

UNITED STATES DEPARTMENT OF THE INTERIOR  
GEOLOGICAL SURVEY

Geophysical Log Suite from Drill Hole No. 5  
Mariano Lake-Lake Valley Drilling Project, McKinley County,  
New Mexico

by

U.S. Geological Survey

Open-File Report 81-970

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This report is preliminary and has not been reviewed  
for conformity with U.S. Geological Survey editorial standards  
and stratigraphic nomenclature.

## Table of Contents

	Page
Introduction.....	1
Purpose.....	1
General Drilling Plan.....	1
Drill Hole No. S-5.....	4
References.....	6

### ILLUSTRATIONS

Figure 1--Location of USGS Drill Holes, Gallup 1 <sup>0</sup> x 2 <sup>0</sup> quadrangle.....	2
Figure 2--Location of USGS Drill Hole No. 5, Crownpoint 7 1/2' quadrangle.....	5

Plate 1: 4 Parameter log - natural gamma, neutron-neutron porosity, self-potential, resistance (not plotted).

Plate 2: 4 Parameter log - natural gamma, resistivity, gamma-gamma density, caliper.

Plate 3: Magnetic susceptibility

Plate 4: Magnetic susceptibility/hole temp.

Plate 5: KUT

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INTRODUCTION

In the fall of 1980, the U.S. Geological Survey contracted with Longman Drilling Company of Albuquerque, New Mexico to rotary drill and core twelve holes along a north-south line from Mariano Lake to the vicinity of Lake Valley, New Mexico. This report incorporates the logs from drill hole no. 5. Similar reports on holes no. 1, 2, 3 and 4 were released by the U.S. Geological Survey (1981a, b).

The drilling project is funded under a reimbursable interagency agreement between the U.S. Bureau of Indian Affairs (BIA) and the U.S. Geological Survey (USGS). The program was designed by representatives of the BIA, USGS, and the Minerals Department of the Navajo Tribe.

PURPOSE

The principal objective of this project was to provide core samples and geophysical logs for petrologic, sedimentologic, geophysical, and geochemical studies of the Upper Jurassic Morrison Formation. Other objectives included the following: stratigraphic and coal studies of Upper Cretaceous rocks; hydrologic and water monitoring of well no. 2; control for a proposed seismic study of the same geographic area; and development of water wells by the Navajo Tribal Water and Sanitation Department.

GENERAL DRILLING PLAN

The locations of all twelve drill holes are shown on figure 1, which is a portion of the Gallup 1<sup>0</sup> x 2<sup>0</sup> Quadrangle. The general drilling plan called

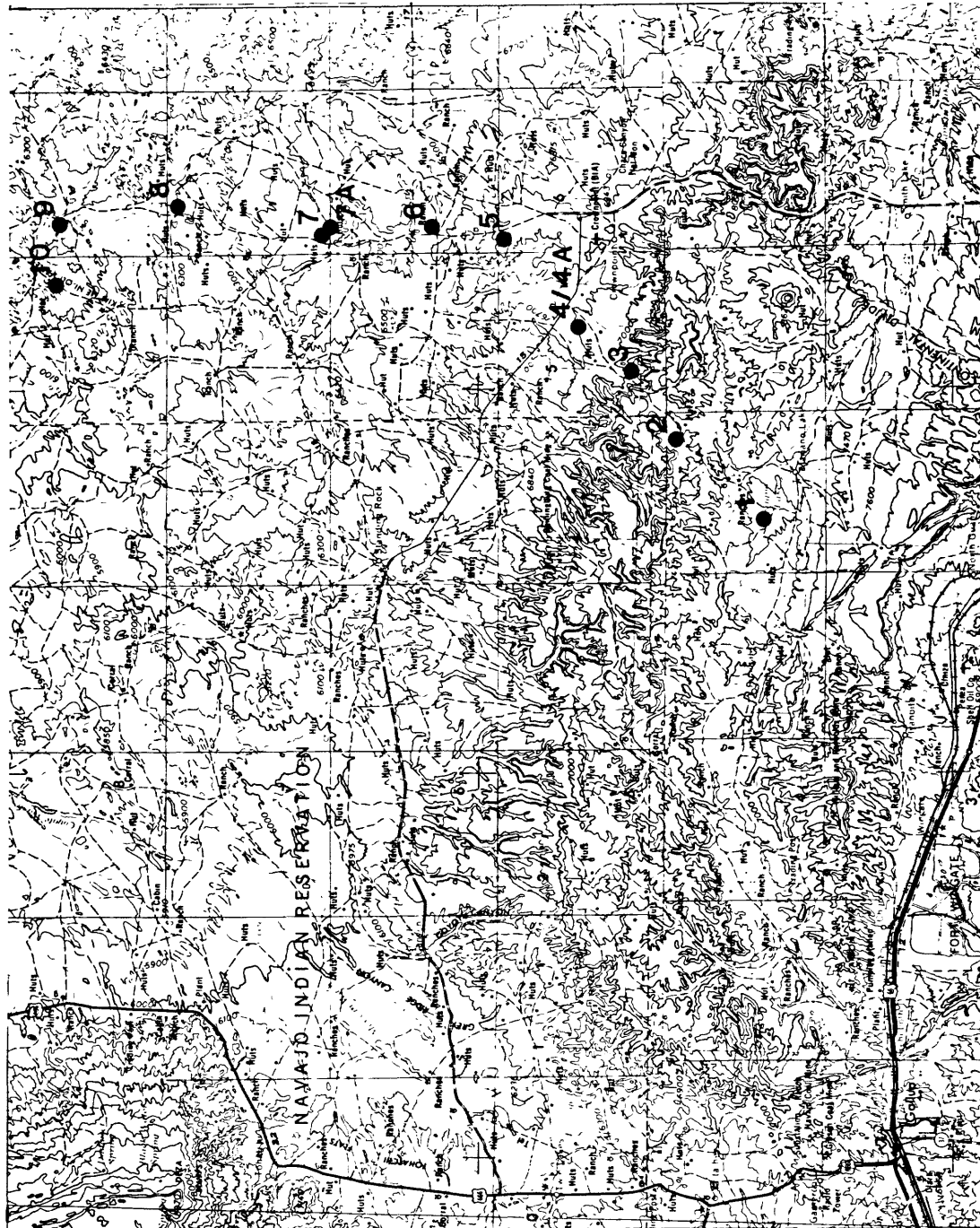


Figure 1. - Location of USGS Drill Holes, Gallup 1° x 2° Quadrangle.

most holes to be rotary drilled into the Upper Cretaceous Dakota Sandstone and then cored into or through the Recapture Member of the Morrison Formation. The interval to be cored in each hole was about 600 ft.

Exceptions to the general drilling were as follows: Hole No. 2, rotary drilled, surface to Jurassic Entrada Sandstone; Hole No. 4A, cored 21-218 feet, to test an observed near-surface I. P. anomaly; Hole No. 6, deepened after coring by rotary drilling into the Jurassic Entrada Sandstone; Hole No. 7A, cored only the Westwater Canyon Member of the Morrison Formation; Hole No. 8, abandoned in lower part of Westwater Canyon Member of the Morrison Formation; and Holes Nos. 9 and 10, abandoned in Upper Cretaceous rocks.

Chip samples were collected at 10-ft or 20-ft intervals throughout each hole and sludge samples collected at 20-ft intervals throughout the cored interval.

The following suite of geophysical logs were included in the general drilling project: natural gamma, self potential, neutron-neutron porosity, resistance, resistivity, temperature, deviation, gamma-gamma density, caliper, magnetic susceptibility, gamma ray spectrometer (KUT), sonic, induced polarization, conductivity and high resolution 4-arm digital dipmeter.

DRILL HOLE NO. S-5

The location of this well is shown on figure 2.

The vital statistics on this well are:

Spud date: Dec. 14, 1980

Location: T. 17 N., R 12 W., NE1/4 sec. 6.

Lat. 35<sup>0</sup>44'15" Long. 108<sup>0</sup>08'48"

Collar Elevation	6795	Point Lookout Sandstone (Cretaceous)
Core Point Top:	2250 feet (depth)	Dakota Sandstone (Cretaceous)
Bottom Cored Interval:	2850 feet (depth)	Recapture Member Morrison Formation (Jurassic)
Total Depth:	2850 feet (depth)	Recapture Member Morrison Formation (Jurassic)

Completion of well: Abandoned, Jan. 18, 1981.

The following suite of geophysical logs were run on this hole and accompany this report: natural gamma, self potential, resistance (not plotted), neutron-neutron porosity, deviation, caliper, gamma-gamma density, resistivity, KUT, and magnetic susceptibility (2) (pls. 1-5).

The self potential, resistance (not plotted) and resistivity logs are of poor quality due to high-salt-based mud used to maximize hole stability and core recovery. Salt concentration at the time of logging was greater than 40,000 ppm and possibly as high as 80,000 ppm.

Coal and carbonaceous shale intervals were encountered at 430 ft., 1120 ft., and 2260 ft.

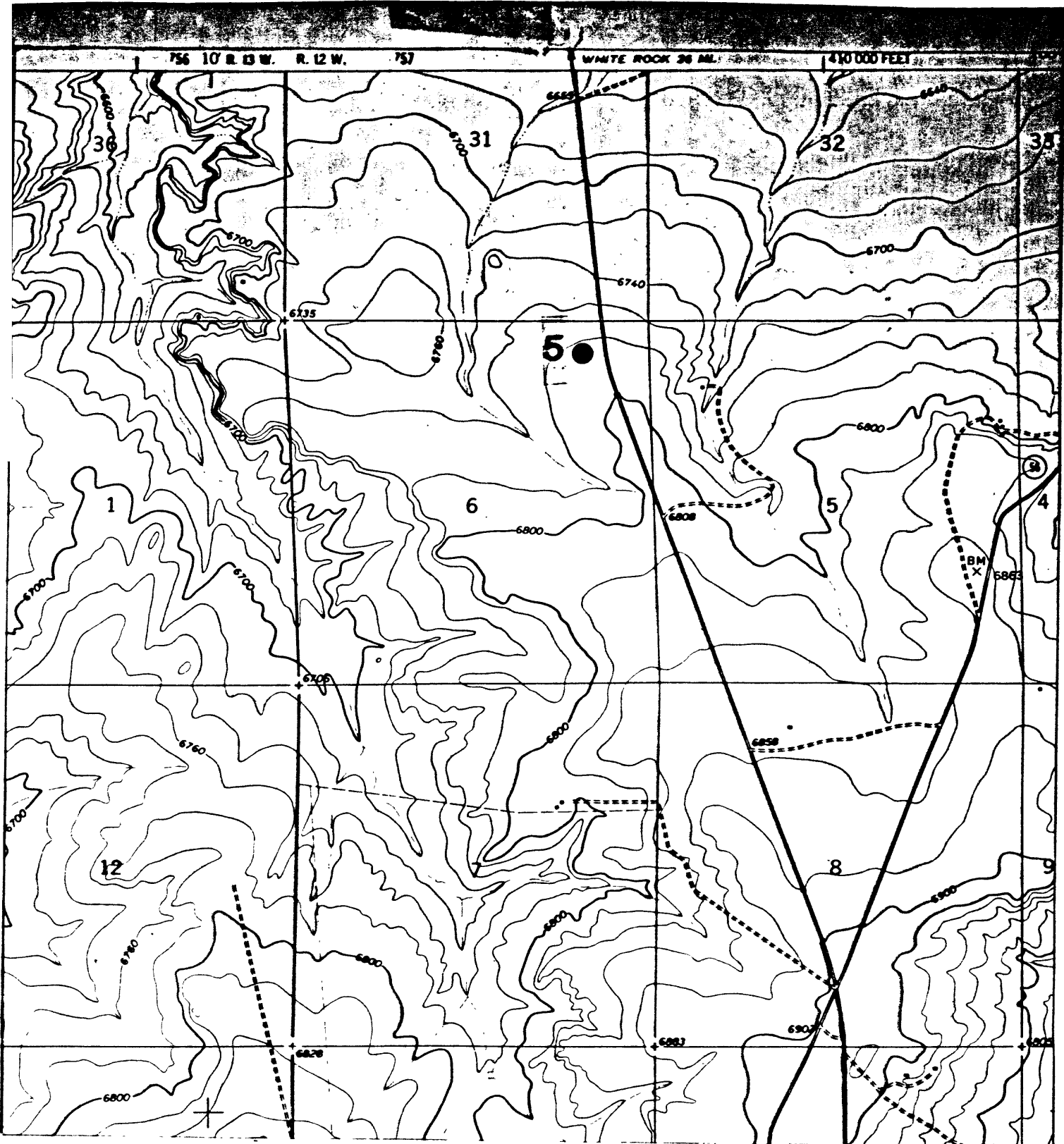


Figure 2.--Location of USGS Drill Hole No. 5, Crownpoint 7 1/2' Quadrangle, T17N, R12W.

## References

- U.S. Geological Survey, 1981a, Geophysical Log Suite from Drill Hole Nos. 1 and 2, Mariano Lake - Lake Valley Drilling Project, McKinley County, New Mexico: U.S. Geological Survey Open-File Report 81-172.
- U.S. Geological Survey, 1981b, Geophysical Log Suite from Drill Hole No. 3, Mariano Lake - Lake Valley Drilling Project, McKinley County, New Mexico: U.S. Geological Survey Open-File Report 81-439.
- U.S. Geological Survey, 1981c, Geophysical Log Suite from Drill Hole No. 4, Mariano Lake - Lake Valley Drilling Project, McKinley County, New Mexico: U.S. Geological Survey Open-File Report 81-969.