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K&A
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Geotechnical & Environmental Engineers

Branch Office – Colorado Springs, CO

September 24, 1996

Mr. Brandy Gilmore
Colorado Department of Transportation
Materials Branch, Geology Section
4340 East Louisiana Avenue
Denver, CO 80222

Subject: Subsurface Exploration, Suspect Cavities, Interstate 70, Hidden Valley, Clear Creek County, Colorado.

Project No. 96-300.1

Dear Mr. Gilmore:

This letter summarizes the results of subsurface exploration in areas of suspected cavities underlying Interstate 70. The project area is located roughly one-quarter mile east of the Hidden Valley exit, east of Idaho Springs, Clear Creek County, Colorado.

Site Conditions and History: The project area lies approximately three miles east of Idaho Springs within the extensively mined Colorado Mineral Belt. Clear Creek parallels the interstate on the south while bedrock cliffs dominate the north side of the interstate.

In May of 1996, a sinkhole developed in the eastbound passing lane of I-70. It was believed that abandoned alluvial mine adits underlying the roadway may be a possible cause of the sinkhole. A ground penetrating radar (GPR) survey performed by Geo-Recovery Systems, Inc. one week following the development of the sinkhole identified numerous potential void-like anomalies. Based on recommendations from Kevin Taylor of Geo-Recovery Systems, Inc., ten anomalies were highlighted and designated for drilling. One exploratory boring was drilled at each anomaly location in an attempt to obtain information on the depth to the top of and height of the cavities, if any. Locations of the borings are shown on Fig. 1.

General Subsurface Conditions: Exploratory borings were drilled using a 4-3/4" wireline diamond-tipped casing advancer with a rotary tri-cone bit. Water was used as the circulation medium. Rock fill and/or sand, gravel, cobble, and boulder alluvium was encountered in all of the borings. Logs of the borings indicating penetration resistance per foot are shown on Figs. 2-6. Small void spaces on the order of 3"-12" in height were frequently encountered and appear to be inherent to the fill and natural soil materials. No voids of a sufficient frequency, size, or depth judged to be potential cavities were observed.

Limitations: This study has been conducted in accordance with generally accepted geotechnical engineering practices in this area for use by the client for evaluating the existence of potentially damaging cavities underlying the project area of Interstate 70. The conclusions submitted in this report are based upon the data obtained from the exploratory borings drilled at the locations recommended by Geo-Recovery Systems, Inc shown on Fig. 1. Although only small void spaces were encountered in the borings, the nature and extent of subsurface variations throughout the project area may not be fully represented by the borings drilled during this study and could impact the conclusions presented herein.

Sincerely,

KUMAR & ASSOCIATES, INC.

By _____
Matt Gallagher

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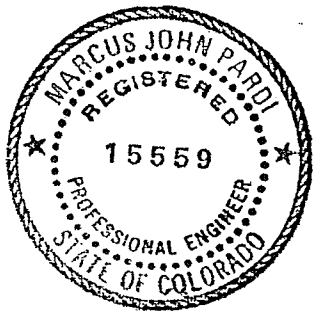
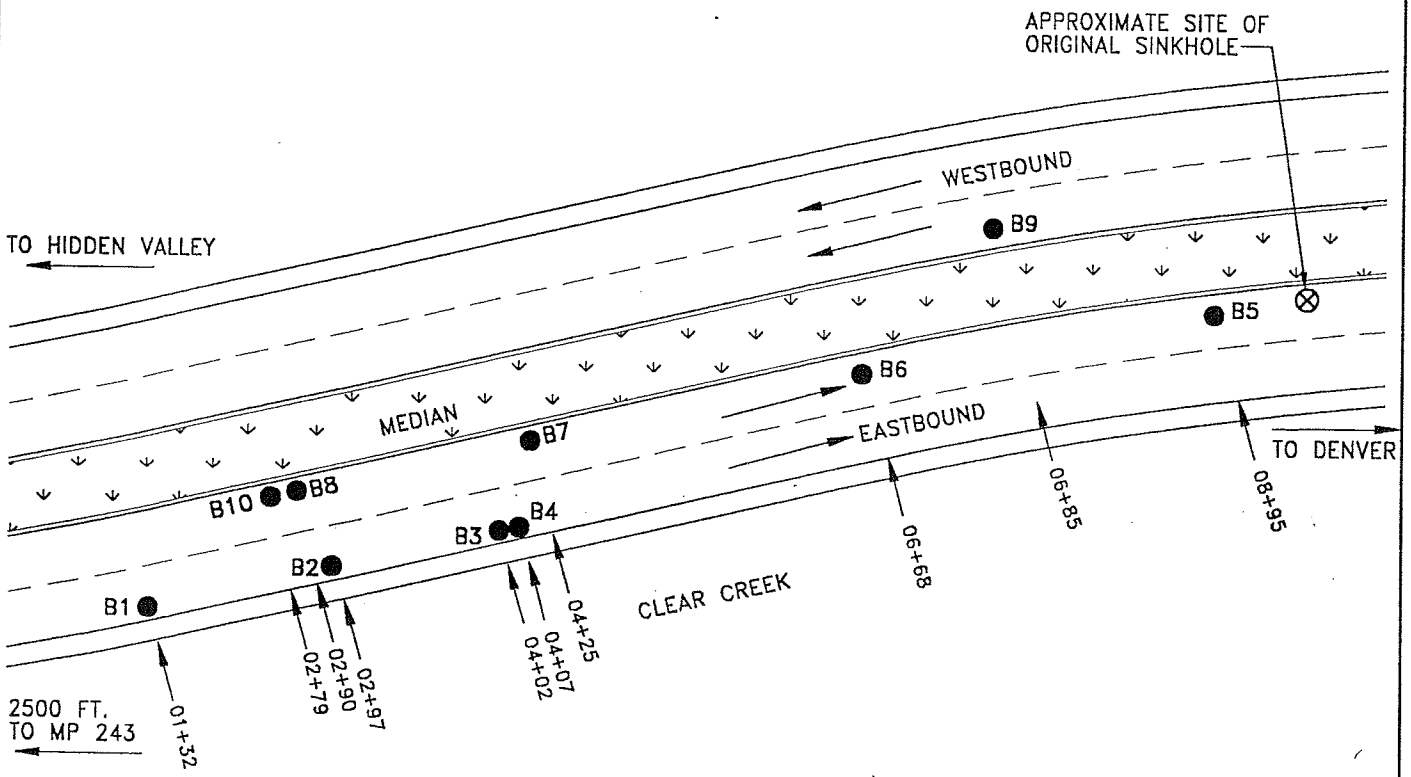
Reviewed By:
Marcus J. Pardi, P.E.





I-70 AT HIDDEN VALLEY
NOT TO SCALE

96-300.1	Kumar & Associates	LOCATIONS OF EXPLORATORY BORINGS	Fig. 1

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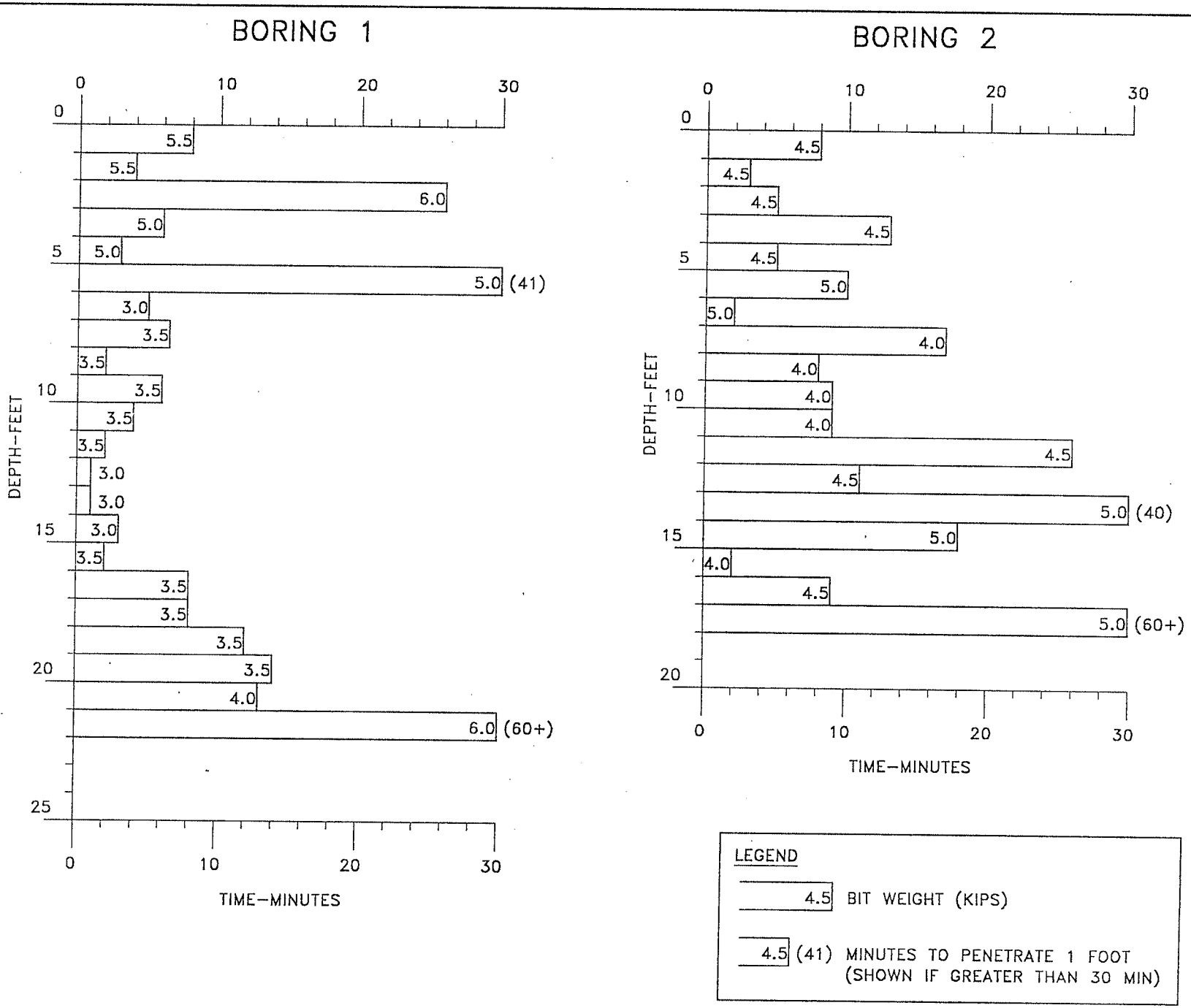
PENETRATION RATE OF EXPLORATORY BORINGS

Fig. 2



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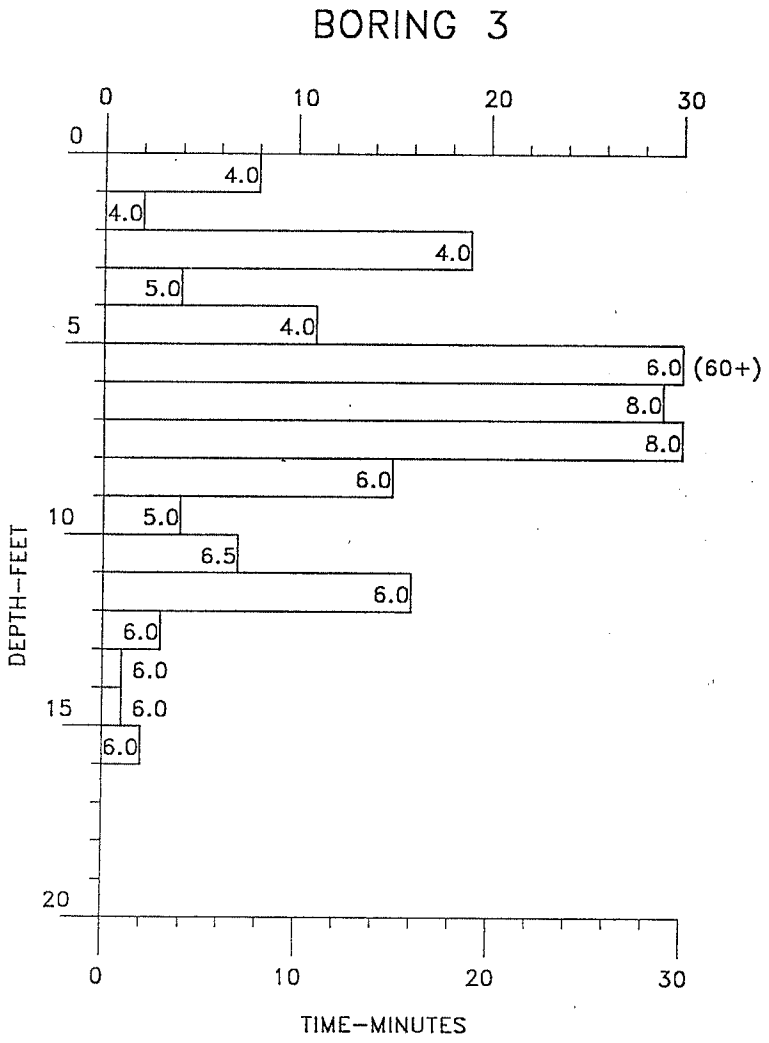
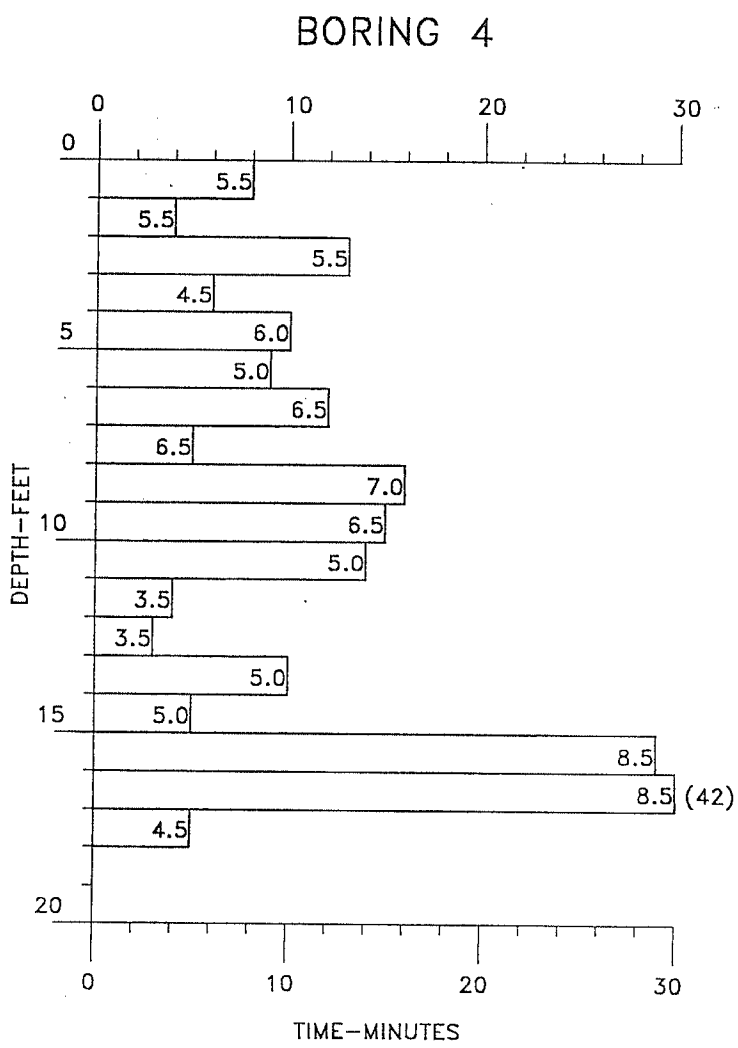
PENETRATION RATE OF EXPLORATORY BORINGS

Fig. 3





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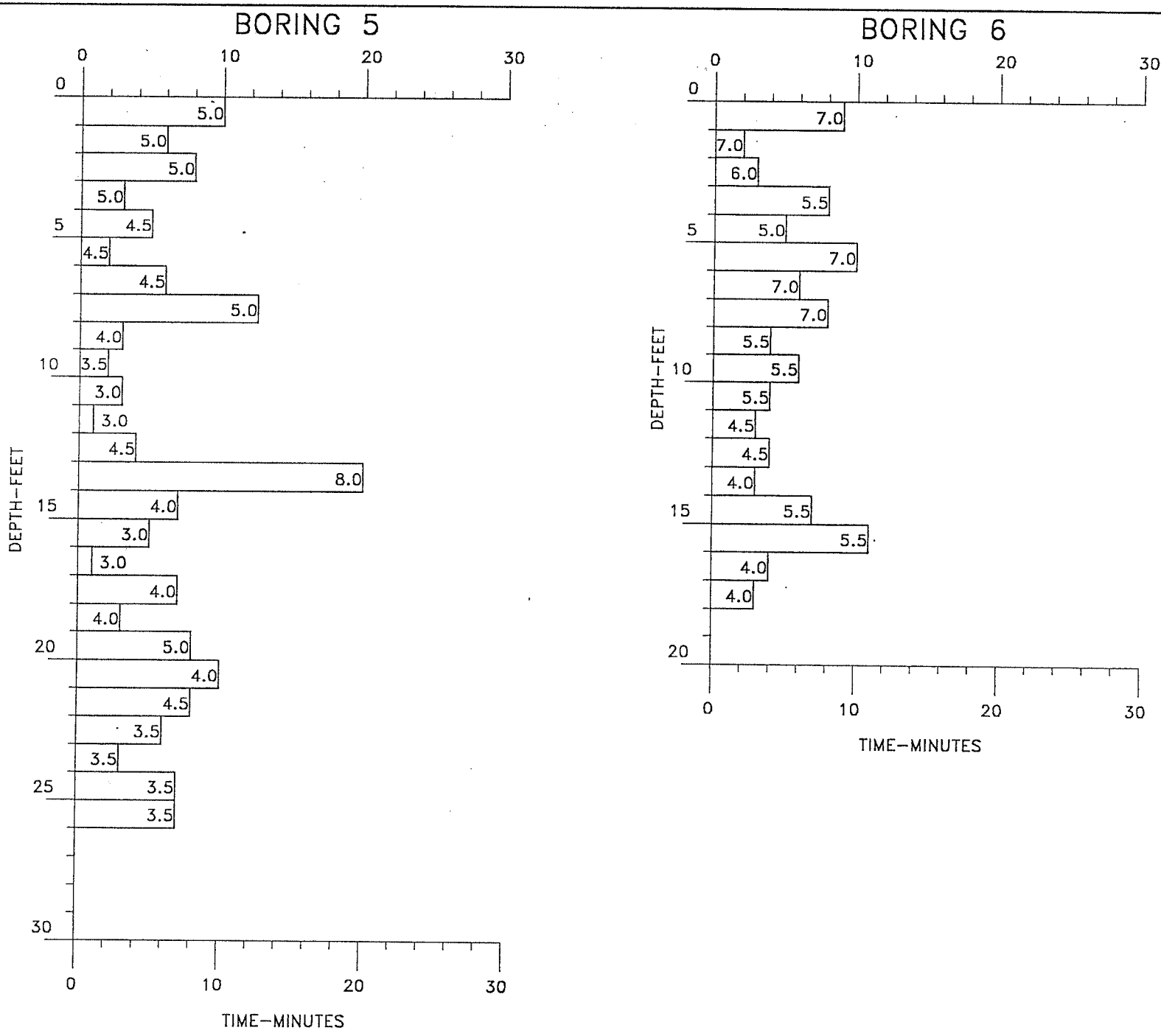
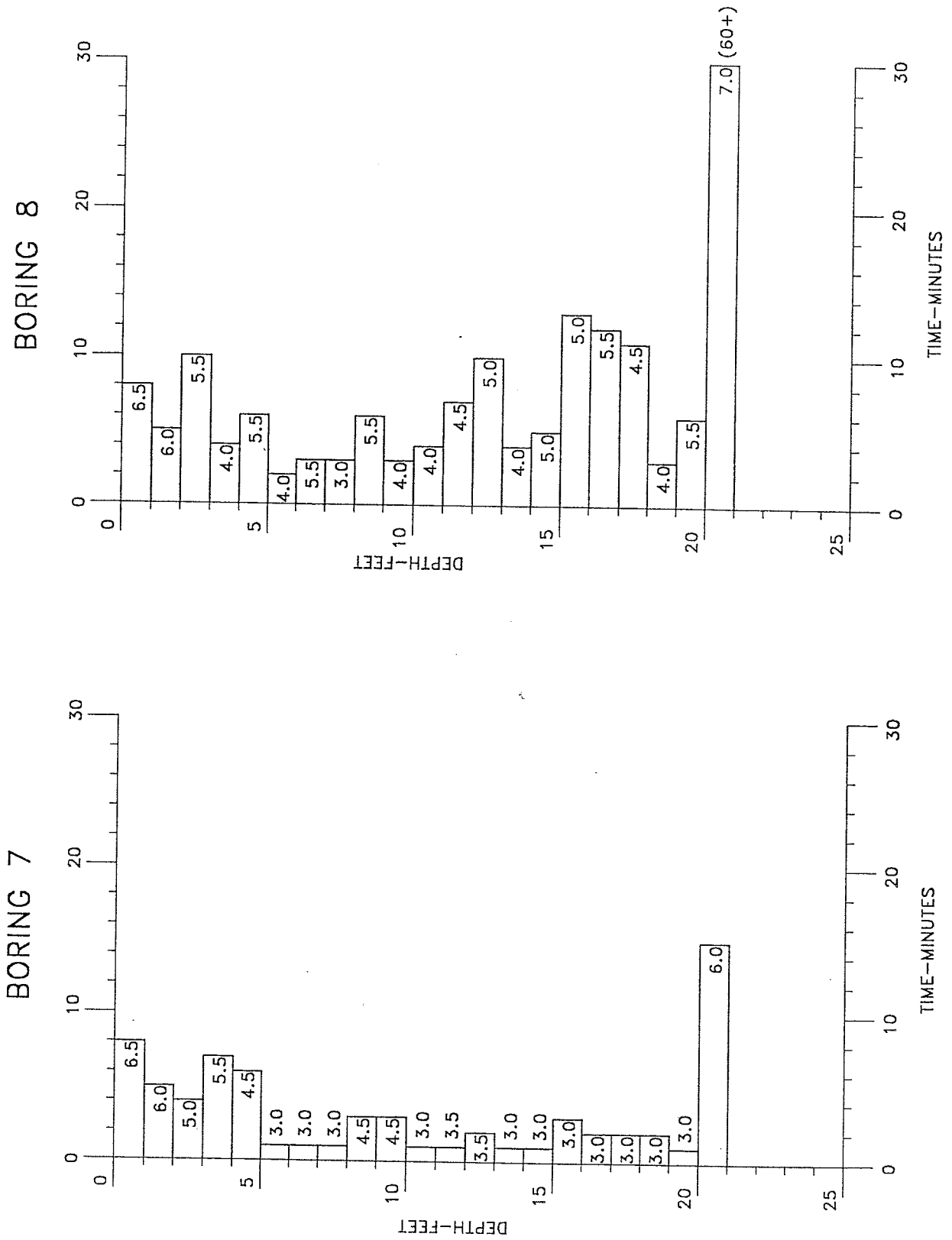
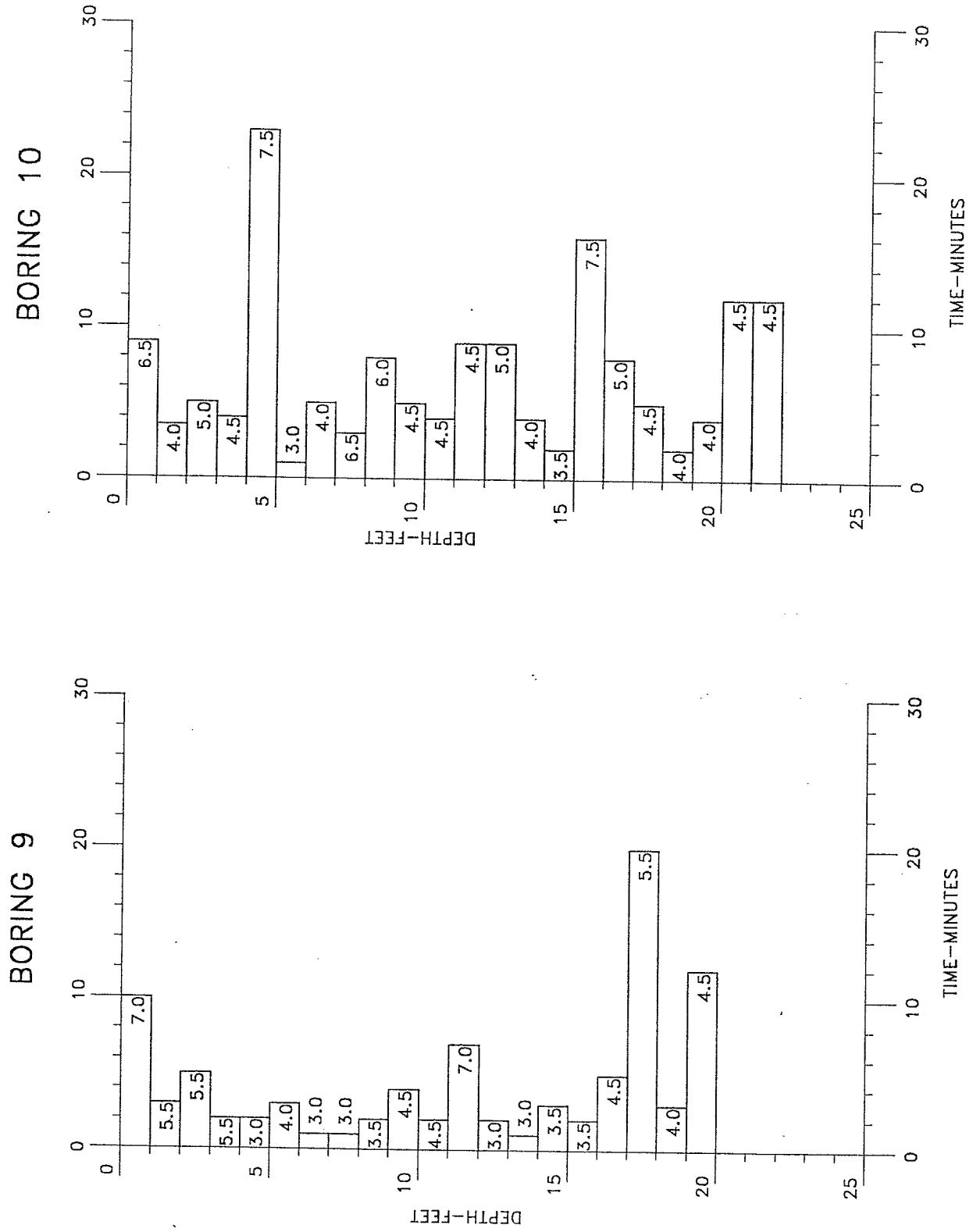
PENETRATION RATE OF EXPLORATORY BORINGS

Fig. 4





96-300.1	Kumar & Associates	PENETRATION RATE OF EXPLORATORY BORINGS	Fig. 5



96-300.1	Kumar & Associates	PENETRATION RATE OF EXPLORATORY BORINGS	Fig. 6