



## Environmental Management Consolidated Business Center Ash Fall Project

Control of Measuring and Test Equipment

Procedure: AFP-AP-17  
Revision 0, 04/21/16

### Control of Measuring and Test Equipment

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**Revision: 0**

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## 1.0 PURPOSE

This procedure establishes the responsibilities and process for the identification, control, calibration, storage, use, and maintenance of measuring and test equipment (M&TE).

## 2.0 SCOPE

The scope of this procedure includes M&TE that are used for process monitoring, data collection, inspection, and acceptance testing by the Department of Energy Environmental Management Consolidated Business Center (EMCBC) Ash Fall Project supporting the Office of River Protection (ORP) Program.

## 3.0 APPLICABILITY

This procedure applies to EMCBC Ash Fall Project personnel who control, calibrate, store, maintain, or use M&TE.

This procedure does not apply to standard commercial equipment (e.g., rulers, tape measures, levels, laboratory glassware, etc.) that provides adequate accuracy for the intended work.

## 4.0 REQUIREMENTS and REFERENCES

### 4.1 Requirements

4.1.1 EM-QA-001, *EM Quality Assurance Program (QAP)*

4.1.2 ASME NQA-1-2008/2009a, *Quality Assurance Requirements for Nuclear Facility Applications*

### 4.2 References

4.2.1 AFP-QAPP-01, *Quality Assurance Project Plan (QAPP)*

4.2.2 AFP-AP-11, *Procurement Document Control*

4.2.3 AFP-AP-19, *Corrective Actions*

4.2.4 AFP-AP-20, *Quality Assurance Records*

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## 5.0 DEFINITIONS and ACRONYMS

- 5.1 Accuracy – The degree of agreement of the measurement with the true value of the quantity measured.
- 5.2 Calibration – The process of determining the performance parameters of an instrument or system by comparing it with measurement standards. Adjustment may be a part of a calibration, but not necessarily. A calibration assures that a device or system will produce results which meet or exceed some defined criteria with a specified degree of confidence.
- 5.3 Calibration Check – An examination performed and documented to verify that M&TE is functioning and operating within specified tolerances.
- 5.4 Calibration Standard – A material measure, measuring instrument, reference material, or system intended to define, realize, conserve, or reproduce a unit or one or more known values of a quantity to serve as a reference.
- 5.5 Measuring and Test Equipment – Devices or systems used to calibrate, measure, gage, test, or inspect in order to acquire data to verify conformance to specified requirements.
- 5.6 Nationally Recognized Standard – The National Institute of Standards and Technology (NIST) is the agency recognized in the United States for the establishment of “Nationally Recognized Standards.” NIST has the responsibility to develop, maintain, and retain custody of the “National Standards of Measurement” and to provide the means and methods for making measurements consistent with those standards.
- 5.7 Out of Calibration – A term that refers to M&TE that produces results known to be in error, M&TE that has not been recalibrated within the required time period, or M&TE for which the calibration status cannot be determined.
- 5.8 Reference Standard – Generally of the highest metrological quality available at a given location, from which measurements made at that location are derived.
- 5.9 Tolerance – A quantity of acceptable level of accuracy.
- 5.10 Traceability – The property of measurement that can be related by an unbroken chain of calibrations.

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## 6.0 RESPONSIBILITIES

### 6.1 Responsible Ash Fall Project Staff

6.1.1 Selects the appropriate M&TE for use.

### 6.2 M&TE Coordinator (QA Lead or Ash Fall Project Staff)

6.2.1 Maintains an up-to-date list of M&TE.

6.2.2 Ensures M&TE is appropriately labeled.

### 6.3 M&TE User (Ash Fall Project Staff)

6.3.1 Ensures M&TE is calibrated prior to use.

6.3.2 Completes the M&TE Justification, Form 17-1 as appropriate.

6.3.3 Handles, stores, and protects M&TE to ensure accuracy is maintained.

6.3.4 Documents the use of M&TE.

## 7.0 GENERAL INFORMATION

None.

## 8.0 PROCEDURE

### 8.1 M&TE Selection

8.1.1 The responsible Ash Fall Project Staff selects the appropriate M&TE for use based on the following.

- A. Operational range exceeds anticipated measurement range capabilities.
- B. Environmental considerations under which the equipment will be expected to perform.
- C. Meets the accuracy requirements for the measurement.

8.1.2 The M&TE Coordinator maintains a list of M&TE that includes the following.

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- A. Unique identification of the M&TE.
- B. Description or type of M&TE.
- C. Date calibrated and recalibration due date or interval, as appropriate.
- D. Calibrated tolerance or accuracy.
- E. Indication of special/restricted use status (One Time Only M&TE, Non-retrievable M&TE, or a calibration frequency based on the number of samples rather than a specific timeframe).

## 8.2 Establishment of Standards for In-House Calibrated M&TE

- 8.2.1 The M&TE User ensures calibration standards are traceable to nationally recognized standards.
- 8.2.2 If no nationally recognized standard exists, the M&TE User identifies the basis for calibration on the M&TE Justification, Form 17-1.
- 8.2.3 The M&TE User ensures that standards have an accuracy four times greater than the required accuracy of the M&TE or standard to be calibrated.

NOTE: Use of calibration standards with accuracy less than four times greater than the required accuracy of the M&TE or standard being calibrated is allowed if use of these standards can be shown to adequately meet the tolerance requirements and if reference calibration standards or standards with greater accuracy do not exist or are unavailable.

- 8.2.4 If a calibration standard with accuracy less than four times greater than the required accuracy of the M&TE or standard being calibrated is utilized, the M&TE User will complete the M&TE Justification, Form 17-1 and address the following.
  - A. The modified uncertainty of the M&TE to reflect the increased uncertainty in the reference standards output.
  - B. Information with respect to accuracy including an explanation when the accuracy is limited and why the accuracy is adequate for the calibration standard or M&TE's intended use.

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## 8.3 Calibration of M&TE

8.3.1 The M&TE User ensures that M&TE is calibrated, adjusted, maintained, and/or standardized as appropriate, prior to first use and again at established intervals either by a calibration service supplier or in-house using approved implementing procedures.

8.3.2 The M&TE User ensures devices are calibrated at intervals specified by the manufacturer.

8.3.3 When a calibration interval other than the one recommended by the M&TE manufacturer is designated, the M&TE User:

A. Documents the justification for the chosen calibration interval on an M&TE Justification, Form 17-1.

B. Includes the following information in the justification:

- The alternate recalibration due date or frequency
- The reasons for altering the previously recommended frequency
- The methods to verify the validity of collected data (e.g., such as redundant measurements)

C. Ensures the justification is based on such criteria as the type of equipment, stability characteristics, required accuracy, precision, intended use, degree of use, and/or other conditions affecting measurement control.

D. Ensures that the modified due date is indicated on the M&TE sticker and on the M&TE list.

8.3.4 The M&TE User calibrates and adjusts M&TE that includes software or programmable hardware as a unit.

8.3.5 The M&TE User recalibrates M&TE, as appropriate, when software that affects calibration has been updated.

8.3.6 The M&TE User ensures calibration certificates/reports include the following:

A. The unique identification of the M&TE calibrated

B. Date calibrated

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- C. Calibration data
- D. Recalibration due date or calibration interval/frequency
- E. Identification of the procedure used to calibrate the M&TE
- F. Identification of and traceability to the calibration standards used for the calibration
- G. Results of the calibration and statement of acceptability
- H. As-found condition of the M&TE
- I. Individual performing the calibration
- J. Reference to a corrective action report, if generated as a result of the calibration

8.3.7 When a supplier is used for calibration services, the M&TE User ensures the procurement of calibration supplier services is performed in accordance with AFP-AP-11, *Procurement Document Control*.

8.3.8 For one-time-only M&TE, the M&TE User ensures the equipment is calibrated before and after use.

8.3.9 The M&TE User processes the M&TE Justification, Form 17-1 and calibration certificates/reports in accordance with Section 9.0.

8.3.10 The M&TE User notifies the M&TE Coordinator of any calibration M&TE Justification, Form 17-1 and calibration certificates/reports being processed.

8.3.11 Upon evidence that the M&TE has received an acceptable calibration, the M&TE Coordinator:

- A. Attaches the calibration sticker to the M&TE such that the function or accuracy of the equipment is not impaired. If the device is too small to attach a sticker, attach the sticker to a storage container and ensure the container stays within the proximity of the device.
- B. For M&TE with a limited calibration, ensures the limitations are identified on the calibration sticker.
- C. Updates the calibration status on the M&TE List and processes the list in accordance with Section 9.0.

8.4 Storage of M&TE

8.4.1 The M&TE User ensures:

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- A. The M&TE is stored consistent with manufacturer's recommendations and are handled and protected to maintain accuracy and to reduce the likelihood of damage or loss.
- B. Access to the M&TE storage area is adequately controlled by using methods such as locked cabinets, rooms, buildings, or other means that provides appropriate protection.

## 8.5 Usage of M&TE

### 8.5.1 The M&TE User:

- A. Controls the selection of the M&TE to ensure it is the proper type for the intended use.
- B. Ensures the M&TE is used within its calibrated capabilities (e.g., range, accuracy, tolerance).
- C. Checks the M&TE for any physical damage.
- D. Verifies the M&TE is not past its calibration due date.
- E. Documents the use of M&TE, including the use of standards, in a database or logbook, and includes the M&TE unique identifier and the data collected with the M&TE.
- F. Performs a calibration check or recalibration when M&TE is suspect, and documents the results in a database or log book.

## 8.6 Processing Out-of-Calibration Conditions

### 8.6.1 When any of the following conditions occur, the M&TE User initiates a corrective action report in accordance with AFP-AP-19, *Corrective Actions*.

- A. The M&TE produces results known to be in error (e.g., outside of specified tolerances).
- B. The calibration status of the M&TE cannot be determined.
- C. The M&TE has been subjected to recalibration procedures or periodic checks and found to be out of the allowed tolerances.

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- D. M&TE is lost or damaged.
- E. M&TE is abandoned in place.
- 8.6.2 The M&TE User initiates a corrective action report in accordance with AFP-AP-19, *Corrective Actions* and conducts an evaluation of the acceptability of data collected since the previous calibration.
- 8.6.3 The M&TE User controls out-of-calibration conditions by doing one or more of the following:
  - A. Apply an Out of Service tag or other similar tag to the M&TE. Ensure tags include:
    - Description of the M&TE
    - Unique identifier of the M&TE
    - Reason for applying the tag
    - Name of the person tagging the M&TE
  - B. Segregate the M&TE by moving it to an area appropriately identified area.
- 8.6.4 The M&TE User obtains calibration of the M&TE.
- 8.6.5 The M&TE User repairs or replaces M&TE that is consistently found to be out-of-calibration.
- 8.7 Removal of M&TE from Service
  - 8.7.1 If it is necessary to remove the M&TE from service, the M&TE User:
    - A. Removes any labels or indications that the M&TE is calibrated.
    - B. Notifies the M&TE Coordinator of the removal
  - 8.7.2 The M&TE Coordinator updates the M&TE List and processes the list in accordance with Section 9.0.

## 9.0 RECORDS

- 9.1 The approved document in its entirety shall be submitted by the EMCBC Coordinator to records in accordance with AFP-AP-20, *Quality Assurance Records*.

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9.2 The following are considered Lifetime QA Records:

- M&TE List
- M&TE Justification form
- Calibration certificates/reports

## 10.0 FORMS USED

Form 17-1 – M&TE Justification

## 11.0 ATTACHMENTS

None.

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## Form 17-1 – MT&E Justification

<b>Ash Fall Project AFP-AP-17, Form 17-1</b>	<b>M&amp;TE JUSTIFICATION</b>	<b>Page    of</b>
Date:	M&TE Description:	M&TE ID:
Description of Justification:		
Initiator Printed Name:	Initiator Signature:	Date:
Responsible Ash Fall Project Staff Printed Name:	Responsible Ash Fall Project Staff Signature:	Date:

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**Form 12-1 – Record of Revision**

DOCUMENT: AFP-AP-17, *Control of Measuring and Test Equipment*

Revision Number	Description of Changes	Revision on Pages	Effective Date
0	Initial Issue	All	04/21/2016