

<b>Region 4</b> <b>U.S. Environmental Protection Agency</b> <b>Laboratory Services &amp; Applied Science Division</b> <b>Athens, Georgia</b>	
<b>Operating Procedure</b>	
<b>Title: Equipment Inventory and Management</b>	<b>ID: LSASDPROC-1009-R2</b>
<b>Issuing Authority: Deputy Director, LSASD</b>	
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**Purpose**

This Operating Procedure is specific to the Region 4 Laboratory Services and Applied Science Division (LSASD) to maintain conformance to technical and quality system requirements. This document describes the procedures necessary to demonstrate the operational status and maintain 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 system. This procedure does not address agency defined property management procedures. This procedure covers the approaches and documentation used for the maintenance, calibration, verification and inventory of equipment used for LSASD activities. It 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. 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.
- 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 analysts only operate equipment for procedures for which they are authorized to perform per the LSASD Operating Procedure for Training and Demonstration of Competency (LSASDPROC-1003, most recent version).
- 1.1.7. Equipment is handled and maintained in accordance with the manufacturer's operating instructions.

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

## **1.2. Equipment Inventory**

### **1.2.1. Inventory**

At LSASD the equipment Field Services Branch (FSB), 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.

Obsolete items removed from service will be appropriately retired in the equipment inventory by the responsible staff referenced above.

### **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.** FSB equipment received after the effective date of this procedure will be assigned a number that includes the six-digit date (i.e., MMDDYY) the equipment was received followed by a sequential number starting at 01 (e.g., 031424-01, 031424-02, 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 (LIMS) 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 (defined in Section 2.5) 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. Additionally, maintenance, including software upgrades, may be recommended, or carried out by EPA personnel with prior approval of the BFEMs.

#### **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 and date of removal from service, 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 LSB equipment is defective, the analyst responsible for the equipment will notify the QAC and Laboratory Equipment Manager.

For equipment maintained at the FEC, the BFEM will be responsible for equipment repairs. The LSASD personnel will ensure that the equipment is functioning properly following manufacture or method recommended performance checks prior to it being placed back into service. The BFEMs are responsible for including all documentation associated with the equipment repair in the LSASD 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 following manufacture or method recommended performance checks 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 Complaint Resolution and Control of Nonconforming Work (LSASDPROC-1006, most recent version).

### **1.3.2. Required Maintenance**

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

### **1.4. Equipment Calibration and Standards**

Prior to being utilized, measurement equipment will be visually inspected for cleanliness and operability, and calibration verification or performance check will be conducted to ensure the equipment is in working condition. 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, all calibration documentation will be maintained with the equipment documenting the most recent calibration or in the Laboratory Information Management System (LIMS).

When equipment or reference standards are calibrated by an outside calibration service, LSASD will ensure the vendor is ISO 17025 or ISO 17034 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 with 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**

Detailed procedures for traceability, certification and verification of equipment is documented in Equipment Certifications (LSASDPROC-1011, current version). 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,

when 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.

NIST traceable documentation for standards, buffers, reagents or reference materials will be maintained in a central file at the FEC or in LIMS.

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 (LSASDPROC-1008, most recent version). Laboratory Services Branch (LSB) supplies will be inspected and/or verified in accordance with the LSB Operating Procedure for Screening of Supplies-Quarantine Room (LSBPROC-121, most recent version).

#### **1.4.2. Recertification of Calibration Standards, Buffers and Reagents**

It is the policy of LSASD to allow for recertification of calibration standards, buffers, and reagents. For the laboratory, the Laboratory Operations Quality Assurance Manual (LSBPROC-120, current version) details this process.

For field procedures, standard expiration dates should routinely be checked prior to a project field deployment and discarded upon expiration. If a standard is approaching the expiration date, staff can contact the manufacturer for an updated certificate of analysis or extended expiration date.

The field also allows for recertification of expired standards for field measurement procedures (pH, specific conductivity, ORP, and turbidity) and field laboratory procedures (alkalinity and ferrous iron). Field staff shall complete the Standard Recertification logbook and conduct a comparison evaluation of the expired standard with an unexpired working standard. If the results meet procedure specific acceptance criteria, staff shall label the standard with the Recertification Date and New Expiration Date, not to exceed one year. If the standard fails to meet procedure specific acceptance criteria, then the standard must be discarded. A standard may only be recertified and assigned a new expiration date once. This procedure should be used on a limited basis with Section Supervisor approval.

### **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. Branch FEM or Section FEM will primarily be responsible for equipment sign-out and sign-in at the FEC. 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 and is suitable for producing data of acceptable quality.

### **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**

Field Services 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 documented on the job training and has experience working with specific measurement instruments.

### **2.6. Equipment Log**

Notebook, logbook 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. Logbooks will be documented in accordance with LSASD operating Procedure for logbooks (LSASDPROC-1002, most recent version). 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 Field Services Branch to sign-out/sign-in sampling equipment, track equipment use history, and maintain equipment availability status.

### **3 References**

LSASD Operating Procedure for Logbooks (LSASDPROC-1002), most recent version.

LSASD Operating Procedure for Training and Demonstration of Competency (LSASDPROC-1003), most recent version.

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

LSASD Operating Procedure for Field Equipment Cleaning and Decontamination at the FEC (ASBPROC-206), most recent version.

LSASD Operating Procedure for Complaint Resolution and Control of Nonconforming Work (LSASDPROC-1006), most recent version.

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

LSB Operating Procedure for Screening of Supplies-Quarantine Room (LSBPROC-121), most recent version.

Equipment Certifications (LSASDPROC-1011), most recent version

Revision History

This table shows changes to this controlled document over time. The most recent version is presented in the bottom 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 based on 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
LSASDPROC-1009-R2, <i>Equipment Inventory and Management</i> , replaces LSASDPROC-1009-R1  General: Updated name of the field branch (Field Services Branch or FSB) throughout. Other minor editorial changes throughout. Section 1.3.1: Added language recommended equipment removed from service include date of removal on its tag. Section 2.2: Added language clarifying calibration verifications are intended to produce environmental data of acceptable quality.	December 2025