OKLAHOMA Environmental Quality

State Environmental Laboratory Services Division

QUALITY ASSURANCE MANUAL

Effective Date:

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QUALITY ASSURANCE MANUAL

Quality System Operating Policies of the
State Environmental Laboratory Services
Division

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1 Document Distribution, Availability, And Management

To facilitate distribution and reduce paper waste, this Quality Assurance Manual (QAM) is available to State Environmental Laboratory Services Division (SELSD) staff in SELSD "I" drive **I:\SEL-Documents & Resources\Controlled Documents\Division Wide (SELSD)** and for Agency and customer review at **https://www.deq.ok.gov/divisions/sels/**.

1.1 Management of the Quality Assurance Manual (QAM)

The Quality Assurance Manual (QAM) is the consolidated and updated document that supersedes and replaces two previously distinct documents: the Quality Assurance Plan (QAP) and the Data Quality Manual (DQM). The decision to combine the QAP and DQM into a single, comprehensive Quality Assurance Manual was made to streamline documentation, reduce redundancy, and provide a singular, cohesive reference for quality assurance policies, procedures, and requirements.

This document is maintained, revised, and distributed by SELSD Accreditation and Quality Assurance Section (AQA) with input from divisional management and SELSD staff. AQA serves as the primary points of contact for this document. The QAM is subjected to ongoing annual review and distribution. The QAM remains effective until a new revision is authorized. Each review will ensure the QAM reflects current practices and complies with all relevant regulations, accreditation, and certification standards.

Approval of this document is indicated by signature of the QAM signatories. It is mandatory that all SELSD staff read, understand, and implement all aspects of this QAM, including any supporting documents mentioned. Deviations from this QAM will be documented through the Root Cause and Resolution Plan (RCRP).

This QAM is proprietary and may not be altered in any way except by approval of the Division Director (DD), or designee, and AQA.

2 Introduction

2.1 Oklahoma Department of Environmental Quality (DEQ) Agency Mission Statement

Our Mission and Our True North: "To protect and improve public health and our environment in a manner that supports and advances a prosperous Oklahoma for current and future generations."

Our mission reflects our unwavering commitment to the citizens of Oklahoma and the entities we regulate, that protecting our air, land, and water is paramount. We believe that Oklahoma deserves optimal service with professionalism and integrity.

2.2 Agency Partners

The following divisions work together with SELSD to support the agency's mission:

- **Air Quality Division (AQD):** AQD operates various programs to carry out DEQ's regulatory duties under state and federal law. The programs include air monitoring, air permits, emissions inventory, compliance and enforcement, lead-based paint, and rules and planning.

- **Water Quality Division (WQD):** The primary function of WQD is to maintain clean water for Oklahoma by regulating facilities that produce and distribute public drinking water and that treat, transport, store, and discharge wastewater. WQD is also responsible, in cooperation with other state agencies, for maintaining water quality standards in Oklahoma's lakes, rivers, and streams.

- **Land Protection Division (LPD):** LPD inspects and permits hazardous waste and solid waste treatment, storage, and disposal facilities, permits and inspects certain underground injection wells, manages radioactive materials, restores contaminated land to safe and useful conditions, maintains the list of recyclers for the State, and assists facilities with

compliance under Emergency Planning and Community Right-to-Know Act (EPCRA).

- **Environmental Complaints and Local Services (ECLS):** ECLS performs compliance inspections and provides technical assistance to DEQ permitted facilities. ECLS administers Oklahoma's on-site sewage treatment program. This includes soil tests, on-site system designs, inspection of system installations and regulatory oversight of certified installers, certified profilers and septage pumpers and transporters. ECLS responds to all citizen complaints regarding environmental pollution. ECLS also plays a significant role in disaster response and recovery for the State's water, sanitation, and waste disposal efforts.

- **Office of Communications and Education (OCE) & Office of Continuous Improvement (OCI):** OCE strives to provide and improve access between the agency and Oklahomans, local, state, and federal agencies, the regulated community, and media professionals. OCE leads educational and informative workshops across the state and supplies public speakers for civic groups and the regulated community. OCI promotes DEQ programs and initiatives through the website and social media. OCI champions Strategic Planning and Lean projects throughout the Agency.

- **Administrative Services Division (ASD):** ASD provides support to the other divisions in the form of procurement, payroll, human resources, records management, recruitment, building security, and building operations.

- **Office of Executive Director (OED):** OED provides executive leadership to the agency and legal counsel to the divisions.

- **Office of Business and Regulatory Affairs (OBRA):** OBRA provides customer assistance, permit and technical assistance, compliance

assistance and regulatory assistance to the regulated community, especially businesses and business-related organizations.

- **Office of Funding and Grant Assistance:** Assisting entities in securing funding opportunities that help protect or improve human health and the environment across all media. This office helps navigate funding opportunities whether the funding program at issue is administered by DEQ or other state or federal agencies.

2.3 State Environmental Laboratory Services Division Mission Statement

The mission of SELSD is to effectively meet the roles and responsibilities required of the Oklahoma Principal State Laboratory. Generate analytical data of known and documented quality to protect public and environmental health in the State of Oklahoma. Serve as a technical resource for DEQ programs and staff, state, federal and tribal agencies, municipalities, students, and Oklahoma citizens through laboratory services, education, outreach, development of consensus standards and continued advancement of the environmental laboratory sector.

2.4 The SELSD Quality Policy Statement

SELSD’s mission is supported by employees’ commitment to work together to produce analytical data of known and documented quality and provide technical services of the highest utility. This policy is accomplished by implementing the following quality objectives:

- Maintain a Mission Statement, Quality Policy, Quality Objectives, and Ethical Practices that are supported by all levels of management and staff and that remain relevant through routine review and revision.

- Continually understand, implement, maintain, document, and improve the elements of SELSD’s Management System through the RCRP and Management System Review (MSR) processes.

- Maintain conformance to requirements, regulations, procedures, and policies.
- Implement a division-wide training and competency program to ensure compliance with required program elements as defined by the applicable authority or standard.
- Provide a high level of customer service that meets the needs and requirements of our clients and stakeholders through effective and timely communication.
- Maintain a Laboratory Accreditation Program (LAP) to ensure statewide analytical capacity that ensures consistency and defensibility of all regulatory compliance data generated for Oklahoma.
- Maintain fiscal responsibility to our clients, stakeholders, and citizens to ensure fair value for services and utilization of resources.

2.5 Definitions and Acronyms

Definitions and acronyms are used throughout this manual, and are contained within the referenced ISO/IEC, TNI, and EPA documents. Additional definitions and acronyms for analytical quality control are listed in **Appendix H**. Any terms not defined or clarified within this manual are assumed to have the standard usage definition.

3 Purpose, Scope, Governance, And Oversight

3.1 Purpose

This Quality Assurance Manual (QAM) establishes the comprehensive quality policy for State Environmental Laboratory Services Division (SELSD) and outlines the procedures, data quality objectives (DQOs), and technical and operational policies necessary to ensure the generation of valid, legally defensible, and high-quality data. SELSD's QAM complies with regulatory standards and ensures that

all laboratory operations follow best practices, maintaining acceptable and defensible levels of accuracy, precision, and reliability.

Additionally, this QAM provides guidance for meeting analytical and quality assurance requirements as outlined in Quality Assurance Project Plans (QAPPs) developed for projects submitted to EPA Region 6 or other regulatory bodies. All work done in support of projects by SELSD operates under this quality management system, with documented controls in place to ensure data integrity and compliance with applicable regulations.

SELSD is committed to continuous improvement, regulatory compliance, and the production of accurate and reliable environmental data. This commitment is maintained through internal audits, management reviews, and a robust corrective and preventive action process to address non-conformances and opportunities for improvement. Staff receive ongoing training and competency evaluations to ensure they are equipped to meet all regulatory requirements and laboratory standards.

SELSD provides technical and analytical support to DEQ programs, state, federal, and tribal agencies, municipalities, and private citizens. The division operates with the following specialized laboratory sections:

- Elemental Analysis (EA)
- Environmental Microbiology (EM)
- General Chemistry (GCh)
- Gas Chromatography Mass Spectrometry (GCMS)
- Gas Chromatography (GC)
- Sample and Data Management (SDM)
- Accreditation, Quality Assurance, & Environmental Safety (AQA)

- Field & Laboratory Customer Assistance (FLCA)

Each section within SELSD is responsible for maintaining compliance with regulatory requirements, particularly in relation to data quality, sample handling, and adherence to method-specific requirements. The laboratory maintains up-to-date scopes of certification and accreditation, which are available upon request, ensuring that all analyses performed are within the laboratory's demonstrated competence.

SELSD is equipped to handle a wide range of environmental samples, including:

- Aqueous (potable water and non-potable water)
- Biological tissue
- Chemical waste
- Non-aqueous liquids and solids

Definitions, examples of these matrices, and the available test methods can be found in **Appendix C** of this document. All other sample types require notification and approval prior to delivery, with provisions made on a case-by-case basis to ensure proper handling and analysis.

3.2 Scope

This document applies to all SELSD staff. It establishes the SELSD Quality Management System (QMS), including all laboratory and accreditation activities undertaken by SELSD, including regulatory compliance, and drinking water primacy functions. Matters addressed include, but are not limited to the requirements established in the following regulations and standards:

- TNI Environmental Laboratory 2016 Standard Volume 1
- TNI Environmental Laboratory 2016 Standard Volume 2

- EPA Manual for the Certification of Laboratories Analyzing Drinking Water (Fifth Edition)
- First and Second Supplements to the EPA Manual for the Certification of Laboratories Analyzing Drinking Water (Fifth Edition)
- EPA Safe Drinking Water Act – 40 CFR 141
- EPA Clean Water Act – 40 CFR 136
- Publications of the National Radon Safety Board (NRSB)

In addition, SELSD staff participating in collaborative activities under the authority of another division or agency (such as field staff assisting LPD with sample collection) are subject to that entity's technical, operational, and quality management system (however named) procedures, as identified by that entity.

3.3 Governance

According to Title 27A, Article IV of the Environmental Quality Code, §2-4-201 DEQ is authorized to acquire, operate, and maintain laboratories to analyze samples to:

- Obtain factual data to support any order, permit, function, or program of the Department.
- Provide laboratory services for individuals, cities, towns, counties, tribes, state institutions and other state and federal agencies.
- Provide such services and perform such other analyses as is necessary to implement and enforce the programs and functions under the jurisdiction of the Department pursuant to this Code.

The Environmental Quality Board (EQB), through its association with the Water Quality Management Advisory Council (WQMAC) shall promulgate rules for State

laboratory services under this Code. The EQB shall follow the procedures required by the Administrative Procedures Act for promulgation of such rules.

According to Title 27A, Article IV of the Environmental Quality Code, §2-4-301; DEQ is designated as the administrative agency for national environmental laboratory accreditation programs and shall:

- Establish and administer the state water quality and environmental laboratory accreditation programs for laboratories which apply.
- Issue, modify, renew, reinstate, revoke, or suspend the accreditation of a laboratory or deny a new or renewal accreditation application.

Under §2-4-302, the EQB in association with the WQMAC shall promulgate rules for accreditation of privately and publicly owned laboratories for performance of environmental analyses. The EQB may also promulgate rules which adopt standards of a national environmental laboratory accreditation program and the US EPA by reference.

Rulemaking is done on an as needed basis to comply with changing methods and accreditation standards and requirements. SELSD DD is charged with oversight and coordination of all rule change activities.

3.4 Oversight

AQA: Accreditation and Quality Assurance staff report to the AQA manager, while ensuring that the QAO maintains direct access to the DD. In the absence of the AQA manager, their responsibilities will be placed on the DD.

- Accreditation: Trained personnel perform assessments, provide technical assistance, and conduct routine evaluations of external labs' work, such as proficiency testing, while also offering recommendations for accreditation decisions. The DD authorizes final decisions for accreditation activities, including the issuance of accreditation certificates and scopes.

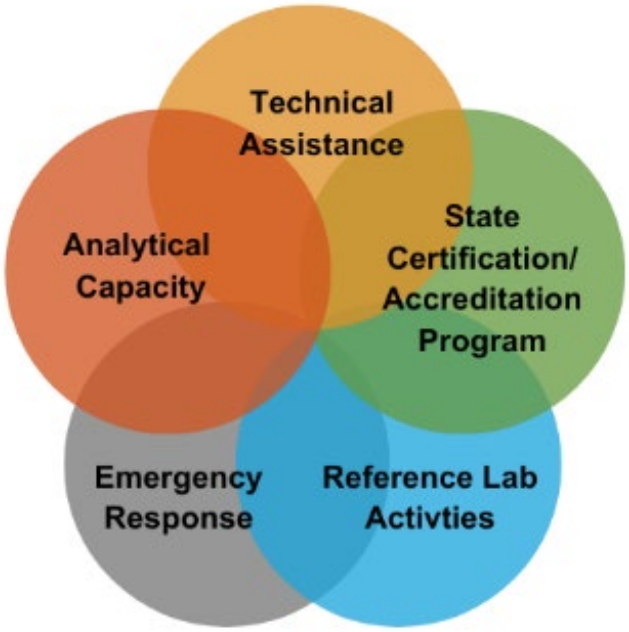
- Quality Assurance: Trained personnel perform tracking, review, and maintenance of demonstrations of capability, controlled documents, laboratory records, proficiency testing, corrective action processes, and customer feedback. They also perform routine internal audits and provide training and technical assistance.

4 Certification, Accreditation, and Professional Participation

4.1 Oklahoma DEQ State Primacy Functions

DEQ is given primary enforcement responsibility and authority to administer the EPA's drinking water regulations within its borders. To receive and maintain primacy status, the State must have available laboratory facilities capable of performing analytical measurements for all federally mandated contaminants specified in the State Primary Drinking Water Regulations. SELSD is designated and certified by EPA as the Oklahoma Principal State Laboratory (PSL). The LAP is authorized by EPA to certify public, municipal, industrial, and commercial laboratories for the State of Oklahoma. SELSD, together with these certified laboratories, are considered the Principal State Laboratory System. This network ensures the scope of analytical capacity for Drinking Water compliance testing in the state.

This graphic represents the key functions of the principal state lab:



4.2 Drinking Water Certification and Accreditation

SELSD is recertified every three years through on-site audits conducted by US EPA Region 6. These audits cover all primacy activities including sampling and certification of other drinking water laboratories. Additionally, the laboratory undergoes biennial on-site assessments by The NELAC Institute (TNI) to ensure continued compliance with the TNI Environmental Laboratory Standard. The LAP is evaluated and approved by TNI every three years, ensuring ongoing conformance to national accreditation standards.

4.3 The NELAC Institute (TNI)

TNI was developed to support the National Environmental Laboratory Accreditation Program (NELAP). The TNI network is represented by federal, state, and private entities developing and implementing consensus standards for laboratory accreditation. Currently, SELSD is accredited for EPA 537.1 and EPA 533 in support of EPA's fifth Unregulated Contaminant Monitoring Rule (UCMR 5) as well as recognition of the LAP as a TNI Accreditation Body (AB). The staff of SELSD also actively participate in the development and implementation of

consensus standards by engaging as associate and voting members in TNI committees. Through this involvement, SELSD contributes to shaping and refining the standards that guide and define laboratory practices across the industry and nation.

4.4 Environmental Response Laboratory Network (ERLN)

ERLN is EPA's national network of laboratories that can be accessed as needed to support large scale environmental responses. SELSD is a member of the ERLN and participates in exercises coordinated by the ERLN. SELSD is also a member of the Water Laboratory Alliance (WLA), which is a component of the ERLN.

SELSD staff participate in planning and development of emergency responses measures and procedures, as well as partaking in relevant practice exercises.

4.5 Association of Public Health Laboratories (APHL)

APHL represents state and local government health laboratories and works to strengthen laboratory systems serving the public's health in the US and globally. SELSD staff collaborate with APHL to develop and implement policy to protect public and environmental health.

4.6 Federal and State Program Support

SELSD provides support for DEQ environmental programs as well as programs for other State agencies and Oklahoma tribes. Program support includes:

- **Safe Drinking Water Act (SDWA):** SELSD implements operational, technical, and analytical procedures, including those relating to quality assurance, quality control, and emergency response to meet the requirements of all SDWA support and rule implementation. The individual federal Rules are listed below. Specific procedural implementation to support compliance to the Rules is documented in the individual Unit or Section procedures.
    - Chemical Contaminants Rule (CCR)

  - Lead and Copper Revised Rule (LCR/LCRR/LCRI)
  - Radionuclides Rule
  - Aircraft Drinking Water Rule (ADWR)
  - Ground Water Rule (GWR)
  - Stage 1 and Stage 2 Disinfectants and Disinfection Byproducts Rules (DBPR)
  - Surface Water Treatment Rules (SWTR)
  - Revised Total Coliform Rule and Total Coliform Rule (TCR/RTCR)
  - Unregulated Contaminant Monitoring Rule (UCMR)

- **Clean Water Act (CWA):** SELSD supports the National Pollutant Discharge Elimination System (NPDES) by maintaining capacity for the methodologies required under the NPDES Program, as well as supporting DEQ complaints, fish kills, and special investigations through field assessments and collections, analysis, technical assistance, and collaborations with tribal, state, and federal agencies and entities.

- **Resource Conservation and Recovery Act (RCRA)**: SELSD supports the Solid and Hazardous Waste Programs by implementing and maintaining capacity for methods that support solid and hazardous waste identification. SELSD also provides project planning, analytical and technical support, and customized reporting for these programs.

- **Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA):** SELSD supports the CERCLA Program by implementing and maintaining capacity for methods that support hazardous waste identification. SELSD also provides project planning, analytical support, sampling support, technical assistance, and customized reporting.

- **Clean Air Act:** The SELSD supports the Clean Air Act through the collection and analysis of Mercury in Fish. The SELSD performs biomonitoring that includes performing risk assessments and issuing fish consumption advisories.

- **Harmful Algal Blooms (HAB):** SELSD maintains analytical capacity to perform identification, enumeration, and toxin testing in response to HABs. SELSD performs sample collection, collaboration, risk assessment, and monitors ongoing HABs that threaten Public Water Supplies.

- **Private (PRIV):** SELSD provides technical and analytical assistance to private customers (homeowners, realtors, water vendors, other environmental laboratories, etc.) of Oklahoma. The service and testing are customized individually based on request, need, or SELSD's knowledge of local conditions. Additionally, customers are provided the appropriate collection materials and collection instructions per their test selection through on-line tutorials, FAQs, and instructions. Direct technical assistance is provided to customers after analysis for data interpretation and information for risk assessment of potential health threats.

- **Grant and Special Project Support:** SELSD implements operational, technical, and analytical procedures, including those relating to quality assurance, quality control, and public outreach to meet the requirements of special projects such as EPA's 3T's Program and National Rivers and Streams Assessment (NRSA) and National Lakes Assessment (NLA).

- **Natural Resource Damage Assessment and Restoration (NRDAR):** The Natural Resource Damage Assessment and Restoration (NRDAR) program is a part of CERCLA (Superfund) and Oil Pollution Act (OPA) which seeks to assess injury to natural resources due to the release of a hazardous substance, pursue damages against responsible parties, and restore injured resources as much as possible. SELSD personnel serve as technical representatives for the State's natural resource trustee (OSEE) on

3 NRDAR trustee councils: Tar Creek and Tulsa County Smelters and the Skull Creek Pipeline Oil Spill trustee council. Representatives work with federal agencies and tribal governments to evaluate injury, build a case for damages, pursue compensation, and restore injured resources.

5 SELSD Organization, Representatives, and Staffing Responsibilities

General DEQ employee qualifications by job classification are provided the Agency Quality Manual Plan (QMP) and on the OPM Job Family Index. Employee responsibilities are addressed in the DEQ Administrative Procedures Manual (APM) which is available to all staff at 292-DEQ Hub/Policies & Procedures Link/Employee Responsibilities. The most current organizational chart is available to all staff at 292-DEQ Hub/ Human Resources/ Organizational Chart.

SELSD's organizational structure is designed to support and maintain the effective and sustainable implementation of the quality system. Specific organization along with roles and responsibilities for SELSD staff are defined below.

Title	Roles and Responsibilities
SELSD (Everyone)	• Read and maintain compliance with Quality Assurance Manual • Read and follow all current and approved SELSD documents and procedures that fall within individual's role and responsibilities • Participate and maintain compliance with the Ethics and Data Integrity Program • Maintain compliance with all applicable programs and standards

Title	Roles and Responsibilities
Division Director (DD)	• Agency leadership • SELSD budget and strategic planning and oversight, including MSR • Manage AQA staff, program priorities, and operations • Rulemaking • Principal State Laboratory activities • Function as a deputy for the AD and AQA Manager in the event of an extended absence • Provide direction, support, and oversight to divisional staff • Authorize final decisions for accreditation activities
Assistant Director (AD)	• Agency leadership • SELSD budget and strategic planning and oversight, including MSR • Manage Technical Operations Manager (TOM), SEL priorities and operations • Rulemaking • Principal State Laboratory Activities • Function as a deputy for the DD and TOM in the event of an extended absence • Provide direction, support, and oversight to divisional staff

Title	Roles and Responsibilities
Environmental Projects Manager (EMP)	• National Resource Damage Assessment Trustee • Water Quality Standards and Discharge Permit Advisor • Subject matter expert for Chemical of Emerging Concern (CEC) and unregulated contaminants • Agency and divisional delegate • Rulemaking
Accreditation and Quality Assurance Manager (AQA)	• Oversee and manage quality assurance, laboratory accreditation, and environmental health and safety activities • Accreditation body point of contact and representation for both EPA and TNI • Performance of internal audits • Performance of laboratory assessments • Rulemaking • Technical and regulatory resource • Function as deputy for the QAO in the event of an extended absence • Function as deputy for the EHSO in the event of an extended absence

Title	Roles and Responsibilities
Quality Assurance Officer (QAO)	• EPA certification and point of contact • TNI accreditation and point of contact • QAM revision and maintenance • Performance of internal audits • Quality system improvement and maintenance • Technical and regulatory resource
Quality Assurance Scientist (QAS)	• PT monitoring and review • Support equipment management • QAM revision and maintenance • Performance of internal audits • Quality System improvement and maintenance • Technical and regulatory resource
Laboratory Accreditation Officer	• Performance of laboratory assessments • Performance of internal audits • Technical and regulatory resource • Ensure regulatory and procedural suitability and compliance • Evaluation, tracking, and review of laboratory applications and materials • Rulemaking

Title	Roles and Responsibilities
Environmental Health and Safety Officer (EHSO)	• Safety policy and procedure development • Chemical and waste management • Safety inspections and incident investigation • SELSD Safety Team leadership • Safety training management • Personal protective equipment inventory and budget
Sample and Data Management (SDM) Manager	• Provide leadership and personnel management • Special projects coordination and IT oversight • Professional development and training • Customer relations
Field and Laboratory Customer Assistance (FLCA) Manager	• Provide leadership and personnel management • Ensure safe working conditions • Ensure capacity to provide products and services • Ensure delivery of quality and timely products and services

Title	Roles and Responsibilities
FLCA Staff	• Effective customer and program support • Quality assurance, quality control, and record maintenance • Competency maintenance/expansion and professional development • Instrument/equipment maintenance and troubleshooting • Inventory control, planning, and procurement • Sample kit preparation
Laboratory Technical Operations Manager (TOM)	• Oversee operations of laboratory • Manage and provide direction, oversight, and support to laboratory technical managers • Ensure continuity of operations regarding analysis of regulated analytes • Facilitate response to environmental and public health emergencies • Ensure data quality and competency of analytical staff • Function as deputy of a laboratory technical manager in the event of an extended absence

Title	Roles and Responsibilities
Laboratory Technical Managers	• Provide leadership and personnel management • Workload and resource management • Technical operations management • Divisional and agency representation • Lean advocate

Title	Roles and Responsibilities
Sample and Data Management Staff (SDM)	<u>Sample Management Staff (SDM-SM)</u> • Sample receipt and accessioning • Customer service and account management • Method performance and program support • Quality assurance, quality control, and record maintenance • Competency maintenance/expansion and professional development <u>Data Management Staff (SDM-DM)</u> • Serves as back-up support to SDM-SM • Virtual infrastructure maintenance and enhancement • Generate all invoicing data and specialized EDDs for laboratory analytical work • Reconcile SDWIS reporting errors • Project management of LIMS upgrade • Divisional and agency representation • PC deployment and inventory • Triage, evaluate, and troubleshoot LIMS errors for division

Title	Roles and Responsibilities
Laboratory Scientist	• Method performance and program support • Quality assurance, quality control, and record maintenance • Competency maintenance/expansion and professional development • Instrument/equipment maintenance and troubleshooting • Inventory control, planning, and procurement • Divisional and agency representation • May function as a deputy for a Laboratory Technical Manager in the event of an extended absence
Technical Operational Specialist	• Training coordinator • Divisional purchasing support specialist • Divisional shared resources support • Training Plan development monitoring • Staff training development and tracking • Purchase requisition processing Material • Purchasing and receiving • Division-wide supply inventory management • Support management and staff as needed

Title	Roles and Responsibilities
Business Support Coordinator	• Purchasing coordinator or laboratory procurement officer • Rulemaking liaison • OnBase Subject Matter Expert • Invoicing administrator • Contract administrator-maintenance, service, and supplies • Budget and planning facilitator and advisor
Business Operations Support Staff	• Administrative support • Oversight of division contracting and contract renewals • Management with assistance for budget renewal • Oversees invoice validation, distribution, and tracking for laboratory analysis • Coordinates divisional travel • Oversight of divisional procurement activities

6 Management System Review (MSR) And Performance Reporting

Management System Review (MSR) or Management Review of the SELSD Quality Management System is conducted annually, between January and March, to ensure its continuing suitability, adequacy, and effectiveness as well as feed into the laboratory planning system including the goals, objectives, and action plans for the coming year. The review covers:

- the suitability of policies and procedures
- reports from managerial and supervisory personnel
- the outcome of recent internal audits
- corrective and preventive actions
- assessments by external bodies
- the results of interlaboratory comparisons or proficiency tests
- changes in the volume and type of work
- customer feedback
- customer complaints
- recommendations for improvement
- other relevant factors, such as quality control activities, resources, and staff training.

The outcomes of the management review are documented and include decisions related to the improvement of the Quality Management System, enhancement of customer services, and identification of resource needs for the upcoming year.

All actions, decisions, and follow-up activities from the management review are documented and maintained as part of the laboratory's quality records to ensure compliance with regulatory and accreditation standards.

All the reports listed below may also contribute to the Management Review:

- EPA QA/Agency Annual Report including key performance measures (KPM)
- Workload Metrics Evaluation Report
- Office of the Secretary of Energy and Environment (OSEE)/EQB Report (annual) –includes lead testing in schools/childcare facilities, small system assistance program, etc.
- Association of State Drinking Water Administrators (ASDWA) Report (quarterly)
- Complaints and Special Projects Report (quarterly)
- Small System Assistance Report (quarterly)
- Year to Year (Y2Y) Workload Report (monthly)
- Internal audit reports from the past year
- External audit or assessment reports from the past year
- SELSD Request for Additional General Appropriation (as needed)
- Workload Report (weekly)

The data collected from these processes may also be used for other annual reports as needed. These reports are available upon a written request.

7 Document Management

Physical and electronic documents include but are not limited to records, procedures, reference documents, and policies. The proper creation, maintenance, and control of documents is essential to supporting the Quality System and vital to data defensibility.

SELSD maintains a series of approved procedures and templates that provide instructions and guidance for the document control system. Detailed procedures for the creation, review, approval, distribution, revision, storage, and archival of documents are found in the **Document Control SOP (SELSD-SOP-002)**. AQA maintains a list of all documents, except records, in a master document tracker, **9750-QSL01** and **Revision History Log, AQA-QA-SD-001.**

7.1 Identification of Approved Signatories

SELSD permits and utilizes the use of physical and electronic signatures for all documentation, records, reports, and quality assurance procedures, provided that such signatures comply with applicable regulatory and legal standards. These signatures, whether electronic or physical, carry the same legal and procedural weight in accordance with SELSD policies and applicable regulations. SELSD has implemented the following rules:

- All SELSD staff are permitted to use either physical or electronic signatures when appropriate or necessary.
- SELSD staff are only allowed to use their own personal signatures, they are not to sign for or use anyone else’s signature under any circumstance.
- In rare, unavoidable instances, AQA may need to sign for other staff but must include a note/comment that addresses who signed for whom and why, and preferably the person or some other witness should be present with AQA when this is done.

Physical signatures from staff members are collected annually via the **Annual Staff Signature Sheet 9002-QSF01**.

7.2 Report Authorization

All final analytical test reports, data deliverables, or other reports by SELSD may be closed by any authorized SELSD staff. While staff may complete and finalize the project content, the final signature indicating responsibility for report approval and release rests solely with the DD and/or their designee, as a measure of quality control and accountability. No other staff members are permitted to sign reports unless they have been delegated authority to do so by the DD.

The delegation of this authority shall be documented and may be granted on a case-by-case basis, or as part of designated personnel roles within the organization.

This does not apply to reports issued by the Laboratory Accreditation Program. These reports are generated and authorized in accordance with the assessment procedure.

7.3 SOP Authorization

All Standard Operating Procedures (SOPs) within SELSD require the approval of the respective manager prior to implementation. However, final approval for the implementation of any SOP rests with AQA and the DD. AQA and DD maintain ultimate authority and discretion over the approval process, ensuring compliance with all applicable regulatory, operational, and quality standards before any SOP is enacted. Record of SOP approval prior to implementation is maintained.

8 Retention And Disposition of Records

SELSD follows the **Agency's Consolidated Records Disposition Schedule 94-09** which is available to all staff at 292-DEQ Hub/Central Records Tab/Records Disposition Schedule Link/DEQ Schedule 94-09 folder.

All laboratory records, including analytical data, quality control documentation, and client reports, will be handled in accordance with the Agency's Consolidated Records Disposition Schedule 94-09. This schedule governs the retention and proper disposition of all records and is available upon request.

In the event that the laboratory ceases operations, DEQ will assume full responsibility for the management and disposition of all laboratory records, samples, and ongoing regulatory obligations. All actions will be carried out in accordance with the **Agency's Consolidated Records Disposition Schedule 94-09**. The laboratory will coordinate with the Agency to ensure a seamless transition and compliance with all regulatory and client obligations.

9 SELSD Training Program

All DEQ employees have access to Workday Learning, which is a statewide training and tracking system that allows staff access to a variety of live and virtual training opportunities. All staff also have unlimited access to online training opportunities through the LinkedIn Learning program provided by the Office of Management and Enterprise Services (OMES). SELSD staff have access to Teams SELSD OneLab <Training> channel. This is a central location for training materials including basic laboratory skills, Labware, method and training plans, quality assurance, and safety.

9.1 New Employees

New DEQ employees are provided a new employee orientation, as well as optional training opportunities throughout the year that are relative to agency operations, personal development, and/or divisional cross-trainings. SELSD has a documented training program. Upon hire, SELSD personnel participate in basic divisional onboarding trainings that are determined and assigned by managers, divisional management, and AQA. These trainings are tracked on an onboarding checklist and are to be completed prior to staff performing their assignments unsupervised.

9.2 SELSD Initial and Ongoing Demonstration of Capability (IDOC/ODOC)

Employees new to an analytical method must train under the guidance of an experienced analyst until the employee demonstrates capability and proficiency for the method. Employees are provided with initial and on-going training to ensure that they are competent to execute the duties they are expected to perform. Instrumentation and methods that are new or have gone through significant changes must undergo an initial demonstration of capability, similar to an analyst completing an IDOC, to ensure they meet performance standards and are fit for use. The demonstration of capability (DOC) process is further defined in **9000-QSP02**.

9.3 SELSD Management

All SELSD management follow the Agency's Manager Training Requirements SOP which states that all managers are required to complete a minimum of 12 hours of approved supervisory training annually. New managers are required to complete 24 hours of approved manager training within the first 12 months of their appointment to a supervisory position. More details are provided in the Agency's SOP which is available to all staff at 292-DEQ Hub/Policies & Procedures Link/Manager Training Requirements.

SELSD staff are required to notify the Technical Operational Specialist via completing an electronic **SELSD Attendance Form** when they have attended a training so that it can be added to the training tracker, **9000-QSL01**.

10 Ethics And Data Integrity

The **SELSD-SOP-003 Ethics and Data Integrity Program** is applicable to every aspect of the Division's operations. All new SELSD staff are required to participate in Ethics and Data Integrity orientation while current employees must complete annual refresher training. SELSD requires employees to sign a SELSD Ethics and Data Integrity Statement annually. A signed SELSD Ethics Statement indicates

that the employee is aware of their obligations to data integrity and the consequences of any infractions to the Ethics and Data Integrity Program.

10.1 Laboratory Accreditation Officers & Assessors

Laboratory accreditation officers and qualified assessors performing laboratory accreditation activities must successfully complete Ethics and Data Integrity training prior to participation in assessment activities. Additional training for assessors to ensure appropriate ethics during performance of job duties includes ethics related to performing an assessment and the need for non-discriminatory actions.

All assessors must act impartially and declare any conflicts of interest as soon as a potential conflict is identified to the AQA manager.

10.2 Confidentiality

The Water Quality Management Advisory Council (WQMAC) and the Environmental Quality Board (EQB) oversee the activities of SELSD. The committee is formed based on the State of Oklahoma requirements of interested stakeholders and declarations of conflicts of interest presented. Confidentiality is defined by state requirements with all information possibly open due to freedom of information requirements. Claims of confidentiality by any DEQ clients are addressed in Oklahoma Statute 252 Section 4-1-5(d). Typically, laboratory test results are released only to the customer identified on the sample submission documents unless otherwise required by law.

10.3 Conflicts of Interest

Conflict of interest guidelines are covered in the DEQ APM under Employee Responsibilities, which is available to all staff via Microsoft SharePoint at 292-DEQ Hub/Policies & Procedures Link/Employee Responsibilities. This document requires that employees of the Agency avoid conduct that might cast suspicion on the objectivity of the employee. Employees are required to complete a DEQ Disclosure Form upon hiring if any conflicts of interest exist. Thereafter,

employees are prompted annually to review and update their disclosure. Any conflicts of interest discovered at any time must be reported immediately.

11 Quality Assurance and Quality Control

The Quality Management System (QMS) consists of two primary components: Quality Assurance (QA) and Quality Control (QC). This section of the QAM serves to address the major components of data quality and documents how SELSD generates data that is appropriate for use.

11.1 Quality Assurance (QA)

The QA system encompasses all planned and systematic activities within the laboratory that are implemented to provide confidence that results meet predefined quality standards. QA is not solely about the accuracy of individual tests; it addresses the entire process, from sample collection through reporting, and seeks to improve performance over time. QA activities, which undergo ongoing assessment and improvement, are maintained, tracked, and reported through a variety of processes that include:

- **Laboratory Supplies and Services**: The supplies and services SELSD maintains meet or exceed relevant requirements for the methods for which the laboratory is certified, accredited, and/or contractually obligated, and the analytical reagents and standards are of the required or approved quality and traceability. Certificates of Analysis or Quality, however named, are retained and available for review to authorized personnel upon request.

- **Laboratory Instrumentation and Equipment:** SELSD maintains an inventory of the instruments and equipment needed for data generation in the Lab Capacity Log 9010-QSL01. The log includes information such as manufacturer, model, serial number, year in service, lifespan, replacement cost, etc.

- **Analyst Training:** SELSD provides analysts with the training needed to effectively complete their analytical work. Prior to reporting generated data, the SELSD demonstrates the ability of the analyst, instrumentation, support equipment, and supplies to perform the relevant method within specified limits and performance criteria. Analysts must successfully complete IDOCs and ODOCs to be approved for performance of the associated analyses.

- **Laboratory Software, Programs, and Databases:** Laboratory software is purchased to aid in the generation, analysis, verification, and reporting of laboratory data. Laboratory software requires verification to ensure that it is working properly and that errors do not occur during the generation of data. Electronic data has proper software support and archival procedures so that data may be accessed for assessments and electronic data review.

11.2 Quality Control (QC)

QC includes the activities the laboratory implements to assess how well the data meets applicable requirements. Method QC samples are implemented to verify that the analytical system is in control. These samples are used to calculate accuracy and precision and aid in the detection of contamination and other method or instrument performance issues. The environmental programs and associated analytical reference methods typically specify the minimum QC requirements, frequency, and limits for method analysis that must be performed. Where these are not specified, the laboratory Technical Manager pecifies them. Method QC sample requirements are documented in the method SOPs. Numerous types of laboratory and project QC exist to allow different aspects of the data to be assessed. In general, method QC is conducted to:

- Determine method or instrument sensitivity (Ex: DL/MDL, IDL)

- Determine analyst capability (Ex: IDOC, ODOC, PT)

- Verify instrument performance (Ex: ICV, ICC, CCV, IPC, IS)

- Verify minimum reporting limit (Ex: LOQ, MRL, PQL)
- Determine contamination (Ex: MB, LRB)
- Determine accuracy/recovery (method performance) (Ex: QCS, LCS, LFB)
- Determine precision (sampling and/or analysis) (Ex: Sample Duplicate, MS/MSD, LFM/LFMD)
- Determine sample and matrix-related issues (Ex: MS, LFM)

11.3 Proficiency Testing

As an external assessment of laboratory performance, SELSD participates in double-blind proficiency testing (PT or PE) studies specific to environmental programs SELSD supports. This participation demonstrates the laboratory's ability to produce acceptable analytical results according to vendor specified limits. Double-blind studies involve sample analyses of "unknown" samples developed and distributed by private or federal sector providers. Each study is conducted at least once annually for overall improvement and monitoring of laboratory performance as well as to maintain EPA certification or TNI accreditation. The LAP is used as guidance for PT participation frequency which calls for participation twice annually approximately every 6 months.

SELSD handles and prepares the PT study samples in accordance with the instructions provided by the PT Provider. PT samples are analyzed in accordance with the laboratory's routine SOPs using the same QC, acceptance criteria and staff as used for the analysis of routine environmental samples.

The selected PT vendors for drinking water must be regulated by TNI-approved oversight bodies (PTOBs), or Proficiency Test Provider Accrediting Bodies (PTP ABs). The oversight groups ensure that providers manufacture their proficiency testing materials and conduct their studies in adherence to regulatory and TNI requirements.

The lab participates in various studies including:

- Non-Potable Water- Wastewater (WP/MP)
- Potable Water- Drinking Water (WS/MS)
- Soil/Hazardous Waste (SM)
- Underground Storage Tank (UST)
- Environmental Samples: U.S Geological Survey-Standard Reference Sample (USGS-SRS)

12 Corrective Action

A Corrective Action Plan is a requirement under the *TNI Standard* (EL-V1M2-2016; Section 4.11) for NELAP accreditation as well as a requirement for Drinking Water Certification as defined in the *Manual for the Certification of Laboratories Analyzing Drinking Water* (EPA-815-R-05-004; 5th ED; Chapter III, Section 11.12). SELSD has implemented **SELSD-SOP-004** to accomplish the goals of the Corrective Action Plan requirement.

The Root Cause and Resolution Plan (RCRP) is a corrective action plan that is essential to SELSD. The RCRP outlines structured protocols to identify, correct, prevent, and monitor actual and potential deviations and deficiencies, thereby minimizing recurrence of such events. It also facilitates the identification and documentation of technical enhancements and improvements within Division operations and services. Additionally, the RCRP serves to record and approve permissible deviations from established policies and procedures. All SELSD staff are required to review and utilize the RCRP procedures.

13 Audits/Assessments

SELSD implements and monitors activities for continual improvement of the quality system, including:

- Proficiency Testing studies, both single and double-blind.
- External assessments, certifications, and accreditations.
- Internal audits and reviews.
- Customer feedback, complaints, and public comment.

13.1 External Audits & Assessments

EPA Drinking Water Audit

- EPA Region 6 conducts an audit of SELSD every three years to evaluate the laboratory's compliance with the Manual for the Certification of Laboratories Analyzing Drinking Water (EPA 815-R-05-004, January 2005). The audit includes an assessment of SELSD’s procedures for drinking water compliance analysis and other activities. Additionally, the LAP is evaluated for its oversight and accreditation of laboratories performing drinking water analysis.

TNI Assessment

- SELSD maintains accreditation for the analysis of per- and polyfluoroalkyl substances (PFAS) analysis by EPA Methods 533 and 537.1 by undergoing a TNI evaluation by NH ELAP every two years to determine adherence to the 2016 TNI Standards for Laboratories. The evaluation covers the implementation of EPA Methods 533 and 537.1, as well as SELSD's overall Quality System.
- The LAP maintains recognition as a TNI AB by undergoing an evaluation by trained TNI evaluators every three years to determine adherence to the 2016 TNI Standards for Accreditation Bodies. The scope of this assessment covers the LAP and TNI-relevant portions of the SELSD Quality System.

Agency Management System Review (MSR)

Compliance with the Agency QMP is assessed through an MSR and Technical Audit (TA), which is performed by the Agency QAO. One division assessed each year based on a predetermined, rotating schedule. A summary of findings is presented to the assessed Division's Director.

Response Documentation

Similar to the internal audit process outlined below, the External Audit Packet AQA-QA-SD-023 is used to document and formulate a response for submission to the external auditor. It contains the same components as the Internal Audit Packet AQA-QA-SD-022, with modifications specific to external audits.

13.2 Internal Audit Program

The Internal Audit (IA) Program applies to all aspects of divisional operations, including testing, calibration, and management activities. The goal is to assess the quality system and its related components/procedures for compliance with regulatory requirements and standards. Internal audits are performed in accordance with a predetermined schedule and procedure, to verify that operations comply with the requirements of the quality system and relevant standards. The audit program is designed to address all elements of the quality system, including technical and support activities, as well as management and administrative areas, to provide a comprehensive evaluation of the laboratory's operations.

Audit Schedule and Frequency: An internal audit schedule is developed and maintained by AQA annually. The internal audit schedule ensures that all Drinking Water methods, each laboratory section, and all aspects of the quality management system are reviewed at least once every 12 months. All non-drinking water methods are internally audited on a triennial basis.

Auditor Independence and Qualifications: Internal audits are conducted by AQA staff and other qualified and trained personnel. Designated internal auditors must be trained in the relevant procedures and are expected to have a clear understanding of the audit process. To ensure impartiality, auditors are independent of the activities they are auditing and will not audit their own work or areas in which they are directly involved. The independence of the auditors is a key element in maintaining objectivity and ensuring the effectiveness of the audit process.

Documentation and Reporting of Findings: The internal audit is documented through the **Internal Audit Packet AQA-QA-SD-022** that is provided to all involved staff and managment. Internal audit tracking numbers and any associated RCRPs are recorded on the **SELS Internal Audit Tracking Log, 9400-QSL03** for reference purposes.

The internal audit process documented through the **Internal Audit Packet AQA-QA-SD-022** includes the following components:

- Audit Report: This contains a detailed description of the areas audited, specific findings, recommendations, and any identified non- conformances.
- Response Report: The auditees will complete a portion of this section by providing their corrective action responses to the findings, action deadlines, and evidence addressing each issue. The corrective action response is finalized upon QA approval of the responses for all identified non-conformitites.

Corrective actions for all findings are documented, tracked, and addressed in a timely manner to ensure compliance with regulatory standards and internal procedures. Each finding must be accompanied by a documented response, detailing the corrective actions taken and the individuals responsible for their implementation.

The Root Cause and Resolution Plan (RCRP) may also be used alongside **Internal Audit Packet AQA-QA-SD-022** to provide additional documentation for addressing corrective actions that may be more complex.

Corrective Actions and Follow-Up Audits: Corrective actions are monitored and reviewed for effectiveness within an adequate time frame. If recurrence is identified, further action will be pursued.

Follow-up audits include areas where findings were previously noted to ensure that corrective actions are both implemented and effective. Management is responsible for ensuring that all corrective actions are closed within the agreed time frame and that the integrity of the laboratory's operations is maintained.

Management Involvement and Review: Management plays a key role in the internal audit process by reviewing audit findings, approving corrective actions, and ensuring that the audit schedule is completed annually. AQA is responsible for planning and organizing the audits in collaboration with management and ensuring that all elements of the management system are addressed during the audit cycle.

The internal audit program also includes a mechanism for ongoing management review to assess the overall effectiveness of the internal audit process and the laboratory's compliance with regulatory standards and internal procedures. Management ensures that appropriate resources are allocated to support the audit program and that audit findings are promptly addressed to maintain the integrity and effectiveness of the quality system.

13.3 Management Review

SELSD managers perform a review of their sections annually to evaluate and report on the continued suitability, effectiveness, or status of:

- Policies and procedures
- Reports from managerial and supervisory personnel

- Outcome of recent internal audits
- Corrective and preventive actions
- Assessment by external bodies
- Results of PTs
- Changes in volume and type of work
- Customer feedback
- Complaints
- Recommendations for improvement
- QC activities
- Resources
- Staff training

13.4 Customer Feedback And Complaints

SELSD's customer feedback and complaints process is defined in **9650-QSP01-Customer Satisfaction and Support Procedure**. This procedure addresses both positive and negative feedback, complaints about services, requests for mediation, and informal appeals. RCRP forms are used to track investigations when complaints significantly impact laboratory operations.

Complaints received for or through the LAP are handled in accordance with **AQA-LAP-SOP-003, LAP Complaints Procedure**.

13.5 Non-Conforming Work

Non-conforming work refers to any instance where laboratory operations, including testing, calibration, or data reporting, do not conform to internal procedures or agreed-upon client requirements.

When audit findings cast doubt on the effectiveness of operations or the validity of test or calibration results, the laboratory will take timely and appropriate corrective actions. The laboratory will notify customers via written communication if investigations reveal that test or calibration results may have been impacted.

Upon identification of non-conforming work, appropriate corrective actions will be taken to rectify the issue and prevent recurrence. This process includes:

- **Identification and Reporting:** Non-conforming work may be identified through internal audits, customer feedback, routine quality control checks, or staff observations. All instances of non-conformance are documented in a RCRP.

- **Evaluation:** Each case of non-conformance is evaluated to determine its impact on data integrity, client results, and overall laboratory operations. The significance of the non-conformance is assessed by AQA, DD, AD, and TOM to guide further actions.

- **Corrective Action:** Immediate steps are taken to correct the non-conformance. Root cause analysis is conducted and documented via a RCRP to identify the underlying reasons for the non-conformance, and appropriate corrective actions are implemented to prevent future occurrences.

- **Customer Notification:** If the non-conforming work affects client data, the laboratory notifies the impacted client as soon as reasonable and permissible via writing. Necessary actions, such as recalling or re-issuing reports, are taken in collaboration with the client.

- **Resumption of Work:** Work affected by non-conformance is only resumed after proper corrective actions have been implemented and approved by AQA, DD, AD, and TOM.

- **Monitoring:** Corrective actions are monitored for effectiveness, and additional reviews or audits are conducted if necessary to ensure that the issue does not recur.

14 Project Planning, Sample Handling, and Chain of Custody

When planning analytical activities, contact the FLCA Manager. To achieve the best quality of data and ensure sample integrity, the laboratory will assist in organizing the sampling event including supplying sampling materials, confirming laboratory capacity, ensuring method availability, reporting limits, discussing sample scheduling and delivery options, addressing QA/QC needs, and verifying data reporting and delivery requirements.

14.1 Quality Assurance Project Plans (QAPPs or work plans)

A QAPP or work plan establishes the outline for the planning, implementation, and assessment of a project, and guides data acquisition and decision-making activities. It also describes the quality assurance procedures, quality control specifications, and data quality objectives (DQOs).

Requirements for QAPP or work plan development can be found in the EPA Requirements for Quality Assurance Project Plans (QA/R-5) and additional guidance can be found in EPA Guidance for Quality Assurance Project Plans (G-5).

To assist in the evaluation of customer DQOs, SELSD has developed a **Project Planning Tool (PPT), FLCA-SD-001-R9** (**Appendix E**) which documents and tracks analytical components such as sampling start date and duration, number of samples, analyte, matrix, requested methods, reporting limits, special analytical requests, QC planning and reporting, deliverables, and turnaround time. This planning tool goes beyond the basic information collected on the COC and provides detailed documentation of customer needs. The PPT is utilized whether a QAPP or work plan is relevant to the project or not. To initiate the PPT process, the FLCA Manager must be contacted to receive the QR code/link for access to

the PPT Questionnaire that is used to fill out the PPT and facilitate project discussions.

Customers requesting analytical services for environmental projects should review **Appendix C** to evaluate whether the analytical services offered are appropriate to meet specific project DQOs. Customers requesting data for special project applications or specific reporting levels not addressed in **Appendix C** should contact the FLCA Manager.

Contact **SELSquality@deq.ok.gov** flor assistance with documenting or reviewing the analytical components of a QAPP or work plan or setting up QAPP or work plan-based analytics.

14.2 Sample Scheduling and Project Setup (Pre-logging)

Method requirements (such as sample hold time) may necessitate the delivery of certain sample types on a given day of the week for optimal analysis or to ensure analysis can be properly planned. Advanced planning and scheduling of ongoing or large projects allows the laboratory time to prepare to meet specific needs or address laboratory capacity or instrument scheduling during high volume periods.

SELSD prefers projects be logged prior to collection (pre-logged) so that sampling kits can be prepared with certain site-specific sample information pre-populated on the field COC. Pre-logging samples into the Laboratory Information Management System (LIMS) generates a bar-coded COC with matching sample container labels specific to the sampling event. The LIMS generated label includes a unique alpha-numeric identifier and bar code, other relevant identifiers such as sample description or public water system (PWS) sampling point, the container and preservative type, and the requested analyses for the sample.

Pre-logging samples simplifies the paperwork for the customer, improves traceability, and provides a more efficient way of generating appropriate forms. It also expedites physical sample receipt as pre-logged samples can be received

and processing can be initiated more quickly than samples received on an ad-hoc basis.

14.3 Sampling Requirements

Individual environmental programs and projects should reference a QAPP or work plan outlining or referencing their field and sample collection activities. For PWS samples and some general analytical methods, current sampling instructions are provided with the sampling kits and collection/submittal tutorials are provided at https://www.deq.ok.gov/state-environmental-laboratory-services/sample-collection-assistance/. For some analyses, SELSD staff must collect the samples. In other instances, SELSD staff can provide field sampling and technical assistance upon request.

Appropriate and accurate sample collection activities and documentation are essential for traceability and construction of quality data. Compliance samples are cancelled or rejected if received in an improper container, with inadequate volume, incorrect preservation, or beyond the allowable hold time. Non-compliance samples received as outlined above may be analyzed and flagged/qualified (Appendix B) if there is a potential impact to the data quality.

- **Containers:** Samplers should use SELSD-provided containers proven to meet the QA requirements specific for the method used, analyte requested, and any regulatory requirement. These volume specific containers may contain or be supplied with preservatives as required by the reference method. These requirements are essential for proper analysis and materials traceability.

- **Preservation:** Some methods require samples to undergo chemical or thermal preservation. Sample collectors should always preserve samples immediately following collection unless otherwise noted per special instruction from the laboratory.

- Thermal preservation requirements are highly variable between methods. If thermal preservation is required, the sample should be packed with sufficient ice to reach and maintain the appropriate method preservation temperature immediately after collection. The use of “blue ice” is highly discouraged because it generally does not maintain the sample at the acceptable temperature. It is recommended such samples be hand delivered, mailed overnight, or shipped via expedited service to Sample and Data Management (SDM) to ensure the sample is received at the proper temperature. Samples in the “cooling-down” phase are accepted only if received promptly after collection and packed with adequate ice. These samples will be assessed individually, based on the collection time, collection location, current temperature, and presence of ice.

- **Hold Time:** To be considered valid or not compromised, samples should be delivered to the laboratory as soon as possible after collection. Samples that exceed method holding times may introduce bias and the data could be unfit for use.

- **Volume**: When Field and Laboratory Customer Assistance (FLCA) personnel receive a request for containers, the customer is instructed on the proper volume of sample required to obtain valid analytical results. If an insufficient volume is collected, the analysis of all requested analytes and quality control samples may be impossible. Volumes listed in Appendix C should only be used as guidance and should be confirmed with FLCA personnel prior to project onset to avoid additional collection activities.

- **Sample Labeling:** When SELSD provided labels are not used, sample containers must be clearly identified with a unique identifier in permanent ink and contain suitable information to prevent the possibility of confusing or misrepresenting the sample which could render a sample useless.

- **Chain of Custody (COC):** The COC is a legal document that provides traceable/defensible documentation of sample collection, requested

analyses, transport conditions, and transfer activities as well as the type of container and preservative, and date and time of collection to indicate adherence to allowed test holding times. At the minimum, the COC must contain:

  - Sampler's name
  - Customer contact information
  - Sample collection date and time
  - Sample location
  - Requested analyses
  - Chemical preservative (if the container is preserved in the field prior to delivery to the laboratory).

- Anyone having physical custody of the samples before and during receipt must sign the COC and record the date and time of all custody transfers, which includes all receives and relinquishes. Any special remarks about the sample condition or integrity should also be recorded on the COC. Access the online COC at **https://www.deq.ok.gov/state-environmental-laboratory-services/sample-collection-assistance/**. See **Appendix A** for a sample COC provided as reference.

14.4 Sample Transport, Storage, and Delivery to SELSD

New customers or those needing to make updates to their LIMS profile must complete a Customer Profile form. Access the online form at **https://www.deq.ok.gov/state-environmental-laboratory-services/sample-collection-assistance/** or contact SDM. A copy is included in **Appendix F** for reference.

Normal operating hours of SDM are from 8:00 a.m. to 4:30 p.m., Monday through Friday. Samples may be delivered to SELSD by hand-delivery during business

hours or can be mailed or couriered to the address listed on page 1 of the title page.

When samples are delivered by DEQ employees after business hours (8:00 a.m. to 4:30 p.m) and then received by Sample Management staff the next business day, there must be documented custody and proper, secure storage of the samples in between.

For additional questions or special arrangements regarding sample delivery contact SELSD at 405-702-1000 or 1-866-412-3057 and request to speak to a SDM representative.

14.5 Accessioning, Acceptance, and Storage of Samples

Access to the SDM area is restricted to authorized personnel through key card access. Samples are received and maintained in SDM until all appropriate receipt activities are complete. SDM personnel:

- Organize and verify the samples received against those indicated on the COC. Ensure sample IDs and any affixed labels match the COC.
- Inspect samples and containers to verify receipt conditions and integrity: Container, Condition, Temperature/Preservation, Volume, and Hold Time.
- Gather signatures to document physical custody transfer.
- Samples not already pre-logged are logged into the LIMS and assigned a unique sample identification label and barcode.

If SDM staff are unable to secure all required sample information in a suitable timeframe, samples may be cancelled. Customers are notified of cancelled tests or samples, typically by telephone, and assistance is provided if additional/replacement samples are needed.

SDM staff place accessioned samples in the designated storage location with appropriate thermal preservation, storage conditions (light or heat sensitivity), and

isolated from standards and samples known to be highly contaminated. Samples under these conditions are now ready for transfer to the laboratory for analysis.

14.6 Sample Retention & Disposal

The laboratory maintains physical custody of samples until analytical activities have been completed, results verified and reported to the customer, and hold time expired, unless otherwise noted in procedures or requested by the customer. SELSD assumes the responsibility for the disposal of samples unless the customer has requested that the samples be returned. SELSD requires documented notification of situations where samples need to be relinquished back to the customer. Such transfers must be documented using a COC process. Samples are disposed of according to procedures and in compliance with regulations. For samples that may be used as evidence in a criminal investigation, the laboratory will follow appropriate procedures to protect the integrity of the sample.

14.7 Sample Subcontracting/Outsourcing

During normal operations, SELSD may subcontract analytical work to another laboratory due to workload, expertise, or temporary incapacity. SELSD maintains a register of all subcontractors for tests performed. This work is performed under the following conditions:

- The subcontracted laboratory maintains documented competence for the required field of testing.
- The customer is notified.
- SELSD assumes responsibility to the customer for the work performed by the subcontracted laboratory.
- The work complies with all relative and regulatory standards.
- The subcontracted laboratory is identified on the final report.

- SELSD will provide a copy of the subcontractor's report to the client if requested.

15 Contract Services and Procurement

15.1 Customer Contracts for Analytical Services

Chain of Custody (COC) forms are considered a contract for services between the laboratory and its customers. The COC indicates testing needs and requirements. The COC is signed at the time of physical custody transfer which then makes it a legally binding document and subject to all the testing requirements described in the QAM.

Project Planning Tool (PPT) FLCA-SD-001 is also considered a form of an intra-agency contract that is more formalized than a COC as it contains specific information related to project support as defined above in section 14.1.

15.2 Professional Services Contracts

Inter-Agency Contracts can be established with other state, regional, national, and governmental entities. Contracts of this type are executed according to all applicable state regulations, and typically involve very specific expectations and a formal statement of work that defines data quality objectives, deliverables, turnaround times, pricing, and invoicing.

- **Third-Party Assessors:** If third-party assessors are utilized for assessments, all accreditation decisions will remain with DEQ, including issuance of the assessment report. Third-party assessors must be formally approved for use by AQA and divisional management prior to participation in any assessment. Use of third-party assessors is described in 7000-SOP02-Conducting Laboratory On-Site Assessments.

- **Service Maintenance Contracts:** Qualified technical personnel (vendor or third party) provide contracted maintenance and support for a variety of instrumentation and equipment within the normal scope of SELSD

operations. These contracts are utilized in cases where a warranty may be in place, or the routine technical and corrective maintenance is beyond the scope or resources of SELSD technical staff. A list of contracts is maintained by SELSD Business Support Coordinator in the Purchasing Tracking Log that is updated annually by fiscal year.

- **Encumbered Contracts:** SELSD routinely establishes annual agreements with material and supply vendors for recurring products, services, and trainings. These documents are not technically contracting but dedicated purchase orders that allow SELSD staff to obtain operational supplies at a reduced cost or improved efficiency. The use of state-wide contract vendors is required and are frequently utilized for many commonly used items.

15.3 Procurement of Supplies and Contracted Services

SELSD will have and maintain the required equipment, supplies, and services to meet all mission critical functions, certification and accreditation requirements, as well as all contractual obligations.

DEQ Purchasing – All acquisitions of DEQ shall be made in accordance with provisions of the following:

- Oklahoma Central Purchasing Act, Title 74 O.S § 85.1 et seq.
- OMES Central Purchasing Division Administrative Rules OAC 260:115.
- Provisions of the State Use Committee.
- Information Technology Accessibility Standards.
- Title 61 of Oklahoma Statutes which contains sections of law specific to acquisition of construction and construction-related services.
- DEQ's Internal Purchasing Procedures.

Although staff do initiate requisitions for supplies and services, the Business Support Coordinator is charged with ensuring all SELSD purchases comply with the requirements listed above. Also, with input from AQA and SELSD Management, the Business Support Coordinator manages SELSD purchasing procedures and associated WIDs. The Division Director or Assistant Division Director verifies need, assigns funding, and signs off on all SELSD purchases.

15.4 Verification of Materials

For purposes of definition, materials in this context refer to a wide range of chemicals, standards, media, containers, consumables, and durables.

Supplies are shipped to DEQ Central Office. Once received, Shipping & Receiving (S&R) personnel verify package contents against the packing slip, stamp and sign the verified packing slip, and contact SELSD staff for pick up. In cases where shipments need cold storage, packages are immediately brought to the designated refrigerator/freezer in the SDM Section where a copy of the packing slip is left with the incoming items and a log is signed by S&R personnel to document custody transfer. Once SELSD staff take custody of the materials they go through the following steps:

- Verify that item was received as ordered (correct type, volume, quantity, and condition).
- Verify that a Certificate of Quality, Purity, Grade, or Traceability is provided, if applicable, and that the supporting documentation meets suitability requirements for intended use. This information is made readily available.
- Verify the validity of any expiration dates associated with the materials. If the manufacturer does not provide an assigned expiration date, section staff must do so. Refer to below section “Material Expiration and Extension.”

Once materials have been identified as ready for use, the verifier will initial and date the bottle, box, bag, or other container. Additional verification may be

required prior to utilization of these materials using approved test and raw material verification procedures.

Material Expiration and Extension: All SELSD laboratory personnel involved in the handling of laboratory materials must adhere to the following guidelines to maintain quality and integrity.

- Laboratory materials with a manufacturer-designated expiration date may use this expiration date, unless the manufacturer-specified storage conditions are not met, or the analytical method specifies a shorter expiration date. For materials labeled with a 'retest' date provided by the manufacturer, the laboratory may recognize the 'retest' date as the expiration date, contingent upon compliance with the specified storage conditions. If storage conditions are not met, evaluation of acceptability of continued use and determination of expiration date must be made and documented with input from the respective manager and AQA, at minimum. If the analytical method specifies a shorter expiration date, the specifications outlined in the method take precedence.

- Laboratory materials without a manufacturer-designated expiration date are assigned a 1-year expiration date upon opening, unless the analytical method specifies a shorter expiration date, in which case, the specifications outlined in the method take precedence.

- In cases where an unopened material has reached its manufacturer's expiration date, an extension request for a new expiration date may be permitted. For specification on how to do this, please follow the instructions in the **Laboratory Material Expiration and Extension Policy, SELSD-SD-005**.

- Opened materials are not eligible for expiration date extension, unless explicitly allowed by the analytical method, specified by the manufacturer, or

authorized in writing by AQA, DD, AD, or TOM under extenuating circumstances.

15.5 Verification of Instrumentation and Equipment

Instruments and equipment are purchased and placed into service based on the ability to meet performance-based criteria, regulatory and program requirements, as well as vendor specifications according to intended use. Major or highly technical instrumentation and equipment are typically installed and verified by the vendor or a third party. Some instrumentation and equipment are supported through service maintenance contracts. Preventative and routine instrument and equipment maintenance schedules and procedures are maintained by management and addressed in method SOPs.

16 DATA HANDLING

Environmental monitoring and concerns, such as those addressed in a QAPP or work plan, are assessed and confirmed by analytical data and the resulting decisions are supported by that data. The data must be handled appropriately to ensure there is no loss to the quality of data. This section covers how SELSD handles analytical data. Additional details can be found in the individual analytical SOP of each method.

16.1 Data Quality Components

The following components are required for analytical laboratory data to be usable:

- **Technically Valid:** Data generated by SELSD is valid in that it is obtained by the instruments, methods and procedures required, approved, or prescribed relative to the end use of the data.

- **Traceable**: Data must be traceable such that the user can follow the data through the lifecycle from collection to reporting. Data generated by SELSD is traceable through the use of various forms which include chains of custody

(COCs), spreadsheets and logs, instrument and support equipment calibrations and verifications, and bar-coding/QR codes.

- **Complete:** All relevant actions taken during sample collection and data generation are maintained with the original batch data, including calculations, deviations, professional judgement, flags and qualifications.

- **Correct**: Data must represent the real-world construction of the actual activities performed during data generation. SELSD data is correct in that standard procedures are followed, method control samples are evaluated to ensure that methods are performing accurately, and questionable data quality is indicated using data flags, qualifiers, project narratives, or customer contacts.

- **Consistent:** Method precision elements are evaluated to ensure that methods are performing consistently over time and across various project and programs.

- **Relevant:** Data must meet the requirements given for its intended use. Data objectives are evaluated for program and project requirements and qualified where negative effects to end use may be detected.

- **Defensible:** Data must be generated in a way that maintains legal defensibility and is supported by sufficient documentation to verify suitability to defend the decisions resulting from the data. The laboratory ensures integrity by:

    - Using custody (bar code) tracking and enhanced storage requirements.

    - Using correct, approved, and controlled documentation.

    - Maintaining the SELSD Ethics and Data Integrity Program and associated training to ensure that employees know proper from improper practices relative to data generation.

- Maintaining and storing all records related to sample analysis per program requirements as required to facilitate the recreation of data generation.

16.2 Raw Data and Data Reduction

Raw data is any data that has been collected but has not been processed for use. In the laboratory, raw data generally refers to the information collected via analytical instrumentation or hand recorded during sample analysis. Data reduction for the laboratory typically refers to the process of converting raw instrument data into more understandable, useful information.

Staff must follow data reduction requirements documented in the reference method, analytical method SOPs, associated WIDs, and this manual. Some data reduction may also be achieved using instrumentation software, LIMS, or verified and controlled spreadsheets. The accuracy of all automatic and manual data reduction is routinely verified through data review and document review processes.

16.3 Units of Measure

Analytes are typically reported in the units indicated in the reference method or as identified by a regulatory program. Individual SOPs identify the final reporting units for the analyte or method. Special projects may require different reporting units than those documented in the SOP or DQM. In these cases, the project must be planned to ensure that reporting accommodations can be made.

Concentration variations, program regulations, and project or client requests may necessitate conversion between reported units. Refer to the figure below for common conversion information.

Concentration Conversions

kg	g	mg	µg	ng	
%	‰	ppm	ppb	ppt	kg
	%	‰	ppm	ppb	g
		%	‰	ppm	mg
			%	‰	µg
				%	ng

kg	g	mg	µg	ng	
%	‰	ppm	ppb	ppt	L
	%	‰	ppm	ppb	mL
		%	‰	ppm	µL

L≈ kg
mL≈ g
µL≈ mg

16.4 Significant Figures

To better represent the confidence of the calculated value, it is necessary to know how many digits to retain, where to truncate, and when and how to round the value. Sample results for compliance samples are reported as stated in the regulatory requirements or with the same number of significant figures as documented in the reference method or as designated by the maximum contamination level (MCL) value.

In general, reporting rules are as follows:

- Sample data is not reported with more than three significant figures.
- Sample data is not reported with more decimal places than the Minimum Reporting Limit (MRL).
- Sample data is not rounded and reported if less than the MRL. Unless the customer has specifically requested a numerical value below the MRL, but above the instrument's Method Detection Limit (MDL) in which the laboratory will flag the sample data as being reported below MRL, but above MDL.
- QC data is reported to one decimal place.

The SELSD LIMS generally uses the following traditional rounding and significant figure rules. However, it also can apply custom rules if needed to meet method or program requirements.

The significant figures in a calculated number indicate the amount and location of rounding required to appropriately show the accuracy and confidence of the measurement. Only place values that are significant should be reported. Staff should use the significant digit rules in the Significant Figures table below.

The application of the significant figure rules is relevant to all calculations performed during the generation of data, unless a specific format is prescribed in the approved or accepted reference method, program regulations, or customer request, in which case the required or requested format is utilized. Exceptions are applied to vendor-supplied software and in-house spreadsheets that make the application otherwise impossible.

Table 16.4 Rules and Tips for the Determination of Significant Figures (sf)

Rule or Tip	Example	# of sf
All non-zero numbers **are** significant.	**14.65**	4 sf
All zeros in between non-zero numbers **are** significant.	0.**40497**	5 sf
Leading zeros are **not** significant. They are placeholders to represent the magnitude or scale of a number.	0.00**4** 0.**523**	1 sf 3 sf
If there are no non-zero digits to the LEFT of the decimal, all zeros in between the decimal and the preceding non-zero values RIGHT of the decimal are **not** significant.	0.000**45**	2 sf
Ending zeros after a decimal **are** significant **if** they are accuracy markers.	**15.500**	5 sf

Rule or Tip	Example	# of sf
Zeros on the left side of a decimal with a preceding non-zero number **are** significant.	**400.5**	4 sf
If you can write the number in scientific notation and eliminate the zeros, they are **not** significant.		
Final zeros in a calculated value may or may not be significant, depending on reporting criteria.		
When multiplying or dividing, the calculated result should have as many significant figures as the number with the smallest number of significant figures. The quantity of significant figures in each factor is important; the position is not. In this example, 12 has the smallest number of significant figures (two); the result would therefore also have only two significant figures.	**12** X 14.6 X 735.3 128824.56	$1.2 X10^5$
When adding or subtracting, the calculated result should have as many decimal places as the number with the smallest number of significant figures. The position of significant figures in each factor is important; the quantity is not. In this example, 12 is significant to the ones place, while the remaining numbers are significant to the tenths place. The final result is significant to the ones position.	**12** + 14.6 + 735.3 761.9	762
You cannot round to “n” significant digits, a digit is either significant, or it is not. Rounding is all-together a different process and is used to reduce any digits in the value that are not significant. Once you determine which digits are significant, you can employ a rounding rule.		

16.5 Rounding

Once the significant figures are determined for a type of analysis, rounding rules should be applied to eliminate any unneeded digits. Staff should employ the mathematical rules for rounding listed in the Rounding Rules table below.

For data values below the reporting limit, results are not rounded, and the sample data is reported as less than the given method reporting limit.

For methods that report sample results as a “total” of the individual analytes, the individual analyte results are first rounded according to the rounding rules, then the individual results are totaled and reported.

Table 16.5 Rounding Rules

Rules, Tips, and Examples	Value	Result
If the digit to be dropped is **less** than 5, drop the digit and leave the preceding digit as is.	15.22**2**	15.22
If the digit to be dropped is **equal** to or **greater** than 5, drop the digit and INCREASE the preceding digit by 1.	15.22**6**	15.23
While performing addition or subtraction operations, round to the smallest number of places (i.e., the least precise number). In this example, 11.1 is the least precise number, to the tenths place, so the resulting value is only precise to the tenths place.	**11.1** + 11.12 + 11.13 33.35	33.4

Rules, Tips, and Examples	Value	Result
When rounding during multiplication or division, carry all digits through then round the product/quotient to the same number of significant figures as the multiplier/divisor/dividend with the fewest significant figures. In the example, 9.7 has only two significant figures, therefore the product is rounded to two significant figures.	0.0174 x **9.7** / 7.75 0.021778…	0.022

16.6 Correction of Data for Moisture

A measurement of % solids/moisture is determined on soil, sediment, and non-aqueous solid waste samples unless otherwise specified by the customer. The % solids/moisture value is used during data reduction for calculating final analytical concentrations on a dry weight basis. These values are reported with the sample data when appropriate. Corrections for moisture require the application of the dry weight factor and raise the method reporting limit accordingly.

$$\%\ \text{Solid} = \frac{\text{Sample Dry Weight}}{\text{Sample Wet Weight}} \text{x } 100 \quad \text{and} \quad \%\ \text{Moisture} = \frac{\text{Sample Wet Weight}}{\text{Sample Dry Weight}} \text{x } 100$$

17 Statistics And Calculations

This section discusses some of the QC and statistical terms and calculations commonly encountered during the generation of environmental data. The individual method SOPs address the specific procedures required to implement and assess QC requirements.

17.1 Representative Samples

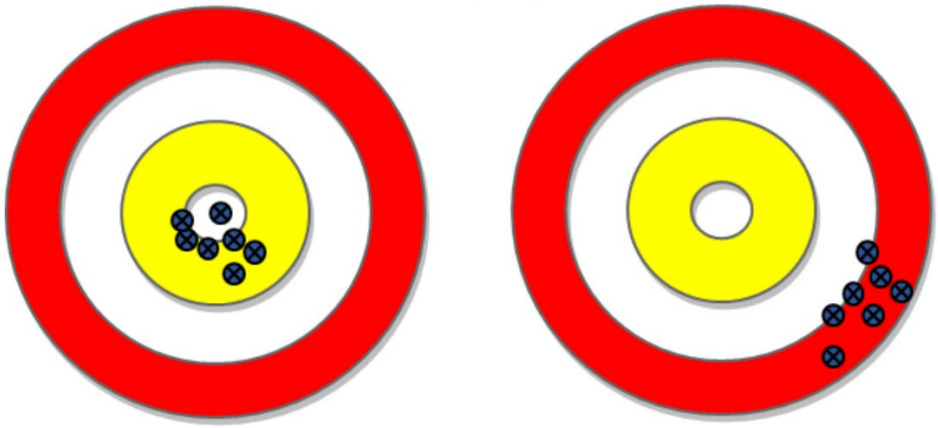
When an environmental concern needs to be addressed, customers/project managers determine the best and most representative locations to characterize the sampling environment. They consider what samples to take, how many to take, where to take them, etc. to obtain the most representative collection of data from which to make decisions. Ideally, the representative samples exactly reflect the composition of the area being sampled; however, due to various types of errors, this is unlikely. When analysis occurs on a single sample of a larger population, uncertainty is introduced and should be accounted for by using precision-related measurements.

17.2 Accuracy

Accuracy is an expression of the systematic error (bias) inherent in a measurement system. Accuracy is typically measured through the analysis of reference standards that have been certified to a specific, or known, concentration or value. When the measured value is close to the known value, the accuracy is considered “high”. When the accuracy is far from the known value, it is considered “low”.

Accuracy is well represented using the “bullseye” graphic. The first image demonstrates seven arrows that have fallen in the center of the target (the expected value). This archer was very accurate in hitting the bullseye. In the second image, the archer has failed to hit the bullseye. This archer had a lower degree of accuracy than the first archer did.

Accuracy Figure



High Accuracy Low Accuracy

SELSD assesses accuracy, in general, by calculating “percent recovery” from various types of QC samples. These recoveries must fall within historically determined or method defined limits. Data are either reanalyzed or qualified when accuracy values fall outside of the laboratory or method defined limits.

The accuracy of a sample or standard can be measured using the following Percent

Recovery equations:

$$\% \text{ Recovery} = \frac{(\text{spiked sample result - original sample})}{\text{spiked concentration}} \times 100$$

$$\% \text{ Recovery} = \frac{\text{measured value}}{\text{known value}} \times 100$$

The first calculation is used when the measurement value contains a contribution from the sample, such as in the case of matrix spikes, matrix spike duplicates, and

surrogate recoveries. The second calculation is used when there is no sample contribution, such as in the case of a laboratory control sample (LCS) and calibration verifications.

17.3 Precision

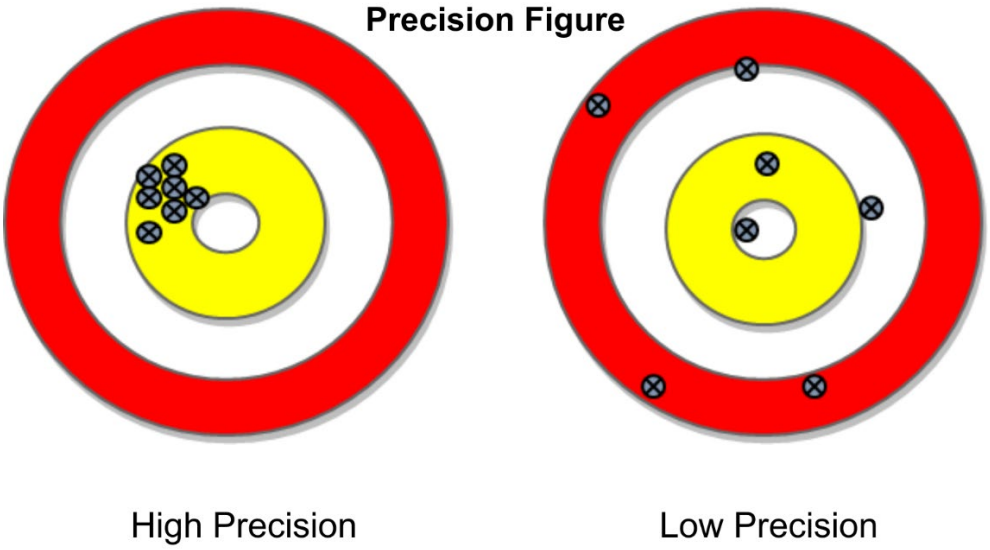
Precision is independent and unrelated to accuracy, and measures reproducibility and repeatability of data. It measures the variability, or random error, during sampling, sample handling, preparation, or analysis and is an expression of the measurement of uncertainty in the calculated mean value of a series of replicate measurements. High precision values result in reduced uncertainty with the data (and vice versa). SELSD assesses analytical precision through the measurement of sample duplicates, QC sample replicates, and matrix-spike duplicates. Data should be qualified when precision values fall outside of the laboratory or method defined limits.

Project specific precision samples assessed by Project Managers/laboratory customers include:

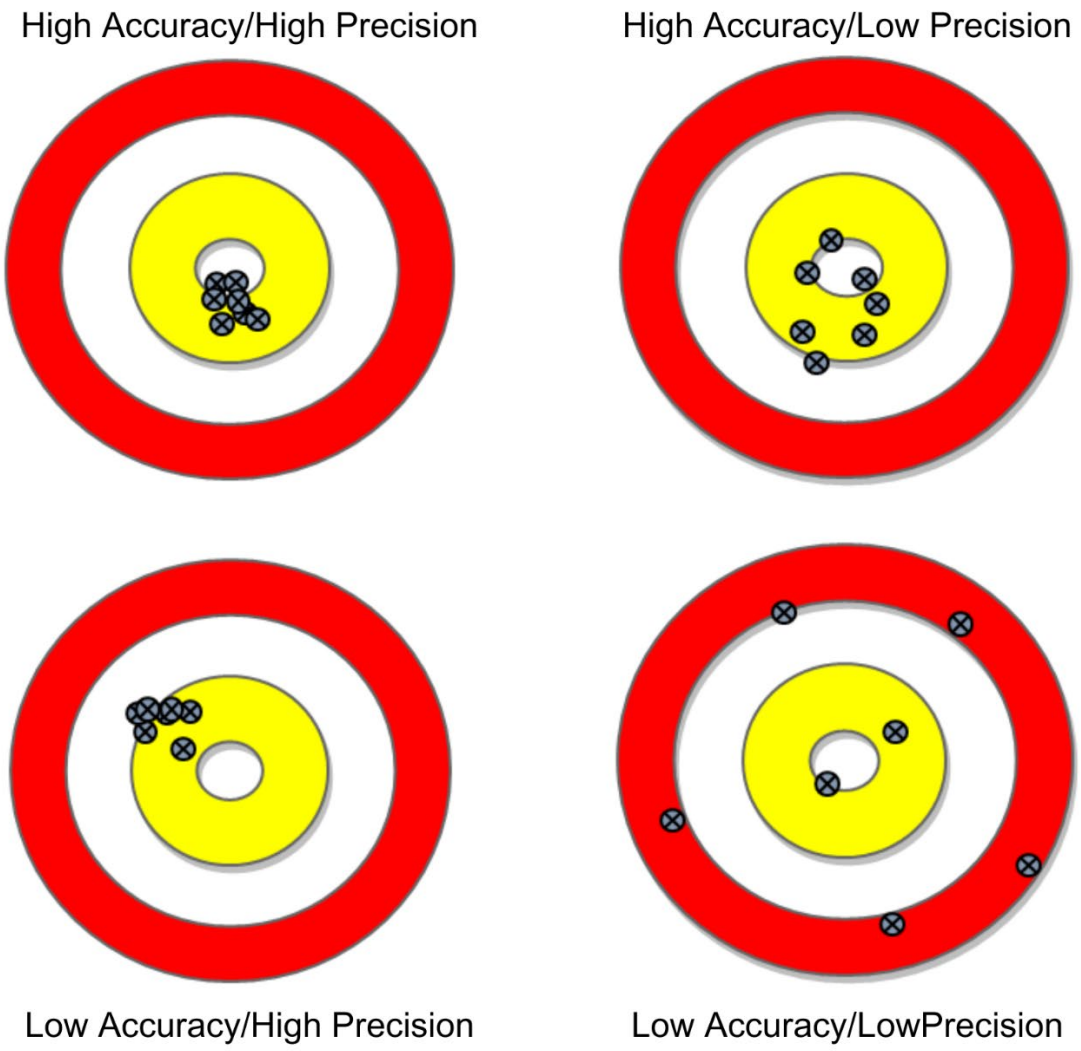
- **Field duplicate sample** (split sample) - A single sample taken in the field, thoroughly homogenized, divided into two separate containers, and analyzed as two independent samples. Field duplicates measure the precision of the sample collection variability or error. Split samples may also be sent to two different laboratories to assess the reproducibility of the overall measurement process.

- **Field replicate sample** (co-located/collocated) – Samples that are collected from the same site, at the same location, at approximately the same time. These samples measure sampling precision, matrix variations, and variations in environmental concentration.

Precision is also well demonstrated using a “bullseye” example. The first image demonstrates seven arrows that have all fallen close together (they hit “precisely” the same area on the target). This archer was very precise. In the second image, the seven arrows are scattered around the target, and none are concentrated to a specific area. This archer was less precise.



Accuracy and Precision Figure



The figure above demonstrates both accuracy and precision in relation to each other. The first image illustrates arrows that are concentrated around the bullseye (high accuracy) and close together (high precision). The second image shows arrows that are on the bullseye (high accuracy) but not close together (low precision). The third image demonstrates arrows that are far from the bullseye (low accuracy) but close together (high precision). The last image shows arrows that are far from the bullseye (low accuracy) and having fallen far from each other (low precision).

17.4 Standard Deviation

Standard deviation, s or SD, is a statistical measurement indicating how precise the average is and how well the individual measurements compare to each other. Standard deviation demonstrates the random error present in a measurement system by measuring the amount of variation from the average of the results. It may be calculated using the following equations:

$$s = \sqrt{\frac{\sum_{t-1}^{N}\left(X_1-\overline{X}\right)^2}{(N-1)}} = \text{SD} = \sqrt{\frac{\left(X_1-\overline{X}\right)^2+\left(X_2-\overline{X}\right)^2+\left(X_3-\overline{X}\right)^2\ldots}{(N-1)}}$$

s = (SD) = Standard deviation X_i = Value of each individual measurement N = Number of measurements $\overline{X}$ = Sample mean of the measurements

% Relative Standard Deviation

To report the standard deviation in relative terms (without units, as a percentage), the %RSD calculation below is used. %RSD calculations are useful for comparing the degree of uncertainty between measurements of varying absolute magnitude, typically when there are at least three measurements for comparison.

$$\%RSD = \frac{s}{\overline{X}} \times 100$$

$\%RSD$ = % Relative Standard Deviation

s = Standard deviation

$\overline{X}$ = Sample mean of the measurements

17.5 Relative % Difference

Relative percent difference (RPD) is used to compare the precision between two measurements, such as sample duplicates that are expected to behave similarly.

$$RPD = \frac{(X_1 - X_2)}{\overline{X}} \times 100$$

RPD = Relative Percent Difference

$\overline{X}$ = Mean of sample measurements

X_1 = Value of measurement

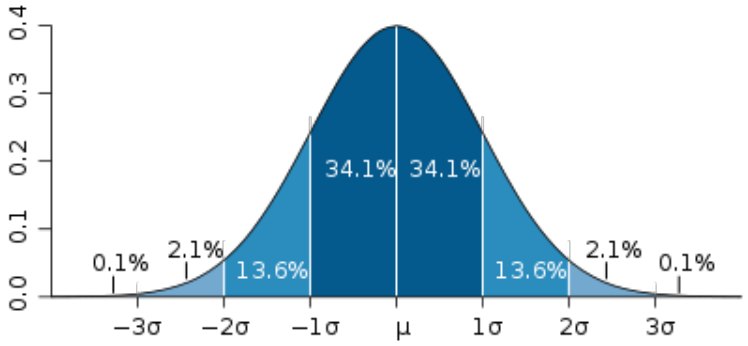
X_2 = Value of comparison measurement

17.6 Confidence Intervals and Limits

The confidence interval is the range around the mean in which a data value is likely to occur. This interval is defined by the confidence limits which are the upper and lower numbers designating the range. The true value should reside at a stated confidence level. Confidence limits are typically set at 95%, but may also include levels for 90% or 99%, depending on the application or desired confidence. The

standard deviation value can be used to determine confidence intervals for the evaluation of replicate data. Confidence limits, determined using a normal distribution under the empirical rule, can be seen in the Normal Distribution figure below:

Figure 16.4.3 – Standard Deviation Normal Distribution



Within the figure, dark blue is one standard deviation from the mean. For the normal distribution, this accounts for 68.27% of the set; while two standard deviations from the mean (medium and dark blue) account for 95.45%; and three standard deviations (light, medium, and dark blue) account for 99.73%.

A laboratory application of confidence levels would be the calculation of control limits and warning limits on a control chart.

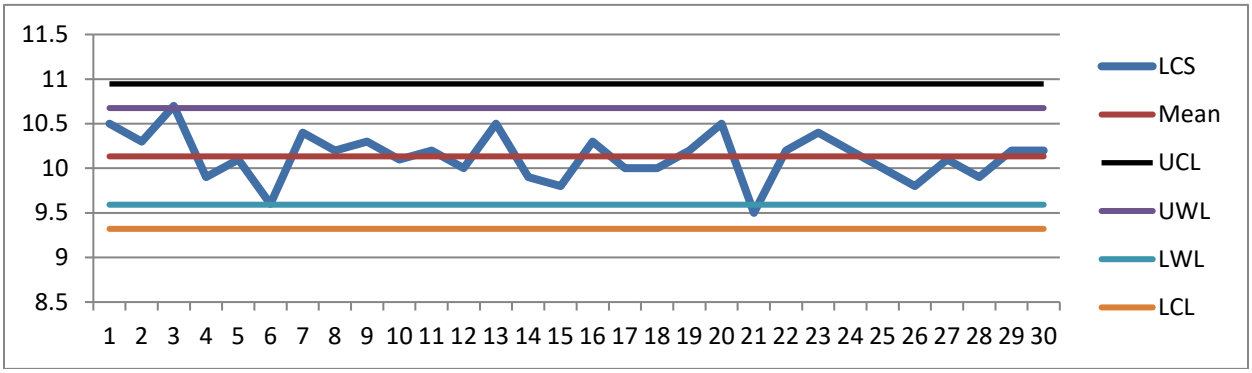
17.7 Control Charts

Control charts are useful to monitor data for analytical performance, method stability, and trends. Control charts are typically developed using a minimum of 20 consecutive data points that are plotted along with a central line, often the mean

value for the percent recovery, percent difference, percent relative standard deviation, or other type of normally distributed data. The confidence limits define the region in which a data point must lie for the analytical system to be considered in control. As a general rule, if any data from a batch is reported, the batch QC results must be included in control charts.

The figure below illustrates a control chart with upper and lower warning and control limits. Data points close to the reference line (Mean) represent data with less variation in the inherent error, and points scattered closer to the limits (upper and lower warning limits-UWL, LWL) represent data with larger error variations. Data beyond the upper and lower control limits (UCL, LCL) indicate data that is out of control and should be addressed.

Figure 16.5 – Example of a Control Chart



Determination of Outliers: A data point should not be discarded as an outlier without proper explanation or valid justification. This applies to all data points collected (i.e., LFB, LCS, MDL, linear curves, DOCs, duplicates, etc.). Justifiable reasons for removing outliers would include a known and documented laboratory error or the use of an appropriate statistical outlier test. All such occurrences/exclusions must be documented on the batch record. Furthermore, routine failures due to analytical variations must also be recorded, even if follow-up actions resolve the issue

17.8 Measurement Uncertainty

Most analytical results have some inherent degree of uncertainty associated with the measurements. Uncertainty results from the natural variations associated with analytical systems relative to fluctuations in measuring devices, equipment, instruments, standards, chemicals, and reagents; limits associated with the technical aspects of a method or process; characteristics of the sample matrix or individual analytes; and human error in collection, preserving, transporting, analyzing, or evaluating data. Total uncertainty is the sum of all uncertainty caused by measurement errors, personal interpretations, and natural variability.

Uncertainty, though normal, should be accounted for, evaluated, or addressed when the project, program, customer, or regulation requires. The cumulative impact of these errors is important in that they could potentially bias data, creating a situation where the sample concentration is no longer representative of the actual environmental concentration. Estimating the potential impact of errors increases the usability and reliability of the data. For environmental projects, the tolerance levels, if relevant, for this error should be defined in the QAPP or work plan, along with the consequences associated with making decisions based on biased data.

Analytical uncertainty is a component of measurement uncertainty that includes the laboratory activities that are performed as part of analysis. Analytical uncertainty is influenced by numerous everyday activities encountered in the laboratory and can be determined from routine QC samples. Duplicate analyses indicate uncertainty through precision measurements; calibration checks, spiked samples, and reference materials indicate uncertainty through accuracy measurements; and proficiency testing allows for inter-laboratory comparisons. Tracking QC sample data in a control chart with a defined confidence interval can provide an indicator of the fluctuations in method performance over time.

18 Method Detection and Reporting Limits

Numerous terms are associated with sensitivity of environmental analytical systems. “Method Detection limit (MDL)” is a general collective term that may reference several types of sensitivity limits and refers to the minimum concentration that can be distinguished as actual analyte signal over instrument noise. An MDL must be reestablished or verified at least annually and when there is a change in analyst, instrumentation, technology, method, or following major instrument maintenance that may affect the sensitivity of the method. The process and requirements for performing MDLs are described within the MDL Procedure, SELSD-SOP-001.

18.1 Sensitivity Measurements

Method Detection Limit (MDL): the minimum concentration of a substance that can be reported with 99% confidence that the measured concentration is distinguishable from method blank results. MDL studies are routinely demonstrated by SELSD for the establishment and verification of reliable analyte detection, quantitation, and reporting limits. An acceptable MDL study is required for all suitable methods and analyses prior to reporting data.

Method Reporting Limit (MRL): the lowest concentration verified by the laboratory with an acceptable degree of precision and accuracy. MRL is the minimum value in which the laboratory reports data without qualification. The MRL may also be defined as the lowest concentration or amount of the target analyte required to be reported from a data collection project.

It is essential for Project Managers/laboratory customers and data users to understand that MDLs are performed in a clean matrix free of the environmental interferences often found in real-world samples. The MRLs are typically established based on MDLs and regulatory or program needs. Typically, the MRL should be at least three times the MDL value to ensure that there is adequate consistency and reliability of measurement at the MRL.

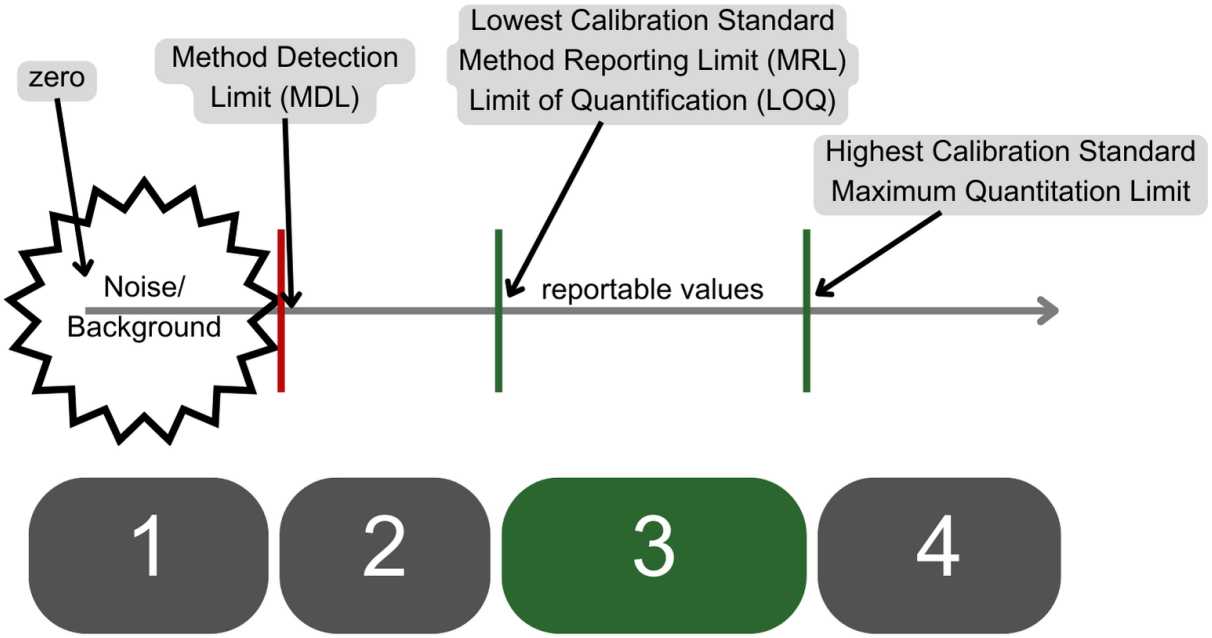
MRLs may be modified within reason to meet project needs, however, the MDL is a measurement-based, calculated value and cannot be “lowered”.

18.2 Instrument Sensitivity Relationships

Sensitivity is affected by the preparation and analytical method utilized; instrumentation and equipment used; analyst capability and experience; standard, reagent and chemical quality; analyte of interest; sample matrix; contamination; background noise; and measurement variability.

The sensitivity figure below shows the typical relationship between the various terms and levels of measurement.

Figure 18.2 – Sensitivity Relationships:



- **Section 1:** In this section, the signal of analyte is often so weak that the instrument cannot differentiate actual analyte signal from instrument noise, even though a small amount of analyte may be present.

- **Section 2:** The detection limit means that an instrument can correctly identify the analyte but cannot determine the amount of analyte with reliable accuracy or precision. Data reported in this region can only be estimated.

- **Section 3:** This is the area that the instrument can detect and measure an analyte with an acceptable degree of accuracy and precision.

- **Section 4:** This is the area above the highest calibration standard or verified linear range of the instrument. The instrument can identify the analyte but cannot determine the amount of analyte with reliable accuracy or precision.

19 Calibration And Linearity

19.1 Calibration

Analytical instrumentation and supporting equipment require calibration or verification to ensure proper working order and accurate and precise data. When required, initial calibrations are verified with a second source standard or that of a separate lot, that is traceable to a vendor certified or national standard, when commercially available. Ongoing instrument verification is supported through instrument calibration, vendor service, or per maintenance contracts. Calibration requirements are typically prescribed in the reference method, applicable program, or instrument manufacturers' guidelines. The method SOP includes details for calibration type, concentration range, number of standards used, calibration and verification frequency, calibration standard information, and acceptance criteria.

For methods that do not require a full instrument calibration on each day of use, the calibration curve is verified through the use of a calibration verification check/control sample (i.e., CV or LCS), at a minimum of once per analytical batch or as required by the method or program. The method SOPs include procedures for calibration verification, to include the procedure, calculations, associated statistics, concentrations, frequency, acceptance criteria and actions for unacceptable verifications.

Sample results are quantified with an acceptable degree of confidence between the lower concentration limit (lower reporting level and/or lowest calibration standard), and the upper concentration limit (upper concentration limit or highest calibration standard) that define the calibration range. Special requirements apply to data with values beyond (above or below) the verified calibration range.

To ensure proper instrument calibration or calibration verification, standards and materials of the appropriate or required quality and traceability to NIST or other national standards are purchased. Expired standards are not used for calibrations or verifications.

Support equipment calibration and verification procedures can be found in the **Support Equipment Calibration and Verification SOP, AQA-QA-SOP-001.**

19.2 Linearity

Linearity can be determined by measuring an analyte at several concentrations and creating a plot of signal against concentration. The resulting plot is then inspected for areas where a linear relationship exists, which is known as the linear dynamic range (LDR). This linear relationship can be utilized to extrapolate unknown concentrations of analyte in a sample.

The linear dynamic range of a method is typically determined by an LDR study that examines the concentration range in which the linearity of the established calibration curve is maintained. This study typically occurs during method validation or standardization, and is repeated periodically to ensure consistency of response. This linearity may vary based on laboratory specific conditions and is verified by the laboratory at the frequency required by the reference method.

20 Analytical Data Assessment and Verification

Data verification is conducted during field and laboratory data collection and reporting activities to evaluate the completeness, correctness, and conformance/compliance of a specific set of data against predetermined method,

procedural, or contractual requirements that are defined in regulatory standards, project plans, or client requests.

Analytical data assessment includes review and verification of the QA/QC components of the data. This evaluation determines the degree of reliability and defensibility of the data by verifying the quality associated with the SELSD analytical system and by quantifying any errors associated with the measurements. Sufficient records are maintained to re-create the sample preparation, instrument calibration/verification, and analytical processes to facilitate data verification.

Due to the nature and variability of field and analytical measurements, data of questionable quality or certainty are occasionally generated. To retain usability of the data, this information must be communicated to the data user. This can be achieved through the use of data flags, qualifiers, or data narratives. See Appendix B for a full list of qualifiers and flags.

20.1 Routine Analytical Data Review & Project Closure

- **Analyst Review (Level 1 Review)**: Data verification begins with the analyst of record (AOR) performing the sample preparation and analysis, ensuring data is entered into LIMS, entering data narratives if needed, suggesting flags and qualifiers if needed, and evaluating method and sample performance using established criteria for calibration, verification, and other quality controls.

- **Peer Review (Level 2 Review):** Peer review is typically performed by a trained analyst but may also be performed by any level of management or QA. They check data entry for complete information and accurate transcription, review any data qualifiers or flags, and perform manual calculation on at least 10% of calculated data such as quality control percent recovery.

- **Manager Review (Level 3 Review):** This level of review is performed by the relevant section manager, or their designee. Designees can include senior level scientists, other management staff, and QA. They review data narratives, check for MCL exceedances and ensure appropriate action is taken, evaluate QC within the report to be appropriate, and review/apply flags or qualifiers as needed.

- **Project Closure & Analytical Test Report Release:** When all review is completed, projects are closed, the report is generated, report is visually verified (i.e., no obvious errors of report sections being overlapped or missing), and the report is issued to the customer(s). Project closure and report release can be performed by any trained individual. All reports contain the DD's name and signature regardless of who performed review and/or project closure.

Table 20.1 – Routine Analytical Review Process

Labware Batch Level		Labware Project Level	
Level 1 / AOR	Level 2 / Peer Review	Level 3 / Manager	Project Closure
• Analyze samples • Evaluate QC / instrument response • Enter data to LabWare / ensure data parsing • Enter data narrative(s) if applicable • Update control charts if applicable • Place flag(s) or qualifier(s) if needed • Provide data packet to peer reviewer	• Verify ≥10% of calculations • Review data in LabWare for appropriate entry/parsing • Evaluate appropriateness of flag(s) or qualifier(s) if applicable • Authorize data and close batch (✓)	• Sample Level Review (✓) • Review of MCL exceedance(s) and ensure customer notification if applicable • Evaluate data narrative(s) if applicable • Evaluate QC for appropriateness • Review flag(s) or qualifier(s) if applicable • Project Review	• Release & Close Project • Preview report to ensure appropriate appearance and legibility • Issue final report to customer

20.2 QA Data Review

QA staff perform review of completed data sets for several reasons, including but not limited to, internal audits, approval of method/instrument validation, demonstrations of capability, MDL data, and technical assistance. Through the annual internal audit process, QA ensures that at least 10% of data generated from each section is reviewed by QA annually.

21 Guide to The SELSD Report Of Analysis

SELSD analytical results are reported on a standard report template that meets EPA requirements for data reporting. See **Appendix D** for an example final report.

21.1 Report Heading

- Need to contact us for any reason? Local phone, email, and addresses are listed for your convenience.
- In the upper right corner, there is a QR code that when scanned will take you to the SELSD website.
- The report number is located in the center under “Report of Analysis”. This is the number that is referenced in the corrected reports.
- The customer’s name appears in bold in the upper left margin. Below the name is the location where the customer has elected to have the final report sent and may not represent the location where the sample was physically collected. The customer may elect to receive their report of analysis via email or fax in which case that information will appear in place of an address.

21.2 Project Summary

- A Project by SELSD definition is a sampling event and may contain one or a series of samples derived from one or more sampling locations.

- Every SELSD customer is assigned a unique ID to differentiate between customers with the same or similar surnames. In this case, DOE-001 is the Account.

- The Project is a combination of the customer ID followed by a number that represents the number of total projects submitted by that customer. Project DOE-001_0002 is the second project submitted by this customer. If you need or want technical assistance with your samples or test results, please refer to the specific project when contacting SELSD.

- The Description field may include additional information about the project.

- Program and Subprogram are primarily sample categories that help SELSD sort and prioritize its workload and ensure all program specific data quality and reporting requirements are met.

- The signature after the Project Summary section represents the person who closed the project and authorized the data to be reported to the customer.

21.3 Project Sample Summary

- In this section under “Project Notes”, you will find any specific information about your project that may be pertinent to the collection or analysis of the samples contained in the project.

- In this section you will also see a full listing of all the samples in the project.

- The Sample ID is an alpha numeric unique identifier for each sample container received by SELSD. This number begins with its Program affiliation followed by the unique number. When contacting SELSD for sample assistance, please provide this number as a point of reference to improve service.

- This section contains all information relative to the collection of the sample. You will see the sample location, which includes the sample source and

where the sample was physically collected, the sample date and time, and who it was collected by. For customers who have their own sample numbers, this number will appear to the right of the SELSD sample number.

- Also, in this section of the report you will see the date and time when each sample was received by the laboratory and the temperature of the sample when it was received. This is critically important information as many tests run by the laboratory have very specific thermal preservation and holding time requirements.

21.4 Report Footer

- Want to provide feedback? Customer surveys are located on the SELSD webpage or follow the link provided.

- SELSD is certified by EPA to perform drinking water analysis (OK00013) and by New Hampshire Environmental Laboratory Accreditation Program (NH ELAP #2338) for EPA 537.1 and EPA 533.

- The Report Date on the right side of the footer is the date that the report was printed.

21.5 Analytical Results

- This section is organized by sample and then followed directly by data pertaining to each analysis method run on the sample. If there was more than one sample in the project, each sample will be separated by a shaded sample information box. QA Code applies to field QC activities and may not appear on your report depending on the context under which the sample was submitted, and to which program it is affiliated.

- Under the shaded box you will find the Analysis Method(s) used for the testing next to a common name for the Analysis. This section also contains the component name which is highly variable and represents the name of the analyte(s) tested on that sample.

- Once the laboratory completes your analysis, you will receive a single numerical result or a set of results for each test method. In most cases this is a numerical value. However, in some cases as you can see on page 2, the result may be listed as “Present” or “Absent” in response to the presence or absence of a target organism or bacteria.

- Most results are reported in a variety of units based on several factors that include technology used and the sensitivity of the test method, reference ranges, and reporting level requirements.

- For each SELSD test, method LOQ (reporting levels) have been established through vigorous QC procedures. Any result that is preceded with a “<” means that the measured result on your sample is “less than” the established LOQ or reporting limit for that component.

- Sometimes preliminary reports are issued at the customer’s request or to expedite reporting of the test results. In such cases, the sample results have not gone through full data review and authorization and are thus referred to as “preliminary”. If there are no such preliminary designations on your test results, they should be considered final and subject to known and documented quality.

- In certain instances, it may be necessary to flag or qualify a sample or test result. As you can see on page 2 of **Appendix D**, a “J1” flag has been applied to the sample PRIV-1963515-01. An H flag has been applied to the PRIV-1963530-01. Data qualifiers and flags are added to the report of analysis to best describe the quality or limitations of the sample data and assist the data user in determining the usability of the data for their needs. A full list of SELSD flags and qualifiers is provided in **Appendix B**.

For any questions regarding analytical test reports or data provided by SELSD, customers are encouraged to contact the laboratory using the phone numbers or email listed in the header.

22 Data Reporting

22.1 Data Delivery Options

Delivery preferences are collected through Customer Profile forms (see Appendix F) with details entered into the unique customer's LIMS account. Delivery options include the following: email, fax, postal mail, or online only. If no preference is made the delivery option will be set to email. If no email is provided and no preference set, the delivery option will be set to postal mail.

Public Water System (PWS) compliance data is automatically exported for the customer directly into the OK PWS Compliance database at http://sdwis.deq.state.ok.us/DWW/.

22.2 Corrected Reports

Amendments to authorized and released analytical data reports require a corrected final report with a new unique report identification. The corrected report shall be identified as a corrected final report and include a reference to the original report ID as well as a brief description of the correction, reasoning for it, and initials and date. After the corrected report is reissued to the client, the original report is maintained and archived.

22.3 Specialized Deliverables

- Preliminary Reports
- EDD
- Summary QC Table
- Full QC Table
- Raw Data
- Specific Customer Request

These deliverables are determined based on the selections made by the customer during the project planning process. If no specialized deliverables are requested, then a standard analytical report will be issued.

Preliminary data reports may be available upon request or when circumstances require sample results to be provided prior to LIMS project authorization. The sample results and/or QC samples may not have been fully reviewed or verified and the values reported on these reports are not considered final. These reports will not have an authorization signature and will show “Preliminary” next to the results.

Data validation is typically performed as a third-party assessment, independent of the utilized laboratory. SELSD does not typically perform project validation activities, although with special agreement, SELSD management may assist customers with interpreting their data against program requirements, regulatory compliance limits, or health-based risks.

23 Laboratory Accreditation Program

The LAP executes business under the scope of SELSD AQA; however, the LAP also operates under additional state, federal, and national rules and requirements. This program is a fee-based program operated within the legislative requirements of the State of Oklahoma and consists of three programs established in the Oklahoma Administrative Code (OAC) Title 252:

- State Laboratory Accreditation (OAC 252:301)
- Industrial Discharge Laboratory Accreditation (OAC 252:302)
- TNI National Laboratory Accreditation (OAC 252:307)

These programs are intended to address a variety of data needs, and therefore each have associated requirements and categories of matrix/method/analyte

combinations available for accreditation. Offered scopes of accreditation for each program is determined by regulatory data needs and each OAC chapter.

23.1 Program Operations

The LAP provides oversight to accredited laboratories to ensure that data generated and reported in support of Oklahoma regulatory compliance is equivalent, defensible, and of a known quality. This oversight is achieved through:

- Review of laboratory documents, manuals, records, and data
- Performance of initial and ongoing on-site or virtual assessments of the laboratory
- Provision of technical assistance and resources to laboratories and the public
- At no time is an assessor to provide consultancy to a laboratory that is seeking accreditation as this would constitute a conflict of interest. Assessors can however provide general technical assistance, but laboratories must be given the flexibility to meet the rules/requirements as best fits their organization.
- Continuous tracking and evaluation of laboratory-submitted materials and PT data
- Investigation of complaints and inquiries
- Annual application process

An example of the accreditation certificate issued to laboratories can be found in Appendix G.

- The proper usage of the Oklahoma State logo, DEQ logo, and TNI symbol is described in each of the relevant accreditation program rules. If these are

used inappropriately, DEQ may take legal action as needed to correct the issue.

23.2 SELSD Assessors

Before an assessor is allowed to perform unsupervised assessments for the LAP, the assessor shall have performed a minimum number of assessments under the supervision of an assessor whose competence has been qualified by the LAP. Assessor training is addressed in AQA-LAP-SOP-006, LAP Assessor Training.

24 Safety

24.1 Agency Safety Procedures

The Agency's safety procedures, responsibilities, and expectations are defined in documents available to all staff at 292-DEQ Hub/Agency Safety Tab. These procedures are also referenced in Safety Team documents.

SELSD expects all staff to embrace a strong safety-minded culture and consistently implement safe performance of work. To maintain a safe workplace, employees and guests are expected to apply good laboratory practice, training, and common sense while at work, onsite, or in the field. The ultimate responsibility and accountability for ensuring adequate protection of staff, the public, and the environment from the SELSD operations rests with management.

24.2 SELSD Safety Team

The Safety Team is comprised of an Environmental Health and Safety Officer and a group of SELSD staff representing all SELSD sections that meet to review current safety-related regulations and requirements, safety events, near-misses, complaints, safety training, and policy and procedure development. These meetings are open to all staff and the success of the team depends on the robust participation of the members. Under management sponsorship, the Safety Team uses consensus decision-making to develop the tools needed for SELSD to

successfully meet safety-related regulations and requirements and ensure the safety of all SELSD employees and visitors.

24.3 Laboratory Safety Training and Education

Safety training is mandated for all new SELSD hires. Existing staff will be provided refresher training and continuing education annually and as needed. Training materials are available to all staff and include the following: written procedures, safety newsletters, power points, and quizzes.

24.4 Safety Documents

Refer to these documents regarding laboratory safety information or request information from the SELSD Safety Team through the Outlook email group “SELS DEQ Safety Team.”

- The Lab Safety Manual and Chemical Hygiene Plan, SELSD-MAN-002 is located in the I drive in the SEL-Documents & Resources folder. Other safety documents are located in the SELSD Divisional Team Safety Channel.
- Safety Data Sheets (SDS) for specific chemical hazards must be readily accessible. They are all stored electronically in the I drive in the SEL- Safety folder. Staff are required to email any updated SDS for any new chemical entering the laboratory to The Safety Team.
- Each divisional SOP should have a safety section tailored for activity-specific safety hazards.

Appendix A – Sample Custody Documentation

Document defensibility and traceability is becoming more and more critical regarding environmental projects and programs. Federally funded environmental programs and evidentiary samples often require appropriate document traceability to ensure data defensibility regarding decisions based on analytical data.

COC forms are generated from the LIMS. Some projects may be pre-logged so that the COC is received with event specific information pre-filled. To obtain an actual sample COC or to inquire about pre-logging, contact the Sample and Data Management Section.

To view a video on how to properly fill out a COC go to:
https://www.youtube.com/watch?v=o0DS7eLAvAw

DO NOT COPY

State Environmental Laboratory Services Division

707 North Robinson Ave
Oklahoma City, OK 73102
General Inquires: 1 (405) 702-1000

Project ID: DOE-001_0001
Customer Description: JOHN DOE
Project Description: 2021 DQM EXAMPLE
SubProgram: Private

Return with samples

Sample Information

Sample Collection By: CHN Phone Number:
Collection Notes:
Traceability:

Sample ID	Sample Address and Sampling Location	Collection Date	Collection Time	Container	Requested Analysis
PRIV-1000189-01 ICE 10	Sparkling Spring SS Site 1		AM PM	CPB NA2S2O3 120ML	TC EC PA
PRIV-1000197-01 10	Sparkling Spring SS Site 1		AM PM	CPB HNO3 8OZ	HARDNESS
PRIV-1000197-02 10	Sparkling Spring SS Site 1		AM PM	CPB NONE 1L	ALKALINITY, CHLORIDE, CONDUCTIVITY, PH, SULFATE, TDS, Conductivity_____
PRIV-1001481-01 10	Dirty Spring DS Site 1		AM PM	CPB HNO3 16OZ	TURBIDITY, METALS TOTAL
PRIV-1052187-04 10	Dirty Spring DS Site 1		AM PM	AGB NH4CL 8OZ	552.3

Chain of Custody Record Must Be Signed

Relinquished By: _____ Signature: _____ Date/Time: / / : AM / PM
Received By: _____ Signature: _____ Date/Time: / / : AM / PM
Relinquished By: _____ Signature: _____ Date/Time: / / : AM / PM
Received By: _____ Signature: _____ Date/Time: / / : AM / PM

Delivery Method
☐ Hand Delivered
☐ Courier
☐ Mail

Receipt Condition: ☐ On Ice ☐ No Ice ☐ SELSD Bottles
Receipt Temp: ℃
Receipt Comments:

Sample ID Key

ICE: Ship Sample on Ice

Appendix B – Qualifiers and Flags

At times field and analytical activities may run into situations or problems that could impact data quality and results. In these instances, data qualifiers and flags are added to the final analytical data report in an effort to describe impacts to the quality or limitations of the sample data and assist the data user in determining the suitability of the data for their needs. The list below explains qualifiers and flags that could appear on a final laboratory report. Since there are no requirements for private customers, the listed qualifiers/flags are used for these customers, where appropriate, as they meet method requirements. If you see a qualifier/flag not on this list or need additional explanation, contact **SELSquality@deq.ok.gov** for further information.

SELSD Flags	
Flag	**Definition**
BOD	(BOD) BOD depletion is less than 1.0.
BR	(BR) Broken in Transit or Shipping
C	(C) Sample may have been contaminated with target analyte during processing. See narrative for details.
CAN	(CAN) No result reported. Analysis cancelled.
CBC	(CBC) No result reported. Could not be calculated.
CF	(CF) Corrected Final Report. Replaces previous report <report number>.
CL	(CL) Chlorine Present. Sample Rejected.
CON	(CON) Result Confirmed.
E	(E) Concentration of target analyte exceeded calibration range of instrument.
FIS	(FIS) Internal standard outside of range.
FQC	(FQC) Field quality control failure.
FZ	(FZ) Frozen Sample

SELSD Flags	
Flag	**Definition**
GC_CONTRACT	Sample outsourced to contract lab GC2308093
H	(H) Method holding time was exceeded.
H2	(H2) Sample extraction or preparation was conducted outside of method required hold time.
H3	(H3) Sample was received or analysis requested beyond the method required holding time.
HTH	(HTH) Hard to homogenize.
IP	(IP) Invalid Sampling Protocol. Sample rejected.
IQS	(IQS) Insufficient quantity of sample.
ISC	(ISC) Incorrect sample container.
ISP	(ISP) Improper sample preservation.
J	(J) The value is an estimate.
J1	(J1) Estimated value. See narrative.
JR	(JR) Approximate value result is below the reporting level but greater than the method detection limit.
KS_CONTRACT	Sample outsourced to contract lab KS2298503
LAC	(LAC) No result reported. Lab accident.
MI	(MI) Matrix interference
MOD	(MOD) Method was modified. See narrative for details.
NHS	(NHS) Non-homogenous sample.
NM_CONTRACT	Sample outsourced to contract lab NM00023
NM_U	U-analyte was not detected in this sample above the method's sample detection limit.
Q	(Q) Laboratory quality control failure. Insufficient quantity of sample to reanalyze.
LQC	(LQC) Laboratory quality control failure. See narrative for details.

SELSD Flags	
Flag	**Definition**
RADON_CANISTER	EPA recommends taking action to reduce the levels of Radon in your home if the results of one long-term test, or the average of two short-term tests, show Radon levels of 4pCi/L or higher. You may also want to consider taking action if the level is below 4 pCi/L.
RC-R	Requestor Cancelled Result/Analyte
RC-S	Requestor Cancelled Sample
RC-T	Requestor Cancelled Test
RET	The State of Oklahoma does not regulate private water wells. These sample results meet the minimum requirements regarding the Nitrate/Nitrite, Lead and Total Coliform standards for safe drinking water.
RLR	(RLR) Reporting limit raised.
TE	Sample exceeded storage temperature requirements before analysis.
TIC	(TIC) Tentatively identified compound.
TOTAL_COLIFORM_MPN	The State of Oklahoma does not regulate private water wells. The sample result of <1.0MPN/100mL indicated that Total Coliform/E. Coli bacteria were Absent. This sample result meets the minimum requirements regarding the Total Coliform standard for safe drinking water.
TOTAL_COLIFORM_SDW	The State of Oklahoma does not regulate private water wells. This sample result meets the minimum requirements regarding the Total Coliform standard for safe drinking water.
WI_CONTRACT	Sample outsourced to contract lab WI00007_8

Appendix C – Lab Analysis Table

This Lab Analysis Table contains general analytical information related to the services SELSD can routinely provide. This information is grouped by matrix and method. It includes individual analytes, references methods, holding times, container types, and preservation requirements by matrix. Most current version of this form can be found in SELSD-SD-013. Thermal preservation requirements are highly variable between methods and as such are not included in this table. If you have further questions, contact SELSD at **SELSquality@deq.ok.gov**.

Potable Water: Refers to water samples that are safe and suitable for human consumption. Potable water has been treated, filtered, or is naturally clean enough to meet regulatory standards for drinking water.

Non-Potable Water: Refers to water samples that are not safe for human consumption. Non-potable water may contain contaminants such as chemicals, pollutants, or microorganisms that could make it unsafe for drinking but may still be used for other purposes like irrigation, industrial processes, or sanitation.

Solids: Refers to materials that are >15% settleable solids, sediment, sludge, waste, and other solid materials that require analysis for contaminants, chemical composition, or other characteristics.

Matrix: Drinking Water (Potable Water) US EPA Accredited					
Method	**Analytes**	**Hold Time**	**Preservation Temperature**	**Preservative**	**Container Type**
EPA 200.7	Aluminum, total Barium, total Beryllium, total Cadmium, total Calcium, total Chromium, total Copper, total Iron, total Manganese, total Nickel, total Silica, total Silver, total Sodium, total Zinc, total	180 Days	Room Temperature	Nitric Acid to a pH <2	Clear Plastic Bottle 1 Liter

Matrix: Drinking Water (Potable Water) US EPA Accredited					
Method	**Analytes**	**Hold Time**	**Preservation Temperature**	**Preservative**	**Container Type**
EPA 200.8	Aluminum, total Antimony, total Arsenic, total Barium, total Beryllium, total Cadmium, total Chromium, total Copper, total Lead, total Manganese, total Nickel, total Selenium, total Silver, total Thallium, total Uranium, total	180 Days	Room Temperature	Nitric Acid to a pH <2	Clear Plastic Bottle 1 Liter

Matrix: Drinking Water (Potable Water) US EPA Accredited					
Method	**Analytes**	**Hold Time**	**Preservation Temperature**	**Preservative**	**Container Type**
EPA 245.1	Mercury, total	28 Days	Room Temperature	Nitric Acid to a pH <2	Clear Plastic Bottle (4 Ounce) 125 Milliliters
EPA 300.1	Bromate	28 Days	4°C	EDA	Amber Glass Bottle (8 Ounce) 250 Milliliters
	Chlorite	14 days	4°C	EDA	Amber Glass Bottle (8 Ounce) 250 Milliliters
EPA 335.4	Cyanide, Total	14 Days	4°C	Sodium Hydroxide	Clear Plastic Bottle 1 Liter
EPA 353.2	Nitrate as N (calculation)	48 hours	4°C	None	Clear Plastic Bottle (4 Ounce) 125 Milliliters
	Nitrite as N	48 hours	4°C	None	Clear Plastic Bottle (4 Ounce) 125 Milliliters
	Nitrate + Nitrite as N	28 days	4°C	Sulfuric Acid	Clear Plastic Bottle (4 Ounce) 125 Milliliters
EPA 365.1	Orthophosphate as P	48 hours	4°C	None	Clear Plastic Bottle (4 Ounce) 125 Milliliters
EPA 504.1	Dibromochloropropane (DBCP) Ethylene Dibromide (EDB)	14 Days	4°C	Sodium Thiosulfate	Clear Glass Vial 40 Milliliter

Matrix: Drinking Water (Potable Water) US EPA Accredited					
Method	**Analytes**	**Hold Time**	**Preservation Temperature**	**Preservative**	**Container Type**
EPA 505	Alachlor Atrazine Technical Chlordane Endrin Heptachlor Heptachlor Epoxide Hexachlorobenzene Hexachlorocyclopentadiene Lindane (gamma-BHC) Methoxychlor Simazine Toxaphene PCBs	7 days	4°C	Sodium Thiosulfate	Clear Glass Vial 40 Milliliter
EPA 515.3	2,4,5-TP (Silvex) 2,4-D Dalapon Dinoseb Pentachlorophenol (PCP) Picloram	14 days	4°C	Sodium Thiosulfate	Amber Glass Bottle (8 Ounce) 250 Milliliters
EPA 524.3 (THM)	Chloroform Bromodichloromethane Bromoform Dibromochloromethane Total Trihalomethanes	14 days	< 10°C during first 48 hrs, ≤ 6°C when stored	Maleic and Ascorbic Acid	Amber Glass Vial 40 Milliliter

Matrix: Drinking Water (Potable Water) US EPA Accredited					
Method	**Analytes**	**Hold Time**	**Preservation Temperature**	**Preservative**	**Container Type**
EPA 524.3 (VOC)	1,1,1-Trichloroethane 1,1,2-Trichloroethane 1,1-Dichloroethene 1,2,4-Trichlorobenzene 1,2-Dichlorobenzene 1,2-Dichloroethane 1,2-Dichloropropane 1,4-Dichlorobenzene Benzene Carbon tetrachloride Chlorobenzene cis-1,2-Dichloroethene Ethylbenzene Methylene chloride Styrene Tetrachloroethene Toluene Total Trihalomethanes (TTHM) Total Xylenes trans-1,2-Dichloroethene Trichloroethene Vinyl chloride	14 days	< 10°C during first 48 hrs, ≤ 6°C when stored	Maleic and Ascorbic Acid	Amber Glass Vial 40 Milliliter
EPA 531.2	Aldicarb Aldicarb sulfone Aldicarb sulfoxide Carbofuran Oxamyl	28 days	< 10°C during first 48 hrs, ≤ 6°C when stored	Potassium Dihydrogen Citrate/Sodium Thiosulfate	Amber Glass vial 60 Milliliters

Matrix: Drinking Water (Potable Water) US EPA Accredited					
Method	**Analytes**	**Hold Time**	**Preservation Temperature**	**Preservative**	**Container Type**
EPA 533 *	11-CL-PF3OUDS 8:2 FTS 4:2 FTS 6:2 FTS DONA 9-CL-PF3ONS HFPO-DA (GENX) NFDHA PFEESA PFMPA PFMBA PFBS PFBA PFDA PFDOA PFHPS PFHPA PFHXS PFHXA PFNA	28 days	Not frozen; received at < 10°C, stored at ≤ 6°C	Ammonium Acetate	Polypropylene screw cap bottle 250 Milliliters
EPA 537.1 *	NETFOSAA NMEFOSAA PFTDA PFTRDA	14 days	Not frozen; received at < 10°C, stored at ≤ 6°C	Trizma and and Tris HCL	Polypropylene screw cap bottle 250 Milliliters

* Analysis is accredited by TNI. EPA certification is not offered at this time.

Matrix: Drinking Water (Potable Water) US EPA Accredited					
Method	**Analytes**	**Hold Time**	**Preservation Temperature**	**Preservative**	**Container Type**
EPA 547	Glyphosate	14 Days	4°C	Sodium Thiosulfate	Amber Glass vial 60 Milliliters
EPA 552.3	Dibromoacetic acid Dichloroacetic acid Monobromoacetic acid Monochloroacetic acid Total Haloacetic Acids (HAA5) Trichloroacetic acid	14 days	< 10°C during first 48 hrs, ≤ 6°C when stored	Ammonium Chloride	Amber Glass Bottle (8 Ounce) 250 Milliliters
SM2320B	Total Alkalinity, Calcium Carbonate	14 Days	4°C	None	Clear Plastic Bottle (8 Ounce) 250 Milliliters
SM2540C	Total Dissolved Solids (TDS)	7 Days	4°C	None	Clear Plastic Bottle 1 Liter
SM9215B	Heterotrophic Plate Count (Pour Plate)	6 Hours	On ice	Sodium Thiosulfate	Sterile Clear Plastic Bottle 120 Milliliter
IDEXX SimPlate TM HPC	Heterotrophic Plate Count (SimPlate)	6 Hours	On ice	Sodium Thiosulfate	Sterile Clear Plastic Bottle 120 Milliliter
SM9222B	Total Coliforms (Membrane Filtration)	24 hours	On ice	Sodium Thiosulfate	Sterile Clear Plastic Bottle 120 Milliliter
SM9222D	Fecal Coliforms (Membrane Filtration)	6 Hours	On ice	Sodium Thiosulfate	Sterile Clear Plastic Bottle 120 Milliliter
SM9223B**	Total Coliform (MPN) E. Coli (MPN)	30 Hours	Ambient or on ice	Sodium Thiosulfate	Sterile Clear Plastic Bottle 120 Milliliter
SM9223B***	Total Coliform (P/A) E. Coli (P/A)	30 Hours	Ambient or on ice	Sodium Thiosulfate	Sterile Clear Plastic Bottle 120 Milliliter
SM9230D	Enterococci (P/A)	6 hours	On ice	Sodium Thiosulfate	Sterile Clear Plastic Bottle 120 Milliliter

** Analysis may be conducted via Colilert-18 or Colilert

*** Analysis may be conducted via Colilert-18, Colilert, or Colisure

Matrix: Non-potable Water					
Method	**Analytes**	**Hold Time**	**Preservation Temperature**	**Preservative**	**Container Type**
EPA 110.2	True Color	48 hours	6°C	None	Clear Plastic Bottle (4 Ounce) 125 Milliliters
EPA 130.1	Total Hardness as CaCO3	180 days	4°C	Nitric Acid	Clear Plastic Bottle (8 Ounce) 250 Milliliters
EPA 150.1	pH	15 mins	none	None	Clear Plastic Bottle (4 Ounce) 125 Milliliters
EPA 300.1	Fluoride Bromide	28 days	none	none	Clear Plastic Bottle (4 Ounce) 125 Milliliters
EPA 325.2	Chloride	28 days	4°C	None	Clear Plastic Bottle (4 Ounce) 125 Milliliters
EPA 335.4	Cyanide, Total	14 Days	4°C	Sodium Hydroxide	Clear Plastic Bottle 1 Liter
EPA 350.1	Ammonia as Nitrogen	28 days	4°C	Sulfuric Acid	Clear Plastic Bottle (4 Ounce) 125 Milliliters
EPA 351.2	Total Kjeldahl Nitrogen (TKN)	28 days	4°C	Sulfuric Acid	Clear Plastic Bottle (4 Ounce) 125 Milliliters
EPA 353.2	Nitrate as N (calculation)	48 hours	4°C	None	Clear Plastic Bottle (8 Ounce) 250 Milliliters
	Nitrite as N	48 hours	4°C	None	Clear Plastic Bottle (4 Ounce) 125 Milliliters
	Nitrate + Nitrite as N	28 days	4°C	Sulfuric Acid	Clear Plastic Bottle (4 Ounce) 125 Milliliters

Matrix: Non-potable Water					
Method	**Analytes**	**Hold Time**	**Preservation Temperature**	**Preservative**	**Container Type**
EPA 365.1	Orthophosphate as P	48 hours	4°C	None	Clear Plastic Bottle (4 Ounce) 125 Milliliters
EPA 365.3	Phosphorous, total	28 days	4°C	Sulfuric Acid	Clear Glass Jar (8 Ounce) 250 Milliliters
EPA 375.4	Sulfate	28 days	4°C	None	Clear Glass Jar (8 Ounce) 250 Milliliters
EPA 1664 B	Oil and Grease	28 days	0°C-6°C	Hydrochloric Acid	Glass, wide mouth, 1 liter, PTFE-lined screw cap
SM2320B	Alkalinity	14 days	4°C	None	Clear Plastic Bottles (varying sizes) 125 milliliters to 1 L and more
SM2320B.4b	Acid Neutralizing Capacity	7 days	4°C	None	Plastic Cubitainer 3 Liters
SM 2340B	Calcium Hardness calc by EPA 200.7 Magnesium Hardness calc by EPA 200.7	180 days	Room Temperature	Nitric Acid to a pH <2	Clear Plastic Bottle 1 Liter
SM 2510B	Conductivity	28 days	Ice, 4°C	None	Clear Plastic Bottle (8 Ounce) 250 Milliliters
SM2130B	Turbidity	2 days	Ice, 4°C	None	Clear Plastic Bottle (8 Ounce) 250 Milliliters
SM2540B	Total Solids (TS)	7 days	4°C	None	Clear Plastic Bottle 1 Liter
SM2540C	Total Dissolved Solids (TDS)	7 days	4°C	None	Clear Plastic Bottle 1 Liter
SM2540D	Total Suspended Solids (TSS)	7 days	4°C	None	Clear Plastic Bottle 1 Liter
SM2540F	Settleable Solids (SS)	48 hours	4°C	None	Clear Plastic Bottle 1 Liter
SM5210B	5-day Biochemical Oxygen Demand (BOD5) Carbonaceous BOD (CBOD)	48 hours	received on ice. stored at ≤6°C	None	Clear Plastic Bottle 1 Liter

Matrix: Non-potable Water					
Method	**Analytes**	**Hold Time**	**Preservation Temperature**	**Preservative**	**Container Type**
SM5210C	Demand, Ultimate Biochemical Oxygen (BOD20)	28 days	received on ice. stored at ≤6°C	Sulfuric Acid	Amber Glass Bottle (16 Ounce) 500 Milliliters
SM5310C	Dissolved Organic Carbon (DOC) Total Organic Carbon (TOC)	28 days	4°C	Sulfuric Acid	Amber Glass Bottle (16 Ounce) 500 Milliliters
SM5910B	UV 254	48 hours	4°C	None	Amber Glass Bottle (8 Ounce) 250 Milliliters
SM9260E	Enteric Pathogen (SHIGELLA)	3 days	received on ice. stored at ≤6°C.	None	Sterile Clear Plastic Bottle 1 Liter
SM10200H PREP	Chlorophyll Prep(Filter & Extraction)	24 hours	unfiltered/ extracted: 4°C, Filtered: < 0°C	Protected from light	Amber or Opaque Plastic Bottle 1 Liter
SM10200H	Chlorophyll -a/ Pheophytin-a	24 hours if unfiltered; 21 days on a filter; 2-24 hours if extracted	unfiltered/ extracted: 4°C, Filtered: < 0°C	Protected from light	Extracted: Clear Glass Tube 15 Milliliter, Filtered: Glass Fiber Filter, Unfiltered: Amber or Opaque Plastic Bottle 1 Liter
SM10300C	Periphyton	21 days on a filter; 2-24 hours if extracted	unfiltered/ extracted: 4°C, Filtered: -20°C	Protected from light	Extracted: Clear Glass Tube 15 Milliliter, Filtered: Glass Fiber Filter, Unfiltered: Amber or Opaque Plastic Bottle 1 Liter

Matrix: Non-potable Water					
Method	**Analytes**	**Hold Time**	**Preservation Temperature**	**Preservative**	**Container Type**
EPA 8015C/5030C	Gasoline Range Organics (GRO)	14 days with acid preservation; 7 days unpreserved	Above freezing to 6°C	Hydrochloric Acid to a pH<2	3 Clear Glass Vials 40 Milliliter (each)
EPA 8020A/5030C	MTBE Benzene Toluene Ethylbenzene m+p-Xylene o-Xylene Total Xylenes 1,3,5-Trimethylbenzene 1,2,4-Trimethylbenzene Naphthalene Total BTEX	14 days with acid preservation; 7 days unpreserved	Above freezing to 6°C	Hydrochloric Acid to a pH<2	3 Clear Glass Vials 40 Milliliter (each)
EPA 8260D	Volatile Organic Compounds (VOCs)	7 days	Above freezing to 6°C	None	Clear Glass Vial 40 Milliliter, No headspace
EPA 8270E	Semi Volatile Organic Compounds (SVOCs)	7 days	Above freezing to 6°C	Sodium Thiosulfate	Amber Glass Bottle 1 Liter
TNRCC1005	Total Petroleum Hydrocarbons (TPH)	14 days	2-6°C	Hydrochloric Acid	Clear Glass Vial 40 Milliliter

Matrix: Non-potable Water					
Method	**Analytes**	**Hold Time**	**Preservation Temperature**	**Preservative**	**Container Type**
EPA 200.8	Aluminium Antimony Arsenic Barium Beryllium Cadmiuim Chromium Cobalt Copper Lead Manganese Molybdenum Nickel Selenium Silver Thallium Vanadium Zinc	180 days	Room Temperature	Nitric Acid to a pH <2	Clear Plastic Bottle 1 Liter

Matrix: Non-potable Water					
Method	**Analytes**	**Hold Time**	**Preservation Temperature**	**Preservative**	**Container Type**
EPA 6010	Aluminum, total Antimony, total Arsenic, total Barium, total Beryllium, total Boron, total Cadmium, total Calcium, total Chromium, total Cobalt, total Copper, total Lead, total Manganese, total Magnesium, total Molybdenum, total Nickel, total Potassium, total Selenium, total Silver, total Sodium, total Thallium, total Vanadium, total Zinc, total	180 days	Room Temperature	None	Clear Glass Jar (8 Ounce) 250 Milliliters

Matrix: Non-potable Water					
Method	**Analytes**	**Hold Time**	**Preservation Temperature**	**Preservative**	**Container Type**
EPA 200.7	Aluminium Antimony Arsenic Barium Beryllium Cadmiuim Calcium Chromium Cobalt Copper Iron Lead Magnesium Manganese Molybdenum Nickel Potassium Selenium Silica Silver Sodium Thallium Tin Vanadium Zinc	180 days	Room Temperature	Nitric Acid to a pH <2	Clear Plastic Bottle 1 Liter
EPA 245.1	Mercury	28 days	Room Temperature	Nitric Acid to a pH <2	Clear Plastic Bottle 1 Liter

Matrix: Non-potable Water					
Method	**Analytes**	**Hold Time**	**Preservation Temperature**	**Preservative**	**Container Type**
SM9223B*	Total Coliform (MPN) E. Coli (MPN)	30 Hours	Ambient or on ice	Sodium Thiosulfate	Sterile Clear Plastic Bottle 120 Milliliter
SM9222D	Fecal Coliforms (Membrane Filtration)	6 Hours	On ice	Sodium Thiosulfate	Sterile Clear Plastic Bottle 120 Milliliter
SM9230D	Enterococci (P/A)	6 hours	On ice	Sodium Thiosulfate	Sterile Clear Plastic Bottle 120 Milliliter

* Analysis may be conducted via Colilert-18 or Colilert

Matrix: Solids					
Method	**Analytes**	**Hold Time**	**Preservation Temperature**	**Preservative**	**Container Type**
EPA 6010	Aluminum, total Antimony, total Arsenic, total Barium, total Beryllium, total Boron, total Cadmium, total Calcium, total Chromium, total Cobalt, total Copper, total Iron, total Lead, total Magnesium, total Manganese, total Molybdenum, total Nickel, total Potassium, total Selenium, total Silver, total Sodium, total Thallium, total Tin, total Vanadium, total Zinc, total	180 days	Room Temperature	None	Clear Glass Jar (8 Ounce) 250 Milliliters

Matrix: Solids					
Method	**Analytes**	**Hold Time**	**Preservation Temperature**	**Preservative**	**Container Type**
EPA 7473	Mercury in fish and tissues	60 days	Ice	None	Clear Plastic Tube 50 Milliliter
*EPA 325.2M	Chloride	28 days	-	None	Clear Plastic Bottle (4 Ounce) 125 Milliliters
*EPA 335.4M	Cyanide, total	14 days	4°C	None	Clear Glass Jar (8 Ounce) 250 Milliliters
*EPA 350.1M	Nitrogen, Ammonia	28 days	-	None	Clear Glass Jar (8 Ounce) 250 Milliliters
*EPA 351.2M	Total Kjeldahl Nitrogen (TKN)	28 days	-	None	Clear Glass Jar (8 Ounce) 250 Milliliters
EPA 9045D	pH	15 min.	none	None	Clear Glass Jar (8 Ounce) 250 Milliliters
Percent Solids	Percent Solids/Percent Moisture (EPACLPSOW EXH D)	14 days	None	None	Clear Glass Jar (8 Ounce) 250 Milliliters; Clear Glass Vial 40 Milliliters
EPA 8082A/3550C	Polychlorinated Biphenyls (PCB) in Sediment	None	0 to 6 °C	None	Clear Glass Jar (8 Ounce) 250 Milliliters
TNRCC1005	Total Petroleum Hydrocarbons (TPH)	14 days	≤-12° C	None	Clear Glass Vial 40 Milliliters
EPA 8015C	Gasoline Range Organics (GRO)	14 days	-7°C to -20°C	None	Clear Glass Vial 40 Milliliters

*Analysis in solid matrix is not currently supported. Please reach out directly for inquiries regarding analysis of this parameter

Matrix: Solids					
Method	**Analytes**	**Hold Time**	**Preservation Temperature**	**Preservative**	**Container Type**
EPA 8020A/5030C	MTBE Benzene Toluene Ethylbenzene m+p-Xylene o-Xylene Total Xylenes 1,3,5-Trimethylbenzene 1,2,4-Trimethylbenzene Naphthalene Total BTEX	14 days	-7°C to -20°C	None	Clear Glass Vial 40 Milliliters
EPA 8260D/5035A	Volatile Organic Compounds (VOCs)	14 days	-7°C to -20°C	None	Clear Glass Vial 40 Milliliters
EPA 8270E	Semi volatile Organic Compounds (SVOCs)	14 days	Above Freezing to 6°C	None	Clear Glass Jar (8 Ounce) 250 Milliliters
EPA 1020B	Flashpoint	None	Ambient or colder	None	Clear Glass Vial 40 Milliliters

Appendix D – Labware Report

State Environmental Laboratory Services Division

Physical Address: 707 North Robinson Avenue, Oklahoma City, OK 73102
Mailing Address: P.O. Box 1677, Oklahoma City, OK 73101
(405) 702-1000
selsd@deq.ok.gov

Report of Analysis

00238502.PDF

EMAIL TO
JOHN DOE
JOHN.DOE@EMAIL.COM

PROJECT SUMMARY

Project: DOE-001_0002
Customer: JOHN DOE
Account: DOE-001
Description: Example data for QAM
Program: Private
Subprogram: Private

AUTHORIZING SIGNATURE

George Russell - Division Director

PROJECT SAMPLE SUMMARY

Project Status: Complete

****BOLD** sample IDs are pending analysis or review and are not finalized.****

Sample ID	Sample Location	Sample Date	Sampler	Received Date	Receipt Temp. (°C)
PRIV-1963515-01	123 BBQ LANE, FLAVORTOWN, OK KITCHEN SINK	1/1/25 1:00 pm	JD	1/3/24 11:00 am	10
PRIV-1963529-01	123 BBQ LANE, FLAVORTOWN, OK FAUCET 1	1/1/25 1:15 pm	JD	1/3/24 11:00 am	19
PRIV-1963530-01	123 BBQ LANE, FLAVORTOWN, OK FAUCET 1	1/1/25 1:15 pm	JD	1/3/24 11:00 am	19

Customer satisfaction survey can be found at ***https://www.deq.ok.gov/divisions/sels/***

EPA DRINKING WATER CERTIFICATION #OK00013

Report Date: 1/3/2025
Page 1 of 2

State Environmental Laboratory Services Division
Physical Address: 707 North Robinson Avenue, Oklahoma City, OK 73102
Mailing Address: P.O. Box 1677, Oklahoma City, OK 73101
(405) 702-1000
selsd@deq.ok.gov

Report of Analysis

00238502.PDF

Analytical Results

Sample ID: PRIV-1963515-01
Sample Location: 123 BBQ LANE, FLAVORTOWN, OK KITCHEN SINK

Flags: (J1) Estimated value. See narrative.

Analysis Method: SM 9223B **Analysis:** SM9223B Total Coliforms & E. coli, P/A

Component	Result	Unit	Qualifiers	Analyst	Analyzed On
E. coli	Absent			HNL	01/03/2025
Total Coliform	Present			HNL	01/03/2025

Analytical Results

Sample ID: PRIV-1963529-01
Sample Location: 123 BBQ LANE, FLAVORTOWN, OK FAUCET 1

Analysis Method: EPA 200.8 **Analysis:** EPA200.8 Trace Elements

Component	Result	Unit	Qualifiers	Analyst	Analyzed On
Aluminum, Total	614	µg/L		HNL	01/03/2025
Arsenic, Total	134	µg/L		HNL	01/03/2025
Beryllium, Total	364	µg/L		HNL	01/03/2025
Copper, Total	378	µg/L		HNL	01/03/2025
Zinc, Total	1300	µg/L		HNL	01/03/2025

Analytical Results

Sample ID: PRIV-1963530-01
Sample Location: 123 BBQ LANE, FLAVORTOWN, OK FAUCET 1

Flags: (H) Method holding time was exceeded.

Analysis Method: pH Screen **Analysis:** pH

Component	Result	Unit	Qualifiers	Analyst	Analyzed On
pH	7.43	PH		HNL	01/03/2025

Customer satisfaction survey can be found at ***https://www.deq.ok.gov/divisions/sels/***

EPA DRINKING WATER CERTIFICATION #OK00013

Report Date: 1/3/2025
Page 2 of 2

Appendix E – PPT (Project Planning Tool) FLCA-SD-001

STATE ENVIRONMENTAL LABORATORY
PROJECT PLANNING DETAILS FORM

Initiation Form:

Or

https://forms.office.com/g/f2Qr2kLcN5

This form is used to formally document follow-up and confirmation of information provided in the Project Planning Initiation Form. This form will also allow additional information and details to be documented that are not captured in the initiation form. These details typically pertain to how the SELS will process the samples internally.

Project Name-Description (Provided on Initiation Form):

Project Manager or Back-Up:

Date of Follow-Up Contact:

Name of SELS Staff Completing Form:

1. **Review Project Planning Tool Initiation Form**
Review the information provided on the initiation form to ensure details and understanding are correct for project scope and requirements. ☐ Click or tap here to enter text.

2. **Lab Location and Business Hours, After Hours**
☐If DEQ staff is the project manager, does the project manager know the after-hours policy and procedure? *If not, we will provide a copy of the current procedure.*
Choose an item.

-OR-
☐ If non-DEQ staff, does the project manager know the laboratory location and business hours for sample supplies pick up and sample delivery? *After hours not available for non-DEQ staff unless approved by management.*

3. Analytics

Discuss requested analytics. Compliance and non-compliance data, federal and state regulations, QAPPs may determine appropriate or acceptable methods. Record the analytes, methods and matrices requested in the table below- Table 3.1.
For test lists, use current reference tools for analyte and method listings.
Ex. RCRA 7, RCRA 8, Priority Pollutants, Routine Chemistry, Routine Metals, Oil and Gas

Table 3.1 Analytics Requested

Analyte or Test List	Minimum Reporting Limits	Method(s)	Matrix
Click or tap here to enter text.		Click or tap here to enter text.	Choose an item.
Click or tap here to enter text.		Click or tap here to enter text.	Choose an item.
Click or tap here to enter text.		Click or tap here to enter text.	Choose an item.
Click or tap here to enter text.		Click or tap here to enter text.	Choose an item.
Click or tap here to enter text.		Click or tap here to enter text.	Choose an item.
Click or tap here to enter text.		Click or tap here to enter text.	Choose an item.

Analytics Requested Notes:
Click or tap here to enter text.

4. Reporting Limits

If the project manager needs to verify reporting limits (i.e low level permits) meet requirements for this project, please indicate below. Reporting limits for analytes, methods and matrices identified in the request table will be provided to the project manager before approvals are completed.

Current reporting limits requested? Choose an item.
Reporting Limits Sent to Project Manager by Click or tap here to enter text. On Click or tap to enter a date.

5. **TICs (Tentatively Identified Compounds):** *are non-targeted compound(s) that can be seen by the testing method, but their identity and concentration cannot be confirmed without further investigation.*

If applicable, does PM need TICs to be reported? Yes/ No (circle one)

6. **Sample Matrix**

If solid or sediment- moisture corrections are applied to these results by default unless otherwise indicated. If moisture correction is not needed, results will be reported as wet weight.

Is the matrix or material to be analyzed identified or described on the initiation form? Click or tap here to enter text.

Provide additional details below if needed, especially for abnormal matrices.

Notes: Click or tap here to enter text.

7. **Field Quality Control**

If field QC is requested, please list field site IDs or descriptors.

Ex. Site 1 Field Duplicate; Site 2 Field Blank

Field Duplicates
Click or tap here to enter text.
Click or tap here to enter text.
Field Blanks
Click or tap here to enter text.
Click or tap here to enter text.
Trip Blanks
Click or tap here to enter text.
Click or tap here to enter text.

8. **Analysis Quality Control**

Is there a specific site or sites requested for laboratory analysis quality control?
PM can designate which sample will be duplicated or spiked if needed. If not designated, normal laboratory quality controls and frequencies will be used.

Click or tap here to enter text.

9. **Reporting**

Definitions of deliverables are below. Check next to each one requested for this project. Final reports are always provided.

- ☐ Final Reports Only
- ☐ Preliminary Data or Lab Reports may be provided for any level of reporting but must be indicated.
- ☐ EDD is electronic data deliverable in the form of an excel spreadsheet of sample, test, and results information.

- ☐ Summary QC Table is a pass/fail table for each analyte along with the requirements listed.
- ☐ Full QC Table lists all result values, calculation results and requirements listed for each analyte. Includes batch quality control and field quality control evaluations (if known).
- ☐ Raw Data is all raw and traceable data associated with the full laboratory lifecycle of the analysis of samples for this project. Includes raw instrument data, equipment logs, reagent and solutions log, quality control charts for each analytical method, certificates for standards, etc. This type of packet requires a significant amount of work and time to compile.

Data Packet Levels- For SELS Staff Information Only

Level I- Final Report
Level II- Final Report, COC, EDD, QC Statement if needed, Summary QC if needed.
Level III- Final Report, COC, EDD, Summary QC Table, QC Statement
Level IV- Final Report, COC, EDD, Full QC Table, Raw Instrument Data, Logs, Charts and Certificates, Full Traceability Packet

Items may be added, dropped or altered for each level. Levels indicate complexity and effort for SELS staff to complete. These levels also translate to subprogram if DEQ project manager/program is the customer.

10. Additional Details for QAPP Projects

If project has a QAPP- did the PM send a copy of the QAPP to SELS for review?
Choose an item.
SELS staff has reviewed the QAPP and understands the Quality Control requirements.
Staff Initials Click or tap here to enter text. Date Click or tap to enter a date.

11. Billing

If invoicing is indicated as billing method on initiation form, ask the following:

- Is a purchase order in place to pay for this project? Choose an item.
- If yes, PO # Click or tap here to enter text.
- Is there a maximum amount for lab services? $Click or tap here to enter text.
- Does the PM need a cost estimate per sample for the analytes requested? ☐Yes ☐ No
- Cost Estimate Per Sample $Click or tap here to enter text.
- Invoice Recipient Name (if other than project manager listed): Click or tap here to enter text.

Lab Use Only

The following sections are for lab use only to document items related to lab activities. These are not a part of the customer interview to complete the above portion.

Lab Capacity

Provide initial details from initiation form and details above to appropriate section managers for capacity assessment. Sample load, frequency, staffing, hold times, supplies and instrument availability should all be considered. Assessment options are accepted, delayed, or rejected.

Manager(s) Contacted, Date(s), Assessment: Click or tap here to enter text.

Sample Logging Information

The data intent and use determine the correct program and subprogram.

Program	**Includes**
☐ SDWA	Compliance, Non-Compliance
☐ PDES	Stormwater, Wastewater
☐ Private	(Research, Education, Contract, etc)
☐ Contractual	(Other Agency or Tribal)
☐ Lab Priority	Investigation, Criminal/Enforcement, Complaints
☐ ODEQ	RCRA, Superfund, Solid Waste

Subprogram Click or tap here to enter text.

Does the Project Manager have a LabWare account in the correct Address Book? If no, use a customer profile form to record account information before logging the project.
Account: Click or tap here to enter text.

Project ID: Click or tap here to enter text.
Project Description: Click or tap here to enter text.
Login Date: Click or tap to enter a date.
Login By: Click or tap here to enter text.

Sample Logging- Log According to Information Provided Above or in the QAPP
Number of Sampling Sites Click or tap here to enter text.
Field QC Samples Click or tap here to enter text.
Sample Point Group- Address(es) or EPA Site ID- Project Manager can send for logging if known Click or tap here to enter text.
Sample Point- Site IDs or locations- Project Manager can send for logging if known. Click or tap here to enter text.

Notifications

Notify the project manager when the sampling materials- containers, preservatives, Chain of Custody, sample labels, etc. are assembled and ready for pick up.

Date of Notification for Sampling Supply Pick Up: Click or tap to enter a date.
Initials: Click or tap here to enter text.

Additional Project Notes

Previous projects? Click or tap here to enter text.
History or background? Click or tap here to enter text.
Report analyte values between MDL and RL? Click or tap here to enter text.
Sampling Instructions Needed? Click or tap here to enter text.
Preservative requirements, shipping/transport requirements, hold times known? Click or tap here to enter text.
Click or tap here to enter text.

Approvals

1. Project Manager/Customer

Name	Title	Click or tap to enter a date.

2. SELS Project Planning Management

Name	Environmental Program Manager	Click or tap to enter a date.
Name	Environmental Program Manager	Click or tap to enter a date.

3. Quality Systems

Name	SELS Quality Assurance Officer or Designee	Click or tap to enter a date.

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Printed: 1/6/2025

Appendix F – Customer Profile Form

CUSTOMER PROFILE FORM

OKLAHOMA DEPARTMENT OF ENVIRONMENTAL QUALITY
STATE ENVIRONMENTAL LABORATORY SERVICES

Please fill the form out completely. Use N/A (Not Applicable) for those pieces of information that do not apply.

PART 1.

Have you or someone in your household/company filled out or provided this information to the SELS previously? ☐ YES ☐ NO

If yes, list company/person(s) who this account can be associated with: _____
Please fill out the form again if any information has changed.

PART 2.

☐ Business Company Name: _____
☐ Private Customer *Check one box to the left that represents your customer type account*

Point of Contact: _____
Designate who will be a contact for questions for this account. If name is same as above, write "Same"

Mailing Address: _____

City: _____

State: _____ Zip: _____

Phone Number: _____

Email Address: _____

PART 3.

Preferred Method of Laboratory Result Reporting: ☐ Email ☐ Mail
Email or address provided above will be used. If another address needs to be used (e.g. billing purposes), note below in additional information

Additional Information: _____

_____

LABORATORY USE ONLY

Account ID: _____ Date Received: _____/_____/

Circle One: New / Update Received By (Initials): _____

707 North Robinson Ave, Oklahoma City, OK 73102

SELSD QS DC 0500-STF01-R01-101018
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Appendix G – LAP Accreditation Certificate Example

OKLAHOMA Environmental Quality

OKLAHOMA

Oklahoma Department of Environmental Quality
Laboratory Accreditation Program

State Laboratory ID: «Alias02»
EPA ID: «Lab_No»

Certificate #: «Certif_No»

«Lab_Name»

«Lab_Street_1»
«Lab_City», «Lab_State» «Lab_ZipCode»

has been accredited for the analysis of environmental samples for analytes listed on the attached Scope of Accreditation.

Continued accreditation is contingent upon successful on-going compliance with OAC 252:301 which was promulgated and adopted pursuant to the Oklahoma Environmental Quality Code (Code), 27AO.S. § 2-4-101 *et seq.* Specific methods and analytes certified are cited on the laboratory's Scope of Accreditation.

The Scope of Accreditation, inspection reports and accreditation status are on file and may be obtained from:
Oklahoma DEQ, State Environmental Laboratory Services Division,
Laboratory Accreditation Program,
707 N Robinson, P.O. Box 1677, Oklahoma City, Oklahoma 73101-1677,
(405) 702-1000, www.deq.ok.gov.

ISSUED: «Cert_Issue_Date»

EXPIRES: «Cert_Exp_Date»

George Russell IV, State Environmental Laboratory Services Interim Division Director

This certificate is valid proof of Accreditation only when associated with its Scope of Accreditation.

7000-STR01-R02-091919

Appendix H – Definitions and Acronyms Table

SELSD Terms	Acronyms	Definitions	Other Common Terminologies and Acronyms
Calibration Verification	CV	A fortified QC that is used to check or verify the calibration initially, ongoing, or both. The QC is from the same standard source(s) as the calibrants.	• Initial Calibration Verification (ICV) • Continuous Calibration Verification (CCV) • Initial Procedural Verification (IPC) • Continuous Calibration Check (CCC) • Calibration Check (CC) • Continuous Calibration Verification Standard (CCVS) • Cal Check

SELSD Terms	Acronyms	Definitions	Other Common Terminologies and Acronyms
Laboratory Control Standard	LCS	A fortified QC that is used to check or verify the calibration that is from separate source(s) as the calibrants.	• Quality Control Standard (QCS) • Quality Control Sample (QCS) • LCSD • ASCV
Laboratory Fortified Blank	LFB	A fortified QC that is prepared and analyzed as a sample to show if methodology is in control and to measure laboratory precision and accuracy.	• ORP • Bacteria Positive Control (LFB+) • Bacteria Negative Control (LFB-) • PCS
Laboratory Fortified Matrix	LFM	A sample that is split into two or more aliquots in the laboratory, and at least one of the aliquots is fortified with a known amount of target analyte(s) and then prepared and analyzed like a sample. This is performed to evaluate the effect of the matrix on the method's recovery.	• Matrix Spike (MS)

SELSD Terms	Acronyms	Definitions	Other Common Terminologies and Acronyms
Laboratory Fortified Matrix Duplicate	LFMD	A sample that is split into three or more aliquots in the laboratory, and two of the aliquots are fortified with the same concentration of target analyte(s) and then prepared and analyzed like samples. This is performed to evaluate the effect of the matrix on the method's recovery as well as to measure the method's precision.	• Matrix Spike Duplicate (MSD)
Laboratory Duplicate	LD	A sample that has been split into two aliquots in the laboratory and each aliquot is prepared and analyzed as an independent sample to determine precision of the method.	• Duplicate • DUP • Sample Dup
Field Duplicate	FD	Two aliquots from the same sample source collected at the same time in the field and each aliquot is prepared and analyzed as an independent sample to determine precision of the sampling.	

SELSD Terms	Acronyms	Definitions	Other Common Terminologies and Acronyms
Laboratory Replicate	LR	A sample that has been split into more than two aliquots in the laboratory and each aliquot is prepared and analyzed as an independent sample to determine precision of the method.	
Field Replicate	FR	More than two aliquots from the same sample source collected at the same time in the field and each aliquot is prepared and analyzed as an independent sample to determine precision of the sampling.	
Initial Demonstration of Capability	IDOC	Demonstration that an analyst is competent to perform a method when they either have not officially performed it before, or it has been over 12 months since the method was last performed.	• Initial Demonstration of Capability (IDC) • Demonstration of Capability (DOC)
Ongoing Demonstration of Capability	ODOC	Demonstration that an analyst has maintained competency to perform a method.	• Ongoing Demonstration of Capability (ODC) • Demonstration of Capability (DOC)

SELSD Terms	Acronyms	Definitions	Other Common Terminologies and Acronyms
Equipment Blank	EB	A blank that is used to check the effectiveness of decontamination procedures on sampling equipment.	• Filtered Blank
Calibration Blank	CB	A blank that is used to check or verify the calibration initially, ongoing, or both.	• Initial Calibration Blank (ICB) • Continuous Calibration Blank (CCB)
Method Blank	MB	A blank that is used to check the entirety of the sampling and analytical process.	• Field Reagent Blank (FRB)
Trip Blank	TB	A blank that is used to check the travel and storage from the field and the analytical process.	
Laboratory Reagent Blank	LRB	A blank that is used to check the entire laboratory process of preparation and analysis.	• Blank • Procedural Blank (PB) • Method Blank (MB)
Instrument Blank	IB	A blank that is used to check the entire instrumental analysis process.	• Zero Blank

SELSD Terms	Acronyms	Definitions	Other Common Terminologies and Acronyms
Field Reagent Blank	FRB	An aliquot of reagent water that is placed in a sample container in the laboratory and treated as a sample in all respects, including shipment to the sampling site, exposure to sampling site conditions, storage, preservation, and all analytical procedures. The purpose of the FRB is to determine if method analytes or other interferences are present in the field environment.	• Field Blank
Instrument Detection Limit	IDL	The lowest concentration of target analyte(s) that can be detected by an instrument with reasonable confidence.	• Instrument Detection Limit (IDL) • Method Detection Limit (MDL)
Method Detection Limit	MDL	The lowest concentration of target analyte(s) that can be detected by a method with reasonable confidence.	• Detection Limit (DL)
Limit of Quantitation	LOQ	The lowest concentration of target analyte(s) that can be identified and quantified within specified limits of precision and accuracy.	• Lowest Concentration Minimum Reporting Limit (LCMRL)

SELSD Terms	Acronyms	Definitions	Other Common Terminologies and Acronyms
Method Reporting Limit	MRL	The lowest concentration of target analyte(s) that the laboratory will report to a customer. Often correlates to the lowest calibration standard used.	• Limit of Quantitation (LOQ) • Low Level of Quantitation (LLOQ) • Reporting Detection Limit (RDL) • Reporting Limit (RL) • Reporting Limit Spike (RLS) •
Internal Standard	IS	Non-target analyte(s) that are extremely unlikely to be found in sample. These are added in known amount(s) to sample or other analytical batch components after sample preparation but prior to analysis and used to measure the relative responses of other method analytes and surrogates that are components of the same solution.	

SELSD Terms	Acronyms	Definitions	Other Common Terminologies and Acronyms
Surrogate Standard	SS	Non-target analyte(s) that resemble the target analyte(s) and is extremely unlikely to be found in sample. These are added in known amount(s) to sample or other analytical batch components prior to sample preparation and is measured with the same procedures used to measure other method analytes. This provides a means to monitor method performance with each sample.	• Surrogate Spike • Isotope Dilution Analog (IDA) • Surrogate Standard Solution (SUR) • Surrogate Primary Dilution Standard (SUR PDS)
Control Limits		A range that a QC must fall within in order to be deemed within control.	• Data Quality Objective (DQO) • Calibration and DORM5 Checks • Positive Control Check against CoA • GGA Control • RPD • DQR (300.1)

SELSD Terms	Acronyms	Definitions	Other Common Terminologies and Acronyms
Calibration		The process of creating known relationship of response to measurement using traceable reference(s).	• CAL
Verification		The process of measuring and evaluating the performance of an instrument or piece of equipment's measurement response relationship using traceable reference(s).	• Precalibration Routine • Performance Check • Performance Verification • Efficiency Calibration Check • Constant/Fitted Efficiency Calibration Checks • Calibration Check Source • Detector Efficiency Verification
Dynamic Range		The concentration range that the instrument response to an analyte is consistent with the calibration response and calculation. This range extends past the highest calibration point used but is measured and evaluated for use prior to implementation on samples.	

Appendix I – Referenced Internal Documents

The following documents are part of SELSD's Quality Management System and are referenced within the text of this QAM. These documents are available upon request.

QAM Section Link (click on section to follow link)	Document Control Identifier	Document Title
7	SELSD-SOP-002	Document Control SOP
7	9750-QSL01	Master Document Tracker
7	AQA-QA-SD-001	Revision History Log
7.1	9002-QSF01	Annual Staff Signature Sheet
9.2	9000-QSP02	Demonstration of Capability (DOC) SOP
9.3	9000-QSL01	SELSD Attendance Form
10	SLESD-SOP-003	SELSD Ethics and Data Integrity Program
11.1	9010-QSL01	Lab Capacity Log
12	SELSD-SOP-004	Root Cause and Resolution Plan
13.1	AQA-QA-SD-023	External Audit Packet
13.1 13.2	AQA-QA-SD-022	Internal Audit Packet
13.2	9400-QSL03	SELS Internal Audit Tracking Log
13.4	9650-QSP01	Customer Satisfaction and Support Procedure

QAM Section Link (click on section to follow link)	Document Control Identifier	Document Title
13.4	AQA-LAP-SOP-003	LAP Complaints Procedure
14.1 15.1 Appendix E	FLCA-SD-001	Project Planning Tool (PPT)
15.2	7000-SOP02	Conducting Laboratory On-Site Assessments
15.4	SELSD-SD-005.	Laboratory Material Expiration and Extension Policy
18	SELSD-SOP-001	MDL Procedure
19.1	AQA-QA-SOP-001	Support Equipment Calibration and Verification SOP
23.2	AQA-LAP-SOP-	LAP Assessor Training
24.4	SELSD-MAN-002	Lab Safety Manual and Chemical Hygiene
Appendix C	SELSD-SD-013	Lab Analysis Table

Appendix J – External Links and References

- 40 CFR 141 – US EPA Safe Drinking Water Act
- 40 CFR 142 – US EPA National Primary Drinking Water Regulations Implementation
- 40 CFR 136 – US EPA Clean Water Act
- US EPA Manual for the Certification of Laboratories Analyzing Drinking Water, Fifth Edition, EPA 815-R-05-004
- Supplement 1 to the Fifth Edition of the Manual for the Certification of Laboratories Analyzing Drinking Water, EPA 815-F-08-006
- Supplement 2 to the Fifth Edition of the Manual for the Certification of Laboratories Analyzing Drinking Water, EPA 815-F-12-006
- TNI 2016 Volume 1, “Management and Technical Requirements for Laboratories Performing Environmental Analysis”, EL-V1-2016-Rev.2.1
- TNI 2016 Volume 2, “General Requirements for Accreditation Bodies Accrediting Environmental Laboratories”, EL-V2-2016 Rev.2.0
- 27A, Article IV of the Environmental Quality Code, §2-4-201
- 27A, Article IV of the Environmental Quality Code, §2-4-301
- 27A, Article IV of the Environmental Quality Code, §2-4-302
- Oklahoma Administrative Code Title 252
- ISO/IEC 17025, “General Requirements for the Competence of Testing and Calibration Laboratories”, ISO/IEC 17025:2017(E)

- Standard Method for the Examination of Water and Wastewater, 23rd and 24th Editions
- EPA Drinking Water Lab Certification
- The NELAC Institute (TNI)
- Environmental Response Laboratory Network (ERLN)
- Association of Public Health Laboratories (APHL)
- Safe Drinking Water Act (SDWA)
- Chemical Contaminants Rule (CCR)
- Lead and Copper Revised Rule (LCR/LCRR/LCRI)
- Radionuclides Rule
- Aircraft Drinking Water Rule (ADWR)
- Ground Water Rule (GWR)
- Stage 1 and Stage 2 Disinfectants and Disinfection Byproducts Rules (DBPR)
- Surface Water Treatment Rules (SWTR)
- Revised Total Coliform Rule and Total Coliform Rule (TCR/RTCR)
- Unregulated Contaminant Monitoring Rule (UCMR)
- Clean Water Act (CWA)
- Resource Conservation And Recovery Act (RCRA)
- Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA)

- Harmful Algal Blooms (HAB)
- Natural Resource Damage Assessment and Restoration (NRDAR)

26 Document Revision History

- Combined the ***Quality Assurance Plan*** **(9010-QSP01-R19-101222)** and ***Data Quality Manual*** **(9010-QSP03-R03-080122)** into a single document, renamed as the ***Quality Assurance Manual*** **(SELSD-MAN-001-R1).**