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ENVIRONMENTAL RESTORATION PROJECT

A Department of Energy Environmental Cleanup Program

Environmental Restoration Project
Standard Operating Procedure

for:

Physical Processing, Storage, and Examination of Borehole Material at the Field Support Facility

Los Alamos
NATIONAL LABORATORY
Los Alamos, New Mexico 87545

Revision Log

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Physical Processing, Storage, and Examination of Borehole Material at the Field Support Facility

Table of Contents

Physical Processing, Storage, and Examination of Borehole Material at the Field Support Facility

1.0 PURPOSE

The purpose of this procedure is to facilitate the physical processing, storage, and examination of borehole material at the Environmental Restoration (ER) Project Field Support Facility (FSF). This procedure applies to all Curatorial staff performing physical processing, storage, and examination of materials collected from ER Project boreholes.

2.0 SCOPE

This SOP is a mandatory document, and ER Project, FSF participants shall implement this SOP when processing, storing, or examining borehole materials.

3.0 TRAINING

3.1 All users of this SOP are trained by reading the procedure. The **user** shall ensure that the training is documented in accordance with QP-2.2, and that training is entered in the ER Project Training Database located at http://erinternal.lanl.gov/Training/Training.asp.

3.2 The **Information Management Project Leader** shall monitor the proper implementation of this procedure and ensures that relevant team members have completed all applicable training assignments in accordance with QP-2.2.

4.0 DEFINITIONS

4.1 *Analytical Sample*—An analytical sample is a subsection or portion, which has been removed from a sample that undergoes testing, analysis, or other technical or scientific evaluation. It is also referred to as a specimen.

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

4.3 *Curatorial Sample Inventory and Tracking System* (CSITS) —The Curatorial Sample Inventory and Tracking System is the computer database that has been developed to track in detail all actions taken on the ER Project borehole materials over which the FSF has control. The primary objective of the database is to assist in establishing and maintaining traceable records of each borehole material collected for the ER Project.

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

4.5 *Examiner*—An examiner is an individual from the ER Program or outside interest who is authorized to visually examine borehole materials at the FSF.

4.6 *Information Block*—An information block is an object placed in a container that represents a depth interval and provides information pertaining to the status of that interval.

4.7 *Rubble*—Rubble consists of fragments of core from a single interval, with diameters that average less than one half the diameter of the whole core.

4.8 *Field Support Facility* (FSF)— For the purpose of this SOP, the FSF is the facility used, in part, for the documentation, storage, and control of borehole materials collected and distributed for analysis and evaluation by ER Project personnel. The FSF consists of physical facilities and equipment designed to effectively process and preserve collected borehole materials.

4.9 *FSF Acceptance Criteria for Borehole Materials*—The allowable exposure levels inside the FSF to radioactivity and non-radioactive contamination occurring from the acceptance, handling, processing, examination, and storage of borehole materials. The FSF Acceptance Criteria (Table 1 of ER SOP-12.01) are designed to ensure that potential exposures are limited to levels at which health and safety concerns are minimized or eliminated.

4.10 *Material Type*—Material type designates the type of material that makes up a sample, (i.e., core, remnants, cuttings, or chips).

4.11 *Unique Identifier*—A unique identifier (ID) is a designation that sets a documentable object or event apart from similar entities. It may be an assigned number, a name and alphanumeric designation, or a set of data items that collectively serve to specify an entity. Examples of unique identifiers used in this procedure include Borehole ID, Container ID, Sample ID, or Specimen ID.

5.0 BACKGROUND AND PRECAUTIONS

5.1 The implementation of ER-SOP-12.01 shall ensure that a determination is made as to the levels of radioactive and non-radioactive hazards associated with ER borehole materials accepted by Curatorial staff. This determination is made prior to the use of this procedure. The user of this procedure is responsible for verifying that FSF Acceptance Criteria (Table 1 of ER-SOP-12.01) levels have not been exceeded prior to physical processing.

5.2 If borehole material contamination levels are below the upper limits of the FSF Acceptance Criteria, the following handling precautions are prescribed:

5.2.1 Laboratory coats and plastic or rubber gloves may be worn while manipulating exposed material.

5.2.2 Eating or drinking is prohibited in areas where these materials are open to the environment.

5.2.3 Handling, processing and examination of materials shall be kept to a minimum.

5.3 Borehole material that has contamination levels that are above the upper limits of the FSF Acceptance Criteria, shall not be accepted into the FSF facility.

Note: Generators should contact ESH for direction on handling and storing contaminated borehole materials that are above the FSF Acceptance Criteria.

6.0 RESPONSIBLE PERSONNEL

The following personnel are responsible for activities identified in this procedure.

6.1 Curatorial Staff

6.2 Examiners

6.3 Information Management Project Leader

7.0 EQUIPMENT

Equipment necessary for this procedure may include, but is not limited to the following:

- Core boxes and dividers
- Core marking supplies
- Measuring rulers marked in tenths of a foot
- Polyethylene lay-flat tubing
- Polystyrene core cradles
- Work tables

8.0 PROCEDURE

Note: ER Project participants may produce paper copies of this procedure printed from the controlled-document electronic file located at http://erinternal.lanl.gov/home_links/Library_proc.shtml. However, it is their responsibility to ensure that they are trained to and utilize the current version of this procedure. The author may be contacted if text is unclear. The Document Control Coordinator (DCC) may be contacted if the author cannot be located.

Note: Deviations from SOPs are made in accordance with QP-4.2 and documented in accordance with QP-5.7, Notebook Documentation for Environmental Restoration Techncial Activities.

Borehole materials received from ER Project field sites shall be processed after arrival at the FSF only after the completion of ER SOP-12.02 activities. The purposes of processing these materials for archival are to ensure proper identification and traceability of these materials. Borehole materials undergo different phases of processing depending upon the condition of the material.

8.1 Inventory Borehole Material

8.1.1 **Curatorial staff** shall conduct a manual inventory of borehole materials and compare that inventory against the documentation obtained from the SOP-12.02 activities.

8.1.2 **Curatorial staff** shall input the data resulting from this activity into the CSITS database, including the storage location of the borehole material.

8.1.3 **Curatorial staff** shall use the CSITS database to verify/validate the data input and to generate a Processing Checklist (Attachment A).

Note: This checklist is used to document the various steps in the processing of borehole materials. The checklist includes any special processing instructions that may apply to a specific container. Individual steps in the Processing Checklist that do not apply are marked as "N/A."

8.1.4 Once the Processing Checklist is completed, the **curatorial staff** verifies and documents with an approval signature in the space provided for Curatorial staff.

8.1.5 **curatorial staff** shall secure the checklist inside a polybag and places it into the respective borehole material container.

8.2 Conduct the Checklist

Note: If any inconsistencies are discovered during the checklist process, Curatorial staff shall confer with the requesting field personnel to remedy any anomalies.

8.2.1 Ensure Proper Borehole Material Bagging and Marking

Curatorial staff shall inspect borehole material for correct packaging (SOP-12.01). If Curatorial staff deem that bagging/rebagging of the borehole material is necessary, they shall bag as follows:

- Lengths of lay-flat tubing (or similar type of preservation material, e.g., polybag) are used for each interval. When utilizing lay-flat tubing, one end of each length is sealed with a heat sealer. One

side of the tubing is marked with the top and bottom depths of the interval.

- Orientation marks, red on the right and blue on the left (Attachment C), are drawn on the plastic bag (provided material orientation has been maintained).
- The borehole material is then inserted into the pre-marked lay-flat tubing, the excess air is squeezed out, and the end of the tubing heat-sealed. This process is repeated for each row of the container as necessary.

8.2.2 Verify Missing/Removed Labels

Curatorial staff shall verify that any missing interval is noted by a marker denoting that the interval is missing or was removed.

8.2.3 Label Container

8.2.3.1 **Curatorial staff** shall utilize the CSITS database to generate five container labels for each individual borehole material container.

8.2.3.2 **Curatorial staff** shall affix the labels to both ends and on the right side of the container lid, and on the front end and right side of the container base.

Note: The borehole material remains in the same box in which it was received from the field unless the container was damaged beyond usefulness. If the container is damaged beyond usefulness, the borehole material is transferred to a new material container.

8.2.4 Verify Borehole Material Orientation Marking

Curatorial staff shall ensure that the field markings are complete, clear, and unobscured; or redraw them as necessary using the process described in ER-SOP-12.01.

Note: Depth indicators are permanently marked and appropriately located on both ends of the borehole material (Attachment B).

8.2.5 If any inconsistencies are discovered during this process, **Curatorial staff** shall confer with the submitting field personnel to remedy any anamolies.

8.2.6 Verify Inserted Box Dividers

Curatorial staff shall ensure that the plastic-coated dividers were properly inserted between each row of borehole material.

8.2.7 Verify Borehole Seating in Foam Cradles

Curatorial staff shall ensure that the borehole material is correctly seated in the foam cradles.

8.2.8 Ensure Container Lids Closed

Curatorial staff shall ensure that all container lids were properly closed and are secure before transporting containers to the permanent assigned shelf locations.

8.2.9 Store Borehole Material

Upon completion of the processing activities, **curatorial staff** shall process containers for storage as follows:

- A specific location is located within the FSF.
- The location is input into the CSITS database.
- The borehole material boxes are shelved.

Note: Where temperature is of no concern, designated boreholes may be stored outside the FSF in the designated cold storage areas. These borehole material storage areas are within a locked area restricted to authorized personnel only.

8.3 Request Examination of Processed Borehole Material

8.3.1 **Examiners** (anyone wishing to conduct further research of archived borehole materials) who want to examine borehole material at the FSF need to complete an Examination Request (Attachment D) and forward that request to curatorial staff at least 24 hours in advance of the borehole material examination.

Note: The 24-hour advance notice allows curatorial staff enough time to get the borehole material pulled from storage and arranged on the examination table. Data from the Examination Request and the CSITS database is used by curatorial staff to initiate an Examination Report (Attachment E).

8.3.2 Prior to the time of the exam, **curatorial staff** may choose to weigh the borehole material and container individually or together as a quality control measure (documented on the Examination Report, Attachment E).

Note: Borehole material may also be compared to photographs (if available) prior to the examination as an additional quality control activity.

8.4 Assist in Examination of Borehole Materials at the FSF

Curatorial staff shall assist examiners during examination activities and shall ensure that activities performed during examination conform to this procedure.

8.5 Examine Borehole Material

8.5.1 **Curatorial staff** shall notify the examiner that the borehole material is available for examination and schedules a date and time for the exam.

8.5.2 At the time of the examination, **curatorial** stall makes a borehole material review folder containing borehole information available for the examiner.

Note: Included in this folder, is a summary of hazardous materials monitoring results indicating that the values are within FSF Acceptance Criteria.

8.5.3 The **examiner** examines the borehole material.

8.5.3.1 Should the examiner decide to remove a specimen for analysis, the **examiner** places a temporary marker, indicating who the examiner is, the date, and what interval they wish removed, is placed on the borehole material.

8.5.3.2 After each specimen is selected for removal, **curatorial staff** shall assist the examiner in the specimen removal and shall make a listing of the removed specimens.

8.5.3.3 **Curatorial staff** shall enter the appropriate information into the CSITS database and the appropriate specimen labels and documentation are generated.

8.5.4 Upon completion of the examination, the **curatorial staff** member may again compare the core material viewed to the core photographs (if taken) and reweigh the borehole material to ensure that the borehole material was not removed or disrupted (i.e., an exception is when specimens were removed for analysis).

8.5.5 If there are no discrepancies, **curatorial staff** completes the Examination Report and proceeds to Section 8.6.

8.6 Reshelf Borehole Material

Curatorial staff shall remove all containers from the Examination Room and replace them in their appropriate storage location.

8.7 Perform Lessons Learned

During the performance of work, **ER Project personnel** shall identify, document, and submit lessons learned, as appropriate, in accordance with

QP-3.2, Lessons Learned, located at
http://erinternal.lanl.gov/home_links/Library_proc.shtml.

9.0 REFERENCES

ER Project participants may locate the ER Project Quality Management Plan at http://erinternal.lanl.gov/home_links/Library_proc.shtml.

The following documents are cited within this procedure:

QP-2.2, Personnel Orientation and Training

QP-3.2, Lessons Learned

QP-4.2, Standard Operating Procedure Development

QP-4.4, Record Transmittal to the Records Processing Facility

QP-5.7, Notebook Documentation for Environmental Restoration Technical Activities

ES&H Administrative Requirements (AR) Manual, AR 12-1, "Personal Protective Equipment"

ER Project Field Support Facility Contaminant Criteria for the Acceptance of Samples, February 8, 1994

ER-SOP-12.01, Field Logging, Handling, and Documentation of Borehole Materials

ER-SOP-12.02, Transportation, Receipt, and Admittance of Borehole Samples for the Field Support Facility

10.0 RECORDS

Curatorial staff are responsible for submitting the following records (processed in accordance with QP-4.4) to the Records Processing Facility only when the borehole material is retired to a disposal area.

10.1 Examination Request

10.2 Examination Report (when applicable see Section 8.5)

11.0 ATTACHMENTS

The document user may employ documentation formats different from those attached to/named in this procedure—as long as the substituted formats provide, as a minimum, the information required in the official forms developed by the procedure.

Attachment A: Processing Checklist (database generated) (1 page)

Attachment B: Core Markings (1 page)

Attachment C: Marks on Lay-Flat Tubing (1 page)

Attachment D: Examination Request (database generated) (1 page)

Attachment E: Examination Report (database generated) (1 page)

Using a token card, click here to record "self-study" training to this procedure.

If you do not possess a token card or encounter problems, contact the RRES-ECR training specialist.

FIELD SUPPORT FACILITY
Processing Checklist

Box ID	Number	Of	Borehole	Top	Bottom
00501	1	56	Example	0.0	6.0

1. Rubble Bagged? _____
2. Bags Footage Marked? _____
3. Missing/Removed Labels in Place? _____
4. Permanent Box Labels Applied? _____
5. Orientation Marks Easily Visible? _____
6. Depth Markers Clear and Legible? _____
7. Box Dividers Inserted? _____
8. Core in Foam Cradles? _____
9. Box Lids Closed? _____
10. Permanent Assigned Shelf Location: _____

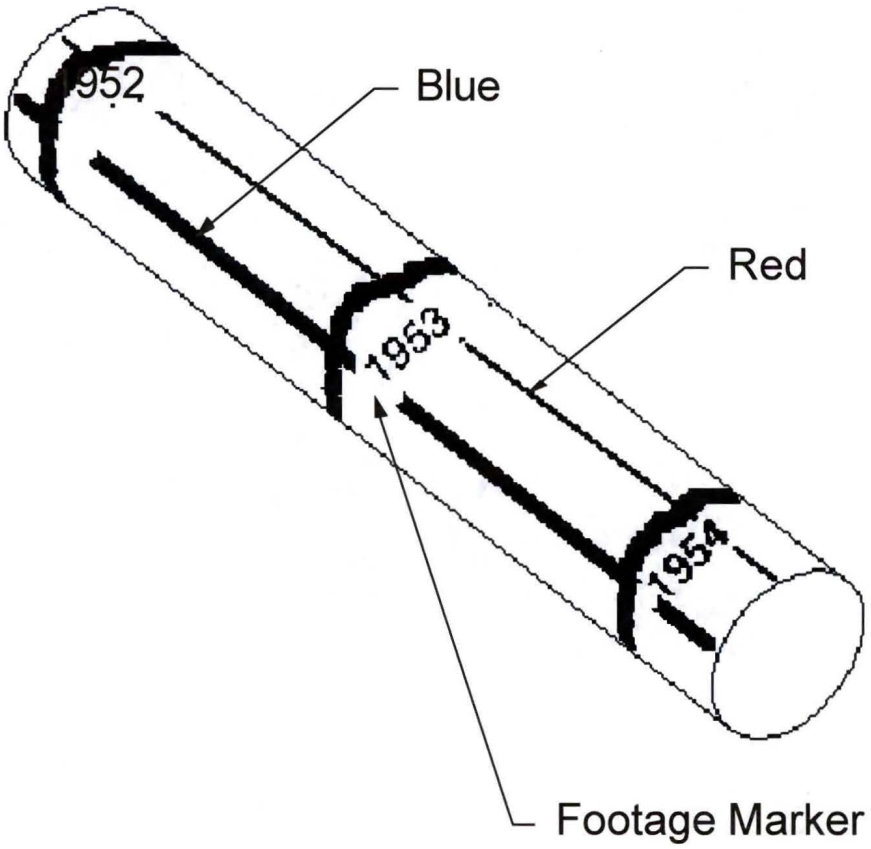
Sample ID	Top	Bottom	Status	Packaging	Comment
000387	**0.0**	**4.0**	**REC**	**None**	
000388	**4.0**	**4.2**	**WC-Fld**	**Unknown**	
000389	**4.2**	**6.0**	**REC**	**None**	

Special Instructions: _____

_____

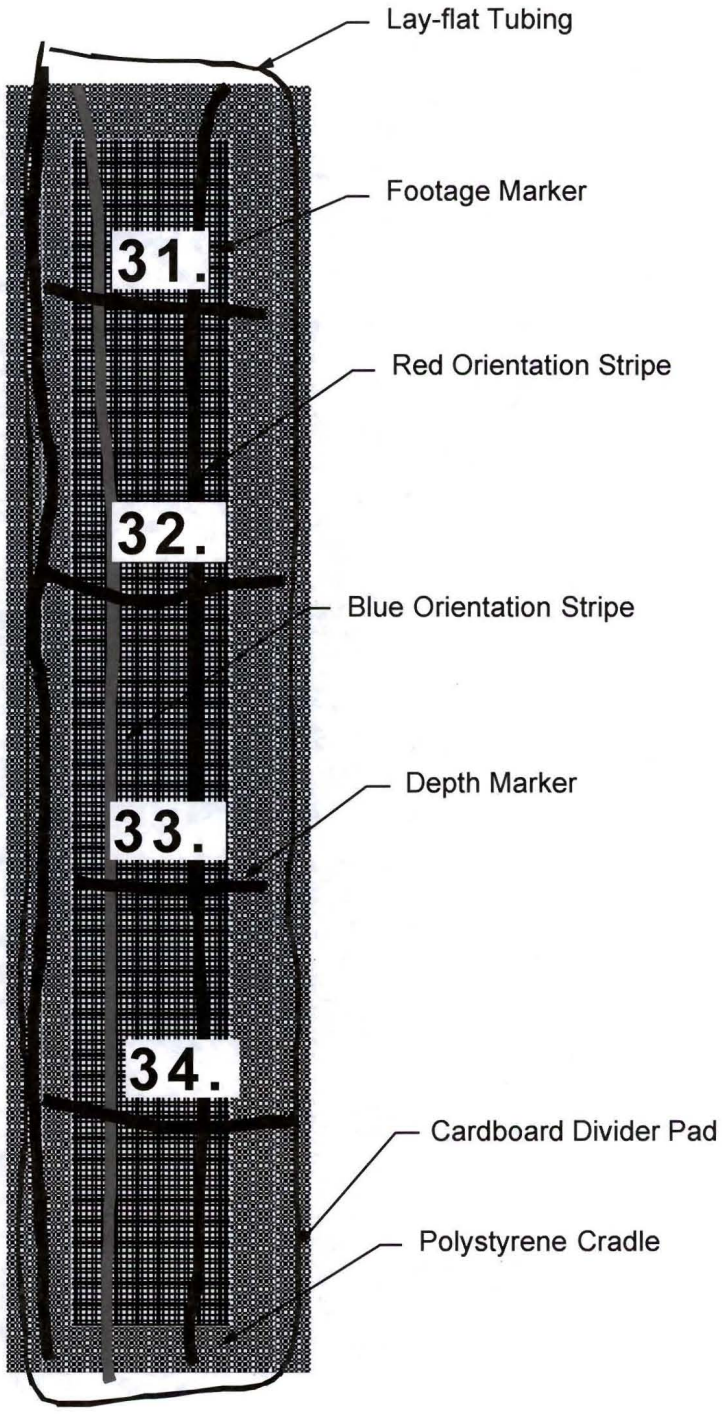
Page ___ of ___ Curatorial Staff _____ Date _____

Core Markings



ORIENTATION STRIPES

Marks on Lay-Flat Tubing



EXAMINATION REQUEST

Field Support Facility

Requester: _____ _____
Print Name Organization

_____ _____
Date of Examination Estimated Duration

Mailing Address: (Include City, State and Zip Code)	Telephone Numbers: (Primary, Alternate and Fax)

The Environmental Restoration Project geologic material that have been provided for your examination at the Field Support Facility are controlled by the Quality Management Plan for the Los Alamos National Laboratory Environmental Restoration Project. The materials made available to you are for visual examination. Requesters needing to destroy or consume material for analytical purposes must collaborate with the Curator Staff who will ensure that these actions are properly performed and documented.

I have read the above statement and will comply with borehole material examination restrictions: _____
Requester's Signature

Acquisition Site – TA/PRS - Borehole	Depth Interval or Reference	Material Type

FSF USE ONLY CURATORIAL STAFF: _____ _____
Print Name/Signature Date

ER-SOP-12.04

Los Alamos
Environmental Restoration Project

EXAMINATION REPORT

Boxes Viewed at the Field Support Facility

Examination ID:_____ Organization:_____ Primary Examiner:_____
Print Name/Signature

Date Viewed:_____ Number of Boxes Viewed:_____

Box ID	Of Borehole	Box	Top D	Bottom D	Type	Exam Room	Weight In	Date	Weight Out	Date	Penetrating Radiation	β/γ Particulate	α Particulates	VOCs	Metals	Radon	Tritium

Curatorial Staff:_____ _____
Print Name/Signature Date

Key: NB = Natural Background AC – FSF Acceptance Criteria

ER-SOP-12.04

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