



Sandia National Laboratories

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**SANDIA NATIONAL LABORATORIES
CIVILIAN RADIOACTIVE WASTE MANAGEMENT
TECHNICAL PROCEDURE (TP)**

**TP-249
Revision 02**

**Maintenance, Verification and Rejection
Criteria of Instrumentation**

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REVISION HISTORY

Rev.	Effective Date	Change Summary
00	9/1/95	Initial issue
01	9/10/98	Minor editorial corrections and update to current requirements
02	04/26/04	Modified per QAIP20-1, Revision 09, to address issues raised in CR2035, 3/9/04.



Table of Contents

<u>Section</u>	<u>Page</u>
1.0 SCOPE.....	4
2.0 OBJECTIVES AND PRIMARY TASKS	4
3.0 RESPONSIBILITIES	4
4.0 QUALIFICATION PREREQUISITES	4
5.0 DEFINITIONS/ACRONYMS.....	4
6.0 PROCESS	5
6.1 Instrument Maintenance	5
6.2 Instrument Performance Verification	5
6.3 Instrument Repair or Replacement	6
7.0 RECORDS.....	6
8.0 REFERENCES	7
APPENDIX - FORMS	8-9



1.0 SCOPE

Sandia National Laboratories (SNL) is responsible for rock mechanics field experiments to monitor and characterize the Exploratory Studies Facility (ESF) in support of the Yucca Mountain Project (YMP). These experiments include installing and monitoring instrumentation that measures the long-term in situ stability of rock units penetrated by ESF excavations.

This Technical Procedure (TP) applies to all SNL YMP personnel and contractors who will be involved in SNL ESF experiments using instrumentation. This TP defines the process for maintaining the instruments, verifying their function and performance, and rejecting instruments and erroneous data generated by malfunctioning instruments.

2.0 OBJECTIVES AND PRIMARY TASKS

The objective of this TP is to facilitate the maintenance of installed instrumentation. Implementation of this procedure will verify continuity of instrumentation performance by scheduled evaluation and analysis of output data and it will provide criteria for the documentation and removal of erroneous data. It will provide criteria to evaluate gage function and instrument problems identified in the data.

3.0 RESPONSIBILITIES

The Principal Investigator (PI) or PI designee is responsible for assuring and documenting that individuals assigned to install data collection instrumentation and wiring have read and are properly trained to this procedure before these individuals initiate work.

4.0 QUALIFICATION PREREQUISITES

The following prerequisites are required when using this TP:

- A current version of this TP is available for use.
- Measuring and Test Equipment (M&TE) used will have a current calibration

5.0 DEFINITIONS/ACRONYMS

ESF	Exploratory Studies Facility
M&TE	Measuring and Test Equipment
PI	Principal Investigator
QA	Quality Assurance
QAIP	Quality Assurance Implementing Procedure
SNL	Sandia National Laboratories
TCO	Test Coordination Office
TP	Technical Procedure



6.0 PROCESS

6.1 Instrument Maintenance

Instrument/instrumentation maintenance includes all activities related to examination of output data for the purpose of assuring function and quality of the data and any activity involved in repair, recalibration and/or full replacement of instruments discovered to be suspect or malfunctioning.

All instruments will undergo some kind of maintenance. Instrument maintenance may be limited to a review of the data plots by the PI or PI designee or may be as extensive as a full replacement of the instrument. The extent of the instrument maintenance will be dependent upon scheduling, instrument access, or test status. The type and extent of instrument maintenance is determined by the PI or PI designee.

Each instrument station or test will be scheduled for preventive instrument maintenance as requested by the PI or PI designee. The PI or PI designee will be responsible for assigning maintenance activities and tracking equipment performance for data traceability.

Tape extensometers, extensometers, thermocouples or other temperature sensors, stressmeters, heat flux, humidity, remote closure, air velocity, acoustic emissions, pressure, flow, and oxygen sensors are examples of instruments that will be maintained.

Instrument maintenance is not limited to these gage types and will include additional gage types as they come on-line.

6.2 Instrument Performance Verification

Instrument performance verification will be conducted using the following process:

1. Obtain plots of the data and listing of the data for the appropriate instrument(s) for the period of performance being examined.
2. Review the data and plots with regard to both established rejection criteria and threshold criteria for the particular instruments. These criteria may include:
 - (a) gage within linear range or specified operating range
 - (b) data trends/gage behavior consistent with expectations
 - (c) comparison to previous measurements
 - (d) presence of alarm flags for malfunction indicators in data output tables
 - (e) presence of alarm flags for threshold indicators in data output tables



3. Complete the Instrument Maintenance Record (Appendix A):
4. Transmit the Instrument Maintenance Record to the PI or PI designee for signature approval.
5. If the Instrument Maintenance Record indicates conditions that exceed rejection criteria or threshold criteria, the PI or PI designee will review the maintenance record and take the appropriate action which may include:
 - (a) determining the impact on previous data
 - (b) scheduling further maintenance observation
 - (c) initiating physical inspection of the instrumentation
 - (d) scheduling instrument repair or replacement
 - (e) informing appropriate personnel/organizations within YMP and process the condition in accordance with the requirements of AP-16.1Q, *Condition Reporting and Resolution*

6.3 Instrument Repair or Replacement

The PI or PI designee will identify instruments to be repaired or replaced and assign the action. Process the action in accordance with the requirements of AP-12.1Q, *Control of Measuring and Test Equipment and Calibration Standards*.

Prior to initiating the repair, any baseline reference measurement that can be made to preserve the data trend should be made. The action will be documented on the Instrument Repair or Replacement Record (Appendix B).

After the repair/replacement, new baseline zero measurements are made using manual reading instruments or through the datalogger equipment. Document any data offsets on the Instrument Repair or Replacement Record (Appendix B).

7.0 RECORDS

Records and record packages, including corrections and changes thereto, generated as a result of implementing this procedure will be prepared and submitted as QA records (QA:QA) to the RPC in accordance with AP-17.1Q, *Records Management*, and AP-SIII.3Q, *Submittal and Incorporation of Data to the Technical Data Management System*.

QA records generated by this procedure include:

- Instrument Maintenance Record (Appendix A)
- Instrument Repair or Replacement Record (Appendix B)



8.0 REFERENCES

1. AP-12.1Q, *Control of Measuring and Test Equipment and Calibration Standards*
2. AP-16.1Q, *Condition Reporting and Resolution*
3. AP-17.1Q, *Records Management*
4. AP-SIII.3Q, *Submittal and Incorporation of Data to the Technical Data Management System*
5. QAIP 20-1, *Technical Procedures*

The most current version of the reference procedures in place at the time of work performance shall apply.



INSTRUMENT REPAIR OR REPLACEMENT RECORD

DATE	STATION LOCATION	INSTRUMENT TYPE	INSTRUMENT UNIQUE ID	*REPAIRED/REPLACED BY

DESCRIPTION OF ACTIVITIES:

BASELINE READINGS:

	Valve
BEFORE	
AFTER	
OFFSET	

M&TE ID	M&TE Recall Date

PI Review: _____
Print

_____ Signature

Date: _____

***Signature above indicate that the individual has read and can demonstrate proficiency in the use of the latest version of TP-249**