Department of Energy
Washington, DC 20585

MAR 26 1991

Mr. John J. Linehan
Deputy Director
Division of High-Level
Waste Management
Office of Nuclear Material
Safety and Safeguards
U.S. Nuclear Regulatory Commission
Washington, DC 20555

Dear Mr. Linehan:

Enclosed are copies of the current approved versions of the Sample Management Facility (SMF) Administrative Procedures (APs) and Branch Technical Procedures (BTPs) related to sample handling, processing, and documentation. A listing of the enclosed procedures and their revision status are indicated as follows:

AP-6.2Q "Management and Operation of Sample Handling Activities at Borehole Sites," Revision 0

Revision in progress; being revised as AP-6.Y; estimated completion date: May 1991

AP-6.3Q "Interaction of Participants and Outside Interests with Yucca Mountain Project Sample Management," Revision 0

Revision in progress; estimated completion date: May 1991

AP-6.4Q "Procedure for the Submittal, Review, and Approval of Requests for Yucca Mountain Project Geologic Specimens," Revision 0

Revision in progress; estimated completion date: May 1991

AP-6.6Q "Field Collection, Documentation, and Specimen Removal of Exploratory Shaft and Drift Rock," Revision 0

No revision required at this time

BTP-SMF-001	"Sample Management for the Yucca Mountain Project Office," Revision 1 Revision in progress; estimated completion date: May 1991
BTP-SMF-002	"Transport, Receipt, and Admittance for Curation to the Sample Management Facility of Borehole Samples," Revision 1 Revision in progress; will include material from BTP-SMF-004; estimated completion date: May 1991
BTP-SMF-003	"Verification of Field Logging and Documentation of Core and Cuttings," Revision 0 No revision required; will be incorporated into AP-6.Y Q
BTP-SMF-004	"Physical Processing and Storage of Core and Cuttings at the Sample Management Facility," Revision 0 No revision required; will be incorporated into BTP-SMF-002
BTP-SMF-005	"Examination of Samples by Participants at the Sample Management Facility," Revision 1 Submitted for QMP-06-04 review February 1991
BTP-SMF-006	"Removal of Whole Core and Other Specimens from Samples by the Sample Management Facility for Shipment, and Remnant Return," Revision 1 Revision 2 submitted for approval and issuance February 27, 1991
BTP-SMF-007	"Acceptance for Curation by the Sample Management Facility of Selected Samples and Documentation," Revision 0 Revision in progress; estimated completion date: May 1991
BTP-SMF-008	"Field Logging, Handling, and Documenting Borehole Samples," Revision 1 Revision in progress; estimated completion date: May 1991

Please note that revisions to these procedures are in preparation. The revisions are based on operational testing at the Apache Leap, Arizona, prototype drill site and at the SMF. The Quality Management Procedure (QMP) 06-04 review and approval process for revisions to APs 6.2Q, 6.3Q, 6.4Q, and BTP-SMF-001 through BTP-SMF-008 will be completed by May 1991. The QMP-06-04 review process has been completed on revision 2 of BTP-SMF-006 and the procedure has been submitted as of February 27, 1991, for final approval and issuance. Also, two new BTPs, BTP-SMF-009, "Reprocessing of Existing Yucca Mountain Core and Specimens" (in review) and BTP-SMF-010, "Gamma-Ray Logging of Yucca Mountain Project Core" (submitted for approval and issuance February 27, 1991) will be completed by May 1991.

Should you have any questions in this regard, please contact Linda Desell of my office at (202) 586-1462.

Sincerely,

Dwight E. Shelor
Acting Associate Director for
Systems and Compliance
Office of Civilian Radioactive
Waste Management

Enclosures: as indicated in text
Uncontrolled Copies of Approved Versions of Administrative Procedures and Branch Technical Procedures for the Yucca Mountain Site Characterization Project Sample Management Facility

cc w/o enclosures:
R. Loux, State of Nevada
M. Baughman, Lincoln County, NV
D. Bechtel, Clark County, NV
S. Bradhurst, Nye County, NV
P. Nieldzielski-Eichner, Nye County, NV
C. Gertz, YMPO
K. Stablein, NRC

Accepted with letter dtd 3/26/91

YUCCA MOUNTAIN PROJECT
ADMINISTRATIVE PROCEDURE

NEAD-001
10/88

Title
AP-6.2Q MANAGEMENT AND OPERATION OF SAMPLE HANDLING ACTIVITIES AT BOREHOLE SITES

1.0 PURPOSE AND SCOPE

This procedure defines requirements and responsibilities of selected Yucca Mountain Project (Project) participants for the management and disposition of Project borehole samples. Site activities affected by this procedure include handling and staging, field logging, core photography, documentation, packaging, and temporary storage of Project borehole samples.

2.0 APPLICABILITY

This procedure applies to Project participants and support contractors who handle, stage, photograph, field log, document, package, and store core, cuttings, fluids, and other borehole samples acquired at Project surface-based and subsurface-based drill sites. This procedure does not apply to those samples requiring alternative handling as directed by the Sample Overview Committee (SOC).

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 documentation, storage, and control of selected samples and sample remnants collected and dispersed for analysis and evaluation by participants. SM includes Field Operations (FO) and the Sample Management Facility (SMF). The staff consists of management and operations personnel who ensure that SM operations and documentation satisfy applicable regulatory and quality requirements.

3.2 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 core, cuttings, fluids, and other geologic samples collected at Project borehole sites. The responsibility for the ultimate curation of samples is assigned to those Project entities whose functions include collecting samples and maintaining custody of those samples. This responsibility is subject to the transfer of custody requirements in the Project Office Branch Technical Procedures (BTPs) related to SM.

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	Supersedes	QA Manager 6/8/89		

3.3 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.

3.4 CUTTINGS

Cuttings are chips of rock produced during drilling that are removed from the borehole by circulation of drilling fluids (gas, foam, or liquid).

3.5 SPECIMEN

A specimen is a subsection or portion that has been removed from a sample.

3.6 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.

3.7 CORE RUN

A core run is an attempt to drill and recover a length of core. It is also core recovered from a core barrel after the attempted core run.

3.8 DRILLING PROGRAM PACKAGE

A Drilling Program Package, prepared for each borehole, is a set of plans describing the scope of work to be performed, the general and detailed requirements for performing the work, and the parameters to be used while drilling or performing work on Project boreholes. The Drilling Program Package consists of a work order, a Criteria Letter, a Drilling Program, and a Cost Estimate, and is prepared by the various participants responsible for those elements.

3.9 SAMPLE OVERVIEW COMMITTEE

The SOC is comprised of representatives from Los Alamos National Laboratory, Lawrence Livermore 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.

4.0 RESPONSIBILITIES

4.1 PROJECT OFFICE SITE REPRESENTATIVE

The Project Office Site Representative (Site Representative) shall coordinate activities at Project borehole sites. The Site Representative or other Project Office Division level designee shall comply with requirements in Project Office Quality Management Procedure (QMP) QMP-01-02, Stop Work, should conflicts arise during work at Project borehole sites.

4.2 PRINCIPAL INVESTIGATOR (PI)

The PI or representative from a Participating Organization designated by the Prject Office as having primary responsibility for a borehole shall provide lead technical support for the design, implementation, and completion of the borehole. The PI shall recommend suspension of activities at the borehole site when concerns about the technical quality of samples or borehole construction arise that would affect the useability of the samples or the borehole for scientific testing. Direct suspension of work will be discussed with the Site Representative.

4.3 NEVADA TEST SITE (NTS) SUPPORT CONTRACTORS

NTS Support Contractors affected by this procedure include Reynolds Electrical & Engineering Company, Inc. (REECo) and Pan Am World Services, Inc. (Pan Am). REECo drilling personnel will be responsible for general drilling services according to Project Administrative Procdure (AP) AP-5.10Q. Teamsters and Laborers assigned to SM will be responsible for sample handling activities. Pan Am will be responsible for photographing borehole samples on an as-needed basis.

4.4 PROJECT PARTICIPANTS

Project Participants (or designees) are responsible for preparing and submitting the appropriate documentation as required to remove selected borehole specimens from the drill site. The participant shall then sign a receipt for the specimens.

4.5 FIELD OPERATIONS MANAGER OF SAMPLE MANAGEMENT

The FO Manager of SM shall coordinate and administer basic borehole sample logging, sample documentation, sample marking and packaging,

photography, and transfer of borehole samples to the SMF. Primary responsibilities will include interaction with the PI and the Site Representative to ensure acceptability of samples and documentation for curation at the SMF. The FO Manager will recommend suspension of any drill site activity that jeopardizes sample acquisition, quality, or documentation, if such suspension does not affect the useability of the sample or the borehole for scientific testing, as indicated by the PI.

4.6 FIELD OPERATIONS SHIFT SUPERVISOR OF SAMPLE MANAGEMENT

The FO Shift Supervisor of SM shall interact daily with participants to monitor drill site activities having an impact on the collection and documentation of quality borehole samples. The FO Shift Supervisor shall report shift activities to the FO Manager and shall ensure that all borehole sites are adequately staffed at all times.

4.7 FIELD OPERATIONS GEOLOGIST OF SAMPLE MANAGEMENT

The FO Geologist of SM shall perform geologic logging and sample handling activities at the drill site. These activities include depth validation, sample marking, packaging, and completion of required geologic field data logs and daily logs.

4.8 SAMPLE OVERVIEW COMMITTEE

The SOC shall be responsible for evaluating requests for samples relative to (1) Project goals, (2) participant sample needs, and (3) assurance of preservation of representative samples, as applicable.

5.0 PROCEDURE

5.1 INTRODUCTION

5.1.1 Sample management operations must ensure that Project samples and related documents and records will support a U.S. Department of Energy license application to the U.S. Nuclear Regulatory Commission to construct a geologic high-level nuclear waste repository. The initial staging and geologic logging of core at the drill site is the point at which depth assignments are made that become the reference points on which all future measurements for sample examinations and specimen removal are based. If these depth assignments are incorrect or indeterminate, the useability of analytical data derived from whole core and other specimens may be compro-

mised. These initial activities significantly impact the entire sample management process.

5.1.2 This procedure describes interfaces of participant personnel at the drill site, methods to be followed and documentation to be prepared during handling and field logging of all borehole samples, and records control. A copy of this procedure with supporting documents and forms will be available at the drill site at all times. The Drilling Program Package that controls drill site activities for the specific borehole will also be available at the drill site. During the course of activities described by this procedure, all borehole samples and sample containers will either be in constant visual contact by field personnel or will be in access-restricted storage.

5.2 INTERFACES

5.2.1 Organizational interfaces at Project borehole sites are shown in Exhibit 1. The Site Representative shall direct activities at Project borehole sites with direct supervision over T&MSS staff and shall interface with the NTS Office.

5.2.2 The PI assigned to a particular hole shall interface with the Site Representative, the FO Shift Supervisor, and the FO Geologist.

5.2.3 The FO Shift Supervisor shall direct daily shift activities by FO staff. The FO Shift Supervisor shall direct the SM-assigned Teamster and Laborer and Pan Am personnel, if required. The FO Manager will interact with the PI and the Site Representataive to monitor the implementation of the drilling plan (formalized in the Drilling Program Package) as it relates to sample collection and sample quality.

5.3 FACILITIES AND EQUIPMENT

Portable logging facilities will be erected at the drill site. Necessary supplies and documentation forms will be available.

5.4 DOCUMENTATION

Accurate and complete documentation of field operation activities is critical for a successful license application. The geologist, or other responsible participants as affected, will maintain a log at all times at the drill site, documenting activities affecting the daily scope of drill

site operations. All entries in this log will be written in black ink, initialed, and dated.

5.5 CORE HANDLING

Core handling procedures shall be performed in the following sequential order according to procedures described in BTP-SMF-008, Field Logging, Handling, and Documenting Borehole Samples. Any deviation from this procedure or from the Drilling Program Package requires prior consultation and agreement between FO personnel and the FO Manager and is subject to the requirements of Section 6 in the Project Quality Assurance Plan (QAP), NNWSI/88-9, Rev. 2.

5.5.1 Staging

5.5.1.1 REECo staff will remove the core run from the core barrel and carry it to the logging facility. REECo drilling staff shall supply proper documentation indicating the depth interval and the top of the run. This shall include, but is not limited to, adequately annotated documentation from a calibrated depth-recording device.

5.5.1.2 The core length will be cleaned if necessary, then fitted together to reconstruct in situ conditions. Marks will be made on the core to ensure that all unnatural breaks (those inadvertently or purposely caused by site personnel) are recognized.

5.5.1.3 The core will be measured to the nearest one tenth of a foot (0.1 ft). Subtracting the amount recovered from the amount cut determines whether a core loss exists. The amount of core cut, recovered, and lost will be documented. Core losses will be assigned depths as accurately as possible using relevant information from the drilling operations and core observation. Standard drilling industry procedures shall be used to ensure that all of the core is recovered from the hole, i.e., that none of the core is left at the bottom of the hole as a stub.

5.5.1.4 Permanent markers will be used to place a pair of colored (two different colors) orientation stripes lengthwise on all core to ensure that a piece of core cannot be inadvertently switched end-for-end. Footage marks will be written directly on the core at one-foot intervals.

5.5.2 Photodocumentation of Core

Pan Am or SM personnel with proper clearance shall take initial photographs of the core immediately after it has been staged, as described above. The borehole number, film roll number, exposure number, and the interval of core photographed by that exposure will be documented on a suitable photographic log by the photographer. After photodocumentation of the core run, the core is ready to be geologically logged unless the removal of whole core specimens from the drill site is required.

5.5.3 Removal of Whole Core Specimens From the Drill Site

5.5.3.1 It may be occasionally be necessary to immediately remove and seal intervals of whole core directly from the drill site and release them to a participant. Release of whole core from the drill site to a participant shall be approved according to AP-6.4Q and prepared for release according to AP-6.3Q and BTP-SMF-008. These instances shall be directed by the Director of the Regulatory and Site Evaluation Division (RSED), Project Office. No core will be removed from the field before it has been staged and photographed as described above. Whenever possible, the core will be logged as described in Section 5.5.4 before removal from the field.

5.5.3.2 The Whole Core Specimen Field Removal Checklist and Contract (contract [Exhibit 2]) will be completed as whole core specimens are removed from the drill site. The following steps shall be followed:

1. Prior to field operations, the SOC will recommend to the RSED Director requests from participants for whole core specimen removal (AP-6.4Q). The RSED Director may then approve the recommendations.

2. The approved request will be compared to the participant's interval pick, unit, or feature of interest (as applicable) at the drill site. Conflicts will be resolved by the RSED Director.

3. The whole core interval will be removed and documented by FO personnel.

4. The whole core specimen will be photographed and the information entered on an appropriate photographic log.

5. The segregated specimen will be packaged to the participant's specifications.

6. The participant or designee and the wellsite geologist will sign and date the contract.

7. The specimen and a copy of the contract will then be released directly to the participant.

5.5.4 Core Logging

Geological core logging by FO staff will occur in two distinct phases: recording structural information and recording lithologic information. These field logs are preliminary only and will not necessarily represent the final interpretation of geologic conditions; rather, they will primarily serve as traceability documentation.

5.5.4.1 Structural Logging

Features of structural significance will be logged on a structure log. These include natural breaks, as well as coring and handling induced breaks. Fracture zones, lithophysal void zones, and rubble zones are also recognized and described, as are piece lengths, core losses, and fracture mineralization.

5.5.4.2 Lithologic Logging

All lithologic information derived from core and cuttings observation will be entered on a lithologic log by the wellsite geologist. A standard logging format will be utilized to ensure that important comparative features of a lithologic unit are noted.

5.5.5 Loading and Labeling of Core Boxes

Core will be cut by FO staff as necessary and loaded into boxes in the same order as it was staged. Boxes will be labeled with borehole information and the interval of the core contained within the box.

5.5.6 Photodocumentation and Sealing of Boxed Core

Boxed core will also be photographed, as described in Section 5.5.2, prior to sealing. An instant print photograph of the core will be made and

placed in the box. The core boxes will then be sealed and, if necessary, placed in secure, temporary storage at the drill site.

5.6 CUTTINGS HANDLING

Cuttings that represent the targeted interval will be collected and logged by FO staff or the PI and placed in a location suitable for geologic logging (BTP-SMF-008). A sufficient quantity of representative cuttings will be collected, unless otherwise specified by the SOC or the RSED Director.

5.6.1 Logging

Cuttings will be laid out in rows suitable for logging. Lithologic descriptions shall be similar to core descriptions as described in Section 5.5.4.2 and recorded on a lithologic log.

5.6.2 Bagging

Cuttings samples will be placed in bags. The bags will be labeled with borehole and depth information.

5.6.3 Boxing, Labeling, and Sealing

After cuttings have been bagged and labeled, they will be boxed in a manner similar to core boxing. The boxes will be labeled with borehole and depth information and sealed in preparation for secure, temporary storage at the drill site.

5.7 OTHER BOREHOLE SAMPLES

The same standards for handling, labeling, and sealing of core and cuttings as described in this procedure shall apply to any other borehole samples collected and logged at the drill site by FO staff or participant personnel (BTP-SMF-008).

5.8 TEMPORARY STORAGE OF BOREHOLE SAMPLES

Provisions for temporary storage of borehole samples will include a lockable facility protected from moisture, wind, and freezing temperatures. It will also have sufficient space to accommodate other drill site samples.

Borehole samples designated for curation by the SMF shall be transmitted from the site to the SMF at least every 24 hours during borehole sample recovery periods.

5.9 IDENTIFICATION AND RESOLUTION OF DISCREPANCIES

5.9.1 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.

5.9.2 If the incorrect information is identified by the originator or other person subsequent to the completion of the document or activity (i.e., becomes a record), the individual is responsible for documenting the corrections to the erroneous information. The incorrect information shall be crossed through, corrected on the original document, and initialed and dated by the individual making the corrections. If the correction is not self-explanatory, the individual shall assign a number to the correction and attach a sheet to the original that fully describes the correction that has been performed.

5.9.3 If a discrepancy is found on a form or document, and the same discrepant information appears on previous documents already verified (entered into a baselined data system), then corrections will be made on a copy of the field record. This corrected copy will be placed with the uncorrected file copy of the record.

5.10 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 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 Office 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 QMP-15-01.

6.0 REFERENCES

AP-5.10Q, Use of NTS Contractors on the NNWSI Project.

AP-6.3Q, Interaction of Participants and Outside Interestes with Yucca Mountain Project Sample Management.

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

BTP-SMF-008, Field Logging, Handling, and Documenting Borehole Samples.

QMP-01-02, Stop Work.

QMP-15-01, Control of Nonconformances.

QMP-17-01, Record Source and Record User Responsibilities.

Yucca Mountain Project QAP, NNWSI/88-9, Rev. 2.

7.0 APPLICABLE FORMS

Exhibit 1. Field Operations Organizational Interfaces and Key Personnel.

Exhibit 2. Whole Core Specimen Field Removal Checklist and Contract.

8.0 RECORDS

The SM Manager shall ensure that the following quality assurance records resulting from implementation of this procedure are processed according to QMP-17-01 and turned over to the T&MSS Local Records Center every 10 business days. Copies of these records will be retained by the SMF and stored at the SMF Documents Center.

1. Whole Core Specimen Field Removal Checklist and Contract.

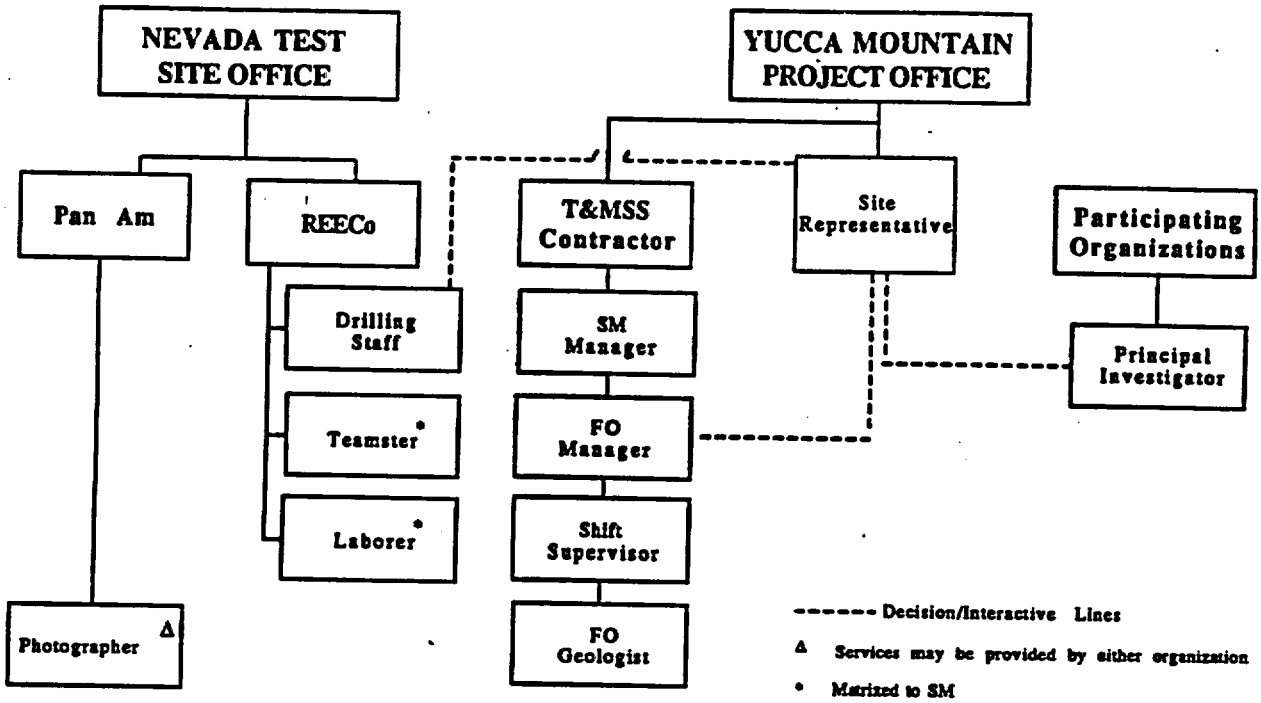

Exhibit 1. Field Operations Organizational Interfaces and Key Personnel.

YUCCA MOUNTAIN PROJECT SAMPLE MANAGEMENT FACILITY

WHOLE CORE SPECIMEN FIELD REMOVAL CHECKLIST AND CONTRACT BTPSMF8-2 5/89

Recipient _____ Address _____
Organization _____
Telephone ( ) _____ (FTS) _____
Courier _____

Completed By _____ Date _____
RSED Director Authorization _____
Borehole ID _____ Page ____ of ____

PLACE SHP BAR CODE LABEL HERE

SPECIMEN INFORMATION			CHECKLIST			
SPC Bar Code Label	Affixed?	Interval Removed / Date Created	Foam Mk?	Mkd/ Tag?	Pkgd? Desc.	Photo?
PLACE SPC BAR CODE LABEL HERE						
PLACE SPC BAR CODE LABEL HERE						
PLACE SPC BAR CODE LABEL HERE						
PLACE SPC BAR CODE LABEL HERE						

I hereby acknowledge receipt of the specimens listed above. Please return all remnant material to the Sample Management Facility when no longer needed.

Recipient _____ Date _____ Time _____ am pm

SMF Use Only — Checked By _____ Date _____

Exhibit 2. Whole Core Specimen Field Removal Checklist and Contract.

YUCCA MOUNTAIN PROJECT
INTERIM CHANGE NOTICE TO ADMINISTRATIVE PROCEDURE

ICN Number: 1 Applies to AP Number: AP-6.3Q Rev. 0

Title: Interaction of Participants and Outside Interests with Yucca Mountain Project Sample Management

REQUIRED CHANGES:

AP SECTION	CHANGE TO
1.0	Insert at the end of the existing paragraph: This procedure fulfills the requirements of section 8 (Identification and Control of Items, Samples and Data) and section 13 (Handling, Shipping and Storage)of the NNWSI Quality Assurance Plan, Rev. 4 as applicable to the operations and activities at the Sample Management Facility. Guidance is given for the control, identification and handlingof samples and specimens.

PCB Chief

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Supersedes N/A	Project Quality Manager 4/18/90		

8908030183

YUCCA MOUNTAIN PROJECT ADMINISTRATIVE PROCEDURE

Title AP-6.3Q INTERACTION OF PARTICIPANTS AND OUTSIDE INTERESTS WITH YUCCA MOUNTAIN PROJECT SAMPLE MANAGEMENT

1.0 PURPOSE AND SCOPE

This procedure defines the requirements and responsibilities of Yucca Mountain Project (Project) participants and outside interests (all known as Users) for interacting with Project Sample Management (SM) staff and facilities.

2.0 APPLICABILITY

This procedure applies to acquisition, completion, and submission to SM of reports, logs, request forms, contracts, records, and other documents by Users. These documents and records will allow Users to examine samples; select whole core and other specimens; submit samples, documents, and records for curation; and access documents and records.

3.0 DEFINITIONS

3.1 SAMPLE MANAGEMENT

Project SM is the organization responsible for the documentation, storage, and control of selected samples and sample remnants collected and dispersed for analysis and evaluation by participants. SM includes the Sample Management Facility (SMF) and Field Operations (FO). SM staff consists of management and operations personnel who ensure that SM operations and documentation satisfy applicable regulatory and quality requirements. SM is operated by T&MSS contractor personnel for the Project.

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 Users. The SMF consists of a physical facility and equipment designed to effectively process and preserve collected samples. Preservation of samples will be for the life of the Project unless otherwise directed by the Yucca Mountain Project Office (Project Office).

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 may include core, cuttings, hand- and bulk-size geologic samples,

APPROVALS

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	Supersedes	QA Manager [signature] 6/3/89		

muck, soils, alluvium, drilling and construction materials, and fluids collected at Project field sites. The responsibility for the ultimate curation of samples is assigned to those Project entities whose functions include collecting samples and maintaining custody of those samples. This responsibility is subject to the transfer of custody requirements in the Project Office Branch Technical Procedures related to SM.

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, or liquid).

3.6 SPECIMEN

A specimen is a subsection or portion that has been removed from a sample.

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 a portion of a specimen that is returned to the SMF by a User after analysis and testing has been performed on that specimen.

3.9 SAMPLE OVERVIEW COMMITTEE (SOC)

The SOC is comprised of representatives from Los Alamos National Laboratory, Lawrence Livermore 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 CURATORIAL SAMPLE INVENTORY AND TRACKING SYSTEM (CSITS)

The CSITS is the computer data base that has been developed to track in detail all actions taken on Project samples over which SM has control. The CSITS will also record all samples collected for the entire Project even if the samples are maintained by the User. The primary objective of the CSITS is to assist in establishing and maintaining traceable records of each sample collected for the Project.

4.0 RESPONSIBILITIES

4.1 SAMPLE MANAGEMENT MANAGER

The SM Manager shall administer the overall operations of SM to ensure that samples and related documents and records under control of the SMF will support a U.S. Department of Energy (DOE) license application to the U.S. Nuclear Regulatory Commission for a geologic high-level nuclear waste repository. The SM Manager will interact with the Project Office and Users concerning SM and organizational policies.

4.2 SAMPLE MANAGEMENT CURATOR

The SM Curator shall be responsible for daily management of all aspects of the SMF. The Curator shall manage SMF staff performing sample handling, data compilation, photodocumentation, records management, and specimen distribution. The Curator shall administer visitor use of the SMF to ensure that policies and procedures are followed.

4.3 USER

The User shall acquire, complete, and submit to the SMF applicable request forms, contracts, and reports required by this procedure.

4.4 SAMPLE OVERVIEW COMMITTEE

The SOC shall be responsible for the review of sample and specimen requests from SOC members and Principal Investigators (PIs) according to Project Administrative Procedure (AP) AP-6.4Q.

4.5 CHIEF OF THE SITE INVESTIGATIONS BRANCH (SIB)

The SIB Chief of the Project Office shall authorize access to the SMF and shall review and approve, if appropriate, sample examination requests to appropriate Users.

4.6 DIRECTOR OF THE REGULATORY AND SITE EVALUATION DIVISION (RSED)

The RSED Director of the Project Office shall approve or disapprove specimen distribution recommendations from the SOC (AP-6.4Q).

5.0 PROCEDURE

5.1 INTRODUCTION

5.1.1 Project SM is the responsibility of the T&MSS contractor. SM has been established to ensure that selected Project samples are documented, controlled, and maintained in a manner consistent with applicable regulations and quality requirements. In support of these functions, SM will ensure that the samples collected and documents and the records generated at Project field sites are of the highest quality by employing effective management and implementing applicable procedures.

5.1.2 SM staff will coordinate activities with Users. These activites may include visitation to the SMF; examination of samples; selection of whole core and other specimens; submission of samples, documents, and records for processing and curation; and access to documents and records. All documents required by this procedure may be obtained by contacting SM.

5.2 ACCESS RESTRICTIONS

The SMF is divided into restricted areas and non-restricted areas.

5.2.1 Restricted Areas

Users with valid scientific or regulatory needs shall apply for and secure authorization for access into restricted areas (areas where samples, specimens, or records are being examined, processed, or stored) prior to visiting the SMF. Access to restricted areas will be authorized in writing by the SIB Chief. Users needing access on a regular basis will be placed on a permanent access list authorized by the SIB Chief. All visitors entering the facility shall register at the reception area.

5.2.2 Non-restricted Areas

Visitors to non-restricted access areas of the SMF shall be approved by the Curator and shall register at the front desk. Groups visiting the SMF on tours approved by the Project Office and/or the DOE Office of External Affairs will be admitted only to non-restricted areas of the facility. Identities of tour group members will be maintained by the SMF.

5.3 EXAMINATION OF SAMPLES

Samples may be examined in two ways: (1) during a Core Examination Meeting and (2) by individual examination of samples. Regardless of the method, Users who need to visually examine samples at the SMF shall complete and sign a Sample Examination Request (Exhibit 1). By signing this form, the User agrees that samples will be visually examined only; that no specimens will be removed; that no destructive actions, e.g., scraping, will be performed; and that no foreign materials, e.g., hydrochloric acid, will be applied to samples or left in the sample container. The request must be submitted to the SIB Chief for approval and received by the SMF prior to the visit. The Curator will interact with the User to schedule the date(s) of the visit. Samples will be available for examination on a priority basis as determined by the RSED Director.

5.4 ACQUISITION OF SPECIMENS

5.4.1 To ensure that sufficient specimens are available for testing and analysis, requests for specimens shall be submitted to the SOC for review and evaluation according to AP-6.4Q. The SOC will recommend a course of action to the RSED Director for each specimen request. The RSED Director shall approve or disapprove the SOC recommendation. Specimens will be distributed only after approval by the RSED Director and if an approved quality assurance (QA) program that controls activities related to specimens is in place by the User.

5.4.2 Users who want to acquire whole core or other specimens shall present a completed and approved SOC Specimen Removal Request (Exhibit 2), available by contacting SM. Requests shall be approved by the RSED Director prior to submission to SM. A User must submit these requests to SM enough in advance to allow sufficient lead time for preparing and removing the specimen. Users who want to obtain whole core specimens during drilling operations shall follow the procedures defined in AP-6.2Q.

5.4.3 A CSITS-generated Specimen Removal Contract (Exhibit 3) for specimens designated for the same User within a shipping container shall be prepared and sent with the shipment. Each contract contains specific information on the specimens which the User will receive. The approved tests to be performed on specimens, and the Study Plan number and title that delineates those tests, will be listed on the contract. This form will be completed at the SMF if the User receives the specimens at the SMF. If the specimens are shipped to the User, each contract shall be signed and returned to the SMF within 10 business days of receipt of the specimens.

5.5. UNQUALIFIED SAMPLES

Geologic samples that were collected prior to implementation of an approved QA plan will be available for examination and distribution. Users wishing to utilize these samples in any manner (examination, request for specimen acquisition) must complete an Unqualified Samples Agreement (Exhibit 4). If the User wishes to examine this type of sample, a Sample Examination Request must be submitted to the SMF prior to examination, as described in Section 5.3. Agreement forms can be obtained by contacting the SMF. Requests for specimens from unqualified core or cuttings shall be approved by the RSED Director according to procedures in AP-6.4Q. A User shall also submit a Specimen Removal Contract to SM, as described in Section 5.4.3. When referencing these specimens in any report, test, or analysis, the User must retain the SPC specimen bar code number assigned to those specimens by the SMF.

5.6 REMNANT RETURN

Remnants no longer needed may be returned by the User to the SMF, along with an inventory identifying the original specimens that were the source of the remnants and the SPC specimen bar code number with depth interval or location identification. Any foreign materials (e.g., hydrochloric acid) that may have been applied to the remnant shall be identified along with the inventory. Upon receipt by the SMF, the User's inventory will be checked against the SMF shipping record, and a list of any discrepancies noted will be compiled. The User will be contacted to resolve any problems, if necessary.

5.7 SUBMISSION OF SAMPLES AND SAMPLE COLLECTION DOCUMENTS TO THE SMF

5.7.1 Samples intended for the site characterization program and defined in Section 3.3, excluding those controlled by AP-6.2Q, shall have applicable collection information submitted to the SMF. The User may acquire a Sample

Collection Report (Exhibit 5) from the SMF for each sample to be collected. The User may also use his or her own collection report; however, the minimal amount of sample information, as delineated on the Sample Collection Report, shall be submitted to the SMF in place of the Sample Collection Report. Not all sample materials will be submitted to the SMF. If the User submits samples to his or her own organization, the User shall have an approved QA program for sample curation.

5.7.2 The Sample Collection Report will be completed prior to submission of the samples to the SMF or to the User's organization. Directions for completion of the report will be provided to the User. A copy of the Sample Collection Report shall be submitted to the SMF within 30 days if the actual sample is retained by the User.

5.7.3 In addition to the Sample Collection Report, the User will be given sets of adhesive-backed bar code labels. If the sample is to be submitted to the SMF for storage, an SMF sample bar code label shall be affixed to the individual sample (if possible) or to the sample container. If the sample will be stored at the User's facility, the bar code label may be affixed to the sample or sample container, the User's field notes, photograph, etc. In either case, an identical bar code label from the same set shall be affixed to the corresponding Sample Collection Report.

5.7.4 If both the sample and Sample Collection Report are submitted to the SMF, the User and an SMF staff member completing the custody change will sign and date the Sample Collection Report. A copy of the report will be given to the User. These signatures are only necessary if the sample is submitted for curation along with the Sample Collection Report.

5.8 IDENTIFICATION AND RESOLUTION OF DISCREPANCIES

5.8.1 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.

5.8.2 If the incorrect information is identified by the originator or other person subsequent to the completion of the document or activity (i.e., becomes a record) the individual is responsible for documenting the corrections to the erroneous information. The incorrect information shall be crossed through, corrected on the original document, and initialed and dated by the individual making the corrections. If the correction is not

self-explanatory, the individual shall assign a number to the correction and attach a sheet to the original that fully describes the correction that has been performed.

5.8.3 If a discrepancy is found on a form or document, and the same discrepant information appears on previous documents already verified (entered into a baselined data system), then corrections will be made on a copy of the record. This corrected copy will be placed with the uncorrected file copy of the record.

5.9 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, SM staff members shall report them to the Project Office Project Quality Manager or another individual in the Project Office QA organization. Reporting and segregation of a nonconforming item or termination of a nonconforming activity will be done according to Project Office Quality Management Procedure (QMP) QMP-15-01.

6.0 REFERENCES

AP-6.2Q, Management and Operation of Sample Handling Activities at Borehole Sites.

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

QMP-15-01, Control of Nonconformances.

QMP-17-01, Record Source and Record User Responsiblities.

7.0 APPLICABLE FORMS

Exhibit 1. Sample Examination Request.

Exhibit 2. SOC Specimen Removal Request.

Exhibit 3. Example of CSITS-generated Specimen Removal Contract.

Exhibit 4. Unqualified Samples Examination Agreement.

Exhibit 5. Sample Collection Report.

8.0 RECORDS

The SM Manager shall ensure that the following QA records resulting from implementation of this procedure are processed according to QMP-17-01 and turned over to the T&MSS Local Records Center at least every 10 business days. Copies of these QA records will be retained by SM and stored at the SMF Docu- ments Center.

1. Sample Examination Request.
2. SOC Specimen Removal Request.
3. Specimen Removal Contract.
4. Unqualified Samples Examination Agreement.
5. Sample Collection Report (SM or other).

YUCCA MOUNTAIN PROJECT SAMPLE MANAGEMENT FACILITY

SAMPLE EXAMINATION REQUEST — BTPSMF5-1 5/89

Requester (Please print) _____

Organization _____

Address _____

_____

Telephone ( ) _____ (FTS) _____

Requested examination date(s) and time: from _____ to _____

Study Plan Number _____ Title _____

SIB Chief Authorization Number _____ Date _____

The Yucca Mountain Project (Project) geologic samples that have been provided for your examination at the Sample Management Facility are controlled by the Project Quality Assurance Program. The samples that are made available to your are for VISUAL EXAMINATION ONLY. NO DESTRUCTIVE ACTIONS OR SUBSAMPLING are to be performed. NO FOREIGN SUBSTANCES will be applied to these samples.

I have read the above statement and will comply with sample examination restrictions.

Requester Signature _____ Date _____

Acquisition Site	Depth Interval or Reference	Sample Type

SMF USE ONLY: TS Assistant _____ Date _____

Exhibit 1. Sample Examination Request.

YUCCA MOUNTAIN PROJECT SAMPLE OVERVIEW COMMITTEE

SOC SPECIMEN REMOVAL REQUEST | Page 1 of 2 | N-QA-083 5/89

Requester _____ Telephone ( ) _____ (FTS) _____

Organization _____

_____

City _____ State _____ Zip Code _____

Signature of SOC Representative _____ Date _____

Study Plan Number _____

Activity Title _____

QA Level Assignment (I, II, III) _____ QALAS Number _____

Test or Analysis to be Performed _____

_____

Specimen Requirement(s) and Description _____

_____

Approved (A), Disapproved (D), Tabled (T)

Specimen Source	Specimen Type	Interval/ Length	Amount	Substitution Acceptable	SOC Chair.	LANL	LLNL	SNL	T&MSS	USGS

Exhibit 2. SOC Specimen Removal Request.

YUCCA MOUNTAIN PROJECT SAMPLE OVERVIEW COMMITTEE

SOC SPECIMEN REMOVAL REQUEST | Page 2 of 2 | N-QA-083 5/89

Approved (A), Disapproved (D), Tabled (T)

Specimen Source	Specimen Type	Interval/ Length	Amount	Substitution Acceptable	SOC Chair.	LANL	LLNL	SNL	T&MSS	USGS

SOC RECOMMENDATION : APPROVED (A), DISAPPROVED (D), TABLED (T) Date _____

YMP/SOC/CHAIR. _____ A,D,T

LANL _____ A,D,T

LLNL _____ A,D,T

SNL _____ A,D,T

T&MSS _____ A,D,T

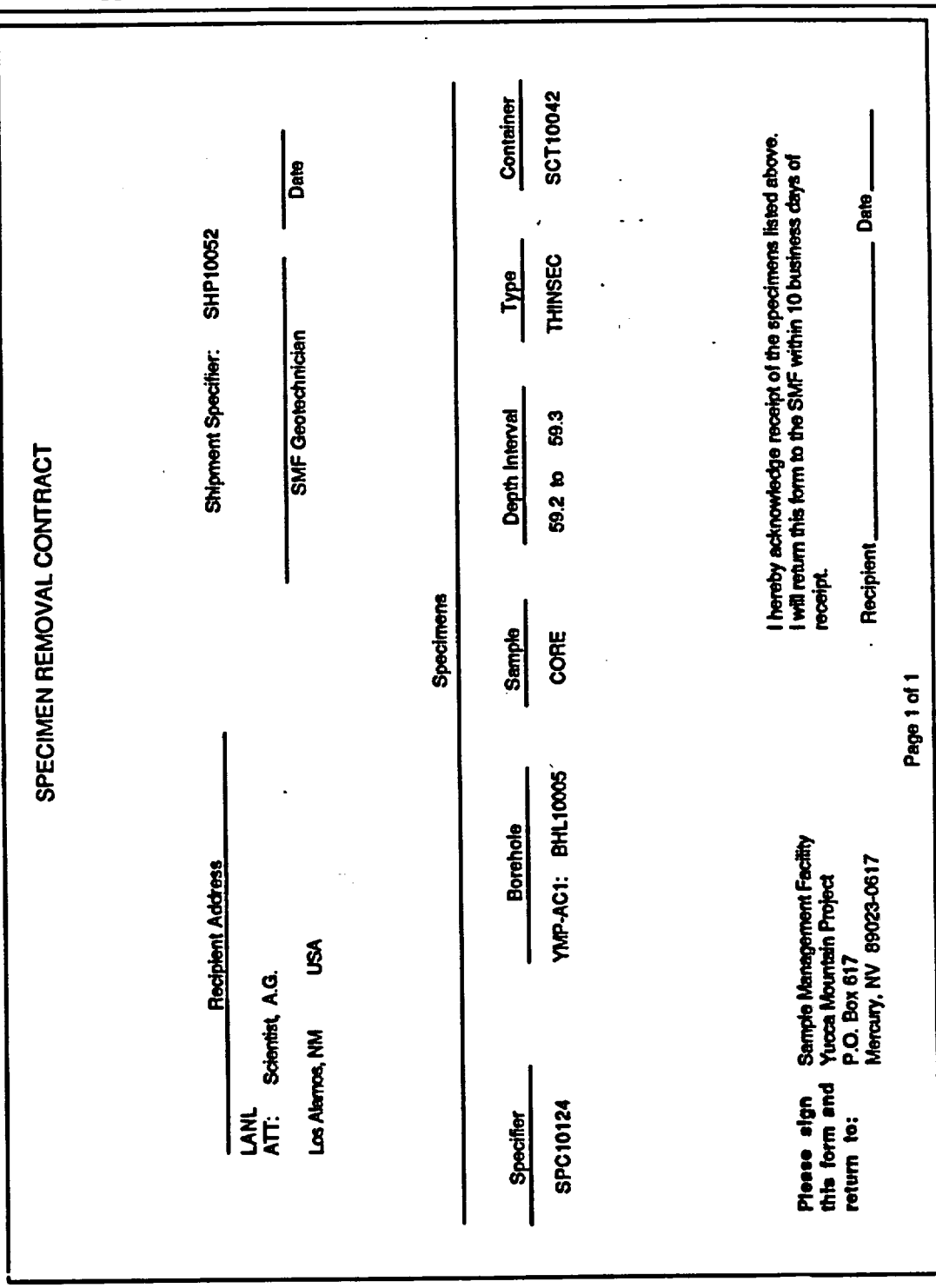
USGS _____ A,D,T

COMMENTS _____

Project Office RSED Director Action (approved/disapproved/tabled)

Signature _____ Date _____

Exhibit 2. SOC Specimen Removal Request (cont'd.)



SPECIMEN REMOVAL CONTRACT

Shipment Specifier: SHP10052

Recipient Address

LANL
ATT: Scientist, A.G.

Los Alamos, NM USA

SMF Geotechnician _____ Date _____

Specimens

Specifier	Borehole	Sample	Depth Interval	Type	Container
SPC10124	YMP-AC1: BHL10005	CORE	59.2 to 59.3	THINSEC	SCT10042

I hereby acknowledge receipt of the specimens listed above. I will return this form to the SMF within 10 business days of receipt.

Recipient _____ Date _____

Please sign this form and return to:

Sample Management Facility
Yucca Mountain Project
P.O. Box 617
Mercury, NV 89023-0617

Page 1 of 1

Exhibit 3. Example of CSITS-generated Specimen Removal Contract.

YUCCA MOUNTAIN PROJECT SAMPLE MANAGEMENT FACILITY

UNQUALIFIED SAMPLES EXAMINATION AGREEMENT	BTPSMF5-3 5/89

Yucca Mountain Project geologic samples that were collected prior to the Waste Management Project Office Quality Assurance Program Plan (WMPO/88-1) and applicable approved implementing procedures are classified as "existing" samples. Existing samples that have not been designated QAL1 through approved procedures are designated as unqualified and are covered by the January 12, 1988, letter from Carl P. Gertz to the Technical Project Officers (NNA.880113.0007). This letter states the following concerning the use of unqualified samples and derived data:

> "At this juncture, each participant is to proceed under the assumption that the existing core and derived data have not been qualified for use in licensing. Each participant must ensure that this data is identified as required by NVO-196-17 (now NNWSI 88/9) and that such data is not entered into documents or systems which are to contain qualified data only."

The responsibility to adequately identify and control exisiting sample-derived data as directed by the Yucca Mountain Project Office is assigned to you, the examiner, as a representative of your organization.

I have read the above statement and will comply with the directions to identify and control unqualified existing data.

Examiner (print)	Signature	Organization	Date

Exhibit 4. Unqualified Samples Examination Agreement.

YUCCA MOUNTAIN PROJECT SAMPLE MANAGEMENT FACILITY

SAMPLE COLLECTION REPORT | BTPSMF7-1 5/89

Date Sample Collected		Page____of_____
Sample Collector		
Organization		
Collector's Sample ID		

PLACE SMP BAR CODE LABEL HERE

Type of sample (*circle*): rock muck soil liquid gas
other (*specify*): _____

Type of site (*Circle all appropriate entries*)

SURFACE:				ESF:			
trench	outcrop	borehole	other	borehole	muck pile	Shaft / Drift in place	other

Collection Location:

SAMPLE: weight_____, volume_____, dimensions_____

FIELD PHOTOS (*circle*): prints slides instant prints video photogrammetry NA

STORAGE REQUIREMENTS:

REMARKS:

SAMPLE TRANSFER TO SMF (*Check one*) ☐ Yes ☐ No

Person Releasing Custody	Date	Person Accepting Custody	Date

SMF USE

STORAGE LOCATION: Area_____ Unit_____
Date Stored_____ Time Stored_____
Verified By:_____ Date_____

Exhibit 5. Sample Collection Report.

N-QA-023

INTERIM CHANGE NOTICE

UNCONTROLLED DOCUMENT

ICN Number: 2	Effective Date: 10/17/90	Page 1 of 6

Applies to:

Number AP-6.40 Rev. 0 Title Procedure for the Submittal, Review, and Approval of Requests for Yucca Mountain Project Geologic Specimens

REQUIRED CHANGE(S): (Minor ☐ Yes ☒ No)

PARAGRAPH	CHANGE TO
Section 7.0	Add to read:
	Exhibit 2. Specimen Removal Process Flowchart.
After Page 12	Add the attached pages.

APPROVALS

Division Director	Director, QA	Project Manager
Robert H. Norton for Maxwell Blanchard	Donald G. Horton	Carl Gertz
Date 10/9/90	Date 10/10/90	Date 10/13/90

~~9908030185~~

'CN Number:	Applies to:	Effective Date:	Page 2 of 6
2	AP-6.4Q	10/17/90	

REQUIRED CHANGE (S): (Minor ☐ Yes ☑ No)

PARAGRAPH

CHANGE TO

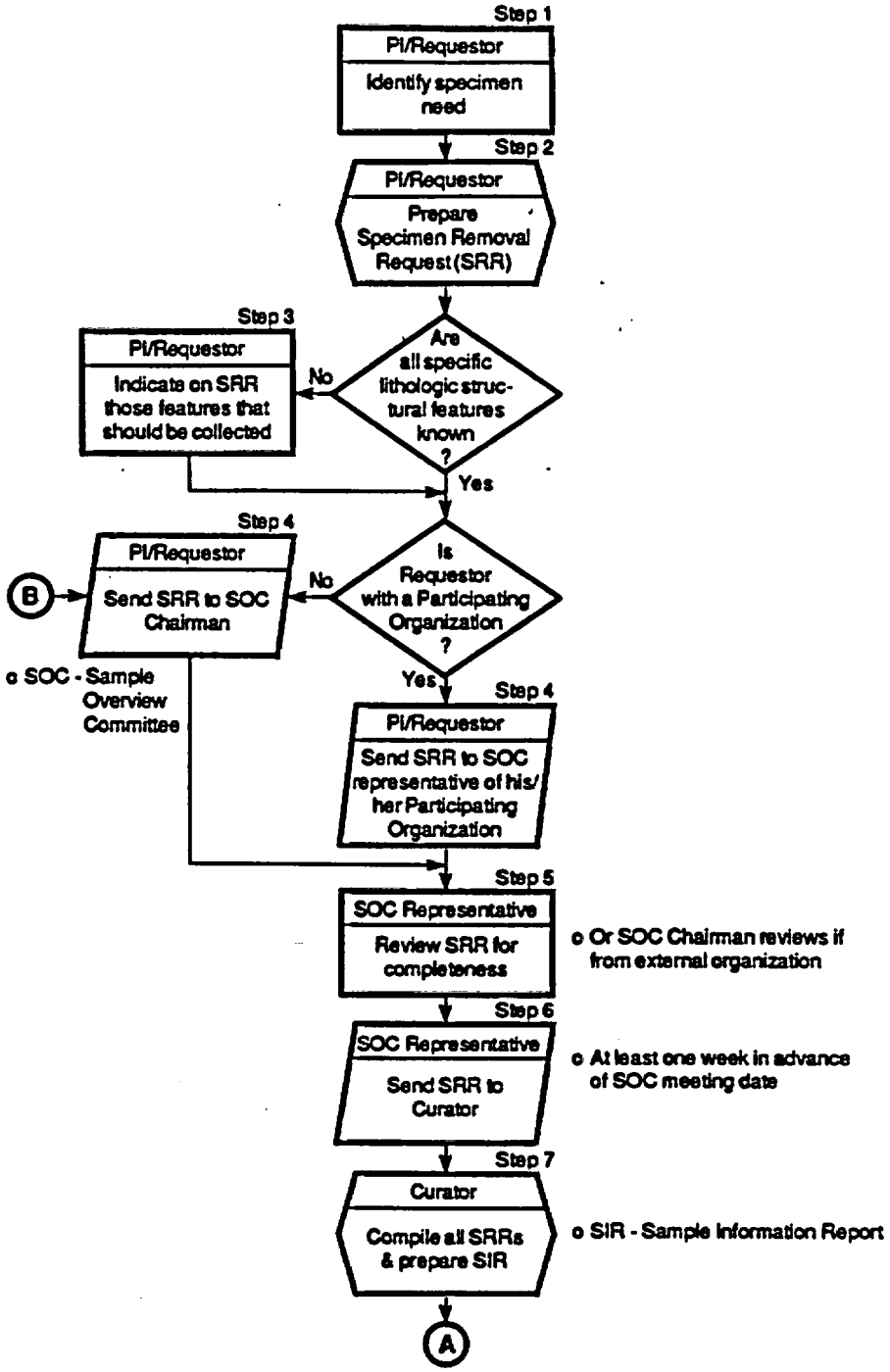


Exhibit 2. Specimen Removal Process Flowchart.

ICN Number:	Applies to:	Effective Date:	Page 3 of 6
2	AP-6.4Q	10/17/90	

REQUIRED CHANGE (S): (Minor ☐ Yes ☒ No)

PARAGRAPH

CHANGE TO

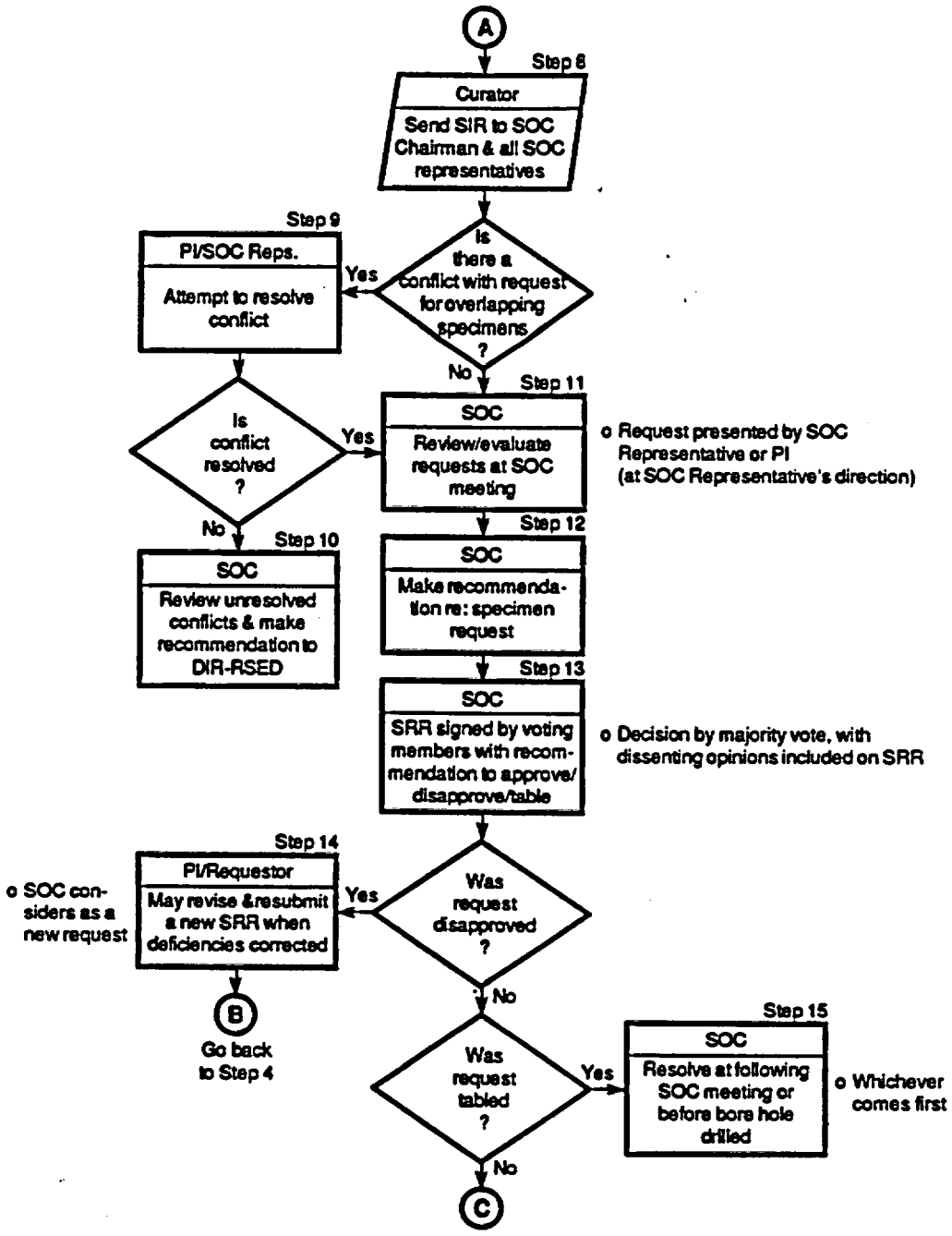


Exhibit 2. Specimen Removal Process Flowchart (continued).

REQUIRED CHANGE (S): (Minor ☐ Yes ☒ No)

PARAGRAPH

CHANGE TO

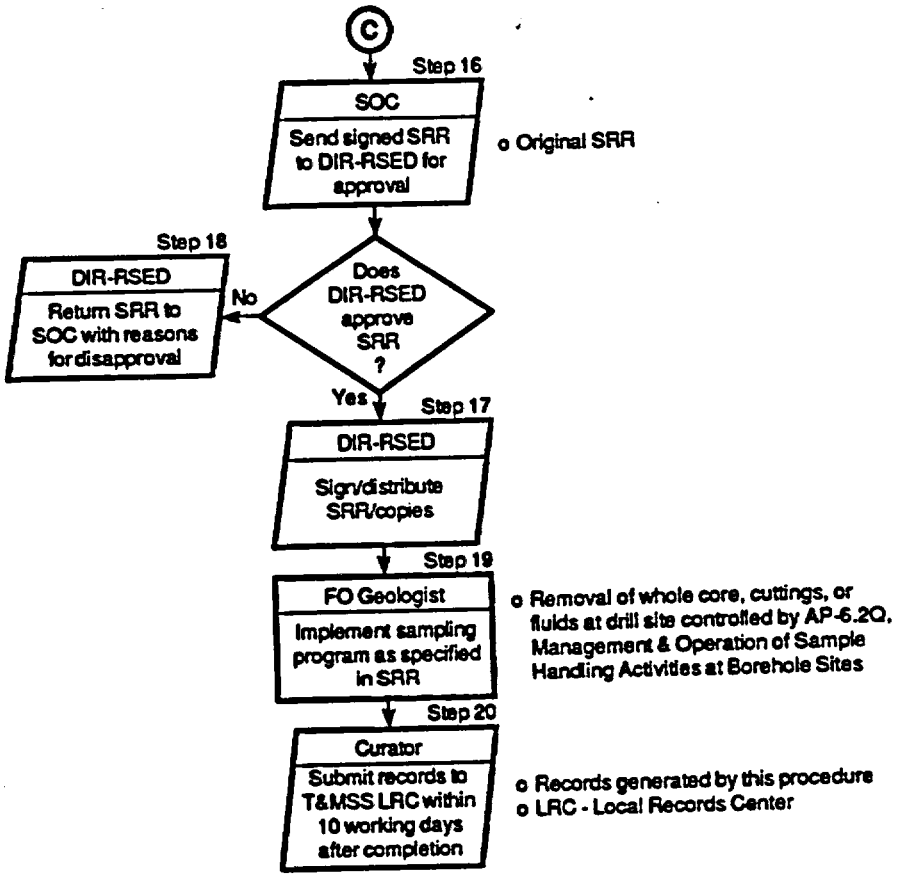


Exhibit 2. Specimen Removal Process Flowchart (continued).

REQUIRED CHANGE (S): (Minor ☐ Yes ☒ No)

PARAGRAPH

CHANGE TO

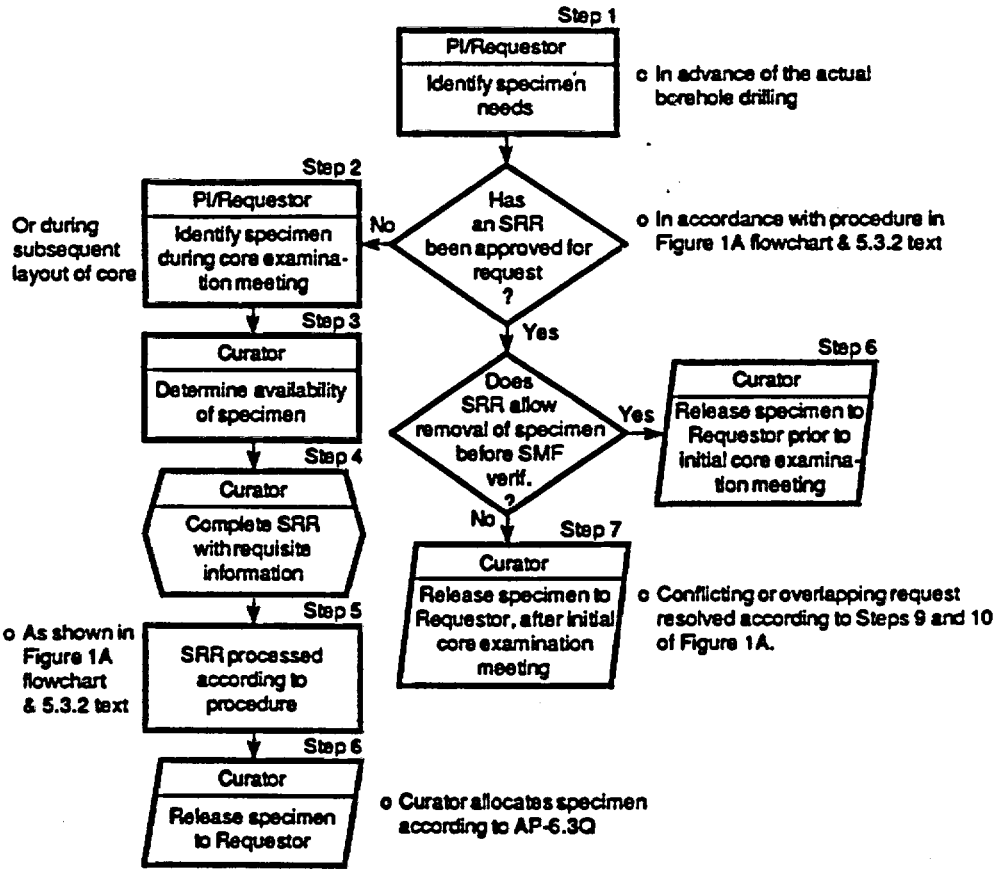


Exhibit 2. Specimen Removal Process Flowchart (continued).

REQUIRED CHANGE (S): (Minor ☐ Yes ☒ No)

PARAGRAPH

CHANGE TO

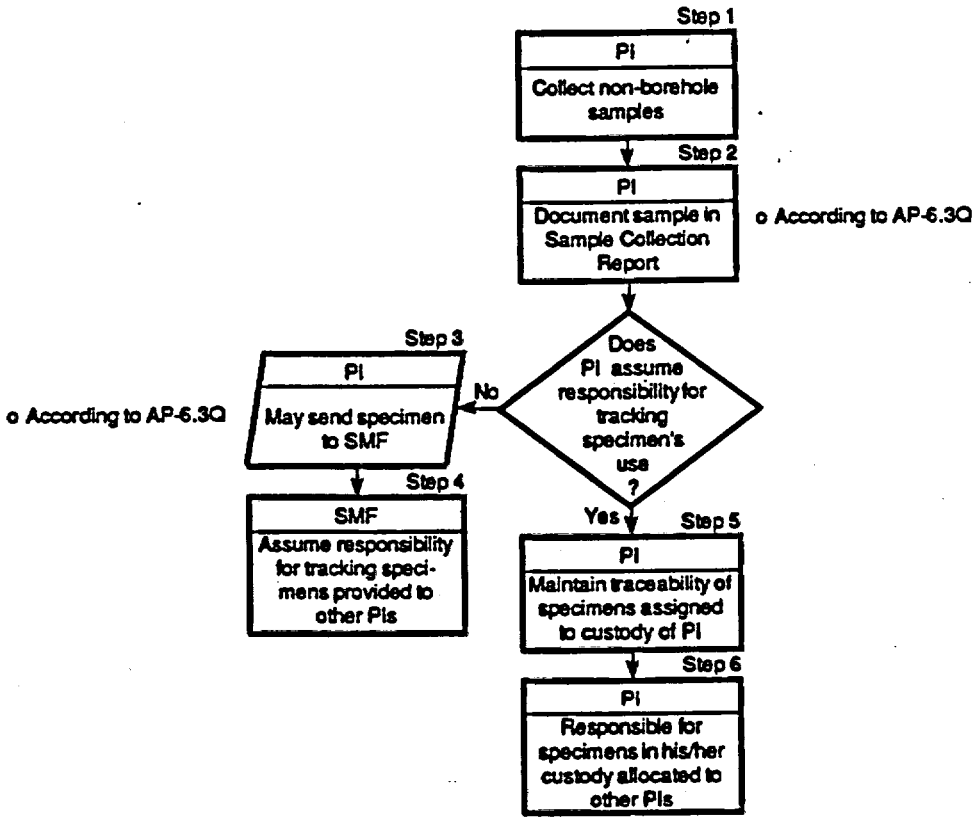


Exhibit 2. Specimen Removal Process Flowchart (continued).

YUCCA MOUNTAIN PROJECT
INTERIM CHANGE NOTICE TO ADMINISTRATIVE PROCEDURE

AD-656
4/89

144

ICN Number: 1 Applies to AP Number: AP-6.4Q Rev. 0

Title: Procedure for the Submittal, Review, and Approval of Requests for Yucca Mountain Project Geologic Samples

REQUIRED CHANGES:

AP SECTION	CHANGE TO
1.0	Insert at the end of the existing paragraph: This procedure fulfills the requirements of section 8 (Identification and Control of Items, Samples and Data) and section 13 (Handling, Shipping and Storage)of the NNWSI Quality Assurance Plan, Rev. 4 as applicable to the operations and activities at the Sample Management Facility. Guidance is given for the control, identification and handlingof samples and specimens.

PCB Chief

Effective Date 4/24/90	Project Manager 4/19/90	Page 1 of 1	No. AP-6.40
Supersedes N/A	Project Quality Manager 4/18/90		

Title AP-6.4Q PROCEDURE FOR THE SUBMITTAL, REVIEW, AND APPROVAL OF REQUESTS FOR YUCCA MOUNTAIN PROJECT GEOLOGIC SPECIMENS

1.0 PURPOSE AND SCOPE

Geologic specimens provide the basis for developing much of the site characterization data relative to the suitability of Yucca Mountain as a mined geologic repository for high-level radioactive waste. This procedure describes the Yucca Mountain Project Office (Project Office) requirements and responsibilities for the allocation of Yucca Mountain Project (Project) geologic specimens.

2.0 APPLICABILITY

This procedure applies to all geologic specimens that have been collected or are planned to be collected in support of site characterization and that will be processed by Sample Management (SM). Geologic specimens covered in this administrative procedure (AP) primarily include those obtained from boreholes and the Exploratory Shaft Facility. Surface outcrop and trench samples shall, if allocation to Principal Investigators (PIs) other than the collector is necessary, be covered by this AP.

3.0 DEFINITIONS

3.1 YUCCA MOUNTAIN PROJECT

The Project was established by the U.S. Department of Energy, Nevada Operations Office (DOE/NV) to carry out planned and systematic actions to provide sufficient information to expand the public's confidence in the suitability of a mined geologic repository that potentially may be located at Yucca Mountain, Nevada. The allocation and disposition of geologic samples must meet the requirements of 10 CFR Part 60; the Project Site Characterization Plan (SCP), Chapter 8; and the Project Quality Assurance Plan (QAP), NNWSI/88-9, Rev. 2.

3.2 YUCCA MOUNTAIN PROJECT OFFICE

The Project Office is assigned by DOE/NV to administer and coordinate the management and technical direction of the activities of Project Participating Organizations and Nevada Test Site (NTS) Support Contractors.

3.3 SAMPLE OVERVIEW COMMITTEE

The Sample Overview Committee (SOC) is a Project-level organization composed of (1) one voting member from each Participating Organization involved in the use of specimens for site investigations in support of site characterization and (2) nonvoting, advisory members from the Technical and Management

Support Services (T&MSS) contractor SM and the Project Office Quality Assurance (QA). The SOC is responsible for ensuring that all Project Participating Organizations and outside organizations are provided with appropriate geologic specimens related to site characterization activities and that representative samples, if required by the Project Office, are retained for archiving. The SOC reviews specimen requests from various Project Participating Organizations and outside organizations and, based on present and future Project needs, makes recommendations on specimen allocations.

3.4 YUCCA MOUNTAIN PROJECT PARTICIPATING ORGANIZATIONS

Participating Organizations consist of the Project Office, Los Alamos National Laboratory, Lawrence Livermore National Laboratory, Sandia National Laboratories, the U.S. Geological Survey (USGS), Science Applications International Corporation (SAIC), Harza Engineering Company (Harza), Westinghouse Electric Corporation (Westinghouse), NTS Support Contractors, and any other Project contractor conducting hydrologic or geologic site investigations and designated by the Project Manager to be an SOC member.

3.5 TECHNICAL AND MANAGEMENT SUPPORT SERVICES CONTRACTOR

The T&MSS contractor (SAIC, Harza, and Westinghouse) provides technical operational management support to the Project Office, which includes the administrative and technical management of SM.

3.6 SAMPLE MANAGEMENT

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

3.7 YUCCA MOUNTAIN PROJECT SAMPLE MANAGEMENT FACILITY

The Project SMF consists of two storage and handling buildings located in Area 25 of the NTS. These buildings are where geologic samples are received, handled, transferred, processed, archived, and allocated in accordance with Project requirements. SMF personnel support the SOC by tracking and distributing specimens and documents and by generating sample status reports.

3.8 SAMPLES

A sample is part of a population whose properties are studied to gain information about the whole or group. Geologic, hydrologic, environmental or

other types of examinations are conducted on samples or specimens derived from samples. Samples include core, cuttings, fluids, and any other geologic samples collected at Yucca Mountain or related field sites.

3.9 ADMITTED SAMPLES

Admitted samples are samples that are in custody at the SMF.

3.10 SPECIMEN

A specimen is a subsection or portion that has been removed from the original sample. Further splits of specimens are subspecimens.

3.11 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 laboratory analysis.

3.12 CORE EXAMINATION MEETING

A Core Examination Meeting is periodically held at the SMF during which a group of PIs may examine large intervals of core in order to select specimens.

4.0 RESPONSIBILITIES

4.1 YUCCA MOUNTAIN PROJECT MANAGER

The Project Manager is responsible for designating Participating Organizations to be represented on the SOC.

4.2 DIRECTOR OF THE PROJECT OFFICE REGULATORY AND SITE EVALUATION DIVISION

The Director of the Regulatory and Site Evaluation Division (RSED) is responsible for the technical management of site characterization activities, which includes the management of samples by SM. The RSED Director is responsible for approving or disapproving recommendations for specimen requests by the SOC and for appointing the SOC Chairman from the RSED Site Investigation Branch (SIB).

4.3 SAMPLE OVERVIEW COMMITTEE CHAIRMAN

The SOC Chairman is responsible for calling and chairing meetings of the SOC, presenting specimen requests from Participating Organizations and non-

member organizations to the SOC where appropriate, and presenting the recommendations of the SOC to the RSED Director.

4.4 CURATOR OF THE SAMPLE MANAGEMENT FACILITY

The Curator distributes samples and specimens as directed by the RSED Director and provides the SOC with periodic updated sample status reports. The Curator ensures that records generated by this procedure are submitted to the T&MSS Local Records Center (LRC) within 10 working days.

4.5 SAMPLE OVERVIEW COMMITTEE

Members of the SOC are responsible for representing their organizations' specimen needs and requests, integrating current and future Project specimen needs, recommending resolution of conflicting specimen requests, and recommending a course of action on all specimen requests to the RSED Director.

4.6 DIRECTOR OF THE PROJECT OFFICE QUALITY ASSURANCE DIVISION

The Director of the Quality Assurance Division is responsible for appointing the QA representative to the SOC.

4.7 TECHNICAL AND MANAGEMENT SUPPORT SERVICES CONTRACTOR

The T&MSS contractor is responsible for appointing the SM representative to the SOC.

4.6 TECHNICAL PROJECT OFFICERS

The Technical Project Officer (TPO) for each of the SOC member organizations is responsible for appointing a representative to the SOC.

4.9 FIELD OPERATIONS MANAGER

The FO Manager of Sample Management for the Project Office is responsible for preparing sampling instructions based on approved Specimen Removal Requests for each borehole.

5.0 PROCEDURE

5.1 INTRODUCTION

The SOC has been established to evaluate requests for specimens with respect to current and future Project specimen plans and needs, and to ensure preservation of representative samples deemed appropriate by the RSED

Director. This procedure establishes the method for the submittal, review, and approval of specimen requests prior to actual allocation of the specimens to Participating Organizations or outside organizations.

5.2 TYPES OF SAMPLES

5.2.1 Borehole samples include core, cuttings, and fluids collected at the drill site.

5.2.2 Existing core and cuttings refer to such material transferred from the USGS Core Library and Data Center, Mercury, Nevada, to the custody of the SMF during 1988-89.

5.2.3 Nonborehole samples include surface samples such as those collected from outcrops or trenches.

5.3 SPECIMEN REQUESTS

5.3.1 Requests for Removal of Specimens at the Drill Site

5.3.1.1 Because some specimens are removed at the drill site for study, review and recommendation by the SOC for specimen requests must occur prior to the drilling of the borehole. Drill site specimens include whole core, rubble, cuttings, or borehole fluids.

5.3.1.2 Each PI (or requestor) identifies specimen needs and prepares an SOC Specimen Removal Request (SRR; Exhibit 1). The SRR shall contain specimen information, such as specimen source (e.g., borehole number, trench number), depth interval, and/or lithologic unit; the size and spacing of specimens; the title of the activity; and the Study Plan number as given in the SCP. A brief description of the type of test or analyses to be performed (e.g., thin section analysis) and any specific specimen requirements (e.g., whole core only, nonfractured) are to be included. If specimens from other intervals, units, and/or locations may be substituted for the initial request, this should be stated. Indicate whether the specimens will be available for subsequent users and what alterations, if any, will be done to it.

5.3.1.2.1 It is not possible to anticipate all the specific lithologic or structural features that may be intersected by a borehole prior to drilling. When appropriate, the PI or requestor shall indicate on the SRR those features that should be collected by the FO Geologists (e.g., specimens at color changes; specimens at, below, or above contacts; specimens from fault zones, etc.) when they are observed in samples at the drill site. The amount of specimen to be collected should be specified (e.g., a 4-inch length of core, 250 grams of cuttings, etc.).

5.3.1.2.2 The PI or requestor sends the SRR to the SOC representative at his or her Participating Organization. Outside organizations shall send requests to the SOC Chairman.

5.3.1.3 The SOC representative for each Participating Organization reviews the SRR for completeness and forwards a copy of the SRR to the Curator. Because of the time involved in compiling the specimen needs and in reviewing and approving the requests, all requests must be submitted to the Curator by the SO representative at least one week in advance of the meeting date when the request will be considered.

5.3.1.4 The Curator compiles all the specimen/sample requests for the borehole and prepares a Sample Information Report (SIR) showing the stratigraphic distribution of specimens by PI or requestor and organization along with additional information on specimen requirements and use. A copy of the SIR, including specimen information from all the participating and outside organizations, is sent to the SOC representative at each Participating Organization and to the SOC Chairman.

5.3.1.4.1 When possible, the PIs involved, along with the SOC representative, should attempt to resolve overlapping specimen requests. Unresolved conflicting requests are reviewed by the SOC, and recommendations concerning their resolution are sent to the RSED Director.

5.3.1.5 The SOC meeting to review requests prior to the drilling of a borehole must be sufficiently in advance of the actual drilling such that the specimen requests are included in the sampling instructions prepared by the FO Manager.

5.3.1.5.1 Each SOC representative or the PI, at the discretion of the SOC representative, presents the specimen request to the SOC for action. The SOC reviews and evaluates specimen requests compiled in the SIR in the context of other specimen requests or allocations for that specimen location, the request's reasonableness in light of the investigation's nature, and the specimen requirements of the PI(s) responsible for the technical purpose of a given borehole. The original SRR (retained by the SOC representative) is either signed by the voting members of the SOC with a recommendation for approval or disapproval; or tabled. The decision is by majority vote, but dissenting opinions shall be included under Comments on the SRR.

5.3.1.5.2 Sample requests that have been disapproved may be revised and resubmitted when the deficiencies have been corrected. The SOC shall consider this request as a new request.

5.3.1.5.3 Tabled requests shall be resolved either before the borehole is drilled or at the following SOC meeting, whichever occurs first.

5.3.1.5.4 The signed SRR shall be sent to the RSED Director for approval/ disapproval.

5.3.1.6 The RSED Director shall act on the SOC's recommendations and shall, after signing the original SRR, send copies of the SRR to the appropriate PIs or requestors, SOC members, and Curator. An additional copy shall be sent to the FO Manager for inclusion of these specimen requests in the drilling instructions.

5.3.1.6.1 Disapproved requests are returned to the SOC with the reason(s) for disapproval and are handled according to Section 5.3.1.5.2.

5.3.1.7 Removal of whole core, cuttings, or fluids at the drill site is controlled by AP-6.2Q, Management and Operation of Sample Handling Activities at Borehole Sites. The sampling program to be implemented by the FO Geologists at the drill site is controlled by the requirements specified in the SRR.

5.3.2 Specimen Requests from Admitted Samples

5.3.2.1 Each PI or requestor identifies specimen needs.

5.3.2.1.1 The identification may take the form of an SRR completed and approved (in accordance with this procedure) in advance of the actual borehole drilling (e.g., a request to sample mineralized fractures, the location of which is not known prior to the examination of core). Unless there are conflicting or overlapping requests, which must be resolved in accordance with this procedure, such specimens may be released by the Curator to the requestor after the initial Core Examination Meeting. Specimens cannot be released prior to the initial Core Examination Meeting unless there is an approved SRR allowing for the removal of specimens before the core samples undergo verification by the SMF staff.

5.3.2.1.2 In some cases, a prior SRR will not be available and the PI or requestor will identify a specimen during the Core Examination Meeting or during a subsequent layout of the core. When the specimen is identified, the Curator will determine the availability of the specimen and will complete the requisite information on the SRR. This SRR shall be processed according to the steps in the following procedure.

5.3.2.2 All SRRs, when completed and signed by the PI or requestor, shall be sent to the SOC representative (or the SOC Chairman, in the case of requests from organizations external to the Project). The SRRs are reviewed for completeness by the SOC representative or SOC Chairman. A copy of the signed SRR is sent to the Curator.

5.3.2.3 The Curator prepares an SIR as described in Section 5.3.1.4. The SIR should also include information on the availability of the requested specimen

(e.g., whether the specimen is reserved for another PI, the physical state of the sample from which the specimen will be taken, the impact on the sample inventory if the sample is allocated).

5.3.2.4 The Curator sends copies of the SIR to all of SOC representatives and to the SOC Chairman. Overlapping or conflicting requests may be resolved between the appropriate parties at this time. If there is no resolution, the conflicting requests are reviewed by the SOC, and a recommendation for resolution is sent to the RSED Director.

5.3.2.5 The SOC representative or the PI, at the discretion of the SOC representative, presents the specimen request to the SOC for action.

5.3.2.6 The SOC reviews and evaluates the specimen requests compiled in the SIR, integrates current and future specimen needs, and submits the original SRR signed by the voting members with a recommendation stating approval, disapproval, or tabling of the request to the RSED Director. Approval is based on a majority vote. Dissenting positions by any voting member of the SOC shall be recorded under SRR Comments section.

5.3.2.6.1 Disapproved requests are covered in Section 5.3.1.5.2.

5.3.2.6.2 Tabled requests shall be resolved no later than the following SOC meeting.

5.3.2.7 The RSED Director shall act on the SOC recommendation, and with approval, shall send copies of the signed SRR to the PI, SOC members, and Curator. The Curator shall allocate the specimen(s) according to procedures in AP-6.3Q, Interaction of Participants and Outside Interests with Yucca Mountain Project Sample Management.

5.3.2.7.1 Disapproved requests are returned to the SOC with the reason(s) for disapproval. Disapproved requests are handled according to Section 5.3.1.5.2.

5.3.3 Specimen Requests from Existing Samples

Existing core and cuttings transferred from the USGS Core Library and Data Center to the custody of the SMF during 1988-89 are, at this time, considered unqualified for use as primary data in site characterization. Such material may be used in prototype work or for corroborative purposes. Requests for specimens of existing core and cuttings shall follow the procedures in Section 5.3.2. Approved recipients of existing core/cuttings shall follow the procedure for unqualified specimens in AP-6.3Q.

5.3.4 Specimen Requests from Nonborehole Samples

5.3.4.1 Nonborehole samples collected by a PI and intended for site characterization shall be documented on the Sample Collection Report in AP-6.3Q. Requests for nonborehole specimens in the custody of the SMF shall follow the procedure in Section 5.3.2.

5.3.4.2 The disposition of specimens or subspecimens in custody at the SMF is controlled by AP-6.3Q. A PI with custody of a nonborehole sample or specimen is responsible for maintaining the traceability of that sample or specimen or any subspecimen either in his/her custody or allocated to other PIs (Section VIII, QAP NNWSI/88-9). As an alternative, the PI with custody of a sample or specimen may send it to the SMF as described in AP-6.3Q. The SMF subsequently assumes responsibility for tracking the material to other PIs. When a PI assumes custody of a specimen, it is the PI's responsibility to maintain the identity of that specimen such that it can be traced back to its collection site.

5.4 OUTSIDE ORGANIZATION REQUESTS

Outside organizations (e.g., the U.S. Nuclear Regulatory Commission and the State of Nevada) shall follow the same procedures as outlined in Section 5.3. The SOC Chairman shall present these requests or, at his or her discretion, allow the requesting organization to make the presentation for the specimen allocation to the SOC. Information requested on the SRR not appropriate for outside organizations shall be marked N/A.

6.0 REFERENCES

AP-6.2Q, Management and Operation of Sample Handling Activities at Borehole Sites.

AP-6.3Q, Interaction of Participants and Outside Interests with Yucca Mountain Project Sample Management.

Project QA Plan, NNWSI/88-9, Rev. 2.

Statutory Draft, Site Characterization Plan, Chapter 8.

10 CFR Part 60, Disposal of High-Level Radioactive Wastes in Geologic Repositories.

7.0 APPLICABLE FORMS

Exhibit 1. SOC Specimen Removal Request.

8.0 RECORDS

The Curator shall ensure that the following QA record resulting from implementation of this procedure is turned over to the appropriate LRC at least every 10 business days:

1. SOC Specimen Removal Request.

YUCCA MOUNTAIN PROJECT SAMPLE OVERVIEW COMMITTEE

SOC SPECIMEN REMOVAL REQUEST | Page 1 of 2 | N-QA-083 5/89

Requester _____ Telephone ( ) _____ (FTS) _____

Organization _____

SMF BAR CODE

City _____ State _____ Zip Code _____

Signature of SOC Representative _____ Date _____

Study Plan Number _____

Activity Title _____

QA Level Assignment (I, II, III) _____ QALAS Number _____

Test or Analysis to be Performed _____

Specimen Requirement(s) and Description _____

Approved (A), Disapproved (D), Tabled (T)

Specimen Source	Specimen Type	Interval/ Length	Amount	Substitution Acceptable	SOC Chair.	LANL	LLNL	SNL	TRUES	USGS

Exhibit 1. SOC Specimen Removal Request.

YUCCA MOUNTAIN PROJECT SAMPLE OVERVIEW COMMITTEE

SOC SPECIMEN REMOVAL REQUEST

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Approved (A), Disapproved (D), Tabled (T)

Specimen Source	Specimen Type	Interval/ Length	Amount	Substitution Acceptable	SOC Chair	LANL	LLNL	SNL	T&MSS	USGS

SOC RECOMMENDATION: APPROVED (A), DISAPPROVED (D), TABLED (T) Date _____

YMP/SOC/CHAIR _____ A,D,T

LANL _____ A,D,T

LLNL _____ A,D,T

SNL _____ A,D,T

T&MSS _____ A,D,T

USGS _____ A,D,T

COMMENTS _____

Project Office RSED Director Action (approved/disapproved/tabled)

Signature _____ Date _____

Exhibit 1. SOC Specimen Removal Request (continued).

YUCCA MOUNTAIN PROJECT
INTERIM CHANGE NOTICE TO ADMINISTRATIVE PROCEDURE

Y-AD-066
4/89

ICN Number: 1 Applies to AP Number: AP 6.6Q Rev: 0

Title: Field Collection, Documentation and SPecimen Removal of Exploratory Shaft and Drift Rock

REQUIRED CHANGES:

AP SECTION	CHANGE TO
1.0	Insert at the end of the existing paragraph: This procedure fulfills the requirements of section 8 (Identification and Control of Items, Samples and Data) and section 13 (Handling, Shipping and Storage)of the NNWSI Quality Assurance Plan, Rev. 4 as applicable to the operations and activities at the Sample Management Facility. Guidance is given for the control, identification and handlingof samples and specimens.

PCB Chief

Effective Date 4/24/90	Project Manager 4/19/90	Page 1 of 1	No. AP-6.6Q
Supersedes N/A	Project Quality Manager 4/18/90		

8908030286

Title
AP-6.6Q FIELD COLLECTION, DOCUMENTATION, AND SPECIMEN REMOVAL OF EXPLORATORY SHAFT AND DRIFT ROCK

1.0 PURPOSE AND SCOPE

This procedure describes the Yucca Mountain Project Office (Project Office) requirements and responsibilities for the collection, documentation, and specimen removal and distribution of bulk mined samples from the Yucca Mountain Project (Project) exploratory shafts and drifts during sinking and mining activities.

2.0 APPLICABILITY

This procedure applies to all bulk samples collected during excavation of the shafts and drifts of the Project Exploratory Shaft Facility (ESF). It does not include core or sidewall samples collected directly from the shafts, drift walls, or breakout rooms.

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 and sample remnants collected and dispersed for analysis and evaluation by participants. SM includes Field Operations (FO) and the Sample Management Facility (SMF). 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 Users. The SMF consists of a physical facility and equipment designed to effectively process and preserve collected samples.

3.3. SAMPLE OVERVIEW COMMITTEE (SOC)

The SOC is comprised of representataives from Lawrence Livermore Natinal Laboratory, Los Alamos Natinal 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.

3.4 EXPLORATORY SHAFT (ES)

The two ESs are each 12-ft in diameter shafts and vertically mined to the approximate depth of the repository horizon. They provide access to the repository horizon for scientific investigations. Construction of the ESs shall be in accordance with Project Administrative Procedure (AP) AP-5.10Q.

3.5 EXPLORATORY SHAFT FACILITY

The ESF includes the surface facilities, shafts, and subsurface excavations directed by the Project to allow detailed study of the host rock under in situ conditions.

3.6 DRIFT

A drift is a horizontally mined excavation in the ESF. A series of drifts will be mined in the ESF.

3.7 DRIFT INTERVAL

A drift interval is a cross-sectional area of a drift from which samples will be routinely collected.

3.8 BREAKOUT ROOM

A breakout room is a lateral opening mined from an ESF shaft from which selected tests will be performed.

3.9 BREAKOUT HORIZON

A breakout horizon is an area or zone from which a lateral drift or station is mined away from the shaft. It may also be a mine drift, pump station, or other area off a vertical shaft.

3.10 SCIENTIFIC SHAFT (ES-1)

The ES-1 will be mined for the purpose of satisfying the scientific needs of the Project site characterization effort.

3.11 FAST SHAFT (ES-2)

The ES-21 will be mined primarily for safety egress, ventilation, and various operational functions, but will also be used for some scientific investigations.

3.12 MUCK

Muck is broken rock that results from excavation during ESF mining operations.

3.13 BULK SAMPLE

A bulk sample is a rock sample of irregular size and shape obtained by excavation. This definition excludes core from drillholes. Bulk samples collected according to this procedure will be representative portions of the muck from each blasting round during excavation of the ESF.

3.14 CURATORIAL SAMPLE INVENTORY AND TRACKING SYSTEM (CSITS)

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

4.0 RESPONSIBILITIES

4.1 SAMPLE MANAGEMENT

SM staff shall direct the collection of muck at the headframe, provide sample collection documentation forms, mark and record sample information to ensure traceability, transport samples to the SMF, provide support facilities for specimen storage and distribution, and archive material from each round.

4.2 PROJECT OFFICE SITE REPRESENTATIVE

The Project Office Site Representataive or other Project Office Division level personnel shall comply with requirements in Project Office Quality Management Procedure (QMP) QMP-01-02, Stop Work, should conflicts arise during collection of samples at Project sample collection sites.

4.3 PRINCIPAL INVESTIGATOR (PI)

The PI from the responsible Project participant is responsible for designing and directing all testing in the ESF and for directing the SM staff to ensure that samples collected meet requirements.

4.4 SAMPLE OVERVIEW COMMITTEE

Prior to excavation of the shafts, the SOC shall review requests from PIs for muck samples and make recommendations to the Director of the Regulatory and Site Evaluation Division (RSED) according to AP-6.4Q. The RSED Director shall approve or disapprove the requests, and the SOC shall notify partici- pants of Project Office authorization.

4.5 ESF TEST MANAGER

The ESF Test Manager will notify PIs who have requested information concerning any unusual or unexpected features encountered during excavation and mapping of the shafts and drifts.

4.6 MINER

The miner shall assist with collection activities by operating equipment, loading muck buckets at the shaft bottom, and assisting with other activities required by the ESF Test Manager or SM staff. Miners will notify the ESF Test Manager or designee of any unusual or unexpected geologic conditions during excavation.

5.0 PROCEDURE

5.1 INTRODUCTION

5.1.1 To obtain representative samples from the ESF, it is important that this procedure be implemented to (1) provide opportunities for all interested parties to obtain samples from the complete geologic section; (2) obtain samples from the vertical section rubblized by each round; (3) obtain well-documented, traceable samples; (4) perform activities in a safe manner; and (5) allow minimal disruption to the regular mining activity. Any deviation from this procedure or from the Drilling Program Package requires prior consultation and agreement between FO personnel and the FO Manager and is subject to the requirements of Section 6 in the Project Quality Assurance Plan (QAP), NNWSI/88-9, Rev. 2. The size of each shaft limits sample

collection at the bottom of the shaft. It is therefore necessary to obtain bulk samples at the headframe and not at the bottom after each shot.

5.1.2 The ESF Test Manager will notify PIs who have requested information concerning any unusual or unexpected features encountered during excavation and mapping of ESF. Miners will also notify the ESF Test Manager of any unusual features. If it is necessary to collect additional samples when these features are encountered, the ESF Test Manager shall direct SM staff in these instances.

5.2 SHAFT SAMPLE COLLECTION

5.2.1 A muck haul truck of sufficient quantity (minimum 10 ton) will be used for collecting and transporting samples from ES-1 and ES-2. Three buckets of muck (approximately two tons each) will be collected as samples during each muck cycle.

5.2.2 After the round is shot and the shaft is readied for mucking, the first shaft sinking bucket will be loaded 3/4 full from the top 4 ft of muck. This first load will be mostly larger pieces. As this first bucket is hoisted to the surface, the miner assisting the cryderman operator at the bottom will signal above this bucket is for sampling. Before the bucket is dumped in the main dump chute, a suitable container (such as a muck truck designated for sample transport) will be positioned under the dump chute and will catch this first bucket of rock. Mucking can then continue until the 4 ft of muck is exposed. At this point a 1/2 - 3/4 bucketful will be loaded, hoisted to the surface, and dumped into the truck. Mucking can then continue until the last 4 ft of the blasting round is exposed. At this time another 1/2 - 3/4 bucketful will be dumped into the truck. The truck will then be driven to Area 25 where it will be emptied into a clean, covered, concrete bin located in a secured area at the SMF.

5.3 DRIFT AND BREAKOUT ROOM SAMPLE COLLECTION

Samples will also be collected from the drifts and breakout rooms that are mined as part of the ESF. SM staff will attempt to sample the muck to represent the lateral distance excavated by the blast. One 55 gal barrel per round will be loaded with muck, transported from the drift by a loader, and carried to the surface on the mancage. It will then be transported to the SMF.

5.4 UNUSUAL SAMPLING REQUIREMENTS

5.4.1 For those predetermined blasting rounds from which dry samples have been requested, samples will be collected prior to water misting or wet-down. The sample will come from the first bucket load and must be kept dry and uncontaminated. The sample will be dumped in an area close to the headframe, leveled to a depth of about 2 ft, and marked with an identifier indicating round and depth in the shaft. The area shall be covered for sorting and sealing. SM staff, the PI, or designated representative will select pieces to be sealed and labeled, transported in a refrigerated truck to the SMF, and placed in a cooler. SM staff shall honor any special handling and/or packaging needs, as specified by the PI and directed by the ESF Test Manager.

5.4.2 Another modification of this procedure may occur when a PI requires collection of all the muck generated from a specified round. It is anticipated that such requests will be limited in number (approximately five) and will be made only for intervals below the breakout horizon. In those cases, the muck will be removed from the shaft according to normal mining procedures and removed to the access-controlled yard at the SMF. It will be leveled to a depth of about 2 ft and marked with an identifier indicating round and depth in the shaft. The PI shall be responsible for providing transportation of the muck to the SMF and for removing the muck when no longer needed. SM shall provide the necessary documentation to record the tranfer to and from the SMF.

5.4.3 Access to the muck from some drift intervals (for instance, those intervals actually crossing fault zones) may be requested by PIs. In this case, muck from those intervals will be specifically collected by SM staff as directed by the ESF Test Manager and made available to the PI.

5.5 TRANSFER OF SAMPLES FROM THE ESF TO THE SMF

The transfer of the samples to the SMF will be documented on the Sample Collection Report (Exhibit 1). SM staff will issue a unique designator in the form of a machine scannable bar code label affixed to the report and to the truck load. The staff delivering the sample load will present the Sample Collection Report to SMF staff upon placing the load into a bin. If all required information is present on the Sample Collection Report, the staff delivering the sample load and the SMF staff member completing the custody change will sign and date the Sample Collection Report. Information from the Sample Collection Report will be entered into CSITS. Information

from CSITS will be used to generate shaft sample bin labels for the sample loadand will contain the sample identification bar code, storage bin location, collection location, date of collection, date of receipt at the SMF, and date placed in storage. These labels will be affixed to label holders on the sample bin.

5.6 SAMPLE EXAMINATION

After the samples are placed in the bin, PIs or their designated representatives can examine and select the samples they require from the collected material. Samples will generally be available at the SMF for examination for approximately seven days; however, availability may be determined by the excavation rate in the ESF. Procedures describing the process required to gain authorization to examine samples are found in Project Administrative Procedure (AP) AP-6.3Q.

5.7 SAMPLE DISTRIBUTION

5.7.1 The removal of bulk specimens shall be authorized by the RSED Director who may at his discretion calll upon the SOC for recommendations for or against specimen removal. The RSED Director shall normally grant a blanket authorization to a PI for examination and specimen removal for shaft and drift specimens. This allows the PI access to all muck materials while they are laid out for examination and specimen selection. SMF staff will then distribute samples to PIs as described in AP-6.3Q. When PIs or their representatives collect the samples from the muck, SM will provide documentation and packing materials.

5.7.2 After all interested parties have selected the samples they require, two 55 gal barrels of archival material will be taken from the truck load for storage at the SMF. These barrels will be documented, labeled, sealed, and then stored in a designated barrel storage area. If archival samples of hydrochemical muck samples are required, they will be sealed and refrigerated. Authorization to secure samples from the archive barrels shall be secured from the RSED Director.

5.8 IDENTIFICATION AND RESOLUTION OF DISCREPANCIES

5.8.1 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.

5.8.2 If the incorrect information is identified by the originator or other person subsequent to the completion of the document or activity (i.e., becomes a record), the individual is responsible for documenting the corrections to the erroneous information. The incorrect information shall be crossed through, corrected on the original document, and initialed and dated by the individual making the corrections. If the correction is not self-explanatory, the individual shall assign a number to the correction and attach a sheet to the original that fully describes the correction that has been performed.

5.8.3 If a discrepancy is found on a form or document, and the same discrepant information appears on previous documents already verified (entered into a baselined data system), then corrections will be made on a copy of the field record. This corrected copy will be placed with the uncorrected file copy of the record.

5.9 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 Office Project Quality Manager or another individual in the Project Office QA organization. Reporting and segregation of a nonconforming item or termination of a nonconforming activity will be done according to QMP-15-01.

6.0 REFERENCES

AP-6.3Q, Interaction of Participants and Outside Interests with Project Office Sample Management.

AP-6.4Q, Approval Procedure for Requests for YMP Geologic Specimens.

QMP-01-02, Stop Work.

QMP-15-01, Control of Nonconformances.

QMP-17-01, Record Source and Record User Responsibilities.

Yucca Mountain Project QAP, NNWSI/88-9, Rev. 2.

7.0 APPLICABLE FORMS

Exhibit 1. Sample Collection Report.

8.0 RECORDS

The PI shall ensure that the following quality assurance records resulting from implementation of this procedure are processed according to QMP-17-01 and turned over to the T&MSS Local Records Center at least every 10 working days. Copies of these records will be retained by SM and stored at the SMF Documents Center.

1. Sample Collection Report.

YUCCA MOUNTAIN PROJECT
ADMINISTRATIVE PROCEDURE
CONTINUATION PAGE

Title AP-6.6Q FIELD COLLECTION, DOCUMENTATION, AND SPECIMEN REMOVAL OF EXPLORATORY SHAFT AND DRIFT ROCK

YUCCA MOUNTAIN PROJECT SAMPLE MANAGEMENT FACILITY

SAMPLE COLLECTION REPORT | BTPSMF7-1 5/89

Date Sample Collected		Page____of____
Sample Collector		
Organization		
Collector's Sample ID		

PLACE SMP BAR CODE LABEL HERE

Type of sample (*circle*): rock muck soil liquid gas
other (*specify*): _____

Type of site (*Circle all appropriate entries*)

SURFACE:				ESF: Shaft		Drift	
trench	outcrop	borehole	other	borehole	muck pile	in place	other

Collection Location:

SAMPLE: weight_____, volume_____, dimensions_____

FIELD PHOTOS (*circle*): prints slides instant prints video photogrammetry NA

STORAGE REQUIREMENTS:

REMARKS:

SAMPLE TRANSFER TO SMF (*Check one*) ☐ Yes ☐ No

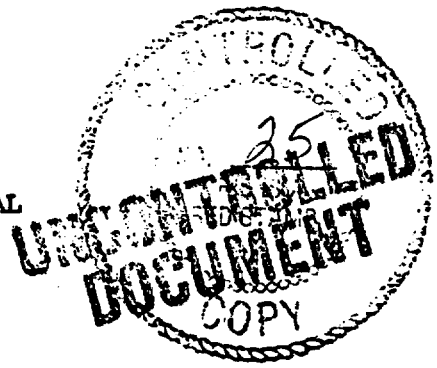
Person Releasing Custody	Date	Person Accepting Custody	Date

SMF USE

STORAGE LOCATION: Area_____ Unit_____
Date Stored_____ Time Stored_____
Verified By_____ Date_____

Exhibit 1. Sample Collection Report.

SAMPLE MANAGEMENT FACILITY
BRANCH TECHNICAL PROCEDURES MANUAL



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DOCUMENT APPROVAL SHEET

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Y-AD-002
4/90

Title
BRANCH TECHNICAL PROCEDURE: SAMPLE MANAGEMENT FOR THE YUCCA MOUNTAIN PROJECT OFFICE

NO. BTP-SMF-001
[x] Q
[ ] Non Q

APPROVAL

T&MSS Assistant PROJECT MANAGER:	John E. Shaler Signature	6/28/89 Date
DIRECTOR OF QUALITY ASSURANCE:	Edwin L. Wilmot Signature	6/28/89 Date
YMP Branch Chief (OTHER, AS REQUIRED)	D. E. Livingston for M. B. Blanchard Signature	6/28/89 Date

REVISION 0 EFFECTIVE DATE: 7/7/89

REVISIONS

	INITIAL AND DATE			
	REVISION 1	REVISION 2	REVISION 3	REVISION 4
PROJECT MANAGER:	10/26/90			
DIRECTOR, QA:	10/26/90			
YMP Branch Chief (OTHER, AS REQUIRED)	10-26-90 Merrill Blanchard 10-26-90			
EFFECTIVE DATE:	10/26/90			

UNCONTROLLED DOCUMENT

9708030289

1.0 PURPOSE AND SCOPE

This procedure describes the Yucca Mountain Project Office (Project Office) requirements and responsibilities for management and operation of the Sample Management Facility (SMF) and Field Operations (FO), Site Operations of the Technical and Management Support Services (T&MSS) contractor. The T&MSS contractor is responsible for the curation of selected Yucca Mountain Project (Project) samples.

2.0 APPLICABILITY

This procedure applies to organizational structure, facility access, staff training, quality assurance (QA) indoctrination, organizational interfaces, and records management of the SMF and the FO.

3.0 DEFINITIONS

3.1 SAMPLE MANAGEMENT

Sample Management (SM) of the 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 FO. SM staff consists of management and operations personnel who ensure that SM operations and documentation satisfy applicable regulatory requirements.

3.2 SAMPLE MANAGEMENT FACILITY

The SMF is the facility used for the documentation, storage, and control of selected samples, remnants, and records collected for the Project. The SMF consists of a physical facility and equipment designed to effectively process and preserve these samples, remnants, and records. Preservation of samples will be for the life of the Project unless otherwise directed by the Project Office.

3.3 SAMPLE

A sample is part of a population whose properties are studied to gain information about the whole or group. Geologic, hydrologic, environmental, or other types of examinations or analyses are conducted on samples covered by this procedure. Examples of samples include core, cuttings,hand- and bulk-size samples, muck, soils, alluvium, drilling and construction materials, and fluids 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, or liquid).

3.6 SPECIMEN

A specimen is a subsection or portion which has been removed from a sample.

3.7 SAMPLE OVERVIEW COMMITTEE

The Sample Overview Committee (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. The purpose of the SOC is to ensure a balance between Project sample needs, acquisition, and use, and the need to curate samples for posterity.

3.8 CURATORIAL SAMPLE INVENTORY AND TRACKING SYSTEM

The Curatorial Sample Inventory and Tracking System (CSITS) is the computer data base that has been developed to track in detail all actions taken on Project samples over which the SMF has control. The CSITS will also record all samples collected for the entire Project even if the samples are maintained by the User. The primary objective of the CSITS is to assist in establishing and maintaining traceable records of each sample collected for the Project. The CSITS user's manuals and other related documents will be available to Users.

3.9 USER

A User is an individual from a Project participating organization or outside interest who interacts with SM staff to acquire access to samples and specimens under the control of SM.

4.0 RESPONSIBILITIES

4.1 SAMPLE MANAGEMENT MANAGER

The SM Manager shall administer the overall operations of SM to ensure that samples and related documents and records collected during the Project

will support a successful license application. The SM Manager will be responsible for integrating SM activities with Project Office goals; acting as the primary point of policy level interaction with the Project Office and Project participants; representing SM on the SOC; and implementing T&MSS Cost Account Management for SM. The SM Manager will also coordinate the following activities: physical plant design and reconstruction, including equipment procurement and installation; development of the CSITS; integration of existing Project samples and records into SM; development of all technical and administrative procedures; and training of SM staff.

4.2 SAMPLE MANAGEMENT FACILITY STAFF

4.2.1 Curator

The Curator shall assist in the establishment and implementation of the overall system at the SMF to ensure that samples and related records will support a successful license application. This goal will be achieved through the application of QA criteria and sample management techniques. The Curator shall be responsible for daily management of all aspects of the SMF, guided by policies developed in consultation with the SM Manager. The Curator shall manage SMF staff performing development of SMF procedures, sample handling, data compilation, photo documentation, records management, and specimen distribution. The Curator shall interact with Project Office QA department staff to ensure that applicable QA requirements are achieved through training, audits, and surveillances. The Curator shall act as primary developer of the CSITS in coordination with the computer programmers. The Curator will coordinate with the T&MSS Records Management to ensure that all records generated by SMF activities are distributed to and maintained by the appropriate organizations. The Curator shall prepare long-range projections and recommendations concerning requirements for SMF staff, facilities, equipment, sample storage, and visitor access. The Curator shall administer visitor use of the SMF to assure that policies and procedures are followed.

4.2.2 Technical Staff Assistant

The Technical Staff (TS) Assistant shall be responsible for coordination of sample traceability and sample status activities. The TS Assistant shall ensure that all requirements necessary to complete procedural activities are met in compliance with QA guidelines and shall report any nonconformance to these procedures.

4.2.3 Geologist

The SMF Geologist shall perform verification of geologic logging and documentation of samples acquired during field site activities. Other responsibilities shall include development of SMF administrative procedures and technical procedures. The SMF Geologist shall coordinate and participate

in reprocessing, relogging, and documenting existing Project samples and in generation and processing of relogging records. The SMF Geologist shall supervise the SMF Geotechnician.

4.2.4 Geotechnician

The SMF Geotechnician shall perform sample handling and processing. The SMF Geotechnician shall assist the SMF Geologist in verification of all drill site sample collection and documentation activities, including marking and packaging core samples and collecting, documenting, and packaging exploratory shaft non-core samples. The SMF Geotechnician shall be responsible for sample processing and specimen removal, preparation, and distribution; reprocessing of existing samples; preparation of samples and specimens for examination by visitors; and construction of required geologic data logs. The SMF Geotechnician shall assist in the development of administrative procedures and technical procedures for logging, transport, processing, and storage of samples and for selection, processing, and distribution of specimens. The SMF Geotechnician shall supervise support staff.

4.2.5 Programmer/Analyst

The Programmer/Analyst shall develop, implement, and maintain the CSITS under the direction of the Curator and according to established Project procedures for software development and control.

4.2.6 Administrative Assistant

The SMF Administrative Assistant shall perform secretarial and administrative support activities. As records specialist, the SMF Administrative Assistant shall initiate and maintain technical and administrative records. The SMF Administrative Assistant shall supervise the Receptionist. The SMF Administrative Assistant shall also perform data entry.

4.2.7 Receptionist

The Receptionist shall control visitor access to the SMF and shall assist in records management, including data entry.

4.3 FIELD OPERATIONS STAFF

4.3.1 Manager

The FO Manager shall be responsible for management of all aspects of FO activities, guided by policies developed in consultation with the SM Manager. The FO Manager shall coordinate FO field site activities, including sample handling, data compilation, photo documentation, records management, specimen distribution, and scheduling. Other responsibilities will include interaction with participant drill site personnel to ensure acceptability of

samples, documents, and records for curation at the SMF. The FO Manager shall supervise activities of the Shift Supervisors and coordinate training of FO staff. The FO Manager shall assist in the development of applicable technical and administrative procedures. The FO Manager shall assist the SM Manager in preparation and management of the FO budget. The FO Manager shall interact with Project QA department staff to ensure that applicable QA requirements are achieved through training, audits, and surveillances. The FO Manager will coordinate with the T&MSS Records Management to ensure that all records generated by FO activities are distributed to and maintained by the appropriate organizations. The FO Manager will prepare long-range projections and recommendations concerning requirements for FO staff, facilities, equipment, and sample storage.

4.3.2 Shift Supervisor

The Shift Supervisor is responsible for assuring that core and other geotechnical samples are collected, documented, logged, marked, packaged, and transferred to the SMF in a manner consistent with quality assurance requirements. These activities require coordinating personnel at all surface-based and underground drilling sites, at surface trenches (as applicable, at the exploratory shaft facility, and at any other Project sampling site. The Shift Supervisor shall oversee the activities of all FO personnel during the assigned shift and verify that the FO Geologist and the FO Geotechnician have followed applicable procedures. The Shift Supervisor shall coordinate with the Project Office representative to ensure that the support contractors meet the requirements of the drilling program and shall report shift activities to the FO Manager. The Shift Supervisor shall recommend suspension of any drill site activity that jeopardizes sample acquisition, quality, or documentation. The Shift Supervisor shall train FO staff. The Shift Supervisor shall supervise activities of the FO Geologist on the same work shift.

4.3.3 Geologist

The FO Geologist shall perform geologic logging and sample handling activities at the drill site. These activities include depth validation, sample marking, packaging, and completion of all required geologic field data logs and daily logs. The FO Geologist shall assist in the development of administrative and technical procedures. The FO Geologist shall assist the Shift Supervisor in training of FO staff. The FO Geologist will supervise the FO Geotechnician.

4.3.4 Geotechnician

The FO Geotechnician is responsible for assisting the FO Geologist in collecting, handling, marking, packaging, and preparing non-core geotechnical and environmental samples. The FO Geotechnician shall also prepare

documentation and assist in the development and revision of technical procedures for sample handling and transport. The FO Geotechnician will coordinate the activities of the support staff.

4.3.5 Administrative Assistant

The FO Administrative Assistant shall perform secretarial and administrative support activities. As records specialist, the FO Administrative Assistant shall initiate and maintain technical and administrative records. The FO Administrative Assistant shall perform data entry.

4.4 REYNOLDS ELECTRICAL & ENGINEERING COMPANY, INC.

REECo Teamsters and Laborers shall assist SM in handling of samples and containers, load containers onto the transport vehicles, and operate all preparation and loading equipment, including banders and forklifts.

4.5 USER

The User is responsible for obtaining and submitting appropriate request forms, contracts, and other documents to the SMF as required by this procedure.

5.0 PROCEDURES

5.1 INTRODUCTION

SM has been established to assure that Project samples and related records are traceable, meet the quality requirements, and can support a U.S. Department of Energy license application to the U.S. Nuclear Regulatory Commission for a high-level nuclear waste geologic repository.

5.2 ORGANIZATIONAL STRUCTURE

SM is the responsibility of the T&MSS contractor (Figure 1), a participant of the Project. SM is part of Programs and Operations (Figure 2) and is responsible for the SMF and the FO. Staff of SM is shown in Figure 3. The overall organization of the Project is structured to ensure that samples collected during the various Project site characterization activities and data derived from these samples will support a license application through the use of effective management and stringent quality control.

5.3 REQUIREMENTS FOR SM STAFF

Each SM staff member shall meet minimum job qualifications for his or her position and receive training in compliance with Project Office Quality Management Procedure (QMP) QMP-02-01. Job descriptions for each position

will be kept on file at the SMF Documents Center. The following information will be maintained and kept current for each SM employee: education, experience, training, and special skills. Project indoctrination shall be presented to all new SM staff. All SM staff shall complete the familiarization program prior to performing activities that affect quality. All SM staff performing applicable QA requirements tasks shall receive formal training in QA requirements, technical and administrative procedures, and the technical objectives of each activity. All staff will receive specialized training related to the activities they perform. Training sessions will be documented and maintained at the SMF Documents Center. The proficiency of all SM staff to perform assigned tasks will be evaluated by management on an annual basis.

5.4 SM POLICIES

It is the responsibility of SM to ensure that access to samples, documents, and records is strictly controlled. This control will facilitate traceability of samples in the support of a license application. SM will implement access restrictions and security controls.

5.4.1 SMF Access Restrictions

Potential users of the SMF shall apply for and secure authorization prior to visiting the facility. Access to the SMF will be limited to authorized persons who have valid scientific or regulatory needs to enter the facility for examination of samples, documents, and records. The Chief of the Site Investigations Branch (Chief-SIB) authorizes access to the SMF and examination of samples and specimens. Representatives of the Project Office who need to regularly visit the SMF will be placed on a permanent access list upon authorization. Access to the facility by representatives of commercial services, such as maintenance, repairs or vending, will be authorized by the Curator. Representatives of commercial services will be escorted as necessary in specific work areas. All visitors entering the facility shall sign the Facility Access Log (Figure 4). In addition to the requirements for access to the facility, all requests for examination of samples and records shall be authorized by the SOC chairman. A list of SM staff having authorization to enter specific work areas within the SMF and to gain access to samples, documents, and records shall be updated and submitted to the LRC on a seminannual basis.

5.4.2 FO Access Restrictions

All samples, documents, and records under control of FO staff in the field will be supervised or locked up to prohibit any unauthorized access.

5.4.3 Security

The SMF will contain samples, records, and documents that represent significant information to be used as a basis for detailed site characterization and consequently crucial to license application. Therefore, the SMF shall be operated as a secured, controlled-access operation. Physical barriers, personal identification requirements, and electronic access devices will be used to preclude entry of unauthorized personnel into sample handling and records storage areas.

5.5 ORGANIZATIONAL INTERFACES

Because of the numerous Users, there are considerable demands on the SMF to provide assistance in various sample acquisition and curatorial activities. The SMF staff will coordinate activities of Users who interact with the SMF, including administrative services, specimen acquisition, access to records,and sample examination services.

5.5.1 SMF Activities

SMF activities may include visitation to the SMF; examination of samples; selection of specimens; submission of samples, documents, and records for curation; access to records and documentation; and deliveries by commercial vendors.

5.5.2 FO Activities

The FO staff will collect samples, perform geologic logging at various Project field sites, and interact with Project Office personnel, participating organizations, and Nevada Test Site Support Contractors.

5.5.3 Stop Work Authority

The Curator shall have stop work authority for SMF activities not being conducted in compliance with applicable Project, Project Office, or QA program requirements, plans, or procedures related to sample collection, control, or quality. The Curator shall follow procedures defined in QMP-01-02. The FO Manager shall recommend suspension of any drill site activity that jeopardizes sample acquisition, quality, or documentation.

5.6 RECORDS MANAGEMENT

Much of the information relative to Project samples is in the form of reports, logs, contracts, requests, records, and other documents completed in the field, at the facility, or by Users. Some of these documents and records provide evidence that the required QA level has been achieved for the overall operations of SM. Other documents and records supply evidence of the identity and validity of the samples or of SM's management of these samples.

All signatures and initials of each SM staff member that may appear on any form that may support traceability of a sample or record shall be updated and submitted to the LRC on a semiannual basis.

5.6.1 SMF Documents Center

The SMF Documents Center contains related documents and records of samples under control of SM. Additionally, documents and records of selected samples under control of Users are maintained by SM.

5.6.2 T&MSS Local Records Center

The T&MSS Local Records Center (LRC) receives, inspects, and prepares for processing all Project records and handles requests for Project records from T&MSS personnel. All unique Project records generated or gathered by SM will be turned over to the LRC at least every 10 business days.

5.7 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 on 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 that fully describes the correction performed.

5.8 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 Office 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 QMP-15-01.

6.0 REFERENCES

QMP-01-02, Rev. 0, Stop Work

QMP-02-01, Rev. 1, Indoctrination and Training

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

7.0 FIGURES

Figure 1, Technical and Management Support Services Project Organization

Figure 2, Program and Operations

Figure 3, Sample Management Organization

Figure 4, Sample Management Facility Access Log

8.0 RECORDS

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

1. SMF Access Log
2. Corrected Copies of Original Records
3. SMF Staff Authorization List
4. SMF Staff Signature List

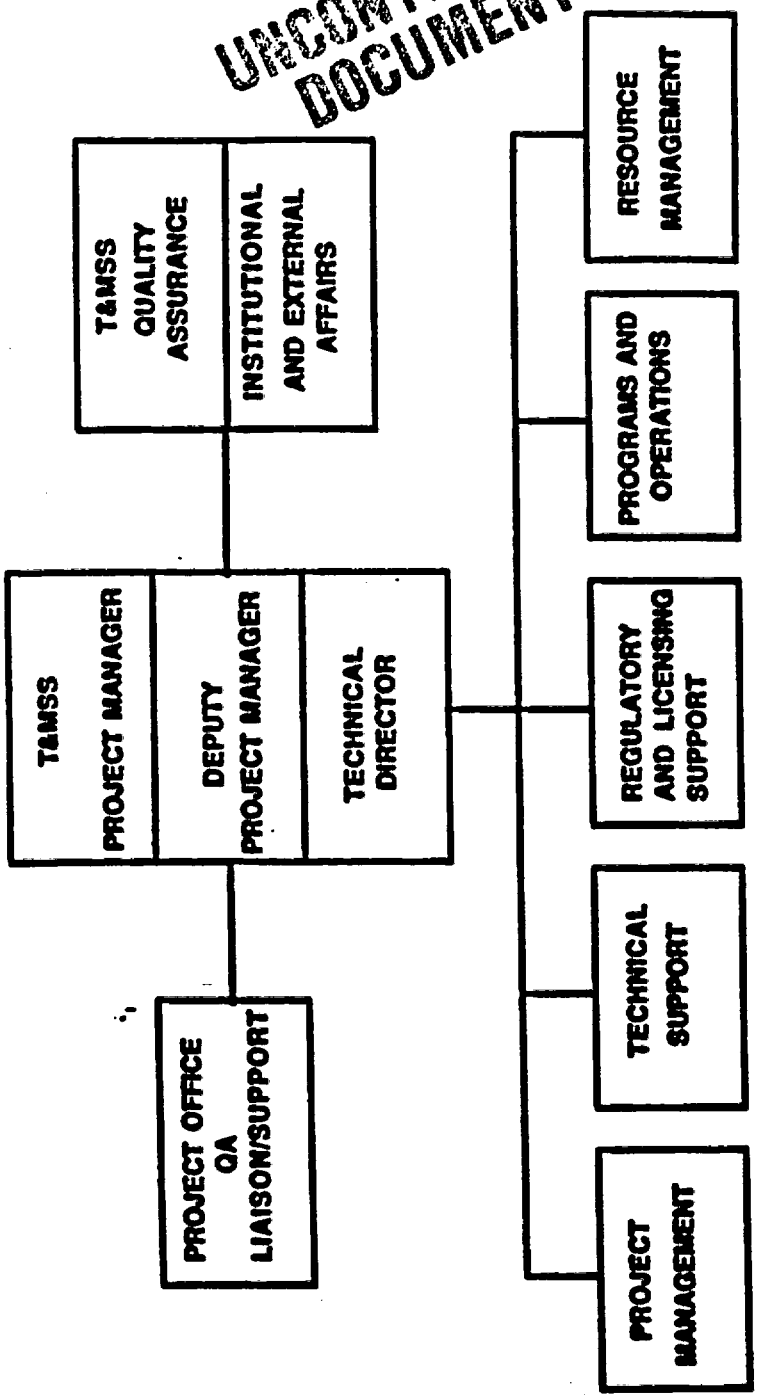

Figure 1 - Technical and Management Support Services Project Organization

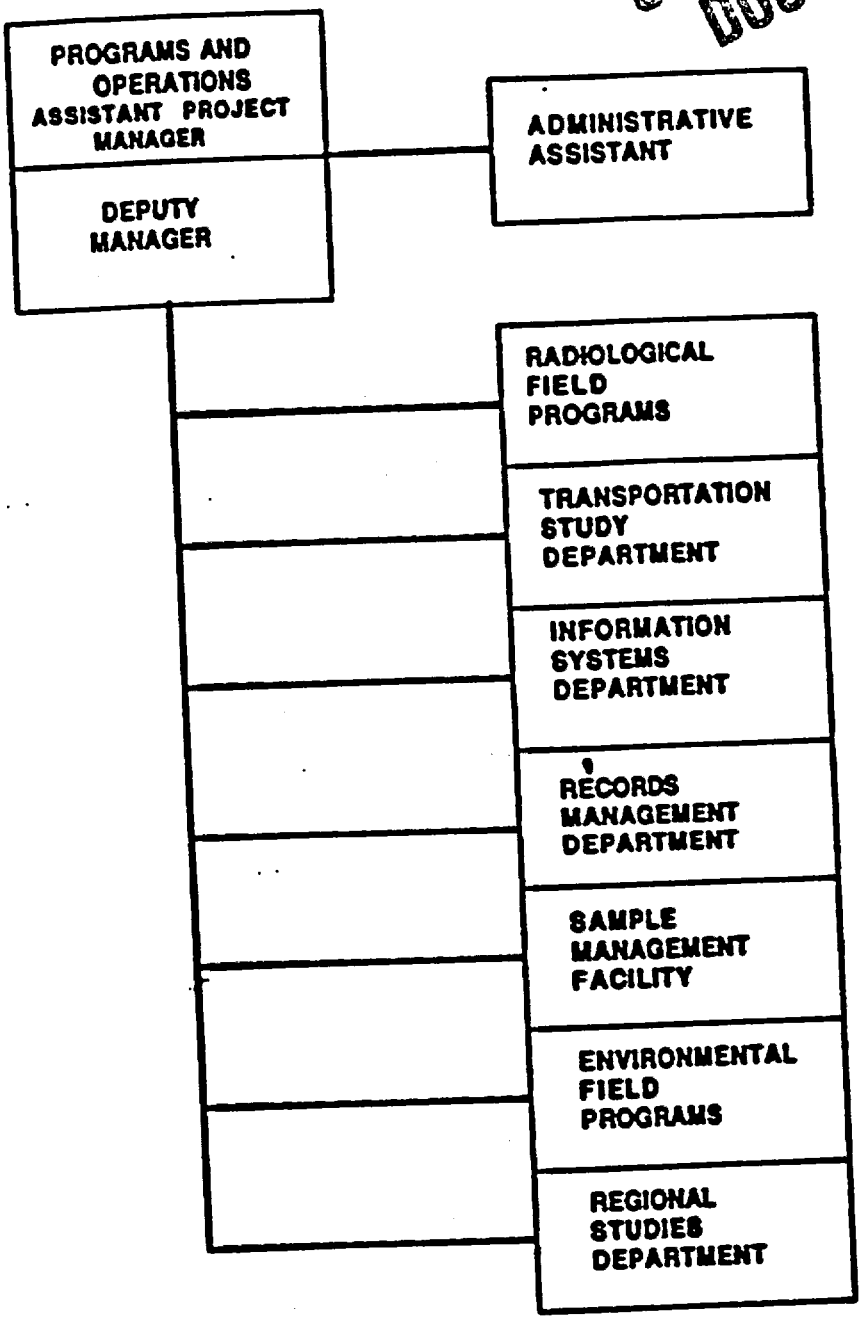

Figure 2 - Programs and Operations

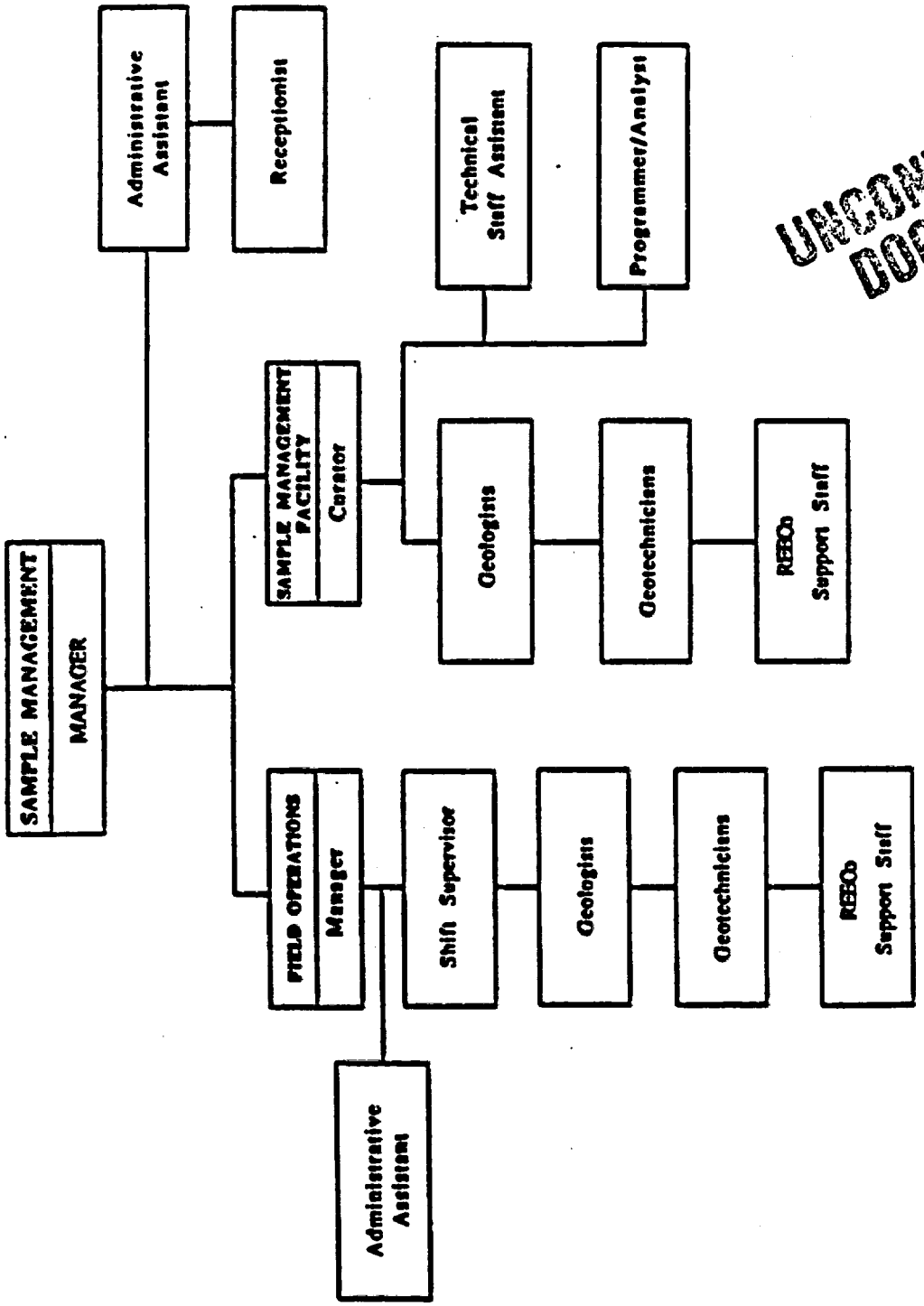

Figure 3 - Sample Management Organization

YUCCA MOUNTAIN PROJECT SAMPLE MANAGEMENT FACILITY

FACILITY ACCESS LOG

Y-AD-152 10/90

NAME	TIME	ORGANIZATION	PURPOSE OF ACCESS	*SMF ONLY*
Print Sign	In Out			Initial Date
Print Sign	In Out			Initial Date
Print Sign	In Out			Initial Date
Print Sign	In Out			Initial Date
Print Sign	In Out			Initial Date
Print Sign	In Out			Initial Date
Print Sign	In Out			Initial Date
Print Sign	In Out			Initial Date
Print Sign	In Out			Initial Date
Print Sign	In Out			Initial Date
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Print Sign	In Out			Initial Date
Print Sign	In Out			Initial Date
Print Sign	In Out			Initial Date
Print Sign	In Out			Initial Date
Print Sign	In Out			Initial Date
Print Sign	In Out			Initial Date
Print Sign	In Out			Initial Date

UNCONTROLLED DOCUMENT

Figure 4 - Sample Management Facility Access Log

YUCCA MOUNTAIN PROJECT OFFICE
DOCUMENT APPROVAL SHEET

Y-AD-002
4/90

Title
BRANCH TECHNICAL PROCEDURE: TRANSPORT, RECEIPT AND ADMITTANCE FOR CURATION TO THE SAMPLE MANAGEMENT FACILITY OF BOREHOLE SAMPLES

NO. BTP-SMF-002
REV. 0

APPROVAL

PROJECT MANAGER: T&MSS Assistant Original signed by	John E. Shaler	Signature	6/28/89 Date
DIRECTOR OF QUALITY ASSURANCE:	Edwin L. Wilmot	Signature	6/28/89 Date
YMP Branch Chief (OTHER, AS REQUIRED)	D. E. Livingston for H. B. Blanchard	Signature	6/28/89 Date

REVISION 0 EFFECTIVE DATE: 7/7/89

REVISIONS

	INITIAL AND DATE			
	REVISION 1	REVISION 2	REVISION 3	REVISION 4
PROJECT MANAGER:	10/26/90			
DIRECTOR, QA:	10/26/90			
YMP Branch Chief (OTHER, AS REQUIRED)	10-26-90 10-26-90			
EFFECTIVE DATE:	10/26/90			

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1.0 PURPOSE AND SCOPE

This procedure describes the Yucca Mountain Project Office (Project Office) requirements and responsibilities for the transport of Yucca Mountain Project (Project) borehole samples from the field collection site to the Sample Management Facility (SMF), receipt from transport personnel, and admittance for curation.

2.0 APPLICABILITY

This procedure applies to the Sample Management (SM) staff and support personnel who perform activities related to transport, receipt, and admittance for curation of Project borehole samples from the field site to the SMF, including core, cuttings, fluids, and other geologic samples.

3.0 DEFINITIONS

3.1 Sample Management

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 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 users. 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 may include core, cuttings, fluids, and other geologic samples collected at Project borehole 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, or liquid).

3.6 Curatorial Sample Inventory and Tracking System (CSITS)

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

4.0 RESPONSIBILITIES

4.1 Field Operations Geologist

The FO Geologist shall supervise the activities applicable to the shipment of samples from the field collection site to the SMF and shall record information applicable to those shipments.

4.2 Sample Management Facility Geotechnician

The SMF Geotechnician shall inspect and accept custody of samples, sample containers, and associated field documentation for admittance for curation upon their arrival at the SMF.

4.3 Field Operations Administrative Assistant

The FO Administrative Assistant shall ensure that quality assurance (QA) records resulting from the implementation of this procedure are turned over to the T&MSS Local Records Center (LRC).

4.4 Reynolds Electrical & Engineering Company, Inc. (REECo)

REECo staff shall place samples in temporary storage if applicable, load the samples onto the transport vehicle, and operate all preparation and loading equipment, including banders and fork lifts.

4.5 Technical Staff Assistant (TS)

The TS Assistant shall sign applicable QA records attesting that the SMF records are correctly completed and conform to QA guidelines.

5.0 PROCEDURES

5.1 Introduction

Borehole samples collected and subsequently stored at Project field sites will be transferred to the SMF for processing and storage. This procedure describes the methods necessary to ensure that samples are correctly packaged and shipped from Project borehole sites such that the samples, containers, and associated documentation arrive at the SMF in acceptable condition. However, clerical and handling errors and discrepancies may occur in the field and during transport preparation, including unsuitable packaging of samples, improper or missing documentation or improper annotation of samples or containers. This procedure is designed to minimize the occurrence of these discrepancies and errors and to recognize and correct these errors before they become part of the permanent record.

5.2 Preparation of Samples and Documentation for Transmittal

5.2.1 All activities associated with transmittal of borehole samples and documentation from the drill site to the SMF will be recorded on the Field Container Summary and Transmittal Form ([transmittal form] Figure 1). Transmittal of borehole samples and documents from the site to the SMF will be performed at least once every 24 hours during borehole sample recovery periods. Any deviation from this schedule shall be approved by the FO Manager. All completed, original records will be photocopied on paper marked "COPY" prior to transmittal. The photocopy will be retained at the borehole site, and the original shall be transferred to the SMF. The transmittal form contains a header and information rows. The header includes:

Shipment Bar Code Label - A shipment bar code label will be affixed to the transmittal form. If the transmittal form consists of two or more pages, the shipment bar code label will be affixed to the first page, and the bar code number will be written on the remaining pages.

Sample Custody Changes - Signatures, dates, and times of sample transfer from the field site to the transport and from the transport to the SMF will be entered here. At the field site, the FO Geologist will release custody and REECo staff will receive custody; at the SMF, REECo staff will release custody and SMF staff will accept custody.

Checked By - The TS Assistant shall sign here and enter the date and time after determining that the information on the transmittal form is completely and accurately entered.

Borehole identification (ID) - This is the unique alphanumeric designation assigned to each borehole.

Pagination - The sequential number for each page will be placed in the first blank. The total number of pages for the entire borehole entry will be placed in the second blank after the borehole has been completely logged.

Shipment Container Total - This is the total number of containers being transported.

Field Forms - Checks will be used by the FO staff to indicate that original, applicable field forms necessary for confirmation verification were shipped, and SMF staff will similarly indicate that the forms were received.

The information rows include:

Sample Type - The type of sample is designated here, e.g., core, cuttings, water, etc.

Container Bar Code Number - The field container bar code number is copied from the bar code on the container label.

Rec'd - Upon receipt of the shipment at the SMF, SMF staff will indicate receipt of each individual container here.

Status Code - Status codes are:

NAT: Not Attempted - If the sample type in the container is core, this would represent cuttings as they would occur during spot coring.
REC: Recovered.
UNREC: Unrecovered - This represents an interval of samples that was drilled but never recovered from the borehole.
WCR: Whole core removed - Section 5.3.3 describes the steps associated with this activity.
LOST: Lost - This is sample that was recovered but was subsequently lost.
DEST: Destroyed - Though this refers primarily to the condition of specimens following laboratory analysis, it is possible that catastrophic events at the drill site might destroy samples.
CONS: Consumed - This is a code almost exclusively reserved for specimens.

Container or Sample Interval - The container interval will be entered here in the same row as the container bar code number.

5.2.2 Dunnage will consist of 4 in thick (minimum) foam rubber pads to protect the borehole samples from mechanical shock sustained during transport. A foam rubber pad will be laid on the floor against the front wall of the transport vehicle and the first row of containers laid on top of

the pad. Another pad will be placed on top of this row and the second row of containers will be stacked on the second pad. Containers will be stacked a maximum of two rows high. The next two rows will be stacked in the same manner and immediately adjacent to the first two rows.

5.2.3 Subsequent rows will be stacked immediately adjacent to the first two rows as described above; this will continue until all containers have been loaded or maximum vehicle capacity has been reached. If the load does not completely fill the length of the vehicle, a backing board will be secured against the load to create an integral package. In addition, tie-downs or other methods will be used to prevent upward displacement of containers during transport.

5.2.4 When an entire load has been placed on the vehicle and the total number of containers and the intervals of the samples within those containers have been agreed upon by the FO staff, the REECo staff, and the Teamster, the transmittal form will be signed and dated in the "Field Site to Transport" section by the responsible personnel. The FO Geologist shall then check on the transmittal form to indicate that the applicable field forms are being sent with the shipment. A bar code label representing the entire shipment will be placed on the transmittal form, as described in Section 5.2.1. If data communications are available at the drill site, information from the transmittal form may be entered into CSITS; otherwise, this will be done after arrival of the shipment at the SMF and prior to verification (Project Office Branch Technical Procedure [BTP] BTP-SMF-003).

5.3 Transport

All applicable Nevada Test Site transport restrictions described in the REECo Safety Manual shall be observed by transport personnel. Transport personnel shall be aware of emergency procedures.

5.4 Receipt of Samples and Documentation

5.4.1 Upon arrival at the SMF, the SMF Geotechnician shall check that field documents completed during field logging as described in BTP-SMF-008 and applicable to that shipment are present and will record receipt of the field documents on the transmittal form. The documents are the Field Photographic Log, the Structural Log, the Lithologic Log, and other applicable forms.

5.4.2 REECo staff will unload the vehicle and place the containers in an available receiving area at the SMF. As the containers are unloaded from the vehicle, the SMF Geotechnician will check that the sample type and container bar code numbers correspond to the transmittal form. If the information is correct, a check (Ā) is placed in the column next to the container bar code number.

5.4.3 After all the containers have been unloaded, and if the total number of containers agrees with that on the transmittal form, the "Transport to

SMF" section shall be signed. REECo staff shall sign the "Person Releasing Custody" and the SMF Geotechnician shall sign the "Person Accepting Custody." If the number of containers does not agree with that on the transmittal form, all persons signing custody release blocks shall be contacted and the problem resolved. The containers will then be stacked sequentially on pallets or placed directly on tables in the working area in preparation for admittance for curation.

5.5 Admittance of Samples for Curation

5.5.1 The process followed for the admittance of samples for curation includes the review of field handling, loading, and transport documentation in order to verify that all records are complete and traceability has been maintained. Container labeling, photography, packaging, orientation, reconstruction of the core, depth notation, and marker notation will be checked.

5.5.2 After a sample shipment has been transferred to the SMF, information from the transmittal form will be entered into CSITS if it has not already been done in the field. The Borehole Sample Confirmation Checklist ([checklist] Figure 2) will be generated from this information. The checklist header contains the batch name and ID, the Project and SMF borehole IDs, and the sample type. The lower section of the checklist contains information from CSITS and spaces to check that information.

5.6 Confirmation Procedure

Sample containers will be placed in sequential order on the examination table with the container lids propped up behind the container bottoms. Using the checklist, the SMF Geotechnician will begin the sample admittance procedures for each box. If the information is correct, a check (Ă) is entered in the appropriate columns, as described:

Container - Depth notations on the core or on the cuttings bags will be scrutinized to ensure that they are marked and sequential and that no depths have been skipped or miswritten (e.g., 109-110-112-113-141-115, etc.). Core will be measured with a steel tape to the nearest 0.1 ft; any differences greater than 0.1 ft will constitute a discrepancy. The bar code numbers (specifier) and the uppermost and lowermost depths on the core or on the cuttings bags will be compared to the information from the checklist and to all container labeling locations.

Labeling - If the depth notations on the samples correspond to those on the checklist and if that information matches all the labels, checks will be placed in the appropriate columns.

Orientation (core only) - The general reconstruction of core and the continuity of the orientation strips will be checked.

Packaging - Determine if polystyrene foam cradles, cardboard liners, cardboard dividers, or other appropriate packaging materials are in place.

Photograph (core only) - The instant print will be removed from the document cache affixed to the inside of the container lid (BTP-SMF-008) and compared to the interval of core in the container. The condition of the core should correspond to that in the photograph.

Sample - Determine if intervals of core or cuttings Not Attempted (NAT), Unrecovered (UNREC), or Whole Core Removed (WCR) are indicated on a marker placed appropriately in the container. Check that the SPC bar code number for the marker matches the SPC bar code number on the Whole Core Specimen Field Removal Checklist and Contract (BTP-SMF-008).

Completed - The SMF Geotechnician will initial and date admittance of the container after performing all the above steps.

5.7 Resolution of Discrepancies

5.7.1 If a discrepancy in depth notation is discovered during completion of the checklist, the correct depth notations will be marked on the core with a green temporary marker, continuing as far downhole as necessary to correct the problem. If the error is such that the problem may be compounded downhole on undrilled core or cuttings, appropriate field personnel will immediately be notified. It may be necessary to follow the core or bags through several containers to entirely resolve a discrepancy. This change, and changes due to discrepancies in box labeling, will be made on all labels by marking through the incorrect interval with a single line, substituting the correct interval, and initialing this action. The core boxes will then indicate a different interval than on the original Borehole Sample Confirmation Checklist. The newly corrected box intervals will be entered into CSITS, and the information will be used to generate an updated Borehole Sample Confirmation Checklist. The modified entries will be checked, and this process will continue until all discrepancies are resolved.

5.7.2 If a discrepancy other than incorrect depth notation is identified subsequent to the completion of the checklist, the incorrect information shall be crossed through, corrected on the original document, and initialed and dated by the individual making 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 that fully describes the correction.

5.8 Temporary Storage

The containers will then be placed on pallets in the SMF until verification of field logging and documentation (Project Office Branch Technical Procedure BTP-SMF-003) commences.

5.9 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 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

BTP-SMF-001, Sample Management for the Yucca Mountain Project

BTP-SMF-003, Verification of Field Logging and Documentation of Core and Cuttings.

BTP-SMF-008, Field Logging, Handling, and Documenting Borehole Samples.

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

REECo Safety Manual.

7.0 FIGURES

Figure 1 - Field Container Summary and Transmittal Form.
Figure 2 - Example of CSITS-generated Borehole Sample Confirmation Checklist.

8.0 QA RECORDS

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

1. Field Container Summary and Transmittal Form.
2. Borehole Sample Confirmation Checklist.

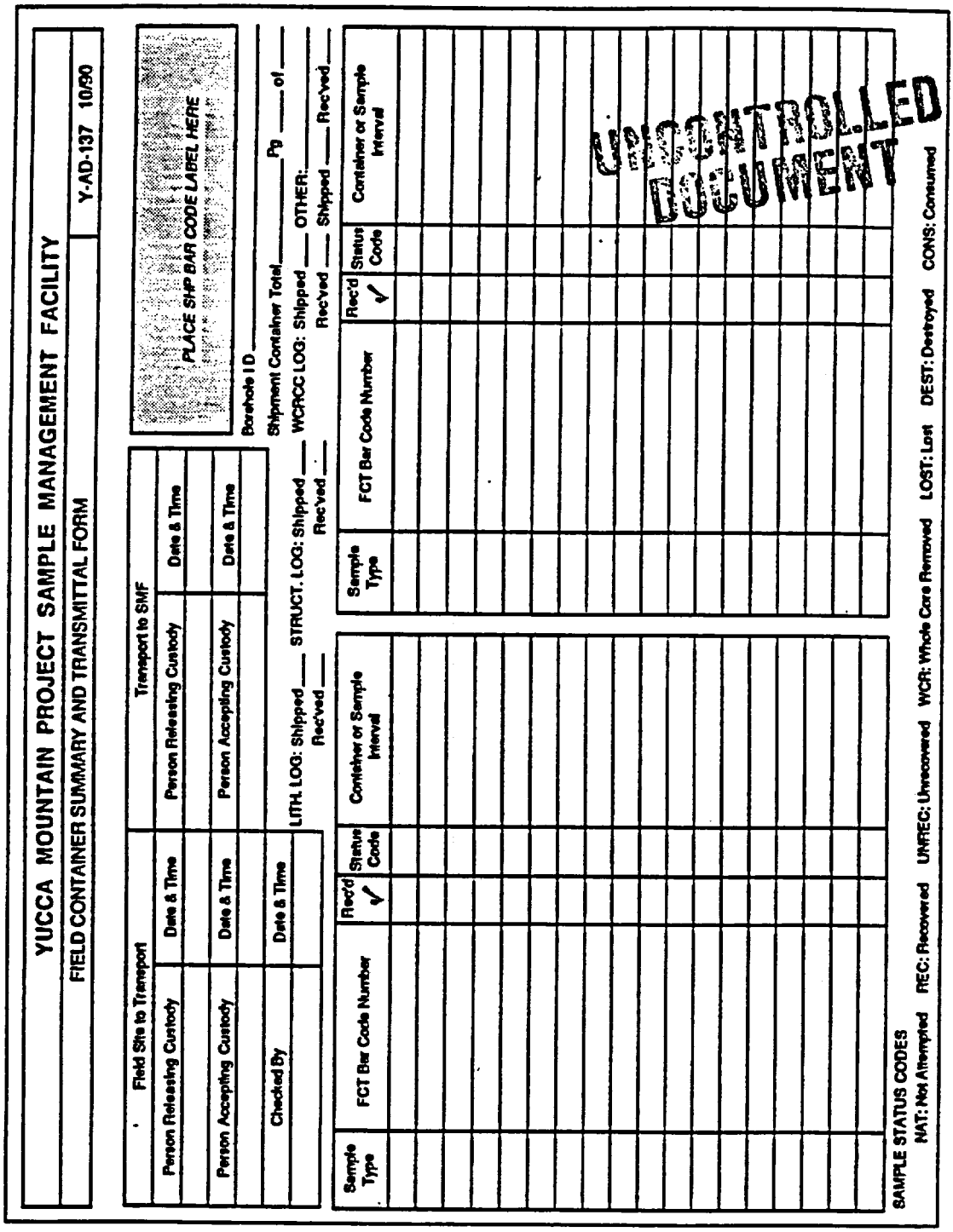

Figure 1 - Field Container Summary and Transmittal Form

BOREHOLE SAMPLE CONFIRMATION CHECKLIST

Batch: WOFAT : BAT10019 Borehole: YMP-AC-1 : BHL10005 Sample Type: CORE

Container			Labeling		Orient.	Pkg.	Photo	Sample			
Specifier	Top	Bottom	Lid	Body				Top	Bot	Status	SMF Geotech.
200	0.0	105.2	✓	✓	✓	✓	✓	0.0	100.0	NAT	✓
								100.0	105.2	REC	✓
201	105.2	110.8	✓	✓	✓	✓		105.2	109.8	REC	✓
								109.8	110.0	UNREC	✓
								110.0	110.8	REC	✓
202	110.8	116.3	✓	✓	✓	✓		110.8	111.3	REC	✓
								111.3	111.7	WCR	✓
								111.7	116.3	REC	✓
203	116.3	120.0	✓	✓	✓	✓	✓	116.3	119.7	REC	✓
								119.7	120.0	UNREC	✓

SMF Geotechnician: [signature] Date: 6/20/99

TS Assistant [signature] Date: 6/20/89

Page 1 of 1

Figure 2 - Example of CSITS-generated Borehole Sample Confirmation Checklist

Title	No.	Rev.
VERIFICATION OF FIELD LOGGING AND DOCUMENTATION OF CORE AND CUTTINGS	BTP-SMF-003	0
	Effective Date 7/7/89	
	Page 1 of 9	

1.0 PURPOSE AND SCOPE

This procedure describes the Yucca Mountain Project Office (Project Office) requirements and responsibilities for the verification of field logging and documentation of Yucca Mountain Project (Project) core and cuttings.

2.0 APPLICABILITY

This procedure applies to verification of field logging and documentation of core and cuttings obtained from surface and subsurface Project borehole sites by staff from Sample Management (SM) of the Technical and Management Support Services (T&MSS) contractor.

3.0 DEFINITIONS

3.1 Sample Management Facility (SMF)

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 users. The SMF consists of a physical facility and equipment designed to effectively process and preserve collected samples. The SMF is operated by SM of the T&MSS contractor for the Project.

3.2 Sample

A sample is part of a population whose properties are studied to gain information about the whole or group. Core and cuttings collected at Project borehole sites are the sample types covered by this procedure.

3.3 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.

3.4 Cuttings

Cuttings are chips of rock produced during drilling that are removed from the borehole by circulation of drilling fluids (gas, foam, or liquid).

APPROVED BY

Assistant Project Manager	Date	YMP Branch Chief	Date	YMP Project Quality Manager	Date
John E. Blaber	6/20/89	D.C. Livingston for M.B. Blanford	6/26/89		6/29/89

8908030294

3.5 Curatorial Sample Inventory and Tracking System (CSITS)

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

4.0 RESPONSIBILITIES

4.1 Sample Management Facility Geologist

The SMF Geologist shall perform verification of logging and documentation.

4.2 Technical Staff (TS) Assistant

The TS Assistant shall sign applicable quality assurance (QA) records attesting that SMF records are correctly completed and conform to QA guidelines.

4.3 Sample Management Facility Administrative Assistant

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

5.0 PROCEDURES

5.1 Introduction

Verification procedures have been designed to ensure that any discrepancies incurred during the logging of Project core and cuttings are found and reconciled before they become a part of the permanent borehole record. These potential discrepancies are generally of two distinct types: (1) simple clerical discrepancies in which the logging forms have been incorrectly filled out (transposed information rows, incorrect transfer of information, missing information, etc.), (2) and significant differences in structural or lithologic interpretations.

5.2 Location and Equipment

Verification shall occur at the SMF. Equipment includes, but is not limited to:

- engineering measuring tape
- colored temporary markers
- pocket transit (0-360 degree)
- grain size chart
- geologic dictionary and other references and volumes
- miscellaneous office supplies
- indelible marker pens
- binocular microscope
- standard rock color chart
- rock hammer
- spray bottle
- knife
- chisel
- magnet
- hand lens
- protractor

5.3 Documentation

Documentation completed by the SMF Geologist during this procedure includes the Structural Verification Checklist (Figure 1) and the Lithologic Verification Checklist (Figure 2). These interval-specific documents will be used in conjunction with the original, applicable field lithologic and structural logs to complete the verification process. In addition, the Borehole Sample Confirmation Checklist (Project Office Branch Technical Procedure [BTP] BTP-SMF-002, Figure 2) will be used to ensure that all depth notations are sequential and correct. The instant print photographs, found in the container document cache, may also be used to aid in the verification process.

5.4 Verification Methods

The verification process involves verifying the accuracy of the Lithologic Log and the Structural Log, both completed during field operations (Project Office Branch Technical Procedure [BTP] BTP-SMF-008). The SMF Geologist shall do this by first using the Borehole Sample Confirmation Checklist (BTP-SMF-002) and summary reports from CSITS to check that container labeling and depth notations are correct. If errors are found, the procedures outlined in BTP-SMF-002 will be repeated. Next, the applicable verification checklists will be used to compare key elements in each field log to actual core conditions, as discussed below. The measurement of piece lengths and the location of features in the core must fall within a margin of error of plus or minus 0.1 ft.

5.4.1 Structural Verification

5.4.1.1 Structural verification occurs in two stages. The first ensures that every row entry of the Structural Log contains all the information pertinent to the feature described in that row. For example, all single fractures will contain information regarding Depth, Fracture Origin, Orientation, Dip, Open-Closed, Fracture Line, Surface Characteristics, and Mineralization. Similarly, core losses (for example) will only contain information regarding Bracket, Depth, Bracket Code, Numeric Value, and possibly, Remarks. Continuing familiarization with the format of the Structural Log and the general characteristics of the core will facilitate this portion of the verification process. The second stage involves comparing features noted on the Structural Log to actual core conditions.

5.4.1.2 Because it would be unreasonably time-consuming to verify every entry on the log, several key elements shall be specifically checked using the Structural Verification Checklist:

1. Brackets: Check that all brackets (Column 1) have corresponding bracket codes (Columns 8-9). For each bracket, locate that feature in the core and determine if the bracket code adequately describes the feature.

2. Fracture Origin: Scan Column 7 for all handling-induced fractures (H), checking that these fractures have been appropriately marked on the core with a pair of heavy parallel black lines on either side of the fracture. Column 7 also contains non-orientation marks (ø, *); determine if they are located and marked correctly on the core.

3. Dip: Scan Columns 18-19, looking for very high or very low dips. Fractures with very high dips (60-90 degrees) should have an associated fracture length (recorded in Numeric Value, Columns 10-13); fractures with very low dips generally will not have an associated orientation determination.

4. Mineralization: It is not necessary to check mineralization on every individual fracture; however, trends of recurring or pronounced mineralization should be checked by scanning the Mineralization Columns of the Structural Log (Columns 23-35) and comparing them to the actual core conditions.

5. Piece Length: Check that every piece of intact core longer than 0.3 ft is noted on the Structural Log in Columns 36-38. Measure all piece lengths and compare to the noted length; they should not differ by more than 0.1 ft.

6. Remarks: Items appearing in the Remarks Column are usually isolated items of particular interest. Scan the Remarks Column and verify the accuracy of the location and nature of these items.

7. Addenda: It is possible that the SMF Geologist may have a different interpretation than the FO Geologist regarding the structural condition of the core or may feel that more structural detail could have been logged. If so, the SMF Geologist shall log his interpretations or additions on a blank Structural Log and attach it to the original Structural Log.

5.4.2 Lithologic Verification

5.4.2.1 The primary intent of lithologic verification is to ensure that all lithologic changes in the rock character are noted and that the rock has been adequately described. It is not necessary that the SMF Geologist concur with the FO Geologist on whether these changes constitute a discrete lithologic unit or are merely internal variations within a unit, but it is important that these changes be logged in a consistent manner. Lithologic verification will occur in four steps:

1. Review the Lithologic Log completed in the field:

   a. Check the accuracy of the header information.

   b. Check run information. This involves verifying that the Run Marker exists, that the borehole ID, run number, and interval are written on that marker, and that the marker is correctly located in the box. This information must match the information noted in the Lithologic Log.

2. Note lithologic changes based on color, composition, texture, or other differences and the intervals at which they occur. Compare these intervals to those noted in the Lithologic Log. When this correlation has been established, verify that the depths noted for these intervals in the Lithologic Log conform to actual core conditions.

3. Verify the accuracy and completeness of the unit description (BTP-SMF-008). It is required that all Primary Descriptive Terms be addressed. Also verify the accuracy of any features in the unit located at a particular depth (Specific Features).

4. As with structural interpretations, the SMF Geologist may feel that the overall lithologic picture could be enhanced with a more complete or a differing view of the lithologic conditions of the core. These additions shall be written on a blank Lithologic Log and attached to the original Lithologic Log. This activity shall be recorded on the "Addendum" portion of the Lithologic Verification Checklist.

5.4.3 The TS Assistant will check and sign applicable QA records to ensure that the records are correctly completed and that they conform to QA guidelines. Completion of both phases of geologic verification will be entered into CSITS by appropriate SMF staff.

5.5 Resolution of Discrepancies

A discrepancy exists when there is incorrect information that significantly affects documentation or notation. Examples of discrepancies include: errors in sample notation, container labeling, and mathematical calculation; entry of information on the wrong line; transposition of symbols; errors in geologic descriptions; and removal of a specimen from the wrong depth interval. Any discrepancies shall be resolved upon discovery.

5.5.1 Depth Notation Discrepancy

If a discrepancy in depth notation is discovered during completion of the checklists, the correct depth notations will be marked on the core or on the cuttings containers with a green temporary marker, continuing as far downhole as necessary to correct the problem. If the error is such that the problem may be compounded downhole on undrilled core or cuttings, appropriate field personnel will immediately be notified. It may be necessary to follow the core through several containers to entirely resolve a discrepancy. This change, and changes due to discrepancies in box labeling, will be made at all labeling locations by marking through and initialing the incorrect interval with a single line and substituting the correct interval. The core boxes will then indicate a different interval than the original Borehole Sample Confirmation Checklist (BTP-SMF-002). The newly corrected box intervals will be entered into CSITS, and this information will be used to generate an updated Borehole

Sample Confirmation Checklist. The modified entries will be checked, and this process will continue until all discrepancies are resolved as described in BTP-SMF-002.

5.5.2 Other Discrepancies

5.5.2.1 If discrepancies other than depth notation are identified subsequent to the completion of the document or activity (that is, before it becomes a verified record), the incorrect information shall be crossed through, corrected on the original document, and initialed and dated by the individual making 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 that fully describes the correction has been performed.

5.5.2.2 If a discrepancy is found on a form or document already verified, such that the information has already been entered into CSITS, the above requirement for notation and correction of incorrect information will not be applicable. The requirement to accurately track a specific version of the incoming field information through the steps of the admittance for curation procedure (BTP-SMF-002) necessitates that no error corrections are made on the completed original field records. Corrections will be made on a copy of the field record; this corrected copy will be placed with the uncorrected file copy of the record.

5.6 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

BTP-SMF-001, Sample Management for the Yucca Mountain Project Office.

BTP-SMF-002, Transport, Receipt and Admittance for Curation by the Sample Management Facility of Borehole Samples.

BTP-SMF-008, Field Logging, Handling, and Documenting Borehole Samples.

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

7.0 FIGURES

Figure 1 - Structural Verification Checklist.
Figure 2 - Lithologic Verification Checklist.

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 at least every 10 business days. Copies of these QA records will be retained by the SMF and stored at the SMF Documents Center.

1. Structural Verification Checklist.
2. Lithologic Verification Checklist.

YUCCA MOUNTAIN PROJECT SAMPLE MANAGEMENT FACILITY

STRUCTURAL VERIFICATION CHECKLIST

BTPSMF3-1 5/89

Borehole ID _____ Interval _____ to _____

Completed By _____ Checked By _____ TS Assistant _____

Date _____ Date _____ Date _____

ACTIVITY			EXPLANATION OR CORRECTIVE ACTION
BRACKET	1. Every bracket has an associated bracket code?	Y / N	
	2. Bracket code (col. 8-9) adequately describes feature?	Y / N	
FRAC. ORIGIN	1. Handling induced fractures correctly marked?	Y / N	
	2. Non-orientation marks (s,') present as indicated?	Y / N	
DIP	1. High angle fracture dips have associated fracture length?	Y / N	
	2. Low angle fracture dips have no orientation?	Y / N	
MINERALIZ.	Overall notation agrees with core conditions?	Y / N	
PIECE LGTH.	All piece lengths (≥ 0.3 ft) noted on log?	Y / N	
REMARKS	1. Features correctly located?	Y / N	
	2. Features correctly described?	Y / N	
ADDENDA	All addenda present?	NA / Y / N	

Figure 1. Structural Verification Checklist.

YUCCA MOUNTAIN PROJECT SAMPLE MANAGEMENT FACILITY

LITHOLOGIC VERIFICATION CHECKLIST

BTPSMF3-2 5/89

Borehole ID _____ Interval _____ to _____

Completed By _____ Checked By _____ TS Assistant _____

Date _____ Date _____ Date _____

ACTIVITY			EXPLANATION OR CORRECTIVE ACTION
FIELD LOGS	Header information accurate?	Y / N	
RUN DATA	1. Run marker correctly labeled?	Y / N	
	2. Run marker correctly located in box?	Y / N	
ROCK UNITS	1. Correlates with sample?	Y / N	
	2. Properly located?	Y / N	
UNIT DESCRIPTION	1. Primary descriptive terms complete and accurate?	Y / N	
	2. Specific features accurate and correctly located?	Y / N	
ADDENDA	All addenda present?	NA / Y / N	

UNCONTROLLED DOCUMENT

Figure 2. Lithologic Verification Checklist.

INTERIM CHANGE NOTICE

N-QA-023
4/90

ICN Number:	Effective Date:	Page 1 of 1
1	6/13/90	

Applies to:

Number BTP-SMF-004 Rev. 0 Title Physical Processing and Storage of Core and Cuttings at the Sample Management Facility

REQUIRED CHANGE(S): (Minor ☒ Yes ☐ No)

PARAGRAPH	CHANGE TO
5.2.8, line 6	Substitute "Container ID" for "RCT or ACT Bar Code"
5.2.8.1.1, Line 2	Substitute "Container ID" for "RCT or ACT Bar Code"
5.3.3.2.2, line 3	Substitute "Container ID" for "RCT Bar Code"
5.3.3.2.1, line 6	Substitute "Container ID" for "ACT Bar Code"
5.3.3.3, line 2	Substitute "Container ID" for "RCT or ACT bar code"
5.4, line 2	Substitute "Container ID" for "RCT or ACT bar code"
Figure 12	Substitute "Container ID #" for "RCT/ACT Bar Code #"
Figure 2	Substitute "Camera Type" for "Film Speed" Substitute "Film Speed" for "F-stop" Substitute "Container ID #" for "RCT/ACT Bar Code #"
Figure 6	Substitute "Container ID #" for "RCT/ACT Bar Code #"

APPROVALS 9008030294

Division Director	Director QA	Project Manager
Maxwell Blanchard		
Date 6-1-90	Date 6/6/90	Date 6/6/90

Title	No.	Rev.
PHYSICAL PROCESSING AND STORAGE OF CORE AND CUTTINGS AT THE SAMPLE MANAGEMENT FACILITY	BTP-SMF-004	0
	Effective Date 7/7/89	
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1.0 PURPOSE AND SCOPE

This procedure describes the Yucca Mountain Project Office (Project Office) requirements and responsibilities for the physical processing and storage of Yucca Mountain Project (Project) core and cuttings at the Sample Management Facility (SMF).

2.0 APPLICABILITY

This procedure applies to Technical and Management Support Services (T&MSS) contractor personnel and support staff performing physical processing and storage of Project core and cuttings at the SMF.

3.0 DEFINITIONS

3.1 Sample Management (SM)

SM of the 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 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. Samples covered by this procedure include core and cuttings 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.

APPROVED BY

Assistant Project Manager	Date	YMP Branch Chief	Date	YMP Project Quality Manager	Date
John E. Kale	6/20/89	D.E. Livingston for M.D. Blanchard	6/26/89		6/29/89

3.5 Cuttings

Cuttings are chips of rock produced during drilling that are removed from the borehole by circulation of drilling fluids (gas, foam, or liquid).

3.6 Archival-Research Borehole Sample Processing System

The archival-research borehole sample processing system of sample preservation is based upon splitting a representative sample of core or cuttings from the total collected sample, one of which is preserved as an archive (archival split), the other of which is available for research and analysis (research split). A critical factor in the application of this system is the availability of core of a certain minimum diameter (approximately 3.0"). The system in place at the SMF requires that the core be split longitudinally off-center, resulting in an approximately 1/3 archival split and 2/3 research split.

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 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 members performing physical processing and storage activities on borehole and other geologic samples. If authorized by the Curator after consultation with the SOC, the core will be moistened with a water spray to enhance the colors for photographic purposes.

4.2 Technical Staff Assistant (TS)

The TS Assistant shall ensure that activities performed during this procedure conform to quality assurance (QA) guidelines.

4.3 Sample Management Facility Geotechnician

The SMF Geotechnician will perform the following core processing and storage activities: sample splitting, placing in containers, labeling, subsampling, and storing. The SMF Geotechnician will conduct the following cuttings processing and

storage activities: cleaning of samples, bagging, placing in containers, labeling, subsampling, and storing.

4.4 Sample Management Facility 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 & Engineering Company, Inc. (REECo)

REECo Teamsters and Laborers shall assist in handling and shelving of sample containers and will operate trucks and other material-handling equipment.

4.6 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.

5.0 PROCEDURES

5.1 Introduction

Core and cuttings acquired from Project field sites shall be processed after arrival at the SMF. The purposes of processing these samples are: (1) to photo-document core, and (2) to achieve and maintain traceability on these samples acquired during Project site characterization activities. In addition to the purposes for processing, core greater than 3" diameter and cuttings will be divided (1) to prepare an archival split for future reference, and (2) to prepare a research split for scientific data-gathering activities. Samples will undergo different phases of processing, depending upon the condition of the sample and the analytical data to be derived. At the discretion of the Director of the Regulatory and Site Evaluation Division (RSED), Project Office, some core greater than 3" diameter will be left whole for analytical purposes or because it is too unconsolidated for slabbing. An archival split shall be cut from whole core or separated from cuttings (approximately 50 grams). The research split of core shall be photographed and placed in the appropriate storage location. At the discretion of the Curator, the archival split may be photographed in addition to or instead of the research split.

5.2 Core Processing

Requested whole core larger than 3" diameter that is selected by participants during a Core Examination Meeting (Project Office Branch Technical Procedure [BTP] BTP-SMF-005) shall be segregated from the rest of the core prior to slabbing. The

reserved whole core specimens held out from processing (BTP-SMF-006) shall have the approval of the RSED Director. Following verification of sample documentation (BTP-SMF-003) and selection and removal of whole core specimens, the remaining whole core will be slabbed, marked, packaged, and stored. Core less than 3" diameter will be verified, permantly marked, packaged, and stored.

5.2.1 Facilities

The core processing room will be equipped with electrical service, compressed air, running water, and drain lines with sediment traps.

5.2.2 Equipment

Core processing equipment will include, but is not limited to:

Self-feeding core slabbing saws
Work tables equipped with casters
Measuring rules marked in tenths of a foot
Dust collection system for dry slabbing
Polyvinyl chloride (PVC) half-tubes
Polyethylene lay-flat tubing
Ear and eye protection
Core marking supplies
Polystyrene core cradles
Pneumatic staple guns
Core boxes

5.2.3 Core Slabbing Documentation

Information from CSITS will be used to generate one Core Slabbing/Boxing Checklist (Figure 1) per box to document the various steps in the slabbing process of whole core. The top portion of the checklist will include the borehole identification (ID) and other information specific to the core in that box (i.e., container interval, sample status). The lower portion of the Core Slabbing/Boxing Checklist will be divided into preslabbing and postslabbing sections and provides space for each activity in the process to be documented by the SMF Geotechnician performing it. During slabbing, the Core Slabbing/Boxing Checklist will be stored in a document cache mounted inside the lid of each box. Core that measures less than 3" diameter (small bore core) will not be slabbed. Individual steps in the Core Slabbing/Boxing Checklist that do not apply to small bore core will be marked "N/A" during core processing.

5.2.4 Core Box Preparation

5.2.4.1 Prior to the removal of the whole core from the field box in preparation for slabbing, another box of the same size will be constructed and include polystyrene cradles sized to fit the archival split of core. Polystyrene core status and whole core specimen markers will be placed in the research split box at the appropriate positions, and duplicates will be made and placed in the archival split box. Labels for these markers will be generated using information in CSITS. After the core from a field box has been slabbed, the field box will be used to hold the research split of core, and the newly constructed box will hold the archival split of core. Information from

CSITS will be used to generate five labels for each box, including borehole ID, box interval, and an index of sample interval statuses as they will exist immediately after slabbing (Figures 2 and 3). Labels will be affixed to both ends and one side of the core box lid and to both ends of the body of each archival or research split box. After all the core (excluding whole core specimens) from a borehole has been slabbed and boxed, a sequential box number will be laminated to the box (i.e., Box 3 of 246). Core less than 3" diameter will remain in the same box in which it was received from the field. Permanent labels for boxes containing 3" or less diameter core will contain the same information as the research core box labels.

5.2.4.2 The whole core (3" diameter or larger) will be removed from the field core box and placed one row at a time in PVC half-tubes fastened to a work table. Both the archival and research core box interiors will be marked at the top and bottom of each row to indicate the total depth interval represented in that row (i.e., core, missing core, whole core specimens removed, etc.).

5.2.5 Orientation Stripes and Depth Mark Finalization and Duplication

On core larger than 3" diameter, a second set of permanent orientation stripes will be placed 180° from the existing orientation stripes on the core. The blue footage indicator will be extended with a permanent marker to completely circumscribe the core. Depth indicators will be permanently marked in blue and appropriately located on both sides of the core (Figure 4). Core less than 3" diameter will have the temporary field markings replaced by permanent markings. These markings will not be duplicated as on core 3" diameter or larger.

5.2.6 Slabbing of Core

5.2.6.1 Approximately 3 ft of whole core (3" diameter or larger) from the work table will be placed in the core sawing jig with the top end to the operator's left and the original field orientation stripes facing outward toward the saw operator. The core shall be slabbed longitudinally into the approximately 1/3 archival split and 2/3 research split, each portion containing identical markings. The core will be slabbed with a diamond saw blade. Cores will be slabbed using water as the coolant/lubricant, or with a special dry-cutting sawblade. When the dry-cutting sawblade is used, a dust collection system will be used to control air quality within the saw room.

5.2.6.2 Rubble will be removed from the field transport bag and laid out on the work table. An approximate 1/3 - 2/3 diameter longitudinal split will be made on the rubble sample. Each split will be rebagged separately in 8" wide, 4-mil thick polyethylene lay-flat tubing, with a minimal amount of disturbance to the sample. Rubble from core less than 3" diameter will be bagged, but not split into archival and research portions. Each bag will be marked with orientation marks and depth indicators and placed in its respective box, row, and position.

5.2.7 Final Markings on Slabbed Core

After slabbing, the research split of core will be removed from the saw jig first, the archival split afterwards. Both splits of core will be laid out in the Core Processing Area, with the 1/3 and 2/3 splits placed face down, parallel to each other, and oriented correctly. Any markings that may have been obscured during slabbing shall be verified using the Core Status section of the Core Slabbing/Boxing Checklist (Figure 1) before being redrawn. The core will then be placed in its respective row and box.

5.2.8 Photography of Split Core

The core, whether newly slabbed (3" diameter or larger) or whole (less than 3" diameter), shall be photographed to record its initial condition, position in the box, orientation, and color. The Core Photography Log (Figure 5), used to document photography of the core, includes borehole ID, photographer's name and organization, film speed and f-stop, and date. Information on each exposure will include the following: exposure number, RCT (research) or ACT (archive) bar code number, box interval, missing footage status, and remarks. A Nevada Test Site (NTS) Support Contractor or the SMF staff shall be responsible for photographing the core. The SMF Geotechnician will complete this log as the photographs are taken and will initial and date the action.

5.2.8.1 Methods

5.2.8.1.1 The core and labeling cards will be arranged as shown in Figure 6. The borehole ID, RCT or ACT bar code number, box depth interval, date photographed, missing and whole core specimen interval markers, grey scale, and color scale will be displayed in each shot.

5.2.8.1.2 A box of research or small bore core will be placed with the shallower end of the interval in the lower left of the box stand. The box and photographic marquees will be outlined with tape to facilitate placement for subsequent shots. Labels will be in place to represent missing core and to explain discontinuous intervals (e.g., whole core specimens). If authorized by the Curator after consultation with the SOC, the core will be moistened with a water spray to enhance the colors. Core placement and camera focus shall be checked to ensure correct arrangement and legibility of labels. The SMF Geotechnician will record the exposure numbers, replace the core box lid, and remove the box from the box stand.

5.2.8.1.3 The developed exposures shall be examined by an SMF staff member to ensure that all boxes of core have been photographed and that the exposures are adequate to document the condition of the core. A list of any unsatisfactory or missing photographs will be made and the photographs will be retaken.

5.2.8.2 Handling and Archiving of Prints and Negatives

A minimum of three set of prints shall be maintained, one by the SMF Documents Center and two by the T&MSS LRC. The NTS Support Contractor or the SMF shall submit the original negatives to the T&MSS LRC. An index of each borehole photographic record will be kept in the resepective notebook.

5.2.9 Bagging of Archival Core

If bagging of the archival split is deemed necessary by the SOC, it will be sealed in polyethylene lay-flat tubing as soon as it has been marked and labeled. Lengths of lay-flat tubing will be cut for each core interval. One end of each length will be sealed with a heat sealer. One side of the tubing will be marked with the top and bottom depths of the core interval near the ends. Orientation marks, red on the right and blue on the left (Figure 4), will be drawn on the plastic bag. The approximately 3-foot section of core will be laid slabbed side face up on a contoured polystyrene cradle. The core and polystyrene cradle will then be inserted into the premarked lay-flat tubing, the excess air will be squeezed out, and the end of the tubing will be heat sealed. The sealed section of core will be placed in a protective cardboard divider pad and positioned in the archival split box. This process will be repeated for the other row in the box.

5.2.10 Sealing of Boxes

After core processing, containers will be sealed with filament tape and prepared for storage.

5.3 Cuttings Processing

Following verification of samples at the SMF (BTP-SMF-003), cuttings will be washed (if necessary), divided into archival and research splits, packaged, and stored.

5.3.1 Facilities

The cuttings processing room will be equipped with electrical service, compressed air, running water, and drain lines with sediment traps.

5.3.2 Equipment

Cuttings processing equipment will include, but is not limited to:

- Wemas automatic drill cuttings washer/dryer
- Work table equipped with casters
- Riffle type sample splitter
- Digital platform scale
- Storage boxes
- Storage vials
- Pneumatic stapler

5.3.3 Processing

A Cuttings Processing Log (Figure 11) will be used to document the various steps in processing the cuttings samples. The log contains the batch ID, borehole ID, container ID and interval, sample ID and interval of each bag, and a checklist delineating each stage of processing (i.e., wash/dry, split).

5.3.3.1 Washing and Drying

If the cuttings were produced by drilling with air, the samples will not be washed. If the cuttings were produced by drilling with drilling muds or air/foam, the samples will be washed.

5.3.3.2 Splitting

5.3.3.2.1 An archival split shall be taken from each cuttings sample received at the SMF. Cuttings will be split using a riffle-type sample splitter. The amount of sample taken for the archival split shall be up to 50 percent of the entire cuttings sample, not to exceed 50 grams. The archival cuttings sample will then be placed into a prelabeled plastic vial with screw caps. Each vial will have a label affixed denoting borehole ID, sample interval, and ACT bar code number of that sample. The plastic vial will be kept in a storage box containing other archival cuttings samples within the storage box sample range.

5.3.3.2.2 The research cuttings sample split, which will not exceed 200 grams, will be kept in plastic vials with screw caps. Each vial will have a label affixed denoting borehole ID, sample interval, and RCT bar code number of that sample. Principal Investigators requiring amounts of cuttings greater than 200 grams shall collect them at the borehole site and then submit a Sample Collection Report (BTP-SMF-007) to the SMF. SM Geotechnicians can also collect the cuttings for the investigator and document this on a Sample Collection Report.

5.3.3.3 Packaging and Labeling

Vials containing the research and archival splits of cuttings will be stored in separate boxes. The borehole ID, container interval, RCT or ACT bar code number (if applicable), and missing footage within that container (if applicable) will be entered into CSITS. Four permanent label types will be generated using information contained in CSITS with the aforementioned information contained on them: an Archival Sample vial label (Figure 7), a Research Sample vial label (Figure 8), an Archival Sample storage box label (Figure 9), and a Research Sample storage box label (Figure 10). Boxes will be sealed with filament tape.

5.4 Sample Storage

A Sample Container Storage Log (Figure 12) is generated using information contained in CSITS and includes the borehole ID, sample type, and RCT or ACT bar code

number. The SMF Geotechnician placing the sample container in storage will enter the storage location and the date the container was shelved into the Sample Container Storage Log. The SMF Geotechnician and the TS Assistant shall both sign and date this record. The storage location of each container will be entered into CSITS. The storage areas shall be access-limited.

5.4.1 Core Sample Storage

The 1/3 and 2/3 diameter splits of the processed core, as well as the small bore core, will be shelved separately by acquisition site and location ID system. The 1/3 diameter archival split will be stored in the Archival Core Storage area of Building 4221, while the 2/3 diameter research split and the small bore core will be stored in Building 4320.

5.4.2 Cuttings Storage

Both the archival and research cuttings sample splits will be stored in the bulk sample storage area in Building 4320.

5.5 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 BTP-SMF-001, Section 5.7.4.

5.6 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

BTP-SMF-001, Sample Management for the Yucca Mountain Project.

BTP-SMF-003, Verification of Field Logging and Documentation of Core and Cuttings.

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

BTP-SMF-006, Removal of Whole Core and Other Specimens from Samples for Shipment and Remnant Return.

BTP-SMF-007, Acceptance for Curation by the SMF of Selected Samples and Documentation.

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

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

7.0 FIGURES

Figure 1 - Example of CSITS-generated Core Slabbing/Boxing Checklist.
Figure 2 - Example of CSITS-generated Core Box Label for Research Split.
Figure 3 - Example of CSITS-generated Core Box Label for Archival Split.
Figure 4 - Example of Core Markings.
Figure 5 - SMF Core Photography Log.
Figure 6 - Core Photographic Format.
Figure 7 - Example of CSITS-generated Vial Label for Cuttings Archival Sample.
Figure 8 - Example of CSITS-generated Vial Label for Cuttings Research Sample.
Figure 9 - Example of CSITS-generated Archive Cuttings Container Label.
Figure 10 - Example of CSITS-generated Research Cuttings Container Label.
Figure 11 - Example of CSITS-generated Cuttings Processing Log.
Figure 12 - Sample Container 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. Copies of these QA records will be retained by the SMF and stored at the SMF Documents Center.

1. Core Slabbing/Boxing Checklist.
2. SMF Core Photography Log.
3. Cuttings Processing Log.
4. Sample Container Storage Log.
5. Core Photographs.

CONTROLLED DOCUMENT

CORE SLABBING/BOXING CHECKLIST

Batch: RAT : BAT43

Borehole: SCORE : BHLT1

Container

Specifier: FCT100003
Top Depth: 50.0
Bot Depth: 75.0

Sample Status

50.0	to	60.0	: REC
60.0	to	62.5	: WCR
62.5	to	75.0	: REC

Remarks: _____

CORE SLABBING CHECKLIST

	Archival	Research
Labels Affixed to Boxes?	✓	✓
Duplicate Orientation Marks Drawn?	✓	✓
Depth Markers Extended Around Core?	✓	✓
Duplicate Footage Markers Drawn?	✓	✓
Rubble Split and Bagged?	✓	✓
Missing Footage Markers Inserted?	✓	✓
Whole Core Removed Markers Inserted?	✓	✓
Core Slabbed?	✓	✓

George Donaldson — SMF Geotechnician — 7/1/89 — Date

Chris Kenner — TS Assistant — 7/1/89 — Date

CORE BOXING CHECKLIST

	Archival	Research
Tubing Marked with Depth and Orientation?	✓	N/A
Core Placed In Polystyrene Cradle?	✓	✓
Cardboard Liner In Place?	✓	✓
Archive Core Placed In Lay-flat Tubing?	✓	N/A

George Donaldson — SMF Geotechnician — 7/1/89 — Date

Page 1 of 1

Figure 1. Example of CSITS-generated Core Slabbing/Boxing Checklist.

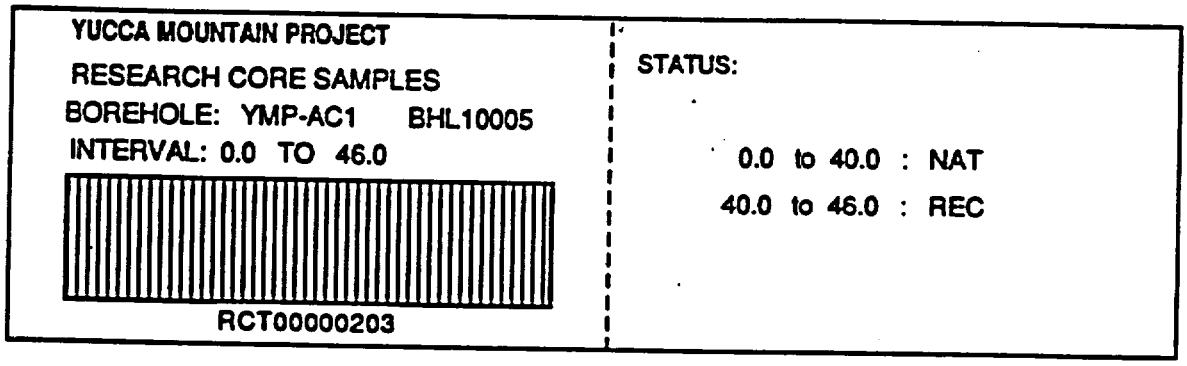

Figure 2. Example of CSITS-generated core box label for Research Split.

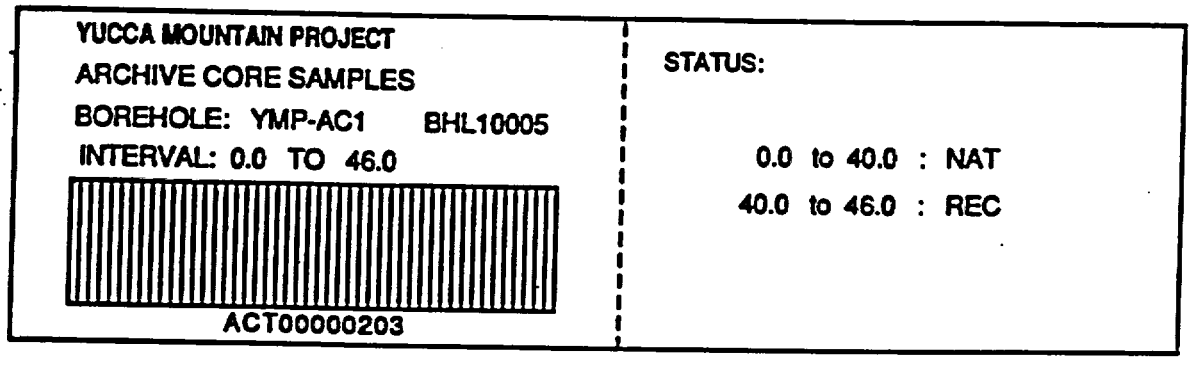

Figure 3. Example of CSITS-generated core box label for Archival Split.

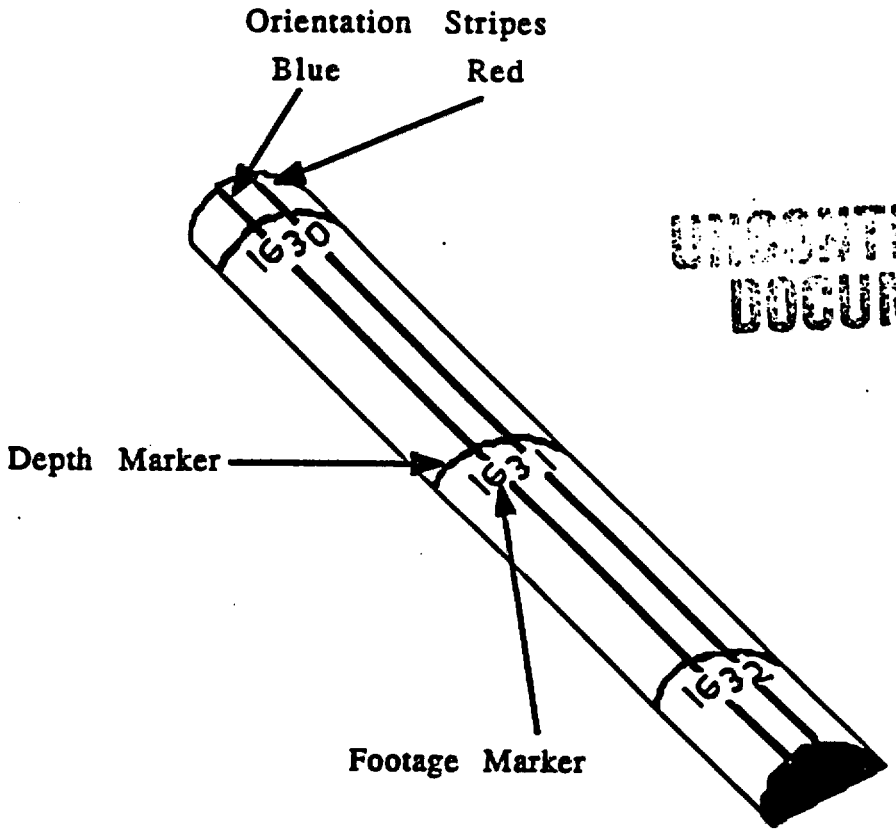

Figure 4. Example of Core Markings.

YUCCA MOUNTAIN PROJECT SAMPLE MANAGEMENT FACILITY

SMF CORE PHOTOGRAPHY LOG

BTPSMF4-1 5/89

Borehole I D ________ Photographer ________ Organization ________

Film Speed ________ f-stop ________ Date ________

Expo-sure#	RCT/ACT Bar Code #	Box Interval	Missing Footage		Remarks
			Interval	*Expl	

NAT - Not Attempted
LOST - Lost
DES - Destroyed
CON - Consumed
UNREC - Unrecvd.

SMF Geotechnican ________ Date ________

TS Assistant ________ Date ________

Figure 5. SMF Core Photography Log.

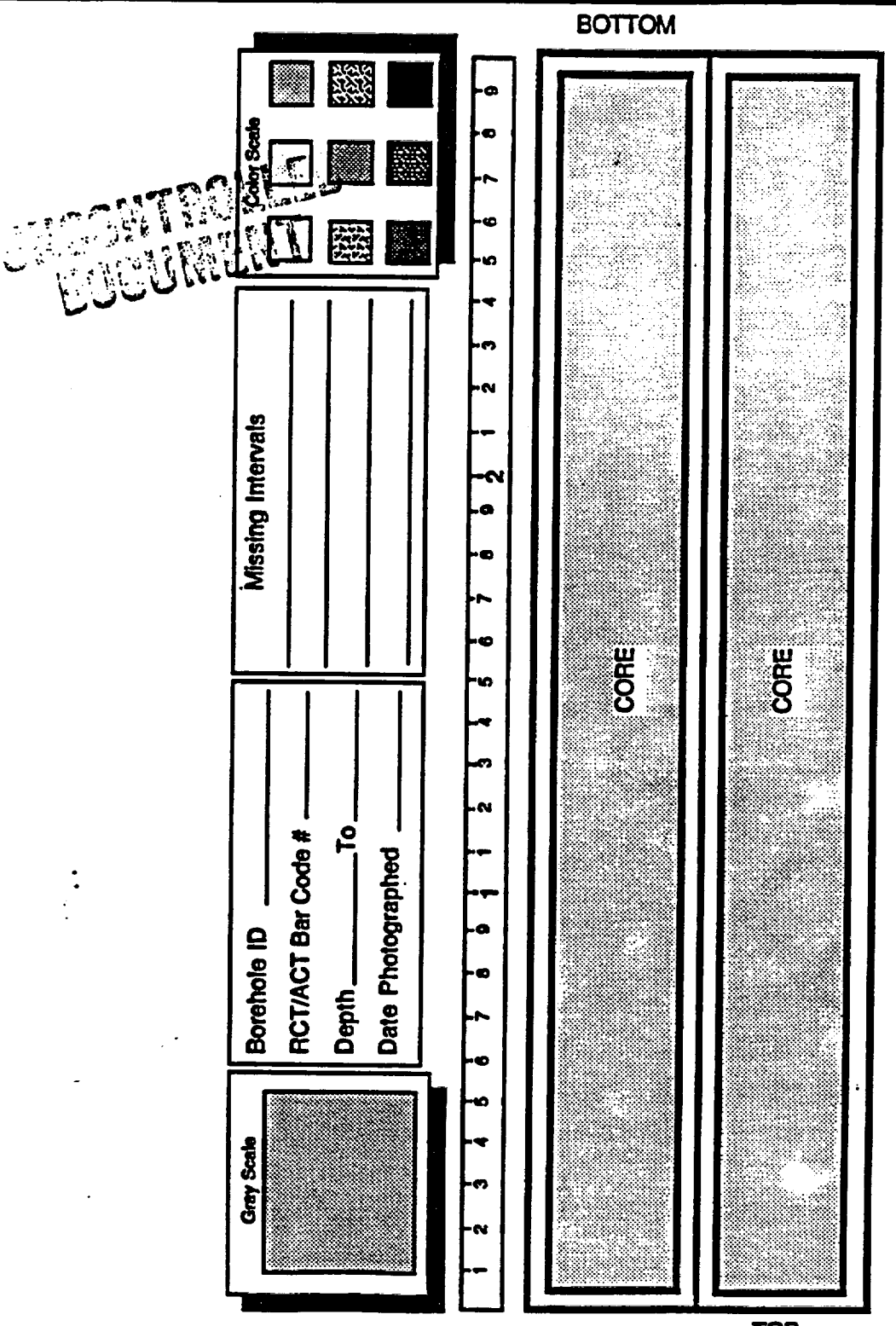

Figure 6. Core Photographic Format.

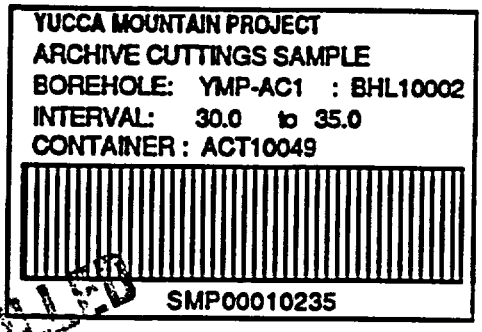

Figure 7. Example of CSITS-generated Vial Label for Cuttings Archival Sample.

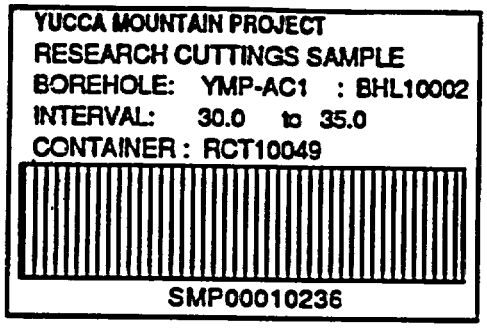

Figure 8. Example of CSITS-generated Vial Label for Cuttings Research Sample.

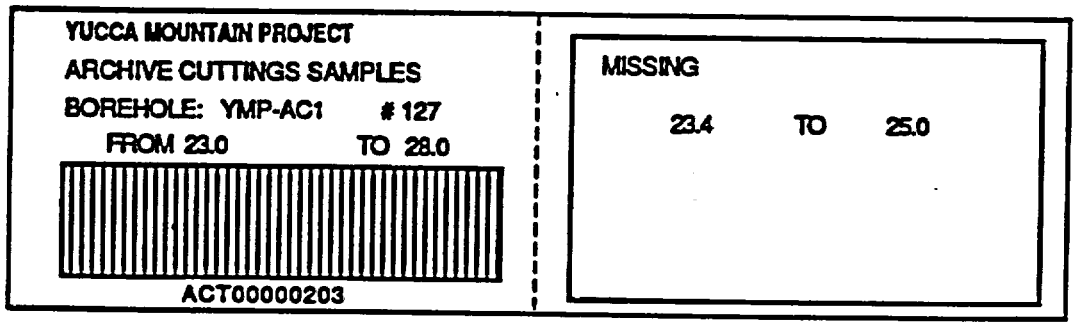

Figure 9. Example of CSITS-generated Archive Cuttings Container Label.

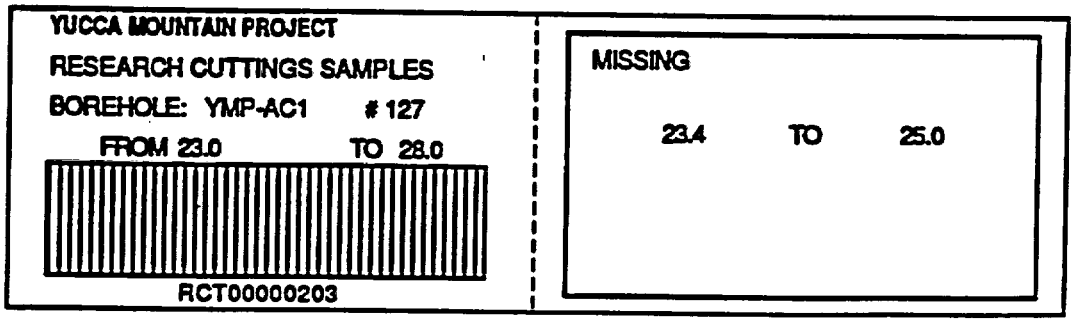

Figure 10. Example of CSITS-generated Research Cuttings Container Label.

CUTTINGS PROCESSING LOG

Batch: CUTPROC : BAT62
Borehole: YMP-AC2 : BHL143

Container
Specifier: FCT000319 Top: 238.7 Bot: 350.0

Sample				Wash/Dry	Split	Packaged	Labeled
Specifier : SMP00000382	Top: 238.7	Bot: 300.0		✓	✓	✓	✓
Specifier : SMP00000383	Top: 300.0	Bot: 350.0		✓	✓	✓	✓

UNCONTROLLED

George Donaldson 6/20/89
SMF Geotechnician Date

Chris Lewis 6/20/89
TS Assistant Date

Page 1 of 1

Figure 11. Example of CSITS-generated Cuttings Processing Log.

YUCCA MOUNTAIN PROJECT SAMPLE MANAGEMENT FACILITY

SAMPLE CONTAINER STORAGE LOG — BTPSMF4-2 5/89

Borehole I D	Sample Type	RCT/ACT Bar Bode #	Storage Location	Placed By	Date

SMF Geotechnician ____ Date ____ TS Assistant ____ Date ____

Figure 12. Sample Container Storage Log.

YUCCA MOUNTAIN PROJECT OFFICE
DOCUMENT APPROVAL SHEET

Y-AD-002
4/90

Title
BRANCH TECHNICAL PROCEDURE: EXAMINATION OF SAMPLES BY PARTICIPANTS AT THE SAMPLE MANAGEMENT FACILITY

NO. BTP-SMF-005
[X]Q
[ ]Non Q

APPROVAL

T&MSS Assistant PROJECT MANAGER:	John E. Shaler	Signature	6/28/89 Date
DIRECTOR OF QUALITY ASSURANCE:	Edwin L. Wilmot	Signature	6/28/89 Date
YMP Branch Chief (OTHER, AS REQUIRED)	D. E. Livingston for H. B. Blanchard	Signature	6/28/89 Date

REVISION 0 EFFECTIVE DATE: 7/7/89

REVISIONS

	INITIAL AND DATE			
	REVISION 1	REVISION 2	REVISION 3	REVISION 4
PROJECT MANAGER:	10/26/90			
DIRECTOR, QA:	10/26/90			
YMP Branch Chief (OTHER, AS REQUIRED)	10-26-90 Maxwell Blanchard 10-26-90			
EFFECTIVE DATE:	10/26/90			

UNCONTROLLED DOCUMENT

8908230296

1.0 PURPOSE AND SCOPE

This procedure describes the Yucca Mountain Project Office (Project Office) requirements and responsibilities for examination by Yucca Mountain Project (Project) Participants of Project samples at the Sample Management Facility (SMF).

2.0 APPLICABILITY

This procedure applies to Technical and Management Support Services (T&MSS) contractor personnel and support staff coordinating examinations of Project samples by Project Participants and other outside interests at the SMF.

3.0 DEFINITIONS

3.1 Sample Management

SM of the 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 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 Unqualified Sample

An unqualified sample is a geologic sample collected for the Project prior to implementation of the Project Office Quality Assurance Program Plan (QAPP; WMPO/88-1) and applicable, approved implementing procedures. These samples will be considered unqualified until they have been qualified under appropriate procedures.

3.4 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 core, cuttings, existing samples, and other geologic samples collected at Project field sites.

3.5 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.

3.6 Cuttings

Cuttings are chips of rock that are cut by a drill bit during drilling and are removed from the borehole in the drilling fluids (gas, foam, or liquid).

3.7 Specimen

A specimen is a subsection or portion which has been removed from a sample.

3.8 Curatorial Sample Inventory and Tracking System (CSITS)

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

3.9 Requester

A Requester is an individual from a Project Participant or outside interest who requests to visually examine samples and existing samples under control of the SMF.

3.10 Examiner

An Examiner is an individual from a Project Participant or outside interest who is authorized to visually examine samples and existing samples under control of the SMF.

4.0 RESPONSIBILITIES

4.1 Curator

The Curator may authorize extensions of examination periods and determine the need to weigh a sample prior to examination.

4.2 Technical Staff (TS) Assistant

The TS Assistant shall assist Examiners during examination activities and shall ensure that activities performed during this procedure conform to QA guidelines.

4.3 Sample Management Facility Geologist

The SMF Geologist shall assist Examiners during examination activities.

4.4 Sample Management Facility Geotechnician

The SMF Geotechnician shall assist Examiners during examination activities and shall complete documentation and prepare samples for examination. The SMF Geotechnician shall also verify that samples have not been visibly altered or subsampled during examination.

4.5 Sample Management Facility Administrative Assistant

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

4.6 Reynolds Electrical & Engineering Company, Inc.

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

4.7 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. 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. The Curator shall distribute samples only when so approved by the RSED Director.

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. Although many specimens will be removed for detailed analysis, significant site-specific information can be gained by visual examination alone. New samples that have undergone processing at the SMF will be available for examination there. Unqualified samples will also be available for examination. Examinations of cores by the Requester may be necessary to select specific pieces of whole core

samples for removal prior to core slabbing. Selected specimens shall be segregated subsequent to verification of field logging.

5.2 Authorization for Examination

Requesters who want to visually examine samples at the SMF shall submit a completed Sample Examination Request (Figure 1). This request must be approved by the Chief of the Site Investigations Branch (SIB), Project Office, and received by the SMF prior to the visit. The SMF Geotechnician will use this form to schedule examination of verified whole core, processed samples, and unqualified samples by the Requester. It is important for the Requester to include the requested date, time and duration of examination to enable the SMF to schedule the requested examination times with the minimum of conflict. Information from the Sample Examination Request will be entered into CSITS after authorization by the SIB Chief is received at the SMF. Authorization for visual examination includes the following restrictions: no specimens will be removed; no destructive actions (e.g., scraping) will be performed; and no foreign materials (e.g., hydrochloric acid) will be applied to samples or left in the container.

5.3 Examination of Whole Core Prior to Core Examination Meeting

If a Requester needs to examine core prior to a Core Examination Meeting (Section 5.4), the Requester will be allowed sufficient time to complete the necessary examination. Specimen requests may be submitted to the SOC at this time; however, no requests will be filled by the SMF until after the Core Examination Meeting.

5.4 Core Examination Meeting

5.4.1 If more than one Requester expresses interest in examining and collecting specimens of core, a Core Examination Meeting will be scheduled subsequent to verification of field logging, but prior to core processing. Core Examination Meetings will occur as soon as practicably possible after verification of core (Project Office Branch Technical Procedure [BTP] BTP-SMF-003). In the event that the proposed total depth of the borehole is not reached or is considerably delayed (rig breakdown, change of scope of study plan, mobilizing rig to another location, etc.), the meeting will be scheduled to examine all available core. Requesters will be notified of the Core Examination Meeting by the SMF.

5.4.2 Data from the Sample Examination Request will be used to complete a Sample Examination Record (Figure 2). The Sample Examination Record includes the following information: Examiner, organization, address, telephone number, SIB Chief authorization, borehole or field site, container ID bar code number, sample interval, weights, SMF Geotechnician's initials, and date.

5.4.3 The Support Staff will lay out sequential boxes of core from a single borehole in the Core Examination Room on or before the scheduled meeting date. A core review packet containing copies of borehole information and a general overview of the core will be available for Examiners during the Core Examination Meeting.

5.4.4 Examiners will examine samples, record requested intervals, and place temporary markers on core to indicate the Examiner and requested interval. If there are intervals of core that two or more Examiners request, an attempt will be made to resolve the conflict during the Core Examination Meeting. If Examiners are unable to resolve the problem, assignment of specimen intervals will be determined by the RSED Director.

5.5 Examination of Samples Subsequent to Processing

5.5.1 If an Examiner requests to examine samples after processing, a Sample Examination Record will be generated as described in Section 5.4.2. Prior to or at the time of an Examiner's scheduled examination, the Support Staff will remove the requested samples from storage using the relocation module of CSITS. Sample weighing and recording of sample weights will be carried out at the discretion of the Curator as a quality control measure. The sample weights may be recorded on the Sample Examination Record. The Support Staff may weigh the sample and container individually or together. The containers of samples will then be placed on examination tables. Core samples may be compared to photographs prior to examination as an additional quality control activity.

5.5.2 The SMF staff will be on hand to work with the Examiners during specimen selection. After each specimen has been selected, measured, and marked, the SMF staff member assisting the Examiner will make a listing of the specimen request information. When all the specimens from a particular borehole have been selected, the list will be sent to the SOC Chairman and each SOC representative for review and evaluation of the specimen request.

5.5.3 Upon completion of viewing by the Examiner, the SMF Geotechnician may again compare core samples viewed to the core photographs and reweigh the core boxes to determine if the core is the same weight and in the same visual condition as when it was released for examination. If there are no discrepancies, the SMF Geotechnician will then complete the Sample Examination Record and initial this action. The SMF Geotechnician will sign this form in the upper right-hand corner and submit it to the TS Assistant for verification.

5.6 Examination of Unqualified Samples

A Requester may want to examine unqualified samples at the SMF. In addition to the Sample Examination Request, a Requester shall submit a completed Unqualified Samples Examination Agreement (Figure 3) prior to examination of existing samples. Sample weighing and recording of sample weights will be conducted as described in Section 5.5.1. Sample containers

will then be placed on examination tables, and the seals will be broken if the core has not been previously examined.

5.7 Reshelving of Samples

The Support Staff will reseal all containers with filament tape, remove them from the examination room, and replace them in the appropriate storage location using the relocation module of CSITS.

5.8 Identification and Resolution of Discrepancies

A discrepancy exists when there is incorrect informati[illegible] 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 BTP-SMF-001, Section 5.7.

5.9 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, SMD 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-5.9Q, Qualification of Data or Data Analyses Not Developed Under the Yucca Mountain Project Quality Assurance Plan.

BTP-SMF-001, Sample Management for the Yucca Mountain Project.

BTP-SMF-003, Verification of Field Logging and Documentation of Core and Cuttings.

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

7.0 FIGURES

Figure 1 - Sample Examination Request.
Figure 2 - Sample Examination Record.
Figure 3 - Unqualified Samples Examination Agreement.

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. Sample Examination Request.
2. Sample Examination Record.
3. Unqualified Samples Examination Agreement.

YUCCA MOUNTAIN PROJECT SAMPLE MANAGEMENT FACILITY

SAMPLE EXAMINATION REQUEST

Y-AD-146 10/90

Requester (Please print) _____

Organization _____

Address _____

_____

Telephone ( ) _____ (FTS) _____

Requested examination date(s) and time: from _____ to _____

Study Plan Number _____ Title _____

SIB Chief Authorization Number _____ Date _____

The Yucca Mountain Project (Project) geologic samples that have been provided for your examination at the Sample Management Facility are controlled by the Project Quality Assurance Program. The samples that are made available to you are for VISUAL EXAMINATION ONLY. NO DESTRUCTIVE ACTIONS OR SUBSAMPLING are to be performed. NO FOREIGN SUBSTANCES will be applied to these samples.

UNCONTROLLED DOCUMENT

I have read the above statement and will comply with sample examination restrictions.

Requester Signature _____ Date _____

Acquisition Site	Depth Interval or Reference	Sample Type

SMF USE ONLY: TS Assistant _____ Date _____

Figure 1 - Sample Examination Request

YUCCA MOUNTAIN PROJECT SAMPLE MANAGEMENT FACILITY

SAMPLE EXAMINATION RECORD — Y-AD-147 10/90

Examiner _____

Organization _____

Address _____

_____

Telephone ( ) _____ (FTS) _____

Borehole/Field Site	Bar Code #	Sample Interval	Weight		Date Out	Check	Date In	Check
			Out	In				

SMF Geotechnician _____ Date _____

TS Assistant _____ Date _____

Figure 2 - Sample Examination Record

YUCCA MOUNTAIN PROJECT SAMPLE MANAGEMENT FACILITY

UNQUALIFIED SAMPLES EXAMINATION AGREEMENT | **Y-AD-148 10/90**

Yucca Mountain Project geologic samples that were collected prior to the Waste Management Project Office Quality Assurance Program Plan (WMPO/88-1) and applicable approved implementing procedures are classified as "existing" samples. Existing samples that have not been designated qualified through approved procedures are designated as unqualified and are covered by the January 12, 1988, letter from Carl P. Gertz to the Technical Project Officers (NNA.880113.0007). This letter states the following concerning the use of unqualified samples and derived data:

> "At this juncture, each Participant is to proceed under the assumption that the existing core and derived data have not been qualified for use in licensing. Each Participant must ensure that this data is identified as required by NVO-196-17 (now NNWSI 88/9) and that such data is not entered into documents or systems which are to contain qualified data only."

The responsibility to adequately identify and control exisiting sample-derived data as directed by the Yucca Mountain Project Office is assigned to you, the examiner, as a representative of your organization.

I have read the above statement and will comply with the directions to identify and control unqualified existing data.

Examiner (print)	Signature	Organization	Date

Figure 3 - Unqualified Samples Examination Agreement

YUCCA MOUNTAIN PROJECT OFFICE
DOCUMENT APPROVAL SHEET

Y-AD-002
4/90

Title
BRANCH TECHNICAL PROCEDURE: REMOVAL OF WHOLE AND OTHER SPECIMENS FROM SAMPLES BY THE SMF FOR SHIPMENT, AND REMNANT RETURN

NO. BTP-SMF-006
[x] Q
[ ] Non Q

APPROVAL

T&MSS Assistant PROJECT MANAGER:	John E. Shaler (Signature)	6/28/89 (Date)
DIRECTOR OF QUALITY ASSURANCE:	Edwin L. Wilmot (Signature)	6/28/89 (Date)
YMP Branch Chief (OTHER, AS REQUIRED)	D.E. Livingston for M. B. Blanchard (Signature)	6/28/89 (Date)

REVISION 0 EFFECTIVE DATE: 7/7/89

REVISIONS

	INITIAL AND DATE			
	REVISION 1	REVISION 2	REVISION 3	REVISION 4
for PROJECT MANAGER:	10/26/90			
DIRECTOR, QA:	10/26/90			
YMP Branch Chief (OTHER, AS REQUIRED)	10-26-90			
EFFECTIVE DATE:	10/26/90			

UNCONTROLLED DOCUMENT

9908030298

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.

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 analysis. 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 Documents

5.3.2.1 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.

5.3.2.2 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, and processing batch ID. A self-adhesive temporary label with the same information will be generated by CSITS and placed on the whole core specimen immediately after cutting.

5.3.2.3 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.

5.3.2.4 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.

5.3.3 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).

5.3.4 Preliminary Packaging

5.3.4.1 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 portion of the Whole Core Removal Checklist by the SMF Geotechnician performing each step or activity.

5.3.4.2 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 ID number.

5.3.5 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. A temporary label will contain the borehole ID, Requester, Recipient, and ID number.

5.3.6 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.

5.3.7 Final Packaging

5.3.7.1 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.

5.3.7.2 If space is available in a temporary storage container holding whole core specimens from the same borehole and designated for the same Requester, the specimen will be placed in the same container. If no space is available, a temporary storage container will be constructed and identified with an ID number. The specimen will be placed in that container, and the container will be sealed with filament tape.

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 be transported by the Support Staff to the core processing area, where the specimen will be removed from the sample by the SMF Geotechnician using the appropriate equipment. The specimen will be assigned an ID number and, if size permits, 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 ID number and interval will be affixed to the spacer. The box will be inspected prior to reshelving, then sealed with filament tape.

5.4.1.2 Specimens from Research Split of Cuttings

Bags 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 to reflect the contents, Specimen ID 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 number, 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 ID number, shipment date, bill of lading #, container type, special packaging and/or shipping instructions, ID number, acquisition site, sample type, depth interval (if applicable), type of specimen, container ID number, 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, SHP bar code 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 transfer of custody.

5.4.3.2.2 CSITS will generate a Specimen Custody Receipt (Figure 7) for each specimen shipment. A copy of this receipt 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 receipt 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 receipt shall be signed and returned to the SMF within 10 business days after receipt of the specimens.

5.5 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 ID number, and storage location.

5.5.1 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 Custody Receipt. A list of any noted discrepancies will be compiled, and the Recipient will be contacted to resolve the problems, if necessary.

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 ID 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 BTP-SMF-001, 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.

BTP-SMF-001, Sample Management for the Yucca Mountain Project Office.

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

YUCCA MOUNTAIN PROJECT SAMPLE OVERVIEW COMMITTEE

SOC SPECIMEN REMOVAL REQUEST | Page 1 of 2 | Y-AD-151 10/90

Requester _____ Telephone ( ) _____ (FTS) _____

Organization _____

City _____ State _____ Zip Code _____

Signature of SOC Representative _____ Date _____

Study Plan Number _____

Activity Title _____

Test or Analysis to be Performed _____

Specimen Requirement(s) and Description _____

Approved (A), Disapproved (D), Tabled (T)

Specimen Source	Specimen Type	Interval/ Length	Amount	Substitution Acceptable	SOC Chair.	LANL	LLNL	SNL	T&MSS	USGS

Figure 1 - SOC Specimen Removal Request

YUCCA MOUNTAIN PROJECT SAMPLE OVERVIEW COMMITTEE

SOC SPECIMEN REMOVAL REQUEST | Page 2 of 2 | Y-AD-151 10/90

Approved (A), Disapproved (D), Tabled (T)

Specimen Source	Specimen Type	Interval/ Length	Amount	Substitution Acceptable	SOC Chair.	LANL	LLNL	SNL	T&MSS	USGS

SOC RECOMMENDATION : APPROVED (A), DISAPPROVED (D), TABLED (T) Date _____

YMP/SOC/CHAIR. _____ A,D,T

LANL _____ A,D,T

LLNL _____ A,D,T

SNL _____ A,D,T

T&MSS _____ A,D,T

USGS _____ A,D,T

COMMENTS _____

Project Office RSED Director Action (approved/disapproved/tabled)

Signature _____ Date _____

Figure 1 - SOC Specimen Removal Request (continued)

WHOLE CORE SPECIMEN REMOVAL CHECKLIST

Batch: WHOCO : BAT10020 Borehole: YMP-AC1 : BAT10005

Reservation

Specifier: RSV10046
Requester: Scientist, A.G.
Laboratory LANL
Requested 50.0 to 51.0
Reserved: 49.8 to 51.2

Sample

Specifier: SMP10330
Container: FCT10304

Specimen

Actual: 50.1 to 51.1
Container: SCT00101

Special Handling: N/A

CUTTING:

Top and Bottom Specimen Depths Legible?	✓
Orientation Marks Correctly Applied?	✓
Footage Marks Applied?	✓
Actual Top and Bottom Depths Applied to Form and Label? (Place a Dash in the Spaces of Reserved Depths and Actual Depths are the Same)	✓
Temporary Label Affixed to Specimen?	✓

George Donaldson 6/20/89
SMF Geotechnician Date

Chris Lewis 6/20/89
TS Assistant Date

PACKAGING:

Packaging Prep Complete?	✓
Specimen Placed in Styrofoam Cradle?	
Cradle Placed in Divider Pad?	
Lay-flat Tubing Cut and Marked?	
Styrofoam Insert Placed In Core Box?	✓
Specimen Fitted Into Storage Box?	✓
Storage Box # Entered on Form?	✓
Labels Made and Applied?	✓
Specimen Photographed?	✓
Lay-flat Tubing Sealed?	✓
Specimen Boxed?	✓
Special Handling Observed?	✓

George Donaldson 6/20/89
SMF Geotechnician Date

Page 1 of 1

Figure 2 - Example of CSITS-Generated WHole Core Specimen Removal Checklist

SPECIMEN REMOVAL LOG

Batch: SPECBATCH : BAT63

Sample Type: CORE

Requestor/Sample		Specimen Interval/Amount			Type/ID	Removed/Checked By	Removed/Checked Date
Chemist Ima G.		Requ Top: 28.3	Bottom: 28.4		GEOCHEM		
Organization: LANL		Resv Top: 28.1	Bottom: 28.6				
Borehole: YMP-AC1	: BHL143	Act Top: 28.3	Bottom: 28.4			Removed: KMD	6/20/91
Container: RCT341						Checked: DJA	6/20/87
Sample: SMP358							
Chemist Ima G.		Requ Top: 225.1	Bottom: 225.2		GEOCHEM		
Organization: LANL		Resv Top: 224.9	Bottom: 225.4				
Borehole: YMP-AC1	: BHL143	Act Top: 226.0	Bottom: 225.3			Removed: KMD	4/10/91
Container: RCT345						Checked: DJA	6/20/87
Sample: SMP358							
Chemist Ima G.		Requ Top: 233.1	Bottom: 233.2		TS		
Organization: LANL		Resv Top: 233.0	Bottom: 233.4				
Borehole: YMP-AC1	: BHL143	Act Top: 233.1	Bottom: 233.2			Removed: KMD	4/10/91
Container: RCT347						Checked: DJA	4/20/87
Sample: SMP358							

TS Assistant 6/20/91 Date

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Figure 3 - Example of CSITS-Generated Specimen Removal Log

YUCCA MOUNTAIN PROJECT SAMPLE MANAGEMENT FACILITY

SPECIMEN PHOTOGRAPHY LOG

Y-AD-149 10/90

Photographed By _____ T S Assistant _____ Date _____

Exposure No.	Specimen ID #	Date	Remarks

Figure 4 - Specimen Photography Log

SPECIMEN PACKAGING AND SHIPPING LOG

Requester Address

SNL
ATT: A. Geologist
P.O. Box 5800
Albuquerque, NM 87185 USA

Recipient Address

ABC Laboratories
2350 Testway
Lab City, BK 99999-9999 USA
Att'n: A. Chemist

Shipment Specifier: SHP00543911 — Shipment Date: 7/18/90 — Bill of Lading #: UPS-N703 — Container Type (circle): Mailer, (Box), Crate, Pallet

Shipping Instructions: N/A

Specifier	Borehole	Sample	Depth Interval	Type	Container ID #
SPC00354887	UE25 UZ-4	CORE	1220.5-1220.8	THINSEC	SCT00103
SPC00354888	UE25 UZ-4	CORE	1230.5-1230.8	THINSEC	SCT00103
SPC00354889	UE25 UZ-4	CORE	1240.5-1340.8	THINSEC	SCT00103
SPC00354890	UE25 UZ-4	CORE	1250.5-1250.8	THINSEC	SCT00103
SPC00354891	UE25 UZ-4	CORE	1260.5-1260.8	THINSEC	SCT00103

SMF Geotechnician [signature] Date 7/18/90 TS Assistant [signature] Date 7/18/90

Page 1 of 1

Figure 5 - Example of CSITS-Generated Specimen Packaging & Shipping Log

TRANSFER OF CUSTODY FORM

Requester Address	Recipient Address
SNL ATT: A. Geologist P.O. Box 5800 Albuquerque, NM 87185 USA	ABC Laboratories 2350 Testway Lab City, BK 99999-9999 USA Att'n: A. Chemist

Shipment Specifier: SHP00543911 3/5/90 (Shipment Date)

Shipping Instructions: N/A

No. of Pcs.	Shipment Description	Container ID #	Total Weight
6	Boxes contain rock specimens.	SCT00365885 SCT00365886 SCT00365887 SCT00365888 SCT00365889	167.2 lbs.

Person Accepting Custody [signature] Date 3/5/90 Time 10:45 A.M.

SMF Staff Releasing Custody [signature] Date 3/5/90 Time 10:45 A.M.

TS Assistant [signature] Date 3/5/90

Page 1 of 1

UNCONTROLLED DOCUMENT

Figure 6 - Example of CSITS-Generated Transfer of Custody Form

SPECIMEN CUSTODY RECEIPT

Recipient Address

LANL
ATT: Scientist, A.G.

Los Alamos, NM USA

Shipment Specifier: SHP10052

George Donaldson
SMF Geotechnician

6/20/89
Date

Specimens

Specifier	Borehole	Sample	Depth Interval	Type	Container
SPC10124	YMP-AC1: BHL10005	CORE	59.2 to 59.3	THINSEC	SCT10042

Please sign this form and return to:
Sample Management Facility
Yucca Mountain Project
P.O. Box 617
Mercury, NV 89023-0617

I hereby acknowledge receipt of the specimens listed above. I will return this form to the SMF within 10 business days of receipt.

Recipient [signature] Date 6/28/89

Page 1 of 1

Figure 7 - Example of CSITS-Generated Specimen Removal Contract

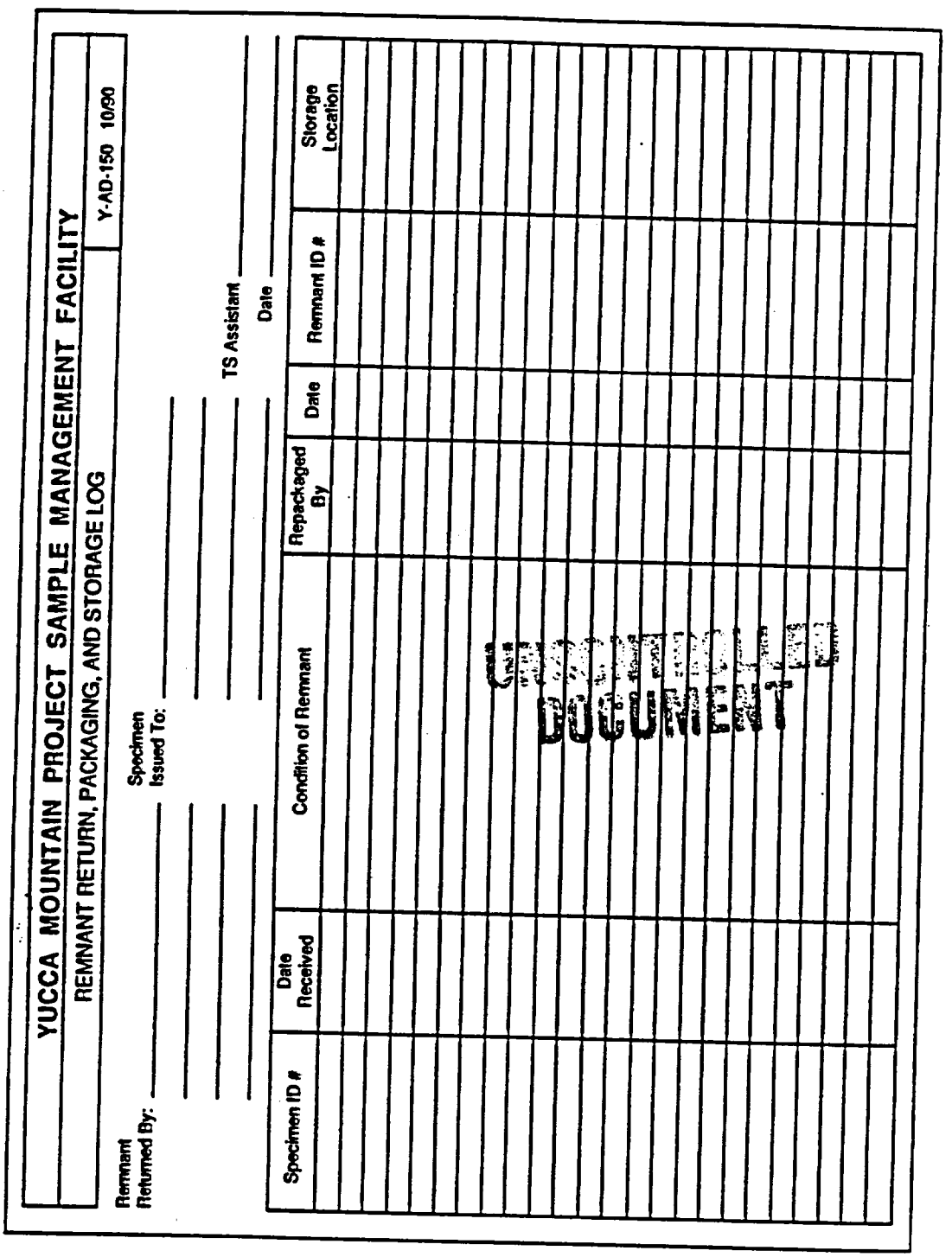

Figure 8 - Remnant Return, Packaging, and Storage Log

INTERIM CHANGE NOTICE

NQA-023
4/90

ICN Number:	Effective Date:	Page 1 of 1
1	6/13/90	

Applies to: Acceptance for Curation by the Sample Management Facility of Selected Samples and Documentation

Number BTP-SMF-007 Rev. 0 Title

REQUIRED CHANGE(S): (Minor ☒ Yes ☐ No)

PARAGRAPH	CHANGE TO
5.4.1.2, line 1	Delete "SMP"
5.4.2, line 3	Delete "SMP"
Figure 2	Delete "SMP" from bar code label area

APPROVALS 8908030300

Division Director	Director, QA	Project Manager
Maxwell Blanchard		
Date 6-1-90	Date 6/6/90	Date 6/6/90

YUCCA MOUNTAIN PROJECT OFFICE
BRANCH TECHNICAL PROCEDURE

Title	No.	Rev.
ACCEPTANCE FOR CURATION BY THE SAMPLE MANAGEMENT FACILITY OF SELECTED SAMPLES AND DOCUMENTATION	BTP-SMF-007	0
	Effective Date 7/7/89	
	Page 1 of 8	

1.0 PURPOSE AND SCOPE

This procedure describes the Yucca Mountain Project Office (Project Office) requirements and responsibilities for acceptance for curation by the Sample Management Facility (SMF) of Yucca Mountain Project (Project) samples and documentation not covered by other Project administrative procedures or Project Office branch technical procedures.

2.0 APPLICABILITY

This procedure applies to Project Sample Management (SM) personnel and support staff performing functions related to acceptance for curation by the SMF of selected Project samples and documentation obtained from field sites.

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 (FO). SM staff consists of management and operations personnel who ensure that SM operations and documentation satisfy applicable regulatory 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 Users. The SMF consists of a physical facility and equipment designed to effectively process and preserve collected samples. The SMF is operated by the T&MSS contractor 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. The various types of samples covered by this procedure include geotechnical samples, environmental samples, construction materials, and other samples collected at Project field sites.

APPROVED BY

Assistant Project Manager	Date	YMP Branch Chief	Date	YMP Project Quality Manager	Date
John E. Walker	6/28/89	D.E. Livingston for M.B. Blanchard	6/28/89	[redacted]	6/28/89

3.4 Collector

A Collector is a staff member or representative of any of the Project participanting or outside interests who submits samples or documents to the SMF for curation.

4.0 RESPONSIBILITIES

4.1 Collector

The Collector shall submit to the SMF documentation related to all Project sample collection activities specified in this procedure. The Collector may submit samples to the SMF for curation.

4.2 Curator

The SMF Curator shall supervise SM staff members and support personnel performing activities related to acceptance of samples and documentation for curation and storage at the SMF.

4.3 Technical Staff (TS) Assistant

The TS Assistant will verify sample collection reports associated with samples and field documents submitted to the SMF for curation, if applicable.

4.4 Geologist

The SMF or FO Geologist shall perform sample and documentation handling activities, including receiving, labeling, placing in containers, and storing.

4.5 Geotechnician

The SMF or FO Geotechnician shall perform sample handling and documentation activities, including receiving, labeling, placing in containers, and storing.

4.6 SMF Administrative Assistant

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

4.7 Receptionist

The Receptionist shall be responsible for control of access to the SMF by Collectors.

4.8 Reynolds Electrical & Engineering Company, Inc.

Reynolds Electrical & Engineering Company, Inc. Teamsters and Laborers shall provide general drilling services and perform labor activities, including unloading and storing of samples and operation of fork lifts and other materials-handling equipment.

5.0 PROCEDURES

5.1 Responsibilities for Curation of Project Samples and Documents

Various types of samples will be collected and documents generated in support of the site characterization studies at Yucca Mountain (Figure 1). Samples may be stored at the SMF or at the Collectors' laboratories; however, the SMF will maintain selected collection documentation on samples collected for the Project from which testing or analytical data will be used to support the license application.

5.2 Sample Types

Samples will be collected from surface operations (e.g., trenching), from surface-based boreholes, and from underground operations (e.g., drift mining). These samples include geotechnical samples, environmental samples, construction materials, and other samples, and may be submitted to the SMF for curation.

5.2.1 Surface Samples

5.2.1.1 Most surface samples covered by this procedure will be stored by Collectors and will fall under participating organizations' QA programs. Copies of all sample collection records will be located at and tracked by the SMF. A Collector may also submit samples and documents to the SMF to store and track. A Collector may want to collect casual (undocumented) samples; however, any data derived from these casual samples cannot be used in support of the license application.

5.2.1.2 Surface samples include hand and bulk rock samples, alluvium, soils, fluids, and construction materials. Acquisition sites may be the ground surface, surface stations (e.g., ambient air, precipitation), streams and creeks, outcrops, trenches, construction sites, etc.

5.2.2 Surface-based Borehole Samples

Surface-based borehole samples will be stored by both the SMF and Collectors. Core and cuttings retrieved from the majority of surface-based boreholes will be stored at and tracked by the SMF. Fluid samples will be stored by both the SMF and Collectors.

5.2.3 Underground Samples

Underground samples will be collected during construction of the exploratory shaft facility (ESF). Samples will be collected from the shaft and drifts. Rock samples covered by this procedure include hand- and bulk-size geologic samples. Collection and documentation requirements for core and cuttings from the ESF are described in Project Office Branch Technical Procedure (BTP) BTP-SMF-008, and muck sampling requirements are covered in Project Administrative Procedure (AP) AP-6.6Q. Fluids may be collected from drilling operations (e.g., drilling fluids, produced gases and liquids), construction materials, utility waters, geologic formations, and site characterization testing.

5.3 Document Types

Copies of selected collection documentation associated with all samples collected for site characterization from which data will be used in support of the license application are stored and tracked by the SMF. These documents include those associated with samples collected by Collectors and stored by the SMF, as well as those stored by Collectors.

5.4 Acceptance for Curation of Samples and Documents

After collection of samples intended for use in site characterization, a Collector shall submit a completed Sample Collection Report (Figure 2) with each sample collected and/or submitted to the SMF for curation. This report shall be completed prior to submission of the samples to the SMF or the Collector's organization. A copy of the Sample Collection Report must be submitted to the SMF within 10 working days of collection, even if the actual sample is retained by the Collector.

5.4.1 Transfer of Custody of Samples

5.4.1.1 Upon arrival at the SMF, the Collector shall register at the Reception area. Samples or sample containers will be unloaded and placed in the Shipping and Receiving area or other appropriate area. SM staff will determine if the following information is completed on each Sample Collection Report: the date sample was collected, Collector and organization, and Collector's sample identification. Other information should include sample type; type of field site; collection location; sample weight, volume or dimensions; type of field photographs (if applicable); storage requirements; and remarks.

5.4.1.2 SM staff will determine if all SMP bar code labels have been properly applied to the sample (if possible), inside the sample container, on the outside of the sample container, and on the Sample Collection Report. If a photograph of the sample at its acquisition site is submitted with the sample, a bar code label should appear on the back of the photograph. SM staff will compare the field photograph to the sample to verify that the sample is adequately documented.

5.4.1.3 If the sample and Sample Collection Report are submitted to the SMF, the Collector and the SM staff member completing the custody change will sign and date the Sample Collection Report. A copy of the report will be given to the Collector. These signatures are only necessary if the sample is submitted for curation along with the Sample Collection Report.

5.4.2 Containerization and Labeling of Samples

The sample will be placed in an appropriate container, depending upon the type of sample. Information from the Sample Collection Report will be used to generate container labels for the sample and will contain the SMP bar code number, sample type, collection location, Collector, date of collection, date of receipt by the SMF, and date of storage. These labels will then be affixed to the appropriate sample containers. The container will be sealed according to the specifications of the Collector.

5.4.3 Sample Storage

The container will be assigned a storage location (e.g., storage racks, cooler), depending upon the type of storage container and appropriate environmental conditions (e.g., shelf life, temperature) designated by the Collector. Storage location and date and time of storage will be recorded on the Sample Collection Report. If samples are not placed in permanent storage immediately, they will be placed in a designated temporary storage area maintained at required environmental conditions.

5.4.4 Verification

After completion of the Sample Collection Report, an SM staff member will verify that the report has been properly completed by signing and dating the form. This signature also indicates the SM staff member who received and verified the Sample Collection Report if no sample was submitted with the report.

5.4.5 Records Storage

All documents and records submitted to the SMF for curation will be submitted to the LRC. Working copies will be retained at the SMF Documents Center. Access to these documents and records will be obtained through authorization by the Curator.

5.5 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 on 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 that fully describes the correction performed.

5.6 Nonconformance Reporting

A nonconformance exists when there is a deficiency in characteristic, procedure, or documentation 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, SM 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-6.6Q, Field Collection, Documentation, and Specimen Removal of ESF Shaft and Drift Rock.

BTP-SMF-001, Sample Management for the Yucca Mountain Project Office.

BTP-SMF-008, Field Logging, Handling and Documenting Borehole Samples.

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

7.0 FIGURES

Figure 1 - Location and Tracking of Samples and Documentation.
Figure 2 - Sample Collection Report.

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 LRC at least every 10 business days. Copies of these QA records will be retained by the SMF and stored at the SMF Documents Center.

1. Sample Collection Report.
2. Photographs.

General Acquisition Location	Sample Type	Samples and Documents Stored/Tracked by		Samples Stored by Collector	Documents Stored/Tracked by SMF
		SMF	Collector		
Surface	Muck	√			
	Bulk	√		√	√
	Hand	√		√	√
	Casual		√		
	Soils	√			√
	Alluvium	√		√	√
	Construct.	√	√	√	√
	Biota	√	√	√	√
	Fluids	√	√	√	√
Surface-based Borehole	Cuttings	√			
	Core	√			
	Fluids	√	√	√	√
Underground	Cuttings	√			
	Core	√			
	Bulk	√		√	√
	Hand	√		√	√
	Fluids	√	√	√	√

Figure 1. Location and Tracking of Samples and Documents.

YUCCA MOUNTAIN PROJECT SAMPLE MANAGEMENT FACILITY

SAMPLE COLLECTION REPORT | BTPSMF7-1 5/89

Date Sample Collected		Page____of____
Sample Collector		
Organization		
Collector's Sample ID		

PLACE SMP BAR CODE LABEL HERE

Type of sample (*circle*): rock muck soil liquid gas
other (*specify*): _____

Type of site (*Circle all appropriate entries*)

SURFACE:				ESF:			
trench	outcrop	borehole	other	Shaft borehole	Drift muck pile	Drift in place	Drift other

Collection Location:

SAMPLE: weight_____, volume_____, dimensions_____

FIELD PHOTOS (*circle*): prints slides instant prints video photogrammetry NA

STORAGE REQUIREMENTS:

REMARKS:

SAMPLE TRANSFER TO SMF (*Check one*) ☐ Yes ☐ No

Person Releasing Custody	Date	Person Accepting Custody	Date

SMF USE

STORAGE LOCATION: Area_____ Unit_____
Date Stored_____ Time Stored_____
Verified By_____ Date_____

Figure 2. Sample Collection Report.

YUCCA MOUNTAIN PROJECT OFFICE
DOCUMENT APPROVAL SHEET

Y-AD-002
4/90

Title
BRANCH TECHNICAL PROCEDURE: FIELD LOGGING, HANDLING, AND DOCUMENTING BOREHOLE SAMPLES

NO. BTP-SMF-008
[X]Q
[ ]Non Q

APPROVAL

PROJECT MANAGER: T&MSS Assistant Original signed by	W. V. Macnabb	Signature	7/6/89 Date
DIRECTOR OF QUALITY ASSURANCE:	Edwin L. Wilmot	Signature	7/7/89 Date
YMP Branch Chief (OTHER, AS REQUIRED)	Uel S. Clanton	Signature	7/6/89 Date

CONTROL NO. 25 THIS IS A RED STAMP COPY

REVISION 0 EFFECTIVE DATE: 7/14/89

REVISIONS

	INITIAL AND DATE			
	REVISION 1	REVISION 2	REVISION 3	REVISION 4
PROJECT MANAGER:	10/26/90			
DIRECTOR, QA:	10/26/90			
YMP Branch Chief (OTHER, AS REQUIRED)	10-26-90 10-26-90			
EFFECTIVE DATE:	10/26/90			

UNCONTROLLED DOCUMENT

DEPARTMENT OF ENERGY · UNITED STATES OF AMERICA

8908030302

1.0 PURPOSE AND SCOPE

This procedure describes the Yucca Mountain Project Office (Project Office) requirements and responsibilities for documentation, lithologic and structural logging, core photography, and packaging of selected Yucca Mountain Project (Project) borehole samples at the borehole site.

2.0 APPLICABILITY

This procedure applies to staff of Sample Management (SM), Technical and Management Support Services (T&MSS) contractor, performing field logging, documentation, and packaging of cores, cuttings, fluids, and other borehole samples acquired at Project surface-based and subsurface-based drill sites (Project Office Administrative Procedure [AP] AP-6.2Q), exclusive of those samples requiring alternative handling as directed by the Sample Overview Committee (SOC).

3.0 DEFINITIONS

3.1 Sample Management

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

3.2 Sample

A sample is part of a population whose properties are studied to gain information about the whole or group. Geologic, hydrologic, environmental, or other types of examinations are conducted on samples covered by this procedure. Examples of samples include core, cuttings, and fluids collected at Project borehole sites.

3.3 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.

3.4 Cuttings

Cuttings are chips of rock produced during drilling that are removed from the borehole by circulation of drilling fluids (gas, foam, or liquid).

3.5 Rubble

Rubble is comprised of pieces of core with diameters smaller than half the diameter of whole core such that reconstruction between individual pieces is impossible.

3.6 Specimen

A specimen is a subsection or portion which has been removed from a sample.

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 Fluids

Fluids collected as samples include gases and liquids.

3.9 Sidewall Sample

A sidewall sample is the material extracted from the wall of a borehole with a sidewall sampler.

3.10 Core Run

A core run is an attempt to drill and recover a length of core; also the piece of core recovered from a core barrel during the core run.

3.11 Cyclone Separator

A cyclone separator is a collecting device attached to the end of the cuttings return line. It is equipped with a valve at the bottom from which cuttings are collected.

3.12 Curatorial Sample Inventory and Tracking System

The Curatorial Sample Inventory and Tracking System (CSITS) is a computer-based system designed to aid in the control and documentation of Project samples.

3.13 Drilling Program Package

A Drilling Program Package, prepared for each borehole, is a set of plans describing the scope of work to be performed, the general and detailed requirements for performing the work, and the parameters to be used while drilling or performing work on Project boreholes. The Drilling Program Package consists of a work order, a Criteria Letter, a Drilling Program, and a Cost Estimate. Drilling activities will be coordinated according to AP-5.10Q.

3.14 Sample Overview Committee

The SOC is comprised of representatives from Los Alamos National Laboratory, Lawrence Livermore 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.

4.0 RESPONSIBILITIES

4.1 Sample Management Manager

The SM Manager shall coordinate the overall development and implementation of the Project sample management activities.

4.2 Field Operations Manager

The FO Manager shall coordinate and administer borehole sample documentation, basic sample logging, sample marking and packaging, photography, and transfer of borehole samples to the SMF. Primary responsibilities will include interaction with the Principal Investigator (PI) and the Project Office Site Representative to ensure acceptability of samples and documentation for curation at the SMF. The FO Manager shall supervise the activities of the Shift Supervisor.

4.3 Field Operations Shift Supervisor

The Shift Supervisor shall report shift activities to the FO Manager and shall ensure that all borehole sites are adequately staffed at all times. The Shift Supervisor shall have signature authority on appropriate documentation. The Shift Supervisor shall supervise the FO Geologist and shall assist in training all appropriate FO staff. The Shift Supervisor shall interact with appropriate Participants to recommend suspension of drill site activities having a negative impact on the collection and documentation of quality borehole samples, complying with Project Office Quality Management Procedure (QMP) QMP-01-02. The resolution of issues affecting the collection and documentation of quality borehole samples is the responsibility of the Shift Supervisor and shall be accomplished through appropriate interfaces.

4.4 Field Operations Geologist

The FO Geologist shall perform sample logging and handling activities at the drill site. These activities include collection of cuttings, depth validation, sample marking, packaging, and completion of all geologic field logs and reports. The FO Geologist shall direct activities of the FO Geotechnician and support staff.

4.5 Field Operations Geotechnician

The FO Geotechnician shall perform collection of cuttings, sample staging, marking, packaging, and documentation as directed by the FO Geologist.

4.6 Technical Staff Assistant

The Technical Staff (TS) Assistant shall ensure that all requirements necessary to log and document borehole samples are followed and conform to QA requirements and will report any nonconformance to this procedure, as described in Section 5.11.

4.7 Field Operations Administrative Assistant

The FO Administrative Assistant shall submit records resulting from implementation of this procedure to the T&MSS Local Records Center (LRC) according to QMP-17-01.

4.8 Nevada Test Site (NTS) Support Contractors

NTS Support Contractors affected by this procedure include Reynolds Electrical & Engineering Company, Inc. (REECo) and Pan Am World Services, Inc. (Pan Am). REECo staff shall place samples in temporary storage (if applicable), load the samples onto the transport vehicle, and operate all preparation and loading equipment, including banders and forklifts. Pan Am shall photograph field samples and complete documentation, as needed.

4.9 Project Participant

The Participant, outside interest, or designee shall supply the SMF with the appropriate information required to remove whole core specimens from the drill site (Section 5.3.3) and shall sign a receipt for these specimens.

4.10 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 Director), Project Office, who shall approve or disapprove the recommendations.

5.0 PROCEDURES

5.1 Introduction

5.1.1 The initial handling and staging of core at the drill site is the point at which depth assignments are made that become the reference points on which all future measurements for sample examinations and for acquisition of whole core and other specimens are based. If these depth assignments are incorrect or indeterminate, the useability of analytical data derived from whole core and other specimens may be compromised. These initial activities significantly impact the entire sample management process; therefore, the quality controls delineated by this procedure must be rigorously followed.

5.1.2 This procedure prescribes the specific methods to be followed and documentation to be prepared during handling and field logging of all borehole samples. Responsibilities of and interfaces between organizations and personnel relevant to, but not directly affected by, this procedure are described in AP-6.2Q. A copy of this procedure with supporting references and forms will be available at the drill site at all times. The Drilling Program Package (prepared in accordance with AP-5.10Q) for the particular borehole will also be available at the drill site and is the document controlling drill site activities. During the course of activities described by this procedure, all borehole samples and sample containers will either be in constant visual contact by SM field personnel or will be in access-restricted-storage controlled by SM.

5.2 Pre-drilling Preparation

Prior to drilling operations, portable logging facilities will be set up at the drill site and will contain supplies such as logging equipment, reference materials, copies of the Drilling Program Package, copies of this and other applicable procedures, and adequate quantities of documentation forms. The FO Geologist, FO Geotechnician, and/or FO Shift Supervisor (collectively known as FO Staff) will be at the drill site sufficiently in advance of drilling operations to prepare the work area and to organize the working procedures.

5.2.1 Facilities

Portable facilities for geologic sample logging will contain the following equipment: desk, core racks, core transport trays, work table, and container labeling and securing equipment. The facilities will be well-lit, heated and air conditioned, and placed at a convenient location on the drillpad. Samples will be maintained in environmental conditions as defined in approved design documents according to AP-5.10Q.

5.2.2 Equipment

Field equipment will be assembled prior to initiation of field activities. The equipment will minimally include the following items:

- engineering measuring tape
- colored temporary markers
- indelible marker pens
- grain size chart
- hand lens
- polystyrene core cradles
- knife
- chisel
- magnet
- rags/sponges
- PVC core trays
- non-tearing, waterproof labels
- cuttings bags (or boxes)
- standard rock color chart
- miscellaneous office supplies
- core loss and run markers
- impermeable packaging
- wire mesh sieve
- core boxes and dividers
- pocket transit (0-360 degree)
- 4" X 6" index cards
- rock hammer
- heat sealer
- lay-flat tubing
- geologic dictionary and other references and volumes
- Project Office Geologic Field Logging Manual
- photographic equipment
- spray bottle
- filament tape
- rock saw
- protractor
- binocular microscope

5.2.3 Documentation

5.2.3.1 The information to be recorded on the field records listed below attempts to maximize efficient information-gathering and minimize redundancy. Each document will be fully described in this procedure in order of appearance during the course of drilling operations. All documents will be completed in indelible black ink and will be photocopied daily upon completion on paper marked "Copy". The documents are:

- Field Photographic Log
- Whole Core Specimen Field Removal Checklist and Contract
- Structural Log
- Lithologic Log
- Shift Drilling Summary
- Borehole Completion Report

5.2.3.2 In addition to these documents, a Daily Activities Log will be maintained at all times in the portable logging facility. The Daily Activities Log can be summarized as a chronological log of all activities that affect the daily scope of drill site operations. This log will be a paginated, hardbound, ruled notebook and will be a permanent part of the borehole record. All entries will be legible, concise, and in indelible black ink. A 24-hour timeclock (0000-2400 hrs) will be used to record daily events in chronological order. These events include, but are not limited to:

Sign On/Off - all drill site personnel will sign in and sign out at the logging facility upon on-site arrival and departure.

Drilling time - run information (Sections 5.3.1.3 and 5.3.1.4) and time required to cut the runs, as well as drilling times and intervals of other samples collected.

Non-drilling time - may include trip time, standby, rig maintenance and repair, well tests, geophysical logging, checks between depth recording instruments and pipe tallys, etc.

Communication - duration and type of communication with key field operations personnel with Project Participants and outside interests, and any consequences of the communication.

5.2.3.3 The degree of detail necessary to document these activities depends upon the events of the day and upon the individual making entries. Entries in the Daily Activities Log will be made by FO Staff. Incoming staff shall read the day's entries and shall be briefed by outgoing staff, as necessary. All entries will be initialed; in addition, any deletions or changes will be marked through with a single line and initialed.

5.3 Core Handling

Core handling procedures shall be performed in the following sequential order. Any deviation from this procedure or from the Drilling Program Package requires prior consultation and agreement between field operations personnel and the FO Manager, and is subject to the stipulations of Criteria VI in the Project Quality Assurance Plan (QAP) NNWSI/88-9, Rev. 2 and the requirements of AP-5.10Q. Deviations and references to authorizing documents shall be recorded in the Daily Activities Log.

5.3.1 Staging

The inner core barrel sleeve (inner sleeve) containing the core will be removed from the core barrel by drilling rig personnel. One end of the inner sleeve will be appropriately marked to designate top of the run, ensuring that the run will not be switched end-for-end during transport to the portable logging facility. Run information (run number, interval) will be written on a temporary run card (4" X 6" index card) by the driller and given to the FO Staff. The interval of the run is determined by standard and appropriate drilling techniques and will include, but is not limited to, the use of pipe tallies, calibrated depth recording instruments (Geolograph, Totco, or equivalent). Pertinent drilling activities (start/stop of core runs, standby times, unusual drilling conditions, etc.) shall be annotated on the depth-recording instrument. The inner sleeve will then be carried to the logging facility by REECo or FO Staff and placed in a core rack. The FO Staff will

open the inner sleeve to expose the core. A polystyrene foam Run Marker with the borehole identification (ID), run number, and run interval (Figure 1) will replace the driller's run card at the top of the run.

5.3.1.1 Cleaning

The FO Staff will clean the samples according to instructions of the primary PI responsible for the borehole, exercising caution to avoid disturbing unconsolidated zones.

5.3.1.2 Fitting

5.3.1.2.1 Starting at the top of the core run, pieces of core are fitted together (as in a jigsaw puzzle) by the FO Staff to reconstruct larger sections of core. Rubble zones will be reconstructed to represent as accurately as possible the interval from which they were recovered. All artificial breaks sustained during handling of the core will be marked with parallel heavy black lines on both sides of the break. In zones of closely-spaced, parallel breaks, green alignment marks will be drawn perpendicular to and across the surface trace of the break, staggered horizontally (Figure 1). If a small piece of core between parallel breaks in such a zone is lost or temporarily misplaced, these short, green alignment marks would not match across the break, thus identifying a potential fitting problem.

5.3.1.2.2 Ideally, after a length of core has been fitted, it duplicates in situ conditions. This rarely occurs, however, because breaks in the core cannot always be fitted together perfectly. When this happens, a black non-orientation mark (*) shall be written on one side of the break, indicating a departure from the in situ condition (Figure 2).

5.3.1.3 Measurement of Run Interval

After the core has been fitted and non-orientation marks placed, the FO Staff will measure the core with a steel tape to the nearest 0.1 ft. Subtracting the amount recovered from the amount cut determines whether an apparent core loss exists. The amount of core drilled and recovered will be entered in the Daily Activities Log and on the Run Marker (Figure 1). True core loss will be determined as described in the following section and will not be documented until the next run is recovered.

5.3.1.4 Determination of Core Loss

5.3.1.4.1 If a core loss is indicated after measuring the core, the Geologist and the driller will attempt to determine the interval(s) at which the loss(s) occurred. Calibrated depth recording instruments installed on the rig, the presence of core marks, and the driller's logs may offer clues.

5.3.1.4.2 Sometimes during coring, the bottom portion of a run is not recovered until the following run is cut because it is left at the bottom of the hole. This apparent core loss may result in inaccurate core measurement if the bottom of a core run is not matched with the top of the successive run. This apparent lost core may be recovered in the following run and may be identified by bit marks, core match, or other clues. The core stub may also be ground up and subsequently recovered as rubble in the next run.

5.3.1.4.3 If more core is recovered from the barrel than was cut by that run, the extra core shall be reconciled with the last (uphole) core loss or with the next downhole run (sometimes more core [about 0.1"] will be recovered from a run than was cut because of the way the core breaks below the core catcher).

5.3.1.4.4 If the ends of two successive core runs fit together, the position(s) of the loss(s) will be determined using the following procedure unless otherwise directed by the PI, based on previous drilling experience in a particular rock type:

a. The core loss will be assigned to obvious loss zones. These are best recognized immediately after opening the inner sleeve as intervals with substantially reduced sample amounts.

b. If there are no obvious loss zones, the core loss shall be assigned to the lowermost rubble zone in that run.

c. If there are no rubble zones, the loss will be placed immediately below the lowermost non-orientation mark.

5.3.1.4.2 The borehole ID, the core loss interval, and the total amount of true core loss will be entered on the label of a polystyrene foam Lost Core Marker (Figure 1) and placed at the proper location. The true core loss interval will be entered alongside the run information in the Daily Activities Log. The amount of true core loss will be entered on the Run Marker, and a black core loss non-orientation mark (ø) will be written on both sides of the loss (Figure 1).

5.3.1.5 Depth Notation

The FO Staff will measure the core to the nearest 0.1 ft. Footage marks will be written on the core with a blue, temporary marker at one-foot intervals, encircling the core as much as possible. The FO Staff will ensure that the depths written on the core correspond to the depths noted on the Run Marker. The top of the run shall be the starting point for measurement. If the top of the run is angled (e.g., a fracture) and does not match with the previous run, the starting point shall be the mid-point of the core. When a footage mark falls within a rubble zone, the depth will be written on an index card and placed appropriately in the inner sleeve (Figure 2).

5.3.1.6 Orientation Stripes

Orientation stripes will now be placed on the core. Orientation in this context has no relation to azimuthal bearings (from true north, clockwise); rather, it serves to maintain the fit achieved previously and also provides a reference for fracture logging. The FO Staff will use red and blue permanent markers taped together to place orientation stripes on the core, red on the right, from the uppermost depth to the lowermost depth (Figure 2). The last piece of core from a run will be used to fit and orient the first piece of core from the next run. Orientation between two runs may not be possible; if so, a non-orientation mark will be placed at the bottom of the first run and at the top of the next run. The core run is now ready for photodocumentation.

5.3.2 Photodocumentation

5.3.2.1 Field photography of the core prior to excessive handling is a reliable method to document the approximate in situ condition of the core and provides a visual record in the event of core destruction. Field photo-documentation occurs twice: while core is in the inner sleeve and after core has been logged and boxed.

5.3.2.2 Initial photographs shall be taken of the core still in the inner sleeve, immediately after core orientation and marking is completed. All photographs will be taken by qualified T&MSS contractor personnel or by NTS Support Contractor photographers.

5.3.2.3 The Field Photographic Log (Figure 3) will be completed by the photographer and contains header information and information columns. The header information includes:

Borehole ID - unique alphanumeric designation given to each borehole.

Checked by - FO Staff member's initials and date verifying that information on record is correct; staff member must have been trained on the procedure and cannot have taken picture if signing here.

Pagination - numbers sequentially assigned to sheets; first blank contains the number of that particular sheet and the second blank contains the total number of sheets, filled in after completion of the borehole.

Photographed by - photographer's initials and date.

FO Manager - signature and date.

The information columns include:

Roll number / ASA - film rolls assigned sequential numbers; ASA number for that particular roll of film.

Exposure number / f-stop / speed - exposure number begins at 1 for the first exposure, continues sequentially until all the exposures on the particular roll have been made; f-stop and speed of each exposure.

Run number / interval - run number of the run being photographed; interval documented by that particular exposure (when core is in sleeve).

Box FCT bar code # / interval - FCT bar code #; interval contained in that box (when core is in box).

Other - documentation of any other feature being photographed, including an interesting item in the core, drawing of a drilling activity, etc., which the FO Geologist feels requires photodocumentation.

5.3.2.4 A 35mm format single lens reflex camera or other appropriate format camera will be used for primary field photography. Equipment and accessories will include, but are not limited to:

Lenses - 50 mm standard; 28-35 mm wide angle and other appropriate accessories for close-up photographs.

Lens filters - skylight or UV filter; polarizer for eliminating glare from wet core (if applicable).

Film - indoor film shall be matched with the type of lighting (i.e., light source, type of electronic flash); unexposed film will be stored in a cool, dry place.

Camera rack - to standardize distance and establish consistent camera position; camera rack will be above core rack to accomodate repetitive exposures of core in the inner sleeve.

Flood lights and/or flash unit - floods normally used if appropriate power source is available; electronic flash to back up flood lights.

Instant print camera and accessories - instant print camera used to photograph core after boxing.

Miscellaneous - color card, scale in 0.1 ft intervals; 4" X 6" index cards.

5.3.2.5 Methods

5.3.2.5.1 All core markings and labels shall be complete, accurate, legible, and visible to the photographer. A Color Card and an Information Card (4" X 6" index card) labeled with the borehole ID, run number, depth interval, date, and core loss interval(s) will be centered in the photograph above the core. A scale marked in 0.1 ft intervals will be placed parallel to the section being photographed.

5.3.2.5.2 The camera will be attached to the camera rack and checked for distance, focus, f-stop, and shutter speed. The field of view will be checked for shadows or obstructions. Each exposure will include 2 ft of core; the first exposure will be made at the top of the run, and continuous exposures will be made until the entire run of core is photodocumented.

5.3.2.5.3 Individual close-up exposures of specific interesting features in the core may be taken after the entire length of the run has been sequentially exposed. This will be done by placing a Color Card and an index card with the borehole ID, depth or depth interval, and description of the feature beside the core section of interest.

5.3.2.5.4 Adhesive labels with the following information will be attached to the film cannister and to the roll of film: borehole ID, run number(s), date, roll number, and total footage interval documented by the roll. The exposed film will be locked in a cool, dark location by the FO Staff and will be periodically transferred to the SMF by the Shift Supervisor. The signature of the Shift Supervisor on the Field Photographic Log signifies receipt of the film rolls by the Shift Supervisor for the SMF.

5.3.2.5.5 After photodocumentation of the core run, the core is ready to be geologically logged unless the immediate sealing and removal of whole core specimens from the drill site is required. As appropriate, the primary PI may direct activities to ensure that important geologic features are documented before the removal of whole core specimens.

5.3.3 Removal of Whole Core Specimens From the Drill Site

5.3.3.1 It may occasionally be necessary to immediately remove and seal intervals of whole core directly from the drill site and release them to a Participant for immediate transport to that Participant's laboratory, without benefit of SMF processing. These instances shall be directed by the RSED Director and shall be dictated by peculiar analysis requirements such that the time necessary for SMF processing would jeopardize the analytical integrity of the whole core specimen. No core will be removed from the field before it has been staged and photographed as described in Sections 5.3.1.1 through 5.3.1.4 and 5.3.2. Whenever possible, the core will be logged as described in Section 5.3.4 before removal from the field.

5.3.3.2 As whole core specimens are removed from the drill site, the FO Staff will complete the Whole Core Specimen Field Removal Checklist and Contract (contract; Figure 4). The contract consists of the header and the information columns. The header information includes:

Recipient - Participant, outside interest, or designee qualified to accept custody of whole core specimens at the drill site.

Organization - recipient's organization.

Telephone - recipient's telephone number; also FTS.

Address - recipient's address.

Courier - person accepting specimen in field or transporting specimen.

Completed By / Date - FO Staff performing removal process and date.

RSED Director authorization - may be an assigned number, a document, or other correspondence; describe briefly, as necessary.

Borehole ID - unique alphanumeric designation assigned to borehole from which whole core specimens were removed.

Pagination - numbers sequentially assigned to sheets; first blank contains the number of that particular sheet, and the second blank contains the total number of sheets.

SHP bar code label - shipment bar code label representing a single shipment, which may consist of any number of whole core specimens; if there is more than one page of contracts to document the shipment, the pages will be stapled together, and label will only be placed on the first page.

5.3.3.3 The following steps shall be followed to remove whole core specimens from the drill site. Underlined steps describe the information columns of the contract.

a. Prior to field operations, the RSED Director must approve requests from Participants for whole core removal (AP-6.4Q); a copy of RSED Director authorization and approved requested interval (including a buffer) will be available to qualified site personnel prior to whole core removal.

b. FO Geologist will compare the approved requested interval or feature to the interval pick at the drill site by the Participant; conflicts resolved by the RSED Director or designee.

c. SPC bar code label: specimen bar code label will be affixed to the specimen (if possible), the Contract, and packaging material containing specimen; a check will be placed in the "Affixed" Column.

d. Interval removed and date created: whole core interval will be sawed (if necessary) and removed by FO Staff; actual interval removed and date created will be noted.

e. Foam marker: place check (Ā) here when polystyrene foam Whole Core Removed marker labeled with borehole ID, interval, date, PI, and laboratory or location where core will be sent has been placed in inner sleeve.

f. Marked/tag: if it is undesirable or impossible to mark directly on the core, an alternate method of identifying that interval of the core will be used, including affixing an aluminum tag to the core labeled with borehole ID, interval, date, and laboratory or placing the sample in a labeled container. If a bar code label cannot be directly attached to the specimen, a bar code label shall be placed in the packaging with the specimen. Place a check (Ā) here to indicate that either footage marks and orientation stripes are written directly on the specimen or that the specimen has been properly identified with an alternate method.

g. Packaged / description: segregated core will be packaged by the FO Staff to specifications of the Participant assuming responsibility of the specimen. Impermeable packaging will be used if required to retain in situ moisture; other types of packaging may be used to preserve certain rock characteristics. Orientation stripes and footages will be written on the packaging, regardless of whether they exist on the specimen. Include a description of the packaging material.

h. Photographed: segregated whole core specimens will be photographed. All core markings shall be complete, accurate, legible, and visible to photographer. A Color Card and Information Card (4" X 6" index card) labeled with borehole ID, depth interval, date, PI, and laboratory will be centered in the photograph above the core. A scale marked in 0.1 ft intervals will be placed parallel to the section being photographed. After the exposure, all information on the Information Card and the SPC bar code number will be recorded in the "Other" Column on the Field Photographic Log (Figure 3). Place a check (Ā) to indicate that the specimen was properly photographed and that the information was entered on the Field Photographic Log.

i. Affix an SHP bar code label to the contract (Section 5.3.3.2).

j. The Participant or designee and the FO Geologist will sign and date contract.

k. The specimen and photocopy of contract will be shipped or released directly to Participant.

l. If data communications are available at the drill site, information from the contract shall be entered into CSITS.

5.3.4 Core Logging

Geological core logging will occur in two distinct phases: recording structural information (fracture frequency, rubble zones, etc.), and recording lithologic information (rock type and description, accessory mineralization, etc.).

5.3.4.1 Structural Logging

5.3.4.1.1 Significant structural features will be logged by the FO Geologist on a Structural Log (Figure 5). Each horizontal row represents a description of a single structural feature in the core. Two rows are used together to represent intervals of similar features with discrete upper and lower depths. The log includes:

Borehole ID - unique alphanumeric designation given to each borehole.

From / To - interval documented on the particular sheet.

Core Diameter - diameter of core being logged.

Inclination and Bearing - engineered attitude of borehole; inclination expressed in degrees from vertical, and bearing expressed as a 360° azimuthal bearing; does not relate to natural drift of the hole.

Pagination - numbers sequentially assigned to sheets; first blank contains the number of that particular sheet, and the second blank contains the total number of sheets, filled in after completion of the borehole.

Completed by and date - FO Geologist's signature and date.

Checked by and date - FO Staff not directly responsible for completion of this form but trained on this procedure.

5.3.4.1.2 The 41 vertical information columns are coded as follows to yield the pertinent information:

Bracket /-X (1) - A "/" and "X" are entered to delineate zones of similar fracturing or breakage, core losses, intervals of rubble, and significant void intervals. The "/" is entered beside the upper depth (top) of the zone and the "X" on the next row beside the lower depth (bottom) of the zone. This column is left blank for single features that occur at a particular depth. Entries made in the first row of a bracket interval indicate the predominance of that feature over the interval and not that the feature physically occurs near the top of the interval. Likewise, entries noted in the lower row of a bracket interval indicate the less predominant role of that feature and not that the feature occurs near the bottom of the interval. The "/" and "X" associated with a particular bracket shall always be entered on the same page of the log.

Depth (2-6) - The depth of each fracture or interval is entered to the nearest 0.1 ft. Fractures will be located at their mid-point.

Frac. origin (7) - A letter code is used to designate the origin of the fracture or feature. The codes are:

N: Natural - natural fractures are normally characterized by mineral coatings or fillings, a weathered appearance, and/or tectonic features such as slickensides or fabric element offset.

C: Coring-induced - coring-induced fractures are recognized by fresh, tightly fitting surfaces with a rough fracture line, always a lack of mineralization, and evidence of grinding or rotation in the core barrel. Five types of coring-induced fractures are recognized: PC - petal centerline, HC - helical clockwise, HCC - helical counterclockwise, CIR - coring-induced rotated, and D - disc. These codes will be entered in the Remarks Column.

H: Handling-induced - handling-induced fractures are either inadvertently or purposefully caused; whenever a fracture is induced by handling, it is immediately marked with heavy black lines (indelible marker) parallel to and on either side of the break.

I: Indeterminate - indeterminate is used when the origin of the fracture cannot be determined. It is preferable to be conservative when using the designations (N) and (C).

Bracket code (8-9) - A letter code is entered to identify those features bracketed in Column 1. The codes are:

RZ: Rubble zone - zone containing rock fragments with a maximum average diameter less than half the diameter of the whole core and broken in such a manner as to render impossible the reconstruction between individual fragments. The origin of an RZ may be natural (N) or coring-induced (C).

FZ: Fracture zone - zone of open and/or closed fractures, generally with associated primary and secondary orientations (Columns 14-17) and dip (Columns 18-19)

FL: Fracture length - applies to high angle (greater than 60°), single entry fractures generally with a length of 0.5 ft or longer; the only case in which a bracket code is used to describe a single feature.

CL: Core loss - used to designate intervals in which no core was recovered

FC: Fracture count - used for a count of similar (parallel) fractures within the bracketed interval.

VI: Void interval - interval with lithophysal or other voids, estimated at greater than 5% of total volume, estimated using a percent volume chart.

Numeric value (10-13) - Every bracket code (except PC) has an associated numeric value (NV). The NV for an RZ represents the average maximum length of the rubble pieces. The NV for an FZ represents the average spacing between the breaks or fractures comprising the FZ. When used in conjunction with the FL bracket code, NV represents the measured length of that fracture to the nearest 0.05 ft. The NV for a CL bracket code represents the length of the loss to the nearest 0.1 ft. The NV for a FC bracket code is the average spacing between the fractures, less than 0.3 ft (if the spacing is greater than 0.3 ft, a piece length exists - see Columns 38-40). The NV for a VI bracket is the estimated volume percent of lithophysal voids in that interval.

Orientation (14-17) - The dip direction (not an azimuthal bearing) of fractures and slickensides relative to the long axis of the core is recorded in these columns. The direction is determined using a coordinate system relative to the orientation stripes (Figure 6). An example is shown in Figure 7. The core is divided into four quadrants counterclockwise from the orientation stripes (with the core held in correct horizontal position); these quadrants are assigned letters A through D and are further divided in half and designated A1, A2; B1, B2; C1, C2; and D1, D2. Planar fractures transect the core in an elliptical plane. The orientation is determined by first noting the uphole intersection point of the fracture plane, followed by the downhole intersection point. The one-eighth divisions of the core are used to designate these intersection points.

Dip (18-19) - Dip is the angle between a plane normal to the vertical axis of the core and the line of the feature, expressed in degrees. It is used primarily for fractures and inclined bedding. It does not necessarily represent the true in situ dip of the feature.

Fracture description (20) - A single digit code is entered to indicate: 1 - continuous (an open fracture that breaks the core into two discrete pieces or a healed fracture that can be traced without a break around the entire core boundary); 2 - discontinuous (a healed fracture that cannot be traced completely around the core boundary); 3 - hairline (a healed fracture with a very small aperture); and 4 - en echelon (a special discontinuous fracture whose overall trace is composed of smaller segments arranged in a step-like pattern).

Fracture line (21) - Fracture line refers to the intersection of the fracture plane with the exterior surface of the core. These single digit codes are:
1 - planar; 2 - irregular; 3 - curved; and 4 - undulatory.

Surface characteristics (22) - A single digit code is chosen to indicate the character of the surface of the fracture. This is usually applied to those that are open, but often the surfaces of closed fractures may be inferred. The codes are: 1 - smooth or polished; 2 - irregular; 3 - curved; and 4 - undulatory.

Tectonic features (23-24) - Tectonic features are generally discerned from examination of disrupted phenocrysts, pumice or lithic fragments. The codes are:

SR: Solution removal of matrix, as evidenced by mismatching of phenocrysts or pumice across the fracture in two or more places.
SS: Slickensides. Rake, if discerned, is recorded in the Remarks Column.
ON: Offset normal to the longitudinal axis of the fracture face. If a magnitude of offset can be measured, include in the Remarks Column.
OP: Offset parallel to the longitudinal axis of the fracture face. If a magnitude can be measured, include in the Remarks Column.
OO: Offset oblique to the longitudinal axis of the fracture face. If a direction or magnitude can be measured, include in the Remarks Column.

Secondary mineralization (25-36) - Mineralization is indicated by placing a numeral (1,2,3,4) in the appropriate mineral column. The extent of mineralization on a single fracture or within a bracketed fracture zone is generalized by the numeral assigned. The codes are: 1 - predominant (fracture surface[s] 75-100% mineralized); 2 - moderate (50-75%); 3 - minor (25-50%); and 4 - trace (< 25%). Thus, a "1" in a particular mineral column indicates that that mineral predominates the fracture surface(s) being described, and a "4" in a mineral column indicates that that mineral occurs in trace amounts. Any combination of numerals may be used to accurately portray the mineralization observed. When dealing with a bracketed zone, numerals will be placed only in the row indicating the top depth (/) of that bracket. Three columns (33-35) marked "other" are reserved for three-letter abbreviations for mineralization other than those listed.

Weathered (37) - This refers to a surficial dull, dirty, or altered appearance of a fracture surface which cannot be classified as mineralized and which is not a surficial coating of drilling mud. An "X" is placed in this column if this condition is noted for the fracture.

Piece length (38-40) - Lengths of intact core equal to or greater than 0.3 ft are noted. These are measured between any two open natural breaks. Piece lengths bounded at either or both ends by fractures are measured from the center of the top fracture to the center of the bottom fracture. The measurement is listed in the same row as the lowermost break. Figure

8 exemplifies a piece length entry in which a two-foot unbroken section of core lies between 1210.0 ft and 1212.0 ft. These piece length measurements are used later to calculate Rock Quality Designation, Core Index, or other geomechanical indices.

Remarks - This space is set aside for comments and unusual core conditions. The cause of a nonorientation mark, if surmised, is particularly applicable. Also, the type of coring induced fracture, as described above, is entered here.

5.3.4.2 Lithologic Logging

5.3.4.2.1 A standardized lithologic logging format will be used to ensure that important comparative features of a lithologic unit (e.g., color, degree of welding, degree of vitrification, nature of lithophysae) are noted. All lithologic information derived from core and cuttings observation by the FO Geologist will be entered on the Lithologic Log (Figure 9). The two sections of the log are the header and the information rows. The header information consists of the following:

Borehole ID - unique alphanumeric designation assigned to the borehole.

Type - indicate core or cuttings.

From / To - represents the interval documented on the particular sheet.

Pagination - numbers sequentially assigned to sheets; first blank contains the number of that particular sheet, and the second blank contains the total number of sheets, filled in after completion of the borehole.

Completed by and date - FO Geologist's signature and date.

Checked by and date - FO Staff not directly responsible for completion of this form but who is trained on this procedure.

5.3.4.2.2 The information rows will be used to record a lithologic description of the rock, as well as the accepted geologic formation and/or member names, if known. Depths will be recorded in feet to the nearest 0.1 ft; features may be measured in tenths of a foot, centimeters, or millimeters, as appropriate.

5.3.4.2.3 A standard logging format will be utilized to ensure that characteristic features of lithologic units will not be overlooked. Charts, tables, and other references (compiled in the Project Office Geologic Field Logging Manual) will be available at the site to aid the FO Geologist in logging features in a consistent manner. This consistency is accomplished through the use of lithologic abbreviations in a standardized lithologic logging format, described below.

5.3.4.2.4 This logging format consists of three parts: 1) Primary Descriptive Terms, 2) General Features, and 3) Specific Features.

1. Primary Descriptive Terms: noted for every lithologic unit in the following order, offering a broad skeletal description of the interval.

   Unit - a distinct body of rock, representing a discrete geologic event; distinguished from other units above and below it by different physical properties (e.g., color, mineralogy, and morphology); predominantly tuffs at Yucca Mountain.
   Type - This is an adjective describing the unit, suggestive of the depositional mode and is generally ash flow, ash fall, bedded, or reworked.
   Color - hue and tone noted under appropriate lighting conditions, along with reference to a standard geologic color chart (e.g., Geological Society of America Rock-Color Chart); e.g. light red (visual), SR 6/6 (color chart reference).
   Welding - degree of welding; choices are: nonwelded, moderately and densely. Vitrification - degree of vitrification; choices are vitric, moderately devitrified, and devitrified.

2. General Features: characteristic of the entire unit interval; estimate percent volumes (volumetric proportions) of these features, when applicable, using a suitable percent volume chart; when present, general features will be described in the following order; additional detail may be added as appropriate:

   Pumice - includes percent volume of the interval, degree of vitrification, color, and flattening ratio.
   Lithic fragments - includes percent volume of the interval, rock type, color, shape (sphericity and roundness) and diameter of fragments.
   Phenocrysts - includes percent volume of the interval, mineral type (if distinguishable and expressed minimally as mafics/quartz/feldspar), color, shape, diameter, and, if possible, the proportion of each mineral to total phenocryst volume.
   Lithophysae - includes percent void of the interval, shape, size, and mineralization, if any.
   Unit contact - describes nature of contact with underlying unit; generally ranges from sharp to gradational but may include any appropriate phrase.

3. Specific Features: Specific features are characteristic of a zone within a unit interval. These are isolated, localized features and are not common throughout the unit. Due to their localized nature, these features always contain depth notation, e.g., "at 1518.5', a 0.10' elongate lithophysae with calcite infilling" or "from 1325.7 -

1328.2', numerous very small (0.05') euhedral, very dark red (5R2/6) lithic fragments". Also, all marker blocks (Run, Core Loss, Whole Core Removed) will be logged here.

5.3.4.2.5 A typical lithologic description might read as follows (note: this example is written out, but a field log would utilize standard lithologic abbreviations):

"304.4 - 328.6' Tuff, ash flow: light brown (5YR5/6) to moderate yellowish brown (10YR5/4), moderately welded, devitrified; 5-10% pumice, light brown (5YR5/6), devitrified, 3:1 flattening ratio; 10% lithic fragments, dusky brown (5YR2/2), mostly sub-angular with low sphericity, 1-3 cm diameter; less than 5% phenocrysts of sanidine, quartz, biotite, very small to 2 cm; 15- 20% void lithophysae, sub-rounded with moderate to high sphericity, mostly 1-3 cm diameter, trace quartz infilling; from 306.9 - 310.8', numerous irregular pinpoint calcite crystals; at 311.6', a 3:1 flattened, devitrified large (0.2') pumice fragment with mineralization halo, possibly vapor-phase mineralization; gradational contact."

5.3.4.2.6 This format guarantees certain minimal detail. Although it is necessary that the sequence of the format is followed, the FO Geologist should describe lithology as thoroughly as time and logging ability allow.

5.3.5 Loading of Core Boxes

5.3.5.1 Waxed cardboard boxes fitted with polystyrene foam cradles will be stored at the drill site in sufficient numbers to accomodate projected daily core recovery cycles. Prior to recovery of a core run, the FO Staff will prepare sufficient boxes to accomodate the run.

5.3.5.2 The boxes will be placed on the core rack parallel to the inner sleeve. Core will be measured in the inner sleeve to determine where artificial cuts will be made or pre-existing breaks (natural or coring induced) will be selected in order to fit the core in each box. If necessary, the core will be sawed, and the cut will be marked on each piece of core with a parallel set of black lines. The shallowest core from the run will be placed in Row 1, left to right, as shown in Figure 10. Core will be loaded into the box until both Rows 1 and 2 are filled. All polystyrene foam markers (Run, Lost Core, and Whole Core Removed) will be transferred directly from their position in the inner sleeve to their corresponding position in the core box during the loading process.

5.3.5.3 Sufficient space will be left in the core box for intervals of rubble between portions of whole core. Rubble zones will be removed with minimum disruption from the inner sleeve after all the whole core sections have been placed in core boxes. An interval of rubble will be pushed to the end of the inner sleeve. A piece of split polyvinyl chloride (PVC) tube slightly larger in diameter than the inner sleeve will be cradled under one end of the

split barrel until the ends are parallel. A piece of lay-flat tubing will be slipped over the inner sleeve, the split PVC tube, and the interval of rubble. The section of rubble will then be pushed over the edge of the inner sleeve while the PVC and lay-flat tubing are pulled parallel and away from the inner sleeve. All rubble will be bagged to the nearest one foot; that is, no lay-flat tubing will contain more than one foot of rubble nor will it contain rubble from both sides of a footage mark. At the discretion of the FO Geologist, rubble may also be discretely bagged to reflect changes in lithologic units or other zones of geologic interest.

5.3.5.4 After the rubble has been transferred from the inner sleeve, the split PVC tube will be removed, and the ends of the lay-flat tubing will be sealed with a heat sealing iron. The sealed sections of rubble will be labeled with the borehole ID and depth intervals represented by writing the top depth at the top of the sealed tubing and the bottom depth at the bottom of the tubing. Orientation stripes will be placed on the tubing as described in Section 5.3.1.6, and the tubing will be placed in the appropriate position in the core box.

5.3.6 Labeling of Boxes

After each run is loaded, information on the contents of the boxes containing that run will be entered by the FO Staff on two adhesive labels, each printed with the borehole ID and a bar code. The FO Staff will record the sample type, the interval of the samples contained in the boxes, and the sample existence codes and their intervals. Existence codes are:

NAT: Not Attempted - if the sample type is core, this would represent cuttings as would occur during spot coring.
REC: Recovered
UNREC: Unrecovered - represents an interval of samples drilled but never recovered from the borehole.
WCR: Whole core removed - see Section 5.3.3.
LOST: Lost - a sample that was recovered but was subsequently lost.
DEST: Destroyed - primarily refers to condition of specimens following analysis; also, catastrophic events at the drill site could destroy samples.
CONS: Consumed - reserved almost exclusively for specimens.

These labels will then be affixed in the left-hand corner of the downhole end on both the lid and body of the box (Figure 11).

5.3.7 Photodocumentation of Boxed Core

The FO Staff will prepare the boxed core for photodocumentation (Figure 12). One core box will be placed on a photographic table equipped with registration points, lights, and a camera stand. A signboard with bar code number, borehole ID, date, name of the photographer, and color bar will be placed to the left of the box. Signboards for each row of the box (containing

the row #, interval of core, and missing intervals of core in that row) will be placed at the top of each row. A scale marked in 0.1 ft intervals will be placed parallel to the section being photographed. An exposure will be made using a 35 mm or similar format single lens reflex camera (see Section 5.3.2 for additional photographic details). One additional exposure will be made with an instant print camera. The film roll number, exposure number, FCT bar code #, interval of core photographed, and film type (instant print in "Other" column) will be documented on the Field Photographic Log (Figure 3). The instant print photograph will be placed in a document cache affixed inside the lid of the box.

5.3.8 Sealing of Core

If it is necessary to preserve particular rock properties at the request of a Participant or at the discretion of the FO Geologist, the following procedure will be used to seal core in low-permeability packaging. After photodocumentation, the FO Geologist will remove the core in exact order from the core box and place it in split PVC tubes on a level work surface. These split PVC tube cradles will allow the manipulation of the core into the packaging as complete sections. Each section of core and the split PVC tube cradle will be placed in the low-permeability packaging. The split PVC tube cradle will be removed, and the packaging will be heat-sealed. The sealed core will then be placed in the box in the same order that it was originally removed. The interval packaged will be noted on the Field Photographic Log (Figure 3) in the "Comments" column next to the interval of boxed core photographed.

5.3.9 Sealing of Boxes

Following photodocumentation, each box will be sealed by the FO Staff with nylon filament tape in preparation for temporary storage at the drill site. This does not preclude reopening the boxes for subsequent examination while still at the drill site.

5.4 Cuttings Handling Procedure

Cuttings will be collected by FO staff or REECo rig personnel with a cyclone separator or other suitable device at intervals specified in the drilling program. A sufficient quantity of representative cuttings will be collected, unless otherwise specified by the SOC. Specific samples will be collected and handled according to Participant specifications, as directed by the SOC and specified in the Drilling Program Package. Every effort shall be made to collect cuttings which represent the targeted interval; communication between the driller and the FO Geologist should help determine the amount of cavings found in the samples and the approximate lag.

5.4.1 Logging

5.4.1.1 Cuttings will be laid out in rows convenient for logging. Subdivisions within these rows may be made at the discretion of the FO Geologist. If a sample was not collected due to loss of circulation or other reason, FO staff or REECo rig personnel will place an acceptable marker in the place of the unrecovered sample to preserve the continuity of the samples within the rows. Cuttings will be logged by scanning the rows and determining lithologic breaks based on color or other textural changes.

5.4.1.2 Lithologic descriptions shall be written on the Lithologic Log (Figure 9) in the format described in Section 5.3.4.2. The degree of detail will be less in a cuttings log; nevertheless, every effort should be made to at least complete the "Primary Descriptive Terms" section of the logging format.

5.4.2 Bagging

A sufficient quantity of representative cuttings, as specified in the Drilling Program Package, will be placed in plastic-lined cloth sample bags by the FO Staff. A bag label will be labeled with the following information: date, bag #, borehole ID, depth interval, and collector. A duplicate label printed on non-tearing, waterproof paper will be placed inside the bag, and the bag will be tightly sealed.

5.4.3 Boxing and Labeling

After cuttings have been bagged and labeled, the FO Staff will box the bags in a manner similar to core boxing (Section 5.3.5). The FO Staff will record the sample type, the interval of the samples contained in the box, and the sample existence codes and their intervals on two adhesive labels, each printed with the borehole ID and a bar code. Since each bag of cuttings represents a sample and each sample must be represented on the label, the following example is given to illustrate the format to be used to record similar samples in a continuous existence code:

30.0-70.0; 8 spls @ 5'	REC
70.0-80.0	UNREC
80.0-120.0; 4 spls @ 10'	REC

These labels will then be affixed in the left hand corner of the downhole end on both the lid and body of the box (Figure 11). The boxes will be sealed with nylon filament strapping tape in preparation for temporary storage at the drill site.

5.5 Other Borehole Samples

The same standards for handling, labeling, and sealing of core and cuttings shall apply to any other borehole samples collected at the drill site. These standards are described above in Sections 5.3 and 5.4.

5.6 Temporary Storage of Borehole Samples

Samples will be maintained in environmental conditions as defined in approved design documents according to AP-5.10Q. Minimal provisions for temporary storage of borehole samples will include an access-restricted facility protected from direct sunlight, moisture, wind, and freezing temperatures and sufficient space to accomodate other drill site samples. Transmittal of borehole samples from the site to the SMF will be performed at least once every 24 hours during borehole sample recovery periods.

5.7 Shift Drilling Summary

Upon completion of a shift at each borehole site, the Shift Supervisor shall complete the Shift Drilling Summary (Figure 13). Information on the report consists of:

Borehole ID - unique alphanumeric designation assigned to each borehole.

Shift - "Day" or "Night" entered here.

Time - time covered by the shift, expressed in a 24-hour timeclock (0000 - 2400)

Pagination - numbers sequentially assigned to sheets; first blank contains the number of that particular sheet, and the second blank contains the total number of sheets, filled in after completion of the record.

Drilled interval - total interval drilled during the shift.

Core cut - total footage of core cut during the shift.

Core recov'd - total footage of core recovered during the shift.

Completed by and date - Shift Supervisor's signature and date.

Checked by and date - FO Staff not directly responsible for completion of this form but who is trained on this procedure.

Summary of activities - summary of shift activities and may include, but is not limited to: drilling, testing, logging, or standby activities; equipment breakdown; unusual features or occurrences encountered; rig changeouts; inspections.

Geologic information - gross lithologic and structural information.

Operating data - specific information on each bit used during the shift, as well as other operating data.

Personnel - all personnel on site noted.

5.8 Completion of the Borehole

5.8.1 During and upon completion of drilling activities, the FO Geologist will fill out the Borehole Completion Report (Figure 14). This report is designed to summarize a specific set of borehole information on a single form. It is not intended to be fully comprehensive; rather, it summarizes information that is often referenced during the course of drilling and post-drilling operations.

5.8.2 This report will be filled out as the information becomes available (e.g., 'Location' after survey, 'Total Depth' after completion of drilling). The information on the report consists of:

Borehole ID - unique alphanumeric designation assigned to each borehole.

Grd. elev. - surveyed ground elevation.

TD - total depth drilled, measured from ground elevation.

Location - location noted in two ways: 1) Section, Township, Range, Quarter/Quarter, and 2) Nevada State Surface Coordinates; also, Bottom Hole Coordinates are noted to indicate borehole drift; 'Area' refers to NTS areas.

Inclination and bearing - inclination is degrees from vertical; bearing is a compass trace of the hole.

Completed by / checked by and date - signatures of FO Geologist completing the report and individual checking the report, but not directly responsible for completing the report and is trained on the procedure; and dates.

FO Manager - signature and date upon determining that the report is correctly and completely filled out and complies with procedural requirements.

Rig on loc - date the drilling rig moves on the drilling location.

Spud date - date the drilling begins.

Completion date - date the drilling is completed.

Drilling company - REECo, unless otherwise specified.

Driller(s) - names and shift designation for each driller.

Junk - drilling debris left in the borehole, e.g., bits, core barrels, drill stems.

No. of compressors - number and type of compressor and capacity.

Drilling rigs - rig number, name, and class; primary rig listed first.

Circulating media - air/foam, air, water, etc.

Borehole size - diameters of the borehole as controlled by the bit size.

Casing - different casings, including depths, inside and outside diameters, etc.

Invasion - type (e.g., water, gas), interval, and remarks.

Logging information - names and types of geophysical log suites run.

Correlated tops - name of the unit, formation, or marker; remarks.

Remarks - any pertinent remarks, additional information from the above categories, or footnotes.

5.9 Records Storage

All documents and records related to this procedure and submitted to the SMF will be submitted to the LRC according to QMP-17-01. Working copies will be retained at the SMF Documents Center.

5.10 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 on 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 that fully describes the correction that has been performed.

5.11 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, SM staff members shall report them to the Project Office Project Quality Manager or other individual in the Project Office QA organization. Reporting and segregation of a nonconforming item or termination of a nonconforming activity will be done according to QMP-15-01.

6.0 REFERENCES

AP-5.10, Use of NTS Contractors on the NNWSI Project.

AP-6.2Q, Management and Operation of Sample Handling Activities at Borehole Sites.

Geological Society of America Rock-Color Chart, 1984.

Project Office Geologic Field Logging Manual.

QAP, NNWSI/88-9, Rev. 2.

QMP-01-02, Stop Work.

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

QMP-17-01, Record Source and Record User Responsibilities.

BTP-SMF-001, Sample Management for the Yucca Mountain Project Office.

7.0 FIGURES

Figure 1 - Example of Core Loss Nonorientation Marks and Marker Placement.
Figure 2 - Example of Orientation Stripes and Footage Marks.
Figure 3 - Field Photographic Log.
Figure 4 - Whole Core Specimen Field Removal Checklist and Contract.
Figure 5 - Structural Log.
Figure 6 - Orientation System for Dip Direction.
Figure 7 - Example of Orientation System and Designation.
Figure 8 - Example of Piece Length.
Figure 9 - Lithologic Log.
Figure 10 - Core Boxing.
Figure 11 - Field Container Labeling.
Figure 12 - Example of Photographic Arrangement for Boxed Core.
Figure 13 - Shift Drilling Summary.
Figure 14 - Borehole Completion Report.

8.0 QA RECORDS

The FO Administrative Assistant shall ensure that the following QA records resulting from the implementation of this procedure are processed according to QMP 17-01 and turned over to the T&MSS LRC at least every 10 business days.

Copies of these QA records will be retained by the SMF and stored at the SMF Documents Center.

1. Field Photographic Log.
2. Whole Core Specimen Field Removal Checklist and Contract.
3. Structural Log.
4. Lithologic Log.
5. Shift Drilling Summary.
6. Borehole Completion Report.
7. Daily Activities Log.
8. Photographs.

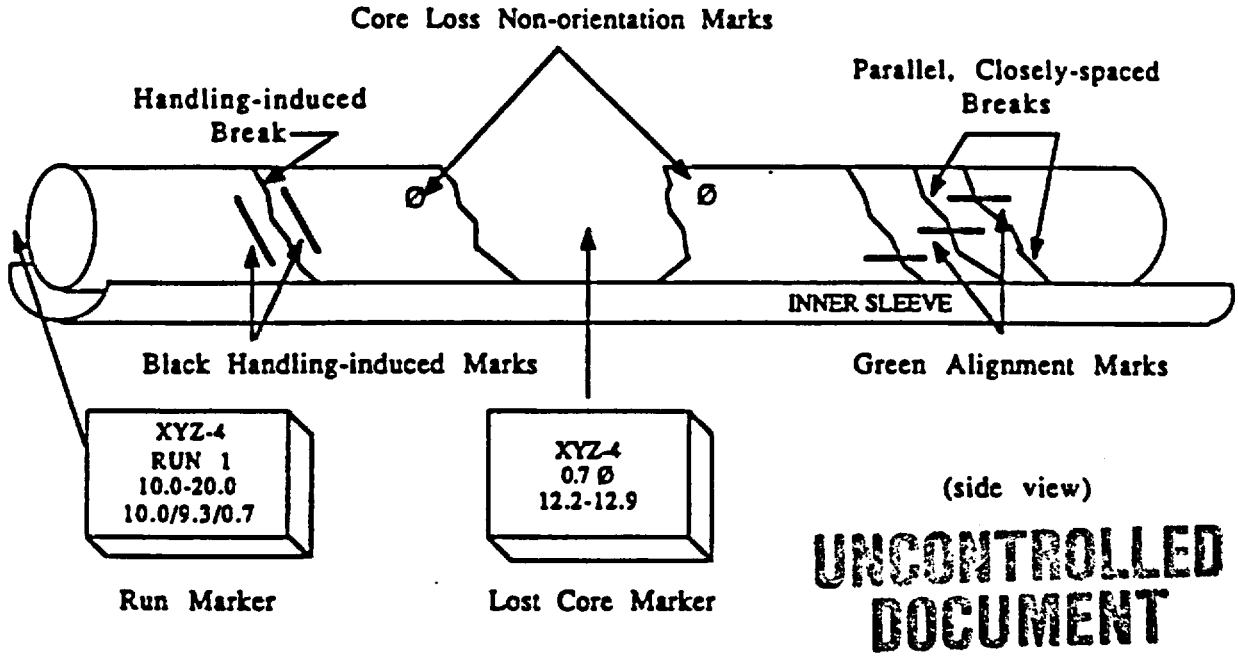

Figure 1 - Example of Core Loss Nonorientation Marks and Marker Placement

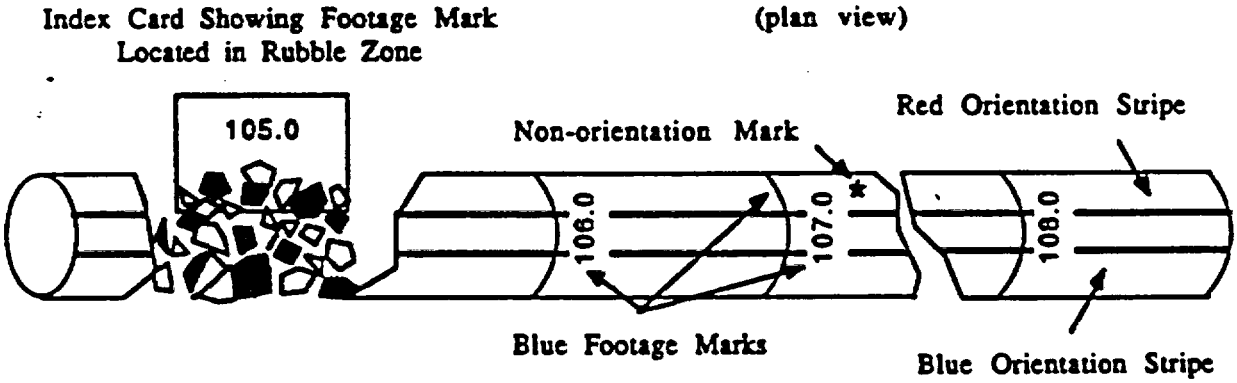

Figure 2 - Example of Orientation Stripes and Footage Marks

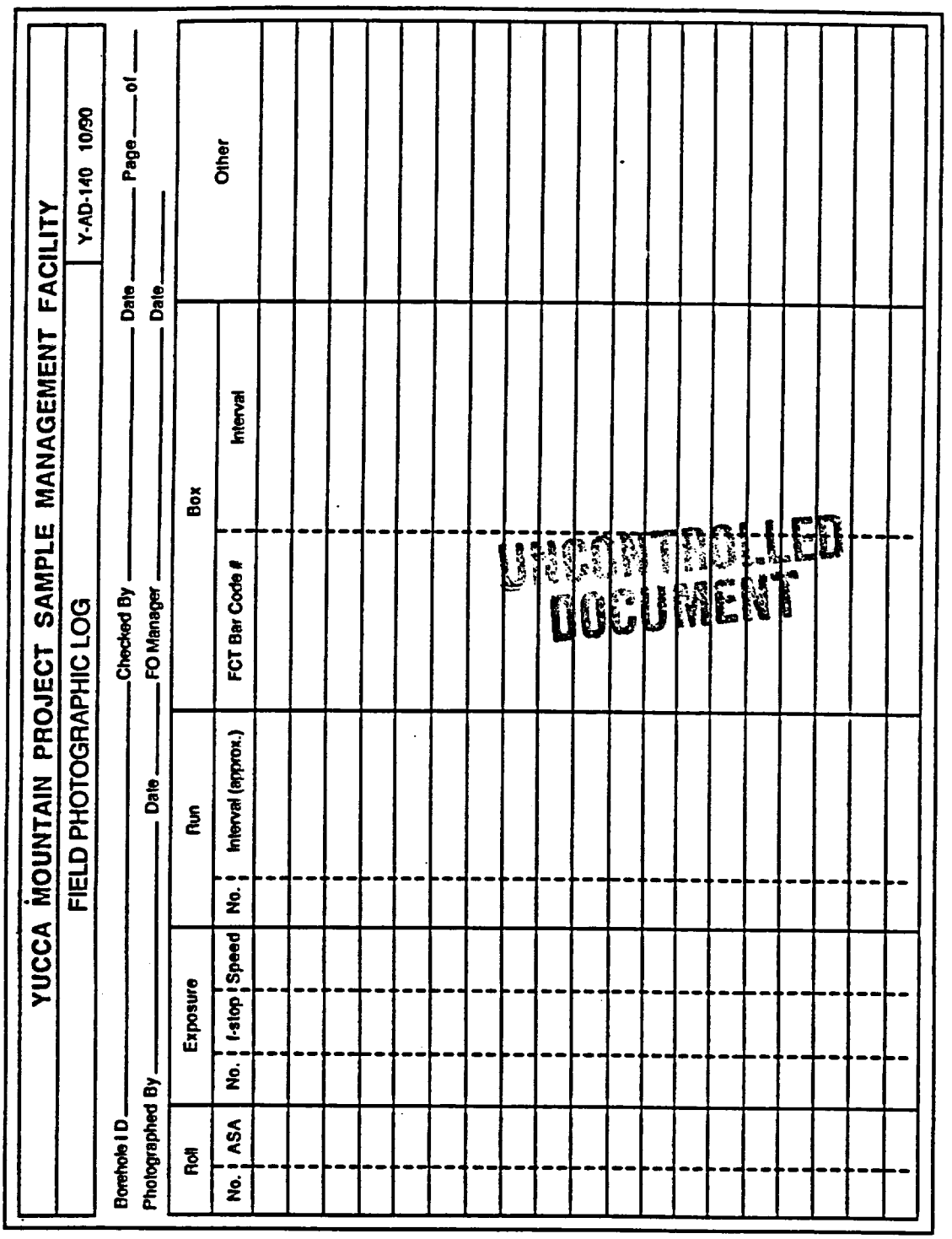

Figure 3 - Field Photographic Log

YUCCA MOUNTAIN PROJECT SAMPLE MANAGEMENT FACILITY

WHOLE CORE SPECIMEN FIELD REMOVAL CHECKLIST AND CONTRACT | Y-AD-141 10/90

Recipient _____ Address _____
Organization _____
Telephone ( ) _____ (FTS) _____
Courier _____

Completed By _____ Date _____
RSED Director Authorization _____
Borehole ID _____ Page ____ of ____

PLACE SHP BAR CODE LABEL HERE

SPECIMEN INFORMATION			CHECKLIST			
SPC Bar Code Label	Affixed?	Interval Removed / Date Created	Foam Mk?	Mkd/ Tag?	Pkgd? Desc.	Photo?
PLACE SPC BAR CODE LABEL HERE						
PLACE SPC BAR CODE LABEL HERE						
PLACE SPC BAR CODE LABEL HERE						
PLACE SPC BAR CODE LABEL HERE						

I hereby acknowledge receipt of the specimens listed above. Please return all remnant material to the Sample Management Facility when no longer needed.

Recipient _____ Date _____ Time _____ am pm

SMF Use Only: Checked By _____ Date _____

Figure 4 - Whole Core Specimen Field Removal Checklist and Contract

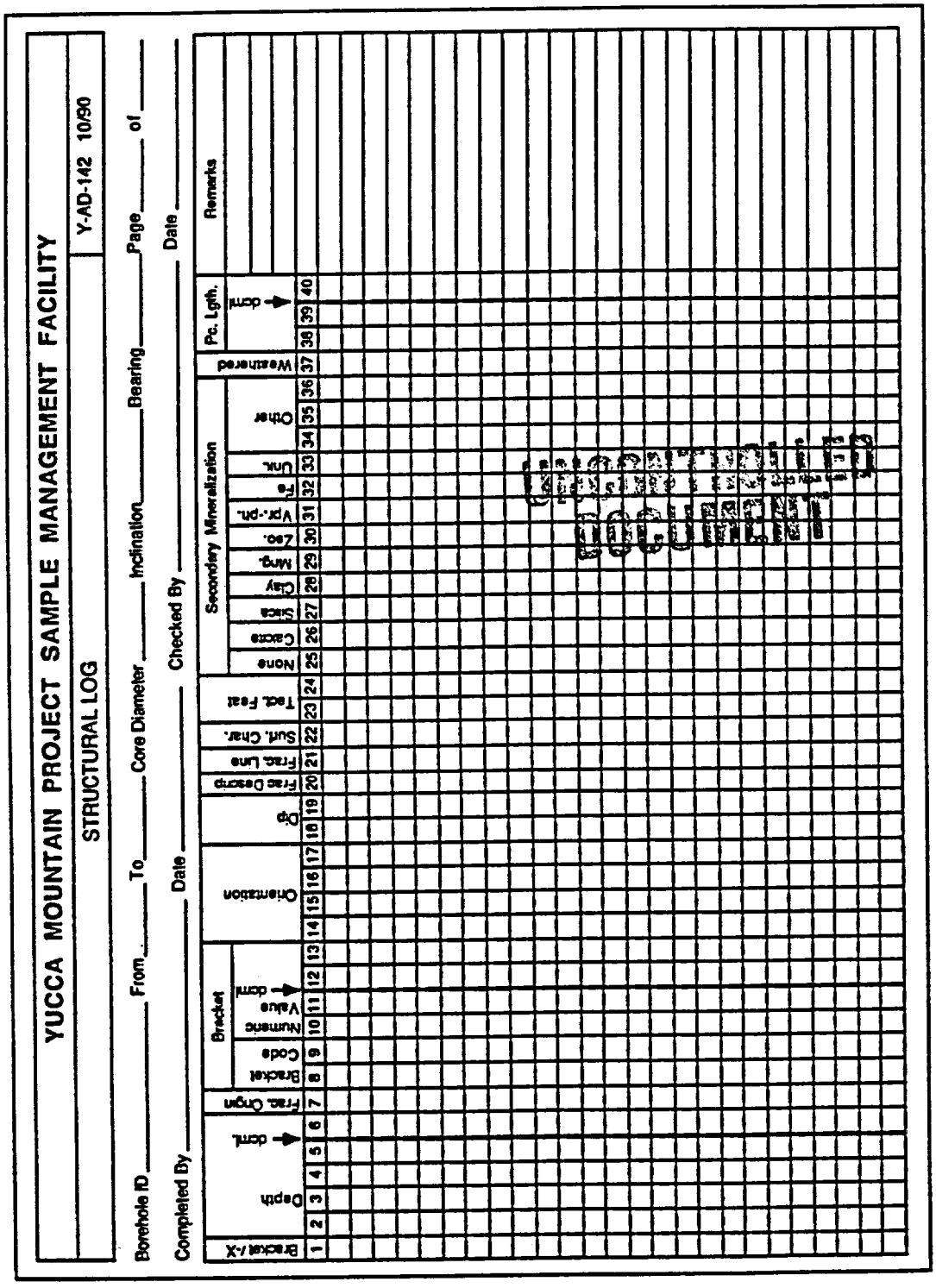

Figure 5 - Structural Log

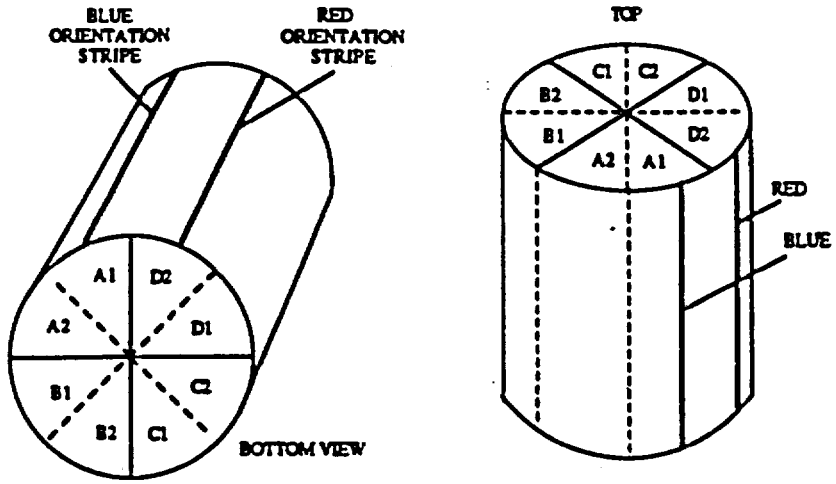

Figure 6 - Orientation System for Dip Direction

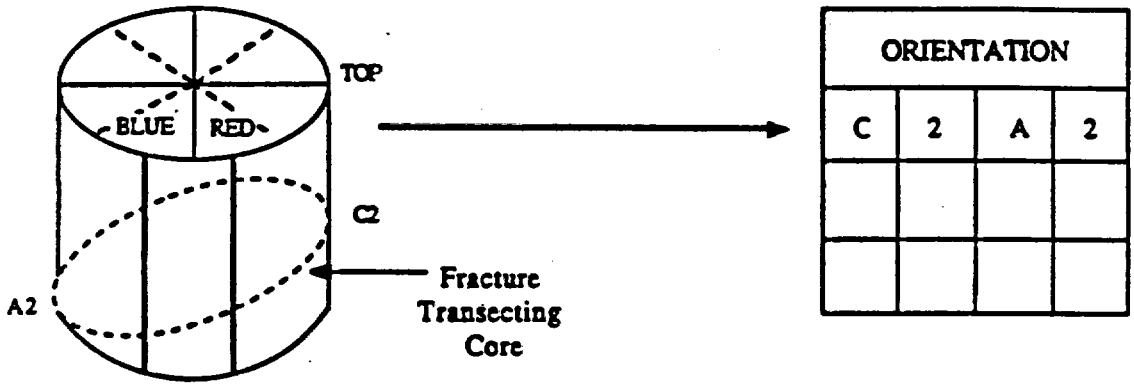

Figure 7 - Example of Orientation System and Designation

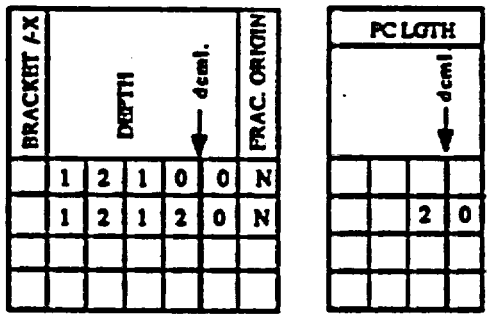

Figure 8 - Example of Piece Length

YUCCA MOUNTAIN PROJECT SAMPLE MANAGEMENT FACILITY

LITHOLOGIC LOG | Y-AD-143 10/90

Borehole ID _____ Type _____ From _____ To _____ Page _____ of _____

Completed By _____ Date _____ Checked By _____ Date _____

Description

Figure 9 - Lithologic Log

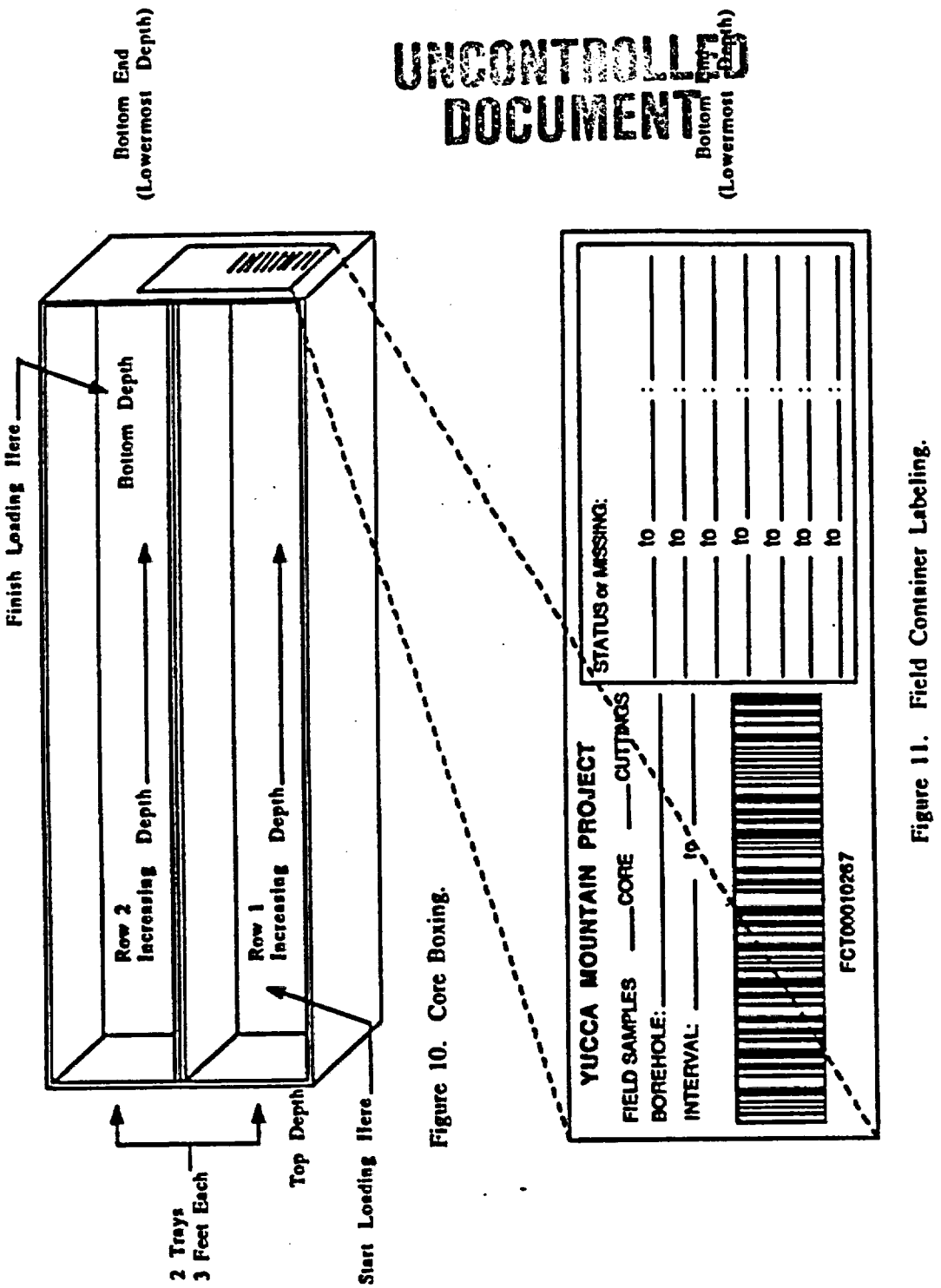

Figure 10. Core Boxing.

Figure 11. Field Container Labeling.

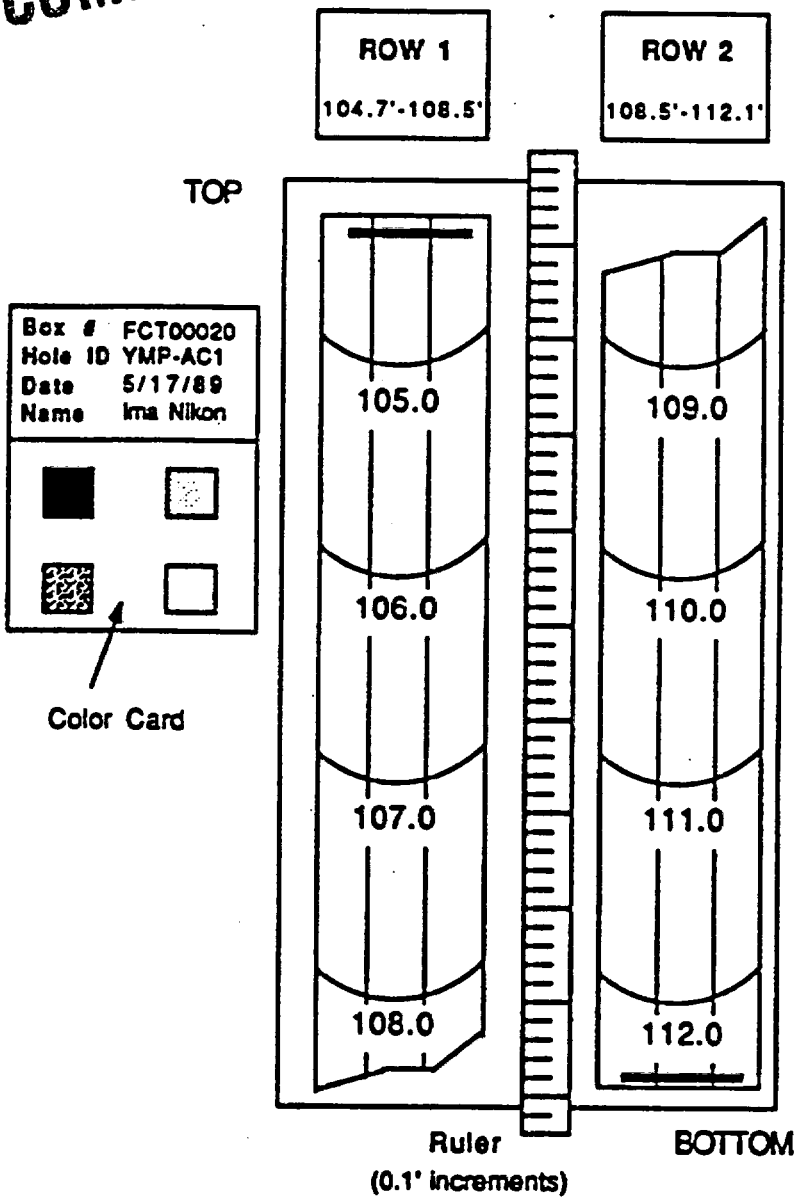

Figure 12 - Photographic Arrangement for Boxed Core

YUCCA MOUNTAIN PROJECT SAMPLE MANAGEMENT FACILITY

SHIFT DRILLING SUMMARY — Y-AD-144 10/90

Borehole ID _____ Shift _____ Date _____ Page ____ of ____

Drilled Interval _____ Cut _____ Recovered _____ % Recovery _____

Completed By _____ Date _____ Checked By _____ Date _____

SUMMARY OF ACTIVITIES _____

GEOLOGIC INFORMATION _____

OPERATING INFORMATION:

Bit Type/No.	Footage/Hrs.	Bit Weight (Range)

RPM (Range) _____
Air Inject. CFM (Range) _____
Air Return CFM (Range) _____
Water Inject. GPM (Range) _____
Water Return GPM (Range) _____

PERSONNEL:

REECo

Project Office

T&MSS

Other

Figure 13 - Shift Drilling Summary

YUCCA MOUNTAIN PROJECT SAMPLE MANAGEMENT FACILITY

BOREHOLE COMPLETION REPORT — Y-AD-145 10/90

Borehole ID _____
Grd. Elev. _____ T.D. _____

SEC _____ TWP _____ RGE _____ 1/4 - 1/4 _____ ;Area _____
Nev. Surf. Coord. _____ x _____
Bottom Hole Coord. _____ x _____

Hole Inclination _____
Bearing _____

Completed By _____ Date _____
Checked By _____ Date _____
FO Manager _____ Date _____

Rig On Loc _____
Spud Date _____
Completion Date _____

Drilling Company _____
Driller(s) _____, _____, _____
Junk _____
No. of Compressors _____
Capacity _____

Rig #	Name	Class	Circulating Media		
			From	To	Type

Borehole Size		
From	To	Size

Casing			
From	To	I.D.	O.D.

Water Invasion		
From	To	Type (Perched/Wtr Table)

Geophysical Logging Data

Correlated Tops			
Name	From	To	Thickness

Remarks

Figure 14 - Borehole Completion Report