

BTP-SMF-006: REV1 DRAFT

**REMOVAL OF WHOLE CORE AND OTHER SPECIMENS FROM SAMPLES
BY THE SAMPLE MANAGEMENT FACILITY FOR SHIPMENT, AND
REMNANT RETURN**

NOTES

This "Information Copy" indicates changes made to BTP-SMF-006 Rev 0, (approved 7/7/89) as a result of experience gained processing prototype core from Utah. All changes have been italicized in this copy.

KEY:

- (+) Means the preceding phrase has been added to the original
- (-) Means the preceding phrase has been deleted from the original
- (#) Means the preceding phrase has been changed from the original

Some explanations regarding changes have been included.

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PDR WASTE
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REMOVAL OF WHOLE CORE AND OTHER SPECIMENS
FROM SAMPLES BY THE SAMPLE MANAGEMENT
FACILITY FOR SHIPMENT, AND REMNANT RETURN

BTP-SMF-006 Rev1

1.0 PURPOSE AND SCOPE

This procedure describes the Yucca Mountain Project Office (Project Office) requirements and responsibilities for removal of whole core and other specimens from Yucca Mountain Project (Project) samples and remnants for shipment to Project participants and other outside interests and remnant return to the Sample Management Facility (SMF).

2.0 APPLICABILITY

This procedure applies to removal of whole core specimens and other specimens from Project samples and remnants, to shipment of whole core specimens and other specimens to participants and other outside interests, and to remnant return, repackaging and storage. These activities shall be performed by SMF personnel and support staff.

3.0 DEFINITIONS

3.1 Sample Management (SM)

SM of the Technical and Management Support Services (T&MSS) contractor is the organization responsible for the collection, documentation, storage, and control of selected samples, remnants, and records. SM includes the SMF and Field Operations. SM staff consists of management and operations personnel who ensure that SM operations and documentation satisfy applicable regulatory and quality requirements.

3.2 Sample Management Facility

The SMF is the facility used for the documentation, storage, and control of samples and sample remnants collected and dispersed for analysis and evaluation by Requesters. The SMF consists of a physical facility and equipment designed to effectively process and preserve collected samples. The SMF is operated by T&MSS contractor personnel for the Project.

3.3 Sample

A sample is part of a population whose properties are studied to gain information about the whole or group. Examples of samples covered by this procedure include whole core; research split core; cuttings; and bulk, hand, trench, and other geologic samples collected at Project field sites.

3.4 Core

A core is a cylindrical section of rock, or fragment thereof, taken as a sample of the interval penetrated by a core bit and brought to the surface for examination and/or analysis.

3.5 Cuttings

Cuttings are chips of rock produced during drilling that are removed from the borehole by

circulation of drilling fluids (gas, foam, liquid).

3.6 Specimen

A specimen is a portion or subsection which has been removed from a sample or remnant and given a unique identification (ID) number for tracking.

3.7 Whole Core Specimen

A whole core specimen is a subsection of whole core that constitutes the entire core sample recovered for the depth interval represented.

3.8 Remnant

A remnant is the portion of a specimen that is returned to the SMF by a Recipient after analysis and testing has been performed.

3.9 Sample Overview Committee (SOC)

The SOC is comprised of representatives from Lawrence Livermore National Laboratory, Los Alamos National Laboratory, Sandia National Laboratories, the U.S. Geological Survey, SM, T&MSS, and the Project Office. It was formed to ensure a balance between Project sample needs, acquisition, and use, and the need to curate samples for posterity.

3.10 Requester

A Requester is an individual from a Project participant or outside interest who requests to have a specimen removed from a Project sample or remnant by the SMF staff.

3.11 Recipient

A Recipient is a Project participant, outside interest, or representative thereof who receives an SOC-authorized specimen removed by the SMF staff from a Project sample or remnant.

3.12 Curatorial Sample Inventory and Tracking System (CSITS)

The CSITS is the computer-based system designed to aid in the control and documentation of Project samples.

4.0 RESPONSIBILITIES

4.1 Curator

The Curator shall supervise SMF staff performing activities related to removal of whole core and other specimens. The Curator shall distribute samples only when so approved by the SOC.

4.2 Technical Staff (TS) Assistant

The TS Assistant shall ensure that activities performed during this procedure conform to quality assurance (QA) guidelines and report any nonconformance to the supervisor.

4.3 SMF Geotechnician

The SMF Geotechnician will perform the following whole core and other specimen related activities: removal, labeling, packaging, preparation for shipping, remnant return verification, repackaging, and storage.

4.4 SMF Administrative Assistant

The SMF Administrative Assistant shall submit original QA records resulting from the implementation of this procedure to the T&MSS Local Records Center (LRC).

4.5 Reynolds Electrical and Engineering Company, Inc.

The Reynolds Electrical and Engineering Company, Inc. Teamsters and Laborers (Support Staff) shall assist in handling and shelving of sample containers and will operate trucks and other material-handling equipment.

4.6 Sample Overview Committee

The SOC shall recommend the allocation of whole core and other specimens to the Director of the Regulatory and Site Evaluation Division (RSED) of the Project Office. The RSED Director will approve or disapprove the SOC recommendation.

5.0 PROCEDURES

5.1 Introduction

The geologic samples acquired during the Project are the primary sources of technical data used in site characterization at Yucca Mountain. It may be necessary to segregate whole core specimens from the core for complete, detailed analyses. Specimens from the research split of cores, cuttings, trench, and other geologic samples will be necessary for other analyses. This procedure specifies the necessary steps to isolate whole core and to create specimens (to subsample) in order to ensure that sufficient sample and specimen material is available to other researchers.

5.2 Specimen Acquisition Requests

5.2.1 Requests from interested parties for specimens from borehole and other samples are submitted to the SOC for review. With the approval of the RSED Director, a specimen(s) may be: (1) obtained at the borehole site as described in Project Office Branch Technical Procedure [BTP] BTP-SMF-008; (2) selected at a Core Examination Meeting after lithologic verification, but before slabbing, with removal at a later time; or (3) selected at an individual core viewing after the core has been processed. Specimen requests, with the exception of whole core specimens removed in the field, will be filled after completion of the Core Examination Meeting.

5.2.2 Requests for specimens selected prior to or during a Core Examination Meeting will be submitted to the Curator for compilation onto SOC Specimen Removal Request forms (Figure 1). The Curator will submit these forms to the SOC Chairman and SOC representatives for review and evaluation.

5.2.3 Requesters wanting to acquire whole core and other specimens for analysis subsequent to core processing shall complete and submit to their respective SOC representative a SOC Specimen Removal Request for processing as described in AP-6.4Q. These requests shall be approved by the RSED Director before submission to the SMF.

5.3 Whole Core Specimen Removal

5.3.1 Approval

If removal of whole core specimens at the borehole site has been approved by the RSED Director, the specimen will be segregated from the remainder of the whole core as described in BTP-SMF-008. Whole core that has been selected and reserved by participants or other outside interests during a Core Examination Meeting (BTP-SMF-005) will be segregated from the rest of the whole core after verification of lithologic and structural logging (BTP-SMF-003), but before processing.

5.3.2 It is not always possible or desirable to remove a core specimen from the exact interval requested because of previously undetected fractures or other significant features in the core. The SOC, through consultation with a representative of the SMF, shall take this type of occurrence into consideration and allow a buffer zone so that the interval can be adjusted up or down the core length to obtain an integral specimen. (#) - -Section renumbered and moved to more appropriate position.

5.3.3 (#) Documents

5.3.3.1 (#) A Whole Core Specimen Removal Checklist (Figure 2) will be completed by the SMF Geotechnician during whole core segregation activities and will accompany the whole core specimen throughout the removal process. The checklist includes pertinent information about each specimen to be removed and a checklist to verify each stage of the removal procedure.

5.3.3.2 (#) The upper portion of the checklist contains the following CSITS generated information about the specimen: laboratory name, Requester, borehole ID, requested specimen interval and SOC-authorized specimen interval, unique specimen identification number, and processing batch ID. A self-adhesive temporary label with the same information will be generated and placed on the whole core specimen immediately after cutting.

5.3.3.3 (#) The lower portion of the checklist lists cutting, marking, photographing and packaging activities to be performed on the whole core specimen. A space next to each activity listed on the form will be checked to indicate completion of that activity. During specimen cutting and packaging, the SMF Geotechnician completes, signs, and dates the lower portion of the form. The SMF Geotechnician will also fill in the remaining items on the upper part of the Removal Checklist: actual interval of whole core cut and container ID (#) number.

5.3.4 (#) Specimen Removal

The whole core specimen will be cut using the appropriate technique. The SMF Geotechnician will verify that the orientation stripes are present and legible on the whole core specimen and will enter the actual top and bottom specimen depths on the specimen (unless otherwise directed by the Curator), checklist, and temporary label. Information supplied by the SMF Geotechnician during specimen removal includes the actual interval of whole core removed, the initials of the SMF Geotechnician removing the specimen, and the date. This process will be documented on the CSITS-generated Specimen Removal Log (Figure 3).

5.3.5 (#) Preliminary Packaging

5.3.5.1 (#) The whole core specimen will be placed in a polystyrene foam cradle and cardboard divider pad cut to the same length as the specimen. Polyethylene lay-flat tubing will be cut to accommodate the whole core specimen, marked with orientation stripes and depth indicators, and placed with the specimen. Each step in the packaging process must be documented on the lower part of the Whole Core Removal Checklist by the SMF Geotechnician performing each step or activity.

5.3.5.2 (#) Where a whole core specimen has been removed from a core container, a polystyrene foam spacer of the same length will be placed in that container to represent the interval of removed core. If a whole core specimen includes all of the core contained in one container, that container will be discarded, and a marker representing that whole core specimen, though not the same length as the whole core specimen, will be placed in the succeeding container. A label affixed to the polystyrene foam spacer will include borehole ID, depth interval removed, Requester, date of removal, and *specimen ID number*. (#)

5.3.6 (#) Labeling

Permanent specimen labels will be printed using the same information as that on the upper portion of the Whole Core Specimen Removal Checklist, with the exception of the requested and authorized intervals. The actual interval of the whole core specimen and the storage container ID will also be included. CSITS-generated permanent labels shall be affixed to the side of the divider pad and to the lay-flat plastic tubing that contains the whole core specimen. *The label will contain the borehole ID, Requester, Recipient, and specimen ID number.* (#) - **-Removed reference to Bar Code and corrected typographical error.**

5.3.7 (#) Photography

The whole core specimen and its permanent label will be photographed before final packaging. The photograph will be taken with an instant print camera. This activity is recorded on the Specimen Photography Log (Figure 4). Information recorded on this log includes the exposure number, specimen ID number, date the photograph was taken, and remarks.

5.3.8 (#) Final Packaging

5.3.8.1(#) The whole core specimen, polystyrene foam cradle, and divider pad will be placed in the premarked polyethylene lay-flat tubing, and the tubing will be sealed with an impulse heat sealer. The sealed tubing containing the specimen will then be placed into the temporary storage box, and the box will be sealed with filament tape. The whole core specimens will be temporarily stored until shipped to the Requester.

5.3.8.2(#) *All whole core specimens from a borehole designated for one Requester will be placed in a temporary container identified with a unique number and labeled. The container will be sealed with filament tape. Additional containers will be constructed and filled as needed.* (#) - **-Reworded for clarity.**

5.4 Specimen Removal

The SMF Geotechnician will use a Specimen Removal Log (Figure 3), with information taken from the approved Specimen Removal Request (Figure 1), to direct the Support Staff to transfer the research split sample containers or remnant containers with the required samples or remnants from storage to the sample processing area.

5.4.1 Removal

5.4.1.1 Specimens from Research Split of Core

5.4.1.1.1 The polyethylene lay-flat tubing will be removed (if applicable) from the required research split core interval, and the requested interval of core will be temporarily marked. The (*box will... (-)*) specimen will be removed from the sample by the SMF Geotechnician using the appropriate

equipment. If size permits, the specimen will be marked with orientation marks and depth. If specimens are to be oriented but are too small for the placement of orientation marks (i.e., thin-section stubs), a notch will be cut in the specimen denoting the uphole direction of the borehole. Specimens will be placed in plastic tubing (impermeable, if requested) in the case of large specimens, or in self-sealing plastic bags for small specimens. A label with the *specimen ID* (#) number, acquisition site, depth interval, and Recipient will be attached to the container. The specimen will be placed in temporary storage, if necessary, until shipment to the Recipient. This process will be documented on the Specimen Removal Log (Figure 3).

5.4.1.1.2 A polystyrene foam spacer will be cut to the approximate size of the removed specimen and placed in the core box at the place where the specimen was removed. A label containing the *specimen identification number*, (#) interval, borehole ID, Recipient, and Date removed will be affixed to the spacer. The box will be inspected prior to reshelving and sealed with filament tape.

5.4.1.2 Specimens from Research Split of Cuttings

Vials (#) containing the requested specimens will be removed from the container and opened. The requested specimen amount will be separated from the remaining cuttings with a riffle-type splitter to ensure a representative split from the sample. The specimen will be weighed, then placed in a vial which will be labeled with the *borehole ID*, *depth interval*, *specimen identification number*, (#) and Recipient. The specimen will be placed in temporary storage, if necessary, until shipment to the Requester. The original cuttings will be replaced in the storage vial and storage container. The container will be sealed with filament tape and scheduled for reshelving. This process will be documented in the Specimen Removal Log (Figure 3).

5.4.1.3 Other Specimen Removal

5.4.1.3.1 Specimens can also be removed from remnants, hand samples, and bulk samples. Documentation on removal of these types of specimens is similar to that used when removing samples from core and cuttings.

5.4.1.3.2 The appropriate equipment will be used to remove the specimen from the sample. The specimen will be weighed, if necessary, and then placed in an appropriate container that will be labeled to reflect the contents, *specimen ID* (#) label, and Requester. The container will be sealed with filament tape and placed in temporary storage, if necessary, until shipment to the Recipient. The original sample or remnant will be replaced back in the storage container. The container will be sealed with filament tape and scheduled for reshelving. The process will be documented on the Specimen Removal Log (Figure 3).

5.4.2 Specimen Photography

5.4.2.1 All specimens removed from the research split core, and other selected samples, shall be photographed before shipment to the Requester. Information recorded on the Specimen Photography Log (Figure 4) will include the exposure number, *specimen ID* (#) number, and date the photograph was taken. The photograph shall include the specimen and its CSITS-generated label.

5.4.3 Packaging and Shipping

Packaging and shipment of specimens to the Recipient will follow isolation of whole core specimens and slabbing of whole core samples. Packaging and shipping activities will be recorded on the Specimen Packaging and Shipping Log (Figure 5) and will include the following information: Requester name and address, Recipient name and address, *shipment identification number*, (#) shipment date, bill of lading number, container type, special packaging and/or shipping instructions,

specimen ID numbers,(#) acquisition site, sample type, depth intervals (if applicable), type of specimen, *container ID labels,(#)* and SMF Geotechnician's initials and the date. Spaces will be provided for additional information to be supplied by the Geotechnician packaging the specimens.

5.4.3.1 Packaging

5.4.3.1.1 Whole core and other specimens will be packaged according to specifications of the Requester. In the absence of special instructions, specimens will be placed in cardboard boxes, cushioned mailers, pallets, or wooden crates (depending upon the size of the shipment) with appropriate dunnage. A label identifying its contents will be affixed to the ends of both the lid and body of crates and boxes, or on all sides of a palletized shipment.

5.4.3.1.2 The specimen containers will be assigned a storage location until shipment to the consignee or transferred directly to Shipping and Receiving.

5.4.3.2 Shipping

5.4.3.2.1 Appropriate transport carrier forms will be completed and will serve as a transfer of custody document for each specimen shipment to the Requester. If a bill of lading is not available from the courier accepting custody of the specimen shipment, a Transfer of Custody Form (Figure 6) will be used. This document will include the Requester's name and address, Recipient's name and address, *shipment ID number,(#)* date shipped, shipping instructions, number of containers in the shipment, *container ID numbers,(#)* and total weight of the containers. Spaces will be provided for the signatures of the courier accepting custody of the shipment, the SMF staff member relinquishing custody of the shipment, and the date and time of custody transfer.

5.4.3.2.2 A Specimen Removal Contract (Figure 7) will be generated for each specimen shipment. A copy of this contract will be mailed to the Recipient. Another copy will be sent with the shipment for completion by the Recipient upon receipt of the specimens and is to be returned to the SMF. Each contract contains specific information on the specimens that the Recipient will receive. This form will be completed at the SMF if the Recipient has accepted custody of the specimens there. If specimens are shipped to the Recipient, the contract shall be signed and returned to the SMF within 10 business days after receipt of the specimens.

5.5 Remnant Return (#)

Remnants of specimens no longer required for analysis should be returned to the SMF accompanied by an inventory identifying the original specimens that were the source of the remnants and the *specimen ID (#)* number with depth interval or location ID. The bill of lading and inventory will be copied and stamped for the SMF Documents Center. The inventory will be checked against the Specimen Removal Contract. A list of any noted discrepancies will be compiled, and the Recipient will be contacted to resolve the problems, if necessary.

5.5.1 Remnant Processing(#)

All activities associated with remnant processing will be recorded on the Remnant Return, Packaging and Storage Log (Figure 8). This log includes person returning remnants, Recipient of specimen, *specimen ID (#)* number, date received by the SMF, condition of specimen, repacker and date, *remnant identification (#)* number, and storage location.

-- 5.5 and 5.5.1 switched position to reflect proper order of operations.

5.5.2 Storage

5.5.2.1 The returned remnants will be isolated from the specimens and samples, inventoried, and

placed in containers. Labels with the borehole ID and *remnant identification* (#) number will be placed on the end of the lid and body of each container. Containers will be sealed with filament tape and arranged by borehole and depth in the remnant storage area.

5.5.2.2 Remnants of specimens will be stored in Building 4320 on storage racks. All fluids will be stored in the walk-in cooler on storage shelves. Remnants of bulk samples, if primarily intact, will be stored on pallets in Building 4320. Smaller remnants of bulk samples, as well as hand samples, will be stored in boxes on racks in Building 4320.

5.6 Identification and Resolution of Discrepancies

A discrepancy exists when there is incorrect information that significantly affects documentation or notation that is beyond the scope of the immediate activity or form being completed. Any discrepancies shall be resolved upon discovery by crossing through the error, correcting it in the original document, and initialing and dating the correction. If the correction is not self-explanatory, the individual shall assign a number to the correction and attach a sheet to the original record that fully describes the correction performed. Discrepancies discovered after an activity or form has been completed will be handled according to the procedure outlined in Quality Management Procedure (QMP) QMP-17-01 Section 5.7.

5.7 Nonconformance Reporting

A nonconformance exists when there is a deficiency in characteristic, documentation, or procedure that renders the quality of an item or activity unacceptable or indeterminate. The intent of nonconformance reporting is to assure the resolution of the conditions not meeting the requirements or to assure that undefined conditions are defined. If there are any nonconformances to this procedure noted during or after associated activities, SMF staff members shall report them to the Project Quality Manager or another individual in the Project Office QA organization. Segregation of a nonconforming item or termination of a nonconforming activity will be done according to Quality Management Procedure (QMP) QMP-15-01.

6.0 REFERENCES

AP-6.4Q, Approval Procedure for Requests for Yucca Mountain Project Geologic Specimens.

QMP-17-01, Rev. 1, Records Management: Record Source Implementation.

BTP-SMF-002, Transport, Receipt and Admittance for Curation to the SMF of Borehole Samples.

BTP-SMF-004, Physical Processing and Storage of Core and Cuttings at the SMF.

BTP-SMF-005, Examination of Samples by Participants at the SMF.

BTP-SMF-008, Field Logging and Documentation of Borehole Samples.

QMP-15-01, Rev. 1, Control of Nonconformances.

7.0 FIGURES

Figure 1 - SOC Specimen Removal Request.

Figure 2 - Example of CSITS-generated Whole Core Specimen Removal Checklist.

- Figure 3 - Example of CSITS-generated Specimen Removal Log.
- Figure 4 - Specimen Photography Log.
- Figure 5 - Example of CSITS-generated Specimen Packaging and Shipping Log.
- Figure 6 - Example of CSITS-generated Transfer of Custody Form.
- Figure 7 - Example of CSITS-generated Specimen Removal Contract.
- Figure 8 - Remnant Return, Packaging and Storage Log.

8.0 QA RECORDS

The SMF Administrative Assistant shall ensure that the following QA records resulting from implementation of this procedure are turned over to the T&MSS LRC within 10 business days. Copies of these QA records will be retained by the SMF and stored at the SMF Documents Center.

1. SOC Specimen Removal Request.
2. Whole Core Specimen Removal Checklist.
3. Specimen Removal Log.
4. Specimen Photography Log.
5. Specimen Packaging and Shipping Log.
6. Transfer of Custody Form.
7. Specimen Removal Contract.
8. Remnant Return, Packaging and Storage Log.
9. Photographs.