QAM-Q-107

Laboratory Personnel Training

Revision 16

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Texas Institute for Applied Environmental Research

1. **Applicability and Purpose**
   This procedure applies to all personnel performing quality related analyses or data generation in the laboratory at the Texas Institute for Applied Environmental Research (TIAER), Tarleton State University, Stephenville, Texas. The purpose of this procedure is to provide a method for the proper training of laboratory personnel. This includes training on new procedures, certification of new personnel, and ongoing recertification of skills for previously trained laboratory workers. Proper training and documentation of that training ensure required levels of quality assurance, ethics, client confidentiality, safety awareness, correct handling of radioactive materials and control of hazardous waste disposal.

2. **Definitions**
   2.1. Demonstration of Capability (DOC): A documented process to ensure that an analyst is trained well enough to produce acceptable results. The DOC is performed upon initial training of an analyst in a chemical determination procedure (IDOC), then at least annually thereafter (CDOC).
   2.2. National Environmental Laboratory Accreditation Conference (NELAC); TNI= The NELAC Institute

3. **Equipment, Reagents and Standards**
   None

4. **Procedure**
   4.1. The Laboratory Manager (LM) formulates and sets goals with respect to the education, training and skills of the laboratory personnel. The Laboratory Quality Assurance Officer (LQAO) maintains training records and assures these goals are met. The laboratory has policy and procedures for identifying training needs and providing training of personnel. The training program is relevant to the present and anticipated tasks of the laboratory.
      4.1.1. The LQAO maintains records of the authorization(s), competence, educational and professional qualifications, training, skills and experience of all technical personnel. This information is readily available and includes the date on which authorization and/or competence is confirmed.

4.1.2. The LM maintains current job descriptions for the laboratory personnel, generally found in QAM-Q-100.

4.1.3. The LQAO maintains documentation that each analyst has read, understood, and is using the latest version of the TIAER laboratory's Quality Assurance Manual chapters (QAMs) or SOPs that relate to his/her job responsibilities.

4.1.4. The LQAO is responsible for reviewing training records and certifying the analyst in accordance with the TIAER QAM.

4.1.5. The analyst, LM and LQAO sign a DOC Certification Statement (Q-100-1) prior to the analyst independently performing any quality-related data collection activities.

4.1.6. Analysts sign Quality Policy, Ethics Policy and Confidentiality Statements prior to performing any work on their own.

4.1.7. The Radiation Safety Officer (RSO) is responsible for the training of personnel in handling and disposing of radioactive materials, dosimetry and monitoring, control of sources and general radiation safety requirements in accordance with QAM-R-100, "TIAER Radiochemistry Program".

4.2. Prior to performing any laboratory procedure for data collection, the analyst is certified for Demonstration of Capability (DOC) to perform that procedure by the Laboratory Manager on a Personnel Training Record (PTR, Attachment 1, Q-107-1) and a completed Demonstration of Capability Certification Statement (Q-100-1). The trainer is either the LM or another certified analyst. DOC certifications on all analytical SOPs are renewed at least annually for all analysts. Some non-data SOPs and QAMs do not require DOCs, but do require record of the training on a PTR.

4.2.1. The work of an analyst in training must be co-initialed or signed by the trainer.

4.3. The level of required training varies between analyses, sample characteristics and the experience or education of the analyst. The LM decides what limitations are required and documents them on the PTR, Laboratory Master

Training Log (Attachment 2, Q-107-2) and a DOC Certification Statement (Q-100-1).

4.4. Analysts are certified on individual QAMs and SOPs that pertain to their work areas from these categories: Quality (Q), Safety (S), Waste (W), Administrative (A), Instrumentation (I), Chemical analysis (C) and Radiochemistry (R).

4.4.1. Analyst DOC certification: The initial (I) ***DOC*** is performed upon initial training of an analyst in an ***SOP only***, after a major change in an analytical SOP, and at least annually after that for continuing (C) DOC. Prior to performing any data collection activities relating to actual samples, the analyst performs an acceptable analysis of at least one of the following:

4.4.1.1. at least one unknown blind standard prepared by the LM, LQAO or designee (IDOC),

4.4.1.2. a Proficiency Testing (PT) standard obtained from a NELAC approved PT provider (IDOC or CDOC), or

4.4.1.3. Analyze at least four consecutive laboratory control samples (LCSs), provided they meet acceptance criteria in QAM-Q-101, "Laboratory Quality Control" (IDOC or CDOC). Generally, acceptable performance is achieved by using the results of the set of four LCS analyses and computing the average percent recovery and the standard deviation of the percent recovery(s). Recoveries meet requirements in project QAPP for LCSs or otherwise be within 80 to 120%. Precision is acceptable if the standard deviation divided by the mean recovery is 10% or less. Project or specific method requirements may be different for precision.

4.4.1.4. If no standard of any type is practical or available, the analyst analyzes a field sample with detectable levels (above the Practical Quantitation Limit described in QAM-Q-101) that have been previously analyzed by a certified analyst, using the precision requirements stated above.

4.4.1.5. Where gamma-ray spectrometry is used to identify and quantify more than one analyte, the laboratory

control sample shall contain gamma-emitting radionuclides that represent the low (e.g., 241Am), medium (e.g., 137Cs) and high (e.g., 60Co) energy range of the analyzed gamma-ray spectra. As indicated by these examples, the nuclides need not exactly bracket the calibrated energy range or the range over which nuclides are identified and quantified. Alpha spectrometry may also have the same requirements with different isotopes to cover the energy range.

4.4.2. NELAP approved PT providers determine acceptance criteria for blinds they provide. Blind samples provided by the LM, LQAO or designee should generally have acceptance criteria of 10%, depending on the test, unless otherwise specified by the manufacturer or SOP.

4.4.3. If acceptable certification is not awarded the analyst, the LM then initiates corrective action in accordance with section 5 of this QAM.

4.5. Annual CDOC recertification and training is required for all analysts, including the LM, on SOPs generating data for the TIAER database. After a major SOP revision, all analysts previously trained on that SOP are recertified for the revision with a CDOC.

4.5.1. In addition to the CDOC recertification for analysts, the laboratory is required to pass PT samples twice a year. This semiannual PT analysis is required for each test the laboratory performs, unless one is not required as described above. It is preferred that a different analyst perform the PT, if possible, each time. This may not be possible if the PT sample is not easily analyzed exactly as a field sample. Semiannual PT analyses are documented in accordance with TNI/NELAC certification.

4.6. PTRs are signed by the analyst and the trainer prior to analyst certification, and approved by the LM. If limitations are lifted at a later date, the record is updated and approved by the LM.

4.7. An annual training refresher on quality, ethics and data integrity, and client data confidentiality is provided to all

TIAER laboratory staff. This training refresher is scheduled by the LQAO and may coincide with other training.

4.8. Certain procedures or programs may have different requirements for DOC or performance. These are followed when applicable to the client or data end-user.

5. Quality Control and Safety Aspects

5.1. All aspects of this procedure comply with TIAER Laboratory QAMs for safety and quality.

5.2. Nonconformance situations, such as failed PT samples or DOC, are documented and corrected in accordance with QAM-Q-105, "Corrective Actions". The analyst who fails DOC certification or PT samples is given another opportunity to pass. Upon second failure, the analyst is disqualified from performing the analysis until complete retraining is done and a DOC or PT is passed by the analyst.

6. References

6.1. Standard Methods for the Examination of Water and Wastewater, latest online edition (EPA approved), Ed. by Arnold Greenberg, et al., APHA.

6.2. Handbook for Analytical Quality Control in Water and Wastewater Laboratories, USEPA EMSL, EPA-600/4-79-015, March 1979.

6.3. National Environmental Laboratory Accreditation Conference (NELAC) TNI standard, 2016.

6.4. TIAER Quality Assurance Manual, QAM-Q-100 and accompanying chapters, latest revision.

7. Attachments

7.1. Personnel Training Record, Q-107-1

7.2. Sample of Master Training Logbook, Q-107-2

7.3. Required Training for New Employees (and annual re-training of all laboratory staff)

Attachment 1
TIAER Personnel Training Record

Name: _____ Logged_____

SOP/QAM#/Rev. #: _____ SOP Title:_____

Report Date:_____ Matrix: _____

Certification (circle): NEW UPDATED ANNUAL RETRAINING DOC attached

Topics covered:

Trainer Comments:

Performance Evaluation results (if applicable):

Analyte	Conc.	Units	Rep 1	Rep 2	Rep 3	Rep 4	Mean Recovery	Acceptance Range	Standard Deviation	% RSD or Acceptance Criteria	% RSD	Pass/ Fail
Analyte	True Conc.	Units	Obs. Conc	% Rec	Other obs.	% RPD	Other Recovery	Acceptance Range	Other: _____	Other (describe): _____	Other: _____	Pass/ Fail

Comments or limitations:

Certified that the analyst has read and understands role in this procedure and will comply with the most current procedure for this method. Analyst is approved to perform with the above limitations.

Analyst: _____ Date: _____

Trainer: _____ Date: _____

Laboratory Manager: _____ Date: _____

Attachment 2
Sample of Laboratory Master Training Log

Name	Date	SOP/QAM	Rev #	New	Updated	Annual	DOC done	Limitations/comments

Q-107-2, Rev. 16

Attachment 3

Required Training for New Employees (and annual re-training for laboratory staff)

Other specific SOP/QAMs are required depending on job duties

SOP	***Title***	***Comments***
QAM-S-101	Laboratory Safety	Safety tour required on first day
QAM-Q-100	Quality Assurance Manual	Data ethics and integrity required before starting work
QAM-Q-101	Laboratory Quality Control	
QAM-Q-102	Laboratory Material Acceptance Criteria	Dependent on job duties
QAM-Q-103	Laboratory Equipment Maintenance	Dependent on job duties
QAM-Q-104	Data Entry and Review	Dependent on job duties
QAM-Q-105	Corrective Actions	
QAM-Q-107	Laboratory Personnel Training	
QAM-Q-110	Sample Receipt and Login	Dependent on job duties
QAM-Q-111	Aliquot Preparation and Sample Preservation	Dependent on job duties
QAM-Q-112	Sample Composting	Dependent on job duties
QAM-A-102	Laboratory Document and Data Control	
QAM-A-104	Preparation and Control of Laboratory Procedures	Dependent on job duties
QAM-W-101	Disposal of Laboratory Waste	
Tarleton	Hazard Communication	Online
Tarleton	Bloodborne Pathogens	Online
Tarleton	Information Security Awareness	Online
Tarleton	Laboratory Safety	Online
Tarleton	Ethics	Online
Tarleton	Various other Human Resources training	Online
TIAER/Tarleton	8 hour HAZMAT training for rad workers	In first 90 days, then refresher (3yr)
TIAER	A-102	Sign signature and initials page of Logbook A-102-1
Tarleton	Lab Safety	Online
TIAER	Ethics and Data Integrity Training	Online
QAM-I-101	Operation and Calibration of Analytical Balance	
QAM-I-111	Operation and Calibration of Conductivity Meter	
QAM-I-115	Operation and Calibration of the IR Thermometer	
QAM-I-116	Preparation of Labware	
SOP-C-113	Determination of Specific Conductivity	
SOP-C-126	Determination of Temperature	