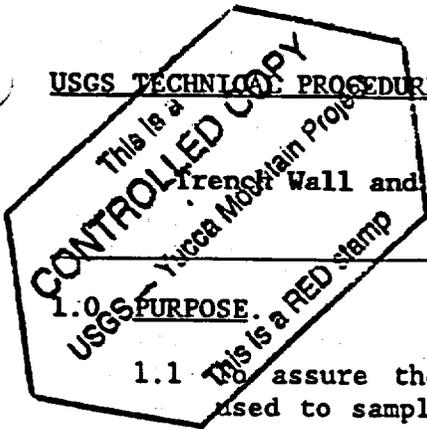


USGS TECHNICAL PROCEDURE GP-27, R1



Yucca Mountain Wall and Natural Outcrop Sampling for Coordinated Studies

1.0 PURPOSE.

1.1 To assure the accuracy, validity, and applicability of the methods used to sample hydrogenic or other types of deposits, this procedure provides a guide for USGS personnel and contractors to perform the described activity. From this procedure, the Department of Energy (DOE) and the Nuclear Regulatory Commission (NRC) can evaluate these activities for meeting requirements of the NNWSI Project, and competent, trained personnel can reproduce the work.

1.2 This procedure describes the components of the work, the principles of the methods used, and their limits. It also describes the detailed methods to be used for calibration, operation and performance verification of any equipment. In addition, it defines the requirements for data acceptance, documentation, and control; and it provides a means of data traceability.

2.0 SCOPE OF COMPLIANCE.

2.1 This procedure applies to all USGS personnel and their contractors who may perform work referred to in Para. 1.1, or use data obtained from this procedure if the data are deemed to potentially affect public health and safety as related to a nuclear waste repository.

2.2 All data derived from this procedure that are presented to support licensing of the NNWSI Project repository, and any equipment calibrations or recalibrations that may be required shall be in accordance with this technical procedure. Variations are allowed only if and when this procedure is formally revised, or otherwise modified, as described in Section 8.

3.0 PERSONNEL RESPONSIBILITIES. The Principal Investigator (PI) is responsible for assuring full compliance with this procedure. Per QMP-2.02 and QMP-2.03, the PI shall require that all personnel assigned to work under this procedure shall have the necessary technical training, experience, and personal skills, to adequately perform this procedure; and they shall have a working knowledge of the USGS QA Manual. Responsibilities of others including the reviewer(s), contributing investigators, Branch/NHP Chief, QA Office and the Chief, Branch of NNWSI are as described in Para. 4.3, QMP-5.01.

4.0 DETAILED PROCEDURE. Collection of field samples such that internal structures of samples are preserved or such that relationships among samples or relationships to geologic features can be reconstructed is essential to the interpretation of some types of laboratory data.

- 4.1 Objective: This procedure provides for documentation of geologic relationships and inter-relationships for samples as well as collection of blocks of samples and other oriented samples such as short drill cores.
- 4.2 Methods Used: In carrying out this procedure, field personnel must remember that documentation must be detailed enough to meet the needs of investigators who may never visit the sample locality. Anything done to the sample must be recorded even if the action has no foreseeable effect on results of tests planned by the collector. Results of later work on the sample could be influenced by foreign substances placed on or impregnated through the sample or by actions such as heating or wetting the sample.
- 4.2.1 All samples to be collected should be photographed in place. A detailed sketch can be made if no one with a camera and camera permit is available.
- 4.2.2 All samples must be located precisely on the finest scale available. In the case of trench-wall samples, locations must be marked on the maps of the trench walls.
- 4.2.3 A sample sheet shall be completed for each sample (Attachment 1) or subsample (Attachment 2) taken in the field. For purposes of this procedure, samples cut or broken from a single block or adjacent pieces of outcrop shall be considered to be subsamples of a single sample unless the division has occurred along a visible discontinuity such as the contact between two geologic units.
- 4.2.4 Sampling tools should be cleaned prior to use unless external surfaces of samples will not be used for analysis. Samples collected without prior cleaning of tools should be so noted. Cleaning of tools must remove paint, grease, visible traces of previous samples or other foreign materials. Cleaning may be accomplished with a wire brush or other abrasive and detergent. Any potential contaminant should be noted.
- 4.2.5 Samples may be broken from outcrop by use of hammers, prybars, and cold chisels. They may be cut loose with power circular saws fitted with silicon carbide blades. The outcrop can be drilled with a portable power drill and tungsten carbide bit; the resulting powder should be caught in glass or plastic container as it falls free of the bit. Samples may be taken with a portable coring unit; the orientation of such samples should be recorded.
- 4.2.6 Samples may be encased in quick setting material such as epoxy, latex, or plaster prior to breaking them free from the outcrop. Details of encasing must be recorded so that effects of possible contamination can be anticipated or tested for at a later date.
- 4.2.7 Collected samples shall be placed in a sturdy bag and the bag will be marked to correspond with the number on the sample sheet.

- 4.3 Alternative Method(s) Considered: Sawing with a carbide-tipped chain saw was considered but not tested due to lack of availability of equipment. Any alternate method that accomplishes the goals listed under 4.2 will be acceptable as long as a thorough documentation, as described above, is kept.
- 4.4 Materials/Equipment Required: Essential equipment and materials include:
- o Portable power circular saws
 - o Hammers
 - o Prybars
 - o Cold chisels
 - o Portable power drill with carbide bits
 - o Portable coring unit
 - o Quick-setting material such as epoxy or plaster of paris
 - o Marking pen
 - o Camera equipment
 - o Notebook
 - o Sample bags
- 4.5 Assumptions Affecting the Procedure: There are no assumptions that affect the procedure.
- 4.6 Data Information: Data from this procedure consist of field notes, photographs or sketches, locations marked on maps or areal photographs, and sample data sheets (Attachments 1 and 2).
- 4.6.1 Quantitative/Qualitative Criteria - There are no quantitative/qualitative criteria against which job performance or completion can be evaluated.
- 4.7 Limitations: The procedure relies on the judgement of the person or persons doing the field work to select appropriate samples.
- 4.8 Other: This technique interfaces directly with NWM-USGS technical procedure GCP-02 and provides material to be analyzed under a large number of technical procedures in place at the USGS and LANL. This procedure was derived from and replaces NWM-USGS tentative procedure TP-GP-27, R0.
- 5.0 CALIBRATION REQUIREMENTS. Calibration is not required as a part of this technical procedure.
- 6.0 IDENTIFICATION AND CONTROL OF SAMPLES. Samples will be collected as part of this procedure.
- 6.1 Sample Identification: As part of the data records and documentation, and in compliance with QMP-8.01, all samples will be identified as follows: HD - sequential digit - subsample digit. Blocks of numbers (digits following HD) may be assigned to individual investigators, and therefore, not all numbers may be used at any point in time.

- 6.2 Control and Storage: In compliance with QMP-8.01, the collected and identified samples shall reside in the custody of the principal investigator for whom the samples were collected, or his designee, who shall store them in a secure sample storage area until distribution to analytical scientists.
- 6.3 Special Treatment: Although no strict controls are required, common sense suggests avoidance of excessive moisture or extreme temperatures. Furthermore, any samples subjected to other than "normal" storage and handling conditions shall be noted and the conditions described on the Sample Description Sheet.

7.0 QUALITY ASSURANCE RECORDS. All information collected and recorded under this procedure that is to be used in support of the NNWSI Project licensing process is required to be a part of the official USGS record. Input needed to process the information as a record includes: title or description, subject, originator, date of the document, and whether it is an original, a revision or an addendum.

Specific items from this procedure that will constitute a record are the Sample Description Sheets, names of persons doing descriptions, and dates.

- 7.1 Notebooks or other organized documentation will be prepared as appropriate by the PI or a contributing investigator to record data from this procedure and shall include any information considered by the originator to be pertinent. When data are kept in loose-leaf form, each page will be numbered consecutively and chronologically. All documents will be signed or initialed and dated by the investigator on a daily basis when entries are made. Any revisions will be lined out, initialed, and dated.
- 7.2 All data collected and the applicability of methods used in this procedure will be reviewed and cosigned by a peer or supervisor of the investigator knowledgeable with the objectives of this procedure in accordance with NNWSI-USGS-QMP-6.01, Para. 4.2.2; and as such are acknowledged by both the investigator and the reviewer to be acceptable and meaningful data that meet appropriate quantitative and qualitative acceptance criteria. Unacceptable data shall be identified appropriate to the form of the data.

8.0 MODIFICATIONS. When field modifications become necessary, per Para. 4.8, QMP-5.01, the PI shall fully document the changes, submit the documentation for the same review signature and distribution process as for the original procedure, and indicate whether the change should result in a subsequent revision to the technical procedure. The documentation will be reviewed within 30 days.

9.0 REFERENCES CITED.

There are no references cited for this procedure.

10.0 **ATTACHMENTS.** The following attachments are included with this technical procedure for the purpose of examples as described:

- Attachment 1. Sample Description Sheet.
- Attachment 2. Subsample Description Sheet.

11.0 **APPROVAL.** This technical procedure shall become effective upon its approval as noted by completion of all the following signatures and dates.

John S. Stuckless
Prepared by: John S. Stuckless

6/3/88
Date

K. R. Ludwig
Technical Reviewer: K. R. Ludwig

6/3/88
Date

C. E. Hedge
Branch Chief: C. E. Hedge

6/4/88
Date

L. R. Hayes
Chief, Branch of NNWSI: L. R. Hayes

6/6/88
Date

J. R. Willmon
Quality Assurance: J. R. Willmon

6/7/88
Date

Hydrogenic Deposits Project
Sample Description Sheet

NWM-USGS-GP-27, R1
Attachment 1

Project Sample Number: HD- _____

Field Collection Number: _____ Date and time sampled: ____ / ____ /1988. ____ : ____ AM
PM

Collected by: D.P. Adam B. Carlos J.S. Downey R.M. Forester S.S. Levy D.R. Muhs C.W. Naefer
Z.E. Peterman R.O. Rye J.S. Stuckless E.M. Taylor B.D. Turin D.L. Vaniman J.F. Whelan
Other (specify): _____

Locality description:

Site name: _____

Elevation: _____ feet _____ meters

Latitude: _____ ° _____ ' _____ " N

Longitude: _____ ° _____ ' _____ " W

Quadrangle: _____

7.5' 15' 2" Other: _____

Other reference point(s): _____

Photo numbers: _____

Sketch numbers: _____

Sample description (required): _____

Sample described by: _____
(initials)

Type of material: vein filling soil water bedrock breccia alluvium sediment Other: _____

Color (optional): Wet: _____ Dry: _____ Munsell Rock Color Chart

Subsampling data sheets:

- | | | |
|--|--|--|
| <input type="checkbox"/> Paleontology | <input type="checkbox"/> Petrography | <input type="checkbox"/> Major element chemistry |
| <input type="checkbox"/> Assay | <input type="checkbox"/> Geochronology | <input type="checkbox"/> Minor element chemistry |
| <input type="checkbox"/> Fluid inclusions | <input type="checkbox"/> Stable isotopes | <input type="checkbox"/> Tracer isotopes |
| <input type="checkbox"/> No subsample sheets | <input type="checkbox"/> Soils | <input type="checkbox"/> Other (see notes) |

A subsample data sheet exists for each item checked. The information on this form is included by reference for each such form

Notes: _____

If checked, notes continue oversheet

