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# Seismic-reflection records from a survey at the Rocky Mountain Arsenal near Denver, Colorado

By Robert E. Mattick, 1934 and Donald B. Hoover, 1930 -
R. E. Mattick and D. B. Hoover



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1. Palynological investigations in the Upper Cretaceous and Tertiary of the Mississippi Embayment Region--VI, by Robert H. Tschudy. 29 p. USGS, 710 West High St., Lexington, Ky. 40508; Kentucky Geological Survey, 307 Mineral Industries Bldg., University of Kentucky, 120 Graham Ave., Lexington, Ky. 40506.

2. Preliminary structure map of the Blackford quadrangle, western Kentucky, by Dewey H. Amos. 1 sheet, scale 1:24,000. USGS, 710 West High St., Lexington, Ky. 40508; Kentucky Geological Survey, 307 Mineral Industries Bldg., University of Kentucky, 120 Graham Ave., Lexington, Ky. 40506. /Material from which copy can be made at private expense is available in the two Lexington offices listed. This map supersedes the version open-filed in June 1968 by the same author, entitled "Preliminary map showing faults in the Blackford quadrangle, western Kentucky."/

3. Availability of palynological material from Naval Petroleum Reserve No. 4, XIX: Umiat Test Wells Nos. 3 and 11, Simpson Core Tests 21, 27, 30, 30A, by Richard A. Scott. 2 p.

4. Remote detection of geochemical soil anomalies, by F. C. Canney. 6 p., plus 1 sheet tabular data, 3 figs

5. Geology of the Bushrod Island-New Georgia clay deposit near Monrovia, Liberia, by Lawrence V. Blade. 35 p., including 7 figs., 4 tables.

(6) Seismic-reflection records from a survey at the Rocky Mountain Arsenal near Denver, Colorado, by R. E. Mattick and D. B. Hoover. 7½ p., 1 pl. /Material from which copy can be made at private expense is available in the USGS Library, Bldg. 25, Federal Center, Denver, Colo. 80225./

7. Digital computer terrain mapping from multispectral data, and evaluation of proposed Earth Resources Technology Satellite (ERTS) data channels, Yellowstone National Park: preliminary report, by Harry W. Smedes, Kenneth L. Pierce, and Roger M. Hoffer. 43 p., 19 figs., 1 colored photo. 1012 Federal Bldg., Denver, Colo. 80202; 8102 Federal Office Bldg., Salt Lake City, Utah 84111; Geological Survey of Wyoming, University of Wyoming, Laramie, Wyo. 82070 /P.O.Box 3008, Univ. Sta./.

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* On file at U.S. Geological Survey Library, Bldg. 25, Federal Center, Denver, Colorado.

Figure

# Seismic-reflection records from a survey at the Rocky Mountain Arsenal near Denver, Colorado

By

R. E. Mattick and D. B. Hoover

## Introduction

During July 1966, after competitive bidding, a contract was awarded by the U.S. Geological Survey to GeoData Corporation and Geo Prospectors, Inc., both of Tulsa, Oklahoma, for 18 miles of continuous seismic-reflection profiling in the vicinity of a deep injection disposal well (IDW) at the Rocky Mountain Arsenal near Denver, Colorado. The purpose of this survey was to determine if structure exists in the 12,000-ft sedimentary section or in the Precambrian basement that might be related to the series of earthquakes that occurred in the area starting in the spring of 1962. A paper on the seismic-reflection profiling by Ben R. Rummerfield, A. Peter Olson, and D. B. Hoover (1968) reported the major conclusions of the survey.

Field operations began on September 20, 1966, and were concluded on October 15. Standard seismic-reflection methods were used to obtain continuous subsurface coverage along five profile lines consisting of 54 shotpoint locations (fig. 1). A split-spread configuration of 1760-0-1760 ft was used. Each spread consisted of 24 geophone groups with 5 Electro-Tech series (14 Hz) geophones spaced about 20 ft apart. Each group of 5 geophones was connected in series. Cross spreads were shot at one-mile intervals using the same spread configuration and reshooting at some of the previously used shotpoint locations. A total of 68 spreads was shot at the 54 shotpoint locations. Recording was on photographic paper and FM magnetic tape. SIE GA-33 amplifiers and MR-4 magnetic tape units were used with filter settings of 30-90 Hz. High-velocity (60 percent) dynamite was loaded in a mean charge of 50 lb in each shothole to an average depth of 150 ft.

The seismic data were computed to a datum plane of 5,000 ft above sea level using a normal uphole weathering computation method to correct for differences in weathering and surface elevations. An elevation velocity of 7,000 ft/sec was used. The records were then counted in corrected time below the datum reference plane.

Dynamic and static corrections were calculated for each trace, and these values were used to correct the individual traces in a variable density record section display that was prepared for each line (1-5) and a variable density record section display of the cross spreads at shotpoints 34, 49, 28, 4, 46, 25, 54, 7, 43, 22, 10, and 19.

The following materials relating to this survey are available for inspection and reproduction at the U.S. Geological Survey Library, Building 25, Federal Center, Denver, Colorado:

Appendix I lists the geophone distances, geophone elevations, and shotpoint elevation for each spread. The spreads are listed sequentially by shotpoint number and subsequentially by the direction of the spread from the particular shotpoint. The geophone elevation refers to the center geophone in each 5-group of geophones.

Appendixes II and III contain the paper records and magnetic tapes, respectively. The indexing of the paper records and magnetic tapes is the same as that used in Appendix I. The magnetic tapes can be reproduced commercially.

Appendix IV contains record displays of filtered playback records from a magnetic tape for lines 1-5 and an additional record display of the cross spread records.

Appendix V contains variable density record section displays for lines 1-5 and a variable density record section display of the cross spread records.

## References

Rummerfield, B. F., Olson, A. P., and Hoover, D. B., 1968, Seismic survey in the region of recent earthquake activity near Denver, Colorado: Geophysics, v. 33, no. 6, p. 915-925.

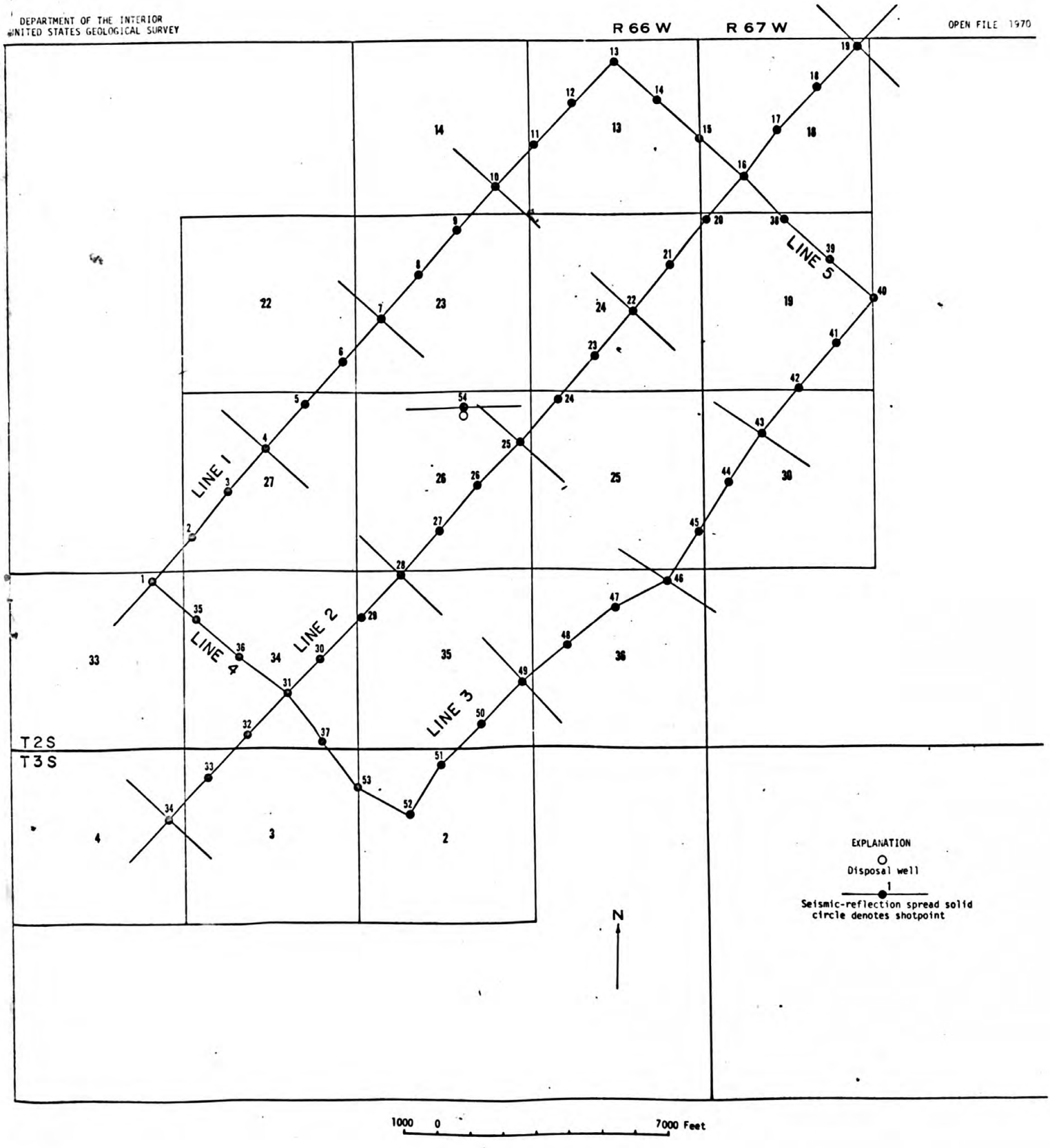


Figure 1.--Map showing location of shotpoints.