

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 SESD Document Control Coordinator.

History	Effective Date
<p>SESDPROC-101-R2, <i>Field Specific Conductance Measurement</i>, replaces SESDPROC-101-R1</p> <p>Cover Page: Author was changed from Marty Allen to Ron Phelps.</p> <p>Revision History Changed Field Quality Manager to Document Control Coordinator.</p> <p>Section 1.3 Changed Field Quality Manager to Document Control Coordinator.</p> <p>Section 2 Added requirements for unattended deployment of in-situ monitoring equipment.</p> <p>Section 3.2 Added sentence to paragraph 2 to identify minimum requirements for calibration/verification.</p> <p>Section 3.3 Moved operational check to Section 3.4.</p>	<p>June 13, 2008</p>
<p>SESDPROC-101-R1, <i>Field Specific Conductance Measurement</i>, replaces SESDPROC-101-R0</p> <p>General Deleted all references to SOSA.</p> <p>Updated referenced procedures due to changes in title names and/or to reflect most recent version.</p> <p>Title Page Changed title for Antonio Quinones from Environmental Investigations Branch to Enforcement and Investigations Branch. Changed Bill Cosgrove's title from Acting Chief to Chief.</p>	<p>November 1, 2007</p>

<p>Section 1.3 Updated information to reflect that procedure is located on the H: drive of the LAN.</p> <p>Section 1.4 Alphabetized and revised the referencing style for consistency.</p> <p>Section 2 Added last paragraph regarding stopping measurements due to environmental conditions.</p>	
<p>SESDPROC-101-R0, Field Specific Conductance Measurement, Original Issue</p>	<p>February 05, 2007</p>

TABLE OF CONTENTS

1	General Information.....	5
1.1	Purpose.....	5
1.2	Scope/Application	5
1.3	Documentation/Verification.....	5
1.4	References.....	5
1.5	General Precautions.....	6
1.5.1	<i>Safety</i>	6
1.5.2	<i>Procedural Precautions</i>	6
2	Quality Control	7
3	Field Specific Conductance Measurement Procedures	8
3.1	General.....	8
3.2	Instrument Calibration and Verification.....	8
3.3	Sample Measurement Procedures.....	9
3.4	Operational Check	9

1 General Information

1.1 Purpose

This document describes procedures, methods and considerations to be used and observed when conducting field specific conductance measurements in aqueous phase environmental media, including groundwater, surface water and certain wastewaters.

1.2 Scope/Application

The procedures contained in this document are to be used by field investigator's when measuring the specific conductance of aqueous phase environmental media in the field. On the occasion that SESD field investigator's determine that any of the procedures described in this section cannot be used to obtain specific conductance measurements of the media being sampled, and that another method must be used to obtain said measurements, the variant instrument and/or measurement procedure will be documented in the field log book, along with a description of the circumstances requiring its use.

1.3 Documentation/Verification

This procedure was prepared by persons deemed technically competent by SESD management, based on their knowledge, skills and abilities and has been tested in practice and reviewed in print by a subject matter expert. The official copy of this procedure resides on the H: drive of the SESD local area network. The Document Control Coordinator is responsible for ensuring the most recent version of the procedure is placed on the H: drive and for maintaining records of review conducted prior to its issuance.

1.4 References

SESD Operating Procedure for Equipment Inventory and Management, SESDPROC-108, Most Recent Version

SESD Operating Procedure for Logbooks, SESDPROC-010, Most Recent Version

United States Environmental Protection Agency (US EPA). 2001. Environmental Investigations Standard Operating Procedures and Quality Assurance Manual. Region 4 Science and Ecosystem Support Division (SESD), Athens, GA

US EPA. Safety, Health and Environmental Management Program Procedures and Policy Manual. Region 4 SESD, Athens, GA, Most Recent Version

1.5 General Precautions

1.5.1 Safety

Proper safety precautions must be observed when conducting field specific conductance measurements. Refer to the SESD Safety, Health and Environmental Management Program Procedures and Policy Manual and any pertinent site-specific Health and Safety Plans (HASPs) for guidelines on safety precautions. These guidelines, however, should only be used to complement the judgment of an experienced professional. Address chemicals that pose specific toxicity or safety concerns and follow any other relevant requirements, as appropriate.

1.5.2 Procedural Precautions

All field specific conductance measurements pertinent to the sampling event, including a unique, traceable identifier for the instrument, such as a property number or serial number, should be recorded in the field log book for the event. All records should be entered according to the procedures outlined in the SESD Operating Procedure Logbooks (SESDPROC-010).

Care should be taken not to contaminate standards and samples and verify the expiration date of all standards prior to use. All meters should be calibrated, operated and maintained according to the manufacturer's specifications.

2 Quality Control

All specific conductance meters will be maintained and operated in accordance with the manufacturer's instructions and the SESD Operating Procedure for Equipment Inventory and Management (SESDPROC-108). Before a meter is taken to the field, it will be properly calibrated or verified, according to Section 3.2 of this procedure, to ensure it is operating properly. These calibration and verification checks shall be documented and maintained in a logbook.

The ambient temperature in the immediate vicinity of the meter should be measured and recorded in the field logbook to insure the instrument is operated within the manufacturer's specified range of operating temperatures. For instruments that are deployed for in-situ measurements, the temperature of the medium being monitored should be measured and recorded in the logbook prior to deployment. *In-situ monitoring equipment may be utilized in unattended deployments where autonomous logging may preclude temperature measurement prior to deployment. Because in situ instrumentation generally has a wide range of operating temperature, the field investigator may utilize professional judgment in determining if the operating environment is suitable for unattended deployment.*

If at any time during a field investigation, it appears that the environmental conditions could jeopardize the quality of the measurement results, the measurements will be stopped. This will be documented in the field logbook.

3 Field Specific Conductance Measurement Procedures

3.1 General

Specific conductance is a measure of the ability of an aqueous solution to conduct an electric current and is customarily reported in micromhos per centimeter ($\mu\text{mhos/cm}$) at 25°C. It is important to note that if the specific conductance measurements are for NPDES reporting purposes, the meter and conductivity cell should be verified by comparing against a laboratory meter with a platinum-electrode type conductivity cell.

3.2 Instrument Calibration and Verification

The meter will be calibrated or verified in accordance with the manufacturer's instructions before it is taken into the field and prior to actual use.

Conductivity is affected by temperature; therefore, temperature should be read first so that appropriate adjustments can be made in accordance with the manufacturer's instructions and the method. The following calibration/verification guidelines are minimum requirements:

1. Verify the meter's internal temperature sensor (thermistor) against a National Institute of Standards and Technology (NIST) traceable thermometer and note any differences between the thermistor and the NIST-traceable thermometer in the logbook. If the temperatures do not agree within $\pm 4^\circ\text{C}$, the unit must be repaired or replaced. Alternatively, if the meter can be used in a manual temperature compensation mode, the NIST-traceable thermometer may be used for temperature readings and the necessary corrections applied. Check and record the temperatures of the standards and the samples.
2. Rinse the probe with de-ionized water and blot dry before conducting the following calibration and verification checks.
3. Immerse the probe in the first standard solution and calibrate or verify the meter against that solution. After the initial standard, calibrate and/or verify the meter using additional standards, as appropriate. Rinse the probe with de-ionized water and blot dry or otherwise remove excess rinse water between the different standards. Record the standard values/temperatures used to calibrate or verify the meter.

Note: Standards must reflect the anticipated specific conductance of the media being measured.

4. If the meter is not accurate to within $\pm 10\%$ of the standard solution(s) known values, the cell should be repaired or replaced, if possible. If this

condition can be corrected by adjusting the cell constant of the probe, refer to the instruction manual and make the adjustment.

3.3 Sample Measurement Procedures

The following procedures must be followed when conducting field specific conductance measurements of grab samples:

1. Collect the sample, check and record its temperature.
2. Correct the instrument's temperature adjustment to the temperature of the sample (if required).
3. Immerse the probe in the sample keeping it away from the sides and bottom of the container. It is important that the center portion of the probe be wetted by the sample.
4. Allow meter to stabilize. Record the results in a log book.
5. Rinse probe with de-ionized water.

The following procedures should be followed when conducting in-situ field specific conductivity measurements:

1. Place the probe into the media to be measured and allow the specific conductivity and temperature readings to stabilize. Once the readings have stabilized, record the measurements in the logbook.
2. When deploying meters for extended periods of time, ensure the measurement location is representative of average media conditions.

3.4 Operational Check

A post-operation instrument verification check should be performed using the appropriate standard(s) at the end of the day or after all measurements have been taken for a particular period of operation. These measurements must be recorded in the field log book.