



## **2.2 TRAINING**

GMI personnel will be trained to this procedure before conducting work, and will document that they have read and understand this procedure. Personnel utilizing the binocular microscope to examine samples shall be professional mineralogists with experience in performing these duties.

## **3.0 DEFINITIONS**

N/A

## **4.0 RESPONSIBILITIES**

4.1 The Principal Investigator is responsible for the preparation of this procedure.

4.2 The Principal Investigator has the responsibility of performing all operations, unless those operations are assigned to other trained personnel. A laboratory notebook will record activities performed on each sample.

## **5.0 PROCESS**

No special environmental conditions are necessary for this procedure.

An untreated split sample or parent sample is placed under the binocular microscope and a brief scan of its surface(s) is made. A grain mount or other special mount or slide can also be used. Areas of interest are noted. A notation in the laboratory notebook is made regarding the sample number and reason for study. A Binocular Microscope Sample File for that sample is made.

Documentation of the performance of the tasks in this procedure will be through the use of laboratory notebooks (scientific notebooks) and the completion of forms associated with this procedure. Laboratory notebooks will meet the requirements of Quality Administration Procedure, QAP-3.2, "Procedures for Documentation of Scientific Investigations", current revision

### **5.1 Video Documentation**

Video documentation of a sample is made to record the appearance of the whole sample with scale, to record fracture surfaces or other surfaces of interest at different magnifications as required to document the appearance of the mineralogy. Documentation is made in color or in black and white as required. If color is used Munsell soil color chart will be used to acquire the various colors of the background and minerals of interest. This information will be typed on to the video frame. Video data

collection is made with a Macintosh Centris 660AV, with MacVision software, with Memorex VHS color camera mounted on a copylight (23C) stand. Video photographs will be printed by an HP550C printer, and will be copied as Mac Tiff files on high-density floppy discs. If SEM, TEM, Probe or other analytical activity will use this sample or a split from this sample, a Map of the sample surface(s) will be made and transferred with the split or the sample to the next analytical file.

## **5.2 Microscopic Examination**

Microscopic examination of the sample is made going from low power to high power as required. Notes of all observations are recorded in the sample file designated for the sample number and this procedure. Visual estimates are made for percent of each mineral coating the surface, mineral orientation if possible, mineral associations, mineral color (Munsell), morphology of the constituents, freshness of the surface(s), among other observations.

## **5.3 Preparation of Sample**

Preparation of split samples will be made as required for SEM or other analysis based upon the requirement of that analysis as long as the split sample location can be documented by section 5.1. If a cutting chip is being examined the entire chip can be used as the SEM sample. If a split sample is required for X-ray diffraction analysis then that sample is documented by video record. If samples are to be scraped from the surface the use of a tungsten carbide scraper is indicated. Mineral coatings scraped off of a surface require data to be recorded such as hardness, texture, homogeneity and other minerals present, among other information including data on the surface itself.

## **5.3 Data Acquisition Methodology and Limitations**

Data acquired from binocular examination will be of the quantitative type and tied to specific physical locations in the field.

These data will be used to track the progress of the U.S. DoE during development activities at Yucca Mountain. All data derived from binocular examination may be used at U.S. Nuclear Regulatory Commission proceedings to evaluate DoE's License application.

Uncertainty attached to the methodology in the acquisition of microscopic analyses includes the variability of the skill level of the laboratory personnel performing the analyses, and individual professional judgement.

Analytical reports of binocular examinations will be submitted to the NWRPO Quality Assurance Records Center for capture and preservation in the project files.

## **6.0 REFERENCES**

NWRPO Quality Assurance Program Plan

## **7.0 RECORDS**

Video file listing video frames taken with sample laboratory Notebook

Video tiff files on floppy discs

Video prints of each frame shot with labels on each print

Video maps for other analytical efforts

Laboratory Notebook for binocular microscope observations

Sample file for binocular microscope observations

Thin section request form (for split samples if they are taken)

Notation in Master Sample Logbook (if split samples are taken)

Laboratory Analytical Reports

## **8.0 ATTACHMENTS**

N/A