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# SAMPLE IDENTIFICATION AND CONTROL FOR MINERALOGY-PETROLOGY STUDIES

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# SAMPLE IDENTIFICATION AND CONTROL FOR MINERALOGY-PETROLOGY STUDIES

## 1. PURPOSE

The purpose of this procedure is to track the origin, history, and disposition of samples collected for mineralogy-petrology studies under NNWSI.

## 2. SCOPE

All geologic samples that will be used to obtain LANL mineralogy-petrology site characterization data for NNWSI are covered under this procedure.

## 3. SAMPLE IDENTIFICATION AND CONTROL

Sample identification must be sufficient to trace a sample and any of its processed derivatives to its original field location (e.g. drill core, drill hole depth, trench location, shaft depth and location, or drift location). If a sample is collected personally by a mineralogy-petrology researcher, then the sample name should include the collector's three initials and a sequence number unique to that collector's NNWSI sample notebook (e.g. "DTV198" for the 198th sample logged in D. T. Vaniman's sample notebook). This type of name is necessary because two different collectors may otherwise come up with identical sample names. An extended name may be added to indicate the sample's origins (e.g. "BB-2" for the second in a series of samples taken at Busted Butte). If a sample originates in a NNWSI-controlled drilling or mining operation, then the sample name appropriate to that operation should be used.

### 3.1 Sample Origins

Samples collected by mineralogy-petrology personnel from outcrop or from trenches will be recorded in the collector's controlled notebook. The sample will be marked by a permanent marking pen either on the sample itself, or on tape wrapping the sample, or on the sample bag. All three markings shall be made if possible. Where the sample orientation and field relations are unambiguous, the plotting of sample position on an appropriate topographic, geologic, highway, or other map will be appropriate in addition to the record made in the controlled notebook. Where field relations are more

complex, a sketch of the sample position or of the relative positions of several samples may be made in the controlled notebook. At the discretion of the collector, a photograph showing the sample position(s) may be taken. The collector's notebook will provide information on the sample identifying name, the name of the collector, the date of collection, and the place of collection.

Samples collected from curated drill cores, drill holes, shafts, or mined intervals will be obtained through the NNWSI Sample Overview Committee. Copies of the sample requests shall be kept in the ESS-1 resident file. Samples collected by the investigator from mined exposures will be described in the investigator's notebook in the same way that outcrop and trench samples are described.

### 3.2 Sample Shipment to Los Alamos

Any samples hand-carried or shipped to LANL shall be recorded in the sample receiving/tracking logbook (see Subsection 3.3 below). Samples shipped from NTS or from another locality shall be handled in accord with procedure TWS-MSTQA-QP-04. Containers for shipping shall be sturdy enough to protect the samples from damage or loss. Beyond this requirement, special packaging is not required for most mineralogy-petrology samples.

### 3.3 Sampled Receipt

Upon receipt, a copy of the shipping manifest or a memo verifying receipt of shipped samples shall be put in the ESS-1 resident file. Hand-carried samples which have been in the collector's custody do not need to be recorded in the resident file. The samples will then be allocated a storage space either in the ESS-1 NNWSI main sample storage center or in the investigator's secure storage area. At this time the samples will be listed in the ESS-1 sample tracking logbook which is kept in the main sample storage center. The information entered in this logbook will consist of: (1) the sample name (either the alphanumeric name which was assigned in the field, or a name which identifies drill hole or drill core designation and depth, or a name which indicates origin of mine samples) and (2) the cabinet number and drawer or other appropriate information to identify the allocated storage space in the ESS-1 main sample storage center, or the building and room number of the investigator's secure storage area if the investigator is

to retain custody. Each shipment entry in the sample tracking logbook will be signed and dated by the recipient.

### 3.4 Sample Storage

Primary sample storage when samples are not in use will be in the ESS-1 main sample storage center. Sample derivatives may be stored elsewhere as follows:

(1) Thin sections will be stored in the central thin section storage area, although these samples may be checked out to investigators on a long-term basis and maintained in the investigator's own secure storage. Thin section butts will be stored with the original sample in the ESS-1 main sample storage center.

(2) Scanning electron microscopes (SEM) mounts will be stored in the investigator's secure storage area or in the secured cabinet in the SEM laboratory.

(3) Rock powders will be stored in the x-ray diffraction (XRD) laboratory or in the investigator's secure storage area.

(4) Thick sections for fluid inclusion analysis will be stored with the thin sections in the central thin section storage area or in the investigator's secure storage area.

(5) Fused discs for x-ray fluorescence (XRF) analysis will be stored in the XRF disc storage cabinet.

(6) Other samples may be stored in the secure storage area of the analyst responsible for their custody.

All other sample derivatives will be returned to the ESS-1 main sample storage center and consolidated with the parent material in the appropriate storage space. Return of sample derivatives to the main storage center will be recorded in the sample tracking logbook at the main sample storage center.

### 3.5 Sample Derivatives

A variety of analyses will be made on splits taken from most samples. Some splits will be thin-sectioned, leading to petrographic slides and epoxy impregnated butts as well as rock chips. Some splits will be powdered for x-ray diffraction and x-ray fluorescence analysis. Some splits will be mounted on aluminum rounds and gold- or carbon-coated for scanning electron microscope analysis. Other splits may be made for other procedures as well. The procedures to be considered are of two types: sample preparation and sample analysis. Sample tracking through these two types of procedures will be as follows:

#### 3.5.1 Sample Preparation Procedures

Sample preparation procedures and the sample tracking appropriate to each are:

(1) Records of thin section preparation and preparation of varnish study mounts are maintained in the thin section laboratory.

(2) Application of conductive coating by vacuum evaporator or by sputter coater is implicit in the use of analytical procedures for SEM or for electron microprobe.

(3) Clay mineral separation for XRD will be recorded in the preparer's laboratory notebook.

(4) Preparation of fused discs for XRF analysis will be recorded in the logbooks appropriate to the procedures used. These logbooks will be retained in the XRF sample preparation laboratory.

(5) Brinkman grinding for XRD will be recorded in the Brinkman Grinder laboratory logbook which is retained in the XRD laboratory. Where crushing by shatterbox precedes the Brinkman crushing, the shatterbox crushing processes will be recorded in the Shatterbox logbook.

Where special sample preparations may be used (e.g., preparation of thick sections for fluid inclusion analysis), the record of that procedure will be retained either in the established preparation laboratory (such as the thin section laboratory) or in the preparer's notebook (e.g., mineral separation by hand).

### 3.5.2 Sample Analysis Procedures

Records of sample analyses are kept in the established analytical laboratory (XRD, XRF, electron microprobe, SEM, fluid inclusion, and thermal analysis). Data from the analysis may be retained in these laboratories, in the analyst's controlled notebook, or in both. Details of this documentation specific to each procedure are as follows:

(1) Camera-method XRD films are retained in the XRD laboratory. The retention of these films in appropriate storage in the XRD laboratory provides record of the fact that a camera-method XRD analysis has been made.

(2) Petrographic descriptions are retained in the analyst's controlled notebook. Record of the fact that a petrographic analysis has been performed will be made in the analyst's controlled notebook or data record.

(3) Electron microprobe analyses are stored as computer records in the electron microprobe laboratory. Hard-copy will be retained by the analyst as a microprobe data record. Each analytical session is recorded in the NNWSI logbook maintained in the electron microprobe laboratory.

(4) XRD data are retained in the XRD laboratory. The primary data consist of digitized raw intensity versus two-theta output from each analysis. These data, stored on hard disk, are backed up onto tape at least every month. The backup tapes are stored in separate secure storage. A computer listing of all analyses run provides record of the fact that the analyses were performed; this record can be verified against the logbooks of stored XRD hard copy. Hard copy output of intensity/two theta plots are stored either in the XRD laboratory or in the investigator's collection of appropriate data records.

(5) Data from the NTS fracture filling studies are stored in the analyst's notebook. Record of the fact that such studies have been performed can be found in the same notebook. The fact that subsets of analyses by electron microprobe, XRD, and SEM are obtained for the fracture filling studies will be documented in the analytical records for the appropriate laboratories.

(6) Data from SEM analysis are retained in the analyst's controlled data record. Record of the fact that SEM analysis occurred will be maintained in the NNWSI logbook maintained in the SEM laboratory.

(7) Data from thermal analysis are retained in the thermal analysis laboratory. Both computer stored and hard copy records will be maintained and will provide record of the fact that thermal analysis was performed.

(8) Data from fluid inclusion analysis are recorded in the analyst's controlled notebook. Record of the fact that a fluid inclusion analysis was performed shall be retained in the NNWSI notebook maintained in the fluid inclusion analysis laboratory.

Data from analyses performed in research and development of new methods are maintained in the analyst's notebook. Data obtained from contracts outside LANL will be maintained by the researcher at LANL in charge of the contract. Record of sample exchange between the contractor and LANL will be maintained in the ESS-1 main sample storage facility NNWSI logbook (Subsection 3.6 below).

### 3.5.3 Sample Tracking

Sample tracking will be done on the basis of procedure-of-interest. In other words, an interest in thin section preparation will be addressed by access to the records in the thin section laboratory, an interest in XRD analyses will be addressed by access to the records in the XRD laboratory, an interest in petrographic studies will be addressed by access to the thin-section checkout logbook, etc. For the analyses performed outside LANL, the sample can be tracked through the NNWSI sample tracking logbook in the ESS-1 main sample storage facility (Subsection 3.6 below).

### 3.6 Sample Shipment from Los Alamos

Any shipment of samples or sample derivatives to a researcher or contractor outside LANL will be recorded in the NNWSI sample tracking logbook in the ESS-1 main sample storage facility. Return of samples to LANL will also be recorded in this logbook. Exchanges of samples or sample derivatives between Divisions at LANL will be recorded. Return of samples to DOE controlled storage will be recorded.

## 4. PERSONNEL QUALIFICATION

Only qualified personnel will be allowed to transport and handle NNWSI mineralogy-petrology samples while in LANL custody. Evidence of qualification shall be documented in a certification record kept in the ESS Division Resident File.