CENTER FOR NUCLEAR WASTE REGULATORY ANALYSES TECHNICAL OPERATING PROCEDURE	Proc. TOP-006 Revision 0 Page 1 of 9

Title PROCEDURE FOR OBTAINING SEISMIC ROCK MECHANICS TEST SPECIMENS FROM THE FIELD

EFFECTIVITY AND APPROVAL

Revision 0 of this procedure became effective on December 7, 1989. This procedure consists of the pages and changes listed below.

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ALL	-	12/07/89

Supersedes Procedure No. None

Approvals

Written By	Date	Technical Review	Date
[signature]	12/6/89	[signature]	12/6/89
Quality Assurance	**Date**	**Cognizant Director**	**Date**
[signature]	12/7/89	[signature]	12/7/89

CNWRA Form TOP-1

PROCEDURE FOR OBTAINING SEISMIC ROCK MECHANICS TEST SPECIMENS FROM THE FIELD

1. Purpose

The purpose of this procedure is to outline requirements for obtaining test specimens from the field for use in evaluating joint properties of tuff rock in the laboratory.

2. Scope and Application

This procedure describes the methods and equipment necessary for extricating specimens from a field/ground/quarry source, the requirements for selecting and obtaining specimens, packaging, shipping, and storage requirements, and field data/identification requirements.

2.1 Applicable Documents and References

The following documents form a part of this procedure to the extent they apply:

2.1.1 Center Technical Operating Procedures;

2.1.2 Center Quality Assurance Manual (CQAM);

2.1.3 Center Project Plan for Seismic/Rock Mechanics Project or other Center Project Plans;

2.1.4 Technical reports and publications relating to items of consequence in this procedure.

2.2 Acceptable Specimens

The specimens described in this procedure are to be used to establish and characterize rock-joint properties of rock. Accordingly, specimens selected and obtained from the field shall have naturally occurring joints or fractures across the specimen which, to the extent practicable, have not been disturbed in the process of removing and transporting it.

3. Responsibility

(1) The cognizant Principal Investigator of the project shall be directly responsible for the implementation of this procedure. In cases where the Principal Investigator is not a member of the CNWRA, the Project/Element Manager shall retain this responsibility.

(2) The cognizant Principal Investigator shall be responsible for the compilation, storage, and retrieval of records prepared in response to this procedure.

(3) The Center Director of Quality Assurance is responsible for providing independent surveillance, review or audits to verify implementation of this procedure.

4. Equipment

4.1 Prying equipment: crow bars, wrecking bars, wedges, sledge hammers, shovels, coring bits, rock drills, etc.

4.2 Surface preparation equipment: rock hammers, stone chisels, chain saws with rock-cutting blades, etc.

4.3 Shipping equipment: banding straps and applicators, wooden pallets (including boltable pairs of boards with bolts), protective fiber mats, identification tags with wire straps, plastic bags or wrapping material (with tape) of thickness sufficient to maintain integrity during shipping and storage, etc.

4.4 Miscellaneous equipment: rock bolts, measuring scales, magnifying glass, Brunton compass, etc.

5. Procedure

5.1 Description

An identification tag number shall be given to each specimen and the following information (to the extent that it is

known) shall be recorded on CNWRA Form RM/S-1.89, and incorporated into Center field notebook before the specimen is removed:

5.1.1 Identification Number: A unique number assigned by the Principal Investigator.

5.1.2 Location: state, county, landowner name, quarry name, geographic coordinates (e.g., latitude and longitude).

5.1.3 Stratigraphic Unit: member, formation, group, system.

5.1.4 Identification of the horizon or bed from which the specimen will be collected in relation to other horizons or beds present at the outcrop, exposure, or excavation surface.

5.1.5 Description of the specimen lithology - rock, color, texture, porosity, mineralogy, structure, and rock type.

5.1.6 Description of the joint orientation(s) (dip and strike), mineral coatings, joint opening width, lateral extent, apparent relief (roughness).

5.1.7 Rock properties: density, strength, permeability, porosity.

5.1.8 Approximate specimen size: in inches - length (l) and width (w) and height (h).

5.1.9 Field or laboratory notebooks shall contain the following identification information: date of entry; full name, initials, or assigned stamp of person(s) performing work, and any additional information pertinent to the field work. See Center Quality Assurance Procedure QAP-001 on Scientific and Laboratory Notebooks for specific requirements of controlled Center notebooks.

5.2 Removal

Specimen removal shall be accomplished as deemed feasible following visual inspection of the target area(s), exposed formation surfaces, or residual materials.

5.2.1 Specimen size: It is desirable that specimens be such that:

5.2.1.1 A naturally occurring joint in the specimen will allow a proper laboratory specimen to be obtained. It is desirable that this naturally occurring joint be approximately in the middle plane of the specimen in the test configurations.

5.2.1.2 The size of the specimen to be taken from the field will be specified by the Principal Investigator/Project Manager.

5.2.2 The target specimen shall be:

5.2.2.1 Marked to indicate orientation prior to removal.

5.2.2.2 Removed from the ground by prying with an appropriate tool, and/or cutting with a saw or drilling a perimeter for subsequent prying.

5.2.2.3 Lifted from the ground in a manner so as to maintain the surfaces of the joint-bounded blocks in contact and to protect the target joint from damage.

5.2.2.4 Measured and examined for suitability for eventual shaping into an acceptable laboratory specimen.

5.3 Shipping

Acceptable specimens shall be:

5.3.1 Banded to a pallet in a manner whereby they may be lifted without affecting the coherence of the joints.

5.3.1.1 Fiber mats or other stress-distributing material may be used to protect the specimen from the bands.

5.3.1.2 Handles may be attached to the banding material on the pallets. The pallets may be doubled with spaces, so that a fork lift, or similar power equipment, may be used to lift the specimen.

5.3.1.3 Boards in pairs, connected by bolts, may be used as clamps to ensure that the specimen does not split at the joint during transport. (Care must be exercised to ensure that the bolts are not excessively tightened so as to alter the joint due to the application of compressive stresses).

5.3.2 Tagged for shipment to a destination appropriate for laboratory preparation or to a designated storage area.

6. Identification and Storage

6.1 All specimens to be stored shall be packaged in plastic bags to protect against atmospheric alteration of the rock material and its properties. (It may prove expedient to package most, if not all, of the specimens in the field.)

6.2 All specimens to be stored shall be tagged with a plastic envelope marked (using indelible fluid) on the outside with

the specimen Identification number (I.D.#). The plastic envelope shall be wired to the pallet or through the strap. The plastic envelope shall contain the information (to the extent that it is available) outlined in Form CNWRA-RM/S-1.89.

7. Deviation from Procedures

Although Center Technical Operating Procedures and other Center-prescribed procedures will be utilized and the characterizations documented, deviation from established and controlled procedures may be necessary. In such cases, no deviation and nonconformance report is required. Prior to a deviation from this procedure, the Principal Investigator or Element Manager shall approve of the change. Concurrence of the deviation given shall be obtained in writing from the same group approving the original procedure, and those approvals shall be in the scientific notebook.

8. Records

8.1 The laboratory notebook or other device used to record the results of geological characterizations shall contain the following information:

(1) Date

(2) Full name, initials or assigned stamp of individual(s) performing the characterization work

(3) Method of characterization utilized, including any deviation from established procedures

(4) Identification Number of specimen, if applicable (This number should be entered at the top of the page).

(5) Equipment used

(6) Results

8.2 Each laboratory project task will have its own controlled laboratory notebook with bound and numbered pages, or another method to capture the results of the work. The lab notebook is the responsibility of the Principal Investigator until project completion or termination. At that point, the project lab notebook(s) are retained as are other results, in appropriate Center files as primary evidence of work accomplishment. Copies of lab notebook pages may be made, but the lab notebook remains Center property.

8.3 Records generated in the implementation of this procedure shall be maintained by the Center as objective evidence of the proper implementation of this procedure.

9. Control of Samples

Geologic samples under the control of the Center shall be kept in a cabinet or equivalent container if not being utilized in project work, a test, or being characterized.

I.D. No._____

FIELD SAMPLE SPECIMEN INFORMATION
Field Information

1. Location: County, State_____
Landowner_____
Quarry Name_____

2. Geologic Information: Member_____
Formation_____
Group_____
System_____

3. Rock Description: Lithology_____
Structure_____
Texture_____
Mineralogy_____
Color_____
Grain Size_____
Comments_____

4. Joint Description: Orientation_____
Width_____
Lateral Extent_____
Apparent Relief_____
Mineral Coating_____

5. Rock Properties:

	Parameter:	How Obtained:	Units:
Density			
Strength			
Permeability			
Porosity			
Other:			

6. Specimen: Size - l_____", w_____", h_____", (S.I.___x___x___)
Joint - length_____", Gap Size_____"

7. Sketch and Comments: Date Stored _____

Signed_____
Cognizant Technical Staff

Date_____

INSTRUCTIONS: Fill-in above to the extent that it is known on indicated date and include copy in the laboratory notebook.

CNWRA Form RM/S-1.89