LOS ALAMOS SCIENTIFIC LABORATORY
UNIVERSITY OF CALIFORNIA
LOS ALAMOS, NEW MEXICO 87545
Telephone Ext:

OFFICE MEMORANDUM

TO James G. Steger, LS-6 Alternate Group Leader DATE: November 3, 1980

FROM Margaret Anne Rogers, LS-6 MAR

SUBJECT LASL GEOLOGIC FIELD PROJECT PERSPECTIVE

SYMBOL LS6-80-370

MAIL STOP 495

General

1482

Field studies are the principal means of obtaining geologic knowledge. Geologic mapping is so essential to many field studies that it is often equated with "field geology." Maps are used to define rock bodies, to plot structural measurements and to relate many kinds of data. Without maps there can be no interpretation of features larger than those which can be seen in a single rock exposure. For instance, any description of structural geology (folds, faults, joints, volcanoes, etc.) must rely on mapping. Geologic maps are also used to construct such important projections as cross sections, structure-contour maps, and isopach maps. Together maps and sections are the ideal means of presenting large amounts of information to other persons.

Generally a geologic field project proceeds in three stages: 1. planning, 2. mapping, observing, and collecting, and 3. preparing a report. Project planning for the LASL geologic field project included the development of new topographic base maps and contracting for aerial photography of suitable scale and quality. Stage 1 is complete. Mapping, which required the establishment of new map (rock) units is complete. Stage 3 can be started although it isn't desireable because stage 2 is not complete.

A complete, well-written report is an extremely important part of a geologic project. Without it, the best possible field study is of little value to other persons. The geologic map and other detailed illustrations should be prepared first and the report written around them. The report should 1. Describe accurately what was observed and 2. synthesize and explain geologic relationships and events.

At this time only the geologic map is prepared. The cross sections that show the vertical dimension of geologic features, the structure-contour map that provides the most precise way to show rock deformation, and the isopach maps that show the variation in thickness of the map (rock) units are not prepared. Their preparation does not require additional field study. All are prepared from the finished geologic map. They should appear in the geologic report as words cannot as concisely, accurately, or effectively describe what they illustrate.

12179

The main divisions of the report are:

I. Introduction
II. Regional geologic setting
III. Rock units
IV. Structures
V. Geomorphology
VI. Geologic history: chronologic interpretation of processes, structural events and paleogeography

Several of these main divisions require additional field study and will be discussed in order of importance.

III. Rock units

There exists no published description of the new map (rock) units that appear on the geologic map. This stratigraphic data is generally presented in detailed columnar sections, which represent either a single measured section or an average sequence for a given area. The sections show the true thickness and lithologic character of the map (rock) units in a particular part of the map area. The number of sections required is related to the degree of variation seen. They are especially critical in the case of new map (rock) units because they become the means by which others identify these units. The sections have not been measured and must be before any report can be written.

IV. Structures

This section is very weak without a structure-contour map and without additional field study on the faults. The faults are located on the map but the amount of displacement along them, the dip of the fault planes, and the age and history of the faulting cannot be reported. The preparation of a geologic map has made determining these other things fairly straight forward. A relatively short period of field study is required.

VI. Geologic History

This section suffers particularly because of the sturcture section. It then follows that the report becomes principally a description of what is known with some speculation. Interpretation will not be possible without additional work as described previously.

V. Geomorphology

During the planning of this project it was decided to make this a separate study in the future. It is not possible to map without being aware of geomorphic features. This descriptive information will be included on the map and in the report. It is not sufficient for interpretation.