

UNITED STATES DEPARTMENT OF THE INTERIOR  
GEOLOGICAL SURVEY

Geophysical Log Suite from Drill Hole No. 3  
Mariano Lake-Lake Valley Drilling Project, McKinley County,  
New Mexico

by

U.S. Geological Survey

Open-File Report 81-439

1981

This report is preliminary  
and has not been edited for conformity  
with USGS editorial standards.

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INTRODUCTION

In the fall of 1980, the U.S. Geological Survey contracted with Longman Drilling Company of Albuquerque, N. Mex. to rotary drill and core nine holes along a north-south line from Mariano Lake to the vicinity of Lake Valley, N. Mex. This report incorporates the logs from drill hole no. 3. Similar reports on holes no. 1 and 2 were released as U.S. Geological Survey Open-File Report 81-172.

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 is to provide core samples and geophysical logs for petrologic, sedimentologic, geophysical, and geochemical studies of the Upper Jurassic Morrison Formation. Other objectives include 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 nine drill holes are shown on figure 1, which is a portion of the Gallup 1° x 2° Quadrangle. The drilling plan calls for seven of the nine 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 will be about 600 ft. Drill holes no. 2 and 9 are not to be cored but was rotary drilled into the Middle Jurassic Entrada Sandstone. Drill hole no. 6 will also be deepened by rotary drilling into the Entrada Sandstone.

Chip samples are to be 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 will be included in the drilling project: natural gamma, self potential, neutron-neutron porosity, resistivity, temperature, deviation, gamma-gamma density, caliper, magnetic susceptibility, gamma ray spectrometer (KUT), conductivity, prompt fission neutron, induced polarization, and sonic. In addition, at least one hole will be logged with a high resolution 4-arm digital dipmeter.

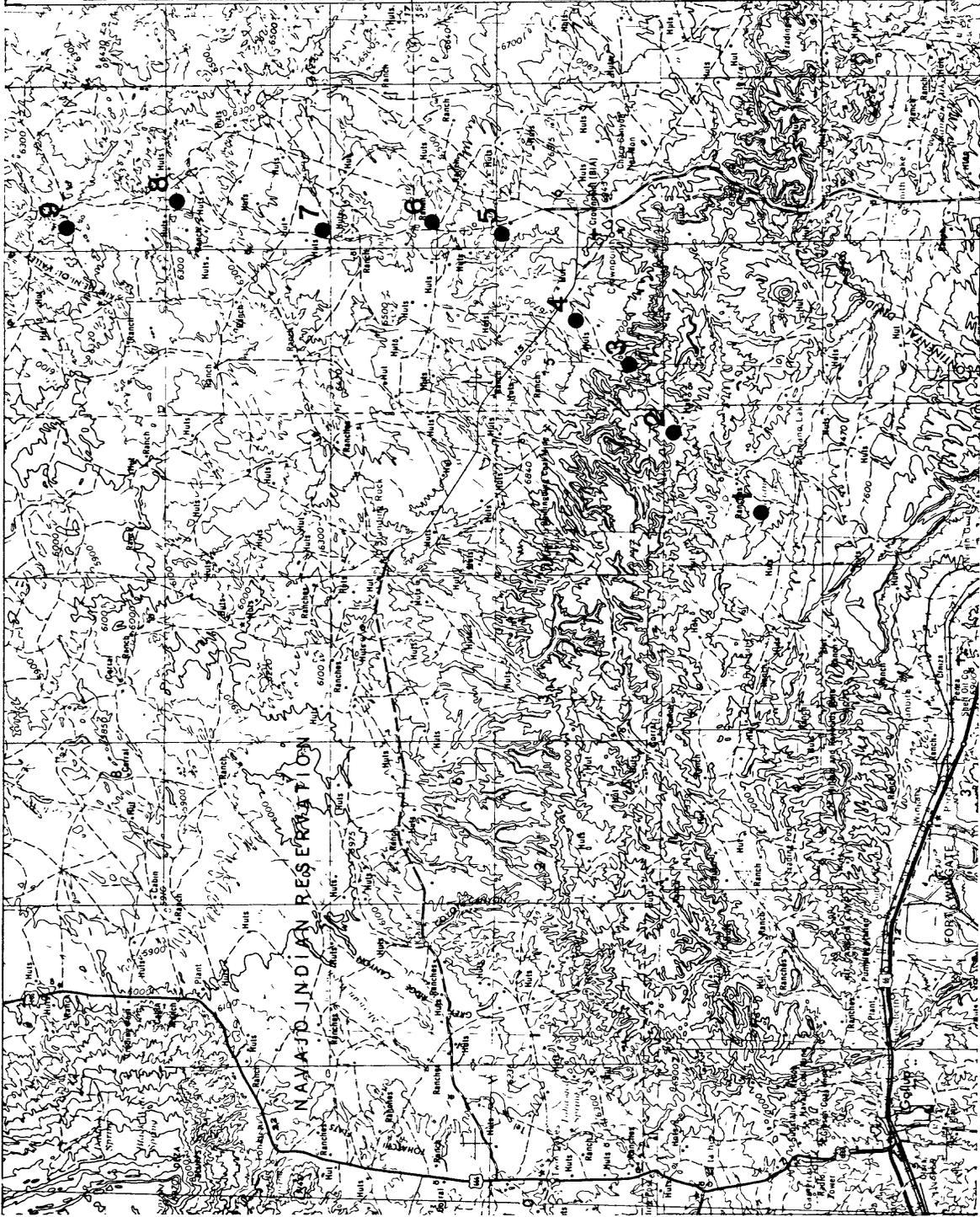


Figure 1. - Location of USGS Drill Holes, Gallup 1° x 2° Quadrangle.

DRILL HOLE NO. S-3.

The location of this well is shown on figure 2.

The vital statistics on this well are:

Location: T. 17 N., R. 13 W., SE1/4 sec. 29.

Collar Elevation:	6965 feet	Gibson coal Mbr. Crevasse Canyon Fm. (Cretaceous)
Core Point Top:	1560 feet (depth)	Dakota Sandstone (Cretaceous)
Bottom Cored Interval	2158 feet (depth)	Recapture Mbr. Morrison Fm (Jurassic)
Total Depth:	2158 feet (depth)	Recapture Mbr. Morrison Fm (Jurassic)

Completion of well: Drilled and Abandoned

The following suite of geophysical logs were run on this hole and accompany this report: natural gamma, self potential, resistance, neutron-neutron porosity, deviation, caliper gamma-gamma density, resistivity, KUT (2), prompt fission neutron (2), and magnetic susceptibility (Plates 1-11).

The self potential, resistance and resistivity logs are of poor quality due to a 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.

Uranium mineralization was encountered at approximately 1765, 1805, and 1855 feet, with a 7-foot ore-zone (>.05 percent) intercept at 1858 feet. A 25-foot zone of coal and carbonaceous shale was penetrated at 450 feet and a 3-foot bed of coal was cut at 1572 feet.

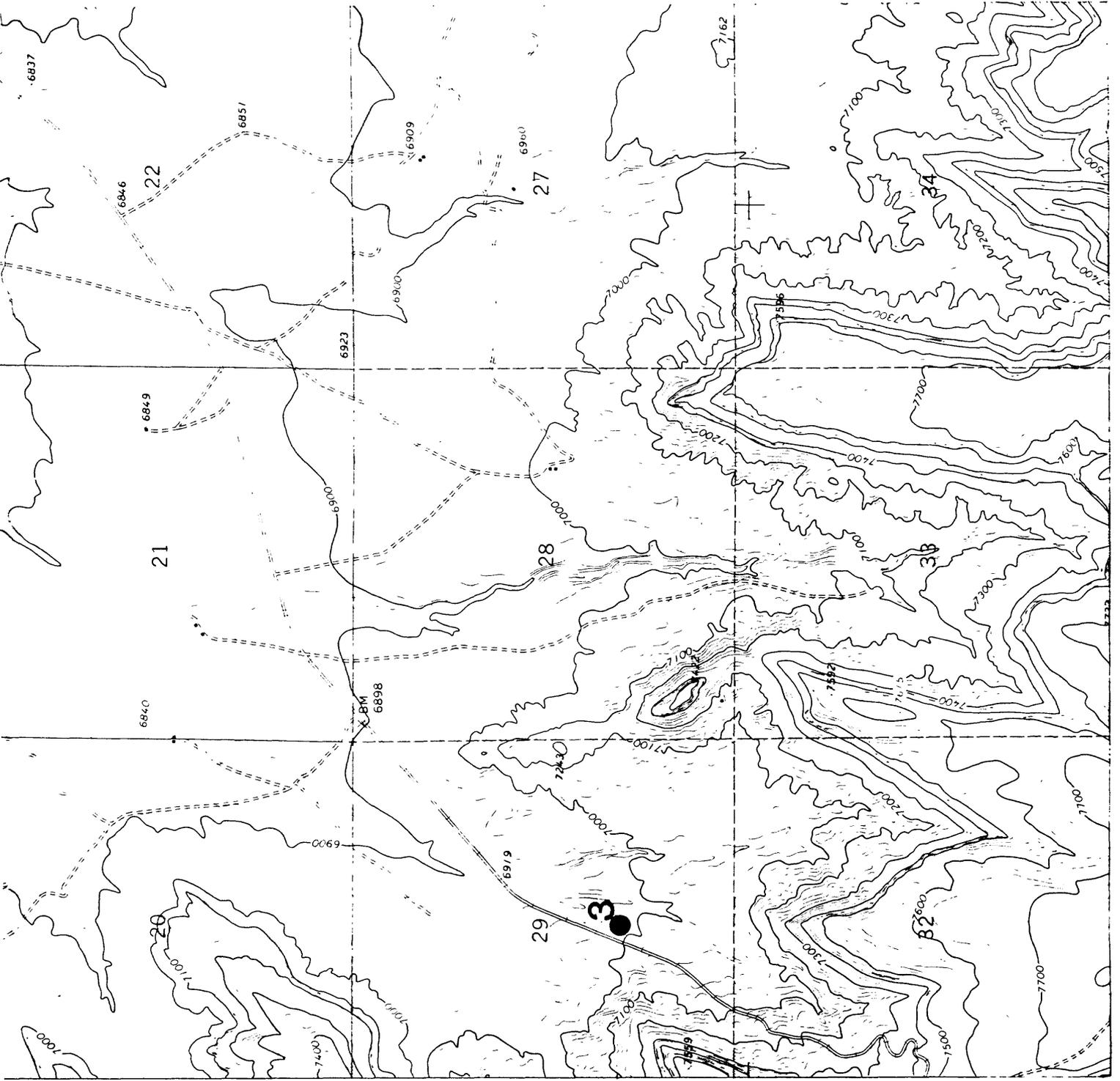
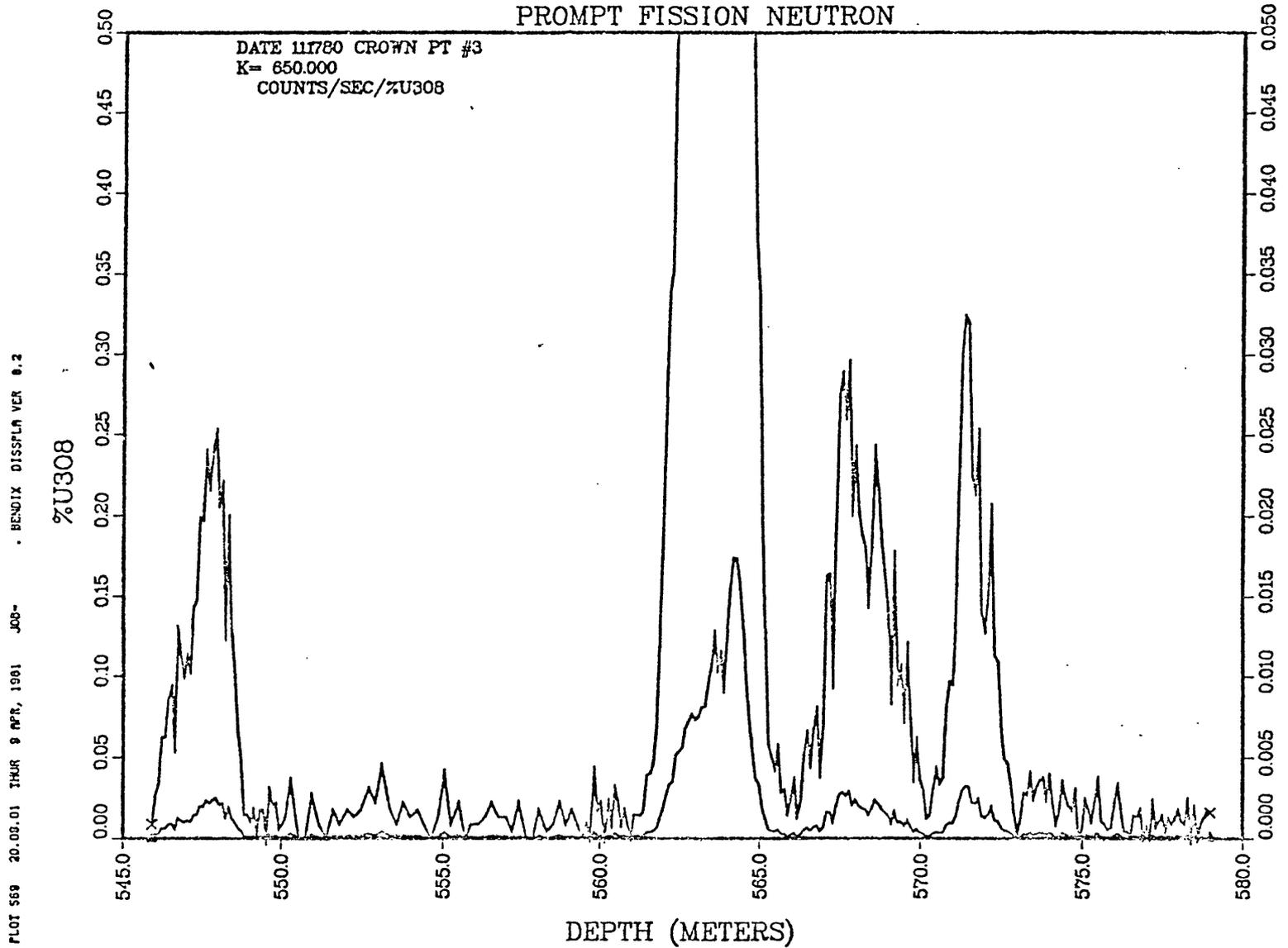


Figure 2. - Location of USGS Drill Hole 3, Crownpoint 7 1/2' Quadrangle, T 17 N, R 13 W.

PROMPT FISSION NEUTRON

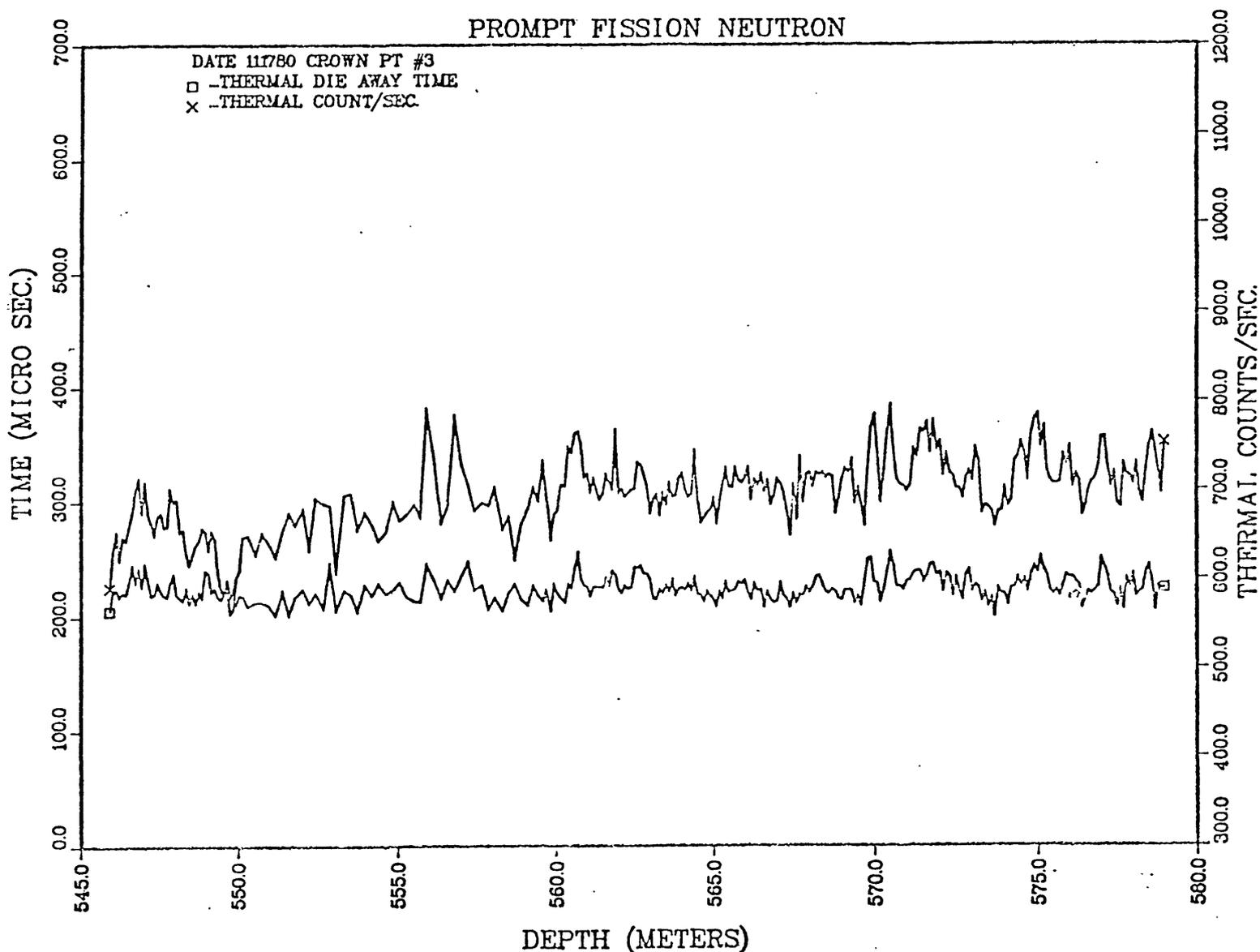
Log of the Direct Measured Uranium Grade Taken  
November 17, 1980 at Crown Point, New Mexico



BENDIX FIELD ENGINEERING CORP.  
Geophysist: D. George  
Operators: A. Crail, J. Burnham

PROMPT FISSION NEUTRON

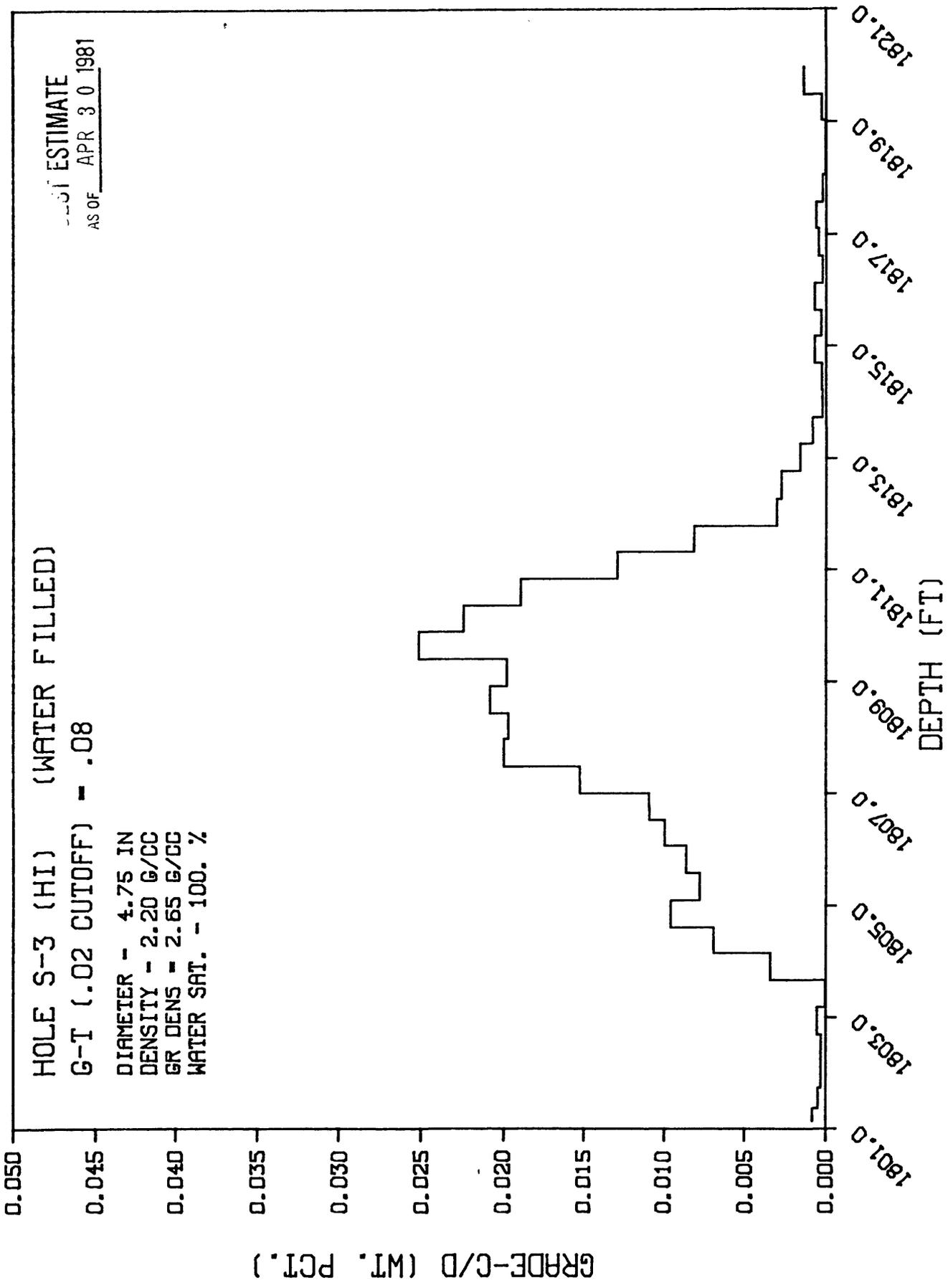
Log for the Thermal Count Rate and the Die-Away Time  
Taken November 17, 1990 at Crown Point, New Mexico.



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# USGS, CROWNPOINT, NM

SANDIA LABORATORIES  
URANIUM LOGGING PROJECT  
ALBUQUERQUE, N. M. 87115



HOLE S-3 (HI) (WATER FILLED)

G-T (.02 CUTOFF) - .08

DIAMETER - 4.75 IN  
DENSITY - 2.20 G/CC  
GR DENS - 2.65 G/CC  
WATER SAT. - 100. %

ESTIMATE  
AS OF APR 30 1981

GRADE-C/D (WT. PCT.)

DEPTH (FT.)

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