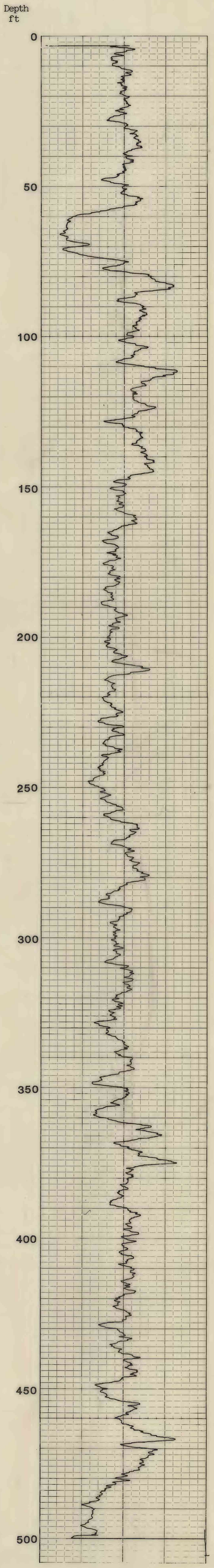
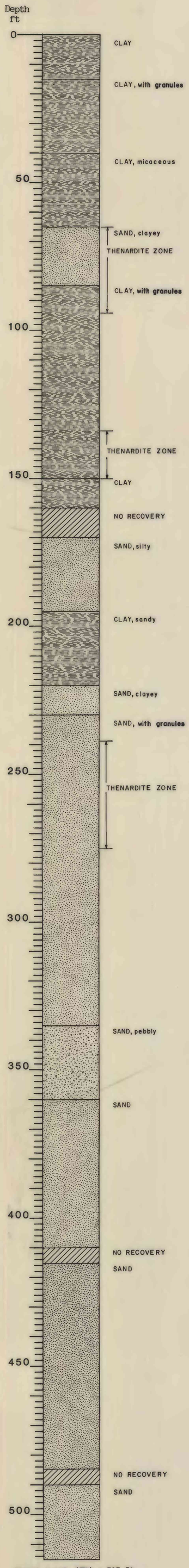
GAMMA-RAY LOG
(c/s)

58 c/s 80 c/s 120 c/s



COLUMNAR SECTION



Total depth (TD) = 515 ft

LITHOLOGIC LOG

Depth (Feet)	Description
0 - 15	Clay, moderate-brown (5YR 4/4, damp), high plasticity, calcareous
15 - 20	Clay, moderate-brown (5YR 4/4, damp), similar to 0-15 ft except addition of 1-3 percent granules
20 - 30	Clay, with granules, moderate-yellowish-brown (10YR 5/4, damp), calcareous; 3-5 percent angular granules
30 - 40	Clay, with granules, moderate-yellowish-brown (10YR 5/4, damp), high plasticity, calcareous; less than 1 percent granules
40 - 50	Clay, micaceous, moderate-yellowish-brown (10YR 5/4, damp), high plasticity, calcareous; abundant biotite flakes in clay; less than 1 percent very coarse sand
50 - 55	Clay, micaceous, moderate-yellowish-brown (10YR 5/4, damp), similar to 40-50 ft except clay has low plasticity
55 - 60	Clay, micaceous, dark-yellowish-brown (10YR 4/2, damp)
60 - 65	Clay, micaceous, mottled moderate-olive-brown (5Y 4/4, damp) and moderate-yellowish-brown (10YR 5/4, damp)
65 - 85	Sand, clayey, 50 percent coarse sand; 20 percent moderate-olive-brown (5Y 4/4, damp), calcareous clay matrix; 30 percent transparent granules determined by x-ray diffraction to be thenardite (Na_2SO_4)
85 - 95	Clay, with granules, olive-gray (5Y 4/1, damp), calcareous; 20 percent thenardite granules
95 - 135	Clay, with granules, mottled olive-gray (5Y 4/1, damp) and moderate-olive-brown (5Y 4/4, damp), high plasticity, calcareous; 1-2 percent coarse sand
135 - 150	Clay, with granules, moderate-olive-brown (5Y 4/4, damp), calcareous; thenardite granules
150 - 160	Clay, mottled olive-gray (5Y 4/1, damp) and moderate-olive-brown (5Y 4/4, damp), calcareous
160 - 170	No recovery
170 - 195	Sand, silty, very fine to very coarse sand consisting of quartz, shale, hornblende, feldspar, and metamorphic detritus; 15 percent moderate-olive-brown (5Y 4/4, damp) micaceous silt matrix.
195 - 200	Clay, sandy, mottled dark-gray (N-3, damp) and moderate-olive-brown (5Y 4/4, damp), calcareous clay, 50 percent; 40 percent very coarse sand; 10 percent granules
200 - 220	Clay, sandy, mottled dark-gray (N-3, damp) and moderate-olive-brown (5Y 4/4, damp), calcareous, 65 percent; 35 percent very coarse sand
220 - 230	Sand, clayey, 50 percent medium sand, 20 percent coarse to very coarse sand; 30 percent mottled dark-gray (N-3, damp) and moderate-olive-brown (5Y 4/4, damp) calcareous clay matrix
230 - 235	Sand, with granules, very coarse sand, 85 percent; 10 percent granules; 5 percent silt; occasional pebbles as large as 10 mm
235 - 240	Sand, with granules, similar to 230-235 ft interval except very coarse sand increasing to 75 percent; granules increasing to 20 percent; 5 percent pebbles as large as 10 mm
240 - 275	Sand, with granules, similar to 235-240 ft interval except sand decreasing to 70 percent and addition of 5 percent silt. Thenardite granules present.
275 - 310	Sand, with granules, similar to 240-275 ft interval except moderate-olive-brown (5Y 4/4, damp) calcareous clay increasing to 20 percent
310 - 320	Sand, with granules, similar to 275-310 ft, interval except clay decreasing to 5 percent
320 - 325	Sand, with granules, very coarse sand, 93 percent; 5 percent moderate-olive-brown (5Y 4/4, damp) calcareous clay matrix; 1-3 percent granules
325 - 330	Sand, with granules, similar to 320-325 ft except color change in clay to olive-gray (5Y 4/1, damp)
330 - 335	Sand, with granules, similar to 325-330 ft except addition of 10 percent angular pebbles as large as 10 mm
335 - 345	Sand, pebbly, very coarse sand, 98 percent; 1 percent pebbles as large as 10 mm; 1 percent silt matrix
345 - 355	Sand, pebbly, similar to 335-345 ft except decrease in very coarse sand to 85 percent and addition of 10-15 percent fine sand
355 - 360	Sand, pebbly, same as 335-345 ft
360 - 375	Sand, very coarse, 94 percent; 5 percent calcareous clay matrix; 1 percent granules
375 - 410	Sand, very coarse, 95 percent; 5 percent grayish-olive (10Y 4/2, damp), calcareous clay
410 - 415	No recovery: Interpretation same as 375-410 ft interval
415 - 420	Sand, very coarse, same as 375-410 ft interval
420 - 440	Sand, very coarse; mottled moderate-olive-brown (5Y 4/4, damp) to grayish-olive (10Y 4/2, damp) calcareous clay
440 - 455	Sand, very coarse; 5 percent grayish-olive (10Y 4/2, damp), calcareous clay
455 - 475	Sand, very coarse, similar to 440-455 ft interval except clay matrix replaced by silt
475 - 485	Sand, very coarse, same as 440-455 ft interval
485 - 490	No recovery: Interpretation, sand
490 - 500	Sand, very coarse, same as 455-475 ft interval
500 - 515	Sand, very coarse; 1-2 percent grayish-olive (10Y 4/2, damp) calcareous clay

INTRODUCTION

DISCUSSION

The Federal Land Policy and Management Act of 1976 (Public Law 94-579) directed the Secretary of the Interior to prepare and implement by September 1980 a comprehensive long-range plan for the management, use, development, and protection of public lands within the California Desert Conservation Area (CDCA). The responsibility to prepare this plan was assigned to the Bureau of Land Management's (BLM) California Desert Planning Staff. The BLM was directed to evaluate mineral as well as botanical, wildlife, cultural, and recreation resource data for effective multiple-use land planning. In turn, the BLM requested assistance from the U.S. Geological Survey (USGS) in defining the mineral resources.

In 1978 the USGS drilled 56 shallow test wells to depths of 50-600 ft to provide BLM with the requested mineral resource data. The lithologic, geophysical, and water quality data obtained from test wells drilled on Clark Lake, Calif., are presented in this report.

LOCATION AND DRILLING METHODS

Test well CL-1 was drilled in NE¼NE¼ sec. 6, T. 10 S., R. 7 E., SBM, California (lat. 33°20'17" N., long. 115°16'50" W.) on Clark Lake (see index map). This test well was completed on March 20, 1978 to a total depth of 515 ft by a conventional rotary drill. Synthetic additives were mixed with the drilling mud to seal the test well from ground water infiltration and artesian flow.

A continuous lithologic log was completed during drilling. Sediment samples were collected at 5-ft intervals and were described in the field. Field lithologic descriptions were supplemented by microscopic study when the samples were returned to the laboratory. Sediment names used in this report are those defined by Folk (1968). The rock-color chart (Goddard and others, 1948) was used to color classify damp to wet samples. Lithologic percentages are approximate.

GEOPHYSICAL LOG

A gamma-ray log was completed from the land surface to a drilled depth of 500 ft. The log was run through the drill string because the playa sediments would have squeezed in or collapsed and sealed the test well before conventional open-hole logs could be completed. Since the geophysical log was run through the drill string, a correction of the natural radioactivity, measured in counts per second must be made before an interpretation of the gamma-ray log is possible. The necessary data for the correction described on Schlumberger Chart GR-2 are listed below. Even after correction only a qualitative interpretation of natural radioactivity is possible because the sonde was not calibrated.

Test well diameter: 5.125 in.	Total thickness of dual-wall drill pipe: 0.28 in.
Drill string inner diameter: 1.815 in.	Sonde outer diameter: 1.125 in.
Drill string outer diameter: 2.875 in.	Logging speed: 17 ft/min

ACKNOWLEDGMENTS

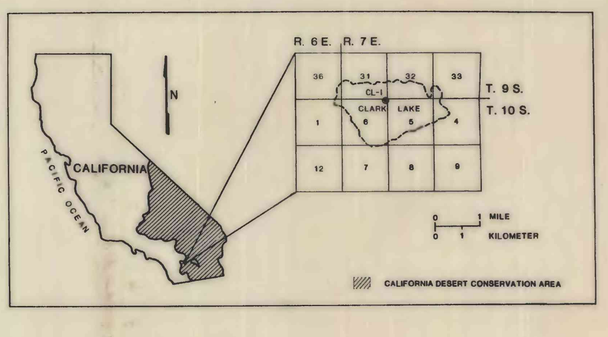
J. D. Cathcart, U.S. Geological Survey, Denver, Colo., ran geophysical logs of the subsurface. G. T. Server supplemented field lithologic descriptions by laboratory study of sediment cuttings under binocular microscope.

REFERENCES

Folk, R. L., 1968, Petrology of sedimentary rocks: Austin, University of Texas, 170 p.

Goddard, E. N., chm., and others, 1948, Rock-color chart: National Research Council; reprinted by Geological Society of America, 1951, 1963, 1970, 6 p.

Schlumberger Well Services, 1975, Cased hole applications, 1975 Edition: Houston, Texas, 124 p.



CONVERSION FACTORS

Multiply English unit	By	To obtain metric units
Inches (in.)	2.540	Centimeters (cm)
Feet (ft)	0.305	Meters (m)

This report has not been edited for conformity with U.S. Geological Survey editorial standards.

GEOPHYSICAL AND LITHOLOGIC DATA FROM A TEST WELL ON CLARK LAKE, SAN DIEGO COUNTY, CALIFORNIA

By

Tully R. Simoni, Jr.

1980