

Region 4 U.S. Environmental Protection Agency Laboratory Services & Applied Science Division Athens, Georgia	
Operating Procedure	
Title: Equipment Inventory and Management	ID: LSASDPROC-1009-R1
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Purpose

This Operating Procedure is specific to the Region 4 Science and Ecosystem Support Division (LSASD) to maintain conformance to technical and quality system requirements. This document describes the procedures necessary to demonstrate the operational status and inventory of equipment used for measurement activities and equipment that comes into direct contact with the sample media and has the potential to cross contaminate samples between sampling stations.

Scope/Application

The requirements of this procedure apply to all personnel who perform work under the LSASD Quality Management System (QMS). This procedure covers the approaches and documentation used for the maintenance, calibration, verification and inventory of equipment used for LSASD activities. This procedure includes the maintenance and use of microscopes, volumetric equipment and equipment that may come into direct contact with the sample media and has the potential to cross contaminate samples. While this SOP may be informative, it is not intended for and may not be directly applicable to operations in other organizations. Mention of trade names or commercial products in this operating procedure does not constitute endorsement or recommendation for use.

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1.0 Procedure

1.1 General

Equipment (hardware and related software) used for LSASD activities and equipment that comes into direct contact with the sample media and has the potential to cross contaminate samples will meet quality requirements identified for each piece of equipment. Important factors in establishing quality requirements include the parameters to be measured and the sensitivity and specificity of the detection system used. Quality requirements must include ensuring that equipment is ready for use. Specifically:

- 1.1.1 LSASD maintains adequate equipment to conduct field measurement and laboratory activities.
- 1.1.2 Equipment utilized for field and analytical measurement activities will be capable of achieving the accuracy and precision required by the measurement objectives.
- 1.1.3 When LSASD is required to use equipment outside its permanent control, it will ensure that all relevant LSASD criteria in this procedure are met. Procedures utilized to ensure compliance with the LSASD quality system requirements will be documented and routed to the Division Quality Assurance Coordinator (QAC).
- 1.1.4 Equipment utilized by LSASD are secured at all times, as feasible.
- 1.1.5 Operating instructions and/or manuals from the manufacturer are available for each piece of equipment.
- 1.1.6 Field investigators and laboratory analyst only operate equipment for procedures which they are authorized per the LSASD Operating Procedure Training and Demonstrations of Competency (LSASD PROC-1003) to perform. In the event that a field investigator or laboratory analyst is not authorized for a certain procedure, the investigator or analyst may conduct the activity under supervision of an authorized party.
- 1.1.7 Equipment is handled and maintained in accordance to the manufacturer's operating instructions.

Equipment used for field measurements will be handled, transported, shipped, stored and operated in a manner that prevents damage, gross contamination and deterioration. Decontamination of equipment will be in accordance to procedures described in the LSASD Operating Procedure for Field Equipment Cleaning and Decontamination (LSASD PROC-205) and Field Equipment Cleaning and Decontamination at the FEC (LSASD PROC-206).

1.2 Equipment Inventory

1.2.1 Inventory

The Applied Science Branch (ASB), Branch Field Equipment Managers (BFEMs) are responsible for maintaining a current equipment inventory list for their specific areas. The BFEMs will maintain a comprehensive list of all field measurement and sampling equipment subject to this procedure. Field measurement equipment, including sampling equipment that comes into contact with the sample media and has the potential to cross contaminate samples between stations (i.e., submersible pumps and vacuum chambers), will be included in this inventory. The QAC will maintain the equipment inventory for all laboratory equipment utilized within the LSASD quality system. The list is maintained on the LAN and available for all staff to review. The equipment inventory list for each instrument or piece of equipment will include:

- 1.2.1.1 A description of the property and software, if applicable
- 1.2.1.2 Manufacturer or vendor name
- 1.2.1.3 Model number
- 1.2.1.4 Serial number or other manufacturer identification number
- 1.2.1.5 A unique identifier, known as the LSASD ID Number
- 1.2.1.6 Storage location (e.g., Field Equipment Center, LSASD Laboratory)
- 1.2.1.7 Date received and/or date placed in service, where available.
- 1.2.1.8 Status of the equipment (e.g., surplus, damaged, etc.)
- 1.2.1.9 A reference to the manufacturer's instruction manual title.

1.2.2 Equipment Labeling and Marking

Prior to being placed into the equipment inventory, all equipment covered under this procedure will be inventoried and labeled with a unique LSASD identification number. The identification number will be assigned only to the identified equipment and will not be reused if the equipment is excised or disposed. Equipment that is no longer used or cannot be repaired will be removed from the inventory.

- 1.2.2.1 ASB equipment received after the effective date of this procedure will be assigned a number that includes the date the equipment was received followed by a sequential number starting at 01 (e.g., 031407-01, 031407-02, etc.). BFEMs will ensure that duplicate LSASD ID Numbers are not assigned to equipment.
- 1.2.2.2 LSB analytical equipment will be assigned a unique identifier compatible with the Laboratory's Informational Management System naming conventions. Support equipment will be identified by serial number or a unique identifier depending on the use of the equipment.

1.3 Equipment Maintenance

Maintenance will be categorized as preventative and/or corrective repair. Both approaches should be used to maintain equipment in working order. Each item of field and analytical measurement

equipment will be checked by a qualified individual prior to use. For field equipment, critical spare parts that can easily be installed by field personnel, which cannot be easily obtained while in the field, will be sent out with the equipment during field investigations.

Equipment maintenance will include software upgrades for certain instruments. LSASD management will assign staff to serve as a point of contact for equipment, that may require periodic software upgrades. The point of contact will ensure that software upgrades are conducted on all equipment. The point of contacts will maintain a list of the equipment which will include the serial number, LSASD ID Number, software version, software upgrade dates and the storage location of the equipment. The point of contact will provide the information to the appropriate BFEM or QAC to be included in the equipment inventory. Updates to software program should be included in the appropriate instrument maintenance logs.

1.3.1 Repair and Re-certification for Use

Equipment known or suspected to be defective will be taken out of service and clearly labeled, preferably with a red tag, until it has been repaired and demonstrated by calibration, verification or testing to function properly. When equipment is tagged in the field as defective, the LSASD project leader will notify the appropriate BFEM in writing, either by email or by using the LSASD Field Equipment Tracking System, that equipment requires repair. When analytical equipment is defective, the analyst responsible for the equipment will notify the QAC.

For equipment maintained at the FEC, the BFEM will be responsible for equipment repairs. Upon completion of the repair, the BFEM will notify the FEC contract personnel that the equipment has been returned. The contract personnel will ensure that the equipment is functioning properly prior to it being placed back into service. The BFEMs are responsible for including all documentation associated with the equipment repair in the LSASD (SESD) Field Equipment Tracking System or appropriate maintenance section of the equipment log. This documentation includes written notifications regarding the equipment repair and any information provided from the manufacturer which describes the defect and the repair.

For equipment stored at the LSASD laboratory or stored at the FEC and not routinely handled and maintained by contract personnel, the BFEM, or primary analyst for laboratory equipment, will be responsible for having the equipment repaired. Once repaired, the BFEM or primary analyst will ensure the equipment is functioning properly prior to it being returned to service. The BFEM, or primary analyst, is responsible for placing all documentation associated with the repair of equipment stored at the LSASD laboratory in the LSASD Field Equipment Tracking System or appropriate maintenance section of the equipment maintenance log. This documentation includes the written notifications regarding the equipment repair and any information provided which describes the defect and the repair.

If there is the potential that data collected with defective equipment were adversely impacted, the issue will be handled according to the LSASD Operating Procedure for Complaints and Nonconforming Work Resolution (LSASD PROC-1006).

1.3.2 Required Maintenance

The BFEMs and QAC are responsible for ensuring that equipment maintenance is performed in-house or by an external vendor.

1.4 Equipment Calibration

Prior to being utilized, measurement equipment will be visually inspected for cleanliness and operability and a calibration, and calibration verification or performance check will be conducted to ensure the equipment is in working condition. A post-operation instrument verification check will be performed using the appropriate standard(s) at the end of the day or after all measurements have been taken for a period of operation. When practicable, equipment requiring calibration will be labeled to indicate the status of calibration and the date when re-calibration is due. Calibration and measurement requirements are found in individual measurement procedures. For laboratory analytical equipment not calibrated with each analytical run a calibration log will be maintained with the equipment documenting the most recent calibration.

When equipment or reference standards are calibrated by an outside calibration service, LSASD will ensure the vendor is ISO 17025 accredited or has some other equivalent means for demonstrating competence, measurement capability and traceability.

All reasonable measures will be taken to safeguard equipment from adjustments which would invalidate the measurements following calibration of the equipment. LSASD personnel will handle, transport and store equipment in accordance to manufacturer recommendations. Periodic calibration or performance checks will be conducted to ensure that equipment calibration has not been adversely impacted between measurement locations.

For equipment that is not directly used for field measurement, visual examination, safety checks or, if appropriate, performance checks, will be conducted to ensure the working condition of the equipment. Microscopes, including attachments, will be cleaned and serviced as needed prior to use.

If equipment leaves the direct control of LSASD for a period of time, the BFEMs or QAC will ensure that the function and, where necessary, the calibration status of the equipment is checked and shown to be satisfactory before the equipment is returned to service.

1.4.1 Traceability, Certification, and Verification Records

The program for the calibration or calibration verification of equipment must ensure that, where the concept is applicable, all significant measurements are traceable through certificates of calibration held by LSASD, and/or to National Standards of Measurement. National Institute of Standards and Technology (NIST) traceable standards will be used, if available. For equipment maintained at the FEC and sent off-site for calibration, certificates or other records of calibration will be maintained in a central file at the FEC. Additionally, NIST traceable documentation for buffers, standards, calibration gases or reference materials will be maintained in a central file at the FEC.

For equipment maintained at the LSASD laboratory and sent off-site for calibration, certificates or other records of calibration will be maintained by the QAC. Additionally, NIST traceable documentation for buffers, standards, reagents, calibration gases or reference materials will be maintained at the LSASD laboratory.

LSASD will maintain records of actions taken to verify the quality of equipment whose properties could affect the quality of sampling, measurement and related activities. Examples would be thermometer, calibration standard or buffer verification.

Critical reference materials such as reagents and consumable materials that affect the quality of tests and/or calibrations will be verified according to the procedures described in the LSASD Operating Procedure for Purchasing Services and Supplies (LSASD PROC-1008).

1.5 Equipment Sign-out/Sign-in

All measurement equipment will be signed-out prior to use in the field and signed-in following use in the field. This will be done using the LSASD Field Equipment Tracking System. FEC contract personnel will primarily be responsible for equipment sign-out and sign-in at the FEC. However, in their absence, it is the project leader's responsibility to sign out the measurement equipment. For measurement equipment that is not routinely handled or maintained by contract personnel or equipment stored at the LSASD laboratory, the project leader or field investigator using the equipment is responsible for checking the equipment out and in.

1.6 Documentation and Records

All calibrations or calibration verifications performed in the field will be recorded in the project specific logbook(s) by the individual conducting the calibration or verification and stored in the associated project file. Calibration of equipment conducted by LSASD personnel will be conducted in accordance with the manufacturer's recommendations

When calibrations require correction factors, the correction factors will be documented in instrument operating procedures, equipment logs and written methods (field logbooks).

The BFEMs and QAC are responsible for maintaining a current equipment inventory list for their specific programs. Additionally, they are responsible for auditing and maintaining equipment maintenance, calibration and verification records in the equipment logs.

2 **Definitions**

2.1 Calibration

The set of operations which establish, under specified conditions, the relationship between values indicated by a measuring instrument or measuring system and corresponding known values. The results of a calibration permit the estimation of errors associated with the measurement equipment.

2.2 Calibration Verification

Provides a means of determining that deviations between measured values and known values are within the limits of error defined during calibration. The results provide an indication that the instrument/system is working properly.

2.3 Preventative Maintenance

A program of routine actions such as cleaning, lubrication, adjusting, or testing to keep equipment ready for use. The most important effect of a preventative maintenance program is to ensure measurement system reliability.

2.4 Branch Field Equipment Manager

Applied Science Branch, or field staff, designated by management, who are responsible for ensuring that the procedures for Equipment Inventory and Management are followed.

2.5 Qualified Individual

Individual who has received on the job training and has experience working with specific measurement instruments.

2.6 Equipment Log

Notebook, log book or electronic file that contains a copy of the purchase order, if available, as well as, maintenance, calibration, verification records, performance checks, correction factors and sign-out/sign-in records. Equipment logs will be established for all equipment used for field measurement activities or equipment that comes into direct contact with the sample media and has the potential to cross contaminate samples between sampling stations. The development of equipment logs is the responsibility of the Branch Field Equipment Managers.

2.7 LSASD Field Equipment Tracking System

Electronic database used by the Applied Science Branch to sign-out/sign-in sampling equipment, track equipment use history, and maintain equipment availability status.

3 References

LSASD Operating Procedure Training and Demonstrations of Competency (LSASD PROC-1003), most recent version.

LSASD Operating Procedure for Field Equipment Cleaning and Decontamination (LSASD PROC-205), most recent version.

Field Equipment Cleaning and Decontamination at the FEC (LSASD PROC-206), most recent version.

LSASD Operating Procedure for Complaints and Nonconforming Work Resolution (LSASD PROC-1006), most recent version.

LSASD Operating Procedure for Purchasing Services and Supplies (LSASD PROC-1008), most recent version.

4 Revision History

This table shows changes to this controlled document over time. The most recent version is presented in the top row of the table. Previous versions of the document are maintained by the LSASD QAC.

History	Effective Date
SESDPROC-1009-R0, Equipment Inventory and Management, Original Issue	October 1, 2017
LSASDPROC-1009-R1, Equipment Inventory and Management, replaces SESDPROC-1009-R0 Renamed base don new Division name. Updated names of the laboratory (Laboratory Services or LSB) and field (Applied Science, or ASB) branches throughout the document. Replaced Laboratory Quality Manager, or LQM with Quality Assurance Coordinator or QAC. Editorial changes throughout.	February 28, 2020