and regional offices are responsible for reviewing and approving the sampling design submitted by the responsible party (RP) or their representative. During the review process, the TCEQ staff follow the protocol established in 40 CFR, Parts 144-148 and 260-270 and in SW-846 to assess the sampling designs for the appropriate type of sampling plan (e.g., trial/risk burn data collection, closure of permitted units, clean-up of unauthorized releases).

Periodically, TCEQ field investigators also conduct split or final sampling with an RP based upon the sampling design previously submitted by the RP and approved by TCEQ personnel. Sampling procedures are conducted in accordance with chapters 1 and 9 of SW-846.

If, during an investigation of a RCRA/UIC facility, a TCEQ investigator suspects mismanagement of hazardous waste or violation of federal and/or state rules, then the TCEQ investigator follows U.S. EPA RCRA sampling handbook protocol in determining the sampling process. See Section B2.2 for further explanation of sampling process for TCEQ investigators and Section B2.3 for sampling process for TCEQ regulated entities.

Sampling designs for permittees are unique and vary depending on the type of facility, type of solid waste or process, site geology, monitoring activities, or remediation.

B2 SAMPLING METHODS

B2.1 Purpose/Background

The primary purpose of the sampling program, whether it be initiated by agency staff, permittees, or other regulated entities, is to obtain representative samples of waste, soil, water, and any other media possibly containing or contaminated by hazardous or Class 1 nonhazardous wastes or Class III *in situ* uranium operations. Representative samples aid in evaluating the nature and extent of waste deposits present at each site or in determining a release from a unit.

Sampling procedures to demonstrate compliance for the various RCRA/UIC programs in the agency by regulated entities must be documented and samples must be collected according to the waste analysis plans (WAPs), permit specifications, remediation or corrective action plans, waste disposal classification verification, or enforcement orders.

In general, sampling requires the collection of adequately sized representative samples of the wastes or contaminated media. Sampling situations vary widely, and therefore no universal sampling procedure can be recommended. This section outlines several procedures for sampling different types of wastes in various physical states and containers.

B2.2 Sampling Considerations by Regional Office RCRA Investigators

RCRA field staff collect soil, sediment, surface water, groundwater, and solid waste samples suspected of containing hazardous waste. Samples are also collected to determine the practices used by generators, receivers, and transporters for waste classification and waste management, including waste disposal and recycling of waste. These samples may be taken any time an investigator needs to make these determinations or the generator is required to report this information. These media and waste can often be complex, multi-phase mixtures of liquids, semi-solids, sludges, or solids. The liquid and semi-solid mixtures vary greatly in viscosity, corrosivity, volatility, explosivity, and flammability. The solid wastes can range from powders to granules to big lumps. The wastes may be in drums, barrels, sacks, bins, vacuum trucks, ponds, or other containers. Sample collection procedures that support data to demonstrate compliance with RCRA/UIC programs must be consistent with procedures outlined in SW-846 and U.S. EPA protocols.

Sampling these diverse types of media and wastes requires different types of samplers. Specific sample collection devices and the procedures for preparing, using, and decontaminating the sample collection devices are described in SW-846 and U.S. EPA protocols. In the event of a sampling or measurement system failure, the investigator is required to try and resample and resubmit the samples whenever possible.

Sufficient volume of sample, representative of the main body of waste or environmental media, must be collected. The sample must also be adequate in size for all analytical needs. The concentration of the contaminant, the type of analysis, and the sample medium determines the volume requirements. The SW-846 and U.S. EPA protocols give general guidelines for volume requirements.

The following equipment should be on hand when sampling wells:

1. Cooler for sample shipping and cooling, sample container, chemical preservatives, and appropriate packing cartons and filler;
2. Thermometer, pH paper and meter, digital camera, labels, appropriate keys (for locked wells), tape measure, water level indicators, and specific-conductivity meter. Sample preservation, analysis, and analytical quality control shall be as defined in the most recent issue of Methods for Chemical Analysis of Water and Wastes (EPA - Technology Transfer). Total dissolved solids shall be determined by evaporation at 180°C;
3. Pumps will normally be used to obtain samples, although samples may be obtained directly from the pump discharge line for high yielding monitoring wells and wells with dedicated pumps. Samples intended to determine volatile organic compounds (VOCs) should not be obtained directly from the pump discharge line unless collecting from a very low flow discharge as a high flow will bias the intended VOC data low. If unable to collect by low flow, the data needs to be qualified as biased low;
4. Bailers and monofilament line with tripod-pulley assembly (if necessary); and
5. Decontamination solutions – tap water, distilled water, Alconox, isopropanol, CLP – specified grade water.

Ideally, sample withdrawal equipment should be completely inert, economical, easily cleaned and reused, able to operate at remote sites in the absence of power resources, and capable of delivering variable rates for well flushing and sample collection.

Table B2.2.1 lists the methods for sampling of emissions from facilities that burn hazardous constituents, as defined in SW-846 as updated. Sampling of emissions from facilities burning hazardous constituents requires specialized sampling devices and procedures. Tables B2.2.2 and B.2.2.3 give general guidelines for volume requirements for aqueous and soil and sediment samples respectively. Preservation and holding times are given in Section B2.4.

During the investigation, the investigator should identify the types and locations of samples that may need to be collected. The investigator will identify:

- The media or wastes to be sampled;
- The physical locations to sample;
- The steps within a treatment process to sample;
- The physical characteristics of the medium to be sampled; and
- Other relevant information that would be helpful in developing a sampling plan.

Table B2.2.1 Sample Collection Methods for Emissions from Hazardous Waste Facilities

Analysis	Methods
Particulate	U.S. EPA Method 5**
Moisture	U.S. EPA Method 4**
Velocity/Temperature	U.S. EPA Methods 1,2**
O_2 – Oxygen	U.S. EPA Method 3A**
CO_2 – Carbon dioxide	U.S. EPA Method 3A**
Total Organic Emissions (Unspeciated Volatile Organics)	0040*
Total Organic Emissions by total chromatographable organics (TCO) and gravimetric (GRAV) analysis procedures	0010*
Particle Size Distribution	U.S. EPA Method 201***, 201A*** or 5**
Aldehydes/Ketone	0011*
Polychlorinated Dibenzo-p-dioxins/ Polychlorinated Dibenzofurans	0023A*
Volatile Organic Compounds Semivolatile Organic Compounds	0030 or 0031* 0010*
Principal Organic Hazardous Constituents/Tedlar Bag	0040*
HCl/Cl2 - Hydrogen chloride and chlorine emissions	0050/0051*
Metals	0060* or U.S. EPA Method29 **
Hexavalent Chromium	0061*

* *Test Methods for Evaluating Solid Waste, Physical/Chemical Methods, SW-846, 3rd Edition*
** 40 CFR, Ch. 1, Pt 60, Appendix A
*** 40 CFR, Ch. 1, Pt. 51, Appendix M

Table B2.2.2 Bottles Required for Aqueous Samples

Analysis	Required Volume	Container Type
Volatile Organics	80 mL	2 40-mL volatile organic analysis (VOA) glass vials
Extractable Organics (base/neutral/acid) and pesticide/ (BNA) polychlorinated biphenyl (PCB)	4 liters	2 80-ounce or 4 1-liter amber glass bottles w/Teflon lined lid
Metals	1 liter	1 1-liter polyethylene bottle
CN- & S^{2-} Cyanide & Sulfide	1 liter	1 1-liter polyethylene bottle
Inorganic (non-metal)	1 liter	1 1-liter polyethylene bottle

Table B2.2.3 Bottles Required for Soil and Sediment Samples

Analysis	Required Volume	Container Type[1]
Volatile Organics	5 grams/sample	3-40 ml VOA glass vials sealed after sample added from sample coring device or 3 hermetically-sealed sample vials
Extractable Organics (BNA and pesticide/PCB)	6 ounces	1 8-ounce or 2 4-ounce wide-mouthed glass jars w/Teflon lined lid
Metals, Cyanides and Sulfides	6 ounces	1 8-ounce or 2 4-ounce wide-mouthed glass jars w/Teflon lined lid

Note: 1 – Sample containers will conform to U.S. EPA regulations for the appropriate constituents.

B2.3 Sampling Considerations by Regulated Entities Demonstrating Compliance

The REM oversees the cleanup of sites with soil and groundwater contamination associated with releases of industrial and municipal hazardous and industrial non-hazardous wastes. The regulated community is required to follow requirements in 30 TAC Chapter 350 (relating to TRRP) for all sampling and corrective action considerations.

Chapter 350 specifies the information and procedures necessary to demonstrate compliance with the TRRP. This program provides a consistent corrective action process directed toward protection of human health and the environment balanced with the economic welfare of the citizens of this state. This program uses a tiered approach incorporating risk assessment techniques to help focus investigations and to determine appropriate protective concentration levels for human health and for ecological receptors. The program also sets reasonable response objectives that will protect human health and the environment and preserve the active and productive use of land. Once subject to the TRRP, the person must comply with all requirements of the adopted rule unless another agency rule states otherwise, or a federal standard or state statutory requirement is more stringent.

The WPD oversees entities which generate, treat, store, or dispose of hazardous or nonhazardous solid waste and are subject to RCRA Subtitle C or D sampling and analysis requirements. The WPD also oversees entities subject to the NESHAP final standards for hazardous waste combustors (40 CFR Part 63, Subpart EEE). Sampling design considerations depend upon a number of variables such as: type of facility generating, treating, storing, or disposing of the hazardous waste; chemicals of concern; media type; number of samples necessary to get a representative sample; corrective action (remediation) or other actions necessary to demonstrate compliance to RCRA regulations.

The RMD, UIC Permits Section, oversees entities responsible for the disposal of hazardous or nonhazardous industrial waste or municipal solid waste via injection wells, and entities subject to 30 TAC 335.47(c)(3). Sample design depends on the facility design, the waste being injected, the timing of samples necessary to get representative samples, the injection well design, or other actions necessary to demonstrate compliance with UIC regulations.

The sampling equipment, preservation, and holding time requirements, recommended to the regulated community for sampling of air emissions from facilities that burn hazardous constituents, for the specific analytical method for each analyte are in SW-846 and in the Handbook Quality Assurance/Quality Control (QA/QC) Procedures for Hazardous Waste Incineration.

B2.4 Preservation and Holding Time Requirements

Maximum holding times (MHTs) have been established by the U.S. EPA and are presented in the CFRs and SW-846. Holding times can be extended if preservation techniques are employed to reduce biodegradation, volatilization, oxidation, sorption, precipitation, and other physical and chemical processes.

The U.S. EPA-established preservation and holding times that may be found in Table B2.4.1 for aqueous samples and Table B2.4.2 for soil and sediment samples. Acceptable sample containers for the collection of aqueous samples and for the collection of soil and sediment samples are listed in Table B2.2.2 and Table B2.2.3, respectively. Analyses performed on samples collected under this program will be within U.S. EPA-established MHTs. Tables B2.4.1 and B2.4.2 list the types of analyses and the applicable holding times. The holding times recommended to the regulated community for sampling of air emissions from facilities that burn hazardous constituents are in SW-846 or in the Handbook of Quality Assurance/Quality Control (QA/QC) Procedures for Hazardous Waste Incineration. Table B2.2.1 lists the methods for sampling of emissions constituents.

Table B2.4.1 Holding Times[1] and Preservation for Aqueous Samples

Analysis	Extraction/Digestion Times	Analysis Time	Preservation Method[2,]
Volatile Organic Compounds (VOCs)	NA	14 days	Hydrogen Chloride (HCL), Sulfuric Acid (H2SO4) or Sodium bisulfate (NaHSO4), to pH<2, cool ≤ 6C
Semi-volatile Organics Base/neutral/acids (BNA) Pesticides/PCBs	7 days	within 40 days after extraction	≤ 6°C
Metals	6 months	6 months, ASAP after digestion	Nitric acid (HNO_3) to pH<2
Mercury	28 days	28 days, ASAP after extraction	HNO_3 to pH<2
Hexavalent Chromium[3]	24 hours	within 24 hours after extraction4	≤ 6°C
Alkalinity	NA	14 days	≤ 6°C
Chlorides	NA	28 days	≤ 6°C
Conductivity	NA	28 days	≤ 6°C
Nitrate-N	NA	48 hours	≤ 6°C
Sulfates and Fluorides	NA	28 days	≤ 6°C
Total Dissolved Solids (TDS)	NA	7 days	≤ 6°C
Perchlorate	NA	28 days	≤ 6°C
Cyanides	NA	14 days	Sodium Hydroxide (NaOH) to pH>12, cool ≤ 6°C
Sulfides	NA	7 days	NaOH to pH>12, 2ml of 2N Zinc Acetate per liter, cool ≤ 6°C

Notes: [1]Holding times begin at the time of collection.

[2] Some waters may effervesce. If this occurs, perform no pH adjustment, cool, and have analyzed immediately. Refer to Chapter 4 of SW-846 Revision 4 for more detailed guidance regarding preservation of aqueous samples.

[3]If hexavalent chromium is analyzed by the Ion Chromatography method U.S. EPA 218.6, the holding time can be extended to 28 days.

Table B2.4.2 Holding Times[1] and Preservation for Soil and Sediment Samples

Analysis	Extraction/Digestion Times	Analysis Time (maximum holding time)	Preservation Method
Volatile Organic Compounds (VOCs)	NA	2 days if unpreserved, 14 days if preserved	For Remediation Activities: For low/med levels, extrude into empty tared hermetically sealed vials containing 5 mL H_2O, cool to ≤ 6°C, if not analyzed within 48 hours, store at < -7°C but > -20°C. For high levels, extrude into in tared hermetically sealed vials containing 5 mL MeOH, and cool to ≤ 6°C. For Waste Permits Activities: sealed zero headspace container preserved according to method specifications.
Semi-volatile Organics Base/neutral/acids (BNA) Pesticides/PCBs	14 days	within 40 days after extraction	≤ 6°C
Metals	6 months	6 months or ASAP after digestion	
Mercury	28 days	ASAP after extraction	≤ 6°C
Hexavalent Chromium	28 days	Within 4 days after extraction	≤ 6°C
Sulfides	NA	7 days	≤ 6°C
Cyanides	NA	14 days	≤ 6°C
TCLP Parameters			
VOCs	14 days	14 days	see individual methods
Semi-Volatile Organics, BNAs and Pesticides/PCBs	14 days/7 days to prep	within 40 days after extraction	≤ 6°C
Metals	6 months	within 6 months after extraction	None
Mercury	28 days	within 28 days after extraction	≤ 6°C

Notes: [1]Holding times begin at the time of collection.

B3 SAMPLE HANDLING AND CUSTODY

B3.1 Purpose/Background

Sample custody is an integral part of any sample collection and analysis plan and applies to both field and laboratory activities associated with sample collection and analysis. The first step to ensure sample integrity is to utilize the appropriate procedures in the field for collection, identification, preservation, and shipment of samples. When samples reach the laboratory, they are then monitored for proper preservation, assigned a laboratory number, and maintained at 6C or less, if required by the method of analysis, until sample preparation and analyses can be performed within required sample holding times. Sample handling procedures for all laboratories demonstrating compliance to RCRA/UIC programs must be described in their QAM and conform or be equivalent to the current standards applied to laboratories that are accredited.

B3.2 Sample Custody Procedure

Custody procedures requires permanent records of all sample handling and shipment. Custody procedures must be used to ensure sample integrity and legally and technically defensible data. The custody procedures for data used to demonstrate compliance with RCRA/UIC programs must be consistent with procedures outlined in SW-846 and U.S. EPA protocols. The custody procedures recommended to the regulated community for sampling of air emissions from facilities that burn hazardous constituents are in the Handbook of Quality Assurance/Quality Control (QA/QC) Procedures for Hazardous Waste Incineration.

B4 ANALYTICAL METHODS REQUIREMENTS

B4.1 Purpose/Background

To support the analytical needs of the RCRA program (and by extension, other waste site management programs), the U.S. EPA created and maintains SW-846, a methods compendium. Please refer to U.S. EPA Office of Resource Conservation and Recovery (ORCR) for more updates to SW-846.

The SW-846 is a guidance document meant to assist the analytical chemist and other users by suggesting sampling and analytical procedures that have undergone thorough evaluation to identify the strengths and weaknesses of the methods and the expected analytical performance for the range of sample types evaluated. The U.S. EPA position for the majority of the methods in SW-846 (which are not method-defined parameters) is: (1) SW-846 is not the only source of methods that can be used, (2) Methods in SW-846 do not need to be implemented exactly as written in SW-846; and (3) Performance data presented in SW-846 methods should not be used as regulatory default or absolute "QC requirement."

However, not all SW-846 methods are guidance. There are certain specific regulatory requirements to use SW-846 methods exactly as written. The U.S. EPA regulations state that, "Several of the hazardous waste regulations under Subtitle C of RCRA require that specific testing methods in SW-846 be employed for certain applications. These requirements relate to testing used to determine a specific kind of property that is termed a "method-defined parameter." The regulation goes on to say that, "*Any reliable method may be used to meet other requirements in 40 CFR Parts 260 - 270*" [emphasis added].

Currently, testing done to meet compliance with the MACT Standards must be done in accordance with 40 CFR Part 63, Subpart EEE. Any modifications to methods required in these rules must be approved by U.S. EPA Region 6.

B4.1.1 Method Selection

The analytical methods chosen by agency staff, permittees ,or other regulated entities to determine or verify compliance are varied and may be dependent upon the following: the chemicals of concern, type of sample media, detection requirements, permit requirements, criteria designated in program rules (e.g., TRRP rules for remediation activities), and that the method chosen to demonstrate compliance or decision-making must be included in the TCEQ Fields of Accreditation for which accreditation is offered and required. The methods that will be commonly used by Regional Office investigators are identified in the TCEQ Laboratory Contracts. A list of laboratories currently accredited along with the methods, media, and analytes they are accredited for can be found on the List of Accredited Laboratories and Their Fields of Accreditation.

Cases with no information available about the waste present a challenge for the regional office investigators when deciding the parameters to request for analysis. The final decision is left to the investigator.

For Regional Office staff, samples are sent to a laboratory contracted by the TCEQ or to the DSHS laboratory for UIC Class III uranium mining facility samples. These laboratories and any subcontractors are accredited by TCEQ according to 30 TAC Chapter 25 (relating to Environmental Testing Laboratory Accreditation and Certification) Subchapters A and B as amended, for the matrices, methods, and parameters of analysis, if available, unless the TCEQ agrees in writing to allow one of the regulatory exceptions specified in 30 TAC 25.6.

A laboratory that provides analytical data for RCRA Subtitle C and the UIC programs to a permittee must be accredited according to 30 TAC Chapter 25 (relating to Environmental Testing Laboratory Accreditation and Certification) Subchapters A and B as amended, for the matrices, methods, and parameters of analysis, if available, unless the laboratory meets one of the regulatory exceptions specified in 30 TAC 25.6.

B4.2 Preparation of the Samples

Table B4.2.1 lists the most common sample preparation procedures requested. The appropriate method is determined by the matrix (water, soil, sludge, emission samples, etc.) and the analytical method selected. Unless otherwise prohibited in SW-846, other agency or U.S. EPA-approved test methods may be used in order to prepare the samples for analysis. The preparation of samples must be described in each laboratory's QAM and conform or be consistent to the 2016 TNI Standards.

Table B4.2.1 Sample Preparation Procedures

Parameters	Method[1]
Organics	
Volatile organics (VOA)	5021A/5030B/5031/5035/5041A
Semivolatile organics (BNA)	3510C/3520C/3540C/3541/3550C/3542
Pesticides/PCBs	3510C/3520C/3540C/3541/3550C
Inorganics	
Metals	3005A/3010A/3015A/3020A/3050B/3051A

Note: [1]Test Methods for Evaluating Solid Waste, Physical/Chemical Methods, SW-3rd Edition, as updated

B4.3 Analytical Methods

Table B4.3.1 lists the most common analytical procedures used to meet regulatory compliance for the RCRA and UIC programs. For permittees or other entities using the services of a commercial laboratory, a complete list of methods/media/analytes for which the agency offers accreditation (also known as the Fields of Accreditation) may be found on the Laboratory Accreditation website. The methods can be used for the analyses of water, soils, sludges, emission samples, and other matrices. The minimum QC procedures that must be followed by accredited laboratories are detailed in Chapter Volume 1, Modules 2 to 7 of the 2016 TNI Standards (*relating to Quality Systems*). Additional, more stringent criteria may be specified in this QAPP, WAP, other program requirements, or conditions of the site (e.g., Remediation and TRRP Rules) based on facility type and type of action being taken for which samples are being collected.

On-site facility laboratories choosing not to be a 2016 TNI Standards accredited (Exempt by 30 TAC 25.6) facility must meet the minimum criteria described in this QAPP and in SW-846 method 8000 for organic analyses and method 7000 for metals. In addition, all laboratories are required to maintain an up-to-date QAM which describes the QA practices of the laboratory. The QC requirements are also discussed further in Section B5. Where specific acceptance criteria are not given, such as for surrogate recoveries, the laboratories are to develop their own criteria and update the limits on at least an annual basis. The limits are reported to the data user in the report QC package and their suitability will be evaluated by the data user.

Table B4.3.1 Analytical Procedures

Parameters	Method
Organics	
Volatile organics (VOA)	8260*
Semivolatile organics (BNA)	8270*
Pesticides/PCBs	8081/8082*
PCBs (emission samples only)	U.S. EPA 1668
Aldehydes/Ketones	8315*
Polychlorinated Dibenzo-p-dioxins/ Polychlorinated Dibenzofurans	8290*
Polycyclic aromatic hydrocarbons (PAHs)	California Air Resources Board (CARB) Method 429
Inorganics	
Alkalinity	2320
Ammonia-N	350.1
Chlorides	300.0/ 9057*
Conductivity	2510
Cyanides	9010/9012/9013*
Nitrate-N	351.1/353.2
Sulfates and Fluorides	300.0/6500/9056* 375.4
Sulfides	9030B/9031/9215*
Total Dissolved Solids (TDS)	160.1
Metals	
Aluminum	7020/6010/6020*
Antimony	7040/7041/6010/6020*
Arsenic	7060/7061/6010/6020*
Barium	7080/7081/6010 6020*
Beryllium	7090/7091/6010/6020*
Cadmium	7130/7131/6010/6020*
Calcium	3500-Ca/7140/6010/6020*
Chromium	7190/7191/6010/6020*

Table B4.3.1 Analytical Procedures

Parameters	Method
Chromium (Hexavalent)	7195/7196/7197/7198/7199*
Cobalt	7200/7201/6010/6020*
Copper	7210/7211/6010/6020*
Iron	7380/7381/6010/6020*
Lead	7420/7421/6010/6020*
Magnesium	3500-Mg/7450/6010/6020*
Manganese	7460/7461/6010/6020*
Mercury	7470/7471/6010/6020*
Nickel	7520/7521/6010/6020*
Potassium	3500-K/7610/6010 / 6020*
Radium-226	U.S. EPA 903.1A/SM7500-RaC
Selenium	7740/7741/7742 / 6010 / 6020 *
Silver	7760A/7761/6010/6020 *
Sodium	3500-Na/7770/6010/6020 *
Uranium	U.S. EPA 200.8/SM7500-UC for drinking water Spectrophotometric Determination of Uranium with 4-(2-Pyridylazo) Resorcinol (PAR)
Vanadium	7910/7911/6010/6020 *
Zinc	7950/7951/6010/6020 *
Hazardous Waste Characterization	
Alkalinity	U.S. EPA 2320B, 310.1
Ignitability	1010B/1020/1030
Corrosivity	9040B/110*
pH	U.S. EPA 9040
Reactivity	SW-846, Chapter 7
Toxicity	1311 followed by appropriate test method procedures

*Test Methods for Evaluating Solid Waste, Physical/Chemical Methods, SW-3rd Edition, as updated

For a complete list of methods for which the Agency offers accreditation, see Fields of Accreditation

B4.4 Analytical Method Modifications

Any modifications to methods can be done in accordance with SW-846 as allowed. A list of all modifications that are acceptable in SW-846 unless otherwise excluded can be found in the analytical checklist instructions found at the back of the QAPP. It is important for the laboratory and regulated community as well as TCEQ staff to understand what can be modified, cannot be modified, and can be modified with U.S. EPA's approval. Basic information concerning the TCEQ method modification application process can be found in the TCEQ regulatory guidance document RG-380, "The Analytical Method Modification Program – How to Apply."

The U.S. EPA expects that some methods in SW-846 will have to be modified to improve method performance for certain target analytes in certain matrices. Such modifications allow acquisition of the most appropriate and scientifically valid data possible for use in determining compliance or non-compliance on the part of a regulated entity. This is the reason why the majority of SW-846 methods were written as guidance rather than mandate. However, other methods are not guidance and are written into the CFR and must be used **without any modification** if results are to be legally and defensibly used to demonstrate compliance for their intended purposes in the RCRA programs. These methods can be found at 40 CFR 260.11.

Modifications to methods and procedures that support the MACT Standards must have prior approval from U.S. EPA. A list of potentially acceptable modifications that are allowed for meeting RCRA compliance according to the U.S. EPA and TCEQ is presented in the instruction sheet of the Analytical Data Report QA/QC Checklist.

B5 QUALITY CONTROL AND ACCEPTANCE CRITERIA

B5.1 Purpose/Background

A program to generate data of acceptable quality will include both a QA component, which encompasses the management procedures and controls, as well as an operational day-to-day QC component. The guidelines for sampling define fundamental elements of such a data collection program.

These guidelines identify the minimum QC components that should be used in the performance of sampling and analyses, including the QC information that should be documented. Data collection should involve:

- The design and planning of a project to achieve the DQOs;
- Implementation of the project plan; and
- Assessment of the data to determine if the DQOs are met.

Guidance is provided to construct QA programs for field work conducted in support of the RCRA and UIC programs.

B5.2 QC Procedures

QA is an integrated system of activities involving planning, QC, quality assessment, reporting, and quality improvement to ensure that a product or service meets defined standards of quality with a stated level of confidence. QC is the overall system of technical activities whose purpose is to measure and control the quality of a product or service so that the product meets the needs of users.

A data set cannot be properly evaluated for accuracy and precision unless it is accompanied by QA data. QA data result from the implementation of QC procedures during sampling and analysis or during the data entry process.

QC procedures that are employed to document the accuracy and precision of sampling and analysis are defined in the following section.

B5.2.1 Field Procedures

The number and type of QC samples collected in the field are dependent upon the types of analyses being performed, on the media being collected, and the intended use of the data. QC samples may include all or some of the following: trip blanks, field spikes, field blanks, equipment blanks, field duplicates, and additional samples for MS and MSDs. Field instruments should be calibrated in accordance with equipment SOPs (available on the OCE FODWEB). The objective for precision of field data collection methods is to achieve and maintain the factory specifications for the field equipment. Field instruments will normally be used for environmental sampling. For pH meters, precision will be evaluated using multiple field measurements. Consecutive field measurements of the same sample should agree within 0.1 pH standard units after the instrument has been field-calibrated with standard National Institute of Standards and Technology (NIST) traceable buffers. Water level indicator readings will be precise within 0.01 foot for duplicate measurements. The organic vapor analyzer (OVA) will be

calibrated each day prior to field use. If calibration readings deviate 15% or more from the concentration of the calibration gas, the instrument will be recalibrated.

The field procedure requirements that are recommended to the regulated community for sampling are in SW-846 and in the Handbook of Quality Assurance/Quality Control (QA/QC) Procedures for Hazardous Waste Incineration for air emissions from facilities that burn hazardous constituents.

B5.2.2 Laboratory Procedures

The QC procedures used by all laboratories for the determination of compliance for the RCRA/UIC program are outlined in each laboratory's QAM and must conform to the 2016 TNI Standards. Permit holders with on-site laboratories exempt from 30 TAC 25.6 (relating to Conditions Under which the Agency May Accept Environmental Data) shall meet requirements specified in this QAPP, WAPs, or other relevant documents or procedures as specified in their permits. All on-site data collection procedures are subject to review by Regional Office investigators as required for the TNI Standards accreditation exemption.

All laboratories must also meet all QC procedures outlined in the analytical method used to meet compliance if more stringent than TNI Standards.

Corrective action procedures used by the laboratories are discussed in each laboratory's QAM. If corrective action does not result in samples being analyzed under in-control conditions, then all affected data must be flagged by the laboratory. For example, if one surrogate is not within acceptance criteria, then the associated data must be flagged. If a matrix spike recovery is not within acceptance criteria, then all samples associated with the same sample matrix type in the batch must be flagged. The description of the failure may be included in a case narrative on the final report of analysis.

The laboratories should generate their own control limits for all laboratory control samples as recommended in SW-846 3rd Edition.

B5.2.3 Specifying Measurement Performance Criteria

The primary goal of this QA program is to ensure the accuracy and completeness of the data that ultimately will be used to determine the status of the sites that are investigated. In order to achieve this accuracy and completeness, it is necessary that all sampling, analysis, and data management activities be conducted in accordance with pre-set standards, and that these activities be reviewed regularly to maintain full compliance with the standards. This program has been designed so that corrective action can be implemented quickly, if necessary, without causing undue expense or delay. The standards and review procedures that TCEQ will use to evaluate accuracy and completeness of data are outlined in this plan. All contractors, subcontractors, and permittees will be required to follow these standards and procedures, at a minimum. All data submitted to the agency or that are required to demonstrate compliance with the RCRA and UIC programs shall be of known quality.

The QA objectives for all measurement data include considerations of precision, bias, accuracy, completeness, representativeness, and comparability. Compliance with the

QA objectives will be judged individually for each site. QC acceptance limits for organic analyses in the RCRA/UIC programs are stated in Tables B5.2.3.1 and B5.2.3.2. These limits represent the quality of QC data necessary to support decision making by TCEQ staff for industrial and hazardous wastes and UIC sample determinations. Data not meeting these QC acceptance criteria should be flagged in the data package with an explanation of problems encountered by the laboratory and a statement of the limitations, if any, on the data due to the problems.

All corrective actions performed in the laboratory or at the direction of TCEQ as a result of data exceeding minimum data quality criteria of the current standard applied to laboratories that are accredited and acceptance criteria designated in this QAPP shall be documented. All records shall be maintained by the laboratory. Data qualifiers are applied when acceptance criteria are not met and corrective action was not successful or corrective action was not performed. Failure to meet QC acceptance criteria in Tables B5.2.3.1 and B.5.2.3.2 does not necessarily mean the data are unusable. Particular care will be taken to review all QC data within the data package for compliance with the RCRA/UIC programs.

The QA objectives that are recommended to the regulated community for analysis of air emissions from facilities that burn hazardous constituents are found in SW-846 or the Handbook of Quality Assurance/Quality Control (QA/QC) Procedures for Hazardous Waste Incineration. The minimum QC procedures that must be followed by the laboratory for the specific sampling and analytical method for each analyte are described in SW-846. QA objectives for the analysis of total organics emissions or particulate distribution are determined on a case by case basis and are facility-specific (see Table B2.2.1 Sample Collection Procedures for Emissions from Hazardous Waste Facilities). While the minimum QC procedures that a laboratory needs to follow are presented in SW-846, other U.S. EPA methods, and the current 2016 TNI Standards, "*The performance data included in these methods are for guidance purposes only, and are not intended to be and must not be used as absolute QC acceptance criteria….*" (See Chapter 2, Paragraph 2 of SW-846). Therefore additional performance standard criteria have been specified in this QAPP.

Table B5.2.3.1 Matrix Spike/Matrix Spike Duplicate Acceptance Limits For Organic Gas Chromatography & Gas Chromatography Mass Spectrometry (GC & GCMS) and Inorganic Analyses

Matrix Spike Compound	Water		Soil/Sediment	
	% Recovery	RPD	% Recovery	RPD
Volatile Organic Compounds				
1,1-Dicholorothene	75-125	20	75-125	20
Trichloroethene	75-125	20	75-125	20
Benzene	75-125	20	75-125	20
Toluene	75-125	20	75-125	20
Chlorobenzene	75-125	20	75-125	20
Semi-volatile organics				
Phenol	70-130	25	70-130	25
2-Chlorophenol	70-130	25	70-130	25
1,4-Dichlorobenzene	70-130	25	70-130	25
N-Nitroso-di-n-propylamine	70-130	25	70-130	25
1,2,4-Trichlorobenzene	70-130	25	70-130	25
4-Chloro-3-methylphenol	70-130	25	70-130	25
Acenaphthene	70-130	25	70-130	25
4-Nitrophenol	70-130	25	70-130	25
2,4-Dinitrotoluene	70-130	25	70-130	25
Pentachlorophenol	70-130	25	70-130	25
Pyrene	70-130	25	70-130	25
Herbicides				
2,4-Diclorophenoxyacetic acid (D)	70-130	25	70-130	25
Silvex	70-130	25	70-130	25
Pesticides				
Gamma-Benzene hexachloride (BHC)	70-130	25	75-125	25
Heptachlor	70-130	25	75-125	25

Matrix Spike Compound	Water		Soil/Sediment	
	% Recovery	RPD	% Recovery	RPD
Aldrin	70-130	25	75-125	25
Dieldrin	70-130	25	75-125	25
Endrin	70-130	25	75-125	25
4,4'-Dichlorodiphenyltrichloroethane (DDT)	70-130	25	75-125	25
Metals				
Aluminum	80-120	20	80-120	20
Antimony	80-120	20	80-120	20
Arsenic	80-120	20	80-120	20
Barium	80-120	20	80-120	20
Beryllium	80-120	20	80-120	20
Cadmium	80-120	20	80-120	20
Calcium	80-120	20	80-120	20
Chromium	80-120	20	80-120	20
Chromium (Hexavalent)	80-120	20	80-120	20
Cobalt	80-120	20	80-120	20
Copper	80-120	20	80-120	20
Iron	80-120	20	80-120	20
Lead	80-120	20	80-120	20
Magnesium	80-120	20	80-120	20
Manganese	80-120	20	80-120	20
Mercury	80-120	20	80-120	20
Nickel	80-120	20	80-120	20
Potassium	80-120	20	80-120	20
Radium-226	80-120	20	80-120	20
Selenium	80-120	20	80-120	20
Silver	80-120	20	80-120	20

Matrix Spike Compound	Water		Soil/Sediment	
	% Recovery	RPD	% Recovery	RPD
Sodium	80-120	20	80-120	20
Uranium	80-120	20	80-120	20
Vanadium	80-120	20	80-120	20

*Each laboratory must establish their own limits but should not exceed the prescribed limits in this QAPP without flagging the data in the data package with explanation in the case-narrative concerning matrix effects, cleanups failed attempts to obtain quality objectives using a different method more suited for the matrix.

Table B5.2.3.2 Surrogate Spike Acceptance Limits For GC and GC/MS Organic Analyses

Surrogate Compounds	Soil/Sediment % Recovery	Water % Recovery
Volatile organics		
1,2-Dichloroethane-d4	75-125	75-125
4-Bromofluorobenzene	75-125	75-125
Toluene-d8	75-125	75-125
Dibromofluoromethane	75-125	75-125
Semi-volatile organics		
Nitrobenzene-d5	70-130	70-130
Terphenyl-d14	70-130	70-130
2-Fluorobiphenyl	70-130	70-130
2-Fluorophenol	70-130	70-130
2,4,6-Tribromophenol	70-130	70-130
Phenol-d5	70-130	70-130
1,2-Dichlorobenzene-d4	70-130	70-130
Herbicides		
2,4-Dichlorophenylacetic acid	70-130	70-130
Pesticides		
Decachlorobiphenyl	70-130	70-130
Tetrachloro-m-xylene	70-130	70-130

These limits are for advisory purposes only. Each laboratory must establish their own limits but should not exceed the prescribed limits in this QAPP without explanation in the data package concerning matrix effects, cleanups, etc., or other problems associated with the sample matrix.

B5.2.4 Proficiency

All laboratories, except those qualifying for exemption under 30 TAC 25.6, must successfully participate in Proficiency Testing (PT) as required by 30 TAC Chapter 25.

B5.2.5 Precision and Replicate (Duplicate) Analysis

The precision of a measurement is an expression of the agreement between multiple measurements of same property conducted under prescribed similar conditions. Precision can be evaluated-by comparing multiple measurements of the same parameter on the same sample under the same conditions. This can be accomplished by analyzing duplicates of an MS and MSD. Precision between duplicates is usually expressed in terms of the relative percent difference (RPD). The RPD can be evaluated both internally (laboratory duplicates) and externally (field duplicates) to the laboratory. For inorganic analytes and metals, the acceptance criteria for precision is an RPD no greater than 20%. The RPD between two results can be calculated using the formula:

$$RPD = |A-B| / [(A + B)/2] \times 100\%$$

where A and B are the results from the duplicate analyses.

B5.2.6 Accuracy and Laboratory Control Samples

The accuracy of an analytical method is the extent to which test results generated by the method and the true value agree. Accuracy can also be described as the closeness of agreement between the value that is adopted, either as a conventional, true or accepted reference value, and the value found.

The true value for accuracy assessment can be obtained in several ways. One alternative is to compare the results of the method with results from an established reference method. This approach assumes that the uncertainty of the reference method is known. Secondly, accuracy can be assessed by analyzing a sample with known concentrations (e.g., a control sample or certified reference material) and comparing the measured value with the true value as supplied with the material. **If certified reference materials or control samples are not available, a blank sample matrix of interest can be spiked with a known concentration by weight or volume.** After extraction of the analyte from the matrix and injection into the analytical instrument, its recovery can be determined by comparing the response of the extract with the response of the reference material dissolved in a pure solvent. Because this accuracy assessment measures the effectiveness of sample preparation, care should be taken to mimic the actual sample preparation as closely as possible.

The primary purpose of the Laboratory Control Samples (LCS) is to demonstrate that the laboratory can perform the overall analytical approach in a matrix free of interferences (e.g., in reagent water, clean sand, or another suitable reference matrix).

Therefore, the LCS results should be used in conjunction with MS/MSD results to separate issues of laboratory performance and "matrix effects."

Measures to assure accuracy of the test method also include calibration and/or continuing calibrations, use of certified reference materials, PT samples, or other measures.

The objective for accuracy of field measurements is to achieve and maintain factory specifications for the field equipment.

B5.2.7 Matrix Spikes and Method Performance

The MS/MSD results are an important measure of the performance of the method relative to the specific sample matrix of interest. The U.S. EPA believes that such a demonstration is an important aspect of an overall QA program, and is particularly important for the RCRA program, where a wide range of different matrices are subject to regulation.

The primary purpose of these MS/MSD analyses is to establish the applicability of the overall analytical approach (e.g., preparative, cleanup, and determinative methods) to the specific sample matrix from the site of interest.

Unfortunately, some may believe that the MS/MSD results can and should *routinely* be used to evaluate performance of an individual laboratory. This was *not* the U.S. EPA's intent in specifying that MS/MSD analyses be performed at a 5% frequency.

The U.S. EPA believes that consistent *trends* in MS/MSD results can be of some use in evaluating laboratory performance, as are trends in surrogate recoveries, LCS recoveries, and other QC data. However, the appropriate use of a *single* set of MS/MSD results is to evaluate *method* performance in the matrix of interest, not to evaluate *laboratory* performance.

Recoveries give valuable information as to the effectiveness of the analytical method for the quantitation of analytes in a particular matrix. Low recoveries may indicate a poor analytical performance or the potential need to select a more appropriate analytical method.

The degree of accuracy and the recovery of analytes to be expected for the analyses of QC samples and spiked samples are dependent on the matrix, method of analysis, and the compound or element being determined.

The acceptance limits for matrix spike/matrix spike duplicate results (for organic and inorganic analyses) can be found in Table B5.2.3.1.

The percent recovery of an analyte can be calculated using the following formula:

$$\% \text{ Recovery} = SSR - SR/SA \times 100$$

where SSR is the spiked sample result, SR is the sample result, and SA is the amount of spike added.

B5.2.8 Sample Representativeness and Blanks

Samples collected that will be analyzed to determine compliance must be representative (e.g., area of interest, medium being sampled, etc.). The U.S. EPA describes a representative sample as a portion of material or water that is as nearly identical in

content and consistency as possible to that in the larger body of material or water being sampled. Assessing sample representativeness is a critical component of any environmental investigation and should be performed before any conclusions are reached. If the samples are not representative, any conclusions or decisions will be incorrect.

Sample collection procedures that support data to demonstrate compliance with RCRA/UIC programs must be consistent with procedures outlined in SW-846 and U.S. EPA protocols.

The type and frequency of blanks are described in the QAPP Glossary and are dependent upon the permit specifications, site, sample matrix, and analytes of interest. The primary purpose of blanks is to allow evaluation of contamination. Comparison of different blank sample results can be used to identify and isolate the source of contamination introduced in the field or the laboratory. Acceptance criteria are defined by the various methods, QAPPs, and data users to support the intended use of the data. A secondary purpose of these blanks is to document proper sample bottle preparation, decontamination, and handling techniques have been employed.

B5.2.9 Comparability

Consistency in the acquisition, handling, and analysis of samples is necessary so the results may be compared with regulatory requirements. Concentrations will be reported in a manner consistent with general practices. Standard U.S. EPA analytical methods and QC will be used to support the comparability of analytical results with those obtained in other testing. Calibrations will be performed in accordance with U.S. EPA or manufacturer's specifications and will be verified at the frequency specified in the methods.

B5.2.10 Completeness

For the U.S. EPA and TCEQ project planning purposes (U.S. EPA R-5) a DQO for completeness is measured as the difference between the planned or proposed amount of samples and/or data and the actual amount collected. A DQO for completeness may state that “90% of the proposed samples must be collected to meet project objectives.”

Completeness of the data is measured as the amount of valid data obtained from the measurement system (field and laboratory) versus the amount of data expected from the system. The data validation will determine the amount of valid data obtained from each site investigation. The specific objective for the completeness of each project will be greater than or equal to 90% for field and laboratory data for each site unless otherwise specified.

Completeness is calculated as a % value. In the equation below, ST is the total number of samples (or data points) collected and SV is the number of samples with a valid analytical report (or total number of possible data points).

$$\% \text{ Completeness} = SV/ST \times 100$$

B5.2.11 Analytical Parameters and Quantitation Limits

Each laboratory's determination of the Limits of Detection (LOD), also known as method detection limits, and Limits of Quantitation (LOQ), also known as practical quantitation limits, will comply with the TNI Standards. For permitted facilities, the LOQ must take into account site-specific samples when determining background data for groundwater monitoring. The LOQ will be the lowest concentration of a target analyte that can be reported with the confidence established by the precision and accuracy limits in this QAPP. For site specific or program specific compliance, analytical parameter quantitation limits will be determined on a per-site or program-specific basis as designated in this QAPP or other reference materials (e.g., TRRP Rule and guidance). Some determination will be made by the responsible party submitting a sampling design plan with concurrence by TCEQ staff conducting the review of the plan. The quantitation limits may vary since they are matrix and analyte dependent.

Laboratories that analyze samples to be used by TCEQ staff or the regulated community for compliance purposes must maintain documentation demonstrating that the analytical methodology used has adequate sensitivity. Unless otherwise specified in regulations or TCEQ guidance, each pollutant of concern must be reported at quantitation levels as low as applicable during normal operating conditions and at levels lower than the appropriate regulatory action levels. The sensitivity of the method may be determined as follows:

- From a method detection limit study performed as defined in 40 CFR Part 136, Appendix B, including Step No. 7 to test for reasonableness of the estimated detection limit;
- From the method quantitation limit, as described in Section 7 of SW-846 Method 8000B, at or below the critical Pollutant Concentration Limits (PCL); or
- By analysis of spiked samples at least 3 to 5 times lower than the regulatory action level that demonstrates compliance by the successful analysis of a sample that contains the analyte of interest at a level below the action level.

It is the responsibility of the sample submitter or regulated entity to provide the laboratory with regulatory action levels so that the reported quantitation limits do not prevent evaluation of regulatory compliance.

B6 INSTRUMENT/EQUIPMENT TESTING, INSPECTION, AND MAINTENANCE

B6.1 Purpose/Background

All equipment, instruments, and other items used in the collection of environmental data must be maintained and tested to verify that it is in proper working condition.

B6.2 Testing, Inspection and Maintenance

New equipment, instruments, tools, gauges, and other items are tested with known standards to determine the acceptability of the equipment. If the new equipment, instruments, tools, gauges, and other items are not acceptable, they are returned for properly working equipment in accordance with agency procedures documented in the Administrative Services Coordinator Manual. Testing, inspection, and maintenance procedures for laboratory equipment must conform or be consistent with criteria in the 2016 TNI Standards.

Equipment, instruments, tools, gauges, and other items requiring preventive maintenance will be serviced in accordance with the manufacturer's specified recommendations and written SOPs developed by the operators.

The contract laboratories are responsible for maintaining and testing their equipment. The procedures used are outlined in each laboratory's QAM or applicable SOPs.

B6.2.1 Schedules

Manufacturer's procedures identify the schedule for servicing critical items in order to minimize the downtime of the measurement system. It will be the responsibility of the operator to adhere to this maintenance schedule and to arrange any necessary and prompt service as required. Service to the equipment, instruments, tools and gauges shall be performed by qualified personnel and be documented. Program managers or designees determine whether acceptance criteria have been met and whether the equipment is adequate and appropriate for use in the field.

In the absence of any manufacturer's recommended maintenance criteria, a maintenance process and schedule will be developed, written, and maintained by the operator based on experience and previous use of the equipment.

A schedule of preventive maintenance is established by each contract laboratory and documented for review by outside investigators.

An inventory check is conducted each month to insure that an adequate reserve of spare parts and supplies is available. Inventory is replenished as needed.

B6.2.2 Records

Logs will be established and maintained to record maintenance and service procedures and schedules. All maintenance records will be documented and traceable to the specific equipment, instruments, tools, and gauges. When equipment, instrument, tools, and gauges are used at the sites and stored at the field offices, records produced will be reviewed, maintained, and filed by the investigator.

The contract laboratories, commercial laboratories, and DSHS laboratory will maintain records for contract, program, and method compliance. These records are reviewed by a TCEQ Laboratory and Quality Assurance assessor within the MD during audits as a condition of accreditation and must conform to record requirements in the 2016 TNI Standards.

B7 INSTRUMENT/EQUIPMENT CALIBRATION AND FREQUENCY

B7.1 Purpose/Background

The accuracy of environmental measurements depends on the proper calibration or standardization of the equipment prior to acquiring data. Instruments and equipment used to gather, generate, or measure environmental data will be calibrated with sufficient frequency and in such a manner that accuracy and reproducibility of results are consistent with applicable specifications. This section describes the procedures and frequency with which field and laboratory equipment shall be calibrated.

B7.2 Instrumentation Requiring Calibration or Standardization

Field equipment such as pH meters, dissolved oxygen meters, explosimeters, OVAs and other field sampling equipment used to make environmental measurements will be calibrated prior to being taken into the field or according to established, written SOPs or manufacturer's recommendations. Only NIST traceable standards (e.g., pH buffers) or equipment (e.g., thermometers) will be used for calibration when available.

All laboratory instruments will be standardized using NIST traceable standards. Other laboratory equipment such as balances and thermometers shall be calibrated against NIST traceable weights and thermometers.

B7.3 Calibration Methods

Field instruments and equipment will be calibrated according to the manufacturer's instructions, which at a minimum will include calibration prior to use. Laboratory instruments and equipment will be calibrated according to the manufacturer's instructions and standardized according to the analytical methods as described in SW-846 or other equivalent approved methods and each laboratory's QA Manual or SOP. Calibration methods specific for measuring air emissions are found in Quality Assurance Handbook for Air Pollution Measurement Systems: Vol III: Stationary Source Specific Methods, Interim Edition.

B7.4 Calibration Standards

Standards used for the calibration of field instruments will be, when available, traceable to certified standards or reference material. Laboratory equipment will be calibrated or standardized against NIST traceable reference materials and standards. Documentation of the certificate of analysis and traceability of the standards and reagents will be maintained by the field investigator or laboratory personnel.

B7.5 Calibration Frequency

Calibration of field instruments and equipment will be performed at approved intervals as specified by the manufacturer or more frequently as conditions dictate. Calibrations may also be required to be performed at the start and completion of each test run. Records of calibration, repair, or replacement will be filed and maintained by the designated field office staff.

Calibration and standardization of laboratory equipment will be based on procedures described in each contract laboratory's QAM and/or SOPs. It is the responsibility of the data validators to ensure that the proper calibration protocols were used.

Records of calibration, repair, or replacement will be filed and maintained by the designated laboratory personnel performing QA activities in accordance with requirements. Calibration records will be filed and maintained at the laboratory location where the work is performed and will be subject to review by a TCEQ MD laboratory inspector during a scheduled QA audit.

In addition all instrument/equipment calibration and frequency procedures must conform to or be consistent with criteria in the 2016 TNI Standards.

B8 INSPECTION/ACCEPTANCE OF SUPPLIES AND CONSUMABLES

B8.1 Purpose

This section describes the supplies and consumables that are critical to the quality of the project and the criteria used for accepting/rejecting the supplies. This section applies largely to TCEQ personnel.

The inspection/acceptance of supplies and consumables by regulated laboratories and contract laboratories must be described in each laboratory's QAM.

B8.2 Critical Supplies and Consumables

The consumables that directly affect the quality of the data are the collection devices, reagents, reagent dispensers, and containers used to store the samples for analysis. Collection devices, reagents, reagent dispensers, and containers are obtained from vendors through the normal procurement procedures referenced in Section 4 of the TCEQ QMP. Containers are also supplied by the contract laboratories and must meet the criteria described below.

B8.3 Acceptance Criteria

The most important factors to consider when choosing containers for hazardous waste samples are compatibility, resistance to breakage, and volume. Containers must not melt, rupture, or leak as a result of handling or chemical reactions with the samples. Containers with wide mouths are preferable. Also, the containers must be large enough to contain the required volume of sample.

The plastic containers recommended for use by TCEQ personnel are constructed of linear polyethylene with a polypropylene cap. These containers should be purchased in 1 liter and 5 liter sizes. They should be used to collect and store aqueous samples which do not contain oily residues, pesticides, or halogenated hydrocarbons.

Glass containers are inert to most chemicals and can be used to collect and store all hazardous waste samples except those that contain hydrofluoric acid or strong alkali. Wide mouth 1 liter jars and 40 mL volatile organics analysis (VOA) vials are recommended. These are provided with a rigid plastic or metal cap and a Teflon liner. The VOA vials are used to collect samples for analysis of volatile organics or very concentrated hydrocarbon samples which are to be analyzed by GC or GC/MS. The 1 liter glass jars are used to collect samples containing semi-volatile organic compounds or halogenated organic compounds to be analyzed by GC and GC/MS.

The containers must be cleaned and unused. In some cases, the containers are pre-rinsed with a solvent or acid. Field blanks, prepared in the laboratory with laboratory pure water (containers opened to air), are collected to determine whether contamination from the sampling site has occurred. Equipment blanks are collected to evaluate contamination from the sampling equipment.

Reagents and their dispensers will be tested for contaminants on a periodic basis and records of the testing will be maintained on-site for inspection purposes. If the reagents do not meet the laboratory standards for purity, they must be returned to the seller, disposed of, or where available purified (e.g., by filtering, distillation, etc.).

B9 NON-DIRECT MEASUREMENTS

B9.1 Purpose

The objective of this section is to identify types of data needed for project implementation and/or decision making that is obtained from non-measurement sources such as computer databases, spreadsheets, programs, and literature files. Prior to evaluation of the data, the acceptance criteria for the use of the data in the project should be defined, and any limitations on the use of the data resulting from uncertainty in its quality should be discussed.

B9.1.1 Permitting

The permit coordinator reviews and may use data from regulatory sources (e.g., emission limits from 40 CFR Part 266).

B9.1.2 Corrective Action Program

Corrective Action project managers review and evaluate site assessment, remediation, and closure data submitted by the regulated community or the data supplier. Corrective Action project managers use state and federal rules and regulations (40 CFR Parts 260-270, 30 TAC Chapters 335 and 350); various guidance documents such as SW-846, *RCRA Corrective Action Plan*, Final U.S. EPA 520-R-94-004, May 1994; TRRP guidance documents; approved work plans and reports; and applicable permits/compliance plans and agreed orders to review the data and to determine if the data supplier has documented representativeness, lack of bias, precision, and identification of qualifiers, and has included an adequate summary of sample data.

B9.1.3 Registration and Reporting

The major TCEQ database for the storage of facility information is the Permitting and Registration Information System (PARIS). PARIS contains information on all registered generators, transporters, receivers, and permitted storage facilities of hazardous waste. This is maintained daily with new and updated information from PARIS being sent to the RCRAInfo database. The goal of the TCEQ is to have the two databases be equal for all the data elements that they share. IHW Permits Section and the UIC Permits Sections haves access to PARIS so that they can update facility information on permitted units and update certain permit related information that both IHW Permits and UIC Permits Section have access to change. This data is available to Regional Offices, ENF, and REM.

B9.1.4 UIC Permit Compliance Data

Regional Office and CID UIC staff enter information into CCEDS for compliance purposes as designated by the regulated facility's permit requirements. CCEDS also contains information that is used to generate 7520 semi-annual and annual reports to the U.S. EPA. CCEDS tracks mechanical integrity testing, facility addresses, investigations, and well workovers. UIC Permits Section staff maintain the UIC injection well inventory, facility background (site specific), injection volumes, and permitting data in IDA. CCEDS is used by the regional office and CID UIC staff for reporting purposes.

B10 DATA MANAGEMENT

B10.1 Purpose/Background

The objective of this section is to describe the project data management scheme, tracing the path of the data from generation in the field or laboratory to final use or storage (refer also to A9 - Documents and Records and C2 - Reports to Management). The areas within the agency that may be evaluated for compliance with program SOPs or data needs depending on specific program needs are as follows:

- The standard record-keeping procedures, document control system, and the approach used for data storage and retrieval on electronic media;
- The control mechanism for detecting and correcting errors and for preventing loss of data during data reduction (e.g., calculations), data reporting, and data entry to forms, reports, and databases;
- All data handling equipment and procedures used to process, compile, and analyze the data, including the procedures for addressing data generated as part of the project as well as data from other sources; and
- Any required computer hardware and software, specific performance requirements for the hardware/software configuration addressed, and procedures that will be followed to demonstrate acceptability of the hardware/software configuration.

B10.1.1 Regional Offices

Even when accepted protocols are followed in collecting and analyzing environmental samples, a potential for loss of data quality arises in the manipulation and reporting of the data. However, certain procedures are designed to minimize the chance of errors related to number handling.

The COC that accompanies each set of samples to the laboratory has a space dedicated to recording observations. The field investigator has primary responsibility to ensure that all pertinent information is recorded correctly, and in the proper units. There are also sample information forms and request for analysis (RFA) forms (Waste RFA Forms A- D 3/15/99, available on OCE FODWEB), which may be attached to the COC. The information forms have room to record field data and other observations.

The field investigator will take field notes at the time of sampling to aid in describing the COC information regarding samples collected in the field. The field notes are completed in the field, and include the COC record number and associated sample identification numbers. Information recorded in the field is entered onto the final report with the sampling results attached to the report and then reviewed by a team leader or section manager prior to final approval noted in CCEDS.

B10.1.2 Laboratory of the Water Quality Planning Division

Laboratory personnel validate the analytical data by comparing the various QC measurements against method specifications, SOPs or specific project plan or program requirements, and by recalculating a random selection of the results produced by each analyst submitting data.

The potential for human error is high during the transfer of data from laboratory work sheets into a LIMS, onto data entry forms, and while being entered into the system of record. It is imperative that all data entered manually be written legibly with special care to maintain the decimal in its proper location. The laboratory utilizes automated data entry as much as possible thus minimizing transcription errors. Each phase of data generation and handling should have routine independent checks made on data transfer on a 10% basis as a minimum. The appropriate section manager will assume responsibility that this task is completed. Whenever errors are noted, laboratory staff will take the appropriate corrective action and document all actions.

Whenever reported data are reduced in size, it is essential that proper rules for modifying official data be followed. Common tables of conversion factors and rules for significant figures will be used.

The WQPD routinely stores all completed COC records and sample reports at the Sugar Land Laboratory. These files are retained and archived for 5 years as specified in the TCEQ retention file schedule and in accordance with 2016 TNI Standards.

The laboratory must maintain files on all QA verification for 5 years and contract laboratories must retain files of all QA verifications for a minimum of 5 years. These files must be readily available for inspection.

The procedures for reporting of analytical results will depend upon which laboratory conducts the analysis. For analyses performed at the TCEQ laboratory, the results are entered into a LIMS. Copies of the results are then sent directly to the sample collector. At the contract laboratories, hard copy reports are generated from the LIMS. These results are sent to TCEQ central office, Regional Offices, and a copy of the report is forwarded to the collector.

Procedures for records storage, control, and retrieval are contained in the TCEQ OPP Section13.2 - Records Management and also noted in Section 5 of the TCEQ QMP.

B10.1.3 Permitting

Data management activities from generation of data in the field or laboratory to the reporting of the data in a trial burn/risk burn report are the responsibility of the regulated community (data suppliers).

When TCEQ determines that a multi-pathway risk assessment is necessary for a hazardous waste combustion facility, the regulated community will use the data from the trial burn/risk burn report to conduct a comprehensive risk assessment. The potential for human error is high during the transfer of data from the trial burn/risk burn report to the risk assessment model spreadsheets. It is imperative that all data are entered correctly with special attention to maintaining the decimal in its proper location.

Each phase of data handling should have routine independent checks made on data transfer. The appropriate TD project manager will assume responsibility that this task is completed.

Whenever reported data are reduced in size, it is essential that proper rules for modifying official data be followed. Common tables of conversion factors and rules for

significant figures should be used. Reduced data should be identified as such to prevent confusion since the reduced data may inadvertently indicate a violation of analytical or physical measurement methodology.

B10.1.4 Corrective Action Program and Industrial and Hazardous Waste

The Corrective Action project manager is a data user. He or she reviews and evaluates site assessment, remediation, and closure data submitted by the regulated community or the data supplier. The cleanup status of permitted facilities or facilities that were cited for a permit violation and are conducting corrective action under an order in the Corrective Action Program is recorded in IDA and updated in the RCRAInfo database. The IHW Permits Section in WPD is responsible for final evaluation and closure of permitted units. The data are available to the U.S. EPA for pulling into various report formats as needed. Information in the database demonstrates TCEQ corrective action compliance with the TCEQ PPG. Data management activities are handled by Corrective Action staff except for final closure of permitted units which is handled by HW Permits staff in WPD.

B10.1.5 Registration and Reporting

Data regarding the generation or receipt of waste is entered into the PARIS database. If a discrepancy or deficiency is identified, the responsible party (e.g., generator or receiver) is sent a resolution notice. The discrepancy or deficiency is addressed before the data is considered complete.

B10.1.6 UIC

UIC staff from CID, RMD, PSEAD, and Regional Offices enters data into databases for their individual areas of responsibility within the UIC program. The databases are used to track compliance activity, information on permitted facilities, and waste disposal information. The CID UIC staff compiles UIC investigations and MIT data, including enforcement actions from CCEDS into 7520 semi- annual and federal fiscal year annual reports to the U.S. EPA in coordination with RMD, UIC Permits Section. The RMD, UIC Permits Section generates the calendar year annual narrative reports submitted to the U.S. EPA under 40 CFR Part 144.8 (b) in coordination with CID UIC staff. The data in Central Registry is peer reviewed after entry by UIC staff (Appendix B). Errors found are corrected immediately. UIC Permits staff enters site-specific, permit and waste disposal information into IDA and PARIS databases for permitted facilities.

B10.2 Contract, Commercial and On-Site Laboratories

Data management procedures must be described in each laboratory's QAM (or other SOPs or documents however named) according to the 2016 TNI Standards if they are an accredited laboratory analyzing samples to demonstrate compliance to the RCRA/UIC programs. Permittees with their own on-site laboratory must meet data management procedures described in their permits. Data management procedures must be made available to Regional Office investigators upon request and should be consistent with the 2016 TNI Standards referenced in 30 TAC Chapter 25.

C1 ASSESSMENTS AND RESPONSE ACTIONS

C1.1 Purpose/Background

The purpose of this section of the QAPP is to ensure that all elements of sampling, analysis, and data reduction and collection are completed as planned. This will be accomplished through a system of internal and external checks such that:

- All elements of the QAPP are implemented as described;
- The quality of the data generated by implementation of the QAPP is adequate; and
- A corrective action plan is in place if unforeseen circumstances force a deviation from the plan.

Assessment and response action records will be maintained and made available for review by the program area that performed the assessment in accordance with applicable SOPs, guidelines, or processes; or for a period of five years after the expiration of the QAPP under which they were performed.

C1.2 Assessment Activities and Project Planning

- Laboratory Audits - Performed by the Accreditation Work Group of MD and LDEQ once before accreditation is issued and once every 2 years thereafter, unless interim accreditations are issued;
- TCEQ technical peer review process - May include RCRA or UIC issues as they relate to new technology, high profile issues, rules, policy, guidance, processes with major revisions or as the need arises as determined by the manager;
- QA reviews of investigation reports - Quality review of each RCRA investigation report generated by the TCEQ Regional Offices is conducted by that Regional office before the report is submitted to the central office. Some UIC investigation reports are generated and reviewed by UIC staff in the Regional Offices; quality review of the UIC investigation reports related to the Uranium Recovery sites is conducted by CID management before the report is sent to the TCEQ Central Record.
- Enforcement Action Requests (EAR) - Peer reviews for RCRA/UIC cases are completed to determine if violations are properly documented, which type of enforcement action to pursue, which type of violator and which priority of enforcement action is appropriate in accordance with the TCEQ ENF SOP. The SOP includes the EIC, the penalty policy and standard documents used for formal enforcement action;
- QC review of enforcement documents - Quality review of each enforcement document including orders, technical requirements, and penalty calculation worksheets for RCRA/UIC cases is conducted by ENF staff. All documents are completed and checked in accordance with the TCEQ ENF SOPs;
- Program Audits - Annual reviews of the permitting, and data entry functions are conducted by the IHW RCRA QA Specialist and Lead RCRA QA Specialist or team leader or other management staff as designated on Table C1.2.1. – Documentation of Assessments for WPD. After each review, the IHW RCRA QA Specialist and RCRA QA Coordinator or other assessment staff completes a report of the findings and any corrective action needed to correct all deficiencies and submits the report to the audited section manager, and deputy director. Verification that corrective action has been taken

on the negative findings is achieved during the next audit; and

- TCEQ Field Investigators -An environmental investigator (EI) II will be accompanied by a senior investigator or manager for on the job training as needed. EI II, EI III and EI IV will be accompanied o an investigation at least once a year by either an EI V, work leader, team leader, or section manager as part of their ongoing work evaluation. CID investigators are accompanied on investigations once a year by the work leader, section manager, or other qualified staff. Investigators' assessment and evaluation processes are performed by work leader, team leader, or section manager during UIC permit investigations and/or Radioactive Material License investigations. Corrective actions needed are discussed at the time of the investigation. Implementation of the corrective actions by the permittee may occur at the time of investigation and verified by the investigator. Otherwise, verification of the Permittee's corrective actions occurs at the next investigation. CID inspects the on-site laboratories at uranium recovery sites and other radioactive material sites as applicable and required every 3 years (§25.6, Subchapter A). Results of the investigation accompaniments are to be documented and placed in the investigator's personnel file.

Table C1.2.1 Documentation of Assessments

Type of Assessment	Number and/or Frequency	Assessment Personnel	Schedule	Reporting and Resolution
Laboratory Audits	Eight contract laboratories, agency lab and unknown number of commercial laboratories applying for accreditation	MD Accreditation Work Group Staff; LDEQ (for Sugar Land Laboratory)	Once before accreditation is issued and once every 2 years thereafter, unless interim accreditation is issued	Technical Report of audit produced and letter sent to laboratory notifying of findings. Follow-up conducted to confirm resolution of issues.
Quality System Audit	Biennially	Agency QA Specialist	No set schedule	Audit report sent to IHW QA Specialist and Lead RCRA QA Specialist, affected Section Manager(s) and Deputy Director
Peer Review of specified technical issue	As needed	Specified by Manager	No set schedule	Final document reported on Technical Peer Review Document
Quality Assurance Review	100% of RCRA investigation reports	Region Office Waste Section Manager	Within 45 days of the investigation date	Maintained by Region Office Program Manager
Quality Control Review	100% of Enforcement Action Request submitted (EAR)	Enforcement ENF Staff and Management	Within 15 days of receipt of report from Regional Office Staff	Section 7i of the EAR
Program Audit Completeness Review	One Class 1, or Class 1ED and one Class 2 modification as	IHW QA Specialist and Lead QA	Annual review	Report sent to RCRA Project Manager, Section Manager and

Table C1.2.1 Documentation of Assessments

Type of Assessment	Number and/or Frequency	Assessment Personnel	Schedule	Reporting and Resolution
	needed	Specialist		Deputy Director
Program Audit Completeness Review	One major permit's amendments or new permit reviewed for completeness as needed	IHW QA Specialist and Lead RCRA QA Specialist	Annual review	Report sent to RCRA Project Manager, Section Manager and Deputy Director
Program Audit Completeness Review	5% of all nonhazardous waste determinations as needed	Technical Analysis Team (TAT) in WPD	Annual review	Report maintained by TAT and available upon request
Program Audit Completeness Review	1 Class 3 Permit modification as needed or approved by WPD Deputy Director	IHW QA Specialist and Lead RCRA QA Specialist	Annual review	Report sent to RCRA Project Manager, Section Manager and Deputy Director
Program Audit Completeness Review	1 Trial Burn/Risk Burn reviewed as needed or approved by WPD Deputy Director	IHW QA Specialist and Lead RCRA QA Specialist	Annual review	Report sent to RCRA Project Manager, Section Managers and Deputy Director
Program Audit Completeness Review	5% or 1 UIC inspection report as needed	RMD/OCE QA Specialist	Annual review	Report sent to UIC Project Manager, Section Manager and Deputy Director
Investigator Inspection Assessment	EI I & II - 4/year EI III & IV - 2/year	Regional Office Investigator Staff EI V and Team Leaders	Set by reviewing staff	Comments drafted with plan of action (if necessary), and filed in personnel files in Regional Offices
Investigator Training Assessment	All Investigators	Team Leaders in Regional Offices	Annually	Staff deficient in training will be sent to needed training as the budget allows

C1.3 Reporting and Resolution of Issues

Findings of procedures and practices which do not conform to the QAPP require timely corrective action. Corrective action for laboratory issues may be initiated by the PSEAD or Regional Offices, the RCRA QA Specialist, laboratory staff and management, data reviewers and all other data users using procedures outlined in SW-846 and all other project specifications (e.g., references) designated in this QAPP, if and when variances from proper protocol are noted. Project managers, team leaders, and laboratory managers are responsible for ensuring that required corrective actions are completed. It is the responsibility of the regulated entity (e.g., permittee) to accurately convey their data needs to the laboratory for the analysis of samples to demonstrate regulatory compliance or waste classification.

Examples of variances which require corrective action may include but are not limited to:

- Equipment failure;
- Excursions from precision and accuracy control;
- Samples arriving at the laboratory with incomplete COC or with sample integrity in doubt;
- Samples arriving with insufficient preservation (e.g., at room temperature);
- Samples lost in transit or in laboratory accidents;
- Failure to meet acceptance limits when analyzing U.S. EPA QA study samples;
- Reporting data in wrong units;
- Calculating data by wrong formula; and
- Incomplete documentation.

For the regulated community meeting compliance, field corrective procedures are described in individual facility QAPPs (i.e. hazardous waste). The individual QAPPs are submitted prior to a facility's Comprehensive Performance Test (CPT), which is a performance demonstration. There are very strict federal rules under which these are conducted. These tests are performed to verify permitting limits and to make sure the equipment is working properly.

Laboratory corrective actions defined in the facility QAPPs include: repair or replacement of faulty equipment; reanalysis of samples and standards; checking reagents for proper strength; request for resampling; or contacting the TCEQ project manager or RCRA or UIC Program RCRA Lead QA Specialist for advice. Unique problems which cannot be corrected by the procedures listed above will require corrective actions to be defined when the need arises.

Corrective action for work conducted in the office could include: notifying the appropriate supervisory personnel, sending personnel to training, modifying and/or developing SOPs or checklists, reevaluating decisions or contacting TCEQ project/program managers or RCRA/UIC Program RCRA Lead QA Specialist for advice. Unique problems which cannot be corrected by the procedures listed above will require corrective actions to be defined when the need arises. Corrective action reports will be developed according to Section 10 of the TCEQ QMP, and the effectiveness of corrective actions will be verified.

C1.4 Laboratory Assessments and Corrective Action

Requirements for laboratory assessments and corrective action procedures must be included in each laboratory's QAM. Assessments should be at a type and frequency as required by the 2016 TNI Standards and should be documented accordingly. Corrective action procedures should be defined, implemented, and documented.

C2 REPORTS TO MANAGEMENT

C2.1 Purpose/Background

TCEQ reports to management provide a structure for apprising management of the status of projects, deviations from approved QA and established standards and uncertainties in decisions based on the data.

C2.1.1 Frequency, Content, and Distribution of Reports

- Investigation Reports – PSEAD creates weekly progress reports of work plan attainment and distributes the reports to Area Directors. The reports are based on investigation information from the CCEDS database. Summary reports are distributed to the Area Directors, and Regional Office management each month for review of progress in investigation activity. For UIC investigations and enforcement, semiannual and federal fiscal year 7520 reports are generated by CID in coordination with RMD, UIC Permits Section. For semi-annual report Forms 7520 - 2A (Compliance Evaluation) and 7520 - 2B for (Significant Non-Compliance) and Part 4 (Quarterly Exceptions List) are included. The federal fiscal year report consists of a complete Form 7520, which in addition to the sections above, includes Form 7520-1 (Permit and Area of Review) and Form 7520 - 3 (Mechanical Integrity Testing). The semi-annual and the federal fiscal year reports are reported to the U.S. EPA Region 6 and EPA headquarters using EPA's web-based application for UIC Data Collection;
- Monthly enforcement report to the Commission: The number of formal actions initiated for the month sorted by program (e.g., IHW, UIC, air, municipal solid waste etc.), number of agreed orders adopted by the Commission, amount of penalties assessed, deferred, or SEP value, number of cases resolved, number of cases being developed, cases being tracked for compliance, NOVs issued by region and central office, number of pending actions for administrative order by the TCEQ, number of cases pending at the Attorney General's Office, number of judgments, number of cases referred for formal enforcement action;
- Corrective Action Program Activities - End of year RCRA report is provided to EPA R6 demonstrating programmatic progress including the achievement of commitments for corrective action regarding the 2020 GPRA baseline facilities.
- Quarterly report to the State of Texas Legislative Budget Board regarding the timeliness and number of permits issued, percentage of corrective action facilities closed, new system waste stream evaluations, and notice of deficiency letters sent for corrective action proposals is compiled by the budget analyst of each applicable division; and
- Corrective action reports will be distributed according to Section 10 of the TCEQ QMP.

D DATA VALIDATION AND USABILITY

For the purposes of the QAPP, TCEQ defines and applies practices and procedures based on U.S. EPA QA/G-8, Guidance on Environmental Data Verification and Data Validation (U.S. EPA240R-02/004). A primary goal of the TCEQ is to ensure that environmental programs and decisions are supported by data of the type and quality needed and expected for their intended use. This data may be used to support remediation activities, waste classification, compliance to the MACT Standards, and groundwater monitoring activities to name a few. Please refer to the Glossary for definitions of data validation and data verification.

Data validation is an integral part of quality management in the TCEQ. The data review, validation, and verification procedures described in this section will ensure: (1) complete documentation is maintained in accordance with Section B10 of this document; (2) transcription and data reduction errors are minimized; (3) the data are reviewed with results documented; and (4) the reported results are qualified if necessary. Laboratory data reduction and verification procedures are required to ensure the overall objectives of analysis and reporting meet method and project specifications.

All laboratory data reduction procedures must be described in each laboratory QAM and/or SOPs and conform or be consistent with the 2016 TNI Standards.

D1 DATA REVIEW, VERIFICATION, AND VALIDATION

D1.1 Purpose/Background

Data review, verification, and validation are key steps in the transition from sampling and analysis to the assessment of the data. This section describes some data verification and validation practices that are used to promote common understanding and effective communication among environmental laboratories, data validators, and users.

Data verification is primarily an evaluation of performance against pre-determined requirements given in a document such as an analytical method procedure or a contract (e.g., permit). Data validation, on the other hand, centers on particular data needs for the program, as stated in this QAPP and other referenced documents where applicable.

Staff of the PSEAD, Regional Offices, REM, CID, IHW Permits Section of the WPD and UIC Permits Section of the RMD, are data users. These data users are the program staff authorized to determine the compliance status of the data supplier, and the regulated community. Program staff review and evaluate assessments, remediation activities, and closure activities submitted by the data supplier. In the review process, program staff will evaluate the data to ensure that:

- Representative samples were collected from the appropriate environmental media during investigation and/or remediation activities;
- Sample collection procedures followed during investigation and/or remedial activities are compliant with all approved work plans, permit provisions, enforcement order provisions, and the applicable federal and/or state guidance documents;
- Sample handling procedures (e.g., COC records) were properly completed and document the condition of samples during the preparation, packing, transportation and analysis process. The data supplier shall be responsible for reporting and correcting all sample handling procedures that deviate from the approved DQOs and/or other project-specific requirements;
- Analytical methods used to evaluate samples collected during investigation and/or remediation activities provide the appropriate level of accuracy required to meet all formal and/or informal DQOs. All deviations from the acceptable criteria and potential impacts affecting the usability of the data shall be reported by the data supplier;
- QC checks are performed and necessary corrective actions have been taken. Program staff will review the data supplied to ensure compliance with the formal and/or informal DQOs stated in all approved work plans, permit provisions, enforcement order provisions, and the applicable federal and/or state guidance documents;
- Proper calibration of instrumentation and equipment are performed. All calibration problems, corrections, and associated impacts on the quality of environmental data shall be clearly and accurately reported by the data supplier for evaluation; and
- Data reduction and processing is performed by the data supplier prior to submittal for review by staff.

D1.1.1 IHW/RMD Permits

Staff of IHW Permits Section in the WPD and UIC Permits Section in the RMD are data users. In order to effectively evaluate an analytical data set, the data user must at least have a general overview of the sample results or data set that is in question. An analytical checklist (Table D.1.2) will be used by the permittee/laboratory to certify the type and quality of the data. TCEQ staff will then use the checklist to verify what has been submitted and validate the intended use of the data. A laboratory case-narrative (LCN) must be used to describe the information needed for a general overview of the QA/QC by the data user. This information can be derived from an in-depth review of the data. At a minimum, problems in QA/QC such as sample matrix, dilutions of the matrix, inadequate sample volume for analysis or re-analysis, sample container condition, sample temperature, sample preservation, and unusual events should be discussed within the LCN. The LCN is required for all analytical data submitted to this group for laboratories demonstrating compliance to permit requirements.

IHW Section also provide a checklist (Table D1.3) to assist IHW permitted facilities which are subject to the groundwater detection monitoring to prepare annual reports to be submitted to the TCEQ.

IHW staff or their contractors or permittees will review environmental data submitted for QA/QC validation by use of standardized check lists and procedures developed in the section. Staff review trial burn/risk burn reports to document if DQOs outlined in the company's QAPP that was submitted in the trial burn/risk burn proposal were achieved.

The following reference documents may be utilized by the data reviewer during the data review/validation process: U.S. EPA Technical Implementation Document for U.S. EPA's Boiler and Industrial Furnace Regulations, U.S. EPA A530-R-92-011, SW-846, *U.S. EPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review* (OSWER 9240.1-45, U.S. EPA, 540/R-04-004, October 2004), and the *U.S. EPA Contract Laboratory Program National Functional Guidelines for Organic Data Review* (U.S. EPA 540/R-99-008 , October 1999).

D1.1.2 IHW Permits Section

The explanation portion of the analytical check sheet has guidance on how to assess the quality of the data. The analytical check sheet is used to document data quality outside of performance goals with respect to MS/MSDs, surrogate recoveries, internal standards or highly contaminated samples to name a few. Data is rejected on a case-by-case basis by the reviewer based on best professional judgment.

D1.1.3 Corrective Action Program

For the Corrective Action Program, the person complying with the requirements of TRRP rule is responsible for the quality of the data, as specified in 30 TAC §350.54(a).. The TCEQ guidance *Review and Reporting of COC Concentration Data under TRRP* (RG-366/TRRP-13) provides procedures the person must follow to document the quality of the data. Corrective Action project managers review the project and laboratory data (including reportable data, laboratory review checklists, and exception reports) and the data usability summary to verify the reporting requirements are met,

the quality of the data is known and documented, and the data are usable for making compliance determinations.

D1.1.4 Regional Offices

Problems with potential limitations of the data are handled at two different levels: (1) at the time of audit or calibration of field samplers by the field investigators, who have prime responsibility for routine field audits and calibrations; and (2) by users of data, such as the IHW/UIC Permits staff who may question or want to verify the DQOs with QA staff at a later date after data is processed. Issues are reconciled at the lowest level and earliest time possible.

The appropriate Regional Office manager and/or field investigator are empowered to review and question any part of the measurement process and may initiate data reviews and corrective actions to bring the process back into compliance. To assess the quality of the data, the precision, accuracy and completeness will be assessed in comparison to the DQOs as discussed in Section B5 when DQOs have been formally established.

D1.2 Delineation of Laboratory Responsibility and Checklists

All laboratory operations subject to TNI Standards, as well as on-site laboratories qualifying for an exemption under 30 TAC Chapter 25.6, are expected to generate data of known and documented quality and maintain the quality systems required to generate quality data.

All data sets submitted to the TCEQ WPD in the OPR should contain a completed copy of the Laboratory Data Report QA/QC Checklist (Table D1.2). This checklist will be used by WPD Permits Section staff to verify minimum data quality completeness, correctness and compliance against method references and other requirements listed in this QAPP. In addition, the laboratory must also provide comments in the LCN that describe in detail any problems encountered in the processing of the samples within the analytical data set in question. Comparable laboratory checklists will also be accepted as long as they meet all required elements, a certified statement attesting to the known quality of the data and a LCN. Refer to the Laboratory Data Report QA/QC Checklist (Table D1.2).

All data sets submitted to the TCEQ regarding remediation action according to 30 TAC Chapter 350 must include a TRRP laboratory review checklist completed by the laboratory and reviewed by the data reviewer to ensure the quality of the data is known, documented, and acceptable for its intended purpose. The laboratory review checklist is comparable to an LCN. Once a person has been referred to the TRRP, the person must comply with all requirements of the adopted rule unless otherwise stated in another agency rule or unless a federal standard or state statutory requirement is more stringent.

D1.2.1 Reporting QA/QC Results

The LCN should provide a clear explanation of each failed precision and accuracy measurement determined to be outside of the method control limits of the QA/QC criteria. Precision and accuracy determinations should be clearly presented with all

results calculated. How the consequences and limitations of the QA/QC failure affect the results should also be included within the LCN.

D1.2.2 Summary Paragraph

The LCN review should include comments that clearly identify the problems associated with the sample results and state their limitations, when compared to the analytical methodology listed within the U.S. EPA Test Methods for Evaluating Solid Waste, SW-846, or other TCEQ approved analytical methods.

D2 VERIFICATION AND VALIDATION METHODS

D2.1 Purpose/Background

To further clarify the respective roles of data verification and data quality assessment or data suitability, the following example from U.S. EPA QA/G-8 (Guidance on Environmental Data Verification and Data Validation (U.S. EPA240R-02/004) has been taken:

> As part of a site characterization soil sampling program for evaluating a potential remediation project, silver is a metal of interest. After samples have been collected, analyzed, and the results reported, the data is submitted for data verification. The data verification process documents that silver recoveries for spiked samples fell below control limits. The data validation process traces the cause for the non-conformance to an elevated pre-spike sample concentration. The data validator notes that the laboratory control samples all have recoveries within criteria, and other spiked samples have recoveries within criteria, and the field duplicate results have significant variability. The data validation process determines that the low silver recovery is a result not of analytical bias, but of the heterogeneity of the matrix. The data quality assessment process considers the fact that all soil samples have silver concentrations below the action limit for the site by a factor of two or more, and therefore the data quality is adequate for the purpose of site characterization with the matrix variability noted on appropriate documentation.

Data validation can be performed in a laboratory (*An exception is compliance data submitted under TRRP*) by staff independent of the data generation or by an independent third party submitting compliance data under this RCRA/UIC QAPP. This validation ensures that all users can verify that decisions made using this data are supported by the type of data and quality needed and expected for their intended use. This validation is documented on the checklist provided at the end of this QAPP.

When compliance data is submitted under TRRP, the laboratory reviews the data for technical compliance to the method and laboratory SOPs. The laboratory then documents the outcome in the laboratory review checklist and data package. The laboratory review checklist and data package are then reviewed and, when warranted, validated by a party independent of the laboratory to determine if the data meet the project objectives and are usable for making project decisions. The outcome of the data review and, if performed, the data validation is documented in the data usability summary included in the assessment report.

Due to the variety of data uses and varying compliances to demonstrate compliance according to federal and state rules, not every laboratory analysis will involve the same degree of data validation and verification. For example, for permitted sites, with on-site laboratories, data verification may be predominantly an internal function of the field or laboratory staff to assure they are producing appropriate outputs according to their permits.

While field or laboratory staff verifies data in “real time” or near real time, TCEQ staff will perform external data verification after receipt of a completed data package

(checklist and case-narrative) where all appropriate steps producing verification documentation are reviewed for completeness, factual content and against RCRA/UIC Program/Permit specifications.

D2.2 Implementation of Validating and Verifying Data

Staff of the Corrective Action Program of the REM, IHW Permits Section of the WPD, UIC Permits Section of the RMD, Registration and Reporting Section of the OLRD, CID, MD, PSEAD, and Regional Offices are data users. These data users are the program staff authorized to determine the compliance status of the data supplier, or the regulated community. Program staff review and evaluate assessments, remediation activities, and closure activities submitted by the data supplier. In the review process, program staff may evaluate the documentation provided by the data suppliers to ensure that all validation and verification of data are performed and that all necessary corrective actions have been taken. Table D2.2.1 (Inputs from the Analytical Laboratory for Data Verification) presents information on a number of operations in the process of environmental data generation, commonly-used records, and the likely source of the specifications for such records that may be reviewed by TCEQ staff, regulated entity, permittee, or contractor depending upon their particular reporting requirements.

The data verification documentation should support the verified data that are reported. The data validator (e.g., contractor, permittee, TCEQ staff) should be aware of the requirements from any planning documents (e.g., Sampling Analysis Plans, minimum QC performance criteria, regulatory standards etc.) so that the data validator knows what information the laboratory was required to provide. Table D2.2.1 (Inputs from the Analytical Laboratory for Data Verification) lists elements that can be used to validate data for its particular use.

Table D2.2.1 Inputs from the Analytical Laboratory for Data Verification

Essential Laboratory Data Requirements to Demonstrate Compliance to RCRA/UIC Programs

Organic Analytes

Field/Laboratory sample ID
Confirmation of results when positive results are detected from location not previously tested by laboratory
Method reference number(s) (extraction/analysis where applicable)
Detection & quantitation limits defined
COC
Date of analysis
Sample receipt and login information
System monitoring compound
Positive controls
- Matrix spike/matrix spike duplicate
- Laboratory control sample
- Surrogates

Negative controls
- Method Blanks

GC/MS tuning - proof of acceptance
Internal standard area and retention time summary
Sample preparation details
- Pre/post sample amounts
- Extractions
- Sample cleanups
- Dilutions
- Sample prep/extraction log

Sample data
- Case-Narrative
- Quantitation reports
- Chromatographs *
- Spectra *
- Instrument run log *
- Initial calibration acceptance criteria met*
- Continuing calibration acceptance criteria met*
- Manual integrations with pre and post integration chromatograms*
- Audit trail report *
- Accreditation certification if not meeting exception defined in 30 TAC 25.6

Inorganic Analytes

Field/Laboratory sample ID
Method reference number(s) (digestion/analysis where applicable)
Detection & quantitation limits defined
COC
Date of analysis
Sample receipt and login information
Positive controls
- Matrix spike/matrix spike duplicate
- Laboratory control sample (LCS)

Negative controls
- Method Blanks

Inductively Coupled Plasma (ICP) interference check sample criteria met*
Post digestion spike sample information
Method of standard addition (MSA) if applicable
Sample preparation details
- Pre/post sample amounts
- Digestions
- Dilutions
- Sample prep log*

Sample data
- Case-Narrative
- Raw sample data, instrument output*
- Instrument run log*

Initial calibration acceptance criteria*
- Continuing calibration acceptance criteria*
- Accreditation certification if not meeting exception as defined in 30 TAC25.6

*Data not required in data package but may be requested by data reviewer as needed

D3 RECONCILIATION WITH USER REQUIREMENTS

D3.1 Purpose/Background

The objective of this section is to describe how the results obtained from the project and/or task are reconciled with the requirements defined by the data user or decision maker. The proposed methods to analyze the data and determine possible anomalies or departures from assumptions established in the planning phase of data collection should be outlined. The process of how issues will be resolved and how limitations on the use of the data will be reported to decision makers should be described. The Corrective Action Program of the REM, IHW Permit Section staff of the WPD, UIC Permits Section of the RMD, CID, MD, and Regional Office staff are data users. These data users are the program staff authorized to determine the compliance status of the data supplier, or the regulated community. Program staff review and evaluate assessments, remediation activities, and closure activities submitted by the data supplier. In the review process, program staff may evaluate if limitations on the use of the data were reported to data users and/or decision makers. If no limitations were reported and limitations are found, the data is returned as deficient.

The data users evaluate the effects of the uncertainly associated with the qualified data, such as the potential bias and imprecision of data. The data users consider the deviations made from the approved QAPP and also determine if data rejected by the data reviewer are critical to the decision being made with the data.

Questions or comments regarding the contents of this QAPP may be directed to the TCEQ Lead RCRA Quality Assurance Specialist: Anju Chalise (512) 239-1529.

GLOSSARY

Acceptance Criteria: Specified limits placed on characteristics of an item, process, or service defined in requirement documents. (ASQC)

Accreditation: The process by which an agency or organization evaluates and recognizes a laboratory as meeting certain predetermined qualifications or standards, thereby accrediting the laboratory. In the context of the National Environmental Laboratory Accreditation Program (NELAP), this process is a voluntary one.

Accreditation Body: Authoritative body that performs accreditation. (TNI) Although NELAP is a national program, state, territorial, or federal governmental agencies serve as Accreditation Bodies having responsibility and accountability for environmental laboratory accreditation and for granting accreditation. The TCEQ is the TNI Accreditation Body for the State of Texas. A NELAP Accreditation Body will also accept, by recognition, the accreditation status of a laboratory as determined by another NELAP Accreditation Body (this is called secondary accreditation). Each Accreditation Body must adopt and adhere to this principle as a condition of membership in NELAP. In accepting the accreditation status of a laboratory through recognition, the Accreditation Body assumes accreditation responsibilities as a secondary accreditation body.

A laboratory seeking accreditation must apply to its home state Accreditation Body for accreditation. However, if the Accreditation Body does not offer accreditation for testing in conformance with a particular field of accreditation (matrix-method/technology-analyte/analyte group), laboratories may obtain primary accreditation for that particular field of accreditation from any other NELAP Accreditation Body.

Accuracy: The degree of agreement between an observed value and an accepted reference value. Accuracy includes a combination of random error (precision) and systematic error (bias) components which are due to sampling and analytical operations; a data quality indicator.

Batch: Environmental samples that are prepared and/or analyzed together with the same process and personnel, using the same lots(s) of reagents. A preparation batch is composed of one to 20 environmental samples of the same TNI-defined matrix, meeting the above mentioned criteria and with a maximum time between the start of processing of the first and last samples (extract, digestates or concentrates) which are analyzed together as a group. An analytical batch can include prepared samples originating from various environmental matrices and can exceed 20 samples.

Blank: A sample that has not been exposed to the analyzed sample stream in order to monitor contamination during sampling, transport, storage or analysis. The blank is subjected to the usual analytical and measurement process to establish a zero baseline or background value and is sometimes used to adjust or correct routine analytical results. Each batch of samples, up to 20, should include the appropriate type of blanks depending upon the sample type, location and any other contributing factors that could compromise data integrity. Blanks include:

Equipment (*rinsate*) Blank: A sample of analyte-free media which has been used to rinse common sampling equipment to check effectiveness of decontamination procedures.

Field Blank: Blank prepared in the field by filling a clean container with pure de-ionized water and appropriate preservative, if any, for specific sampling activity being undertaken. For soil sample, field blank samples can be prepared with certified clean sand or soil rather than clean water

Instrument Blank: A clean sample (e.g., distilled water) processed through the instrumental steps of the measurement process; used to determine instrument contamination.

Method Blank: A sample of a matrix similar to the batch of associated samples that is free from the analytes of interest and is processed simultaneously with and under the same conditions as samples through all steps of the analytical procedures, and in which no target analytes (e.g., Chemicals of Concern 30TAC Chapter 335) or interferences are present at concentration that impact the analytical results for sample analyses.

Trip (*travel*) Blanks: Trip blanks are used for volatile organic compounds (VOCs) analysis only. In addition, trip blanks are prepared *prior to* going into the field by filling containers (VOC vials) with clean water (HPLC-grade) or sand. The sample containers are kept closed and maintained with the sample containers associated with site-specific VOC analysis until returned to the laboratory. Trip blanks are used to evaluate error associated with shipping and handling (i.e., diffusion of volatile organics though the septum during shipment and storage) and analytical procedures. They are used in conjunction with field blanks to isolate sources of sample contamination already noted in previous field blanks. If the trip blank has detectible quantities of the Chemicals of Concern (i.e., analytes of interest) it is possible that any positive results in the sample may be due to contamination; either by accident or by design. (Fundamentals of Environmental Sampling and Analysis)

Chain of Custody (COC) Form: Record that documents the possession of the samples from the time of the collection to receipt in the laboratory. This record generally includes: the number and types of containers; the mode of collection; collector; time of collection; preservation; and requested analysis.

Confirmation: Verification of the identity of a component through the use of an approach with a different scientific principle from the original method. These may include, but are not limited to:

Second column confirmation;
Alternate wavelength;
Derivatization;
Mass spectral interpretation;
Alternate detectors; or/and
Additional cleanup procedures.

Data Quality Objectives (DQOs): Qualitative and quantitative statements derived from a process used to develop performance and acceptance criteria that clarify study, technical, and quality objectives; define the appropriate type of data; and specify tolerable levels of potential decision errors that will be used as the basis for establishing the quality and quantity of data needed to support decisions. The document *Guidance on Systematic Planning Using the Data Quality Objectives Process (EPA QA/G-4)* provides a standard working tool for project managers and planners to develop DQOs for determining the type, quantity, and quality of data needed to reach defensible decisions or make credible estimates.

Data Validation: An analyte and sample specific process that extends the evaluation of the data beyond method, procedural, or contractual compliance (i.e., data verification) to determine the analytical quality of a specific data set. (U.S. EPA QA/G-8)

Data Verification: Process of evaluating the completeness, correctness, and conformance/compliance of a specific data set against the method, procedural, or contractual requirements. (U.S. EPA QA/G-8)

Data Reduction: The process of transforming the number of data items by arithmetic or statistical calculation, standard curves, and concentration factors and collating them into more a more useful form.

Detection Limit (***also see Method Detection Limit***): The lowest concentration or amount of the target analyte (also called Chemical of Concern 30 TAC Chapter 335) that can be identified, measured, and reported with confidence that the analyte concentration is not a false positive value.

Environmental Sample (*also referred to as field sample*): An environmental sample is a representative sample of any material (aqueous, non-aqueous, or mixed matrix) collected from any source for which determination of composition or contamination is requested or required.

Field of Accreditation: TNI's approach to accrediting laboratories by matrix, technology/method and analyte/analyte group.

Field Duplicates (*also referred to as field replicates and split samples*): These are field samples obtained from one sampling point, homogenized, divided into separate containers, and treated as separate samples throughout the remaining sampling handling and analytical processes. These field replicate samples are used to assess error associated with sample heterogeneity, sample methodology, and analytical procedures. Unlike field replicates, collocated samples are not composited and used as discrete samples in order to assess site variation in the immediate vicinity of the sampling area. (Fundamentals of Environmental Sampling and Analysis)

Field Measurement: The determination of physical, biological, or radiological properties, or chemical constituents that are measured on-site, close in time and space to the matrices being sampled/measured, following accepted test methods. This testing is performed in the field outside of a fixed-laboratory or outside of an enclosed structure that meets the requirement of a mobile laboratory.

Field Spikes: Field spikes are usually collected once every sampling event (exceptions are trial or risk burns). These samples are used by the laboratory to demonstrate the stability of the sampling matrix. The field spike is usually made by spiking some of the sampling matrix with known amount of surrogate spike in the field. TCEQ REM does not require this QC parameter to be collected unless warranted by site-specific conditions.

Holding Times: (*Maximum Allowable Holding Times*): The maximum times that samples may be held prior to analysis and still be considered to be valid or compromised. (40 CFR Part 136)

Internal Standard: A known amount of standard added to a test portion of a sample as a reference for evaluation and controlling the precision and bias of the applied analytical method.

Laboratory Control Sample (LCS): (*however named, such as laboratory fortified blank, spiked blank or QC check sample*): A sample matrix, free from the analytes of interest (aka – Chemicals of Concern) spiked with verified known amounts of analytes or a material containing known and verified amounts of analyte generally used to establish intra-laboratory or analyst specific precision and bias or to assess the performance of all or a portion of the measurement system.

Laboratory Duplicate: Aliquots of sample taken from the sample container under laboratory conditions and processed and analyzed independently.

Limit of Detection (LOD): (*also called method detection limit in the 30 TAC Chapter 335*): An estimate of the minimum amount of a substance that an analytical process can reliably detect. An LOD is analyte and matrix specific and may be laboratory dependent.

Matrix: The substrate of a test sample.

Field of Accreditation Matrix: These matrix definitions (applicable to this QAPP) will be used by the Texas Accreditation Program.

Air and Emissions: Whole gas or vapor samples including those contained in flexible or rigid wall containers and the extracted concentrated analytes of interest from a gas or vapor that are collected with a sorbent tube, impinger solution, filter, or other device.

Aqueous: Any aqueous sample excluded from the definition of Drinking Water matrix or Saline/Estuarine source including surface water, groundwater, effluents and TCLP or other extracts.

Chemical Waste: A product or by-product of an industrial process that results in a matrix not previously defined.

Drinking Water: Any aqueous sample that has been designated a potable or potential potable source.

Non-Aqueous Liquid: Any liquid with <15% settleable solids.

Non-Potable Water: Any aqueous sample excluded from the definition of Drinking Water matrix including surface water, groundwater, effluents, water treatment chemicals and TCLP or other extracts.

Solid and Chemical Materials: Includes soils, sediments, sludges, products and by products or an industrial process that results in a matrix not previously defined.

Solids: Includes soils, sediments, sludges and other matrices with >15% settleable solids.

Matrix Spike (MS) (*spiked sample or fortified sample*): A sample prepared by adding a known mass of target analyte to a specified amount of matrix ample for which an independent estimate of target analyte concentration is available. Matrix spikes are used, for example, to determine the effect of the matrix on a method's recover efficiency. (QAMS)

Matrix Spike Duplicate (MSD) (spiked sample or fortified sample duplicate): A second replicate matrix spike prepared in the laboratory and analyzed to obtain a measure of the precision of the recovery for each analyte. (QAMS)

May: Denotes permitted action, but not required action.

Method Detection Limit: One way to establish a LOD, defined as a the minimum concentration of a substance (an analyte) that can be measured and reported with 99% confidence that the analyte concentration is greater than zero and is determined from analysis of a sample in a given matrix containing the analyte.

Must: Denotes a requirement that must be met. (Random House College Dictionary)

National Accreditation Database: The publicly accessible database listing the accreditation status of all laboratories participating in NELAP.

National Institute of Standards and Technology (NIST): An agency of the U.S. Department of Commerce's Technology Administration that is working with U.S. EPA, States, TNI and other public and commercial entities to establish a system under which private sector companies and interested States can be accredited by NIST to provide traceable PT to those laboratories testing drinking water and wastewater. (NIST).

Precision: The degree to which a set of observations or measurements of the same property, obtained under similar conditions, conform to themselves; a data quality indicator. Precision is usually expressed as standard deviation, variance or range, in either absolute or relative terms.

Preservation: Refrigeration and/or reagents added at the time of sample collection (or later) to maintain the chemical and/or biological integrity of the sample.

Proficiency Test Sample: A sample, the composition of which is unknown to the analyst and provided to test whether the analyst/laboratory can produce analytical results within specified acceptance criteria.

Proficiency Testing (PT): A means of evaluating a laboratory's performance under controlled conditions relative to a given set of criteria through analysis of unknown samples provided by an external source.

Quality Assurance (QA): An integrated system of management activities involving planning, implementation, documentation, assessment, reporting, and quality improvement to ensure that a process, item, or service is of the type and quality needed and expected by the customer.

Quality Assurance Project Plan (QAPP): A document describing in comprehensive detail the necessary QA, QC, and other technical activities that should be implemented to ensure that the results of the work performed will satisfy the stated performance criteria.)

Quality Control (QC): The overall system of technical activities that measures the attributes and performance of a process, item, or service against defined standards to verify that they meet the stated needs established by the customer; operational techniques and activities that are used to fulfill requirements for quality.

Quality Control Sample: A sample used to assess the performance of all or a portion of the measurement system. QC sample may be Certified Reference Materials, a quality system matrix fortified by spiking, or actual samples fortified by spiking.

Replicate Analysis (aka – duplicate analysis): The measurements of the target analyte performed identically on two or more sub-samples of the same sample within a short time interval.

Resource Conservation and Recovery Act (RCRA): The enabling legislation under 42 USC 321 *et seq*. (1976), that gives U.S. EPA the authority to control hazardous waste from the "cradle-to-grave" including its generation, transportation, treatment, storage, and disposal.

Safe Drinking Water Act (SDWA): The enabling legislation, 42 USC 300f *et seq*. (1974), (Public Law 93-523), that requires the U.S. EPA to protect the quality of drinking water in the U.S. by setting maximum allowable contaminant levels, monitoring and enforcing violations. The Underground Injection Control Program falls under this act.

Shall: Denotes a requirement that is mandatory whenever the criterion for conformance with the specifications requires that there be no deviation. This does not prohibit the use of alternative approaches or methods for implementing the specifications so long as the requirement is fulfilled. (ANSI).

Should: Denotes a guideline or recommendation whenever non-compliance with the specification is permissible. (ANSI)

Spike: A known mass of target analyte added to a blank sample or sub-sample; used to determine recovery efficiency or for other QC purposes.

Surrogate: A substance with properties that mimic an analyte of interest. It is unlikely to be found in an environmental sample and is added to it for QC purposes.

REFERENCES

1. Test Methods for Evaluating Solid Waste, Physical/Chemical Methods, SW-846 3rd Edition, as updated
2. U.S. EPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review, U.S. EPA 540/R-94/013, February 1994
3. U.S. EPA Contract Laboratory Program National Functional Guidelines for Organic Data Review, U.S. EPA 540/R-94/012, February 1994
4. U.S. EPA Risk Assessment Guidance for Superfund, U.S. EPA 540/R-92/001-004, December 1991
5. Handbook of Quality Assurance/Quality Control (QA/QC) Procedures for Hazardous Waste Incineration, U.S. EPA 625/6-89/023, January 1990
6. U.S. EPA RCRA Sampling Procedures Handbook, Region VI, May 1998
7. 40 CFR Parts 144-148 and 260-270
8. TCEQ Guidance on Implementing SW-846 Method 5035
9. RCRA Corrective Action Plan, Final U.S. EPA 520-R-94-004, May 1994
10. TCEQ PPG
11. U.S. EPA RCRA Ground-Water Monitoring Technical Enforcement Guidance Document, November 1992
12. U.S. EPA RCRA Sampling Procedures Handbook, Revised May 1998
13. TCEQ Enforcement SOPs.
14. Field Operations Division Standard Operating Procedures, Latest Revision
15. Enforcement Initiation Criteria, Latest Revision
16. Quality Assurance Handbook for Air Pollution Measurement Systems: Vol III: Stationary Source Specific Methods, Interim Edition, Office of Research and Development, U.S. EPA/600/R-94/038C, April 1994
17. U.S. Environmental Protection Agency (2002): Guidance on Environmental Data Verification and Data Validation, QA/G-8.
18. Current Perspectives in Site Remediation and Monitoring – The Relationship Between SW-846, PBMS, and Innovative Analytical Technologies U.S. EPA 542-R-01-015

WASTE PERMITS LABORATORY DATA REPORT COVER PAGE

This data package consists of laboratory data that supports one of the following:

- ☐ Groundwater Monitoring
- ☐ Hazardous Waste Classification
- ☐ Hazardous Waste Combustor Maximum Achievable Control Technology Standards
- ☐ Injection Well
- ☐ Other (Explained in Case-Narrative)

Release Statement: I am responsible for the release of this laboratory data package. The data submitted in this package has been reviewed by the laboratory and is complete and technically compliant with the requirements of the methods used, except where noted by the laboratory. By my signature below, I affirm to the best of my knowledge, all problems/anomalies, observed by the laboratory as having the potential to affect the quality of the data, have been identified by the laboratory in the Laboratory Data Report QA/QC Checklist (Table D1.2), and no information or data have been knowingly withheld that would compromise the quality of the data.

Check if Applicable: ☐ This laboratory is an in-house laboratory controlled by the person required to demonstrate compliance according to rule. The official signing the cover page of the report is responsible for releasing this data package and is by signature affirming the above release statement is true.

Please Note: A comparable data checklist and signature page may be used. The checklist has been provided for your convenience. Depending upon the type of data needed to demonstrate regulatory compliance, the responsible party for the completeness of the data package may be a representative of a permitted site (i.e., Comprehensive Performance Testing Entity), a generator of hazardous and industrial non-hazardous waste, or an authorized representative of a non-permitted site. Data of documented and known quality is the responsibility of each laboratory.

_____

Name (Printed) Signature

_____

Official Title Date

LABORATORY DATA QA/QC REPORT & ANNUAL GROUNDWATER DETECTION MONITORING CHECKLIST INSTRUCTIONS

Waste Permits Division and Radioactive Materials Division

The Laboratory Data Report QA/QC Checklist, (Table D1.2) checklist is a tool designed to be completed by all permittees/laboratories, waste generators/laboratories, and any other regulated activities that require an analytical demonstration to verify compliance for RCRA and UIC programs within the Waste Permits Division and Radioactive Materials Division, respectively. The purpose of this checklist is to ensure that the records associated with all analytical data reflect all of the processes and procedures used to generate them, and to evaluate completeness, correctness, and compliance of the data against the applicable TCEQ and federal requirements.

I. Texas Accreditation Program

Laboratories providing data to the TCEQ must be NELAP-accredited unless an exception can be made under 30 TAC 25.6. In addition, all data used to meet compliance with the RCRA and UIC programs will also have to meet the performance criteria as designated in this QAPP.

II. Analytical Methods and Method Modifications Clarifications & Procedures

Analytical Methods

New rulemaking initiatives update 30 TAC Chapter 305 and 30 TAC Chapter 335 to include federal rule changes (U.S. EPA's Methods Innovation Rule) that are set forth in parts of RCRA Clusters XV-XVIII. These rule changes remove the requirements to use U.S. EPA SW-846 methods when conducting RCRA monitoring programs unless prohibited by law, rule, or method. This allows for all versions of a method or different U.S. EPA method if the laboratory can demonstrate compliance through acceptable QA of the performance standards. All methods used by the laboratory must be provided on data report sheets and/or the checklist.

Method Modification Procedures

Due to the variation of waste, it is the responsibility of the permittee/laboratory to find the appropriate method suitable to demonstrate compliance along with data of known quality unless a particular method is required by permit or rule. The U.S. EPA and TCEQ recognize this flexibility through the CFR and TAC and require the permittee, or entity required to demonstrate compliance, to have a laboratory modify a method (as allowed) to ensure compliance to the RCRA thereby protecting the environment and human/animal population. This is due on principle that most RCRA methods are considered performance-based and guidance, therefore modifications to methods in SW-846 may be necessary to meet or enhance performance that could not otherwise be attained to demonstrate compliance. In other words, most of the methods are not one-size-fits-all and should be tailored to fit the sample type and associated interferences while maintaining clear and controlled QC performance standards.

Other methods are not guidance and are written into the CFR and must be used without any modification if they are legally and defensibly used to demonstrate compliance for their intended purposes in the RCRA programs. These are referred to as Method Defined Parameters (MDPs) and can be found at 40 CFR 260.11 (*e.g., Toxicity Characteristic Leaching Procedure (TCLP; flashpoint procedure, and corrosivity to identify hazardous waste*). There are also methods and procedures that support the MACT Standards. Any modifications to these methods must have prior approval from the U.S. EPA.

All modifications to methods must be listed on the Case-Narrative Sheet and be written in the laboratory's SOP if this is a routine procedure or whether a modification was necessary at the time of sample preparation and analysis in order to demonstrate compliance. A list of potentially acceptable modifications that are allowed for meeting RCRA compliance according to the U.S. EPA and TCEQ is presented here.

Equipment	
AA or AE lamp type Absorption cell size Amperometer equipment Atomizer type Auto-analyzer equipment Mixing technology Measurement technology Reaction procedure Automatic concentration equipment (e.g., TurboVap) Beaker and/or flask size Centrifuge tube size Chromatographic cleanup/isolation column type/size Chromatography column and dimensions Colorimetric apparatus Condenser glassware Connective tubing type Dilution glassware type/size Dissolved oxygen analyzer Distillation apparatus Evaporating dish type/size Filter type/size Filtration apparatus Flame AA burner type Fume traps Furnace AA platform and tube type Glassware stopper type	Gooch crucible/platinum dish size Graduated cylinder size Heating equipment Hydride generator Kuderna-Danish size Photometer type Pipet size Pressure reduction apparatus Proportionating or peristaltic pump Purge gas Reduction column composition/size Reflux apparatus Sample cooling and/or stirring devices Sample container type/size Sample digestion apparatus Chemical oxidation Microwave digestion Sample purge cell type/size Sample trap material/size Scrubber apparatus size Separatory funnel size Synder column Solvent delivery System Syringe size Titration vessel size Vacuum apparatus Vial size

Equipment	
Chemicals	
Atomic absorption/emission fuels and oxidant Buffer solution Catalyst Cleanup column elution solvent Color developing reagent Dechlorination reagents for residual chlorine Desiccant/drying chemical Dilution water composition Extraction solvent Fuel/oxidant ratio Class cleaning chemical HPLC system/pump Indicator solution	Inhibitor solution Internal standards Materials for reference matrix (e.g., air/gas, effluent water, oil, sand, soil Nitrification inhibitor Oxidizing and reducing agents Partitioning solvent Sample preservation chemical Sample digestion chemical Scrubber solution and concentration Stock solution concentration Surrogates Titrant
Specifications	
Aeration time Calibration range Conductance measurements Dehydration techniques Desorption technique and time Glassware cleaning techniques and sequences Heating time Hydride elimination techniques Interference elimination techniques	Metal-and-organic-free water preparation. reflux time Sample aliquot size Sample cleanup techniques Sample cooling techniques and times Sample digestion/extraction techniques Sample mixing techniques Solution Standardization techniques

III. IHW Annual Groundwater Detection Monitoring Data

If you are an IHW permitted facility subject to the groundwater detection monitoring and are required to submit an annual report to the IHW Permits Section of the WPD by March 1st of every year the IHW Annual Groundwater Detection Monitoring Report Checklist is provided as a tool for the facility. All data collected from each groundwater sampling event in the preceding calendar year shall be included in the report. The actual content of the report should reflect the current state of the monitoring done at the facility. Refer to the IHW Annual Groundwater Detection Monitoring Report Checklist (Table D1.3).

IV. How to Complete the Laboratory Data Report QA/QC Checklist & IHW Annual Groundwater Detection Monitoring Checklist

Provide a completed copy of the Laboratory Data Report QA/QC Checklist (Table D1.2) for all analytical data sets submitted to the TCEQ to verify compliance to RCRA and UIC

Programs within the Waste Permits Division and Radioactive Materials Division, respectively.

- If you are providing data for the IHW Annual Groundwater Detection Monitoring Report, we recommend you also complete and submit an IHW Annual Groundwater Detection Monitoring Report Checklist (Table D1.3).
- If entries are lengthy or in Table form: (1) refer in the checklist to a specific section of the reference or modified method or (2) use a separate sheet to document the information, indicate "See Attachment No.," and attach the sheet to the checklist. Assign a number or other unique identifier to each attachment and indicate the identifier in the space on the checklist.
- All performance standards (QA/QC samples) that did not meet compliance to the goals and/or requirements to this QAPP must be described in the Case-Narrative for further evaluation by TCEQ staff to determine whether the data can be used to demonstrate regulatory compliance to the program requirements.
- All modifications to methods by the laboratory must be identified in the Case-Narrative for record.
- Sample matrix interference problems must be identified in the Case-Narrative and any corrective action the laboratory took including calling the TCEQ or modifying the method.
- The laboratory report sheet must comply with the minimum reporting requirements of the 2016 TNI Standards.
- The method detection limit (MDL), also known as the limit of detection (LOD – 2016 TNI Standards) , and the practical quantitation limit (PQL - 2016 TNI Standards), also known as the limit of quantitation (LOQ), must be clearly defined.
- Each laboratory must define all flagged data.
- Any results reported outside the lower and upper calibration standards will be considered an estimate and must be flagged.
- A statement or sampling and run dates or proof by COC forms must be provided to verify that samples were run within required holding times.

Table D1.2 LABORATORY DATA QA/QC REPORT CHECKLIST

Facility Name:	**Permit/ISW Reg No.:**	**For TCEQ Use Only**
Laboratory Name:	**U.S. EPA I.D. No.:**	**Project Mgr:**
Reviewer Name:	**TCEQ Project Manager/Data Reviewer:**	
Date:	**Date:**	

Description	**Status**	**Case Narrative (Check Box)**	**Technically Complete**
1. Were laboratory analyses performed by a laboratory accredited by TCEQ, whose accreditation included the matrix (ces), methods, and parameters associated with the data? If not was an explanation given in the case-narrative (e.g., laboratory exemption, accreditation for method /parameter not available from TCEQ)?	**Yes☐ No☐ NA☐**	☐	**Yes☐ No☐ NA☐**
2. Was a case-narrative from laboratory (QC data description summary) submitted with the data set?	**Yes☐ No☐ NA☐**	☐	**Yes☐ No☐ NA☐**
3. Are the sample collection, preparation and analyses methods listed in the permit, preparation and analysis methods listed in the permit or other documents specifying criteria the ones used on the final report?	**Yes☐ No☐ NA☐**	☐	**Yes☐ No☐ NA☐**
4. Were there any modifications to the sample collection, preparation and/or analytical methodology (ies)? If so was the description included on the Case-Narrative?	**Yes☐ No☐ NA☐** **Yes☐ No☐ NA☐**	☐	**Yes☐ No☐ NA☐**
5. Were all samples prepared and analyzed within required holding times?	**Yes☐ No☐ NA☐**	☐	**Yes☐ No☐ NA☐**
6. Were samples properly preserved according to method and QAPP requirements?	**Yes☐ No☐ NA☐**	**N☐**	**Yes☐ No☐ NA☐**

Facility Name:	Permit/ISW Reg No.:	For TCEQ Use Only
Laboratory Name:	U.S. EPA I.D. No.:	Project Mgr:
Reviewer Name:	TCEQ Project Manager/Data Reviewer:	
Date:	Date:	

Description	Status	Case Narrative (Check Box)	Technically Complete
7. Have the method detection limits (MDL) and/or practical quantitation limit (PQL) been defined in the final report? Note: NELAC uses terms limit of detection (LOD) and limit of quantitation respectively.	Yes☐ No☐ NA☐	☐	Yes☐ No☐ NA☐
8. Do parameters listed on final report match regulatory parameters of concern (POC) specified in permit and/or Waste Analysis Plan or other required document? Note: POC may also be referred to chemicals of concern (COCs)	Yes☐ No☐ NA☐	☐	Yes☐ No☐ NA☐
9. Are the POC's included within the analytical method's target analyte list?	Yes☐ No☐ NA☐	☐	Yes☐ No☐ NA☐
10. Were the appropriate type(s) of blanks analyzed?	Yes☐ No☐ NA☐	☐	
11. Did any blank samples contain POC concentrations >5x or 10x of MDL? If so, please explain potential bias?	Yes☐ No☐ NA☐	☐	Yes☐ No☐ NA☐
12. Were method blanks taken through the entire preparation and analytical process?	Yes☐ No☐ NA☐	☐	Yes☐ No☐ NA☐
13. Did the calibration curve and continuing calibration verification meet regulatory (e.g. NELAC Standards) method specifications (No. of standards, acceptance criteria, etc.)?	Yes☐ No☐ NA☐	☐	Yes☐ No☐ NA☐
14. Do the initial calibration standards include a concentration below the regulatory limit/decision level? If not please explain? If an MDL and PQL are each used on a report then the relationship between the two must be defined for each method.	Yes☐ No☐ NA☐ Yes☐ No☐ NA☐	☐	Yes☐ No☐ NA☐
15. Were manual peak integrations performed? If so pre and post chromatograms and method change histories may be requested?	Yes☐ No☐ NA☐ Yes☐ No☐ NA☐	☐	Yes☐ No☐ NA☐
16. Were all results bracketed by a lower and upper range calibration standard?	Yes☐ No☐ NA☐	☐	Yes☐ No☐ NA☐

Facility Name:	**Permit/ISW Reg No.:**	**For TCEQ Use Only**
Laboratory Name:	**U.S. EPA I.D. No.:**	**Project Mgr:**
Reviewer Name:	**TCEQ Project Manager/Data Reviewer:**	
Date:	**Date:**	

Description	**Status**	**Case Narrative (Check Box)**	**Technically Complete**
17. Was any result reported outside of the range of the calibration standards?	**Yes☐ No☐ NA☐**	☐	**Yes☐ No☐ NA☐**
18. Were all matrix spike (MS) and MS duplicate (MSD) recoveries within the data decision making goals of QC data in the RCRA/UIC QAPP and/or within the laboratories control charts? If not were data flagged with explanation in case-narrative?	**Yes☐ No☐ NA☐** **Yes☐ No☐ NA☐**	☐	**Yes☐ No☐ NA☐**
19. Were all of the MS and MSD relative percent differences (RPDs) within the data decision making goals of QC data in the RCRA/UIC QAPP? If not were data flagged with explanation in case-narrative?	**Yes☐ No☐ NA☐**	☐	**Yes☐ No☐ NA☐**
20. Were all laboratory control sample (LCS) recoveries at least within the MS and MSD ranges of recoveries and within laboratories control charts? If not were data flagged with explanation in the case-narrative?	**Yes☐ No☐ NA☐** **Yes☐ No☐ NA☐**	☐	**Yes☐ No☐ NA☐**
21. Were all POCs (COCs) in the LCS?	**Yes☐ No☐ NA☐**	☐	**Yes☐ No☐ NA☐**
22. Were the MS and MSD from samples collected for this work order or other samples in the analytical batch as defined by the Accreditation Standards? *This information is used to identify factors contributing to matrix interferences. It should not be assumed, unless it is understood by the laboratory, that samples relating to this report were the ones selected to be fortified with the POCs.*	**Yes☐ No☐ NA☐**	☐	**Yes☐ No☐ NA☐**
23. Were any of the samples diluted? If so were appropriate calculations made to the MDL and/or PQL of the final report?	**Yes☐ No☐ NA☐**	☐	**Yes☐ No☐ NA☐**

LABORATORY DATA REPORT QA/QC CHECKLIST
LABORATORY CASE-NARRATIVE
(To accompany laboratory checklist)

Facility Name:	Permit/ISW Reg No.:
Laboratory Name:	U.S. EPA I.D. No.:

Method No.	Non-conformance Description	Method Modification Description

Facility Name:	Permit/ISW Reg No.:
Laboratory Name:	U.S. EPA I.D. No.:

Method No.	Non-conformance Description	Method Modification Description

TABLE D1.3 WPD IHW Annual Groundwater Detection Monitoring Report

Facility Name:	**Permit/ISW Reg No.:**
Address:	**Date:**

	Report Elements	**Regulatory Citations, Permit Provisions* or IHW Recommendations**	**To Be Completed by IHW Permitted Facility**		**For TCEQ USE Only (Technically Complete)**
			N/A	**Location of Information within the IHW Annual Groundwater Detection Monitoring Report**	
1.	Certification required under 40 CFR Section 270.11(d)(1).	40 CFR 270.11(d)(1)			Yes☐ No☐ NA☐
2.	Sealed in accordance with Texas Geopractice Act and Rules.	22 TAC 851.156			Yes☐ No☐ NA☐
3.	Discussion of any permit action (e.g., permit mod, renewal, etc.) that might change the groundwater detection monitoring system.	Recommended			Yes☐ No☐ NA☐
4.	Discussion of site historical information for any significant issues related to groundwater detection monitoring including groundwater flow direction change, statistically significant increase (SSI) multiple aquifer sampling, perched aquifer, etc.	Recommended			Yes☐ No☐ NA☐
5.	Discussion of any site specific conditions which affect interpretation of the data collected.	Recommended			Yes☐ No☐ NA☐
6.	Dates and required frequency of sampling events.	Permit Provision II.B.1.d			Yes☐ No☐ NA☐

Facility Name:	**Permit/ISW Reg No.:**
Address:	**Date:**

Report Elements		**Regulatory Citations, Permit Provisions* or IHW Recommendations**	**To Be Completed by IHW Permitted Facility**		**For TCEQ USE Only (Technically Complete)**
			N/A	**Location of Information within the IHW Annual Groundwater Detection Monitoring Report**	
7.	For Post Closure Care, statement of the year (e.g., 5th) as well as the total number of years (e.g., 30) required for groundwater detection monitoring.	Recommended			Yes☐ No☐ NA☐
8.	Identification of all groundwater detection monitoring system wells and associated aquifers required to be sampled by the permit.	Permit Table VI.B.3.b and Permit Provision VI.D.2.c			Yes☐ No☐ NA☐
9.	All wells identified in checklist Item 8 sampled, or explanation of discrepancy provided.	Permit Table VI.B.3.b and Permit Provision VI.D.2.c			Yes☐ No☐ NA☐
10.	Statement whether a SSI has occurred over background values in any well during the previous calendar year's monitoring events.	Permit Provision VI.G.1			Yes☐ No☐ NA☐
11.	Discussion of the status of any SSI events.	Permit Provision VI.G.1			Yes☐ No☐ NA☐
12.	Discussion of groundwater sampling methods.	Permit Provision VI.D.1.c			Yes☐ No☐ NA☐
13.	Groundwater level measurements relative to Mean Sea Level (MSL) measured to within 0.01 ft.	Permit Provision VI.D.2.d(1)			Yes☐ No☐ NA☐
14.	Determination of pH, temperature, Specific Conductivity and, if applicable, Turbidity in nephelometric turbidity units.	Permit Provision VI.D.2.d(2)			Yes☐ No☐ NA☐
15.	Description of groundwater sample appearance (clarity, color, etc.).	Permit Provision VI.D.2.d(3)			Yes☐ No☐ NA☐

Facility Name:	**Permit/ISW Reg No.:**
Address:	**Date:**

Report Elements		**Regulatory Citations, Permit Provisions* or IHW Recommendations**	**To Be Completed by IHW Permitted Facility**		**For TCEQ USE Only (Technically Complete)**
			N/A	**Location of Information within the IHW Annual Groundwater Detection Monitoring Report**	
16.	Comparison of measured total well depth to total constructed well depth and screened interval as noted on well construction logs. Recommendations for any needed corrective action (redevelopment or replacement).	Permit Provision VI.D.2.d(4)			Yes☐ No☐ NA☐
17.	Discussion of findings from inspection of all wells specified in permit, and discussion of any needed repairs or replacements.	Permit Provision VI.D.2.d(5)			Yes☐ No☐ NA☐
18.	Table summarizing groundwater elevation data for each well including field measurements, surveyed elevations of measuring point and calculated groundwater elevation above MSL.	Permit Provision VI.G.2 and VI.D.2.d(1)			Yes☐ No☐ NA☐
19.	Discussion of groundwater flow direction and flow rate in the uppermost aquifer or any other aquifer that is sampled, using the data collected during the preceding calendar year's sampling events. Include all calculations and data inputs used for the determination.	Permit Provision VI.G.3			Yes☐ No☐ NA☐

Facility Name:	**Permit/ISW Reg No.:**
Address:	**Date:**

	Report Elements	**Regulatory Citations, Permit Provisions* or IHW Recommendations**	**To Be Completed by IHW Permitted Facility**		**For TCEQ USE Only (Technically Complete)**
			N/A	**Location of Information within the IHW Annual Groundwater Detection Monitoring Report**	
20.	Contour map sealed by a Professional Geoscientist of the potentiometric water levels in the uppermost aquifer or any other aquifer that is sampled based at a minimum upon concurrent measurements in all monitoring wells for each monitoring event.	Permit Provision VI.G.4 and 22 TAC 851.156			Yes☐ No☐ NA☐
21.	Any exclusion of data collected for generating contour map and justifications.	Recommended			Yes☐ No☐ NA☐
22.	Table summarizing analytical results for all required samples and constituents.	Permit Provision VI.G.2			Yes☐ No☐ NA☐
23.	Field investigation reports including, at a minimum, sample results, sample collection records, COC records, analytical results, associated QC including trip, field and rinsate blanks as applicable, laboratory blanks, spike recovery, duplicate, and surrogate recovery data and a written discussion of the sampling event.	QAPP Section A.9.2.1			Yes☐ No☐ NA☐

Facility Name:	**Permit/ISW Reg No.:**
Address:	**Date:**

	Report Elements	**Regulatory Citations, Permit Provisions* or IHW Recommendations**	**To Be Completed by IHW Permitted Facility**		**For TCEQ USE Only (Technically Complete)**
			N/A	**Location of Information within the IHW Annual Groundwater Detection Monitoring Report**	
24.	Laboratory report including, at a minimum, the Analytical Data Report Cover Page, the COC record, the sample results and associated QC including blank, spike recovery, duplicate, and surrogate recovery data. Information provided shall be sufficient to ensure the quality and the usability of the data.	QAPP Section A.9.2.2 and Analytical Data Report Cover Page found within the QAPP			Yes☐ No☐ NA☐
25.	Analytical Data Report QA/QC checklist and Laboratory Case Narrative (Table D1.2).	RCRA/UIC QAPP			Yes☐ No☐ NA☐
26.	Discussion of statistical methodologies used in accordance with relevant permit provisions. Please note: an alternate statistical methodology cannot be used without an approved permit amendment or modification.	Recommended			Yes☐ No☐ NA☐
27.	Table and/or description of statistical analysis results, including any SSI over background concentrations and all supporting documentation (calculations and data inputs).	Permit Provision VI.G.2			Yes☐ No☐ NA☐
28.	Recommendations for any changes to the groundwater detection monitoring system.	Permit Provision VI.G.5			Yes☐ No☐ NA☐

Facility Name:			**Permit/ISW Reg No.:**	
Address:			**Date:**	
Report Elements	**Regulatory Citations, Permit Provisions* or IHW Recommendations**	**To Be Completed by IHW Permitted Facility**		**For TCEQ USE Only (Technically Complete)**
		N/A	**Location of Information within the IHW Annual Groundwater Detection Monitoring Report**	
TCEQ Project Manager: Date Reviewed:				

* All Permit Provisions referenced herein refer to standard permit provisions in the latest permit modules maintained by the IHW Permits Section. The Regulated Entity is responsible for ensuring that the provisions of their specific permit are met.

Monitoring Division

Name: Sharon R. Coleman, Laboratory and Quality Assurance Section

Title: TCEQ Quality Assurance Manager

Signature: _____ Date: _____

Critical Infrastructure Division

Name: Kelly Cook

Title: Deputy Director

Signature: _____ Date: _____

Name: Hoyt Henry

Title: Manager, Radioactive Materials Compliance and Chemical Reporting Section

Signature: _____ Date: _____

Name: Muhammadali Abbaszadeh, Radioactive Materials Compliance and Chemical Reporting Section

Title: Health Physicist, Work Leader

Signature: _____ Date: _____

Occupational Licensing & Registration Division

Name: Jaya Zyman, P.E.

Title: Deputy Director

Signature: _____ Date: _____

Name: Anne Marie Callery, Registration and Reporting Section

Title: Section Manager

Signature: _____ Date: _____

Radioactive Materials Division

Name: Ashley Forbes

Title: Deputy Director

Signature: _____ Date: _____

Name: Carol Dye, P.G., Underground Injection Control (UIC) Permits Section

Title: Section Manager

Signature: _____ Date: _____

Name: Kathryn Ploch, Radioactive Materials Division

Title: UIC Grant Manager

Signature: _____ Date: _____

Name: Tamara Young, Underground Injection Control Permits Section

Title: UIC Permits Section Program Coordinator, Lead UIC Program Quality Assurance Specialist

Signature: _____ Date: _____

Remediation Division

Name: Beth Seaton

Title: Deputy Director

Signature: _____ Date: _____

Name: Merrie Smith, P.G., Voluntary Cleanup and Corrective Action (VCP-CA) Section

Title: Section Manager

Signature: _____ Date: _____

Waste Permits Division

Name: Charly Fritz
Title: Deputy Director
Signature: _____ Date: _____

Name: Gulay Aki, P.E., Industrial and Hazardous Waste Permits Section
Title: Section Manager
Signature: _____ Date: _____

Name: Megan Henson, Business & Program Services Section
Title: Section Manager
Signature: _____ Date: _____

Name: Brandon Greulich, Industrial and Hazardous Waste Section
Title: IHW Team Leader and RCRA QA Specialist
Signature: _____ Date: _____

Name: Sarah Schreier, Industrial and Hazardous Waste Section
Title: IHW Project Manager and RCRA QA Specialist
Signature: _____ Date: _____

Name: Anju Chalise, Business & Program Services Section
Title: Lead RCRA QA Specialist and Grant Manager
Signature: _____ Date: _____

Office of Compliance & Enforcement Regional Areas

Name: Susan M. Jablonski, P.E., Central Texas Area
Title: Area Director
Signature: _____ Date: _____

Name: David A. Ramirez, Border and Permian Basin Area
Title: Area Director
Signature: _____ Date: _____

Name: Jonathan Walling, Coastal & East Texas Area
Title: Area Director
Signature: _____ Date: _____

Name: Randy J. Ammons, North Central & West Texas Area
Title: Area Director
Signature: _____ Date: _____

Name: Kristi Mills-Jurach, P.E. Program Support and Environmental Assistance
Title: Deputy Director
Signature: _____ Date: _____

United States Environmental Protection Agency, Region 6

Name: Althea C. Foster, RCRA Grants and Brownfields Section, Land, Chemicals, and Redevelopment Division

Title: Chief

Signature: _____ Date: _____

Name: Stephanie Cheaney, RCRA Grants and Brownfields Section, Land, Chemicals, and Redevelopment Division

Title: Texas/New Mexico RCRA Project Officer

Signature: _____ Date: _____

Name: Anhmai Pham, RCRA Grants and Brownfields Section, Land, Chemicals, and Redevelopment Division

Title: RCRA Technical Reviewer

Signature: _____ Date: _____

Contract Laboratories

In lieu of signatures from participating contract laboratories, contracts executed by the Program Support and Environmental Assistance Division (PSEAD) of the Central Texas Area and Radioactive Materials Division (RMD) staff contain the following language:

> CONTRACTOR or PERMITTEE shall perform all work in accordance with requirements and procedures set forth in the Quality Assurance Project Plan (QAPP) required by each program/project for which the particular analysis is requested and specified on the chain-of-custody (COC) document or the request for analysis (RFA) form. CONTRACTOR or PERMITTEE shall be solely responsible for ensuring that it has a copy of the current QAPP from the program/project which is requesting analysis prior to commencing any analysis. CONTRACTOR or PERMITTEE shall be responsible for obtaining copies of all applicable QAPPs from TCEQ.

Laboratories shall state in their standard operating procedures (SOPs) the sample and waste disposal procedures. The procedures shall ensure that all waste samples and by-products from the laboratories that meet the definition of a hazardous waste comply with the RCRA and UIC regulations.

Laboratories listed in the Distribution List are current as of April 29, 2021. If you have questions, please contact PSEAD Laboratory Contract Manager Katie Orr (512) 239-3262. The current list of contract laboratories can be found at OCE Contracted Labs. The Department of State Health Services Laboratory (DSHS) is contracted through the RMD.

TABLE OF CONTENTS

A3 DISTRIBUTION LIST

Office of Compliance & Enforcement: Craig Pritzlaff Director (512) 239-5150

Enforcement Division

Bryan Sinclair (512) 239-2171, James Gradney (512) 239-6549 – MC 219 and Kimberly Sladek (512) 239-1588 – MC 219

Critical Infrastructure Division

Kelly Cook (512) 239-0044, Hoyt Henry (512) 239-5062, and Muhammadali Abbaszadeh (512) 239-6078 – MC 177

Monitoring Division

Sharon R. Coleman (512) 239-6340 and Penny Sterling (512) 239-1617 - MC 165

Program Support and Environmental Assistance Division

Kristi Mills-Jurach, P.E. (512) 239-1261, John Shelton (512) 239-2563, Katie Orr (512) 239-3262, and Tom Heitman (512) 239-3257 MC 174

TCEQ Regional Area and Office Directors

Border and Permian Basin

Area Director David A. Ramirez (956) 430-6048 MC R-15

Regional Office Directors

Region 6 - El Paso, Lorinda Gardner (915) 834-4951

Region 7 – Midland, Lorinda Gardner (915) 834-4951

Region 15 - Harlingen, Jaime A. Garza (956) 430-6030

Region 16 - Laredo, Jaime A. Garza (956) 430-6030

Central Texas Area

Area Director Susan M. Jablonski, P.E. (512) 239-6731 MC/172

Regional Office Directors

Region 9 - Waco, David Van Soest (512) 239-0468

Region 11 - Austin, David Van Soest (512) 239-0468

Region 13 – San Antonio, Joel Anderson (210) 403-4010

Coastal and East Texas

Area Director Jonathan Walling (512) 239-2295 MC 172

Regional Office Directors

Region 5 - Tyler, Leroy Biggers (903) 535-5112

Region 10 - Beaumont, Kathryn B. Sauceda (409) 899-8747

Region 12 - Houston, Nicole Bealle (713) 767-3623

Region 14 – Corpus Christi, Susan Clewis (361) 825-3104

North Central and West Texas

Area Director Randy J. Ammons (806) 796-7092 MC R2

Regional Office Directors

Region 1 - Amarillo, Gary Shipp (acting) (806) 796-7604

Region 2 - Lubbock, Gary Shipp (806) 796-7604

Region 3 - Abilene, Winona L. Henry (325) 698-6120

Region 4 – Dallas/Fort Worth, Alyssa Taylor (817) 588-5928

Region 8 – San Angelo, Winona L. Henry (325) 698-6120

Office of Waste: Brent Wade, Director (512) 239-6566

Occupational Licensing & Registration Division

Jaya Zyman, P.E. (512) 239-2012 - MC 223 and Anne Marie Callery (512) 239-2154 – MC 129

Waste Permits Division

Charly Fritz (512) 239-2331 and Gulay Aki, P.E. (512) 239-2340 – MC 130, Megan Henson (512) 239-1165 and Anju Chalise (512)239-1529- MC-126, Sarah Schreier (512) 239- 5454 MC-130, and Brandon Greulich (512) 239-4660 MC-126

Radioactive Materials Division

Ashley Forbes (512) 239-0493, Carol Dye, P.G. (512) 239-1504, Kathryn Ploch (512) 239 6577, and Tamara Young (512) 239-6582 - MC 233

Remediation Division

Beth Seaton (512) 239-2526 – MC 225, Merrie Smith, P.G. (512) 239-5051 – MC 221, and Mark Maglitto (512) 239-3153 – MC 102

Contract Laboratories

A&B Environmental Services, Inc.
10100 East Freeway, Suite 100
Houston, Texas 77029
(713) 453-6060

ALS Group USA, Corp.
10450 Stancliff Rd., Suite 210
Houston, Texas 77099-4338
(281) 530-5656

Department of State Health Services
1100 West 49th Street
Austin, Texas 78756
(512) 458-7587

SGS North America Inc – Houston
10165 Harwin Drive, Suite 150
Houston, Texas 77036
(713) 271-4700

Lower Colorado River Authority
3505 Montopolis Drive
Austin, Texas 78744-1417
(512) 356-6022

Eurofins TEST AMERICA
32226 Commander Drive
Carrollton, TX 75006-2507
(214) 218-1894

Environmental Protection Agency, Region 6

1201 Elm Street, Suite 500

Dallas, Texas 75270 - 2102

Stephanie Cheaney MC: LCRPT (214)665-8057, E-mail: cheaney.stephanie@epa.gov

Anhmai Pham MC: LCRRB (214) 665-8438, E-mail: pham.anhmai@epa.gov

Althea Foster MC: LCRRB (214)665-2268, E-mail: foster.althea@epa.gov

An electronic copy of the QAPP will be provided by RCRA lead QA Specialist to all TCEQ staff listed on the distribution list for further distribution into the program areas as well as to each contracted laboratory. These areas will include but may not be limited to: Industrial and Hazardous Waste (IHW) Permits Section of the Waste Permits Division (WPD), the Radioactive Materials Division (RMD), IHW Team of the Occupational Licensing and Registration Division (OLRD) and Voluntary Cleanup Program - Corrective Action (VCP-CA) Section of the Remediation Division (REM) within the Office of Waste (OOW); waste programs of the 16 Regional Offices, Program Support Section and Environmental Assistance Division (PSEAD), and Laboratory and Quality Assurance Section within the Monitoring Division (MD), Enforcement Division (ENF), and Critical Infrastructure Division (CID) within the Office of Compliance and Enforcement (OCE).

An electronic copy is also available for use, viewing and printing on the TCEQ Home page URL http://www.tceq.texas.gov/and then typing in "RCRA/UIC QAPP" in the **Site Search** window.

A4 TCEQ PROJECT/TASK ORGANIZATION

The RCRA/UIC QAPP organization chart is included as Attachment A.

Charly Fritz – Deputy Director of WPD; responsible for overall implementation of RCRA permitting projects.

Gulay Aki, P.E. - Manager of IHW Permits Section of the WPD; responsible for the review of RCRA permitting activities.

Megan Henson - Section Manager of B&PS of WPD; responsible for the management of the WPD B&PS activities.

Brandon Greulich and Sarah Schreier - RCRA Quality Assurance Specialist of IHW; IHW Team Leader and the Project Manager are assigned as a role of RCRA QA specialist; responsible for development, approval, implementation, and maintenance of Standard Operating Procedures, conducting audits, assessments, reports and project plans; determine conformance with program quality systems; receive and maintain assessment records and monitor implementation of corrective actions; and provide technical expertise on quality services as consistent with agency's QMP.

Anju Chalise – Lead RCRA Quality Assurance Specialist and Grant Manager; RCRA Grant Manager is assigned as a role of Lead RCRA QA Specialist; responsible for planning and implementing strategies of the RCRA grant consistent with the agency's QMP. Monitoring the expenditures, commitments, development, and effectiveness of the RCRA Grant. Coordinating preparation and distribution of annual assessments, annual reports, QMPs and QAPPs; Coordinating and assisting IHW QA Specialists in developing and implementing quality management systems including program completeness review and assessments in WPD.

Ashley Forbes, - Deputy Director of RMD; responsible for the overall implementation of UIC permitting projects.

Carol Dye, P.G. - Section Manager of UIC Permits Section in the RMD; responsible for the review of UIC permitting activities as described in the QAPP.

Kathryn Ploch – UIC Grant Manager of the RMD; responsible for monitoring commitments and development of the UIC grant.

Tamara Young – Lead UIC QA Specialist of RMD; Program Coordinator for the UIC Permits Section in the RMD; responsible for development of UIC portions of the QAPP, conducting audits and assessments of the UIC quality systems including identifying, documenting, monitoring, implementing, and reporting of corrective action in RMD, and overall coordination with the RCRA QA Lead Specialist.

RCRA/UIC Central Office Staff - Responsible for the review and acceptance/rejection of environmental data submitted by a regulated entity as part of a permit application, corrective action plan, closure plan and/or trial burn plan, a waste audit or as mandated in an enforcement order or corrective action order.

Beth Seaton - Deputy Director of REM; responsible for oversight of all remediation and corrective action activities.

Merrie Smith, P.G. - Manager of VCP/Corrective Action Section of REM; responsible for the oversight of RCRA cleanup and closure activities.

REM Corrective Action Program Staff – Responsible for overseeing compliance with the RCRA requirements for corrective actions and closures.

Bryan Sinclair – Deputy Director of the Enforcement Division; responsible for implementation of the TCEQ's enforcement program (air, water, waste, and multi-media) and updating compliance history in the RCRA Information (RCRAInfo) database.

James Gradney - Manager of Waste Enforcement Section of the Enforcement Division; responsible for management of RCRA/UIC enforcement activities.

Enforcement Staff - Responsible for updating the RCRAInfo database from investigation reports sent from Regional Office staff, issuing agreed orders, technical requirements and calculating penalties for RCRA/UIC cases.

Sharon R. Coleman - QA Manager for the TCEQ; responsible for overall development of the TCEQ QMP, review and approval of program QAPPs, and for monitoring the implementation of the QMP and QAPPs.

Kristi Mills-Jurach, P. E. – Deputy Director of PSEAD in the Office of Compliance and Enforcement; responsible for central office and Regional administration area coordination of waste program field activities, including RCRA/UIC activities in each region; supports the four areas: North Central and West Texas, Coastal and East Texas, Border and Permian Basin, and Central Texas. Responsible for oversight of all contract laboratory administrative functions performed by staff.

Muhammadali Abbaszadeh – Radioactive Materials Compliance Team; Work Leader/Health Physicist in the Radioactive Materials Compliance and Chemical Reporting Section in the CID; responsible for the oversight and consistency of procedures for UIC Class III well activities as defined in the QAPP.

Kelly Cook – Deputy Director of CID; responsible for the oversight and consistency of procedures for UIC Class III well activities as defined in the QAPP.

Hoyt Henry – Manager, Radioactive Materials Compliance and Chemical Reporting Section in the CID; responsible for oversight and consistency of procedures for UIC Class III well activities as defined in this QAPP.

Jaya Zyman, P.E. – Deputy Director of OLRD; responsible for oversight of all IHW registration and reporting activities.

Anne Marie Callery – Manager of Registration and Reporting staff within OLRD; responsible for management of IHW registration and reporting activities.

Four Area Directors - Responsible for monitoring the activities of the Regional Directors and Regional Offices under their designated areas and regions.

Twelve Regional Directors - Responsible for monitoring the investigation and sample collection activities of all field investigators and conformance to SOPs as

referenced in the QAPP. Responsible for oversight of waste program field activities including RCRA/UIC activities in each region.

Regional Investigators - Responsible for performing investigations of RCRA and UIC facilities, conducting field sampling, preparing samples for laboratory analysis, developing investigation reports, and observing annual demonstrations of mechanical integrity testing of UIC facilities.

A5 PROBLEM DEFINITION/BACKGROUND

A5.1 Purpose/Background for RCRA

The passage of the RCRA in 1976 and the Hazardous and Solid Waste Amendments in 1984 (HSWA) provided the nation's primary law governing disposal of solid and hazardous and industrial waste in the United States. To achieve these goals, the RCRA established four distinct, yet interrelated programs:

- The solid waste program, under RCRA Subtitle D, requires comprehensive management of nonhazardous industrial solid waste and municipal solid waste.
- The underground storage tank (UST) program, under RCRA Subtitle I, regulates USTs containing hazardous substances and petroleum products.
- The hazardous waste program, under RCRA Subtitle C, establishes a system for controlling hazardous waste from the time it is generated until its ultimate disposal.
- Collection and analysis of air stack samples to determine compliance with the emission standards in 40 Code of Federal Regulations (CFR) Part 63, Subpart EEE.

This QAPP addresses requirements in RCRA Subtitle C only. To achieve the Subtitle C goals, Congress directed U.S. EPA to create regulations to manage hazardous waste. The first RCRA regulations, "Hazardous Waste and Consolidated Permit Regulations," published in the Federal Register on May 19, 1980 (45 FR 33066), established the basic "cradle to grave" approach to hazardous waste management that exists today. RCRA Subtitle C mandates strict controls over the treatment, storage and disposal (TSD) of hazardous and industrial waste generation and management in the U.S. and consequently in Texas. In addition to these federal requirements, states may develop more stringent requirements or requirements that are broader in scope than the federal regulations. Through the State Authorization rulemaking process, U.S. EPA delegates the primary responsibility of implementing RCRA to individual states in lieu of U.S. EPA. As the authorized agency in Texas for RCRA, the TCEQ has a continuing obligation to maintain a hazardous waste program equivalent to and consistent with the federal hazardous waste program.

In regulatory terms, a RCRA hazardous waste is a waste that appears on one of the four hazardous wastes lists (F-list, K-list, P-list or U-list) or exhibits at least one of four characteristics: (1) ignitability, (2) corrosivity, (3) reactivity, or (4) toxicity. The F-list identifies wastes from common manufacturing and industrial processes, also known as wastes from non-specific sources. The K-list includes certain wastes from specific industries, such as petroleum refining or pesticide manufacturing. The P-list and the U-list are discarded commercial chemical products. These lists include specific commercial chemical products in an unused form. All lists can be found in 40 CFR Part 261. Waste that does not meet any of the listings explained above may still be considered a hazardous waste if it exhibits one of the four characteristics, as listed above and, defined in 40 CFR Part 261, Subpart C.

A5.2 Purpose/Background for UIC

The passage of the Safe Drinking Water Act in 1974 provides the foundation for the regulation of underground injection in the United States. The Injection Well Act, which is Chapter 27 of the Texas Water Code, and Title 3 of the Texas Natural Resource Code provide the statuary authority for regulation of underground injection in Texas. The Injection Well Act (the Act) divides the regulatory responsibilities between the Railroad Commission of Texas (RRCT) and the TCEQ. Both state agencies have full authority for those underground injection wells within their own jurisdiction as defined in the Act.

The TCEQ has a continuing obligation to maintain a UIC Program. Specifically, injection wells are classified into six different types:

- Class I wells, which are used for deep injection, are regulated by the TCEQ. (The RRCT reviews and comments on these applications.);
- Class II wells, which are related to oil and gas production, are regulated by the RRCT.
- Class III wells, which are used to extract minerals other than oil and gas, are regulated by the TCEQ (i.e., in-situ uranium, sulphur, and sodium sulfate) or the RRCT (i.e., brine);
- Class IV wells, which are generally banned, but may be authorized by the TCEQ in certain environmental cleanup operations;
- Class V wells, which are used for many different activities, are regulated by either the TCEQ or the RRCT (i.e., geothermal energy production), depending on the type of well; and
- Class VI wells, which are used for injection of carbon dioxide (CO2) below Underground Sources of Drinking Water for long term storage (geologic sequestration), will be regulated by both TCEQ and the RRCT. TCEQ's jurisdiction will be limited to wells associated with clean energy projects that inject into formations that are not producing oil, gas, or geothermal energy. Neither agency has applied for federal authorization to regulate this newest class of injection well. Currently there are no Class VI wells in Texas.

A5.3 Testing and Monitoring Activities

RCRA and UIC program obligations translate into adhering to Title 40 CFR Chapters 260-270 for RCRA, 40 CFR Parts 144-148 for UIC, *Test Methods for Evaluating Solid Waste:- Physical/Chemical Methods* (SW-846) or other U.S. EPA approved methods, and the HSWA of 1984 Sections 3004 and 3005, during the following:

- Investigations of hazardous waste generators, transporters, and treatment, storage and disposal;
- Investigations of TSD facilities to ensure these entities are properly managing hazardous waste;
- Collection and analysis of soil and groundwater samples to determine the presence and extent of contamination;
- Review of environmental data provided from external sources in permit and compliance plan applications, reports required by rule for generators, reports required by permits and compliance plans, waste characterization plan, facility

investigations, corrective action plans, risk assessments, closure plans, and waste determinations to safeguard the environment and public health against releases/contamination, and to verify contamination is remediated to the appropriate level; and
- Establishment of appropriate field and laboratory analysis procedures for all applicable pollutants to ensure consistency and conformity with regulations and proven methods.

The U.S. EPA has amended a variety of testing and monitoring requirements in the RCRA hazardous waste regulations and certain Clean Air Act regulations that relate to hazardous waste combustors (SW-846 Final Update IIIB). These amendments allow more flexibility in performing RCRA-related sampling and analysis by removing from the regulations a requirement to use the methods in conducting various testing and monitoring and by limiting required uses of a SW-846 method.

The only required use of an SW-846 method is the measurement of method-defined parameters (MDPs). These are parameters having regulatory concentration limits based on the outcome of the specified method of analysis performed as prescribed in the method without deviation. For example, in order to determine whether the levels of hazardous constituents in a particular waste stream are equal to or greater than the toxicity characteristic (TC) levels specified in 40 CFR 261.24, waste generators must test their waste using SW-846 Method 1311: Toxicity Characteristic Leaching Procedure or TCLP. If concentrations of contaminants measured in the TCLP leachate are greater than or equal to the regulatory levels specified in 40 CFR 261.24 Table 1, the waste is a hazardous waste and is subject to RCRA Hazardous Waste regulation. The U.S. EPA has determined the TCLP is the only reliable method for demonstrating a waste does not exceed the maximum TC levels. The U.S. EPA describes the TCLP as a required method-defined parameter. The MDPs are discussed in more detail in Section B of the QAPP.

SW-846 Update IIIB includes revised chapter seven and eleven revised methods, including method revision to remove a requirement to use the SW-846 chapter nine Sampling Plan.

The U.S. EPA Methods Innovation Rule, published in the Federal Register as a Final Rule on June 14, 2005, removes unnecessary requirements in the RCRA regulations to use only SW-846. With the exception of approximately 25 MDPs incorporated by reference in the RCRA regulations at 40 CFR 250.11, SW-846 methods are now guidance.

The TCEQ will not accept an alternative method for RCRA/UIC MDP compliance. Modifications to methods used to demonstrate compliance to Maximum Achievable Control Technology (MACT) Standards must be approved by U.S. EPA Region 6 staff. Modifications to reference methods can be made for all other methods if QC measurement criteria, as designated in this QAPP, can be met and if the regulated entity is not restricted by a permit. When a regulated entity is operating under a permit, a modification to a method or use of an alternate method may require a modification to the permit.

Entities covered by this QAPP include:

- Anyone who generates, treats, stores, or disposes of hazardous solid waste is subject to RCRA Subtitle C sampling and analysis requirements;
- Entities subject to the National Emission Standards for Hazardous Air Pollutants (NESHAP) final standards for hazardous waste combustors (40 CFR Part 63, Subpart EEE);
- Anyone who owns or operates an in-situ recovery operation for uranium, sulfur, and sodium sulfate (Class III wells); and
- Anyone who owns or operates Class I, Class IV and V wells.

A5.4 Decision Makers

- U.S. EPA;
- TCEQ Executive Staff (Executive and Directors);
- TCEQ Deputy Directors, Section Managers, and staff of the WPD, OLRD, REM, CID, PSEAD, WQPD, RMD, ENF, and TD;
- TCEQ Area and Region Directors, Section Managers, and staff of the Regional Offices; and
- Regulated Community.

A5.5 Principal Data Users

- U.S. EPA;
- TCEQ Executive Staff;
- TCEQ Deputy Directors, Section Managers, and staff of the WPD, OLRD, REM, Regional Offices, PSEAD, CID (Radioactive Materials Compliance Team), WQPD, RMD, ENF, and TD;
- TCEQ Area and Region Directors, Section Managers, and staff of the Regional Offices; and
- Regulated Community.

A6 PROJECT/TASK DESCRIPTION

A6.1 Purpose/Background

The purposes of the RCRA and UIC programs are to ensure proper management of hazardous and nonhazardous waste and to prevent pollution of underground sources of drinking water in Texas, in accordance with 40 CFR Parts 144-148 (UIC) and 260-270 (RCRA). With respect to the RCRA and UIC programs, and depending on the activity being conducted, the TCEQ requires permits, authorizations or registrations, and corrective action procedures executed by the regulated community that are as stringent as federal requirements and in some cases more stringent to verify compliance with state and federal regulations. In addition, the regulated community engaging in RCRA/UIC program activities must comply with all state and federal regulations identified or referenced in this QAPP.

Specifically, nine divisions in two offices support the RCRA/UIC programs in the agency. The participating divisions are listed below along with a description of tasks unique to that division which supports activities detailed in this QAPP.

A6.2 TCEQ RCRA/UIC Participating Divisions

State implementation, management and oversight of the RCRA and UIC programs is a cooperative effort between nine divisions within TCEQ that work collectively to ensure compliance applicable to the RCRA or UIC activity being performed. In some instances divisions serve multiple programs since they provide compliance support services to water, waste and air program areas. The following divisions within the OCE and the OOW receive a portion of the RCRA/UIC grant monies and therefore have functions and responsibilities as defined in this QAPP. These functions and responsibilities are briefly described below.

A6.2.1 Waste Permits Division (WPD)

The WPD performs activities associated with the permitting and registration of facilities involved in the storing, processing or disposing of hazardous and nonhazardous industrial wastes and special wastes for RCRA. They contribute to implementation of the RCRA program through the following functions:

- Reviewing environmental data provided from external sources in permit applications;
- Verifying and validating sampling results provided by both commercial and in-house laboratories according to method/program and QAPP requirements;
- Reviewing environmental data submitted by RCRA facilities pursuant to permit requirements;
- Reviewing environmental data submitted with an application for a permit (new, renewal, amendments and modifications) by RCRA facilities;
- Reviewing waste classification data submitted by entities generating/managing hazardous waste and industrial solid wastes;

- Evaluating environmental data submitted by RCRA facilities related to Comprehensive (Confirmatory) Performance Test burns at Hazardous Waste Combustion units as required by 40 CFR Part 63, Subpart EEE;
- Evaluating the RCRA program for optimization purposes to meet the needs and requirements of the State of Texas legislature mandates;
- Performing technical analysis of submission from regulated entities; and
- Performing QA compliance audits of RCRA programs.

A6.2.2 Remediation Division (REM)

The REM oversees the investigation and cleanup associated with releases of hazardous waste and/or hazardous substances subject to the Texas Risk Reduction Program (TRRP) rules (30 TAC Chapter 350) or the 30 TAC Chapter 335 rules. These rules establish response action requirements for the corrective action program areas of the TCEQ. The REM utilizes the technical services of the Toxicology, Risk Assessment, and Research Division on reviewing risk assessments of toxicity to human health and environment, as needed. The REM role in implementing the RCRA/UIC programs includes:

- Reviewing environmental data submitted by RCRA facilities in the form of corrective action plans/reports to verify contamination is remediated at the appropriate level;
- Ensuring sites are assessed and remediated to levels that protect human health and the environment;
- Verifying waste management units or facilities are taken out of service and closed properly; and
- Overseeing post-closure care and monitoring.

In implementing the Forum on Environmental Measurement Directive 2012-02, the VCP-CA section manager will assess and document the competency of REM staff via the established performance evaluation process.

A6.2.3 Occupational Licensing and Registration Division (OLRD)

The OLRD supports various agency programs including the registration of IHW facilities. The OLRD contributes to the implementation of the RCRA and UIC programs by:

- Collecting information on hazardous waste generators, hazardous waste transporters, RCRA/UIC permitted facilities and TSD facilities including basic information on UIC units associated with hazardous and/or industrial waste.

A6.2.4 Program Support and Environmental Assistance Division (PSEAD) and Regional Offices

The Program Support and Environmental Assistance Division is responsible for central-office and regional coordination and supports the four areas: North Central and West Texas, Coastal and East Texas, Border and Permian Basin, and Central Texas. This field operations network, consisting of 16 Regional Offices, is responsible for the following as it relates to the RCRA/UIC programs:

- Investigating hazardous waste generators, transporters, TSD, and other facilities to ensure that these entities are properly managing solid and hazardous waste;
- Collecting and analyzing soil, sediment, surface water and groundwater samples to verify the presence of contamination;
- Collecting and analyzing waste samples to determine proper waste characterization;
- Observing demonstrations of mechanical integrity testing of Class I UIC wells;
- Performing investigations of Class I UIC wells;
- Developing enforcement action referrals for violations identified during investigations;
- Reviewing investigation progress and monitoring reports, including sampling analysis, to determine appropriate action; and
- Executing contracts with external laboratories for sample analyses (see page xiii).

A6.2.5 Critical Infrastructure Division (CID)

The Critical Infrastructure Division, Radioactive Materials Compliance and Chemical Reporting Section is responsible for the following as it relates to the UIC Program:

- Investigating uranium mining facilities (Class III wells, production areas) to determine compliance with permitting and regulatory requirements;
- Inspecting the on-site laboratories at the uranium mining facilities;
- Witnessing plugging activities of the Class III wells at the uranium mining facilities;
- Reviewing groundwater data submitted by uranium mining facilities;
- Reviewing plugging reports for the Class III wells submitted by uranium mining facilities;
- Coordinating with Radioactive Materials Division, UIC Permits Section on 7520 reports for semi-annual and federal fiscal year to U.S. EPA Region 6 related to the TCEQ UIC program; and
- Coordinating with the Radioactive Materials Division, UIC Permits Section on an annual report to U.S. EPA Region 6 related to the TCEQ UIC program.

A6.2.6 Enforcement Division (ENF)

The Enforcement Division is responsible for investigating violations of state environmental laws and, when necessary, developing formal enforcement cases in accordance with state statutes and agency rules. Their responsibility in implementation of the RCRA and UIC programs includes:

- Initiating enforcement actions from Enforcement Action Referrals;
- Tracking enforcement activities;

- Reviewing and responding to notices and disclosures submitted pursuant to the Texas Environment, Health, and Safety Audit Privilege Act; and
- Processing compliance history appeals.

A6.2.7 Monitoring Division (MD) Laboratory and Quality Assurance Section

TCEQ QA Management and the Texas Laboratory Accreditation Program reside in this section of the Monitoring Division. The Laboratory and Quality Assurance Section's supporting role for the RCRA/UIC programs includes:

- Auditing and issuing accreditations to environmental laboratories in accordance with 30 TAC Chapter 25;
- Reviewing the RCRA/UIC QAPP for completeness and correctness according to U.S. EPA QA/R-5 and TCEQ QMP current revision; and
- Assessing the compliance of requirements for quality systems.

Task components rely on guidance provided in the 40 CFR Parts 144-148 and 260-268, SW-846 and HSWA Sections 3004 and 3005 in order to maintain a consistent scientific basis for decision making. The management portion of these components uses guidance provided in the U.S. EPA Guidance for Quality Assurance Project Plans, (U.S. EPA QA/G-5), the Performance Partnership Grant (PPG), and agency policy and procedures.

A6.2.8 Radioactive Materials Division (RMD)

The RMD is responsible for:

- Permitting of Class I and Class III injection wells;
- Permitting subject to 30 TAC 335.47(c)(3)
- Authorization of production areas for *in situ* mining uranium;
- Authorization of Class IV injection wells used for environmental remediation at RCRA or Superfund Sites;
- Authorization of Class V injection wells for environmental remediation, stormwater management, aquifer storage and recovery, aquifer recharge, heating and cooling and other miscellaneous uses;
- Reviewing environmental data submitted by UIC facilities pursuant to permit requirements;
- Reviewing environmental data submitted with an application for permit (new, renewal, amendments, and minor modifications) by UIC facilities;
- Reporting annual UIC program information to U.S. EPA in accordance with federal UIC Rules (40 CFR §144.8(b)(2)) as well as grant-related reporting;
- Rulemaking in response to state and federal mandates; and
- Maintaining and updating of UIC Program federal authorization.

A7 QUALITY OBJECTIVES AND CRITERIA

A7.1 Purpose/Background

This section defines minimum criteria for all entities meeting regulatory compliance under this QAPP. The RCRA and UIC programs use a systematic process for planning data collection activities. The purpose of this element is to document the data quality objectives (DQOs) of a project and to establish performance criteria for the mandatory systematic planning process and measurement system to be used to generate data under this QAPP.

A7.2 Specifying the Quality Objectives

This section describes the quality of data needed for project decision making under the RCRA and UIC programs. The data submitted by the regulated entities as well as the data generated by this agency from its contract and agency laboratories must be of known, traceable, documented, and reported quality. The data must also be sufficient in its intended use which is to support the decision making process used to protect human health and the environment from mismanagement of hazardous and industrial solid wastes. The following qualitative and quantitative approaches define the RCRA and UIC program DQO processes.

A7.2.1 Intended Use of Data

Data generated for use in the RCRA/UIC programs may be used for the following purposes:

- Determining the presence and the extent of contamination in the environmental media of concern (i.e., soil, water, and air);
- Determining the concentration and/or classification of a waste through a hazardous waste determination;
- Determining regulatory compliance issues and initiating cleanup activities through enforcement actions, permitting procedures, or other applicable means, as necessary, to achieve cleanup of a site;
- Defining operating conditions for permitted units and interim status units; and
- Determining the compliance of an injection well facility with applicable state and federal regulations.

A7.2.2 Type of data needed to support agency decisions

The type of data needed to support TCEQ decisions includes the following:

- Representative waste and media samples analyzed by an environmental laboratory accredited by TCEQ (unless excepted by 30 TAC 25.6) according to requirements contained in the TWC 5.134 and 30 TAC Chapter 25 (Environmental Testing Laboratory Accreditation and Certification), Subchapters A and B, with appropriate laboratory analytical results in accordance with the procedures and protocols of SW-846, or other approved protocols of documented analytical methods from the U.S. EPA, the American Society for Testing and Materials, other organizations nationally

recognized as having scientifically valid methods, by the agency Executive Director, or a laboratory method completely documented in an appropriate standard;
- Data supported by documented sample collection and handling procedures;
- Site specific data on non-permitted facilities that manage hazardous waste;
- Trend analysis and planning;
- Qualified data in the databases such as the Internal Data Applications (IDA), the Permitting and Registration Information System (PARIS), and RCRA Information (RCRAInfo);
- Well operating and maintenance information including demonstrations of mechanical integrity; and
- Corrective action data that meet the appropriate regulatory requirements of 40 CFR Parts 260-270 and 30 TAC Chapters 335 (Subchapter S) and/or 350 (TRRP Rules) regarding applicable permits, enforcement agreements and approved plans or reports.

A7.2.3 Conditions under which the data should be collected

Sample collection procedures are outlined in the SW-846 and U.S. EPA protocols.

Data are also collected to determine whether generators, permittees, receivers and transporters have used proper or improper waste classification and waste management practices including disposal and recycling of waste. These samples may be taken any time an investigator needs to make these determinations or the generator is required to report this information.

Sample collection procedures that support data to demonstrate compliance with RCRA/UIC programs by the regulated community must be consistent with procedures outlined in SW-846 and U.S. EPA protocols and documented on Chain of Custody (COC) forms retained at the on-site laboratory or commercial laboratory for a minimum of 5 years.

A7.2.4 Tolerable limits on the probability of making a decision error due to uncertainty in laboratory data

The decision maker relies on state and federal regulations (40 CFR Parts 144-148 and 260-270 and 30 TAC Chapters 289, 305, 331, 335 and 350) in evaluating the allowable uncertainty in the data submitted by the regulated community.

The primary goal of this QA program is to ensure the accuracy and completeness of the data which ultimately will be used to determine the status of the sites investigated. To achieve this accuracy and completeness, all sampling, analysis, and data management activities will be conducted in accordance with pre-set standards, and these activities will be reviewed regularly to maintain full compliance with the standards. This program has been designed so that corrective action can be implemented quickly, if necessary, without causing undue expense or delay. The standards and review procedures the TCEQ will use to attain optimum accuracy and completeness of data are outlined in this plan.

All contractors, subcontractors, and permittees to the TCEQ will be required to follow these standards and procedures, at a minimum. All data submitted to the TCEQ, used

to demonstrate compliance with the RCRA and UIC programs, shall be of known and documented quality.

The minimum QC procedures a laboratory needs to follow are in the SW-846 Manual, other U.S. EPA methods, and the 2016 TNI Standards. However, as stated in Chapter 2 of SW-846, "the performance data included in these methods are for guidance purposes only, and are not intended to be and must not be used as absolute QC acceptance criteria…" Therefore, additional performance standard criteria have been added in this QAPP. For radiological data, the analytical data requirements including the quality control parameters and acceptance criteria must adhere to and comply with the U.S. EPA Multi-Agency Radiological Laboratory Analytical Protocols (MARLAP).

For more information regarding QA/QC criteria for methods used to meet compliance with the RCRA/UIC programs, refer to Section B5.

A7.3 Holding Times

Samples collected under this program will be analyzed within designated holding times specified by U.S. EPA protocols set for samples collected under this program to ensure better probability of sample integrity. Please refer to Section B.2.4 for more information and tables.

A8 SPECIAL TRAINING/CERTIFICATION

A8.1 Purpose/Background

Subsection A8.2 discusses the training which TCEQ regional environmental investigators must complete in order to conduct investigations of RCRA facilities, to collect samples, prepare the samples for analysis, and to develop investigation reports. General training requirements for TCEQ staff are discussed in Section 3 of the TCEQ QMP.

Training and education requirements for laboratory personnel are specified in each laboratory quality assurance manual (QAM) as part of their accreditation documentation. Training and education requirements may also be found in the 2016 TNI Standards.

Environmental data operations conducted for the RCRA and UIC programs by TCEQ staff and contractors are covered under documented quality systems. All personnel are deemed qualified to perform their work through educational credentials, specific job/task training, required demonstrations of competency, and internal and external assessments of their respective programs. All participating laboratories are NELAP-accredited. Records of educational credentials, training, demonstrations of competency, and assessments are retained within the respective divisions and laboratories, and are available for review.

A8.2 Investigator Training

Environmental Investigators are trained to conduct investigations of RCRA facilities, to collect samples, to prepare the samples for analysis, and to develop investigation reports in accordance with the Professional Development Plan Requirements for Environmental Investigators. There are separate PDPs for "Basic Investigators" and "Senior Investigators" which specify required reading, equipment proficiencies, training courses and investigations, activities, and reports. The maintenance of the investigator training and certification records is the responsibility of the investigator's manager.

A8.3 Mechanical Integrity Tests (MIT)

All Class I waste injection wells in Texas are required by 30 TAC 331.43(a) and 40 CFR 146.68(d) to undergo a demonstration of mechanical integrity. Regions 1 (Amarillo), and 14 (Corpus Christi) UIC Investigators review all annual MIT reports, and over a three-year period, physically observe mechanical integrity tests at active wells (i.e., about one-third of the annual MITs are observed by region staff each year). The dates for annual MITs are well-specific, based on the date of the last MIT performed. When possible, UIC Permits Section staff (Appendix B) and/or region office staff observe MITs conducted in association with new well construction and well closures, as schedules permit. Training of staff members for observing this testing includes familiarization with the above cited state and federal regulations. Training also includes studying the TCEQ's Basic Guidelines for MITs and Related Cased Hole Wireline Logging and becoming familiar with the MIT Report Form. Accompanying an experienced investigator on a MIT completes the staff members' initial training.

MITs on Class III wells are accomplished in part with a casing pressure test. This test

confirms the integrity of the casing. The second part of the MIT consists of a review of cementing records which documents the integrity of the casing - borehole annulus. CID UIC staff will witness some of the pressure tests and review the cement records during investigations.

A8.4 Well Constructions, Workovers and Plugging

When permittees notify TCEQ of new Class I injection well construction and well plugging, UIC Permits Section staff either observes aspects of the well construction and well plugging operations or coordinates with the permittee's field crews via phone and email to review and approve changes to procedures that may be warranted. The UIC staff coordinates with the Regional staff regarding new well construction and well plugging operations. Regional staff review and approve Class I well work-over plans and coordinate with permittees for actions related to well workovers and associated MITs. Initial training for these duties includes familiarization with state and federal rules, attending classes in well construction and well log interpretation when available, and accompanying an experienced UIC engineer, geologist, or investigator on a well construction and a well plugging operation.

A8.5 Laboratory Accreditation

The Texas Laboratory Accreditation Program in the Laboratory and Quality Assurance Section of the MD has responsibility for implementation and oversight of the accreditation program. The Texas Laboratory Accreditation Program also tracks the proficiency testing (PT) performance of each accredited laboratory.

Data generated by exempt on-site labs must meet the performance criteria of this QAPP and be documented using the analytical checklist and Case-Narrative supplied at the end of the QAPP.

A9 DOCUMENTS AND RECORDS

A9.1 Purpose/Background

This section defines the records critical to the project (records needed to complete the project), information to be included in the reports, data reporting format, and document control procedures. These records:

- Itemize the information and records included in the data report package and specify the reporting format for hard copy and electronic forms, when used;
- Identify any other records and documents applicable to the project such as audit reports, interim progress reports, and final reports; and
- Specify or reference all applicable requirements for the final disposition of records and documents.

A9.2 Information Included in the Reporting Packages

Data used for the demonstration of compliance (e.g., data collection in support of litigation or compliance with a permit) must be of known and documented quality. Records required for the data or reporting packages are specified in sections A9.2.1 through A9.2.5.

A9.2.1 Field Operations

Data contained in a reporting package varies depending on the type of investigation conducted and the purpose of the sampling activity. Field investigation reports with sample results include, at a minimum, sample collection records, COC records, analytical results, associated results from QC items (including blank, spike recovery, duplicate, and surrogate recovery data) and a written discussion of the sampling event. The retention places and times for this information are documented in the Field Operations Records Retention Schedule, which is part of the Agency Records Retention Schedule. The OCE Field Operations Standard Operating Procedures (FOSOP) Investigation Guidance Documents on the Sharenet website specify what information must be included in investigation reports.

Investigator training and certification records are maintained by the Regional Offices as described in Sections 1.0 and 3.0 of the Professional Development Plan (PDP) document.

OCE has written procedures in place for initiating enforcement as well as for tracking enforcement activity for all investigations conducted. The appropriate level of enforcement must be determined in accordance with the Enforcement Initiation Criteria (EIC) guidance (also available from the TCEQ Home Page: http://www.tceq.texas.gov/ then using the search window). Alleged violations will be addressed either by Notice of Violation (NOV) or Notice of Enforcement (NOE) for formal enforcement action. SOPs located on the internal OCE Field Operations website (FODWEB) specify how to conduct investigations and take enforcement action when appropriate.

A9.2.2 Laboratories

Accreditation and audits of the TCEQ contract laboratories are performed and documented by a laboratory auditor in the MD. The Sugar Land Laboratory is accredited through the Louisiana Department of Environmental Quality (LDEQ). Laboratory accreditation and audit documents are retained by the MD and LDEQ for a minimum of 5 years.

Contract laboratories analyze 90% of the RCRA samples collected by the TCEQ through contract with the MD. The other 10% is analyzed by the TCEQ Sugar Land Laboratory. The DSHS laboratory analyzes all of the TCEQ UIC groundwater samples that TCEQ field staff have taken at a UIC permitted *in-situ* uranium mining sites through the DSHS laboratory/RMD contract.

The contract laboratories maintain QAMs which are submitted to the TCEQ as part of receiving the contract. The manuals are also maintained by staff within the Accreditation Group of the MD. Each contract requires record retention. The contracted laboratories shall maintain all records associated with the analysis of the samples, including documentation of sample receipt, standard and reagent preparation logs, instrument run logs, sample preparation logs, instrument maintenance logs, and facility maintenance logs (e.g., temperature logs, balance calibration logs, etc.) for at least 5 years. Each final laboratory data report submitted to TCEQ will include the COC record, the sample results and associated QC including blank, spike recovery, duplicate, and surrogate recovery data so that the quality of the data is known and a determination of its usability can be made. The TCEQ Sugar Land Laboratory maintains similar records. These records are stored at the Sugar Land Laboratory for 5 years.

The TCEQ and contract laboratories reduce data according to the specific methods and to standard practices for rounding. All data is verified by the laboratories after input into a Laboratory Information Management System (LIMS). The specific procedures and responsibilities are discussed in each laboratory's QAM or SOPs.

Laboratories (contract, commercial, and on-site) performing analyses to demonstrate compliance with federal and state RCRA/UIC regulations must follow requirements as designated in 30 TAC Chapter 25 (relating to Environmental Testing Laboratory Accreditation and Certification) and the 2016 TNI Standards.

A9.2.3 IHW Permits Section

Laboratory data used by the IHW Permits Section for waste classification audits, variances or exclusions from the definition of solid waste, or from regulation as a certain classification of solid waste which include the following: process knowledge, custody documentation for the samples analyzed in a laboratory, QA/QC data for the samples (e.g., project specific matrix spikes, duplicates, etc.), analytical results for the samples and a description as to how these samples are representative of the waste as a whole.

There may be additional information provided (e.g., extenuating circumstances as to why a less stringent classification may be warranted). Data packages submitted for waste classification purposes will include, at a minimum, the requirements found in 30 TAC 335.509 - 335.514. Once the analysis is completed and a determination is made, the data package and decision documentation is combined and sent to the TCEQ Central

Records where it is maintained for 5 years, then stored at the Texas State Library and Archives Commission for 30 years.

A9.2.4 Hazardous Waste Compliance Review

Data reviewers at the agency rely on the information in reporting packages submitted by Regional Offices and the regulated community. The report packages are evaluated for administrative completeness and technical information as required by the governing rule, regulation, permit, order/judgment or approved plan or report. Refer to Section D2 (Verification and Validation Methods - Table D2.2.1) for a list of supporting data that the data reviewer looks for in the report package or may be requested by the data reviewer. Data requirements required for the management of hazardous waste as defined in this QAPP are determined on a site or unit basis through the DQO process with the regulated entity and may be permit specific. Documentation and retention of the data reviews are performed in accordance with the SOPs in the corresponding division and will include one of the following: completed checklists kept with the data, letters to the regulated entity regarding deficiencies and/or completeness, or memorandums to the file.

A9.2.5 Corrective Action Review

Corrective Action project managers review environmental data submitted by RCRA facilities in investigation and assessment reports, risk assessments, corrective action plans/reports, closure reports, and certifications. Project managers also review environmental data submitted by RCRA facilities with an application for a compliance plan (new, renewal, amendments and modifications) or pursuant to permit or compliance plan requirements. The content of these reports is specified under 40 CFR Parts 260-270, 30 TAC Chapter 335, and 30 TAC Chapter 350. The project managers review the reports to determine compliance with applicable rules and associated guidance documents.

The project managers ensure the regulated community follows applicable rules and the appropriate guidance documents when reviewing the data. The guidance documents applicable to environmental data include, but are not limited to, the TCEQ guidance document *Review and Reporting of COC Concentration Data under TRRP*, [RG-366 (TRRP 13)] and the July 23, 1998 memorandum *Implementation of the Existing Risk Reduction Rule*, also known as the Consistency Memo. The project manager documents the review in a corrective action review letter sent to the regulated entity which is tracked in IDA. The letter, which undergoes management and/or peer review prior to mail out, outlines deficiencies and/or compliance status based on the information provided in the report. The Corrective Action Program sends the report and the letter to the TCEQ Central Records where it is maintained for 5 years, then stored at the Texas State Library and Archives Commission for 30 years, in accordance with the TCEQ's *Record Retention Schedule*.

A9.3 Data Reporting Package Format and Documentation Control

This section discusses the various components assembled to document a concise and accurate record of all activities affecting data quality. The format of data reporting packages is consistent with the procedures used for data validation and data assessment.

A9.3.1 Field Operations Records

The PSEAD and the regional offices utilize a database, the Consolidated Compliance and Enforcement Data System (CCEDS), in which investigators document all investigations they conduct. Each regional office has access to CCEDS where investigation information is entered. After the field investigator completes the investigation report, it is approved by his or her manager and noted as "Approved" in the database. The data from CCEDS is uploaded into the RCRAInfo database.

A management report generated from CCEDS is used to verify that all investigation reports have been submitted promptly. Individual reports are reviewed by Regional supervisory personnel. Investigation information that is sent electronically to U.S. EPA from TCEQ's CCEDS database is verified at least annually. The U.S. EPA Region 6 can obtain reports on the number of investigations via the RCRAInfo database or by direct request to PSEAD or regional staff. The U.S. EPA Region 6 also conducts reviews under the RCRA grant during End of Year meetings.

A9.3.2 Laboratory Records

Laboratories will maintain all records associated with the analysis of the samples including documentation of sample receipt, standard and reagent preparation logs, instrument run logs, sample preparation logs, instrument maintenance logs and facility maintenance logs (e.g., temperature logs, balance calibration logs, etc.) for at least 5 years. Laboratories must also meet requirements in the 2016 TNI Standards regarding laboratory records management.

Where applicable or requested by agency staff, the following records will be included:

- Instrument detection and quantitation limits and relationship between the two;
- COC records;
- Sample identification cross-reference table that includes the laboratory and field IDs;
- Sample results with corresponding units;
- Laboratory blank results (method, instrument, etc.);
- Laboratory control sample (LCS) results;
- Matrix spike (MS) and matrix spike duplicate (MSD) results (when the sample used for the MS/MSD is from the site or project being evaluated);
- Surrogate results; and
- Verification/documentation that samples were extracted/digested and/or analyzed within appropriate holding times.

Laboratory data packages should also include discussions regarding any problems or anomalies. A laboratory review checklist or case-narrative should clearly document whether the laboratory has been accredited by TCEQ or other TCEQ-recognized

accrediting body for the matrices, analytical methods, and parameters relating to data included in the data package. The checklist or case-narrative should also document the QC parameters reviewed (e.g., calibration, continuing calibration, and other method-required parameters) against laboratory procedures, method specifications, and criteria specified in this QAPP to allow TCEQ data users to make a full determination as to the usability of the data. Please refer to Section D - Data Validation and Usability for complete instructions and additional information necessary for submitting laboratory data.

A9.3.3 IHW Permits Section

IHW Permits Section reviews data packages submitted for waste characterization purposes to ensure compliance with 30 TAC 335.509 - 511 and 335.513. The laboratory report must also include the COC record, the sample results and associated QC, including blank, spike recovery, duplicate, internal standards, results of interference check sample and surrogate recovery data, as applicable.

The IHW Permits Section consists of data validators, reviewers, and users of waste classification information. The data supplier is responsible for documenting that the waste classification DQOs are met and that the data supplied supports the specific classification assigned.

A9.3.4 UIC

UIC staff in CID enters data related to the investigations of Class III wells associated with *in situ* uranium mining projects, into the investigations tracking database CCEDS . UIC staff in Region 1 and Region 14 enters data into the investigations tracking database, CCEDS, including MIT inspections of waste disposal wells associated with *in situ* uranium mining projects and other components of the UIC program.

UIC Permits staff review data packages that are submitted as required in the UIC Class I Permit Application for waste characterization purposes to ensure compliance with 30 TAC 335.510, 335.511 and 335.513. The reviews are documented in a checklist which is kept with the permit application as long as the permit is in force.

The laboratory report must also include the COC record, the sample results and associated QC including blank, spike recovery, duplicate, internal standards, results of interference check sample and surrogate recovery data, as applicable.

Geologists and engineers are data validators, reviewers, and users of analytical information. The data supplier is responsible for documenting that the analytical DQOs are met and that the data supports the specific assigned purpose. Data reviewers rely on the information in reporting packages submitted by the regulated community as required by the governing rule, regulation, permit, order/judgment or approved plan or report.

A9.3.5 Hazardous Waste Compliance Review

Staff in applicable agency programs are primarily data users. The data users review and evaluate data packages submitted by the regulated community or the data supplier. The data supplier is responsible for ensuring that their compliance data package includes concise and accurate records of any activities that may impact data quality. Data are

reviewed utilizing the data review check list (Table D2.2.1 – Inputs from the Analytical Laboratory for Data Verification) in conjunction with the case-narrative, the state and federal rules and regulations (40 CFR Parts 260-270 and 30 TAC Chapter 335), and various guidance documents such as SW-846, RCRA Ground-Water Monitoring Technical Enforcement Guidance Document, RCRA Sampling Procedures Handbook, policies and procedures of the TCEQ as outlined in the Enforcement Standard Operating Procedures, RCRA Corrective Action Plan, Final U.S. EPA 520-R-94-004, May 1994, approved work plans and reports, and applicable permits, agreed orders and agreed judgments. Other U.S. EPA documents may be utilized during the review process in order to address site specific situations. Review documentation is maintained by the TCEQ Central Records section in accordance with the TCEQ Records Retention Schedule.

The compliance status of facilities is recorded in the RCRAInfo database. The data is available to U.S. EPA for pulling into various report formats as needed. The database provides the record of compliance with the TCEQ PPG for the current U.S. EPA fiscal year.

A9.3.6 Corrective Action Program Review

The data and reports submitted to the Corrective Action Program by the regulated entity conform to the requirements of 40 CFR Parts 260-270, 30 TAC Chapter 335, and 30 TAC Chapter 350. The regulated community is responsible for verifying the data package meets those requirements and the specifications in the TCEQ guidance document *Review and Reporting of COC Concentration Data under TRRP*, [RG-366 (TRRP 13)] or, when applicable, the July 23, 1998 memorandum *Implementation of the Existing Risk Reduction Rule*, also known as the consistency memo. The project manager documents the review of the data/reports in a corrective action review letter sent to the regulated entity which is tracked in IDA. The letter, which undergoes management and/or peer review prior to mail out, outlines deficiencies and/or compliance status based on the information provided in the report. The Corrective Action Program sends the report and the letter to the TCEQ Central Records where it is maintained for 5 years, then stored at the Texas State Library and Achieves Commission for 30 years, in accordance with the TCEQ's *Record Retention Schedule*.

A9.4 Official State Records

TCEQ OPP 13.02 specifies record management procedures necessary to safeguard the legal and financial rights of the State of Texas and any persons directly affected by activities of the TCEQ. Records produced by TCEQ and maintained as official records of the State of Texas are documented in the TCEQ Records Retention Schedule. Reports are maintained by the TCEQ Records Management Program in Austin, Texas. Some retention schedules are mandated by rule while others are based on historical need for the document type. An annual review of the schedule is conducted in January with modifications made as necessary. Project managers or designees shall maintain QA records relating to their respective projects and ensure these records are identified in the Records Retention Schedule.

B1 SAMPLING PROCESS DESIGN

B1.1 Purpose/Background

Sampling designs are not developed by the RCRA/UIC programs or TCEQ staff. The TCEQ staff in the WPD, REM, and regional offices are responsible for reviewing and approving the sampling design submitted by the responsible party (RP) or their representative. During the review process, the TCEQ staff follow the protocol established in 40 CFR, Parts 144-148 and 260-270 and in SW-846 to assess the sampling designs for the appropriate type of sampling plan (e.g., trial/risk burn data collection, closure of permitted units, clean-up of unauthorized releases).

Periodically, TCEQ field investigators also conduct split or final sampling with an RP based upon the sampling design previously submitted by the RP and approved by TCEQ personnel. Sampling procedures are conducted in accordance with chapters 1 and 9 of SW-846.

If, during an investigation of a RCRA/UIC facility, a TCEQ investigator suspects mismanagement of hazardous waste or violation of federal and/or state rules, then the TCEQ investigator follows U.S. EPA RCRA sampling handbook protocol in determining the sampling process. See Section B2.2 for further explanation of sampling process for TCEQ investigators and Section B2.3 for sampling process for TCEQ regulated entities.

Sampling designs for permittees are unique and vary depending on the type of facility, type of solid waste or process, site geology, monitoring activities, or remediation.

B2 SAMPLING METHODS

B2.1 Purpose/Background

The primary purpose of the sampling program, whether it be initiated by agency staff, permittees, or other regulated entities, is to obtain representative samples of waste, soil, water, and any other media possibly containing or contaminated by hazardous or Class 1 nonhazardous wastes or Class III *in situ* uranium operations. Representative samples aid in evaluating the nature and extent of waste deposits present at each site or in determining a release from a unit.

Sampling procedures to demonstrate compliance for the various RCRA/UIC programs in the agency by regulated entities must be documented and samples must be collected according to the waste analysis plans (WAPs), permit specifications, remediation or corrective action plans, waste disposal classification verification, or enforcement orders.

In general, sampling requires the collection of adequately sized representative samples of the wastes or contaminated media. Sampling situations vary widely, and therefore no universal sampling procedure can be recommended. This section outlines several procedures for sampling different types of wastes in various physical states and containers.

B2.2 Sampling Considerations by Regional Office RCRA Investigators

RCRA field staff collect soil, sediment, surface water, groundwater, and solid waste samples suspected of containing hazardous waste. Samples are also collected to determine the practices used by generators, receivers, and transporters for waste classification and waste management, including waste disposal and recycling of waste. These samples may be taken any time an investigator needs to make these determinations or the generator is required to report this information. These media and waste can often be complex, multi-phase mixtures of liquids, semi-solids, sludges, or solids. The liquid and semi-solid mixtures vary greatly in viscosity, corrosivity, volatility, explosivity, and flammability. The solid wastes can range from powders to granules to big lumps. The wastes may be in drums, barrels, sacks, bins, vacuum trucks, ponds, or other containers. Sample collection procedures that support data to demonstrate compliance with RCRA/UIC programs must be consistent with procedures outlined in SW-846 and U.S. EPA protocols.

Sampling these diverse types of media and wastes requires different types of samplers. Specific sample collection devices and the procedures for preparing, using, and decontaminating the sample collection devices are described in SW-846 and U.S. EPA protocols. In the event of a sampling or measurement system failure, the investigator is required to try and resample and resubmit the samples whenever possible.

Sufficient volume of sample, representative of the main body of waste or environmental media, must be collected. The sample must also be adequate in size for all analytical needs. The concentration of the contaminant, the type of analysis, and the sample medium determines the volume requirements. The SW-846 and U.S. EPA protocols give general guidelines for volume requirements.

The following equipment should be on hand when sampling wells:

1. Cooler for sample shipping and cooling, sample container, chemical preservatives, and appropriate packing cartons and filler;
2. Thermometer, pH paper and meter, digital camera, labels, appropriate keys (for locked wells), tape measure, water level indicators, and specific-conductivity meter. Sample preservation, analysis, and analytical quality control shall be as defined in the most recent issue of Methods for Chemical Analysis of Water and Wastes (EPA - Technology Transfer). Total dissolved solids shall be determined by evaporation at 180°C;
3. Pumps will normally be used to obtain samples, although samples may be obtained directly from the pump discharge line for high yielding monitoring wells and wells with dedicated pumps. Samples intended to determine volatile organic compounds (VOCs) should not be obtained directly from the pump discharge line unless collecting from a very low flow discharge as a high flow will bias the intended VOC data low. If unable to collect by low flow, the data needs to be qualified as biased low;
4. Bailers and monofilament line with tripod-pulley assembly (if necessary); and
5. Decontamination solutions – tap water, distilled water, Alconox, isopropanol, CLP – specified grade water.

Ideally, sample withdrawal equipment should be completely inert, economical, easily cleaned and reused, able to operate at remote sites in the absence of power resources, and capable of delivering variable rates for well flushing and sample collection.

Table B2.2.1 lists the methods for sampling of emissions from facilities that burn hazardous constituents, as defined in SW-846 as updated. Sampling of emissions from facilities burning hazardous constituents requires specialized sampling devices and procedures. Tables B2.2.2 and B.2.2.3 give general guidelines for volume requirements for aqueous and soil and sediment samples respectively. Preservation and holding times are given in Section B2.4.

During the investigation, the investigator should identify the types and locations of samples that may need to be collected. The investigator will identify:

- The media or wastes to be sampled;
- The physical locations to sample;
- The steps within a treatment process to sample;
- The physical characteristics of the medium to be sampled; and
- Other relevant information that would be helpful in developing a sampling plan.

Table B2.2.1 Sample Collection Methods for Emissions from Hazardous Waste Facilities

Analysis	Methods
Particulate	U.S. EPA Method 5**
Moisture	U.S. EPA Method 4**
Velocity/Temperature	U.S. EPA Methods 1,2**
O_2 – Oxygen	U.S. EPA Method 3A**
CO_2 – Carbon dioxide	U.S. EPA Method 3A**
Total Organic Emissions (Unspeciated Volatile Organics)	0040*
Total Organic Emissions by total chromatographable organics (TCO) and gravimetric (GRAV) analysis procedures	0010*
Particle Size Distribution	U.S. EPA Method 201***, 201A*** or 5**
Aldehydes/Ketone	0011*
Polychlorinated Dibenzo-p-dioxins/ Polychlorinated Dibenzofurans	0023A*
Volatile Organic Compounds Semivolatile Organic Compounds	0030 or 0031* 0010*
Principal Organic Hazardous Constituents/Tedlar Bag	0040*
HCl/Cl2 - Hydrogen chloride and chlorine emissions	0050/0051*
Metals	0060* or U.S. EPA Method29 **
Hexavalent Chromium	0061*

* *Test Methods for Evaluating Solid Waste, Physical/Chemical Methods, SW-846, 3rd Edition*
** 40 CFR, Ch. 1, Pt 60, Appendix A
*** 40 CFR, Ch. 1, Pt. 51, Appendix M

Table B2.2.2 Bottles Required for Aqueous Samples

Analysis	Required Volume	Container Type
Volatile Organics	80 mL	2 40-mL volatile organic analysis (VOA) glass vials
Extractable Organics (base/neutral/acid) and pesticide/ (BNA) polychlorinated biphenyl (PCB)	4 liters	2 80-ounce or 4 1-liter amber glass bottles w/Teflon lined lid
Metals	1 liter	1 1-liter polyethylene bottle
CN- & S^{2-} Cyanide & Sulfide	1 liter	1 1-liter polyethylene bottle
Inorganic (non-metal)	1 liter	1 1-liter polyethylene bottle

Table B2.2.3 Bottles Required for Soil and Sediment Samples

Analysis	Required Volume	Container Type[1]
Volatile Organics	5 grams/sample	3-40 ml VOA glass vials sealed after sample added from sample coring device or 3 hermetically-sealed sample vials
Extractable Organics (BNA and pesticide/PCB)	6 ounces	1 8-ounce or 2 4-ounce wide-mouthed glass jars w/Teflon lined lid
Metals, Cyanides and Sulfides	6 ounces	1 8-ounce or 2 4-ounce wide-mouthed glass jars w/Teflon lined lid

Note: 1 – Sample containers will conform to U.S. EPA regulations for the appropriate constituents.

B2.3 Sampling Considerations by Regulated Entities Demonstrating Compliance

The REM oversees the cleanup of sites with soil and groundwater contamination associated with releases of industrial and municipal hazardous and industrial non-hazardous wastes. The regulated community is required to follow requirements in 30 TAC Chapter 350 (relating to TRRP) for all sampling and corrective action considerations.

Chapter 350 specifies the information and procedures necessary to demonstrate compliance with the TRRP. This program provides a consistent corrective action process directed toward protection of human health and the environment balanced with the economic welfare of the citizens of this state. This program uses a tiered approach incorporating risk assessment techniques to help focus investigations and to determine appropriate protective concentration levels for human health and for ecological receptors. The program also sets reasonable response objectives that will protect human health and the environment and preserve the active and productive use of land. Once subject to the TRRP, the person must comply with all requirements of the adopted rule unless another agency rule states otherwise, or a federal standard or state statutory requirement is more stringent.

The WPD oversees entities which generate, treat, store, or dispose of hazardous or nonhazardous solid waste and are subject to RCRA Subtitle C or D sampling and analysis requirements. The WPD also oversees entities subject to the NESHAP final standards for hazardous waste combustors (40 CFR Part 63, Subpart EEE). Sampling design considerations depend upon a number of variables such as: type of facility generating, treating, storing, or disposing of the hazardous waste; chemicals of concern; media type; number of samples necessary to get a representative sample; corrective action (remediation) or other actions necessary to demonstrate compliance to RCRA regulations.

The RMD, UIC Permits Section, oversees entities responsible for the disposal of hazardous or nonhazardous industrial waste or municipal solid waste via injection wells, and entities subject to 30 TAC 335.47(c)(3). Sample design depends on the facility design, the waste being injected, the timing of samples necessary to get representative samples, the injection well design, or other actions necessary to demonstrate compliance with UIC regulations.

The sampling equipment, preservation, and holding time requirements, recommended to the regulated community for sampling of air emissions from facilities that burn hazardous constituents, for the specific analytical method for each analyte are in SW-846 and in the Handbook Quality Assurance/Quality Control (QA/QC) Procedures for Hazardous Waste Incineration.

B2.4 Preservation and Holding Time Requirements

Maximum holding times (MHTs) have been established by the U.S. EPA and are presented in the CFRs and SW-846. Holding times can be extended if preservation techniques are employed to reduce biodegradation, volatilization, oxidation, sorption, precipitation, and other physical and chemical processes.

The U.S. EPA-established preservation and holding times that may be found in Table B2.4.1 for aqueous samples and Table B2.4.2 for soil and sediment samples. Acceptable sample containers for the collection of aqueous samples and for the collection of soil and sediment samples are listed in Table B2.2.2 and Table B2.2.3, respectively. Analyses performed on samples collected under this program will be within U.S. EPA-established MHTs. Tables B2.4.1 and B2.4.2 list the types of analyses and the applicable holding times. The holding times recommended to the regulated community for sampling of air emissions from facilities that burn hazardous constituents are in SW-846 or in the Handbook of Quality Assurance/Quality Control (QA/QC) Procedures for Hazardous Waste Incineration. Table B2.2.1 lists the methods for sampling of emissions constituents.

Table B2.4.1 Holding Times[1] and Preservation for Aqueous Samples

Analysis	Extraction/Digestion Times	Analysis Time	Preservation Method[2,]
Volatile Organic Compounds (VOCs)	NA	14 days	Hydrogen Chloride (HCL), Sulfuric Acid (H2SO4) or Sodium bisulfate (NaHSO4), to pH<2, cool ≤ 6C
Semi-volatile Organics Base/neutral/acids (BNA) Pesticides/PCBs	7 days	within 40 days after extraction	≤ 6°C
Metals	6 months	6 months, ASAP after digestion	Nitric acid (HNO_3) to pH<2
Mercury	28 days	28 days, ASAP after extraction	HNO_3 to pH<2
Hexavalent Chromium[3]	24 hours	within 24 hours after extraction4	≤ 6°C
Alkalinity	NA	14 days	≤ 6°C
Chlorides	NA	28 days	≤ 6°C
Conductivity	NA	28 days	≤ 6°C
Nitrate-N	NA	48 hours	≤ 6°C
Sulfates and Fluorides	NA	28 days	≤ 6°C
Total Dissolved Solids (TDS)	NA	7 days	≤ 6°C
Perchlorate	NA	28 days	≤ 6°C
Cyanides	NA	14 days	Sodium Hydroxide (NaOH) to pH>12, cool ≤ 6°C
Sulfides	NA	7 days	NaOH to pH>12, 2ml of 2N Zinc Acetate per liter, cool ≤ 6°C

Notes: [1]Holding times begin at the time of collection.

[2] Some waters may effervesce. If this occurs, perform no pH adjustment, cool, and have analyzed immediately. Refer to Chapter 4 of SW-846 Revision 4 for more detailed guidance regarding preservation of aqueous samples.

[3]If hexavalent chromium is analyzed by the Ion Chromatography method U.S. EPA 218.6, the holding time can be extended to 28 days.

Table B2.4.2 Holding Times[1] and Preservation for Soil and Sediment Samples

Analysis	Extraction/Digestion Times	Analysis Time (maximum holding time)	Preservation Method
Volatile Organic Compounds (VOCs)	NA	2 days if unpreserved, 14 days if preserved	For Remediation Activities: For low/med levels, extrude into empty tared hermetically sealed vials containing 5 mL H_2O, cool to ≤ 6°C, if not analyzed within 48 hours, store at < -7°C but > -20°C. For high levels, extrude into in tared hermetically sealed vials containing 5 mL MeOH, and cool to ≤ 6°C. For Waste Permits Activities: sealed zero headspace container preserved according to method specifications.
Semi-volatile Organics Base/neutral/acids (BNA) Pesticides/PCBs	14 days	within 40 days after extraction	≤ 6°C
Metals	6 months	6 months or ASAP after digestion	
Mercury	28 days	ASAP after extraction	≤ 6°C
Hexavalent Chromium	28 days	Within 4 days after extraction	≤ 6°C
Sulfides	NA	7 days	≤ 6°C
Cyanides	NA	14 days	≤ 6°C
TCLP Parameters			
VOCs	14 days	14 days	see individual methods
Semi-Volatile Organics, BNAs and Pesticides/PCBs	14 days/7 days to prep	within 40 days after extraction	≤ 6°C
Metals	6 months	within 6 months after extraction	None
Mercury	28 days	within 28 days after extraction	≤ 6°C

Notes: [1]Holding times begin at the time of collection.

B3 SAMPLE HANDLING AND CUSTODY

B3.1 Purpose/Background

Sample custody is an integral part of any sample collection and analysis plan and applies to both field and laboratory activities associated with sample collection and analysis. The first step to ensure sample integrity is to utilize the appropriate procedures in the field for collection, identification, preservation, and shipment of samples. When samples reach the laboratory, they are then monitored for proper preservation, assigned a laboratory number, and maintained at 6C or less, if required by the method of analysis, until sample preparation and analyses can be performed within required sample holding times. Sample handling procedures for all laboratories demonstrating compliance to RCRA/UIC programs must be described in their QAM and conform or be equivalent to the current standards applied to laboratories that are accredited.

B3.2 Sample Custody Procedure

Custody procedures requires permanent records of all sample handling and shipment. Custody procedures must be used to ensure sample integrity and legally and technically defensible data. The custody procedures for data used to demonstrate compliance with RCRA/UIC programs must be consistent with procedures outlined in SW-846 and U.S. EPA protocols. The custody procedures recommended to the regulated community for sampling of air emissions from facilities that burn hazardous constituents are in the Handbook of Quality Assurance/Quality Control (QA/QC) Procedures for Hazardous Waste Incineration.

B4 ANALYTICAL METHODS REQUIREMENTS

B4.1 Purpose/Background

To support the analytical needs of the RCRA program (and by extension, other waste site management programs), the U.S. EPA created and maintains SW-846, a methods compendium. Please refer to U.S. EPA Office of Resource Conservation and Recovery (ORCR) for more updates to SW-846.

The SW-846 is a guidance document meant to assist the analytical chemist and other users by suggesting sampling and analytical procedures that have undergone thorough evaluation to identify the strengths and weaknesses of the methods and the expected analytical performance for the range of sample types evaluated. The U.S. EPA position for the majority of the methods in SW-846 (which are not method-defined parameters) is: (1) SW-846 is not the only source of methods that can be used, (2) Methods in SW-846 do not need to be implemented exactly as written in SW-846; and (3) Performance data presented in SW-846 methods should not be used as regulatory default or absolute "QC requirement."

However, not all SW-846 methods are guidance. There are certain specific regulatory requirements to use SW-846 methods exactly as written. The U.S. EPA regulations state that, "Several of the hazardous waste regulations under Subtitle C of RCRA require that specific testing methods in SW-846 be employed for certain applications. These requirements relate to testing used to determine a specific kind of property that is termed a "method-defined parameter." The regulation goes on to say that, "*Any reliable method may be used to meet other requirements in 40 CFR Parts 260 - 270*" [emphasis added].

Currently, testing done to meet compliance with the MACT Standards must be done in accordance with 40 CFR Part 63, Subpart EEE. Any modifications to methods required in these rules must be approved by U.S. EPA Region 6.

B4.1.1 Method Selection

The analytical methods chosen by agency staff, permittees ,or other regulated entities to determine or verify compliance are varied and may be dependent upon the following: the chemicals of concern, type of sample media, detection requirements, permit requirements, criteria designated in program rules (e.g., TRRP rules for remediation activities), and that the method chosen to demonstrate compliance or decision-making must be included in the TCEQ Fields of Accreditation for which accreditation is offered and required. The methods that will be commonly used by Regional Office investigators are identified in the TCEQ Laboratory Contracts. A list of laboratories currently accredited along with the methods, media, and analytes they are accredited for can be found on the List of Accredited Laboratories and Their Fields of Accreditation.

Cases with no information available about the waste present a challenge for the regional office investigators when deciding the parameters to request for analysis. The final decision is left to the investigator.

For Regional Office staff, samples are sent to a laboratory contracted by the TCEQ or to the DSHS laboratory for UIC Class III uranium mining facility samples. These laboratories and any subcontractors are accredited by TCEQ according to 30 TAC Chapter 25 (relating to Environmental Testing Laboratory Accreditation and Certification) Subchapters A and B as amended, for the matrices, methods, and parameters of analysis, if available, unless the TCEQ agrees in writing to allow one of the regulatory exceptions specified in 30 TAC 25.6.

A laboratory that provides analytical data for RCRA Subtitle C and the UIC programs to a permittee must be accredited according to 30 TAC Chapter 25 (relating to Environmental Testing Laboratory Accreditation and Certification) Subchapters A and B as amended, for the matrices, methods, and parameters of analysis, if available, unless the laboratory meets one of the regulatory exceptions specified in 30 TAC 25.6.

B4.2 Preparation of the Samples

Table B4.2.1 lists the most common sample preparation procedures requested. The appropriate method is determined by the matrix (water, soil, sludge, emission samples, etc.) and the analytical method selected. Unless otherwise prohibited in SW-846, other agency or U.S. EPA-approved test methods may be used in order to prepare the samples for analysis. The preparation of samples must be described in each laboratory's QAM and conform or be consistent to the 2016 TNI Standards.

Table B4.2.1 Sample Preparation Procedures

Parameters	Method[1]
Organics	
Volatile organics (VOA)	5021A/5030B/5031/5035/5041A
Semivolatile organics (BNA)	3510C/3520C/3540C/3541/3550C/3542
Pesticides/PCBs	3510C/3520C/3540C/3541/3550C
Inorganics	
Metals	3005A/3010A/3015A/3020A/3050B/3051A

Note: [1]Test Methods for Evaluating Solid Waste, Physical/Chemical Methods, SW-3rd Edition, as updated

B4.3 Analytical Methods

Table B4.3.1 lists the most common analytical procedures used to meet regulatory compliance for the RCRA and UIC programs. For permittees or other entities using the services of a commercial laboratory, a complete list of methods/media/analytes for which the agency offers accreditation (also known as the Fields of Accreditation) may be found on the Laboratory Accreditation website. The methods can be used for the analyses of water, soils, sludges, emission samples, and other matrices. The minimum QC procedures that must be followed by accredited laboratories are detailed in Chapter Volume 1, Modules 2 to 7 of the 2016 TNI Standards (*relating to Quality Systems*). Additional, more stringent criteria may be specified in this QAPP, WAP, other program requirements, or conditions of the site (e.g., Remediation and TRRP Rules) based on facility type and type of action being taken for which samples are being collected.

On-site facility laboratories choosing not to be a 2016 TNI Standards accredited (Exempt by 30 TAC 25.6) facility must meet the minimum criteria described in this QAPP and in SW-846 method 8000 for organic analyses and method 7000 for metals. In addition, all laboratories are required to maintain an up-to-date QAM which describes the QA practices of the laboratory. The QC requirements are also discussed further in Section B5. Where specific acceptance criteria are not given, such as for surrogate recoveries, the laboratories are to develop their own criteria and update the limits on at least an annual basis. The limits are reported to the data user in the report QC package and their suitability will be evaluated by the data user.

Table B4.3.1 Analytical Procedures

Parameters	Method
Organics	
Volatile organics (VOA)	8260*
Semivolatile organics (BNA)	8270*
Pesticides/PCBs	8081/8082*
PCBs (emission samples only)	U.S. EPA 1668
Aldehydes/Ketones	8315*
Polychlorinated Dibenzo-p-dioxins/ Polychlorinated Dibenzofurans	8290*
Polycyclic aromatic hydrocarbons (PAHs)	California Air Resources Board (CARB) Method 429
Inorganics	
Alkalinity	2320
Ammonia-N	350.1
Chlorides	300.0/ 9057*
Conductivity	2510
Cyanides	9010/9012/9013*
Nitrate-N	351.1/353.2
Sulfates and Fluorides	300.0/6500/9056* 375.4
Sulfides	9030B/9031/9215*
Total Dissolved Solids (TDS)	160.1
Metals	
Aluminum	7020/6010/6020*
Antimony	7040/7041/6010/6020*
Arsenic	7060/7061/6010/6020*
Barium	7080/7081/6010 6020*
Beryllium	7090/7091/6010/6020*
Cadmium	7130/7131/6010/6020*
Calcium	3500-Ca/7140/6010/6020*
Chromium	7190/7191/6010/6020*

Table B4.3.1 Analytical Procedures

Parameters	Method
Chromium (Hexavalent)	7195/7196/7197/7198/7199*
Cobalt	7200/7201/6010/6020*
Copper	7210/7211/6010/6020*
Iron	7380/7381/6010/6020*
Lead	7420/7421/6010/6020*
Magnesium	3500-Mg/7450/6010/6020*
Manganese	7460/7461/6010/6020*
Mercury	7470/7471/6010/6020*
Nickel	7520/7521/6010/6020*
Potassium	3500-K/7610/6010 / 6020*
Radium-226	U.S. EPA 903.1A/SM7500-RaC
Selenium	7740/7741/7742 / 6010 / 6020 *
Silver	7760A/7761/6010/6020 *
Sodium	3500-Na/7770/6010/6020 *
Uranium	U.S. EPA 200.8/SM7500-UC for drinking water Spectrophotometric Determination of Uranium with 4-(2-Pyridylazo) Resorcinol (PAR)
Vanadium	7910/7911/6010/6020 *
Zinc	7950/7951/6010/6020 *
Hazardous Waste Characterization	
Alkalinity	U.S. EPA 2320B, 310.1
Ignitability	1010B/1020/1030
Corrosivity	9040B/110*
pH	U.S. EPA 9040
Reactivity	SW-846, Chapter 7
Toxicity	1311 followed by appropriate test method procedures

*Test Methods for Evaluating Solid Waste, Physical/Chemical Methods, SW-3rd Edition, as updated

For a complete list of methods for which the Agency offers accreditation, see Fields of Accreditation

B4.4 Analytical Method Modifications

Any modifications to methods can be done in accordance with SW-846 as allowed. A list of all modifications that are acceptable in SW-846 unless otherwise excluded can be found in the analytical checklist instructions found at the back of the QAPP. It is important for the laboratory and regulated community as well as TCEQ staff to understand what can be modified, cannot be modified, and can be modified with U.S. EPA's approval. Basic information concerning the TCEQ method modification application process can be found in the TCEQ regulatory guidance document RG-380, "The Analytical Method Modification Program – How to Apply."

The U.S. EPA expects that some methods in SW-846 will have to be modified to improve method performance for certain target analytes in certain matrices. Such modifications allow acquisition of the most appropriate and scientifically valid data possible for use in determining compliance or non-compliance on the part of a regulated entity. This is the reason why the majority of SW-846 methods were written as guidance rather than mandate. However, other methods are not guidance and are written into the CFR and must be used **without any modification** if results are to be legally and defensibly used to demonstrate compliance for their intended purposes in the RCRA programs. These methods can be found at 40 CFR 260.11.

Modifications to methods and procedures that support the MACT Standards must have prior approval from U.S. EPA. A list of potentially acceptable modifications that are allowed for meeting RCRA compliance according to the U.S. EPA and TCEQ is presented in the instruction sheet of the Analytical Data Report QA/QC Checklist.

B5 QUALITY CONTROL AND ACCEPTANCE CRITERIA

B5.1 Purpose/Background

A program to generate data of acceptable quality will include both a QA component, which encompasses the management procedures and controls, as well as an operational day-to-day QC component. The guidelines for sampling define fundamental elements of such a data collection program.

These guidelines identify the minimum QC components that should be used in the performance of sampling and analyses, including the QC information that should be documented. Data collection should involve:

- The design and planning of a project to achieve the DQOs;
- Implementation of the project plan; and
- Assessment of the data to determine if the DQOs are met.

Guidance is provided to construct QA programs for field work conducted in support of the RCRA and UIC programs.

B5.2 QC Procedures

QA is an integrated system of activities involving planning, QC, quality assessment, reporting, and quality improvement to ensure that a product or service meets defined standards of quality with a stated level of confidence. QC is the overall system of technical activities whose purpose is to measure and control the quality of a product or service so that the product meets the needs of users.

A data set cannot be properly evaluated for accuracy and precision unless it is accompanied by QA data. QA data result from the implementation of QC procedures during sampling and analysis or during the data entry process.

QC procedures that are employed to document the accuracy and precision of sampling and analysis are defined in the following section.

B5.2.1 Field Procedures

The number and type of QC samples collected in the field are dependent upon the types of analyses being performed, on the media being collected, and the intended use of the data. QC samples may include all or some of the following: trip blanks, field spikes, field blanks, equipment blanks, field duplicates, and additional samples for MS and MSDs. Field instruments should be calibrated in accordance with equipment SOPs (available on the OCE FODWEB). The objective for precision of field data collection methods is to achieve and maintain the factory specifications for the field equipment. Field instruments will normally be used for environmental sampling. For pH meters, precision will be evaluated using multiple field measurements. Consecutive field measurements of the same sample should agree within 0.1 pH standard units after the instrument has been field-calibrated with standard National Institute of Standards and Technology (NIST) traceable buffers. Water level indicator readings will be precise within 0.01 foot for duplicate measurements. The organic vapor analyzer (OVA) will be

calibrated each day prior to field use. If calibration readings deviate 15% or more from the concentration of the calibration gas, the instrument will be recalibrated.

The field procedure requirements that are recommended to the regulated community for sampling are in SW-846 and in the Handbook of Quality Assurance/Quality Control (QA/QC) Procedures for Hazardous Waste Incineration for air emissions from facilities that burn hazardous constituents.

B5.2.2 Laboratory Procedures

The QC procedures used by all laboratories for the determination of compliance for the RCRA/UIC program are outlined in each laboratory's QAM and must conform to the 2016 TNI Standards. Permit holders with on-site laboratories exempt from 30 TAC 25.6 (relating to Conditions Under which the Agency May Accept Environmental Data) shall meet requirements specified in this QAPP, WAPs, or other relevant documents or procedures as specified in their permits. All on-site data collection procedures are subject to review by Regional Office investigators as required for the TNI Standards accreditation exemption.

All laboratories must also meet all QC procedures outlined in the analytical method used to meet compliance if more stringent than TNI Standards.

Corrective action procedures used by the laboratories are discussed in each laboratory's QAM. If corrective action does not result in samples being analyzed under in-control conditions, then all affected data must be flagged by the laboratory. For example, if one surrogate is not within acceptance criteria, then the associated data must be flagged. If a matrix spike recovery is not within acceptance criteria, then all samples associated with the same sample matrix type in the batch must be flagged. The description of the failure may be included in a case narrative on the final report of analysis.

The laboratories should generate their own control limits for all laboratory control samples as recommended in SW-846 3rd Edition.

B5.2.3 Specifying Measurement Performance Criteria

The primary goal of this QA program is to ensure the accuracy and completeness of the data that ultimately will be used to determine the status of the sites that are investigated. In order to achieve this accuracy and completeness, it is necessary that all sampling, analysis, and data management activities be conducted in accordance with pre-set standards, and that these activities be reviewed regularly to maintain full compliance with the standards. This program has been designed so that corrective action can be implemented quickly, if necessary, without causing undue expense or delay. The standards and review procedures that TCEQ will use to evaluate accuracy and completeness of data are outlined in this plan. All contractors, subcontractors, and permittees will be required to follow these standards and procedures, at a minimum. All data submitted to the agency or that are required to demonstrate compliance with the RCRA and UIC programs shall be of known quality.

The QA objectives for all measurement data include considerations of precision, bias, accuracy, completeness, representativeness, and comparability. Compliance with the

QA objectives will be judged individually for each site. QC acceptance limits for organic analyses in the RCRA/UIC programs are stated in Tables B5.2.3.1 and B5.2.3.2. These limits represent the quality of QC data necessary to support decision making by TCEQ staff for industrial and hazardous wastes and UIC sample determinations. Data not meeting these QC acceptance criteria should be flagged in the data package with an explanation of problems encountered by the laboratory and a statement of the limitations, if any, on the data due to the problems.

All corrective actions performed in the laboratory or at the direction of TCEQ as a result of data exceeding minimum data quality criteria of the current standard applied to laboratories that are accredited and acceptance criteria designated in this QAPP shall be documented. All records shall be maintained by the laboratory. Data qualifiers are applied when acceptance criteria are not met and corrective action was not successful or corrective action was not performed. Failure to meet QC acceptance criteria in Tables B5.2.3.1 and B.5.2.3.2 does not necessarily mean the data are unusable. Particular care will be taken to review all QC data within the data package for compliance with the RCRA/UIC programs.

The QA objectives that are recommended to the regulated community for analysis of air emissions from facilities that burn hazardous constituents are found in SW-846 or the Handbook of Quality Assurance/Quality Control (QA/QC) Procedures for Hazardous Waste Incineration. The minimum QC procedures that must be followed by the laboratory for the specific sampling and analytical method for each analyte are described in SW-846. QA objectives for the analysis of total organics emissions or particulate distribution are determined on a case by case basis and are facility-specific (see Table B2.2.1 Sample Collection Procedures for Emissions from Hazardous Waste Facilities). While the minimum QC procedures that a laboratory needs to follow are presented in SW-846, other U.S. EPA methods, and the current 2016 TNI Standards, "*The performance data included in these methods are for guidance purposes only, and are not intended to be and must not be used as absolute QC acceptance criteria….*" (See Chapter 2, Paragraph 2 of SW-846). Therefore additional performance standard criteria have been specified in this QAPP.

Table B5.2.3.1 Matrix Spike/Matrix Spike Duplicate Acceptance Limits For Organic Gas Chromatography & Gas Chromatography Mass Spectrometry (GC & GCMS) and Inorganic Analyses

Matrix Spike Compound	Water		Soil/Sediment	
	% Recovery	RPD	% Recovery	RPD
Volatile Organic Compounds				
1,1-Dicholorothene	75-125	20	75-125	20
Trichloroethene	75-125	20	75-125	20
Benzene	75-125	20	75-125	20
Toluene	75-125	20	75-125	20
Chlorobenzene	75-125	20	75-125	20
Semi-volatile organics				
Phenol	70-130	25	70-130	25
2-Chlorophenol	70-130	25	70-130	25
1,4-Dichlorobenzene	70-130	25	70-130	25
N-Nitroso-di-n-propylamine	70-130	25	70-130	25
1,2,4-Trichlorobenzene	70-130	25	70-130	25
4-Chloro-3-methylphenol	70-130	25	70-130	25
Acenaphthene	70-130	25	70-130	25
4-Nitrophenol	70-130	25	70-130	25
2,4-Dinitrotoluene	70-130	25	70-130	25
Pentachlorophenol	70-130	25	70-130	25
Pyrene	70-130	25	70-130	25
Herbicides				
2,4-Diclorophenoxyacetic acid (D)	70-130	25	70-130	25
Silvex	70-130	25	70-130	25
Pesticides				
Gamma-Benzene hexachloride (BHC)	70-130	25	75-125	25
Heptachlor	70-130	25	75-125	25

Matrix Spike Compound	Water		Soil/Sediment	
	% Recovery	RPD	% Recovery	RPD
Aldrin	70-130	25	75-125	25
Dieldrin	70-130	25	75-125	25
Endrin	70-130	25	75-125	25
4,4'-Dichlorodiphenyltrichloroethane (DDT)	70-130	25	75-125	25
Metals				
Aluminum	80-120	20	80-120	20
Antimony	80-120	20	80-120	20
Arsenic	80-120	20	80-120	20
Barium	80-120	20	80-120	20
Beryllium	80-120	20	80-120	20
Cadmium	80-120	20	80-120	20
Calcium	80-120	20	80-120	20
Chromium	80-120	20	80-120	20
Chromium (Hexavalent)	80-120	20	80-120	20
Cobalt	80-120	20	80-120	20
Copper	80-120	20	80-120	20
Iron	80-120	20	80-120	20
Lead	80-120	20	80-120	20
Magnesium	80-120	20	80-120	20
Manganese	80-120	20	80-120	20
Mercury	80-120	20	80-120	20
Nickel	80-120	20	80-120	20
Potassium	80-120	20	80-120	20
Radium-226	80-120	20	80-120	20
Selenium	80-120	20	80-120	20
Silver	80-120	20	80-120	20

Matrix Spike Compound	Water		Soil/Sediment	
	% Recovery	RPD	% Recovery	RPD
Sodium	80-120	20	80-120	20
Uranium	80-120	20	80-120	20
Vanadium	80-120	20	80-120	20

*Each laboratory must establish their own limits but should not exceed the prescribed limits in this QAPP without flagging the data in the data package with explanation in the case-narrative concerning matrix effects, cleanups failed attempts to obtain quality objectives using a different method more suited for the matrix.

Table B5.2.3.2 Surrogate Spike Acceptance Limits For GC and GC/MS Organic Analyses

Surrogate Compounds	Soil/Sediment % Recovery	Water % Recovery
Volatile organics		
1,2-Dichloroethane-d4	75-125	75-125
4-Bromofluorobenzene	75-125	75-125
Toluene-d8	75-125	75-125
Dibromofluoromethane	75-125	75-125
Semi-volatile organics		
Nitrobenzene-d5	70-130	70-130
Terphenyl-d14	70-130	70-130
2-Fluorobiphenyl	70-130	70-130
2-Fluorophenol	70-130	70-130
2,4,6-Tribromophenol	70-130	70-130
Phenol-d5	70-130	70-130
1,2-Dichlorobenzene-d4	70-130	70-130
Herbicides		
2,4-Dichlorophenylacetic acid	70-130	70-130
Pesticides		
Decachlorobiphenyl	70-130	70-130
Tetrachloro-m-xylene	70-130	70-130

These limits are for advisory purposes only. Each laboratory must establish their own limits but should not exceed the prescribed limits in this QAPP without explanation in the data package concerning matrix effects, cleanups, etc., or other problems associated with the sample matrix.

B5.2.4 Proficiency

All laboratories, except those qualifying for exemption under 30 TAC 25.6, must successfully participate in Proficiency Testing (PT) as required by 30 TAC Chapter 25.

B5.2.5 Precision and Replicate (Duplicate) Analysis

The precision of a measurement is an expression of the agreement between multiple measurements of same property conducted under prescribed similar conditions. Precision can be evaluated-by comparing multiple measurements of the same parameter on the same sample under the same conditions. This can be accomplished by analyzing duplicates of an MS and MSD. Precision between duplicates is usually expressed in terms of the relative percent difference (RPD). The RPD can be evaluated both internally (laboratory duplicates) and externally (field duplicates) to the laboratory. For inorganic analytes and metals, the acceptance criteria for precision is an RPD no greater than 20%. The RPD between two results can be calculated using the formula:

$$RPD = |A-B| / [(A + B)/2] \times 100\%$$

where A and B are the results from the duplicate analyses.

B5.2.6 Accuracy and Laboratory Control Samples

The accuracy of an analytical method is the extent to which test results generated by the method and the true value agree. Accuracy can also be described as the closeness of agreement between the value that is adopted, either as a conventional, true or accepted reference value, and the value found.

The true value for accuracy assessment can be obtained in several ways. One alternative is to compare the results of the method with results from an established reference method. This approach assumes that the uncertainty of the reference method is known. Secondly, accuracy can be assessed by analyzing a sample with known concentrations (e.g., a control sample or certified reference material) and comparing the measured value with the true value as supplied with the material. **If certified reference materials or control samples are not available, a blank sample matrix of interest can be spiked with a known concentration by weight or volume.** After extraction of the analyte from the matrix and injection into the analytical instrument, its recovery can be determined by comparing the response of the extract with the response of the reference material dissolved in a pure solvent. Because this accuracy assessment measures the effectiveness of sample preparation, care should be taken to mimic the actual sample preparation as closely as possible.

The primary purpose of the Laboratory Control Samples (LCS) is to demonstrate that the laboratory can perform the overall analytical approach in a matrix free of interferences (e.g., in reagent water, clean sand, or another suitable reference matrix).

Therefore, the LCS results should be used in conjunction with MS/MSD results to separate issues of laboratory performance and "matrix effects."

Measures to assure accuracy of the test method also include calibration and/or continuing calibrations, use of certified reference materials, PT samples, or other measures.

The objective for accuracy of field measurements is to achieve and maintain factory specifications for the field equipment.

B5.2.7 Matrix Spikes and Method Performance

The MS/MSD results are an important measure of the performance of the method relative to the specific sample matrix of interest. The U.S. EPA believes that such a demonstration is an important aspect of an overall QA program, and is particularly important for the RCRA program, where a wide range of different matrices are subject to regulation.

The primary purpose of these MS/MSD analyses is to establish the applicability of the overall analytical approach (e.g., preparative, cleanup, and determinative methods) to the specific sample matrix from the site of interest.

Unfortunately, some may believe that the MS/MSD results can and should *routinely* be used to evaluate performance of an individual laboratory. This was *not* the U.S. EPA's intent in specifying that MS/MSD analyses be performed at a 5% frequency.

The U.S. EPA believes that consistent *trends* in MS/MSD results can be of some use in evaluating laboratory performance, as are trends in surrogate recoveries, LCS recoveries, and other QC data. However, the appropriate use of a *single* set of MS/MSD results is to evaluate *method* performance in the matrix of interest, not to evaluate *laboratory* performance.

Recoveries give valuable information as to the effectiveness of the analytical method for the quantitation of analytes in a particular matrix. Low recoveries may indicate a poor analytical performance or the potential need to select a more appropriate analytical method.

The degree of accuracy and the recovery of analytes to be expected for the analyses of QC samples and spiked samples are dependent on the matrix, method of analysis, and the compound or element being determined.

The acceptance limits for matrix spike/matrix spike duplicate results (for organic and inorganic analyses) can be found in Table B5.2.3.1.

The percent recovery of an analyte can be calculated using the following formula:

$$\% \text{ Recovery} = SSR - SR/SA \times 100$$

where SSR is the spiked sample result, SR is the sample result, and SA is the amount of spike added.

B5.2.8 Sample Representativeness and Blanks

Samples collected that will be analyzed to determine compliance must be representative (e.g., area of interest, medium being sampled, etc.). The U.S. EPA describes a representative sample as a portion of material or water that is as nearly identical in

content and consistency as possible to that in the larger body of material or water being sampled. Assessing sample representativeness is a critical component of any environmental investigation and should be performed before any conclusions are reached. If the samples are not representative, any conclusions or decisions will be incorrect.

Sample collection procedures that support data to demonstrate compliance with RCRA/UIC programs must be consistent with procedures outlined in SW-846 and U.S. EPA protocols.

The type and frequency of blanks are described in the QAPP Glossary and are dependent upon the permit specifications, site, sample matrix, and analytes of interest. The primary purpose of blanks is to allow evaluation of contamination. Comparison of different blank sample results can be used to identify and isolate the source of contamination introduced in the field or the laboratory. Acceptance criteria are defined by the various methods, QAPPs, and data users to support the intended use of the data. A secondary purpose of these blanks is to document proper sample bottle preparation, decontamination, and handling techniques have been employed.

B5.2.9 Comparability

Consistency in the acquisition, handling, and analysis of samples is necessary so the results may be compared with regulatory requirements. Concentrations will be reported in a manner consistent with general practices. Standard U.S. EPA analytical methods and QC will be used to support the comparability of analytical results with those obtained in other testing. Calibrations will be performed in accordance with U.S. EPA or manufacturer's specifications and will be verified at the frequency specified in the methods.

B5.2.10 Completeness

For the U.S. EPA and TCEQ project planning purposes (U.S. EPA R-5) a DQO for completeness is measured as the difference between the planned or proposed amount of samples and/or data and the actual amount collected. A DQO for completeness may state that “90% of the proposed samples must be collected to meet project objectives.”

Completeness of the data is measured as the amount of valid data obtained from the measurement system (field and laboratory) versus the amount of data expected from the system. The data validation will determine the amount of valid data obtained from each site investigation. The specific objective for the completeness of each project will be greater than or equal to 90% for field and laboratory data for each site unless otherwise specified.

Completeness is calculated as a % value. In the equation below, ST is the total number of samples (or data points) collected and SV is the number of samples with a valid analytical report (or total number of possible data points).

$$\% \text{ Completeness} = SV/ST \times 100$$

B5.2.11 Analytical Parameters and Quantitation Limits

Each laboratory's determination of the Limits of Detection (LOD), also known as method detection limits, and Limits of Quantitation (LOQ), also known as practical quantitation limits, will comply with the TNI Standards. For permitted facilities, the LOQ must take into account site-specific samples when determining background data for groundwater monitoring. The LOQ will be the lowest concentration of a target analyte that can be reported with the confidence established by the precision and accuracy limits in this QAPP. For site specific or program specific compliance, analytical parameter quantitation limits will be determined on a per-site or program-specific basis as designated in this QAPP or other reference materials (e.g., TRRP Rule and guidance). Some determination will be made by the responsible party submitting a sampling design plan with concurrence by TCEQ staff conducting the review of the plan. The quantitation limits may vary since they are matrix and analyte dependent.

Laboratories that analyze samples to be used by TCEQ staff or the regulated community for compliance purposes must maintain documentation demonstrating that the analytical methodology used has adequate sensitivity. Unless otherwise specified in regulations or TCEQ guidance, each pollutant of concern must be reported at quantitation levels as low as applicable during normal operating conditions and at levels lower than the appropriate regulatory action levels. The sensitivity of the method may be determined as follows:

- From a method detection limit study performed as defined in 40 CFR Part 136, Appendix B, including Step No. 7 to test for reasonableness of the estimated detection limit;
- From the method quantitation limit, as described in Section 7 of SW-846 Method 8000B, at or below the critical Pollutant Concentration Limits (PCL); or
- By analysis of spiked samples at least 3 to 5 times lower than the regulatory action level that demonstrates compliance by the successful analysis of a sample that contains the analyte of interest at a level below the action level.

It is the responsibility of the sample submitter or regulated entity to provide the laboratory with regulatory action levels so that the reported quantitation limits do not prevent evaluation of regulatory compliance.

B6 INSTRUMENT/EQUIPMENT TESTING, INSPECTION, AND MAINTENANCE

B6.1 Purpose/Background

All equipment, instruments, and other items used in the collection of environmental data must be maintained and tested to verify that it is in proper working condition.

B6.2 Testing, Inspection and Maintenance

New equipment, instruments, tools, gauges, and other items are tested with known standards to determine the acceptability of the equipment. If the new equipment, instruments, tools, gauges, and other items are not acceptable, they are returned for properly working equipment in accordance with agency procedures documented in the Administrative Services Coordinator Manual. Testing, inspection, and maintenance procedures for laboratory equipment must conform or be consistent with criteria in the 2016 TNI Standards.

Equipment, instruments, tools, gauges, and other items requiring preventive maintenance will be serviced in accordance with the manufacturer's specified recommendations and written SOPs developed by the operators.

The contract laboratories are responsible for maintaining and testing their equipment. The procedures used are outlined in each laboratory's QAM or applicable SOPs.

B6.2.1 Schedules

Manufacturer's procedures identify the schedule for servicing critical items in order to minimize the downtime of the measurement system. It will be the responsibility of the operator to adhere to this maintenance schedule and to arrange any necessary and prompt service as required. Service to the equipment, instruments, tools and gauges shall be performed by qualified personnel and be documented. Program managers or designees determine whether acceptance criteria have been met and whether the equipment is adequate and appropriate for use in the field.

In the absence of any manufacturer's recommended maintenance criteria, a maintenance process and schedule will be developed, written, and maintained by the operator based on experience and previous use of the equipment.

A schedule of preventive maintenance is established by each contract laboratory and documented for review by outside investigators.

An inventory check is conducted each month to insure that an adequate reserve of spare parts and supplies is available. Inventory is replenished as needed.

B6.2.2 Records

Logs will be established and maintained to record maintenance and service procedures and schedules. All maintenance records will be documented and traceable to the specific equipment, instruments, tools, and gauges. When equipment, instrument, tools, and gauges are used at the sites and stored at the field offices, records produced will be reviewed, maintained, and filed by the investigator.

The contract laboratories, commercial laboratories, and DSHS laboratory will maintain records for contract, program, and method compliance. These records are reviewed by a TCEQ Laboratory and Quality Assurance assessor within the MD during audits as a condition of accreditation and must conform to record requirements in the 2016 TNI Standards.

B7 INSTRUMENT/EQUIPMENT CALIBRATION AND FREQUENCY

B7.1 Purpose/Background

The accuracy of environmental measurements depends on the proper calibration or standardization of the equipment prior to acquiring data. Instruments and equipment used to gather, generate, or measure environmental data will be calibrated with sufficient frequency and in such a manner that accuracy and reproducibility of results are consistent with applicable specifications. This section describes the procedures and frequency with which field and laboratory equipment shall be calibrated.

B7.2 Instrumentation Requiring Calibration or Standardization

Field equipment such as pH meters, dissolved oxygen meters, explosimeters, OVAs and other field sampling equipment used to make environmental measurements will be calibrated prior to being taken into the field or according to established, written SOPs or manufacturer's recommendations. Only NIST traceable standards (e.g., pH buffers) or equipment (e.g., thermometers) will be used for calibration when available.

All laboratory instruments will be standardized using NIST traceable standards. Other laboratory equipment such as balances and thermometers shall be calibrated against NIST traceable weights and thermometers.

B7.3 Calibration Methods

Field instruments and equipment will be calibrated according to the manufacturer's instructions, which at a minimum will include calibration prior to use. Laboratory instruments and equipment will be calibrated according to the manufacturer's instructions and standardized according to the analytical methods as described in SW-846 or other equivalent approved methods and each laboratory's QA Manual or SOP. Calibration methods specific for measuring air emissions are found in Quality Assurance Handbook for Air Pollution Measurement Systems: Vol III: Stationary Source Specific Methods, Interim Edition.

B7.4 Calibration Standards

Standards used for the calibration of field instruments will be, when available, traceable to certified standards or reference material. Laboratory equipment will be calibrated or standardized against NIST traceable reference materials and standards. Documentation of the certificate of analysis and traceability of the standards and reagents will be maintained by the field investigator or laboratory personnel.

B7.5 Calibration Frequency

Calibration of field instruments and equipment will be performed at approved intervals as specified by the manufacturer or more frequently as conditions dictate. Calibrations may also be required to be performed at the start and completion of each test run. Records of calibration, repair, or replacement will be filed and maintained by the designated field office staff.

Calibration and standardization of laboratory equipment will be based on procedures described in each contract laboratory's QAM and/or SOPs. It is the responsibility of the data validators to ensure that the proper calibration protocols were used.

Records of calibration, repair, or replacement will be filed and maintained by the designated laboratory personnel performing QA activities in accordance with requirements. Calibration records will be filed and maintained at the laboratory location where the work is performed and will be subject to review by a TCEQ MD laboratory inspector during a scheduled QA audit.

In addition all instrument/equipment calibration and frequency procedures must conform to or be consistent with criteria in the 2016 TNI Standards.

B8 INSPECTION/ACCEPTANCE OF SUPPLIES AND CONSUMABLES

B8.1 Purpose

This section describes the supplies and consumables that are critical to the quality of the project and the criteria used for accepting/rejecting the supplies. This section applies largely to TCEQ personnel.

The inspection/acceptance of supplies and consumables by regulated laboratories and contract laboratories must be described in each laboratory's QAM.

B8.2 Critical Supplies and Consumables

The consumables that directly affect the quality of the data are the collection devices, reagents, reagent dispensers, and containers used to store the samples for analysis. Collection devices, reagents, reagent dispensers, and containers are obtained from vendors through the normal procurement procedures referenced in Section 4 of the TCEQ QMP. Containers are also supplied by the contract laboratories and must meet the criteria described below.

B8.3 Acceptance Criteria

The most important factors to consider when choosing containers for hazardous waste samples are compatibility, resistance to breakage, and volume. Containers must not melt, rupture, or leak as a result of handling or chemical reactions with the samples. Containers with wide mouths are preferable. Also, the containers must be large enough to contain the required volume of sample.

The plastic containers recommended for use by TCEQ personnel are constructed of linear polyethylene with a polypropylene cap. These containers should be purchased in 1 liter and 5 liter sizes. They should be used to collect and store aqueous samples which do not contain oily residues, pesticides, or halogenated hydrocarbons.

Glass containers are inert to most chemicals and can be used to collect and store all hazardous waste samples except those that contain hydrofluoric acid or strong alkali. Wide mouth 1 liter jars and 40 mL volatile organics analysis (VOA) vials are recommended. These are provided with a rigid plastic or metal cap and a Teflon liner. The VOA vials are used to collect samples for analysis of volatile organics or very concentrated hydrocarbon samples which are to be analyzed by GC or GC/MS. The 1 liter glass jars are used to collect samples containing semi-volatile organic compounds or halogenated organic compounds to be analyzed by GC and GC/MS.

The containers must be cleaned and unused. In some cases, the containers are pre-rinsed with a solvent or acid. Field blanks, prepared in the laboratory with laboratory pure water (containers opened to air), are collected to determine whether contamination from the sampling site has occurred. Equipment blanks are collected to evaluate contamination from the sampling equipment.

Reagents and their dispensers will be tested for contaminants on a periodic basis and records of the testing will be maintained on-site for inspection purposes. If the reagents do not meet the laboratory standards for purity, they must be returned to the seller, disposed of, or where available purified (e.g., by filtering, distillation, etc.).

B9 NON-DIRECT MEASUREMENTS

B9.1 Purpose

The objective of this section is to identify types of data needed for project implementation and/or decision making that is obtained from non-measurement sources such as computer databases, spreadsheets, programs, and literature files. Prior to evaluation of the data, the acceptance criteria for the use of the data in the project should be defined, and any limitations on the use of the data resulting from uncertainty in its quality should be discussed.

B9.1.1 Permitting

The permit coordinator reviews and may use data from regulatory sources (e.g., emission limits from 40 CFR Part 266).

B9.1.2 Corrective Action Program

Corrective Action project managers review and evaluate site assessment, remediation, and closure data submitted by the regulated community or the data supplier. Corrective Action project managers use state and federal rules and regulations (40 CFR Parts 260-270, 30 TAC Chapters 335 and 350); various guidance documents such as SW-846, *RCRA Corrective Action Plan*, Final U.S. EPA 520-R-94-004, May 1994; TRRP guidance documents; approved work plans and reports; and applicable permits/compliance plans and agreed orders to review the data and to determine if the data supplier has documented representativeness, lack of bias, precision, and identification of qualifiers, and has included an adequate summary of sample data.

B9.1.3 Registration and Reporting

The major TCEQ database for the storage of facility information is the Permitting and Registration Information System (PARIS). PARIS contains information on all registered generators, transporters, receivers, and permitted storage facilities of hazardous waste. This is maintained daily with new and updated information from PARIS being sent to the RCRAInfo database. The goal of the TCEQ is to have the two databases be equal for all the data elements that they share. IHW Permits Section and the UIC Permits Sections haves access to PARIS so that they can update facility information on permitted units and update certain permit related information that both IHW Permits and UIC Permits Section have access to change. This data is available to Regional Offices, ENF, and REM.

B9.1.4 UIC Permit Compliance Data

Regional Office and CID UIC staff enter information into CCEDS for compliance purposes as designated by the regulated facility's permit requirements. CCEDS also contains information that is used to generate 7520 semi-annual and annual reports to the U.S. EPA. CCEDS tracks mechanical integrity testing, facility addresses, investigations, and well workovers. UIC Permits Section staff maintain the UIC injection well inventory, facility background (site specific), injection volumes, and permitting data in IDA. CCEDS is used by the regional office and CID UIC staff for reporting purposes.

B10 DATA MANAGEMENT

B10.1 Purpose/Background

The objective of this section is to describe the project data management scheme, tracing the path of the data from generation in the field or laboratory to final use or storage (refer also to A9 - Documents and Records and C2 - Reports to Management). The areas within the agency that may be evaluated for compliance with program SOPs or data needs depending on specific program needs are as follows:

- The standard record-keeping procedures, document control system, and the approach used for data storage and retrieval on electronic media;
- The control mechanism for detecting and correcting errors and for preventing loss of data during data reduction (e.g., calculations), data reporting, and data entry to forms, reports, and databases;
- All data handling equipment and procedures used to process, compile, and analyze the data, including the procedures for addressing data generated as part of the project as well as data from other sources; and
- Any required computer hardware and software, specific performance requirements for the hardware/software configuration addressed, and procedures that will be followed to demonstrate acceptability of the hardware/software configuration.

B10.1.1 Regional Offices

Even when accepted protocols are followed in collecting and analyzing environmental samples, a potential for loss of data quality arises in the manipulation and reporting of the data. However, certain procedures are designed to minimize the chance of errors related to number handling.

The COC that accompanies each set of samples to the laboratory has a space dedicated to recording observations. The field investigator has primary responsibility to ensure that all pertinent information is recorded correctly, and in the proper units. There are also sample information forms and request for analysis (RFA) forms (Waste RFA Forms A- D 3/15/99, available on OCE FODWEB), which may be attached to the COC. The information forms have room to record field data and other observations.

The field investigator will take field notes at the time of sampling to aid in describing the COC information regarding samples collected in the field. The field notes are completed in the field, and include the COC record number and associated sample identification numbers. Information recorded in the field is entered onto the final report with the sampling results attached to the report and then reviewed by a team leader or section manager prior to final approval noted in CCEDS.

B10.1.2 Laboratory of the Water Quality Planning Division

Laboratory personnel validate the analytical data by comparing the various QC measurements against method specifications, SOPs or specific project plan or program requirements, and by recalculating a random selection of the results produced by each analyst submitting data.

The potential for human error is high during the transfer of data from laboratory work sheets into a LIMS, onto data entry forms, and while being entered into the system of record. It is imperative that all data entered manually be written legibly with special care to maintain the decimal in its proper location. The laboratory utilizes automated data entry as much as possible thus minimizing transcription errors. Each phase of data generation and handling should have routine independent checks made on data transfer on a 10% basis as a minimum. The appropriate section manager will assume responsibility that this task is completed. Whenever errors are noted, laboratory staff will take the appropriate corrective action and document all actions.

Whenever reported data are reduced in size, it is essential that proper rules for modifying official data be followed. Common tables of conversion factors and rules for significant figures will be used.

The WQPD routinely stores all completed COC records and sample reports at the Sugar Land Laboratory. These files are retained and archived for 5 years as specified in the TCEQ retention file schedule and in accordance with 2016 TNI Standards.

The laboratory must maintain files on all QA verification for 5 years and contract laboratories must retain files of all QA verifications for a minimum of 5 years. These files must be readily available for inspection.

The procedures for reporting of analytical results will depend upon which laboratory conducts the analysis. For analyses performed at the TCEQ laboratory, the results are entered into a LIMS. Copies of the results are then sent directly to the sample collector. At the contract laboratories, hard copy reports are generated from the LIMS. These results are sent to TCEQ central office, Regional Offices, and a copy of the report is forwarded to the collector.

Procedures for records storage, control, and retrieval are contained in the TCEQ OPP Section13.2 - Records Management and also noted in Section 5 of the TCEQ QMP.

B10.1.3 Permitting

Data management activities from generation of data in the field or laboratory to the reporting of the data in a trial burn/risk burn report are the responsibility of the regulated community (data suppliers).

When TCEQ determines that a multi-pathway risk assessment is necessary for a hazardous waste combustion facility, the regulated community will use the data from the trial burn/risk burn report to conduct a comprehensive risk assessment. The potential for human error is high during the transfer of data from the trial burn/risk burn report to the risk assessment model spreadsheets. It is imperative that all data are entered correctly with special attention to maintaining the decimal in its proper location.

Each phase of data handling should have routine independent checks made on data transfer. The appropriate TD project manager will assume responsibility that this task is completed.

Whenever reported data are reduced in size, it is essential that proper rules for modifying official data be followed. Common tables of conversion factors and rules for

significant figures should be used. Reduced data should be identified as such to prevent confusion since the reduced data may inadvertently indicate a violation of analytical or physical measurement methodology.

B10.1.4 Corrective Action Program and Industrial and Hazardous Waste

The Corrective Action project manager is a data user. He or she reviews and evaluates site assessment, remediation, and closure data submitted by the regulated community or the data supplier. The cleanup status of permitted facilities or facilities that were cited for a permit violation and are conducting corrective action under an order in the Corrective Action Program is recorded in IDA and updated in the RCRAInfo database. The IHW Permits Section in WPD is responsible for final evaluation and closure of permitted units. The data are available to the U.S. EPA for pulling into various report formats as needed. Information in the database demonstrates TCEQ corrective action compliance with the TCEQ PPG. Data management activities are handled by Corrective Action staff except for final closure of permitted units which is handled by HW Permits staff in WPD.

B10.1.5 Registration and Reporting

Data regarding the generation or receipt of waste is entered into the PARIS database. If a discrepancy or deficiency is identified, the responsible party (e.g., generator or receiver) is sent a resolution notice. The discrepancy or deficiency is addressed before the data is considered complete.

B10.1.6 UIC

UIC staff from CID, RMD, PSEAD, and Regional Offices enters data into databases for their individual areas of responsibility within the UIC program. The databases are used to track compliance activity, information on permitted facilities, and waste disposal information. The CID UIC staff compiles UIC investigations and MIT data, including enforcement actions from CCEDS into 7520 semi- annual and federal fiscal year annual reports to the U.S. EPA in coordination with RMD, UIC Permits Section. The RMD, UIC Permits Section generates the calendar year annual narrative reports submitted to the U.S. EPA under 40 CFR Part 144.8 (b) in coordination with CID UIC staff. The data in Central Registry is peer reviewed after entry by UIC staff (Appendix B). Errors found are corrected immediately. UIC Permits staff enters site-specific, permit and waste disposal information into IDA and PARIS databases for permitted facilities.

B10.2 Contract, Commercial and On-Site Laboratories

Data management procedures must be described in each laboratory's QAM (or other SOPs or documents however named) according to the 2016 TNI Standards if they are an accredited laboratory analyzing samples to demonstrate compliance to the RCRA/UIC programs. Permittees with their own on-site laboratory must meet data management procedures described in their permits. Data management procedures must be made available to Regional Office investigators upon request and should be consistent with the 2016 TNI Standards referenced in 30 TAC Chapter 25.

C1 ASSESSMENTS AND RESPONSE ACTIONS

C1.1 Purpose/Background

The purpose of this section of the QAPP is to ensure that all elements of sampling, analysis, and data reduction and collection are completed as planned. This will be accomplished through a system of internal and external checks such that:

- All elements of the QAPP are implemented as described;
- The quality of the data generated by implementation of the QAPP is adequate; and
- A corrective action plan is in place if unforeseen circumstances force a deviation from the plan.

Assessment and response action records will be maintained and made available for review by the program area that performed the assessment in accordance with applicable SOPs, guidelines, or processes; or for a period of five years after the expiration of the QAPP under which they were performed.

C1.2 Assessment Activities and Project Planning

- Laboratory Audits - Performed by the Accreditation Work Group of MD and LDEQ once before accreditation is issued and once every 2 years thereafter, unless interim accreditations are issued;
- TCEQ technical peer review process - May include RCRA or UIC issues as they relate to new technology, high profile issues, rules, policy, guidance, processes with major revisions or as the need arises as determined by the manager;
- QA reviews of investigation reports - Quality review of each RCRA investigation report generated by the TCEQ Regional Offices is conducted by that Regional office before the report is submitted to the central office. Some UIC investigation reports are generated and reviewed by UIC staff in the Regional Offices; quality review of the UIC investigation reports related to the Uranium Recovery sites is conducted by CID management before the report is sent to the TCEQ Central Record.
- Enforcement Action Requests (EAR) - Peer reviews for RCRA/UIC cases are completed to determine if violations are properly documented, which type of enforcement action to pursue, which type of violator and which priority of enforcement action is appropriate in accordance with the TCEQ ENF SOP. The SOP includes the EIC, the penalty policy and standard documents used for formal enforcement action;
- QC review of enforcement documents - Quality review of each enforcement document including orders, technical requirements, and penalty calculation worksheets for RCRA/UIC cases is conducted by ENF staff. All documents are completed and checked in accordance with the TCEQ ENF SOPs;
- Program Audits - Annual reviews of the permitting, and data entry functions are conducted by the IHW RCRA QA Specialist and Lead RCRA QA Specialist or team leader or other management staff as designated on Table C1.2.1. – Documentation of Assessments for WPD. After each review, the IHW RCRA QA Specialist and RCRA QA Coordinator or other assessment staff completes a report of the findings and any corrective action needed to correct all deficiencies and submits the report to the audited section manager, and deputy director. Verification that corrective action has been taken

on the negative findings is achieved during the next audit; and

- TCEQ Field Investigators -An environmental investigator (EI) II will be accompanied by a senior investigator or manager for on the job training as needed. EI II, EI III and EI IV will be accompanied o an investigation at least once a year by either an EI V, work leader, team leader, or section manager as part of their ongoing work evaluation. CID investigators are accompanied on investigations once a year by the work leader, section manager, or other qualified staff. Investigators' assessment and evaluation processes are performed by work leader, team leader, or section manager during UIC permit investigations and/or Radioactive Material License investigations. Corrective actions needed are discussed at the time of the investigation. Implementation of the corrective actions by the permittee may occur at the time of investigation and verified by the investigator. Otherwise, verification of the Permittee's corrective actions occurs at the next investigation. CID inspects the on-site laboratories at uranium recovery sites and other radioactive material sites as applicable and required every 3 years (§25.6, Subchapter A). Results of the investigation accompaniments are to be documented and placed in the investigator's personnel file.

Table C1.2.1 Documentation of Assessments

Type of Assessment	Number and/or Frequency	Assessment Personnel	Schedule	Reporting and Resolution
Laboratory Audits	Eight contract laboratories, agency lab and unknown number of commercial laboratories applying for accreditation	MD Accreditation Work Group Staff; LDEQ (for Sugar Land Laboratory)	Once before accreditation is issued and once every 2 years thereafter, unless interim accreditation is issued	Technical Report of audit produced and letter sent to laboratory notifying of findings. Follow-up conducted to confirm resolution of issues.
Quality System Audit	Biennially	Agency QA Specialist	No set schedule	Audit report sent to IHW QA Specialist and Lead RCRA QA Specialist, affected Section Manager(s) and Deputy Director
Peer Review of specified technical issue	As needed	Specified by Manager	No set schedule	Final document reported on Technical Peer Review Document
Quality Assurance Review	100% of RCRA investigation reports	Region Office Waste Section Manager	Within 45 days of the investigation date	Maintained by Region Office Program Manager
Quality Control Review	100% of Enforcement Action Request submitted (EAR)	Enforcement ENF Staff and Management	Within 15 days of receipt of report from Regional Office Staff	Section 7i of the EAR
Program Audit Completeness Review	One Class 1, or Class 1ED and one Class 2 modification as	IHW QA Specialist and Lead QA	Annual review	Report sent to RCRA Project Manager, Section Manager and

Table C1.2.1 Documentation of Assessments

Type of Assessment	Number and/or Frequency	Assessment Personnel	Schedule	Reporting and Resolution
	needed	Specialist		Deputy Director
Program Audit Completeness Review	One major permit's amendments or new permit reviewed for completeness as needed	IHW QA Specialist and Lead RCRA QA Specialist	Annual review	Report sent to RCRA Project Manager, Section Manager and Deputy Director
Program Audit Completeness Review	5% of all nonhazardous waste determinations as needed	Technical Analysis Team (TAT) in WPD	Annual review	Report maintained by TAT and available upon request
Program Audit Completeness Review	1 Class 3 Permit modification as needed or approved by WPD Deputy Director	IHW QA Specialist and Lead RCRA QA Specialist	Annual review	Report sent to RCRA Project Manager, Section Manager and Deputy Director
Program Audit Completeness Review	1 Trial Burn/Risk Burn reviewed as needed or approved by WPD Deputy Director	IHW QA Specialist and Lead RCRA QA Specialist	Annual review	Report sent to RCRA Project Manager, Section Managers and Deputy Director
Program Audit Completeness Review	5% or 1 UIC inspection report as needed	RMD/OCE QA Specialist	Annual review	Report sent to UIC Project Manager, Section Manager and Deputy Director
Investigator Inspection Assessment	EI I & II - 4/year EI III & IV - 2/year	Regional Office Investigator Staff EI V and Team Leaders	Set by reviewing staff	Comments drafted with plan of action (if necessary), and filed in personnel files in Regional Offices
Investigator Training Assessment	All Investigators	Team Leaders in Regional Offices	Annually	Staff deficient in training will be sent to needed training as the budget allows

C1.3 Reporting and Resolution of Issues

Findings of procedures and practices which do not conform to the QAPP require timely corrective action. Corrective action for laboratory issues may be initiated by the PSEAD or Regional Offices, the RCRA QA Specialist, laboratory staff and management, data reviewers and all other data users using procedures outlined in SW-846 and all other project specifications (e.g., references) designated in this QAPP, if and when variances from proper protocol are noted. Project managers, team leaders, and laboratory managers are responsible for ensuring that required corrective actions are completed. It is the responsibility of the regulated entity (e.g., permittee) to accurately convey their data needs to the laboratory for the analysis of samples to demonstrate regulatory compliance or waste classification.

Examples of variances which require corrective action may include but are not limited to:

- Equipment failure;
- Excursions from precision and accuracy control;
- Samples arriving at the laboratory with incomplete COC or with sample integrity in doubt;
- Samples arriving with insufficient preservation (e.g., at room temperature);
- Samples lost in transit or in laboratory accidents;
- Failure to meet acceptance limits when analyzing U.S. EPA QA study samples;
- Reporting data in wrong units;
- Calculating data by wrong formula; and
- Incomplete documentation.

For the regulated community meeting compliance, field corrective procedures are described in individual facility QAPPs (i.e. hazardous waste). The individual QAPPs are submitted prior to a facility's Comprehensive Performance Test (CPT), which is a performance demonstration. There are very strict federal rules under which these are conducted. These tests are performed to verify permitting limits and to make sure the equipment is working properly.

Laboratory corrective actions defined in the facility QAPPs include: repair or replacement of faulty equipment; reanalysis of samples and standards; checking reagents for proper strength; request for resampling; or contacting the TCEQ project manager or RCRA or UIC Program RCRA Lead QA Specialist for advice. Unique problems which cannot be corrected by the procedures listed above will require corrective actions to be defined when the need arises.

Corrective action for work conducted in the office could include: notifying the appropriate supervisory personnel, sending personnel to training, modifying and/or developing SOPs or checklists, reevaluating decisions or contacting TCEQ project/program managers or RCRA/UIC Program RCRA Lead QA Specialist for advice. Unique problems which cannot be corrected by the procedures listed above will require corrective actions to be defined when the need arises. Corrective action reports will be developed according to Section 10 of the TCEQ QMP, and the effectiveness of corrective actions will be verified.

C1.4 Laboratory Assessments and Corrective Action

Requirements for laboratory assessments and corrective action procedures must be included in each laboratory's QAM. Assessments should be at a type and frequency as required by the 2016 TNI Standards and should be documented accordingly. Corrective action procedures should be defined, implemented, and documented.

C2 REPORTS TO MANAGEMENT

C2.1 Purpose/Background

TCEQ reports to management provide a structure for apprising management of the status of projects, deviations from approved QA and established standards and uncertainties in decisions based on the data.

C2.1.1 Frequency, Content, and Distribution of Reports

- Investigation Reports – PSEAD creates weekly progress reports of work plan attainment and distributes the reports to Area Directors. The reports are based on investigation information from the CCEDS database. Summary reports are distributed to the Area Directors, and Regional Office management each month for review of progress in investigation activity. For UIC investigations and enforcement, semiannual and federal fiscal year 7520 reports are generated by CID in coordination with RMD, UIC Permits Section. For semi-annual report Forms 7520 - 2A (Compliance Evaluation) and 7520 - 2B for (Significant Non-Compliance) and Part 4 (Quarterly Exceptions List) are included. The federal fiscal year report consists of a complete Form 7520, which in addition to the sections above, includes Form 7520-1 (Permit and Area of Review) and Form 7520 - 3 (Mechanical Integrity Testing). The semi-annual and the federal fiscal year reports are reported to the U.S. EPA Region 6 and EPA headquarters using EPA's web-based application for UIC Data Collection;
- Monthly enforcement report to the Commission: The number of formal actions initiated for the month sorted by program (e.g., IHW, UIC, air, municipal solid waste etc.), number of agreed orders adopted by the Commission, amount of penalties assessed, deferred, or SEP value, number of cases resolved, number of cases being developed, cases being tracked for compliance, NOVs issued by region and central office, number of pending actions for administrative order by the TCEQ, number of cases pending at the Attorney General's Office, number of judgments, number of cases referred for formal enforcement action;
- Corrective Action Program Activities - End of year RCRA report is provided to EPA R6 demonstrating programmatic progress including the achievement of commitments for corrective action regarding the 2020 GPRA baseline facilities.
- Quarterly report to the State of Texas Legislative Budget Board regarding the timeliness and number of permits issued, percentage of corrective action facilities closed, new system waste stream evaluations, and notice of deficiency letters sent for corrective action proposals is compiled by the budget analyst of each applicable division; and
- Corrective action reports will be distributed according to Section 10 of the TCEQ QMP.

D DATA VALIDATION AND USABILITY

For the purposes of the QAPP, TCEQ defines and applies practices and procedures based on U.S. EPA QA/G-8, Guidance on Environmental Data Verification and Data Validation (U.S. EPA240R-02/004). A primary goal of the TCEQ is to ensure that environmental programs and decisions are supported by data of the type and quality needed and expected for their intended use. This data may be used to support remediation activities, waste classification, compliance to the MACT Standards, and groundwater monitoring activities to name a few. Please refer to the Glossary for definitions of data validation and data verification.

Data validation is an integral part of quality management in the TCEQ. The data review, validation, and verification procedures described in this section will ensure: (1) complete documentation is maintained in accordance with Section B10 of this document; (2) transcription and data reduction errors are minimized; (3) the data are reviewed with results documented; and (4) the reported results are qualified if necessary. Laboratory data reduction and verification procedures are required to ensure the overall objectives of analysis and reporting meet method and project specifications.

All laboratory data reduction procedures must be described in each laboratory QAM and/or SOPs and conform or be consistent with the 2016 TNI Standards.

D1 DATA REVIEW, VERIFICATION, AND VALIDATION

D1.1 Purpose/Background

Data review, verification, and validation are key steps in the transition from sampling and analysis to the assessment of the data. This section describes some data verification and validation practices that are used to promote common understanding and effective communication among environmental laboratories, data validators, and users.

Data verification is primarily an evaluation of performance against pre-determined requirements given in a document such as an analytical method procedure or a contract (e.g., permit). Data validation, on the other hand, centers on particular data needs for the program, as stated in this QAPP and other referenced documents where applicable.

Staff of the PSEAD, Regional Offices, REM, CID, IHW Permits Section of the WPD and UIC Permits Section of the RMD, are data users. These data users are the program staff authorized to determine the compliance status of the data supplier, and the regulated community. Program staff review and evaluate assessments, remediation activities, and closure activities submitted by the data supplier. In the review process, program staff will evaluate the data to ensure that:

- Representative samples were collected from the appropriate environmental media during investigation and/or remediation activities;
- Sample collection procedures followed during investigation and/or remedial activities are compliant with all approved work plans, permit provisions, enforcement order provisions, and the applicable federal and/or state guidance documents;
- Sample handling procedures (e.g., COC records) were properly completed and document the condition of samples during the preparation, packing, transportation and analysis process. The data supplier shall be responsible for reporting and correcting all sample handling procedures that deviate from the approved DQOs and/or other project-specific requirements;
- Analytical methods used to evaluate samples collected during investigation and/or remediation activities provide the appropriate level of accuracy required to meet all formal and/or informal DQOs. All deviations from the acceptable criteria and potential impacts affecting the usability of the data shall be reported by the data supplier;
- QC checks are performed and necessary corrective actions have been taken. Program staff will review the data supplied to ensure compliance with the formal and/or informal DQOs stated in all approved work plans, permit provisions, enforcement order provisions, and the applicable federal and/or state guidance documents;
- Proper calibration of instrumentation and equipment are performed. All calibration problems, corrections, and associated impacts on the quality of environmental data shall be clearly and accurately reported by the data supplier for evaluation; and
- Data reduction and processing is performed by the data supplier prior to submittal for review by staff.

D1.1.1 IHW/RMD Permits

Staff of IHW Permits Section in the WPD and UIC Permits Section in the RMD are data users. In order to effectively evaluate an analytical data set, the data user must at least have a general overview of the sample results or data set that is in question. An analytical checklist (Table D.1.2) will be used by the permittee/laboratory to certify the type and quality of the data. TCEQ staff will then use the checklist to verify what has been submitted and validate the intended use of the data. A laboratory case-narrative (LCN) must be used to describe the information needed for a general overview of the QA/QC by the data user. This information can be derived from an in-depth review of the data. At a minimum, problems in QA/QC such as sample matrix, dilutions of the matrix, inadequate sample volume for analysis or re-analysis, sample container condition, sample temperature, sample preservation, and unusual events should be discussed within the LCN. The LCN is required for all analytical data submitted to this group for laboratories demonstrating compliance to permit requirements.

IHW Section also provide a checklist (Table D1.3) to assist IHW permitted facilities which are subject to the groundwater detection monitoring to prepare annual reports to be submitted to the TCEQ.

IHW staff or their contractors or permittees will review environmental data submitted for QA/QC validation by use of standardized check lists and procedures developed in the section. Staff review trial burn/risk burn reports to document if DQOs outlined in the company's QAPP that was submitted in the trial burn/risk burn proposal were achieved.

The following reference documents may be utilized by the data reviewer during the data review/validation process: U.S. EPA Technical Implementation Document for U.S. EPA's Boiler and Industrial Furnace Regulations, U.S. EPA A530-R-92-011, SW-846, *U.S. EPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review* (OSWER 9240.1-45, U.S. EPA, 540/R-04-004, October 2004), and the *U.S. EPA Contract Laboratory Program National Functional Guidelines for Organic Data Review* (U.S. EPA 540/R-99-008 , October 1999).

D1.1.2 IHW Permits Section

The explanation portion of the analytical check sheet has guidance on how to assess the quality of the data. The analytical check sheet is used to document data quality outside of performance goals with respect to MS/MSDs, surrogate recoveries, internal standards or highly contaminated samples to name a few. Data is rejected on a case-by-case basis by the reviewer based on best professional judgment.

D1.1.3 Corrective Action Program

For the Corrective Action Program, the person complying with the requirements of TRRP rule is responsible for the quality of the data, as specified in 30 TAC §350.54(a).. The TCEQ guidance *Review and Reporting of COC Concentration Data under TRRP* (RG-366/TRRP-13) provides procedures the person must follow to document the quality of the data. Corrective Action project managers review the project and laboratory data (including reportable data, laboratory review checklists, and exception reports) and the data usability summary to verify the reporting requirements are met,

the quality of the data is known and documented, and the data are usable for making compliance determinations.

D1.1.4 Regional Offices

Problems with potential limitations of the data are handled at two different levels: (1) at the time of audit or calibration of field samplers by the field investigators, who have prime responsibility for routine field audits and calibrations; and (2) by users of data, such as the IHW/UIC Permits staff who may question or want to verify the DQOs with QA staff at a later date after data is processed. Issues are reconciled at the lowest level and earliest time possible.

The appropriate Regional Office manager and/or field investigator are empowered to review and question any part of the measurement process and may initiate data reviews and corrective actions to bring the process back into compliance. To assess the quality of the data, the precision, accuracy and completeness will be assessed in comparison to the DQOs as discussed in Section B5 when DQOs have been formally established.

D1.2 Delineation of Laboratory Responsibility and Checklists

All laboratory operations subject to TNI Standards, as well as on-site laboratories qualifying for an exemption under 30 TAC Chapter 25.6, are expected to generate data of known and documented quality and maintain the quality systems required to generate quality data.

All data sets submitted to the TCEQ WPD in the OPR should contain a completed copy of the Laboratory Data Report QA/QC Checklist (Table D1.2). This checklist will be used by WPD Permits Section staff to verify minimum data quality completeness, correctness and compliance against method references and other requirements listed in this QAPP. In addition, the laboratory must also provide comments in the LCN that describe in detail any problems encountered in the processing of the samples within the analytical data set in question. Comparable laboratory checklists will also be accepted as long as they meet all required elements, a certified statement attesting to the known quality of the data and a LCN. Refer to the Laboratory Data Report QA/QC Checklist (Table D1.2).

All data sets submitted to the TCEQ regarding remediation action according to 30 TAC Chapter 350 must include a TRRP laboratory review checklist completed by the laboratory and reviewed by the data reviewer to ensure the quality of the data is known, documented, and acceptable for its intended purpose. The laboratory review checklist is comparable to an LCN. Once a person has been referred to the TRRP, the person must comply with all requirements of the adopted rule unless otherwise stated in another agency rule or unless a federal standard or state statutory requirement is more stringent.

D1.2.1 Reporting QA/QC Results

The LCN should provide a clear explanation of each failed precision and accuracy measurement determined to be outside of the method control limits of the QA/QC criteria. Precision and accuracy determinations should be clearly presented with all

results calculated. How the consequences and limitations of the QA/QC failure affect the results should also be included within the LCN.

D1.2.2 Summary Paragraph

The LCN review should include comments that clearly identify the problems associated with the sample results and state their limitations, when compared to the analytical methodology listed within the U.S. EPA Test Methods for Evaluating Solid Waste, SW-846, or other TCEQ approved analytical methods.

D2 VERIFICATION AND VALIDATION METHODS

D2.1 Purpose/Background

To further clarify the respective roles of data verification and data quality assessment or data suitability, the following example from U.S. EPA QA/G-8 (Guidance on Environmental Data Verification and Data Validation (U.S. EPA240R-02/004) has been taken:

> As part of a site characterization soil sampling program for evaluating a potential remediation project, silver is a metal of interest. After samples have been collected, analyzed, and the results reported, the data is submitted for data verification. The data verification process documents that silver recoveries for spiked samples fell below control limits. The data validation process traces the cause for the non-conformance to an elevated pre-spike sample concentration. The data validator notes that the laboratory control samples all have recoveries within criteria, and other spiked samples have recoveries within criteria, and the field duplicate results have significant variability. The data validation process determines that the low silver recovery is a result not of analytical bias, but of the heterogeneity of the matrix. The data quality assessment process considers the fact that all soil samples have silver concentrations below the action limit for the site by a factor of two or more, and therefore the data quality is adequate for the purpose of site characterization with the matrix variability noted on appropriate documentation.

Data validation can be performed in a laboratory (*An exception is compliance data submitted under TRRP*) by staff independent of the data generation or by an independent third party submitting compliance data under this RCRA/UIC QAPP. This validation ensures that all users can verify that decisions made using this data are supported by the type of data and quality needed and expected for their intended use. This validation is documented on the checklist provided at the end of this QAPP.

When compliance data is submitted under TRRP, the laboratory reviews the data for technical compliance to the method and laboratory SOPs. The laboratory then documents the outcome in the laboratory review checklist and data package. The laboratory review checklist and data package are then reviewed and, when warranted, validated by a party independent of the laboratory to determine if the data meet the project objectives and are usable for making project decisions. The outcome of the data review and, if performed, the data validation is documented in the data usability summary included in the assessment report.

Due to the variety of data uses and varying compliances to demonstrate compliance according to federal and state rules, not every laboratory analysis will involve the same degree of data validation and verification. For example, for permitted sites, with on-site laboratories, data verification may be predominantly an internal function of the field or laboratory staff to assure they are producing appropriate outputs according to their permits.

While field or laboratory staff verifies data in “real time” or near real time, TCEQ staff will perform external data verification after receipt of a completed data package

(checklist and case-narrative) where all appropriate steps producing verification documentation are reviewed for completeness, factual content and against RCRA/UIC Program/Permit specifications.

D2.2 Implementation of Validating and Verifying Data

Staff of the Corrective Action Program of the REM, IHW Permits Section of the WPD, UIC Permits Section of the RMD, Registration and Reporting Section of the OLRD, CID, MD, PSEAD, and Regional Offices are data users. These data users are the program staff authorized to determine the compliance status of the data supplier, or the regulated community. Program staff review and evaluate assessments, remediation activities, and closure activities submitted by the data supplier. In the review process, program staff may evaluate the documentation provided by the data suppliers to ensure that all validation and verification of data are performed and that all necessary corrective actions have been taken. Table D2.2.1 (Inputs from the Analytical Laboratory for Data Verification) presents information on a number of operations in the process of environmental data generation, commonly-used records, and the likely source of the specifications for such records that may be reviewed by TCEQ staff, regulated entity, permittee, or contractor depending upon their particular reporting requirements.

The data verification documentation should support the verified data that are reported. The data validator (e.g., contractor, permittee, TCEQ staff) should be aware of the requirements from any planning documents (e.g., Sampling Analysis Plans, minimum QC performance criteria, regulatory standards etc.) so that the data validator knows what information the laboratory was required to provide. Table D2.2.1 (Inputs from the Analytical Laboratory for Data Verification) lists elements that can be used to validate data for its particular use.

Table D2.2.1 Inputs from the Analytical Laboratory for Data Verification

Essential Laboratory Data Requirements to Demonstrate Compliance to RCRA/UIC Programs

Organic Analytes

Field/Laboratory sample ID
Confirmation of results when positive results are detected from location not previously tested by laboratory
Method reference number(s) (extraction/analysis where applicable)
Detection & quantitation limits defined
COC
Date of analysis
Sample receipt and login information
System monitoring compound
Positive controls
- Matrix spike/matrix spike duplicate
- Laboratory control sample
- Surrogates

Negative controls
- Method Blanks

GC/MS tuning - proof of acceptance
Internal standard area and retention time summary
Sample preparation details
- Pre/post sample amounts
- Extractions
- Sample cleanups
- Dilutions
- Sample prep/extraction log

Sample data
- Case-Narrative
- Quantitation reports
- Chromatographs *
- Spectra *
- Instrument run log *
- Initial calibration acceptance criteria met*
- Continuing calibration acceptance criteria met*
- Manual integrations with pre and post integration chromatograms*
- Audit trail report *
- Accreditation certification if not meeting exception defined in 30 TAC 25.6

Inorganic Analytes

Field/Laboratory sample ID
Method reference number(s) (digestion/analysis where applicable)
Detection & quantitation limits defined
COC
Date of analysis
Sample receipt and login information
Positive controls
- Matrix spike/matrix spike duplicate
- Laboratory control sample (LCS)

Negative controls
- Method Blanks

Inductively Coupled Plasma (ICP) interference check sample criteria met*
Post digestion spike sample information
Method of standard addition (MSA) if applicable
Sample preparation details
- Pre/post sample amounts
- Digestions
- Dilutions
- Sample prep log*

Sample data
- Case-Narrative
- Raw sample data, instrument output*
- Instrument run log*

Initial calibration acceptance criteria*
- Continuing calibration acceptance criteria*
- Accreditation certification if not meeting exception as defined in 30 TAC25.6

*Data not required in data package but may be requested by data reviewer as needed

D3 RECONCILIATION WITH USER REQUIREMENTS

D3.1 Purpose/Background

The objective of this section is to describe how the results obtained from the project and/or task are reconciled with the requirements defined by the data user or decision maker. The proposed methods to analyze the data and determine possible anomalies or departures from assumptions established in the planning phase of data collection should be outlined. The process of how issues will be resolved and how limitations on the use of the data will be reported to decision makers should be described. The Corrective Action Program of the REM, IHW Permit Section staff of the WPD, UIC Permits Section of the RMD, CID, MD, and Regional Office staff are data users. These data users are the program staff authorized to determine the compliance status of the data supplier, or the regulated community. Program staff review and evaluate assessments, remediation activities, and closure activities submitted by the data supplier. In the review process, program staff may evaluate if limitations on the use of the data were reported to data users and/or decision makers. If no limitations were reported and limitations are found, the data is returned as deficient.

The data users evaluate the effects of the uncertainly associated with the qualified data, such as the potential bias and imprecision of data. The data users consider the deviations made from the approved QAPP and also determine if data rejected by the data reviewer are critical to the decision being made with the data.

Questions or comments regarding the contents of this QAPP may be directed to the TCEQ Lead RCRA Quality Assurance Specialist: Anju Chalise (512) 239-1529.

GLOSSARY

Acceptance Criteria: Specified limits placed on characteristics of an item, process, or service defined in requirement documents. (ASQC)

Accreditation: The process by which an agency or organization evaluates and recognizes a laboratory as meeting certain predetermined qualifications or standards, thereby accrediting the laboratory. In the context of the National Environmental Laboratory Accreditation Program (NELAP), this process is a voluntary one.

Accreditation Body: Authoritative body that performs accreditation. (TNI) Although NELAP is a national program, state, territorial, or federal governmental agencies serve as Accreditation Bodies having responsibility and accountability for environmental laboratory accreditation and for granting accreditation. The TCEQ is the TNI Accreditation Body for the State of Texas. A NELAP Accreditation Body will also accept, by recognition, the accreditation status of a laboratory as determined by another NELAP Accreditation Body (this is called secondary accreditation). Each Accreditation Body must adopt and adhere to this principle as a condition of membership in NELAP. In accepting the accreditation status of a laboratory through recognition, the Accreditation Body assumes accreditation responsibilities as a secondary accreditation body.

A laboratory seeking accreditation must apply to its home state Accreditation Body for accreditation. However, if the Accreditation Body does not offer accreditation for testing in conformance with a particular field of accreditation (matrix-method/technology-analyte/analyte group), laboratories may obtain primary accreditation for that particular field of accreditation from any other NELAP Accreditation Body.

Accuracy: The degree of agreement between an observed value and an accepted reference value. Accuracy includes a combination of random error (precision) and systematic error (bias) components which are due to sampling and analytical operations; a data quality indicator.

Batch: Environmental samples that are prepared and/or analyzed together with the same process and personnel, using the same lots(s) of reagents. A preparation batch is composed of one to 20 environmental samples of the same TNI-defined matrix, meeting the above mentioned criteria and with a maximum time between the start of processing of the first and last samples (extract, digestates or concentrates) which are analyzed together as a group. An analytical batch can include prepared samples originating from various environmental matrices and can exceed 20 samples.

Blank: A sample that has not been exposed to the analyzed sample stream in order to monitor contamination during sampling, transport, storage or analysis. The blank is subjected to the usual analytical and measurement process to establish a zero baseline or background value and is sometimes used to adjust or correct routine analytical results. Each batch of samples, up to 20, should include the appropriate type of blanks depending upon the sample type, location and any other contributing factors that could compromise data integrity. Blanks include:

Equipment (*rinsate*) Blank: A sample of analyte-free media which has been used to rinse common sampling equipment to check effectiveness of decontamination procedures.

Field Blank: Blank prepared in the field by filling a clean container with pure de-ionized water and appropriate preservative, if any, for specific sampling activity being undertaken. For soil sample, field blank samples can be prepared with certified clean sand or soil rather than clean water

Instrument Blank: A clean sample (e.g., distilled water) processed through the instrumental steps of the measurement process; used to determine instrument contamination.

Method Blank: A sample of a matrix similar to the batch of associated samples that is free from the analytes of interest and is processed simultaneously with and under the same conditions as samples through all steps of the analytical procedures, and in which no target analytes (e.g., Chemicals of Concern 30TAC Chapter 335) or interferences are present at concentration that impact the analytical results for sample analyses.

Trip (*travel*) Blanks: Trip blanks are used for volatile organic compounds (VOCs) analysis only. In addition, trip blanks are prepared *prior to* going into the field by filling containers (VOC vials) with clean water (HPLC-grade) or sand. The sample containers are kept closed and maintained with the sample containers associated with site-specific VOC analysis until returned to the laboratory. Trip blanks are used to evaluate error associated with shipping and handling (i.e., diffusion of volatile organics though the septum during shipment and storage) and analytical procedures. They are used in conjunction with field blanks to isolate sources of sample contamination already noted in previous field blanks. If the trip blank has detectible quantities of the Chemicals of Concern (i.e., analytes of interest) it is possible that any positive results in the sample may be due to contamination; either by accident or by design. (Fundamentals of Environmental Sampling and Analysis)

Chain of Custody (COC) Form: Record that documents the possession of the samples from the time of the collection to receipt in the laboratory. This record generally includes: the number and types of containers; the mode of collection; collector; time of collection; preservation; and requested analysis.

Confirmation: Verification of the identity of a component through the use of an approach with a different scientific principle from the original method. These may include, but are not limited to:

Second column confirmation;
Alternate wavelength;
Derivatization;
Mass spectral interpretation;
Alternate detectors; or/and
Additional cleanup procedures.

Data Quality Objectives (DQOs): Qualitative and quantitative statements derived from a process used to develop performance and acceptance criteria that clarify study, technical, and quality objectives; define the appropriate type of data; and specify tolerable levels of potential decision errors that will be used as the basis for establishing the quality and quantity of data needed to support decisions. The document *Guidance on Systematic Planning Using the Data Quality Objectives Process (EPA QA/G-4)* provides a standard working tool for project managers and planners to develop DQOs for determining the type, quantity, and quality of data needed to reach defensible decisions or make credible estimates.

Data Validation: An analyte and sample specific process that extends the evaluation of the data beyond method, procedural, or contractual compliance (i.e., data verification) to determine the analytical quality of a specific data set. (U.S. EPA QA/G-8)

Data Verification: Process of evaluating the completeness, correctness, and conformance/compliance of a specific data set against the method, procedural, or contractual requirements. (U.S. EPA QA/G-8)

Data Reduction: The process of transforming the number of data items by arithmetic or statistical calculation, standard curves, and concentration factors and collating them into more a more useful form.

Detection Limit (***also see Method Detection Limit***): The lowest concentration or amount of the target analyte (also called Chemical of Concern 30 TAC Chapter 335) that can be identified, measured, and reported with confidence that the analyte concentration is not a false positive value.

Environmental Sample (*also referred to as field sample*): An environmental sample is a representative sample of any material (aqueous, non-aqueous, or mixed matrix) collected from any source for which determination of composition or contamination is requested or required.

Field of Accreditation: TNI's approach to accrediting laboratories by matrix, technology/method and analyte/analyte group.

Field Duplicates (*also referred to as field replicates and split samples*): These are field samples obtained from one sampling point, homogenized, divided into separate containers, and treated as separate samples throughout the remaining sampling handling and analytical processes. These field replicate samples are used to assess error associated with sample heterogeneity, sample methodology, and analytical procedures. Unlike field replicates, collocated samples are not composited and used as discrete samples in order to assess site variation in the immediate vicinity of the sampling area. (Fundamentals of Environmental Sampling and Analysis)

Field Measurement: The determination of physical, biological, or radiological properties, or chemical constituents that are measured on-site, close in time and space to the matrices being sampled/measured, following accepted test methods. This testing is performed in the field outside of a fixed-laboratory or outside of an enclosed structure that meets the requirement of a mobile laboratory.

Field Spikes: Field spikes are usually collected once every sampling event (exceptions are trial or risk burns). These samples are used by the laboratory to demonstrate the stability of the sampling matrix. The field spike is usually made by spiking some of the sampling matrix with known amount of surrogate spike in the field. TCEQ REM does not require this QC parameter to be collected unless warranted by site-specific conditions.

Holding Times: (*Maximum Allowable Holding Times*): The maximum times that samples may be held prior to analysis and still be considered to be valid or compromised. (40 CFR Part 136)

Internal Standard: A known amount of standard added to a test portion of a sample as a reference for evaluation and controlling the precision and bias of the applied analytical method.

Laboratory Control Sample (LCS): (*however named, such as laboratory fortified blank, spiked blank or QC check sample*): A sample matrix, free from the analytes of interest (aka – Chemicals of Concern) spiked with verified known amounts of analytes or a material containing known and verified amounts of analyte generally used to establish intra-laboratory or analyst specific precision and bias or to assess the performance of all or a portion of the measurement system.

Laboratory Duplicate: Aliquots of sample taken from the sample container under laboratory conditions and processed and analyzed independently.

Limit of Detection (LOD): (*also called method detection limit in the 30 TAC Chapter 335*): An estimate of the minimum amount of a substance that an analytical process can reliably detect. An LOD is analyte and matrix specific and may be laboratory dependent.

Matrix: The substrate of a test sample.

Field of Accreditation Matrix: These matrix definitions (applicable to this QAPP) will be used by the Texas Accreditation Program.

Air and Emissions: Whole gas or vapor samples including those contained in flexible or rigid wall containers and the extracted concentrated analytes of interest from a gas or vapor that are collected with a sorbent tube, impinger solution, filter, or other device.

Aqueous: Any aqueous sample excluded from the definition of Drinking Water matrix or Saline/Estuarine source including surface water, groundwater, effluents and TCLP or other extracts.

Chemical Waste: A product or by-product of an industrial process that results in a matrix not previously defined.

Drinking Water: Any aqueous sample that has been designated a potable or potential potable source.

Non-Aqueous Liquid: Any liquid with <15% settleable solids.

Non-Potable Water: Any aqueous sample excluded from the definition of Drinking Water matrix including surface water, groundwater, effluents, water treatment chemicals and TCLP or other extracts.

Solid and Chemical Materials: Includes soils, sediments, sludges, products and by products or an industrial process that results in a matrix not previously defined.

Solids: Includes soils, sediments, sludges and other matrices with >15% settleable solids.

Matrix Spike (MS) (*spiked sample or fortified sample*): A sample prepared by adding a known mass of target analyte to a specified amount of matrix ample for which an independent estimate of target analyte concentration is available. Matrix spikes are used, for example, to determine the effect of the matrix on a method's recover efficiency. (QAMS)

Matrix Spike Duplicate (MSD) (spiked sample or fortified sample duplicate): A second replicate matrix spike prepared in the laboratory and analyzed to obtain a measure of the precision of the recovery for each analyte. (QAMS)

May: Denotes permitted action, but not required action.

Method Detection Limit: One way to establish a LOD, defined as a the minimum concentration of a substance (an analyte) that can be measured and reported with 99% confidence that the analyte concentration is greater than zero and is determined from analysis of a sample in a given matrix containing the analyte.

Must: Denotes a requirement that must be met. (Random House College Dictionary)

National Accreditation Database: The publicly accessible database listing the accreditation status of all laboratories participating in NELAP.

National Institute of Standards and Technology (NIST): An agency of the U.S. Department of Commerce's Technology Administration that is working with U.S. EPA, States, TNI and other public and commercial entities to establish a system under which private sector companies and interested States can be accredited by NIST to provide traceable PT to those laboratories testing drinking water and wastewater. (NIST).

Precision: The degree to which a set of observations or measurements of the same property, obtained under similar conditions, conform to themselves; a data quality indicator. Precision is usually expressed as standard deviation, variance or range, in either absolute or relative terms.

Preservation: Refrigeration and/or reagents added at the time of sample collection (or later) to maintain the chemical and/or biological integrity of the sample.

Proficiency Test Sample: A sample, the composition of which is unknown to the analyst and provided to test whether the analyst/laboratory can produce analytical results within specified acceptance criteria.

Proficiency Testing (PT): A means of evaluating a laboratory's performance under controlled conditions relative to a given set of criteria through analysis of unknown samples provided by an external source.

Quality Assurance (QA): An integrated system of management activities involving planning, implementation, documentation, assessment, reporting, and quality improvement to ensure that a process, item, or service is of the type and quality needed and expected by the customer.

Quality Assurance Project Plan (QAPP): A document describing in comprehensive detail the necessary QA, QC, and other technical activities that should be implemented to ensure that the results of the work performed will satisfy the stated performance criteria.)

Quality Control (QC): The overall system of technical activities that measures the attributes and performance of a process, item, or service against defined standards to verify that they meet the stated needs established by the customer; operational techniques and activities that are used to fulfill requirements for quality.

Quality Control Sample: A sample used to assess the performance of all or a portion of the measurement system. QC sample may be Certified Reference Materials, a quality system matrix fortified by spiking, or actual samples fortified by spiking.

Replicate Analysis (aka – duplicate analysis): The measurements of the target analyte performed identically on two or more sub-samples of the same sample within a short time interval.

Resource Conservation and Recovery Act (RCRA): The enabling legislation under 42 USC 321 *et seq*. (1976), that gives U.S. EPA the authority to control hazardous waste from the "cradle-to-grave" including its generation, transportation, treatment, storage, and disposal.

Safe Drinking Water Act (SDWA): The enabling legislation, 42 USC 300f *et seq*. (1974), (Public Law 93-523), that requires the U.S. EPA to protect the quality of drinking water in the U.S. by setting maximum allowable contaminant levels, monitoring and enforcing violations. The Underground Injection Control Program falls under this act.

Shall: Denotes a requirement that is mandatory whenever the criterion for conformance with the specifications requires that there be no deviation. This does not prohibit the use of alternative approaches or methods for implementing the specifications so long as the requirement is fulfilled. (ANSI).

Should: Denotes a guideline or recommendation whenever non-compliance with the specification is permissible. (ANSI)

Spike: A known mass of target analyte added to a blank sample or sub-sample; used to determine recovery efficiency or for other QC purposes.

Surrogate: A substance with properties that mimic an analyte of interest. It is unlikely to be found in an environmental sample and is added to it for QC purposes.

REFERENCES

1. Test Methods for Evaluating Solid Waste, Physical/Chemical Methods, SW-846 3rd Edition, as updated
2. U.S. EPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review, U.S. EPA 540/R-94/013, February 1994
3. U.S. EPA Contract Laboratory Program National Functional Guidelines for Organic Data Review, U.S. EPA 540/R-94/012, February 1994
4. U.S. EPA Risk Assessment Guidance for Superfund, U.S. EPA 540/R-92/001-004, December 1991
5. Handbook of Quality Assurance/Quality Control (QA/QC) Procedures for Hazardous Waste Incineration, U.S. EPA 625/6-89/023, January 1990
6. U.S. EPA RCRA Sampling Procedures Handbook, Region VI, May 1998
7. 40 CFR Parts 144-148 and 260-270
8. TCEQ Guidance on Implementing SW-846 Method 5035
9. RCRA Corrective Action Plan, Final U.S. EPA 520-R-94-004, May 1994
10. TCEQ PPG
11. U.S. EPA RCRA Ground-Water Monitoring Technical Enforcement Guidance Document, November 1992
12. U.S. EPA RCRA Sampling Procedures Handbook, Revised May 1998
13. TCEQ Enforcement SOPs.
14. Field Operations Division Standard Operating Procedures, Latest Revision
15. Enforcement Initiation Criteria, Latest Revision
16. Quality Assurance Handbook for Air Pollution Measurement Systems: Vol III: Stationary Source Specific Methods, Interim Edition, Office of Research and Development, U.S. EPA/600/R-94/038C, April 1994
17. U.S. Environmental Protection Agency (2002): Guidance on Environmental Data Verification and Data Validation, QA/G-8.
18. Current Perspectives in Site Remediation and Monitoring – The Relationship Between SW-846, PBMS, and Innovative Analytical Technologies U.S. EPA 542-R-01-015

WASTE PERMITS LABORATORY DATA REPORT COVER PAGE

This data package consists of laboratory data that supports one of the following:

- ☐ Groundwater Monitoring
- ☐ Hazardous Waste Classification
- ☐ Hazardous Waste Combustor Maximum Achievable Control Technology Standards
- ☐ Injection Well
- ☐ Other (Explained in Case-Narrative)

Release Statement: I am responsible for the release of this laboratory data package. The data submitted in this package has been reviewed by the laboratory and is complete and technically compliant with the requirements of the methods used, except where noted by the laboratory. By my signature below, I affirm to the best of my knowledge, all problems/anomalies, observed by the laboratory as having the potential to affect the quality of the data, have been identified by the laboratory in the Laboratory Data Report QA/QC Checklist (Table D1.2), and no information or data have been knowingly withheld that would compromise the quality of the data.

Check if Applicable: ☐ This laboratory is an in-house laboratory controlled by the person required to demonstrate compliance according to rule. The official signing the cover page of the report is responsible for releasing this data package and is by signature affirming the above release statement is true.

Please Note: A comparable data checklist and signature page may be used. The checklist has been provided for your convenience. Depending upon the type of data needed to demonstrate regulatory compliance, the responsible party for the completeness of the data package may be a representative of a permitted site (i.e., Comprehensive Performance Testing Entity), a generator of hazardous and industrial non-hazardous waste, or an authorized representative of a non-permitted site. Data of documented and known quality is the responsibility of each laboratory.

_____

Name (Printed) Signature

_____

Official Title Date

LABORATORY DATA QA/QC REPORT & ANNUAL GROUNDWATER DETECTION MONITORING CHECKLIST INSTRUCTIONS

Waste Permits Division and Radioactive Materials Division

The Laboratory Data Report QA/QC Checklist, (Table D1.2) checklist is a tool designed to be completed by all permittees/laboratories, waste generators/laboratories, and any other regulated activities that require an analytical demonstration to verify compliance for RCRA and UIC programs within the Waste Permits Division and Radioactive Materials Division, respectively. The purpose of this checklist is to ensure that the records associated with all analytical data reflect all of the processes and procedures used to generate them, and to evaluate completeness, correctness, and compliance of the data against the applicable TCEQ and federal requirements.

I. Texas Accreditation Program

Laboratories providing data to the TCEQ must be NELAP-accredited unless an exception can be made under 30 TAC 25.6. In addition, all data used to meet compliance with the RCRA and UIC programs will also have to meet the performance criteria as designated in this QAPP.

II. Analytical Methods and Method Modifications Clarifications & Procedures

Analytical Methods

New rulemaking initiatives update 30 TAC Chapter 305 and 30 TAC Chapter 335 to include federal rule changes (U.S. EPA's Methods Innovation Rule) that are set forth in parts of RCRA Clusters XV-XVIII. These rule changes remove the requirements to use U.S. EPA SW-846 methods when conducting RCRA monitoring programs unless prohibited by law, rule, or method. This allows for all versions of a method or different U.S. EPA method if the laboratory can demonstrate compliance through acceptable QA of the performance standards. All methods used by the laboratory must be provided on data report sheets and/or the checklist.

Method Modification Procedures

Due to the variation of waste, it is the responsibility of the permittee/laboratory to find the appropriate method suitable to demonstrate compliance along with data of known quality unless a particular method is required by permit or rule. The U.S. EPA and TCEQ recognize this flexibility through the CFR and TAC and require the permittee, or entity required to demonstrate compliance, to have a laboratory modify a method (as allowed) to ensure compliance to the RCRA thereby protecting the environment and human/animal population. This is due on principle that most RCRA methods are considered performance-based and guidance, therefore modifications to methods in SW-846 may be necessary to meet or enhance performance that could not otherwise be attained to demonstrate compliance. In other words, most of the methods are not one-size-fits-all and should be tailored to fit the sample type and associated interferences while maintaining clear and controlled QC performance standards.

Other methods are not guidance and are written into the CFR and must be used without any modification if they are legally and defensibly used to demonstrate compliance for their intended purposes in the RCRA programs. These are referred to as Method Defined Parameters (MDPs) and can be found at 40 CFR 260.11 (*e.g., Toxicity Characteristic Leaching Procedure (TCLP; flashpoint procedure, and corrosivity to identify hazardous waste*). There are also methods and procedures that support the MACT Standards. Any modifications to these methods must have prior approval from the U.S. EPA.

All modifications to methods must be listed on the Case-Narrative Sheet and be written in the laboratory's SOP if this is a routine procedure or whether a modification was necessary at the time of sample preparation and analysis in order to demonstrate compliance. A list of potentially acceptable modifications that are allowed for meeting RCRA compliance according to the U.S. EPA and TCEQ is presented here.

Equipment	
AA or AE lamp type Absorption cell size Amperometer equipment Atomizer type Auto-analyzer equipment Mixing technology Measurement technology Reaction procedure Automatic concentration equipment (e.g., TurboVap) Beaker and/or flask size Centrifuge tube size Chromatographic cleanup/isolation column type/size Chromatography column and dimensions Colorimetric apparatus Condenser glassware Connective tubing type Dilution glassware type/size Dissolved oxygen analyzer Distillation apparatus Evaporating dish type/size Filter type/size Filtration apparatus Flame AA burner type Fume traps Furnace AA platform and tube type Glassware stopper type	Gooch crucible/platinum dish size Graduated cylinder size Heating equipment Hydride generator Kuderna-Danish size Photometer type Pipet size Pressure reduction apparatus Proportionating or peristaltic pump Purge gas Reduction column composition/size Reflux apparatus Sample cooling and/or stirring devices Sample container type/size Sample digestion apparatus Chemical oxidation Microwave digestion Sample purge cell type/size Sample trap material/size Scrubber apparatus size Separatory funnel size Synder column Solvent delivery System Syringe size Titration vessel size Vacuum apparatus Vial size

Equipment	
Chemicals	
Atomic absorption/emission fuels and oxidant Buffer solution Catalyst Cleanup column elution solvent Color developing reagent Dechlorination reagents for residual chlorine Desiccant/drying chemical Dilution water composition Extraction solvent Fuel/oxidant ratio Class cleaning chemical HPLC system/pump Indicator solution	Inhibitor solution Internal standards Materials for reference matrix (e.g., air/gas, effluent water, oil, sand, soil Nitrification inhibitor Oxidizing and reducing agents Partitioning solvent Sample preservation chemical Sample digestion chemical Scrubber solution and concentration Stock solution concentration Surrogates Titrant
Specifications	
Aeration time Calibration range Conductance measurements Dehydration techniques Desorption technique and time Glassware cleaning techniques and sequences Heating time Hydride elimination techniques Interference elimination techniques	Metal-and-organic-free water preparation. reflux time Sample aliquot size Sample cleanup techniques Sample cooling techniques and times Sample digestion/extraction techniques Sample mixing techniques Solution Standardization techniques

III. IHW Annual Groundwater Detection Monitoring Data

If you are an IHW permitted facility subject to the groundwater detection monitoring and are required to submit an annual report to the IHW Permits Section of the WPD by March 1st of every year the IHW Annual Groundwater Detection Monitoring Report Checklist is provided as a tool for the facility. All data collected from each groundwater sampling event in the preceding calendar year shall be included in the report. The actual content of the report should reflect the current state of the monitoring done at the facility. Refer to the IHW Annual Groundwater Detection Monitoring Report Checklist (Table D1.3).

IV. How to Complete the Laboratory Data Report QA/QC Checklist & IHW Annual Groundwater Detection Monitoring Checklist

Provide a completed copy of the Laboratory Data Report QA/QC Checklist (Table D1.2) for all analytical data sets submitted to the TCEQ to verify compliance to RCRA and UIC

Programs within the Waste Permits Division and Radioactive Materials Division, respectively.

- If you are providing data for the IHW Annual Groundwater Detection Monitoring Report, we recommend you also complete and submit an IHW Annual Groundwater Detection Monitoring Report Checklist (Table D1.3).
- If entries are lengthy or in Table form: (1) refer in the checklist to a specific section of the reference or modified method or (2) use a separate sheet to document the information, indicate "See Attachment No.," and attach the sheet to the checklist. Assign a number or other unique identifier to each attachment and indicate the identifier in the space on the checklist.
- All performance standards (QA/QC samples) that did not meet compliance to the goals and/or requirements to this QAPP must be described in the Case-Narrative for further evaluation by TCEQ staff to determine whether the data can be used to demonstrate regulatory compliance to the program requirements.
- All modifications to methods by the laboratory must be identified in the Case-Narrative for record.
- Sample matrix interference problems must be identified in the Case-Narrative and any corrective action the laboratory took including calling the TCEQ or modifying the method.
- The laboratory report sheet must comply with the minimum reporting requirements of the 2016 TNI Standards.
- The method detection limit (MDL), also known as the limit of detection (LOD – 2016 TNI Standards) , and the practical quantitation limit (PQL - 2016 TNI Standards), also known as the limit of quantitation (LOQ), must be clearly defined.
- Each laboratory must define all flagged data.
- Any results reported outside the lower and upper calibration standards will be considered an estimate and must be flagged.
- A statement or sampling and run dates or proof by COC forms must be provided to verify that samples were run within required holding times.

Table D1.2 LABORATORY DATA QA/QC REPORT CHECKLIST

Facility Name:	**Permit/ISW Reg No.:**	**For TCEQ Use Only**
Laboratory Name:	**U.S. EPA I.D. No.:**	**Project Mgr:**
Reviewer Name:	**TCEQ Project Manager/Data Reviewer:**	
Date:	**Date:**	

Description	**Status**	**Case Narrative (Check Box)**	**Technically Complete**
1. Were laboratory analyses performed by a laboratory accredited by TCEQ, whose accreditation included the matrix (ces), methods, and parameters associated with the data? If not was an explanation given in the case-narrative (e.g., laboratory exemption, accreditation for method /parameter not available from TCEQ)?	**Yes☐ No☐ NA☐**	☐	**Yes☐ No☐ NA☐**
2. Was a case-narrative from laboratory (QC data description summary) submitted with the data set?	**Yes☐ No☐ NA☐**	☐	**Yes☐ No☐ NA☐**
3. Are the sample collection, preparation and analyses methods listed in the permit, preparation and analysis methods listed in the permit or other documents specifying criteria the ones used on the final report?	**Yes☐ No☐ NA☐**	☐	**Yes☐ No☐ NA☐**
4. Were there any modifications to the sample collection, preparation and/or analytical methodology (ies)? If so was the description included on the Case-Narrative?	**Yes☐ No☐ NA☐** **Yes☐ No☐ NA☐**	☐	**Yes☐ No☐ NA☐**
5. Were all samples prepared and analyzed within required holding times?	**Yes☐ No☐ NA☐**	☐	**Yes☐ No☐ NA☐**
6. Were samples properly preserved according to method and QAPP requirements?	**Yes☐ No☐ NA☐**	**N☐**	**Yes☐ No☐ NA☐**

Facility Name:	Permit/ISW Reg No.:	For TCEQ Use Only
Laboratory Name:	U.S. EPA I.D. No.:	Project Mgr:
Reviewer Name:	TCEQ Project Manager/Data Reviewer:	
Date:	Date:	

Description	Status	Case Narrative (Check Box)	Technically Complete
7. Have the method detection limits (MDL) and/or practical quantitation limit (PQL) been defined in the final report? Note: NELAC uses terms limit of detection (LOD) and limit of quantitation respectively.	Yes☐ No☐ NA☐	☐	Yes☐ No☐ NA☐
8. Do parameters listed on final report match regulatory parameters of concern (POC) specified in permit and/or Waste Analysis Plan or other required document? Note: POC may also be referred to chemicals of concern (COCs)	Yes☐ No☐ NA☐	☐	Yes☐ No☐ NA☐
9. Are the POC's included within the analytical method's target analyte list?	Yes☐ No☐ NA☐	☐	Yes☐ No☐ NA☐
10. Were the appropriate type(s) of blanks analyzed?	Yes☐ No☐ NA☐	☐	
11. Did any blank samples contain POC concentrations >5x or 10x of MDL? If so, please explain potential bias?	Yes☐ No☐ NA☐	☐	Yes☐ No☐ NA☐
12. Were method blanks taken through the entire preparation and analytical process?	Yes☐ No☐ NA☐	☐	Yes☐ No☐ NA☐
13. Did the calibration curve and continuing calibration verification meet regulatory (e.g. NELAC Standards) method specifications (No. of standards, acceptance criteria, etc.)?	Yes☐ No☐ NA☐	☐	Yes☐ No☐ NA☐
14. Do the initial calibration standards include a concentration below the regulatory limit/decision level? If not please explain? If an MDL and PQL are each used on a report then the relationship between the two must be defined for each method.	Yes☐ No☐ NA☐ Yes☐ No☐ NA☐	☐	Yes☐ No☐ NA☐
15. Were manual peak integrations performed? If so pre and post chromatograms and method change histories may be requested?	Yes☐ No☐ NA☐ Yes☐ No☐ NA☐	☐	Yes☐ No☐ NA☐
16. Were all results bracketed by a lower and upper range calibration standard?	Yes☐ No☐ NA☐	☐	Yes☐ No☐ NA☐

Facility Name:	**Permit/ISW Reg No.:**	**For TCEQ Use Only**
Laboratory Name:	**U.S. EPA I.D. No.:**	**Project Mgr:**
Reviewer Name:	**TCEQ Project Manager/Data Reviewer:**	
Date:	**Date:**	

Description	**Status**	**Case Narrative (Check Box)**	**Technically Complete**
17. Was any result reported outside of the range of the calibration standards?	**Yes☐ No☐ NA☐**	☐	**Yes☐ No☐ NA☐**
18. Were all matrix spike (MS) and MS duplicate (MSD) recoveries within the data decision making goals of QC data in the RCRA/UIC QAPP and/or within the laboratories control charts? If not were data flagged with explanation in case-narrative?	**Yes☐ No☐ NA☐** **Yes☐ No☐ NA☐**	☐	**Yes☐ No☐ NA☐**
19. Were all of the MS and MSD relative percent differences (RPDs) within the data decision making goals of QC data in the RCRA/UIC QAPP? If not were data flagged with explanation in case-narrative?	**Yes☐ No☐ NA☐**	☐	**Yes☐ No☐ NA☐**
20. Were all laboratory control sample (LCS) recoveries at least within the MS and MSD ranges of recoveries and within laboratories control charts? If not were data flagged with explanation in the case-narrative?	**Yes☐ No☐ NA☐** **Yes☐ No☐ NA☐**	☐	**Yes☐ No☐ NA☐**
21. Were all POCs (COCs) in the LCS?	**Yes☐ No☐ NA☐**	☐	**Yes☐ No☐ NA☐**
22. Were the MS and MSD from samples collected for this work order or other samples in the analytical batch as defined by the Accreditation Standards? *This information is used to identify factors contributing to matrix interferences. It should not be assumed, unless it is understood by the laboratory, that samples relating to this report were the ones selected to be fortified with the POCs.*	**Yes☐ No☐ NA☐**	☐	**Yes☐ No☐ NA☐**
23. Were any of the samples diluted? If so were appropriate calculations made to the MDL and/or PQL of the final report?	**Yes☐ No☐ NA☐**	☐	**Yes☐ No☐ NA☐**

LABORATORY DATA REPORT QA/QC CHECKLIST
LABORATORY CASE-NARRATIVE
(To accompany laboratory checklist)

Facility Name:	Permit/ISW Reg No.:
Laboratory Name:	U.S. EPA I.D. No.:

Method No.	Non-conformance Description	Method Modification Description

Facility Name:	Permit/ISW Reg No.:
Laboratory Name:	U.S. EPA I.D. No.:

Method No.	Non-conformance Description	Method Modification Description

TABLE D1.3 WPD IHW Annual Groundwater Detection Monitoring Report

Facility Name:	**Permit/ISW Reg No.:**
Address:	**Date:**

	Report Elements	**Regulatory Citations, Permit Provisions* or IHW Recommendations**	**To Be Completed by IHW Permitted Facility**		**For TCEQ USE Only (Technically Complete)**
			N/A	**Location of Information within the IHW Annual Groundwater Detection Monitoring Report**	
1.	Certification required under 40 CFR Section 270.11(d)(1).	40 CFR 270.11(d)(1)			Yes☐ No☐ NA☐
2.	Sealed in accordance with Texas Geopractice Act and Rules.	22 TAC 851.156			Yes☐ No☐ NA☐
3.	Discussion of any permit action (e.g., permit mod, renewal, etc.) that might change the groundwater detection monitoring system.	Recommended			Yes☐ No☐ NA☐
4.	Discussion of site historical information for any significant issues related to groundwater detection monitoring including groundwater flow direction change, statistically significant increase (SSI) multiple aquifer sampling, perched aquifer, etc.	Recommended			Yes☐ No☐ NA☐
5.	Discussion of any site specific conditions which affect interpretation of the data collected.	Recommended			Yes☐ No☐ NA☐
6.	Dates and required frequency of sampling events.	Permit Provision II.B.1.d			Yes☐ No☐ NA☐

Facility Name:	**Permit/ISW Reg No.:**
Address:	**Date:**

Report Elements		**Regulatory Citations, Permit Provisions* or IHW Recommendations**	**To Be Completed by IHW Permitted Facility**		**For TCEQ USE Only (Technically Complete)**
			N/A	**Location of Information within the IHW Annual Groundwater Detection Monitoring Report**	
7.	For Post Closure Care, statement of the year (e.g., 5th) as well as the total number of years (e.g., 30) required for groundwater detection monitoring.	Recommended			Yes☐ No☐ NA☐
8.	Identification of all groundwater detection monitoring system wells and associated aquifers required to be sampled by the permit.	Permit Table VI.B.3.b and Permit Provision VI.D.2.c			Yes☐ No☐ NA☐
9.	All wells identified in checklist Item 8 sampled, or explanation of discrepancy provided.	Permit Table VI.B.3.b and Permit Provision VI.D.2.c			Yes☐ No☐ NA☐
10.	Statement whether a SSI has occurred over background values in any well during the previous calendar year's monitoring events.	Permit Provision VI.G.1			Yes☐ No☐ NA☐
11.	Discussion of the status of any SSI events.	Permit Provision VI.G.1			Yes☐ No☐ NA☐
12.	Discussion of groundwater sampling methods.	Permit Provision VI.D.1.c			Yes☐ No☐ NA☐
13.	Groundwater level measurements relative to Mean Sea Level (MSL) measured to within 0.01 ft.	Permit Provision VI.D.2.d(1)			Yes☐ No☐ NA☐
14.	Determination of pH, temperature, Specific Conductivity and, if applicable, Turbidity in nephelometric turbidity units.	Permit Provision VI.D.2.d(2)			Yes☐ No☐ NA☐
15.	Description of groundwater sample appearance (clarity, color, etc.).	Permit Provision VI.D.2.d(3)			Yes☐ No☐ NA☐

Facility Name:	**Permit/ISW Reg No.:**
Address:	**Date:**

Report Elements		**Regulatory Citations, Permit Provisions* or IHW Recommendations**	**To Be Completed by IHW Permitted Facility**		**For TCEQ USE Only (Technically Complete)**
			N/A	**Location of Information within the IHW Annual Groundwater Detection Monitoring Report**	
16.	Comparison of measured total well depth to total constructed well depth and screened interval as noted on well construction logs. Recommendations for any needed corrective action (redevelopment or replacement).	Permit Provision VI.D.2.d(4)			Yes☐ No☐ NA☐
17.	Discussion of findings from inspection of all wells specified in permit, and discussion of any needed repairs or replacements.	Permit Provision VI.D.2.d(5)			Yes☐ No☐ NA☐
18.	Table summarizing groundwater elevation data for each well including field measurements, surveyed elevations of measuring point and calculated groundwater elevation above MSL.	Permit Provision VI.G.2 and VI.D.2.d(1)			Yes☐ No☐ NA☐
19.	Discussion of groundwater flow direction and flow rate in the uppermost aquifer or any other aquifer that is sampled, using the data collected during the preceding calendar year's sampling events. Include all calculations and data inputs used for the determination.	Permit Provision VI.G.3			Yes☐ No☐ NA☐

Facility Name:	**Permit/ISW Reg No.:**
Address:	**Date:**

	Report Elements	**Regulatory Citations, Permit Provisions* or IHW Recommendations**	**To Be Completed by IHW Permitted Facility**		**For TCEQ USE Only (Technically Complete)**
			N/A	**Location of Information within the IHW Annual Groundwater Detection Monitoring Report**	
20.	Contour map sealed by a Professional Geoscientist of the potentiometric water levels in the uppermost aquifer or any other aquifer that is sampled based at a minimum upon concurrent measurements in all monitoring wells for each monitoring event.	Permit Provision VI.G.4 and 22 TAC 851.156			Yes☐ No☐ NA☐
21.	Any exclusion of data collected for generating contour map and justifications.	Recommended			Yes☐ No☐ NA☐
22.	Table summarizing analytical results for all required samples and constituents.	Permit Provision VI.G.2			Yes☐ No☐ NA☐
23.	Field investigation reports including, at a minimum, sample results, sample collection records, COC records, analytical results, associated QC including trip, field and rinsate blanks as applicable, laboratory blanks, spike recovery, duplicate, and surrogate recovery data and a written discussion of the sampling event.	QAPP Section A.9.2.1			Yes☐ No☐ NA☐

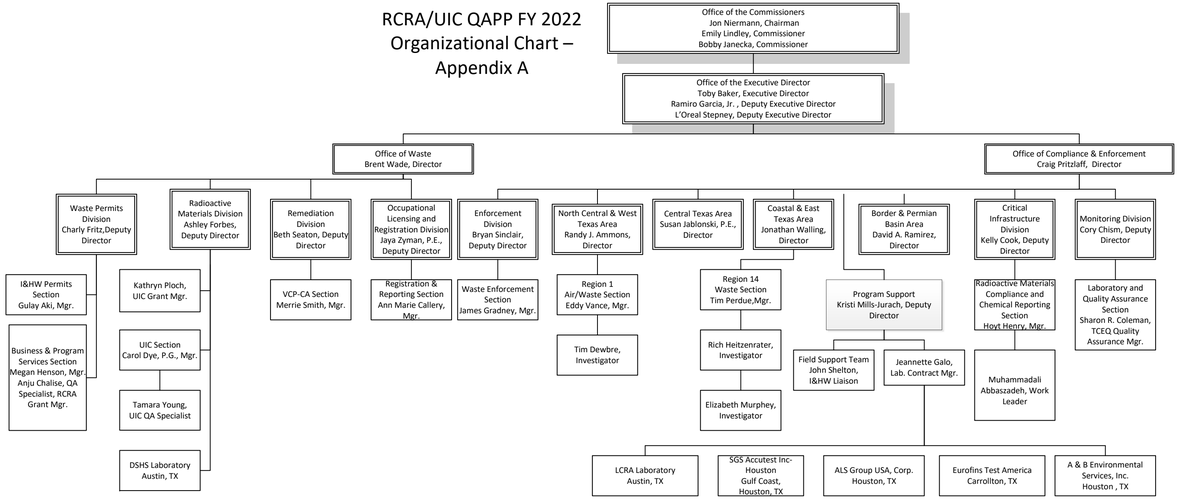
Facility Name:	**Permit/ISW Reg No.:**
Address:	**Date:**

	Report Elements	**Regulatory Citations, Permit Provisions* or IHW Recommendations**	**To Be Completed by IHW Permitted Facility**		**For TCEQ USE Only (Technically Complete)**
			N/A	**Location of Information within the IHW Annual Groundwater Detection Monitoring Report**	
24.	Laboratory report including, at a minimum, the Analytical Data Report Cover Page, the COC record, the sample results and associated QC including blank, spike recovery, duplicate, and surrogate recovery data. Information provided shall be sufficient to ensure the quality and the usability of the data.	QAPP Section A.9.2.2 and Analytical Data Report Cover Page found within the QAPP			Yes☐ No☐ NA☐
25.	Analytical Data Report QA/QC checklist and Laboratory Case Narrative (Table D1.2).	RCRA/UIC QAPP			Yes☐ No☐ NA☐
26.	Discussion of statistical methodologies used in accordance with relevant permit provisions. Please note: an alternate statistical methodology cannot be used without an approved permit amendment or modification.	Recommended			Yes☐ No☐ NA☐
27.	Table and/or description of statistical analysis results, including any SSI over background concentrations and all supporting documentation (calculations and data inputs).	Permit Provision VI.G.2			Yes☐ No☐ NA☐
28.	Recommendations for any changes to the groundwater detection monitoring system.	Permit Provision VI.G.5			Yes☐ No☐ NA☐

Facility Name:			**Permit/ISW Reg No.:**	
Address:			**Date:**	
Report Elements	**Regulatory Citations, Permit Provisions* or IHW Recommendations**	**To Be Completed by IHW Permitted Facility**		**For TCEQ USE Only (Technically Complete)**
		N/A	**Location of Information within the IHW Annual Groundwater Detection Monitoring Report**	
TCEQ Project Manager: Date Reviewed:				

* All Permit Provisions referenced herein refer to standard permit provisions in the latest permit modules maintained by the IHW Permits Section. The Regulated Entity is responsible for ensuring that the provisions of their specific permit are met.

RCRA/UIC QAPP FY 2022 Organizational Chart – Appendix A



DSHS – Texas Department of State Health Services
IHW – Industrial & Hazardous Waste
LCRA – Lower Colorado River Authority
QA – Quality Assurance
UIC – Underground Injection Control
VCP-CA – Voluntary Cleanup Program and IHW Corrective Action Programs

UIC Mechanical Integrity Testing Staff – Appendix B