Ground-Water Resources of the Hueco Bolson Northeast of El Paso Texas

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[Plates are in pocket]

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By Doyle B. Knowles and Richard A. Kennedy

ABSTRACT

The Hueco Bolson is in the extreme western part of Texas and south-central New Mexico, covering parts of El Paso County, Tex., and Dona Ana and Otero Counties, N. Mex. Wells tapping the bolson deposits furnish the major part of the water supply for the city of El Paso, Ciudad Juárez, Fort Bliss, Biggs Air Force Base, and private industries in the area. The progressively increasing demand for water made it obvious that a comprehensive investigation of the quantity and quality of water in storage in the entire Hueco Bolson would be essential for the proper planning of future water supplies. A test-drilling program was started in 1953, jointly sponsored by the city of El Paso, the United States Army, the United States Air Force, and the Texas Board of Water Engineers. The drilling was supervised by the United States Geological Survey.

Thirty-three deep test wells were drilled, comprising a total footage of 32,456 feet. Water samples for chemical analysis were obtained by means of drill-stem tests at most of the wells, an electric log was made after each test well was completed, water-level measurements were made in each well, and pumping tests were made at several selected wells. In addition to the test-drilling program, all available information was collected for existing wells in the area, and chemical analyses were made of water samples collected from many of the wells.

The Hueco Bolson is an intermontane lowland sparsely covered with low vegetation. The bolson is traversed by the Rio Grande valley, the portion of which south of El Paso, known locally as the Lower Valley, is reached by an abrupt drop of 200 to 300 feet from the bolson surface, which is known locally as the Mesa. No well-developed drainage channels are on the Mesa, and the precipitation on it either infiltrates or is lost by evapotranspiration. The average annual evaporation from a U. S. Weather Bureau class A evaporation pan, based on a 4-year period, is 108.15 inches, whereas the average annual precipitation, based on a 75-year record, is 8.65 inches.

The bedrock that underlies the bolson deposits amd makes up the surrounding mountains is relatively impermeable and will not supply large quantities of water to wells. The Franklin and Organ Mountains, which form part of the western boundary of the Hueco Bolson, consist largely of granitic and porphyritic rocks that were the source beds for much of the bolson deposits. The latter consist of lenticular layers of clay, sand, and gravel, which cannot be correlated for long distances. The sands and gravels are thickest and coarsest near the Franklin and Organ Mountains and become progressively thinner and finer grained toward the east. The maximum known thickness of the bolson deposits is 4,920 feet. Caliche lying nearly everywhere beneath the surface of the bolson affords a rather effective barrier to recharge from above. The caliche beds are partly or completely missing beneath depressions in the bolson, however, and recharge takes place when water collects in the depressions during periods of heavy rainfall.

Contours of water levels in the Hueco Bolson show that the principal area of recharge is along the east edge of the Franklin and Organ Mountains, where the runoff from the mountains infiltrates into the coarse gravel of alluvial fans. The water in the bolson deposits in the Mesa is unconfined and almost everywhere is of good quality. The bolson

deposits in El Paso Valley contain fresh water but are overlain and underlain by alluvial deposits containing mineralized water. The lowering of the artesian head in the bolson deposits in places has permitted the infiltration of salt water into the fresh-water-bearing beds. Two large cones of depression, one in El Paso Valley and one in the Mesa, have been formed by large withdrawals of ground water.

Pumpage from deep wells in the El Paso area has increased steadily since 1906. The average withdrawal in 1953 was 27.9 mgd (million gallons per day), of which 13.2 mgd was pumped from wells in the Mesa and 14.7 mgd was pumped from wells in the El Paso Valley.

The fresh water—defined as that containing less than 250 ppm (parts per million) of chloride—in the Hueco Bolson is in a trough of irregular width and depth roughly parallel to the Franklin and Organ Mountains. Salt water—defined as that containing more than 750 ppm of chloride—is present in the bolson sediments that lie beneath and east of the fresh-water-bearing beds and in the younger alluvium in the El Paso Valley. A body of inferior water is present between the fresh and salt water and differs in thickness from place to place.

Pumping tests at wells in the Hueco Bolson showed that the coefficient of transmissibility ranged from 38,000 to 164,000 gpd (gallons per day) per foot. Because of the shortness of the tests, the coefficient of storage of the bolson deposits could not be determined accurately.

The volume of the saturated bolson deposits in Texas is at least 31.6 million acre-feet and in New Mexico at least 24.8 million acre-feet. Of this, about 7.4 million acre-feet in Texas and 6.2 million acre-feet in New Mexico is available for recovery by wells. On the basis of about 50-percent recovery of the available water, 30 mgd could be withdrawn from storage for a period of 110 years. Artificial recharge would extend this period. Suggested methods of artificial recharge are by means of wells on the Mesa and a system of ditches and detention dams in the arroyos along the mountain fronts.

Although a large quantity of water is available in the bolson deposits, detailed planning and proper development will be necessary to secure maximum recovery from the reservoir without serious salt water encroachment.

INTRODUCTION

LOCATION AND EXTENT OF THE AREA

The Hueco Bolson is in the extreme western part of Texas and south-central New Mexico, covering parts of El Paso County, Tex., and Dona Ana and Otero Counties, N. Mex. (fig. 1). It is bounded on the east by the Quitman, Malone, Hueco, and Finlay Mountains, on the north by the Tularosa Basin, on the west by the Organ and and Franklin Mountains, and on the south by the "rimrock," or scarp at the edge of the Rio Grande flood plain.

El Paso, the county seat of El Paso County, lies like a great horseshoe around the south edge of the Franklin Mountains, and is the largest city in western Texas. According to the Bureau of the Census, in 1950 the population of the city proper was 130,485, and the population of the metropolitan area (not including Ciudad Juárez) was 194,968. Ciudad Juárez lies across the Rio Grande from El Paso, and in 1954, according to the Rand McNally Commercial Atlas and Marketing Guide, had a population of 121,913. Below El Paso and Ciudad Juárez the river valley is heavily populated.

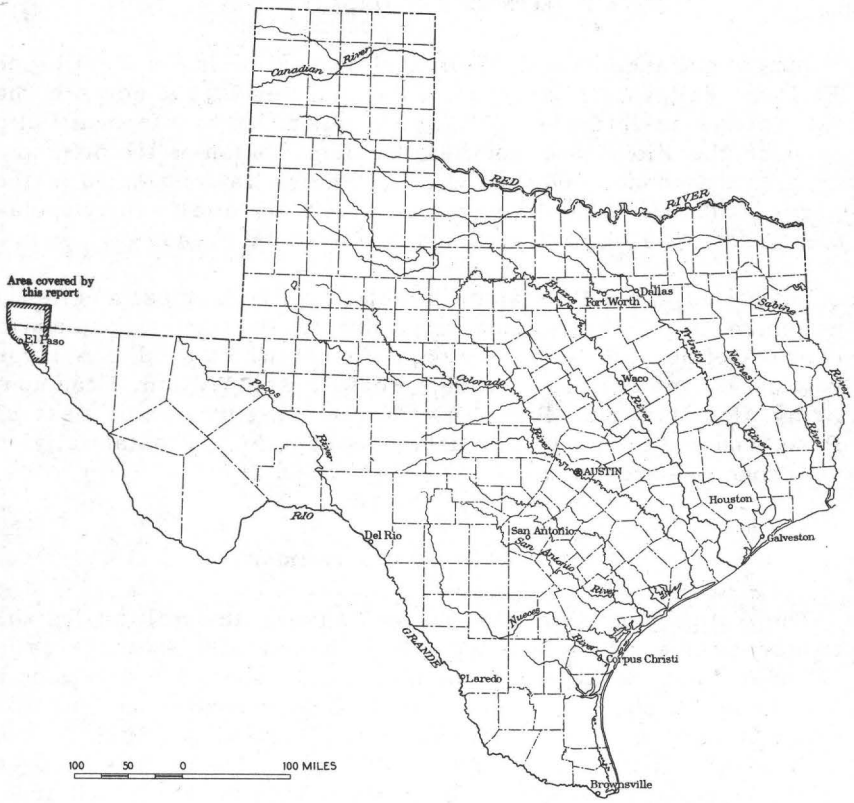

Figure 1. — Map of Texas showing location of the Hueco Bolson northeast of El Paso.

The Rio Grande flows south-southeast along the west side of the Organ and Franklin Mountains through a broad, flat-bottomed valley known as the Mesilla Valley, locally referred to as the Upper Valley. At the south end of the Franklin Mountains, the Rio Grande turns abruptly southeastward and flows across the Hueco Bolson through the El Paso Valley, known locally as the Lower Valley. This valley, which is about 6 to 8 miles wide and 225 to 350 feet deep, is cut diagonally across the bolson. The land surface rises abruptly from the floor of the valley to the bolson floor on the northeast, giving the appearance of a broad, elevated tableland, and for this reason this part of the bolson is locally referred to as the Mesa. The present report deals primarily with the part of the Mesa northeast of El Paso. The area investigated extends about 18 miles into New Mexico, and it covers a total of about 1,000 square miles.

ECONOMIC DEVELOPMENT

Irrigation farming is the principal occupation in the Mesilla and El Paso Valleys. It is estimated that about 70,000 acres in the two valleys is irrigated with water impounded by Elephant Butte Dam on the Rio Grande in New Mexico. Cotton is the principal crop, and an annual average of 85,352 bales was harvested in the period 1949–52. Other important products are alfalfa and vegetables, and cattle which are raised in the upland areas.

Industries in the El Paso area include oil refineries, smelters, a cement mill, food-processing plants, railroad shops, and a copper-refinery. El Paso is a port of entry which handles a large volume of international trade. Fort Bliss, William Beaumont Army Hospital, and Biggs Air Force Base are at or near El Paso, and the military establishments contribute substantially to the economy of the area.

PURPOSE AND SCOPE OF INVESTIGATION

The water supply for the city of El Paso, the military establishments, the industries, and other communities in the area is obtained from wells or from the Rio Grande. The city uses a maximum of about 10 mgd from the Rio Grande, and in 1953 about 28 mgd was pumped from wells in the area. Slightly less than half the pumpage was from wells on the Mesa. The purpose of this investigation was to determine (1) the thickness and areal extent of the bolson deposits underlying the Mesa which contain fresh water, (2) the capacity of the bolson deposits to absorb, store, and transmit water, and (3) the chemical character of the ground water.

The investigation of Sayre and Livingston (1945) covered in detail the ground-water resources of the El Paso Valley near El Paso and the Hueco Bolson for a short distance east and north of El Paso near the Franklin Mountains. The investigation in the greater part of the area north of the El Paso Valley margin (the rimrock) was of a reconnaissance nature. In 1939–40 the city of El Paso had many test wells drilled northeast of the city to ascertain the thickness and areal extent of the water-bearing beds and gravels of the Hueco Bolson adjacent to the city's present well field. However, as the well field expanded from year to year, it became apparent that a comprehensive investigation of the quantity and quality of water in storage in the entire Hueco Bolson would be essential for orderly planning of future water supplies, not only for the city of El Paso but also for the military

establishments and industries of the area. Except in the relatively small area developed by the city, the military establishments, and industries, most of the information needed was not available because the existing wells penetrated only a short distance into the water-bearing sands and gravels. Test drilling throughout the Hueco Bolson area, therefore, was necessary for a full evaluation of the ground-water resources. In 1953 the city of El Paso, the U. S. Army, and the U. S. Air Force appropriated funds for a test-drilling program in an area in the Hueco Bolson that extended about 18 miles north of the Texas-New Mexico boundary (pl. 1). The city, through its Public Service Board, appropriated additional funds to the Texas Board of Water Engineers for cooperation between that agency and the U. S. Geological Survey for the supervision of the drilling and the interpretation of the data and preparation of this report. The test-drilling program was begun in February 1953 and was actively continued along with other phases of the investigation until April 1954.

The investigation was made under the direction of R. W. Sundstrom, district engineer of the Geological Survey in charge of cooperative ground-water investigations in Texas.

METHODS OF INVESTIGATION

INVENTORY OF WELLS

All available data concerning existing wells on the Mesa were collected and studied during the course of the investigation. These included drillers' logs and data on well casings and screens, yield and drawdown, and depth to water. The drillers' logs are given on pages 139–183 and the records of the wells in table 5. The data collected indicated that the large-capacity wells were concentrated in the western part of the Mesa, north and northeast of El Paso. Most of the domestic and stock wells in the rest of the mesa area were drilled only a short distance below the water table, thus giving little information on the total thickness and character of the bolson deposits containing fresh water.

For the purpose of numbering the wells, grid lines have been established at 10-minute intervals throughout the area and the individual grids have been lettered alphabetically. The wells are numbered consecutively within each grid; for example, well R-1 would be well 1 in the "R" grid. The grid was established during the early planning stages of the investigation and was originally set up to include a greater area to the north in New Mexico. Later it was decided not to include such a large area; hence the

first grid shown on the map showing well locations (pl. 1) is the "E" grid.

TEST DRILLING

Much of the investigation was devoted to drilling and analyzing the information from 33 deep test wells, comprising a total footage of 32,456 feet. The test wells ranged in depth from about 500 to 1,680 feet, drilling generally being stopped when sands were penetrated containing water with a chloride concentration of 1,000 ppm or more. Samples of the materials penetrated were collected at close depth intervals so that the physical properties of the bolson deposits could be studied. The logs compiled from the examination of the samples are given on pages 100–138. The depth to water in each test well was determined by means of either an electric measuring device or a steel tape. Nine of the test wells were cased for permanent use for observation of fluctuations in the water table. Pumping tests were made at several of the wells to determine the hydraulic characteristics of the water-bearing material.

The test wells were drilled by contract with portable hydraulic-rotary drilling rigs (fig. 2). It was originally planned to drill the test wells in east-west lines 6 miles apart, with the test wells

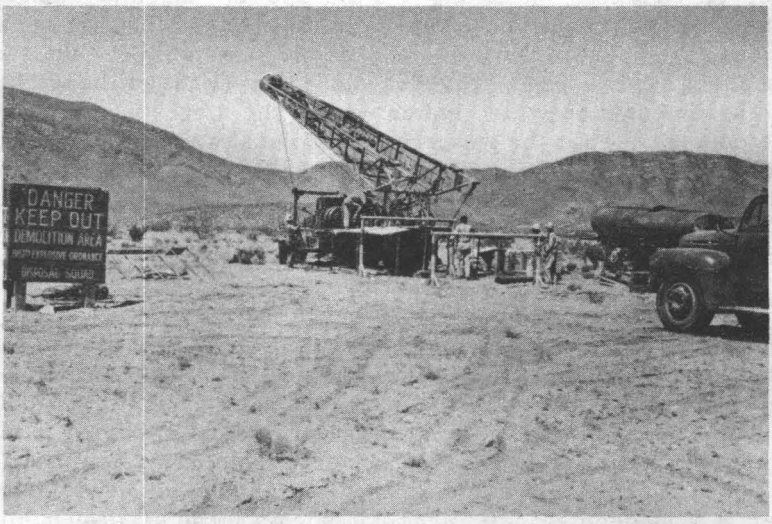

Figure 2. — Rotary drilling rig being assembled at site of well R-28.

spaced 2 miles apart along the lines in Texas and 4 miles apart in New Mexico. As the drilling progressed, the plan was altered somewhat as the needs of the investigation required.

An electric log, consisting of a spontaneous-potential curve and two resistivity curves, was made after each test well was completed. The electric logs were used to determine the thickness of the formations penetrated and the depth to which fresh water extended in the sands.

WATER SAMPLING

Chemical analyses were made of water samples collected from many of the existing water wells on the Mesa. Chemical analyses were made also of 105 samples collected from the 33 test wells, these samples being collected from several depth intervals at most of the wells. The results of the chemical analyses made for this investigation, together with many analyses collected during earlier studies, are given in table 6.

The collection of water samples from individual strata in the test wells necessitated the use of a device that would prevent the mixing of the different waters in the various sand strata penetrated. For this purpose a modified drill-stem testing tool was used, consisting of a hollow cylindrical rubber packer mounted on a sliding mandrel. The drill pipe was attached to the top of the packer and a length of perforated pipe was attached to the bottom. When a sand stratum was penetrated from which a water sample was desired, enough perforated pipe was attached to the packer so that, when the perforated pipe rested on the bottom of the well, the packer was just above the sand. The weight of drill pipe caused the rubber packer to expand against the walls of the well, isolating the sand stratum to be tested from the formations above. The well was then pumped by compressed air forced down a small-diameter pipe installed inside the drill pipe. After the drilling fluid was pumped from the drill pipe and annular space below the packer, water entered the well from the stratum being tested. At first, this water was contaminated by the drilling fluid that had penetrated into the formation; therefore the water sample was not collected until after the well had been pumped long enough for the water to become relatively clear and free of sediment. The testing equipment was then removed from the well, the well was deepened until another sand bed was penetrated from which a water sample was desired, and the process of setting the packer and pumping the well by airlift was repeated.

PERSONNEL AND ACKNOWLEDGMENTS

The writers wish to thank the many persons who have contributed information and assistance during the field investigation and preparation of this report. In particular, thanks are expressed to Harlan H. Hugg, general manager, City of El Paso Public Service Board, E. J. Umbenhauer, superintendent, Water Department of the Public Service Board, and Colonel William J. Prichard, Post Engineer, Fort Bliss. William Obenour, of the Water Department, determined the altitude of the land surface at some of the test wells, and C. R. Jensen, also of the Water Department, supplied information about the El Paso water supply and gave other assistance during the investigation. N. E. Wolfe, drilling superintendent for the B. & W. Drilling Co. of Texas which drilled the test wells, supplied valuable assistance during the test-drilling phase of this investigation.

The writers were assisted during the field investigation by James G. Cronin, Oscar C. Dale, William W. Doyel, Edward R. Leggat, Ben M. Petitt, Ralph E. Smith, Gordon W. Willis, and Leonard A. Wood, all of the U. S. Geological Survey, and by Archie T. Long, W. L. Naftel, and George H. Shafer, of the Texas Board of Water Engineers. Chemical analyses necessary for the investigation were made in the laboratory of the Geological Survey at Austin, Tex. The office of the Geological Survey at Albuquerque, N. Mex., furnished information on the New Mexico portion of the area investigated, collected as a part of the program in cooperation with the New Mexico State Engineer and the New Mexico Bureau of Mines and Mineral Resources.

PHYSICAL FEATURES

TOPOGRAPHY

Hill (1900, p. 9) included under the name Hueco Bolson all that part of the broad intermontane lowland lying between the Franklin-Organ-San Andreas and Quitman–Malone–Finlay–Hueco–Sacramento chains of mountains. However, the Hueco Bolson is part of a larger intermontane lowland divided into two distinct parts (Richardson, 1909, p. 2) by a low, indefinite transverse divide a few miles north of the Texas–New Mexico boundary. The northern part, known as the Tularosa Basin, has no external drainage; it is characterized by salt marshes and dunes of gypsiferous white sands. The southern part, the Hueco Bolson proper, contains no salt or gypsum deposits at the surface and is partly drained by the Rio Grande. According to Meinzer and Hare (1915, p. 11), the divide separating the Tularosa Basin from the Hueco Bolson

approaches on the west to within a few miles of the Texas–New Mexico boundary but swings northward in the vicinity of the Jarilla Mountains. The Hueco Bolson extends southward into Mexico where it is bounded by a part of the Sierra Madre Oriental.

Although the surface of the bolson has the appearance of a nearly level plain, actually it rises from an altitude of about 3,900 feet above sea level on the west side near Fort Bliss to about 4,200 feet on the east side near the Hueco Mountains—a rise of 300 feet in about 17 miles. King (1935, p. 254) has suggested that the rise of the bolson surface to the east may have been caused by gentle tilting resulting from movement along a fault plane near the base of the Franklin Mountains. Going north from Fort Bliss to the Texas–New Mexico boundary, there is a rise of about 100 feet in a distance of 14 miles. South of El Paso there is an abrupt drop of about 200 to 300 feet from the bolson surface to the floor of El Paso Valley.

The bolson is sparsely covered with vegetation consisting mainly of mesquite, with some creosote bush, sagebrush, and grasses. The mesquite catches and holds the drifting sand, forming numerous small mesquite-covered dunes 4 to 5 feet high.

At least six long, narrow, asymmetrical north-trending depressions break the even surface of the bolson. They are not drainage channels, however, but are definite structural features probably resulting from faulting (Sayre and Livingston, 1945, p. 12). There is almost no runoff from the bolson, as most of the precipitation is either lost by evapotranspiration or infiltrates into the ground-water reservoir. No well-developed drainage channels have been formed. Many arroyos, such as that shown in figure 3, cross the alluvial fans near the mountains, and most of the runoff from the mountains infiltrates into the coarse gravels of the fans. During periods of heavy rainfall, however, some of the runoff collects in depressions, forming temporary lakes. Many arroyos draining into the Rio Grande have cut reentrants into the rimrock along the El Paso Valley, but, except in a few places, the reentrants extend only a short distance into the Mesa.

CLIMATE

The climate of the Hueco Bolson is typical of the arid to semi-arid regions of the southwestern United States. The days are warm and the nights are cool. In the late winter and spring, high winds and blowing sand are common. The humidity is low and, consequently, evaporation is high.

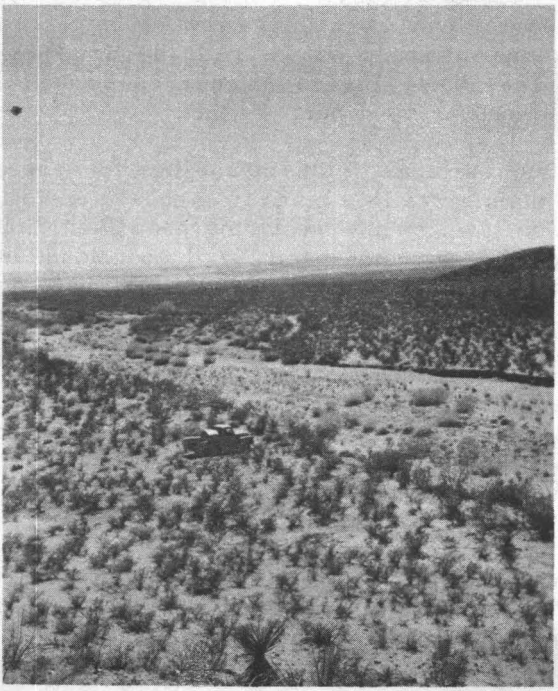

Figure 3. —Arroyo crossing west edge of alluvial fan in Fillmore Pass at south end of Organ Mountains.

Records of the evaporation from a U. S. Weather Bureau class A evaporation pan at Ysleta in the El Paso Valley near El Paso, for part of the period 1948–53, are given in table 1 and are shown graphically in figure 4. The average annual evaporation for 4 years of complete record during the period 1948–53 is 108.15 inches.

Table 1.—*Evaporation, in inches, from class A evaporation pan at Ysleta, Tex., 1948–53*

[From records of U. S. Weather Bureau]

Year	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Annual
1948.....	3.12	4.47	8.15	12.20	13.45	14.17	12.91	12.12	9.42	6.67	4.87	4.57	106.12
1949.....	.....	.....	9.27	9.35	13.07	14.61	12.34	10.15	8.87	6.91	4.43	2.53	.....
1950.....	4.73	4.93	10.86	12.52	13.47	15.40	10.84	11.71	7.93	6.95	4.88	4.33	108.55
1951.....	3.88	5.55	7.62	11.01	14.37	15.70	14.93	12.84	10.26	8.52	4.68	3.40	112.76
1952.....	3.89	4.70	7.83	10.00	12.58	13.58	.....	11.77	9.52	6.91	3.31	2.51	.....
1953.....	4.79	5.15	9.21	12.82	12.95	14.51	12.32	11.26	9.67	6.14	3.89	2.46	105.17
Average...	4.08	4.96	8.82	11.32	13.32	14.66	12.67	11.64	9.28	7.02	4.34	3.30	108.15

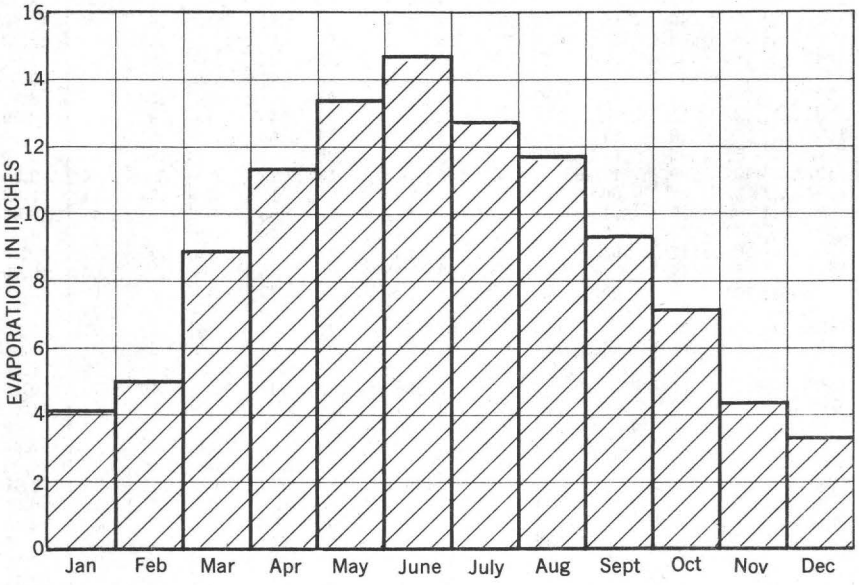

Figure 4. —Average monthly evaporation from class A evaporation pan at Ysleta, Tex., 1948–53. From records of U. S. Weather Bureau.

Most of the rain falls in thundershowers during the summer months, and about 50 percent of the average annual precipitation falls from July through September. The precipitation at El Paso Airport, compiled from records of the Weather Bureau for the period 1878–1953, is given in table 2 and shown graphically in figure 5. The average annual precipitation for the 75-year period was 8.65 inches, the maximum was 18.29 inches in 1884, and the minimum 2.22 inches in 1891. According to Sayre and Livingston (1945, p. 9), the rainfall in El Paso is somewhat greater than it is on the Hueco Bolson, and in the Franklin Mountains the rainfall is greater than that in El Paso.

Table 2.— *Precipitation, in inches, at El Paso, Tex., 1878–1953*

[From records of U. S. Weather Bureau]

Year	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Annual
1878.....	.....	.....	.....	.....	.....	.....	1.25	2.55	0.66	1.02	0.66	0.11	.....
1879.....	1.57	0.83	0.18	0.07	T	0.08	2.47	.35	.04	.95	T	.26	6.80
1880.....	1.01	T	.30	.10	0	T	7.54	3.60	.80	.47	.02	1.53	15.37
1881.....	.35	.24	.01	.22	1.83	.02	8.18	3.15	1.44	1.45	.50	.78	18.17
1882.....	.64	.78	.38	0	.10	.43	1.26	2.82	.40	0	1.46	0	8.27
1883.....	.10	.40	2.09	.10	.02	.04	2.84	1.34	2.51	2.03	.61	.84	12.92
1884.....	.55	.84	.33	.91	T	.11	.46	3.98	3.68	5.15	.21	2.07	18.29
1885.....	.12	.03	.34	.04	1.27	2.63	1.06	.46	.22	.46	.31	.37	7.31
1886.....	.31	.44	.28	T	.01	1.03	1.62	1.85	1.16	.80	.52	.04	8.06
1887.....	.03	.15	.32	.09	.13	.34	.73	1.68	.94	.78	.56	1.01	6.76
1888.....	.32	1.51	.95	.74	.15	.42	1.39	1.32	.49	1.13	1.32	.05	9.79
1889.....	.76	.18	.67	.04	0	.28	1.59	.04	2.64	.35	.55	0	7.10
1890.....	.72	.02	.01	.06	T	.63	.95	3.25	1.81	.41	.35	.28	8.49
1891.....	.27	.09	.16	0	.38	.40	.06	.13	.23	T	T	.50	2.22
1892.....	1.25	.57	.30	.11	T	T	1.14	.07	.12	.22	.93	.61	5.32
1893.....	.02	.52	.31	0	2.28	T	2.08	3.15	2.08	T	.02	.42	10.88
1894.....	.33	.29	.13	.01	.01	.01	1.40	.64	.40	.39	0	.63	4.24
1895.....	.65	.17	.05	T	2.11	.21	2.48	2.01	.28	.88	1.05	.31	10.20
1896.....	1.63	.14	T	T	T	.60	2.73	1.09	1.48	2.02	.04	.06	9.79
1897.....	.54	0	.05	.14	.46	2.17	2.89	2.57	2.73	.77	T	.09	12.41
1898.....	.25	.04	.43	.81	.01	.46	1.46	1.00	.50	T	.16	1.04	6.16
1899.....	.06	.03	.23	.88	T	.61	3.08	.91	.64	.01	.64	.21	7.30
1900.....	.11	.43	.26	.02	.41	.27	2.38	.43	2.18	1.23	.23	T	7.95
1901.....	.35	.68	.47	.47	.05	.39	1.05	.34	.82	2.98	1.05	.03	8.68
1902.....	.57	.01	0	0	T	.01	3.27	2.85	1.86	.31	.49	.78	10.15
1903.....	.61	1.09	.15	.54	.29	2.50	1.19	1.73	3.52	0	0	.01	11.63
1904.....	T	.01	0	0	.06	.54	.59	2.24	3.50	3.51	.01	.84	11.30
1905.....	.86	1.88	1.46	1.38	.03	2.12	2.55	.53	2.29	1.28	2.40	1.02	17.80
1906.....	.87	1.37	.01	.40	.90	T	2.02	4.10	1.18	.44	2.50	1.20	14.99
1907.....	.42	T	T	.07	.10	.76	.35	2.50	.96	2.52	.73	T	8.41
1908.....	.10	.26	.35	.88	.01	0	2.07	2.55	T	.12	.45	.15	6.94
1909.....	.04	.16	.77	0	T	.05	1.62	.51	.60	.02	T	.56	4.33
1910.....	.21	.10	T	T	T	1.35	.60	1.18	.24	.02	.03	.30	4.03
1911.....	.36	.96	.43	.47	.39	2.36	3.43	.45	1.00	.43	.35	.25	10.88
1912.....	0	.15	.27	.96	T	1.27	1.11	2.83	1.77	.50	.80	.48	10.14
1913.....	.49	1.26	.29	.14	T	.91	1.13	.54	.60	T	.97	.76	7.09
1914.....	.03	.53	.10	.47	1.23	1.47	4.91	.85	.56	.80	1.13	3.94	16.02
1915.....	1.01	.59	1.34	.20	T	T	2.45	1.37	2.68	.18	.01	.43	10.26
1916.....	.66	.02	.34	.20	.43	0	.59	3.07	.55	1.07	.52	.32	7.77
1917.....	.32	T	.07	T	.14	.36	.41	4.39	.76	T	.04	0	6.49
1918.....	1.20	.01	.08	0	.05	.83	1.52	1.66	.01	1.03	1.04	.78	8.21
1919.....	.08	.20	.62	.65	.14	.27	1.87	.72	3.30	.97	.93	.12	9.87
1920.....	1.06	.83	.22	.03	.03	.99	.84	1.33	.31	.57	T	T	6.21
1921.....	.06	.26	.04	.01	.31	.79	2.13	.35	2.49	.11	.22	.15	6.92
1922.....	.30	T	.16	.28	.36	.05	1.08	.27	1.07	.35	.29	.09	4.30
1923.....	.64	1.41	.33	.04	.01	.09	.20	2.96	.41	.58	.53	.93	8.13
1924.....	.40	.13	.41	.32	T	T	3.00	2.58	.14	.24	.01	.05	7.28
1925.....	.03	.05	T	T	.59	.17	1.40	2.16	1.03	.79	.02	.27	6.51
1926.....	.54	.17	1.49	1.11	.70	.11	3.31	.27	2.24	.89	.15	.75	11.73
1927.....	.05	.18	.28	T	0	.10	2.52	1.34	1.04	.02	T	.72	6.25
1928.....	T	.71	.05	.22	.96	T	1.15	2.69	.04	1.47	.79	.13	8.21
1929.....	T	.29	.21	T	1.51	.54	3.01	1.18	.12	1.60	.33	.50	9.29
1930.....	.17	.16	.03	T	.62	.53	1.33	1.29	.04	.75	.74	.43	6.09
1931.....	.83	.89	.38	2.24	.06	1.34	.73	2.14	1.10	.14	.64	.30	10.79
1932.....	.17	.68	.03	T	1.46	.15	2.28	2.14	2.85	.53	0	.65	10.94
1933.....	.19	.23	T	.09	.04	2.14	1.34	.27	.99	.60	.04	0	5.93
1934.....	.01	.12	.24	.05	.37	.01	.19	.60	.17	.44	.21	.32	2.73
1935.....	.24	.47	.14	.02	.17	.09	.16	1.72	1.24	.14	.92	.34	5.65
1936.....	.57	.06	T	.11	.56	.34	.68	1.94	3.52	.32	1.32	.51	9.93
1937.....	.12	.32	.48	T	.19	1.05	.39	.36	.48	1.71	.22	.91	6.23
1938.....	1.22	.17	.49	T	.02	2.82	.60	.20	2.31	.19	T	.28	8.30
1939.....	.65	.08	.44	.45	.01	T	.60	.91	.90	.93	.75	.19	5.91
1940.....	.54	.41	.02	.02	.43	1.87	1.06	.78	.25	.82	1.25	.31	7.76
1941.....	.46	.46	1.63	1.49	1.23	.18	1.40	2.13	4.19	1.65	.48	.35	15.65
1942.....	.14	.72	.02	1.04	T	.52	.68	3.82	1.03	1.53	0	1.26	10.76
1943.....	.25	0	.07	T	T	1.63	.92	.44	1.36	T	1.53	.82	7.02
1944.....	.45	1.42	.15	T	.39	1.67	1.52	1.04	.25	1.30	.41	.48	9.08

Table 2.—*Precipitation, in inches, at El Paso, Tex., 1878–1953*—Continued

Year	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Annual
1945....	0.11	0.17	0.64	T	T	0.03	0.47	0.84	0.12	4.31	0.00	0.05	6.74
1946....	1.23	T	.04	.36	1.23	.20	.71	1.19	1.51	.41	.03	1.31	8.22
1947....	.87	T	.66	.06	.68	.53	.97	1.63	.02	.35	.53	.82	7.12
1948....	.25	.63	.04	.11	T	.96	.82	1.82	.03	.18	T	.86	5.70
1949....	1.84	.22	.04	.05	.39	.51	1.18	.43	1.74	1.50	0	.86	8.76
1950....	.29	.26	T	T	.10	.11	3.57	.16	1.32	.94	0	0	6.75
1951....	.33	.63	.59	.45	T	T	2.48	.72	.04	.43	.12	.68	6.47
1952....	.02	.96	.92	1.08	.46	1.14	1.88	1.06	.07	0	.23	.15	7.97
1953....	0	.34	.12	.71	.27	.53	.99	.42	T	.65	T	.39	4.42
Average..	0.45	0.41	0.33	0.29	0.35	0.63	1.70	1.53	1.16	0.83	0.46	0.51	8.65
Years of record.	75	75	75	75	75	75	76	76	76	76	76	76	75

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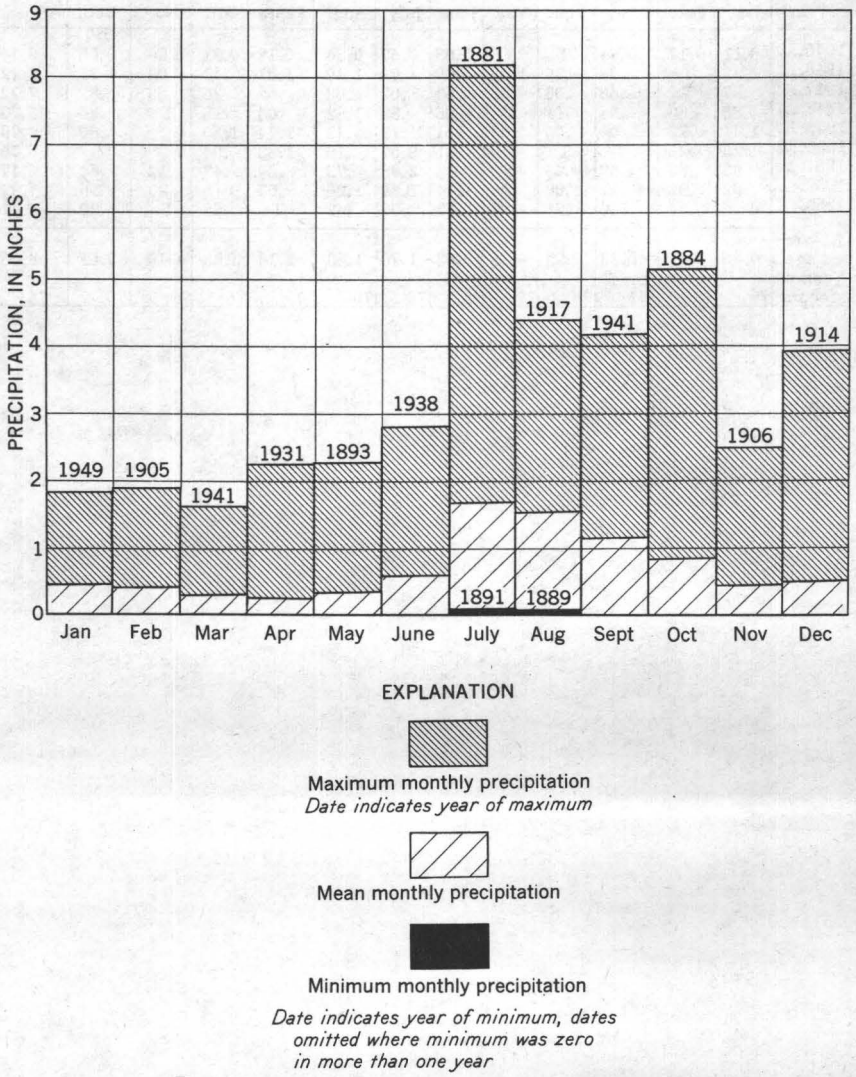

Figure 5.—Precipitation at El Paso, Tex., 1878–1953. From records of U. S. Weather Bureau.

GEOLOGY

The description by Sayre and Livingston (1945) of the geology of the Hueco Bolson area and its relation to the occurrence of ground water has served as the chief source of material in the following discussion. Descriptions of the geology of the area by

Richardson (1909), Dunham (1935), King (1935), and Nelson (1940) also have been helpful.

The rocks of the Hueco Bolson area may be separated into two general groups: the unconsolidated bolson deposits and the consolidated igneous and sedimentary rocks of the mountains and uplands. The bolson deposits are the most important in relation to the water supply because they contain large thicknesses of water-bearing sand and gravel. In general, the consolidated rocks, which form the bedrock underlying the bolson deposits, are too firmly consolidated to supply large quantities of water to wells, and the water that they do contain is too highly mineralized for most uses (Sayre and Livingston, 1945, p. 21). The character and distribution of these rocks have a direct bearing on the occurrence of ground water in the Hueco Bolson because the bolson deposits were derived from them through processes of weathering and erosion.

CONSOLIDATED ROCKS

IGNEOUS ROCKS

Granitic rocks are exposed in relatively large areas in the Franklin Mountains, in most of the Organ Mountains, and in isolated areas in the southern part of the Hueco Mountains. The largest outcrop of granite in the Franklin Mountains is near the middle of the range, but relatively narrow outcrops occur, in general, near the base along most of the east flank of the mountains. The granite is predominately red and consists chiefly of coarse grains of quartz and feldspar. In the Organ Mountains, coarse-grained red granite with phenocrysts of feldspar crops out in small areas near the middle and south end of the east side of the range. The same type of granite occurs in a large area at the south end of the San Andreas Mountains just north of San Augustine Pass, which separates the Organ and San Andreas ranges. A complex mass of granitic rocks, mostly quartz monzonite, constitutes a considerable part of the bedrock in the central part of the Organ Mountains. Part of the granitic rocks are generally believed to be Precambrian, and part which have intruded all the Paleozoic strata are post-Carboniferous, probably Tertiary, in age.

The granitic rocks weather readily into clay and quartz and are good source materials for bolson deposits. Because of rapid erosion, however, weathering is not complete and arkosic sands and gravels are formed. Arkosic material was observed in the cuttings from many of the test wells.

Two types of porphyritic rocks, in addition to the porphyritic granite in the Organ Mountains, are found in the Hueco Bolson area. Rhyolite porphyry underlies a large area in the central part of the Franklin Mountains and crops out in the lower part of the east flank of the range. The rock is pink to maroon, in places black, and the phenocrysts consist predominately of feldspar and quartz. An agglomerate containing pebbles of quartzite and rhyolite occurs near the base of the porphyry. The rhyolite porphyry was extruded during Precambrian time as lava flows and has a total thickness of about 1,500 feet. It does not weather readily but breaks down into angular pebbles and boulders suitable for transportation by storm waters. It is one of the chief source materials for the coarse sands and gravels of the bolson deposits.

Syenite porphyry, which underlies several hills near the base of the Hueco Mountains, is probably post-Cretaceous in age (Sayre and Livingston, 1945, p. 23). The rock consists principally of white to light-colored feldspar with smaller amounts of biotite and augite. It weathers readily and breaks down so completely into clay that even at the base of the syenite masses there are only small areas of rock fragments.

SEDIMENTARY ROCKS

The Lanoria quartzite of Precambrian age crops out along the east flank of the Franklin Mountains near the center of the range. It is a dense thoroughly indurated fine-grained generally grayish quartzite occurring in alternately thick-bedded and thin-bedded layers and having a total thickness of about 1,800 feet. It weathers into pebbles and boulders, furnishing source materials for the sands and gravels of the bolson deposits.

The Bliss sandstone of Cambrian or Ordovician age extends along the east side of the Franklin and Organ Mountains where it generally lies above the granite, but in some places is found overlying the rhyolite porphyry. It crops out also in small areas in the southern part of the Hueco Mountains. It ranges in thickness from a knife edge to 300 feet and generally is conglomeratic near the base and very fine grained near the top. The Bliss sandstone weathers into fine-grained sand.

A thick sequence of limestones ranging in age from Ordovician to Cretaceous overlies the Bliss sandstone. The limestones, which have been described in detail by Sayre and Livingston (1945, p. 25–27) and doubtless others, are light to dark in color, are generally hard, dense, and massive, and in places are interbedded with shale, sandstone, and chert. Impure limestones and

shales generally weather to clay rather easily. Limestone boulders sometimes are formed by rapid weathering, but they generally are reduced to small fragments during transportation from the site of formation to the site of deposition. Limestone pebbles, therefore, are found only sporadically in the bolson deposits, but pebbles of chert are fairly common because the chert is resistant to both weathering and erosion.

UNCONSOLIDATED DEPOSITS

The bolson deposits consist of layers of clay, sand, and gravel of Tertiary age. The individual layers range in thickness from a knife edge to about 100 feet. A study of more than 100 logs of wells drilled in the Hueco Bolson indicates that individual layers cannot be correlated except for very short distances. Before 1920 the city of El Paso had about 45 wells drilled in the vicinity of well V-3 (pl. 1) at intervals of 300 feet along two lines about 300 feet apart. Individual beds were found to be lenticular and could not be correlated between more than two or three adjacent wells. Furthermore, the entire section may change within short distances.

Caliche lies nearly everywhere beneath the surface of the Hueco Bolson. The rimrock, or the margin of El Paso Valley, owes much of its prominence to the erosion-resistant caliche caprock along its edge. The caliche is a nearly continuous layer of hard white calcium carbonate, generally found 2 to 4 feet beneath the bolson surface. It ranges from a knife edge to 8 feet in thickness but generally is 2 to 4 feet thick. Beds of caliche are also found intercalated with other materials in the bolson deposits to a depth of several hundred feet; these caliche beds commonly are disturbed or fractured, and in some places, as near the mountains, the caliche is absent. Because the caliche beds act as barriers to the downward percolation of water, recharge occurs principally near the mountains and in the surface depressions where water collects during periods of heavy rainfall and where caliche is absent or fractured.

The clays in the Hueco Bolson generally are reddish brown to brown but in places are buff to gray. The clay beds range from pure clay to clay mixed with varying amounts of sand, pebbles, and boulders. Sand is the most common admixture.

The sands and gravels of the Hueco Bolson are thickest and coarsest near the Franklin and Organ Mountains. Many of the test wells near the mountains penetrated more sand than clay. The sands become fine grained and thinner to the east, and very little water-bearing sand is found near the Hueco Mountains. No

water-bearing sands were penetrated during the drilling of test well N-1, about 6 miles west of the Hueco Mountains, and only small thicknesses of rather fine-grained sand were penetrated in test well S-9, also a few miles from the Huecos. The gradation from thick coarse deposits near the Franklin and Organ Mountains to thin, fine-grained deposits near the Hueco Mountains indicates that the igneous rocks of the Franklin and Organ Mountains were the main source of the bolson deposits.

The sands and gravels of the bolson are generally gray to salt-and-pepper colored except where they contain enough clay to give them a reddish hue. The beds of gravel generally are thin and lenticular. The sands and gravels consist mostly of quartz with fragments of porphyry, quartzite, chert, and minor amounts of granite and limestone similar to the rocks of the Franklin and Organ Mountains. The particles are angular to subangular, indicating that they have not been transported far from their points of origin.

The maximum thickness of the bolson deposits is not known. Many wells have been drilled to depths of more than 1,000 feet without penetrating bedrock. At 2 test wells drilled near the Hueco Mountains, wells N-1 and S-8, bedrock was penetrated at depths of 895 and 1,013 feet, respectively. Test well R-28, which is near the Franklin Mountains, ended in the unconsolidated deposits at a depth of 1,635 feet. An oil test drilled about 2 miles south of Newman, N. Mex., was reported by King (1935) to have penetrated unconsolidated deposits to a depth of 4,920 feet.

HYDROLOGY

GROUND-WATER RESERVOIRS

Plate 2 shows water-level contours in the Hueco Bolson in January 1954. On the Mesa the contours show the position of the water table, whereas in El Paso Valley the contours show the position of the artesian-head or piezometric surface in feet above mean sea level. Ground water moves in the direction of the hydraulic gradient, which is at right angles to the contours.

The principal intake, or recharge, area is relatively narrow and extends along the foot of the Franklin and Organ Mountains. In this area the hydraulic gradient is steep and averages about 35 feet per mile in an eastward direction. The general slope of the water surface in the unpumped areas of the bolson, which are far from the intake area, is in a south to southeastward direction and averages only about 3 to 4 feet per mile. In the heavily

pumped areas two cones of depression have been formed by large withdrawals of ground water. One cone of depression is in the El Paso Valley where the sands are heavily pumped for municipal and industrial needs. The other cone of depression is on the Mesa near the well fields of Fort Bliss and the Mesa well field of the city of El Paso. A north-south trough exists in the water table on the west side of the bolson north of the Texas–New Mexico boundary. Water moves into this trough from the west, north, and east and passes out of the trough at the south end.

MESA AREA

The yields that can be obtained from wells in the Mesa vary widely from place to place, depending on the thickness of fresh-water-bearing sands that are penetrated. Water of good quality can be found in the sands of the Mesa almost everywhere except in the northeastern part. The thickness and areal extent of the sands containing fresh water are described in considerable detail on pages 24 and 25. The surface of the bolson rises to the east and the water table dips to the southeast, causing the depth to water to increase progressively from about 200 to 400 feet toward the east. The ground water on the Mesa is under water-table conditions.

EL PASO VALLEY AREA

The bolson deposits extend under El Paso Valley where they are covered by younger alluvial deposits of clay, sand, and gravel that were deposited by the Rio Grande after it had cut its valley into the Hueco Bolson. The alluvial deposits contain moderately to highly mineralized water and in most places are separated from the bolson deposits by extensive beds of clay. The bolson deposits under the valley are saturated, and the water contained in them is under artesian head maintained by the higher altitude of the water table underlying the Mesa.

The bolson deposits in El Paso Valley contain fresh water but are overlain and underlain by alluvial deposits containing moderately to highly mineralized water. The lowering of the artesian head in the fresh-water beds by pumping establishes a differential in pressure between the salt-water-bearing beds and the fresh-water-bearing beds, causing the salt water to move toward or into the fresh water. The danger of salt-water contamination of the fresh-water beds is imminent also because of improper well construction or of the movement of salt water through corroded openings in well casings. The chloride content of water from

some wells in the El Paso Valley has been increasing steadily, at least since 1935.

GROUND-WATER DEVELOPMENT

HISTORY

The first well to supply water to the city of El Paso, known as the Watts well, was dug about 1892 a few hundred feet from the Rio Grande (Sayre and Livingston, 1945, p. 5–6). The well supplied a large quantity of water that was of unsatisfactory quality for human consumption, and until 1904 drinking water was shipped into the city from Deming, N. Mex. In 1904, the International Water Co. bought the waterworks and began drilling wells on the Mesa north of Fort Bliss. The city acquired the property of the water company in 1910 and continued to drill wells on the Mesa. Until 1918 the Watts well was used during the summer months to augment the supply from the Mesa well field. The Mesa wells were pumped by airlift from a central plant, but the cost of operating this plant was high owing to the low efficiency of this type of equipment. It was decided, therefore, to explore the deep sands and gravels nearer the city in the El Paso Valley where the pumping lift would be much less than on the Mesa. In December 1917, construction was begun on city well 1 (well V-47) in what is now known as the Montana well field. This well yielded water of good quality at a rate of about 2 mgd. As new wells were developed in the Montana well field, pumping was gradually decreased in the Mesa field and operation of this field was discontinued in 1926. An increase in the chloride content of the water from the Montana field became noticeable in 1935, and part of the city supply again was obtained from the Mesa field where new deep wells had been drilled and equipped with deep-well turbine pumps.

USE OF WATER

Except for short periods there has been a steady increase in pumping from deep wells in the El Paso area since 1906. The use of ground water declined slightly after the city of El Paso placed its 10 mgd surface-water treatment plant in operation in 1943. Figure 6 shows the estimated average daily pumpage from all deep wells (except irrigation wells) in the El Paso area from 1906 to 1953. The average withdrawal in 1953 was 27.9 mgd, of which 13.2 mgd was pumped from wells in the Mesa and 14.7 mgd was pumped from wells in the El Paso Valley.

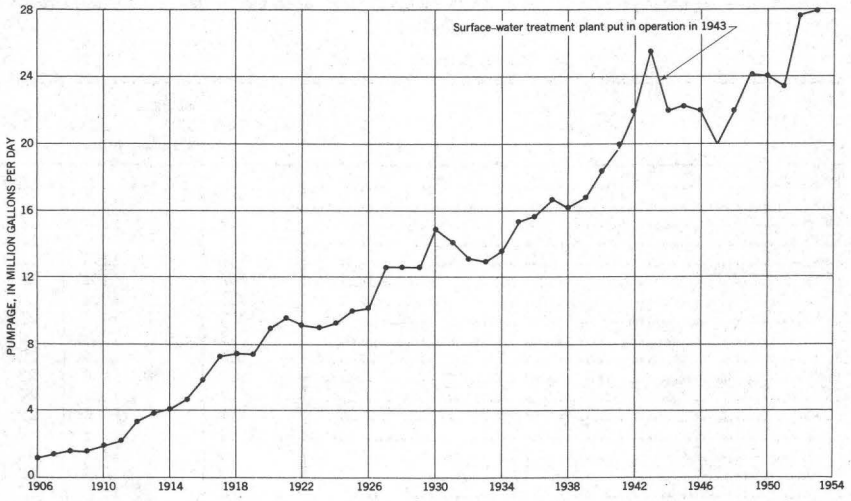

Figure 6. —Estimated average daily pumpage from all deep wells (except irrigation wells) in the El Paso area, Texas, 1906-53.

The city of El Paso is the principal user of water in the area, but many deep wells have been drilled by industries, the military establishments, and Ciudad Juárez, Mexico. In 1953, El Paso used about 38 percent of the water pumped, Ciudad Juárez about 29 percent, industries in the area about 12 percent, the military establishments at Fort Bliss and Biggs Air Force Base about 14 percent, and the El Paso County Water Control and Improvement District No. 1, which supplies water for domestic needs to a residential area in the El Paso Valley outside the El Paso city limits, used about 7 percent.

The average daily pumpage from deep wells ("deep" wells are those in the bolson deposits and exclude the relatively shallow irrigation wells in alluvium of the Rio Grande in El Paso Valley) in the El Paso area and the division of pumpage between the wells in the Mesa and in the El Paso Valley from 1936 to 1953 is given in table 3 and shown graphically in figure 7. Ciudad Juárez is the principal user of ground water in the El Paso Valley, using about 56 percent of the water pumped in 1953. In recent years the city of El Paso gradually has been pumping a larger part of its water supply from the Mesa area. In 1953, it obtained about 86 percent of its ground-water supply from the bolson deposits beneath the Mesa as compared with 65 percent in 1951. Ground-water withdrawals from El Paso Valley, however, have shown an overall increase from year to year.

A relatively small amount of ground water is pumped for irrigation in the Mesa area a short distance north of El Paso.

Table 3.—*Breakdown of estimated daily pumpage from deep wells in the El Paso area, 1936–53*

[In millions of gallons]

Year	Mesa area	El Paso Valley area including Ciudad Juárez	Total
1936	7.5	8.2	15.7
1937	5.1	11.6	16.7
1938	4.9	11.3	16.2
1939	6.5	10.3	16.8
1940	6.8	11.6	18.4
1941	8.2	11.4	19.6
1942	11.8	10.2	22
1943	11.5	14.1	25.6
1944	9.2	12.8	22
1945	9.9	12.4	22.3
1946	9.4	12.6	22
1947	6.9	13.1	20
1948	8.4	13.6	22
1949	10.6	13.5	24.1
1950	9.9	14.1	24
1951	10	13.4	23.4
1952	11.6	16	27.6
1953	13.2	14.7	27.9

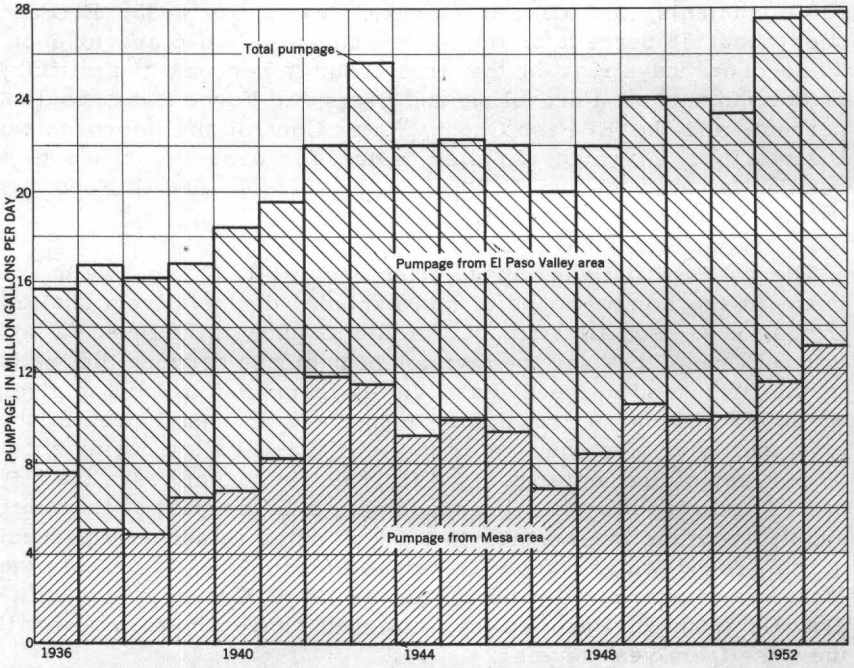

Figure 7. —Breakdown of estimated pumpage from deep wells in the El Paso area, Texas, 1936–53.

This pumpage, which is estimated to have averaged about 3 to 5 mgd in 1953, is not included in table 3.

OCCURRENCE OF GROUND WATER

METHOD USED TO DEFINE FRESH WATER–SALT WATER BOUNDARY

The terms "fresh water" and "salt water" are somewhat generalized and do not have an exact definition. The U. S. Public Health Service (1946) stated that water for domestic use on carriers engaged in interstate commerce preferably should not contain more than 250 ppm of chloride. However, water having a chloride content considerably in excess of this amount is used in many parts of the country for municipal supplies. For example, the water from some of the wells supplying the city of Galveston, Tex., contains more than 800 ppm of chloride. Because of mixing with water of better quality from other wells, however, the resultant supply does not greatly exceed the standard of chloride content recommended by the Public Health Service (Winslow and Doyel, 1954, p. 21). In the present report, water containing less than 250 ppm of chloride is considered "fresh water"; water containing chloride ranging from 250 to 750 ppm is considered "inferior water" but usable for municipal supplies by mixing with water of better quality; and water containing chloride in excess of 750 ppm is considered "salt water" and not usable for municipal purposes.

The approximate altitude of the base of the fresh-water-bearing sand is shown by a contour map (pl. 3). The control used in the preparation of the map was based on (1) the analyses of water samples obtained from more than 100 drill-stem tests made in test wells, (2) the interpretation of electric logs of 33 test wells, and (3) a study of water wells in the area. The results of the chloride determinations obtained from drill-stem tests are given on plates 4–6, which also show the electric logs of the test wells, thus illustrating the relation between the quality of the water in the sands and the curves recorded on the electric logs.

Three curves are recorded on most electric logs: the spontaneous-potential curve and two resistivity curves. The spontaneous-potential curve measures the differences in electric potential across formational boundaries. The resistivity curves record the apparent resistance of the beds penetrated by measuring the potential drop of an induced current between known constant electrode spacings. The first resistivity curve, or short normal curve, is a shallow-penetration curve based on an electrode spacing of 10 to 20 inches. It records the apparent resistivity of the formation and its contained fluid for only a short

distance from the wall of the hole, and therefore is strongly influenced by the drilling fluid that has invaded the formation during the drilling of the hole. The second resistivity curve, or lateral curve, is a deep-penetration curve based generally on a spacing of 19 feet. It records the apparent resistivity of the formation and its fluid and is only slightly influenced by invasion by the drilling fluid.

Several factors are responsible for the variations in the spontaneous-potential curve, the most important of which is believed to be the electrochemical effect of the drilling fluid (Barnes and Livingston, 1947). The resistivity as recorded on the electric log depends largely on the conductivity of the formation fluid and the size, arrangement, cementation, and distribution of the rock particles. These physical characteristics of the rock particles are often referred together as the "formation factor" (Archie, 1942). From the apparent resistivity, the true resistivity of the contained fluid can be determined by the use of the formation factor. A comparison of the resistivity curves, taking into consideration the formation factor and drilling-fluid resistivity, gives an indication of the quality of the water in the formation. As the mineralization of the formation water increases, the resistivity value decreases, and the magnitude of this decrease makes possible an approximation of the degree of mineralization. It is not possible to estimate the change in concentration of each of the mineral constituents in the formation water because of their different electrochemical characteristics. However, in an area where the principal change in mineralization is confined to one or two constituents, the resistivity and self-potential curves can be used to estimate this change reasonably successfully. For a detailed explanation of the interpretation of electric logs, see Archie (1942), Barnes and Livingston (1947), Jones and Buford (1951), or Guyod (1952).

The data on plates 4–6 show that, in general, all the mineral constituents in the water increase in concentration with depth, but the increase in the chloride content is more rapid than the increase in the other anions. Good correlation was obtained between the chloride content as determined from the drill-stem tests and the true resistivity as computed from the short normal curve of the electric logs. This relation was used to estimate the quality of water in wells for which chemical analyses of water were not available.

FRESH WATER

The fresh water in the Hueco Bolson occurs in a trough of irregular width and depth nearly parallel to the Franklin and

Organ Mountains (pl. 3). The trough is relatively narrow in New Mexico but widens south of the Texas-New Mexico boundary. The slope of the base of the fresh water is steep near the mountains but becomes rather gentle to the east. Three east-west cross sections are shown on plates 7 and 8 to illustrate in a general way the depth and nature of the occurrence of fresh water in the bolson. Plate 9 is a cross section approximately parallel to the Franklin and Organ Mountains along the west side of the trough where the fresh water extends the deepest. The base of the fresh water shown on the contour map and on the cross sections is the bottom of the deepest sand containing water with a chloride concentration of 250 ppm or less. However, in some places the base of the fresh water probably is in beds of clay and in other places it is in sand, which may explain some of the minor anomalies shown on plate 3.

A "nose" or ridge in the otherwise fairly even surface of the base of the fresh water extends parallel to the Franklin Mountains southward from about the Texas-New Mexico boundary to the vicinity of well R-31. Fresh-water sands are at a lower altitude both east and west of this rather narrow ridge. Not enough data are available to explain fully the presence of the ridge; a probable explanation is that the deposits underlying it are less permeable than those in adjacent areas and thus have not been flushed out by fresh water to as great a depth.

INFERIOR WATER

The water in the bolson deposits becomes increasingly mineralized with depth. Fresh water occurs in the upper part of the bolson deposits overlying the salt water in the lower part. The contact between the fresh water and salt water is not sharp but consists of a zone of diffusion in which the water is neither fresh nor salty. This zone is of varying thickness and consists in large part of inferior water which contains between 250 and 750 ppm of chloride. The mineral content of the water in the zone of diffusion increases gradually with depth until some higher value is reached, after which the increase in the mineralization is very rapid. A rigid value cannot be fixed for this higher value, but the available data indicate that it is in the order of magnitude of 1,000 ppm of chloride.

The zone of diffusion was found to be of different thickness at test wells drilled at widely different locations. In well F-1, the chloride content of the water obtained from five drill-stem tests taken between 404 and 865 feet below the land surface ranged from 17 to 26 ppm. The chloride content of the water increased

to 54 ppm in the zone tested from 962 to 1,012 feet and to 1,550 ppm in the zone tested from 1,162 to 1,216 feet below the land surface. The electric log indicates that the mineral content of the water increased rapidly below 1,012 feet. In well L-6, the chloride content of the water obtained from a drill-stem test from 419 to 451 feet below the land surface was 200 ppm; from 493 to 535 feet, 510 ppm; from 548 to 590 feet, 1,050 ppm; and from 625 to 667 feet, 5,770 ppm. In well S-8, the chloride content of the water obtained from a drill-stem test from 479 to 515 feet below the land surface was 355 ppm; from 772 to 808 feet, 405 ppm; and from 980 to 1,020 feet, 5,490 ppm.

SALT WATER

The salt water (chloride content exceeds 750 ppm) in the Hueco Bolson area occurs in the bolson sediments that lie beneath and east of the fresh-water-bearing sands and gravels, and in the alluvium in El Paso Valley. The salt water is a source of contamination of the fresh-water supplies. The possibility of upward movement of salt water into the fresh-water body seems to be more probable than the possibility of lateral encroachment from adjacent beds. The water in the bolson deposits is under water-table conditions, and at a given location there is no appreciable difference in head between the water in the deep sands and in sands near the water table. Under natural conditions, therefore, little, if any, water moves between the various sands of the Hueco Bolson. However, when the natural conditions are disturbed by pumping and the head is lowered in the fresh-water sands, there is an upward movement of water from the salt-water deposits into the fresh-water beds.

Another possible source of contamination of the fresh-water beds is from the salt water in the alluvium in El Paso Valley and in the bolson sediments that lie east of the fresh-water beds. The salt water from these sources can move laterally or vertically into the fresh-water beds as the latter are dewatered by pumping.

WATER LEVELS AND THEIR SIGNIFICANCE

A change in water level in a well indicates that a change in storage has taken place in the ground-water reservoir penetrated by the well. The extent of the change in storage depends on the degree of confinement of the water and the nature of the force causing the fluctuation. Some forces that affect water levels, such as atmospheric pressure, seismis waves, earth tides, and changes in surface loading, normally have only a temporary effect

and indicate only a slight change in the actual quantity of water stored in the aquifer. Water levels in artesian wells are many times more sensitive to changes in storage than are water levels in water-table wells, owing to the large difference in storage coefficients. A change in water level of many feet in an artesian well may represent the same change in storage as a change in water level of a fraction of a foot in a water-table well.

In the ground-water reservoir of the Hueco Bolson, as in many ground-water reservoirs, water is continually moving from areas of recharge to areas of discharge. When recharge exceeds discharge, water levels in wells rise, and when discharge exceeds recharge, water levels decline. Water levels are affected by climatic trends that occur over a period of years. The long-term downward trend of water levels shown in the hydrographs in figure 8, however, is attributed primarily to withdrawals from wells and the short-term fluctuations of water levels indicate changes in rates of pumping. The closer the observation well is to the center of pumping, the greater is the response of water level to changes in pumping rates.

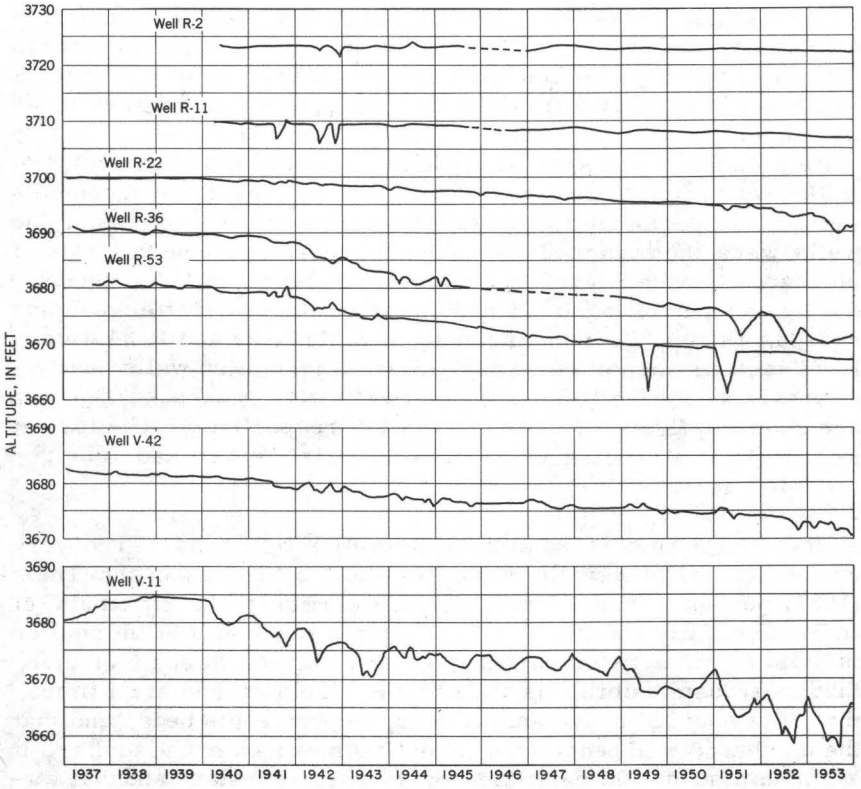

Figure 8. —Hydrographs for representative wells in the Hueco Bolson, El Paso County, Tex.

PUMPING TESTS

RESULTS

Pumping tests are made to determine the hydraulic characteristics of aquifers. These characteristics, called the coefficients of transmissibility and storage, govern the ability of an aquifer to transmit water and to release water from storage. The coefficient of transmissibility may be expressed as the number of gallons of water a day that will flow through a strip of the aquifer 1 foot wide under a hydraulic gradient of 1 foot per foot or through a strip of the aquifer 1 mile wide under a hydraulic gradient of 1 foot per mile. The volume of water that will flow each day through each mile-wide section of the aquifer, therefore, is the product of the hydraulic gradient, in feet per mile, and the coefficient of transmissibility. The coefficient of storage is defined as the volume of water the aquifer releases from or takes into storage per unit surface area of the aquifer per unit change in the component of head normal to that surface. The coefficient may be expressed as the fraction of a cubic foot of water that is discharged from each vertical column of the aquifer having a base 1 foot square as the water level is lowered 1 foot. Under water-table conditions, the coefficient of storage is approximately equal to the specific yield, which is the ratio of the volume of water a saturated material will yield by gravity to its own volume.

Five pumping tests were made in February and March 1954 at wells owned by the city of El Paso. Water-level measurements were made periodically for several hours before each test. The wells were then pumped for about 24 hours at a constant rate of discharge. Water-level measurements were made frequently during the pumping period and for about 24 hours after pumping ceased. During the pumping test on wells R-29 and R-34 water-level measurements were made also in irrigation wells nearby. Hydrographs for the 24-hour tests at wells R-29, R-34, R-56, and V-7 are shown in figures 9, 10, 11, and 12, respectively. The test at well V-41 was limited to 4 hours because the well had to be returned to service.

The drawdown curves for the observation wells and the recovery curves for all the wells were analyzed by means of the Theis (1935) nonequilibrium formula to determine the coefficients of transmissibility and storage. The formula assumes that the aquifer is infinite in areal extent, that it is homogeneous and isotropic, that its transmissibility is the same at all places and at all times, that it is bounded above and below by impermeable beds, and that the discharge well penetrates the entire thickness of the aquifer. It assumes also that the coefficient of storage is constant, and that water is removed from storage instantaneously with decline in head.

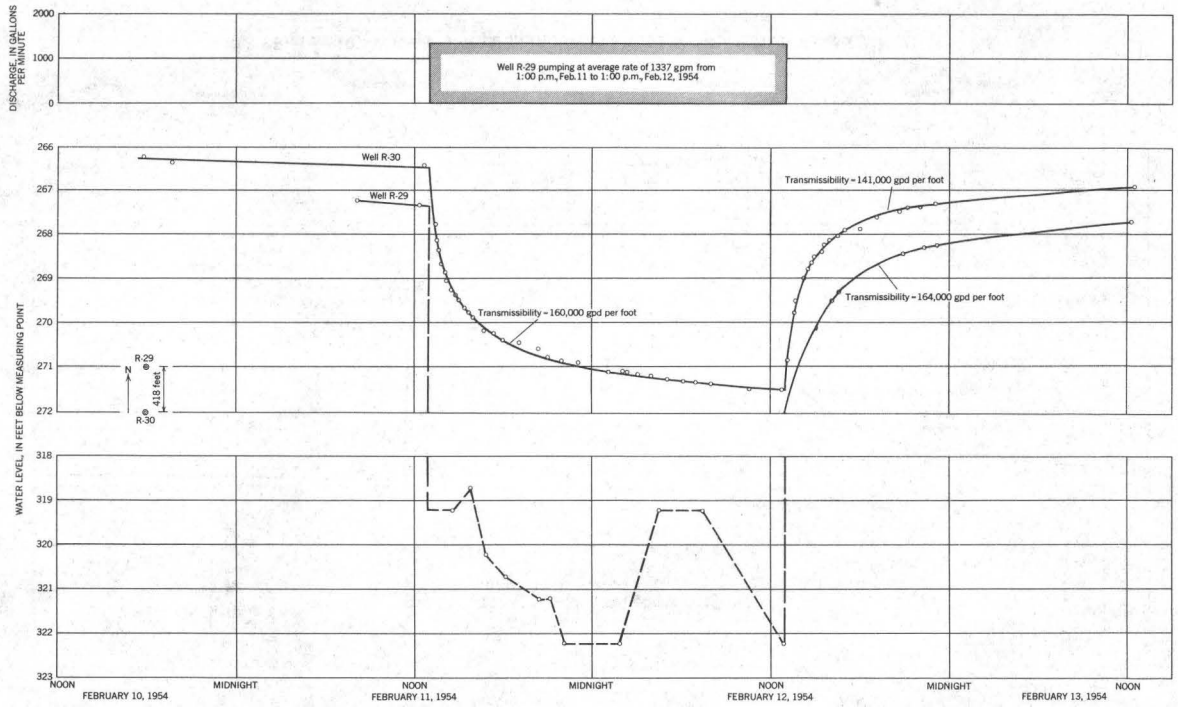

Figure 9. —Results of pumping test at well R-29, Hueco Bolson.

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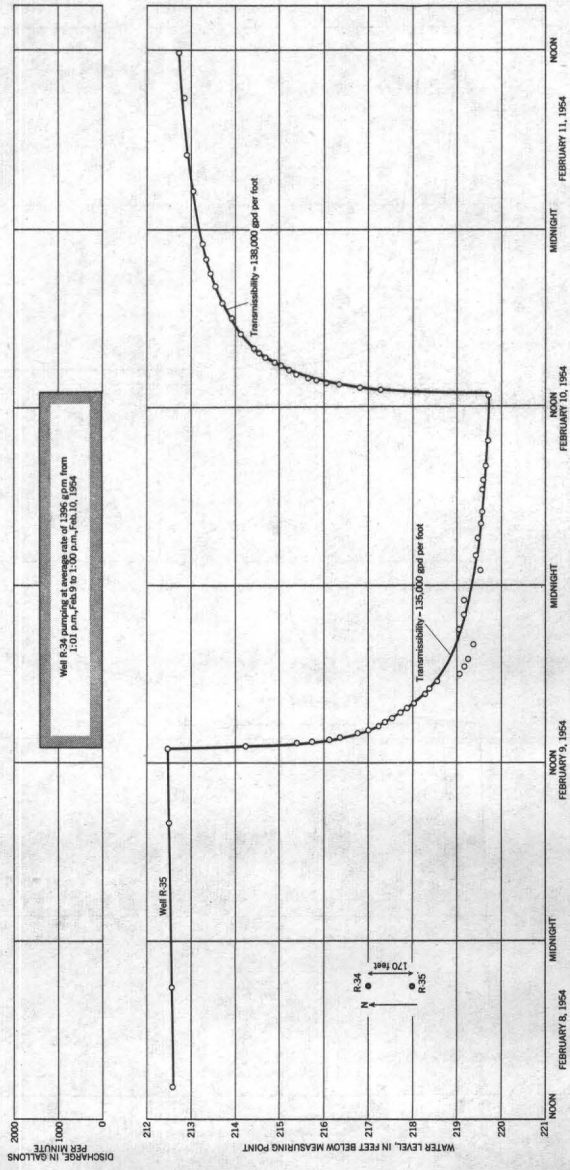

Figure 10. — Results of pumping test at well R-34, Hueco Bolson.

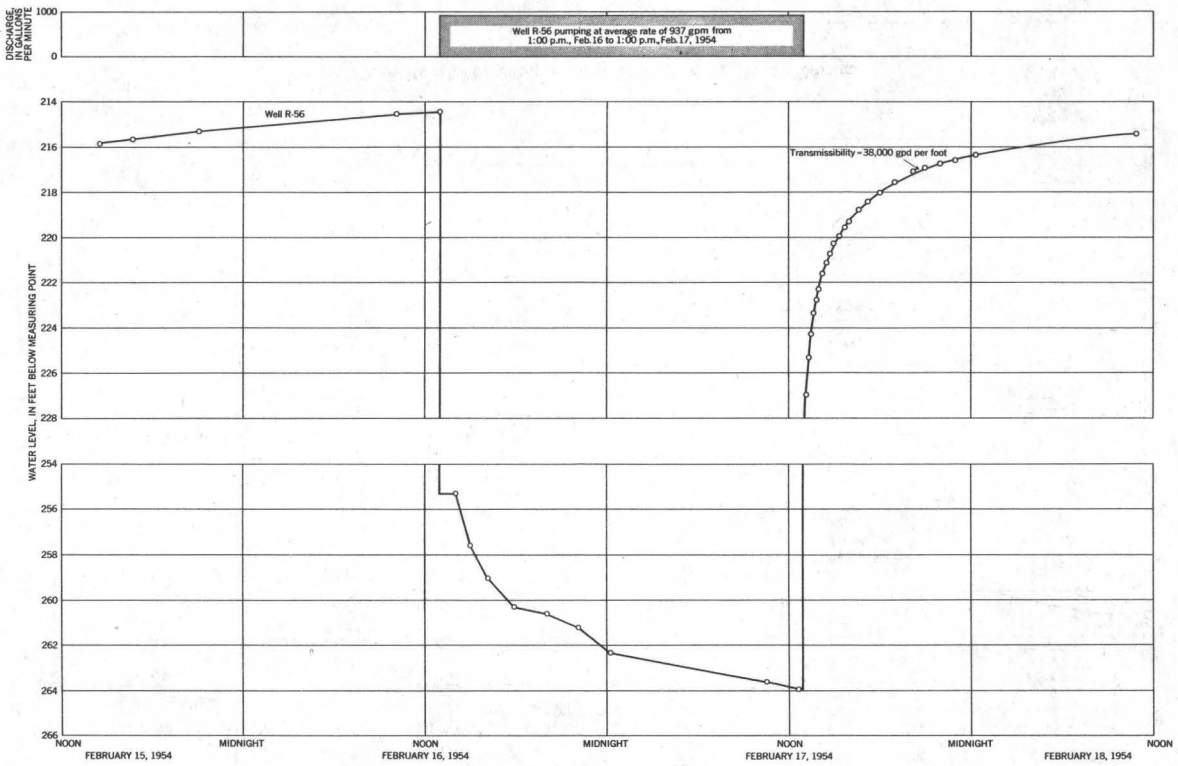

Figure 11. —Results of pumping test at well R-56, Hueco Bolson.

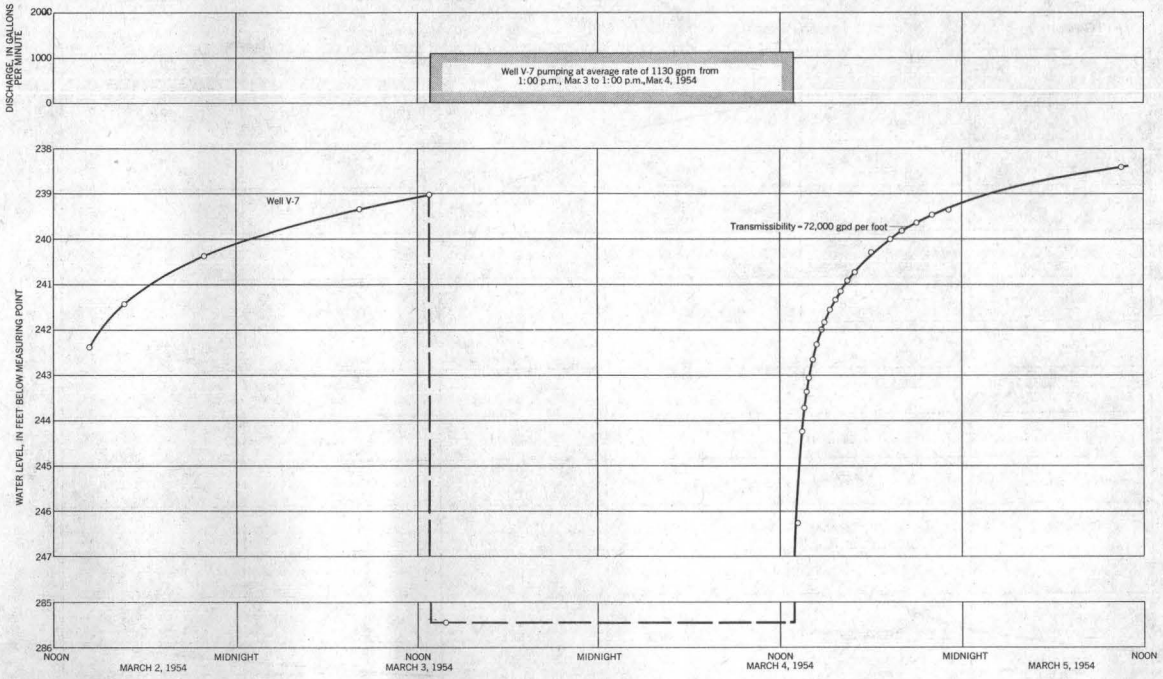

Figure 12. —Results of pumping test at well V-7, Hueco Bolson.

In spite of the restricting assumptions on which it is based, the nonequilibrium formula has been widely and successfully used in predicting aquifer performance.

The coefficients of transmissibility obtained from the pumping tests are given in table 4. The coefficient of transmissibility varies over rather wide limits, ranging from 38,000 at well R-56 to 164,000 gpd per foot at well R-29. This range was to be expected, as the bolson deposits are a heterogeneous mass of sand, gravel, and clay. In fact, the actual range may be somewhat greater because the sands are thicker and coarser near the Franklin Mountains west of well R-29.

Table 4.—*Results of pumping tests in the Hueco Bolson area*

Discharge well	Observation well	Limb of hydrograph analyzed	Transmissibility (gpd per ft)
R-29	R-29	Recovery	164,000
R-29	R-30	Drawdown	160,000
R-29	R-30	Recovery	141,000
R-34	R-35	Drawdown	135,000
R-34	R-35	Recovery	138,000
R-56	R-56	.....do.....	38,000
V-7	V-7	.....do.....	72,000
V-41	V-41	.....do.....	91,000

Sundstrom (1945) made a pumping test at Fort Bliss on wells V-27 and V-29 where he obtained coefficients of transmissibility of 52,000 and 56,000 gpd per foot, respectively. He also used the nonequilibrium formula to analyze the data from a pumping test made by Sayre and Livingston (1945) in the southern part of the Mesa well field. The coefficients of transmissibility ranged from 60,000 in an unused airlift well (not included in the present report) to 108,000 gpd per foot in wells V-2 and V-5. Additional tests in the artesian area of the Hueco Bolson underlying the El Paso Valley are described by Scalapino (1949). On the basis of the many pumping tests that have been made, it is reasonable to assume that the average coefficient of transmissibility for the fresh-water sediments of the Hueco Bolson as a whole is in the general magnitude of 100,000 gpd per foot.

The coefficient of storage of beds under water-table conditions cannot be determined accurately by means of short-term pumping tests. The water drains slowly from the saturated material and a long period of pumping is required to obtain accurate results. The fluctuations in water levels in observation wells in the Mesa show that the water is under water-table conditions; thus the storage coefficient is approximately equal to the specific yield.

The specific yield of sand samples from three test wells was determined by Sayre and Livingston (1945, p. 29) to average about 35 percent.

APPLICATION OF RESULTS

The theoretical effects of extensive artificial recharging in the Montana well field were determined by Scalapino (1949) and Sundstrom and Hood (1952) using transmissibility and storage coefficients determined by pumping tests in the well field. Predictions of future water levels that are summarized in the present report are based on estimated average transmissibility and storage coefficients and should be considered to be of a much more general nature.

The theoretical drawdown, under assumed conditions, at several distances from a well pumping continuously for given periods of time is shown in figure 13. Estimates of increased pumping lift for any well can be made by adding together the drawdown effects of surrounding wells. The same curves may be used in estimating the effects of recharge wells; in figure 13 the ordinate would then represent the rise in water levels caused by a well recharging at 500 gpm (gallons per minute).

If the assumed coefficients of transmissibility and storage, 100,000 gpd per foot and 0.35, respectively, are in the correct order of magnitude, wells yielding 500 gpm could be spaced one-half mile apart without any serious increase in pumping lifts due to mutual interference. More detailed planning would require additional pumping tests in the immediate areas concerned. For example, areas having smaller coefficients of transmissibility and storage would require larger spacing of wells or smaller yields for a given result.

RECHARGE TO THE HUECO BOLSON

NATURAL RECHARGE

The principal areas of recharge in the Hueco Bolson in the order of their importance are the alluvial fans at the base of the Franklin and Organ Mountains and the depressions on the bolson surface in which runoff collects. On the broad, flat areas of the bolson the downward percolation of precipitation is retarded by the caliche layers close to the land surface. Evapotranspiration consumes nearly all the precipitation, leaving only a negligible quantity of water to reach the water table. The conditions necessary for effective recharge are (1) a concentration, by drainageways,

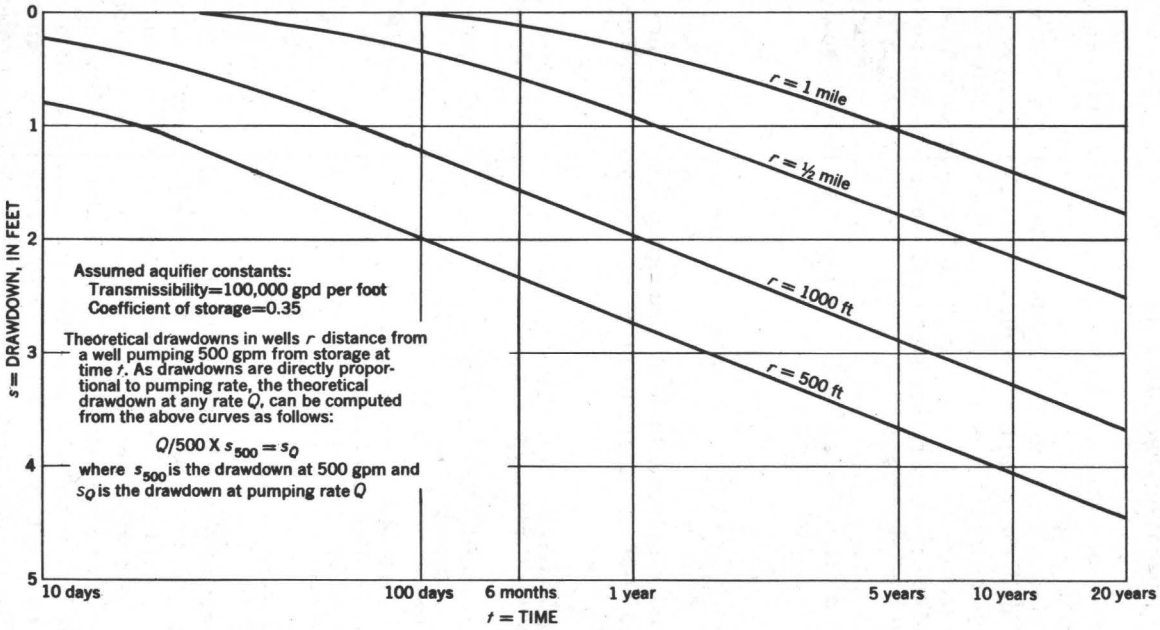

Figure 13. —Theoretical drawdown at several distances from a pumped well for given periods of time.

of storm runoff in an area where the water may percolate into the ground rapidly enough to get below the root zone of plants and (2) the absence, or fracturing, of the caliche. In the Hueco Bolson such areas of recharge are limited to the alluvial fans near the mountains and to the depressions on the bolson where the caliche beds are absent or discontinuous.

The rate of recharge to the Hueco Bolson has been estimated in previous reports by assuming that the volume of recharge was approximately equal to the difference between the volume of water pumped and the computed volume removed from storage on the Mesa. Recharge rates computed for periods between 1936 and 1944 ranged from 15 to 16 mgd. Not enough data have been collected since 1944 to refine these estimates. A fact not mentioned in previous reports is that a part of the apparent recharge is salvaged natural discharge to the Rio Grande; that is, the water withdrawn from wells includes in part water that would otherwise be discharged to the river.

ARTIFICIAL RECHARGE

The principal conclusions presented by Sundstrom and Hood (1952, p. 2–3) as the result of recharge tests in the Lower Valley are as follows:

1. In the Montana well field, treated surface water could be injected into four wells spaced 1,500 feet apart at a total rate of about 6 million gallons a day for an indefinite period.

2. In the Mesa well field, where water occurs under water-table conditions and the loss in storage due to pumping is estimated at 29 billion gallons of water since 1946, treated surface water could be injected at many times the rate possible in the Montana well field.

3. Experimental artificial recharge in the Montana well field since 1949 resulted in a reduction in the chloride content of the ground water in the vicinity of the well (city well 4) used for the experiments. Continued large-scale recharge over a long period would be required to determine the effect on the encroachment of salty water into the ground-water reservoir as a whole, but it is reasonable to assume that the present encroachment would be retarded and, in some places at least, halted altogether.

Because of the larger storage capacity and available rates of recharge of aquifers beneath the Mesa, a recharging program on the Mesa would be far more effective than one in the Lower Valley. Extensive recharging in the vicinity of the Montana well field would cause wells in downtown El Paso to flow, which would be a problem of considerable concern. Extensive recharging also would require higher heads at the injection wells in the Lower Valley than would be required for similar injection rates in wells on the Mesa. A disadvantage of a recharging program for wells on the Mesa, however, is that water must be lifted about 200 feet above the Lower Valley floor.

Excluding the use of wells, few methods of artificial recharge would be practicable in the Hueco Bolson. Spreading of Rio Grande water does not seem feasible because of the combination of arid climate and tight subsoils in the areas accessible for spreading water from that stream. Spreading of runoff from the arroyos along the mountain front, however, does seem to be worthy of consideration. A system of ditches and (or) detention dams that would accelerate the natural rate of recharge and prevent stormflow from going beyond the natural-recharge areas should serve to retard erosion and increase recharge to the bolson deposits.

GROUND WATER IN STORAGE

QUANTITY

The saturated thickness of the deposits in the Hueco Bolson which contain fresh water is shown by 100-foot contours on the isopach map (pl. 10). Computations indicate that the volume of saturated material west of the 100-foot contour in that part of the area in Texas is at least 31.6 million acre-feet and in the part in New Mexico it is at least 24.8 million acre-feet.

Sands and gravels compose the permeable sediments that will yield water to wells. The thickness and areal distribution of the sand and gravel saturated with fresh water in the Hueco Bolson are shown by 100-foot contours on plate 11. Computations based on the thicknesses shown on plate 11 indicate that sand and gravel constitute about 70 percent of the total fresh-water-bearing sediments. This percentage probably is too large because the base of the fresh water could not be determined where it occurred in clay. Using the data from plate 11 as the best that are available, however, the volumes of saturated sand and gravel containing fresh water west of the 100-foot contour in that part of the area in Texas is at least 21.2 million acre-feet and in the part in New Mexico at least 17.6 million acre-feet.

Assuming an average specific yield of 35 percent for the bolson deposits, it is estimated that west of the 100-foot contour line on plate 11 the Hueco Bolson in Texas contains about 7.4 million acre-feet of theoretically recoverable water having a chloride content of less than 250 ppm. West of the 100-foot contour line in New Mexico the Hueco Bolson contains about 6.2 million acre-feet of water that is theoretically recoverable. These estimates are conservative to some extent because some of the test wells did not reach salt water, the area of deepest fresh water near the mountains was not thoroughly explored, the quantity in storage where the thickness of water-bearing materials is less than 100

feet was not considered, and no consideration was given to water that might drain from the fine-grained deposits, such as clay and silt.

By proper well-field planning at least 50 percent of the fresh water in storage probably could be recovered before it became so contaminated as to be unusable for public supply. On the basis of 50-percent recovery, 30 mgd could be withdrawn from storage for a period of 110 years. If half the amount pumped were replaced by recharge (see p. 36),30 mgd could be pumped for 220 years. Any further increase from artificial recharge, of course, would extend this period proportionately.

Not enough data are available to determine the volume of water of inferior quality (250 to 750 ppm of chloride) in storage in the New Mexico part of the area, and only a rough estimate can be made of the volume in storage in the Texas part. The data indicate that at least 3 to 4 million acre-feet of inferior water is stored in the Hueco Bolson in Texas, and that it is about evenly divided between water containing 250 to 500 ppm of chloride and water containing 500 to 750 ppm.

The computations for the amount of fresh water in storage are more accurate for the Texas than the New Mexico portion of the bolson, where only a small number of widely spaced test wells were drilled. Additional test drilling, especially near the Organ Mountains where the fresh-water-bearing materials appear to be thickest, will be necessary to determine accurately the volume of fresh water in storage in the Hueco Bolson in New Mexico.

A small amount of additional test drilling in the Texas portion of the bolson is needed to establish more accurately the volume of fresh water in storage. Test wells are needed particularly in the area between the Military Highway and the faulted east edge of the Franklin Mountains (pl. 1). Almost 600 feet of fresh-water-bearing sands and gravels were penetrated in well R-28, and similar thicknesses may occur in much of the area west of the Military Highway. Conceivably as much as 1 to 2 million acre-feet of fresh water may be in storage in this area, but this can be determined only by test drilling.

RECOVERY

Only a small part of the total quantity of water in storage is available to the present well system. Unless additional wells are developed throughout the area of fresh water, over pumping may result in the contamination of the existing wells. The amount and rate of movement of salt water toward the wells will depend on

the rate and distribution of the withdrawals of the fresh water. If a well is pumped at a high rate, a cone of salt water may move into the fresh-water sands (fig. 14). The same quantity of water could be removed by a group of wells pumped at low rates with less danger of salt-water contamination.

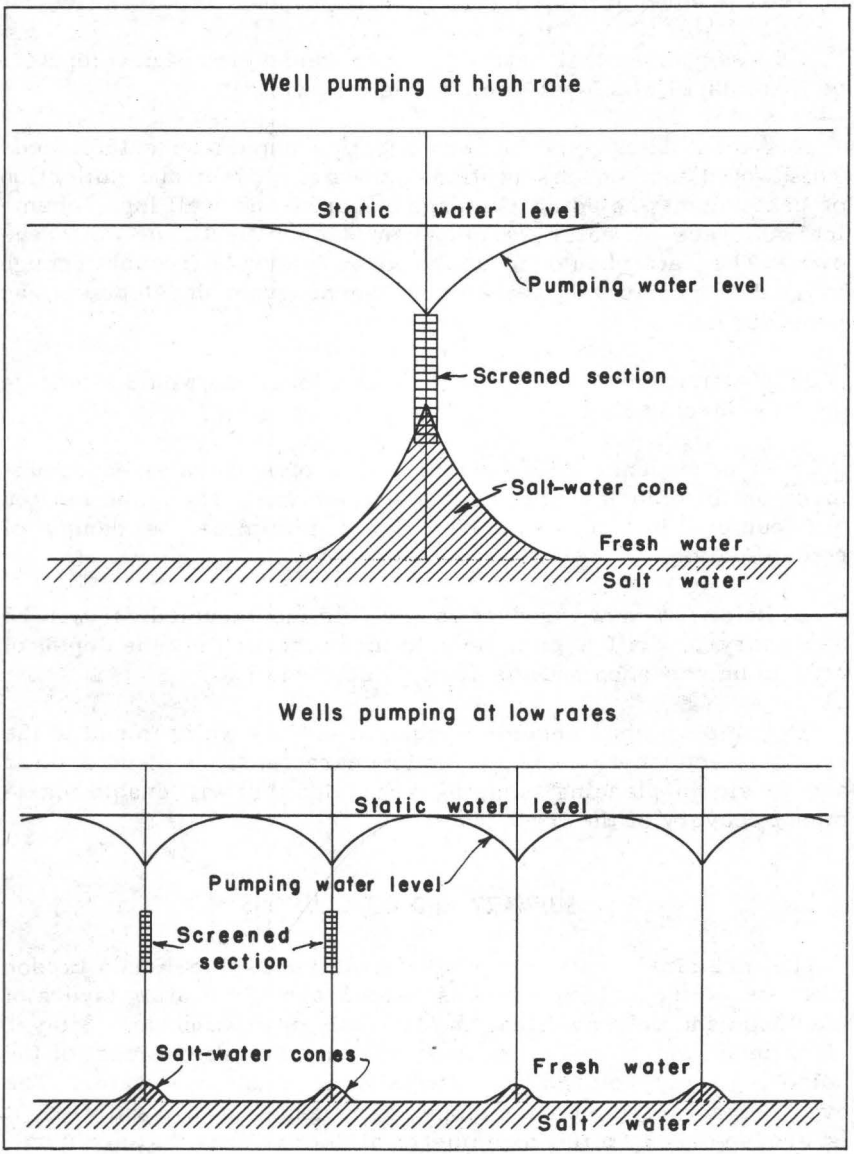

Figure 14. —Effects of salt-water contamination of a single heavily pumped well and of several wells pumping at a low rate.

As fresh ground water is removed from storage, it will be replaced in part also by salt water moving in laterally from the east. If wells are pumped at excessive rates, the salt-water contamination will occur more rapidly. On the contrary, the salt water-fresh water interface will move in more slowly on a broader front if the withdrawals are made from a large number of wells pumped at low rates.

It is suggested that a flexible long-range plan of development be formulated which will include the following:

1. A continuing type of investigation should be established. This would include observations of water levels and collection of basic data, including pumpage records and well logs, chemical analyses of water samples, and other pertinent well records. The data should be analyzed at intervals frequent enough to enable prompt adjustment of the program development, as necessary.

2. Planning tentative gridwork of well locations would facilitate orderly development.

3. In accordance with the principles of salt-water encroachment outlined in the present report, all wells should be located and pumped in such a manner as to minimize the danger of contamination.

4. Before a new production well is constructed, it will be necessary to drill a pilot hole to locate accurately the depths of beds to be screened and the depth to salt water.

5. Pumping tests should be made at all new wells to add to the available information on hydraulic characteristics of the aquifer and to aid in planning pumping schedules that will enable maximum recovery of the fresh water.

SUMMARY AND CONCLUSIONS

The principal water-bearing formation in the Hueco Bolson consists of the bolson deposits, which are alternating layers of clay and sand or gravel that are laterally discontinuous. A layer of caliche, which lies a few feet below the surface in most of the bolson, greatly retards the downward percolation of water. The even surface of the bolson slopes very gently toward the west; it is broken only by a few asymmetrical depressions that are unrelated to drainage. Because of the low rainfall, the high rate of evapotranspiration, and the tight layer of caliche near the surface of the bolson, there is probably no appreciable recharge to

the bolson deposits except in the depressions that pond water where the caliche bed is discontinuous and in the areas of heavy runoff bordering the mountains where highly permeable materials are present.

The Hueco Bolson is divisible into two general areas: the El Paso Valley and the Mesa. Fresh water occurs under artesian head in El Paso Valley where the bolson deposits underlie more recent alluvial deposits. Water-table conditions exist in the Mesa, the surface of which lies about 200 feet above the valley.

Highly mineralized water, known as "salt water," is a potential source of contamination to the fresh-water body. Salt water exists in the valley alluvial deposits, beneath the fresh water throughout the bolson, and in the eastern part of the bolson deposits.

The average annual use of ground water in the El Paso area (excluding irrigation from shallow wells in the El Paso Valley) increased from less than 2 mgd in 1906 to about 28 mgd in 1954. The rapid increase in population of the area in recent years, the increasing interest in irrigation, and the limited supply of surface water indicate that the demand for ground water will continue to grow.

An estimate based on data included in this report indicates that at least 7.4 million acre-feet of fresh water (water having less than 250 ppm of chloride) is stored in the Hueco Bolson in Texas and an additional 6.2 million acre-feet in New Mexico. All this water theoretically is available for pumping by wells, but it does not appear economically feasible to recover more than about 50 percent. It is estimated that 30 mgd of ground water can be withdrawn from storage in the Hueco Bolson for a period of 110 years, and double that if recharge continues at current rates. The period could be extended readily by the practice of artificial recharge. In addition to the fresh water, there is in storage an estimated 3 to 4 million acre-feet of water of inferior quality (250-750 ppm of chloride). Some of this water doubtless could be mixed with fresh water in suitable proportions to render it usable for a public supply.

Although a large quantity of water is available to the area, detailed planning and proper development will be necessary to get maximum recovery from the reservoir without serious contamination of the supply. It is suggested, therefore, that a long-range plan for ground-water development include a continuing-type investigation that would comprise the following:

1. Continue collection of basic data to include records of well construction, well performance, well production, periodic water-level measurements, chemical analyses of water samples, and quantities of water injected into recharge wells.

2. Locate, construct, and pump wells in such a manner as to minimize the danger of salt-water contamination.

3. Construct spreading works to increase the quantity of recharge in the permeable areas bordering the mountains. Construction should be preceded by an investigation to determine the areas and methods best suited for artificial recharge.

4. Make further studies to determine feasibility of recharging through wells, especially in the Mesa area.

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BASIC DATA

Table 5.— *Records of wells in Hueco Bolson area, El Paso*

Method of lift: B, butane; C, cylinder; Cf, centrifugal; E, electric; G, gasoline; H, hand; J, jet; N, none; Ng, natural gas; O, oil or diesel; T, turbine; W, windmill. Number indicates horsepower.

[For items marked with an asterisk(*),

Well	Owner	Driller	Date completed	Altitude of land surface (feet)	Depth of well (feet)	Diameter of well (inches)
*F-1	U. S. Geological Survey.....	B. & W. Drilling Co. of Texas.	1953	3937.4	1,200	.....
*F-2	U. S. Army.....	.....	Old	a3946	181	5
*F-3	U. S. Geological Survey.....	B. & W. Drilling Co. of Texas.	1953	4135.7	1,205	.....
F-4	U. S. Army.....	.....	Old	a4032	.....	8
*F-5	U. S. Geological Survey.....	B. & W. Drilling Co. of Texas.	1953	4015.2	580	.....
*G-1	.....do.....	.....do.....	...do...	4080.7	650	.....
*G-2	.....do.....	.....do.....	...do...	4070.5	1,209	.....
H-1	.....	.....	.....	.....	.....	.....
H-2	.....	.....	.....	.....	.....	.....
*K-13	U. S. Geological Survey.....	B. & W. Drilling Co. of Texas.	1953	4200.1	977	3
*K-14	.....do.....	.....do.....	1954	4167.7	902	3, 4
*K-15	U. S. Army.....	.....	1923	4077.4	798	8
*K-16	U. S. Geological Survey.....	B. & W. Drilling Co. of Texas.	1953	4102.3	1,085	3
*L-1	.....do.....	.....do.....	...do...	4051.6	1,208	.....
*L-2	.....do.....	.....do.....	...do...	4090.4	1,686	.....
*L-3	U. S. Army.....	.....	Old	4074.7	462	6

County, Tex., and Dona Ana and Otero Counties, N. Mex.

Use of water: D, domestic; In, industrial; Ir, irrigation; N, none; P, public supply; S, stock.

see chemical analyses in table 6]

Water level		Method of lift	Use of water	Remarks
Below land surface datum (feet)	Date of measurements			
165.1	Apr. 4, 1953	N	N	Test well. Electric log and drill-stem tests indicate fresh-water sands extend to 1,010 ft. See sample and electric logs.
152.8	Apr. 23, 1936	C, W	N	Well filled.
381.0	June 27, 1953	N	N	Test well. Electric log and drill-stem tests indicate fresh-water sands extend to bottom of well. See sample and electric logs.
267.7 267.6	Apr. 17, 1936 July 9, 1940	C, W	N	Well filled to about 249 ft below land surface.
256.7	Apr. 4, 1953	N	N	Test well. Electric log and drill-stem tests indicate fresh-water sands extend to 360 ft. See sample and electric logs.
287.5	Mar. 29, 1953	N	N	Test well. Electric log and drill-stem tests indicate no fresh-water sands. See sample and electric logs.
312.7	July 14, 1953	N	N	Test well. Electric log and drill-stem tests indicate fresh-water sands extend to 500 ft. See sample and electric logs.
.....	.....	C, W	N	
.....	.....	C, W	N	
381.4	May 31, 1954	N	N	Test well. Electric log and drill-stem tests indicate no fresh-water sands. Bedrock penetrated at 960 ft. Three-inch casing to 768 ft, slotted from 678 to 708 ft and from 738 to 768 ft. See sample and electric logs.
349.3 349.3	Jan. 23, 1954 Apr. 16, 1954	N	N	Test well. Electric log and drill-stem tests indicate fresh-water sands extend to bottom of well. Bedrock penetrated at 890 ft. Three-inch casing to 520 ft, 4-in. from 520 to 610 ft, slotted from 570 to 610 ft. See sample and electric logs.
330.6 330.5	Apr. 17, 1936 May 13, 1953	T, G 95	D	Casing: 8-in. from surface to 794 ft, slotted from 474 to 794 ft. See driller's log.
356.7	Jan. 7, 1954	N	N	Test well. Electric log and drill-stem tests indicate fresh-water sands extend to 870 ft. Three-inch casing to 544 ft, slotted from 526 to 544 ft. See sample and electric logs.
300.3	Mar. 31, 1953	N	N	Test well. Electric log and drill-stem tests indicate no fresh-water sands. See sample and electric logs.
352.4	May 31, 1953	N	N	Test well. Electric log and drill-stem tests indicate fresh-water sands extend to 1,250 ft. See sample and electric logs.
336.0 335.9	Apr. 16, 1936 Mar. 8, 1954	N	N	

See footnotes at end of table.

Table 5.—*Records of wells in Hueco Bolson area, El Paso County,*

Well	Owner	Driller	Date completed	Altitude of land surface (feet)	Depth of well (feet)	Diameter of well (inches)
*L-4	U. S. Geological Survey.....	B. & W. Drilling Co. of Texas.	1953	4086.4	950	.....
*L-5	U. S. Army.....	.....	Old	4059.8	350	.....
*L-6	U. S. Geological Survey.....	B. & W. Drilling Co. of Texas.	1953	4068.0	690	.....
L-7	U. S. Army.....	Layne-Texas Co., Ltd.	1943	.....	439	$10\frac{3}{4}$, $4\frac{1}{2}$
*L-8	.....do.....	.....do.....	1944	4029.4	440	10, 12
L-9	W. W. Threadgill.....	.....	.....	4094.7	400	6
L-10	W. F. Blythe.....	.....	Old	4185.0	520	6
*L-11	James Blythe.....	.....	1933	4032.2	340	6
*L-12	U. S. Geological Survey.....	B. & W. Drilling Co. of Texas.	1953	4045.8	1,209	3
*L-13	Prescott Colquitt.....	.....	.....	4043.9	400	6
M-1	.....	.....	.....	4101.4	.....	8
*M-2	U. S. Geological Survey.....	B. & W. Drilling Co. of Texas.	1953	3998.7	735	.....
M-3	.....	.....	.....	3970.5	.....	.....
M-4	U. S. Army.....	R. F. Casteel.....	1930	[a]4072	450	.....
*M-5	U. S. Geological Survey.....	B. & W. Drilling Co. of Texas.	1953	4061.2	880	3
M-6	Southern Pacific Co.....	Layne & Bowler Co...	1917	3999.8	400	18, 13
*M-7	.....do.....	.....	1902	.....	332	6
M-8	F. M. Reeves.....	.....	Old	4016.2	320	6
N-1	U. S. Geological Survey.....	B. & W. Drilling Co. of Texas.	1953	.....	945	.....
N-2	.....	.....	.....	.....	500+	.....
N-3	.....	Al Parker.....	.....	.....	1,000	.....

Tex., and Dona Ana and Otero Counties, N. Mex.— Continued

Water level		Method of lift	Use of water	Remarks
Below land surface datum (feet)	Date of measurements			
361.3	Apr. 27, 1953	N	N	Test well. Electric log and drill-stem tests indicate no fresh-water sands. See sample and electric logs.
325.6 323.4	June 23, 1937 Mar. 9, 1954	C, W	N	
334.4	Apr. 11, 1953	N	N	Test well. Electric log and drill-stem tests indicate fresh-water sands extend to 445 ft. See sample and electric logs.
b300	1943	T, G 65	D	Casing: $10\frac{3}{4}$-in. from surface to 331 ft, $8\frac{5}{8}$-in. screen from 331 to 354 ft, $4\frac{1}{2}$-in. screen from 354 to 424 ft, $4\frac{1}{2}$-in. from 424 to 434 ft. See driller's log.
293.0	Mar. 10, 1954	T, G 58	D	Casing: 10-in. from surface to 320 ft, 12-in. from 320 to 402 ft, 12-in. screen from 402 to 440 ft. Gravel-walled. See driller's log.
325.6	June 23, 1937	C, G	D, S	
381.9	Mar. 9, 1954	C, G	S	Casing: 6-in. from surface to 90 ft. "Limestone" reported from 90 ft to bottom of well.
319.7	.....do.....	C, W	S	
323.6	Jan. 15, 1954	N	N	Test well. Electric log and drill-stem tests indicate fresh-water sands extend to 680 ft. Three-inch casing to 525 ft, slotted from 480 to 495 ft and from 510 to 525 ft. See sample and electric logs.
327.5	June 16, 1954	C, W	S	
355.3	Mar. 23, 1954	C, W	N	
270.0	Apr. 17, 1953	N	N	Test well. Electric log and drill-stem tests indicate no fresh-water sands. See sample and electric logs.
.....	.....	C, W	S	
b350	1930	C, W	N	
347.9	Jan. 6, 1954	N	N	Test well. Electric log and drill-stem tests indicate no fresh-water sands occur. Three-inch casing to 435 ft, slotted from 425 to 435 ft. See sample and electric logs.
283.6 283.4	June 1, 1936 Jan. 7, 1954	C	N	
.....	.....	.....	.....	Casing: 6-in. from surface to 320 ft, 6-in. screen from 320 to 332 ft. See driller's log.
292.6 290.1	Feb. 8, 1937 July 11, 1938	C, W	N	
.....	.....	N	N	Test well. No water-bearing sands encountered. Bedrock penetrated at 895 ft. See sample and electric logs.
500+	.....	C	N	
.....	.....	N	N	Limestone reported at 480 ft, and very porous zone at 610 ft.

See footnotes at end of table.

Table 5.— *Records of wells in Hueco Bolson area, El Paso County,*

Well	Owner	Driller	Date completed	Altitude of land surface (feet)	Depth of well (feet)	Diameter of well (inches)
N-4	.....	Al Parker.....	.....	.....	700	.....
N-5	.....	.....	.....	.....	.....	.....
*N-6	U. S. Geological Survey.....	B. & W. Drilling Co. of Texas.	1953	4094.6	820	.....
*N-7	Navar Bros	.....	.....	4095.3	300	.....
N-8	Adelberto Navar.....	.....	Old	a4097.0	.....	.....
*R-1	U. S. Geological Survey.....	B. & W. Drilling Co. of Texas.	1953	4125.4	1,200	.....
*R-2	City of El Paso.....	C. R. Jensen.....	1940	4041.2	1,018	4
*R-3	U. S. Geological Survey.....	B. & W. Drilling Co. of Texas.	1953	4060.8	950	.....
*R-4	.....do.....	.....do.....	..do....	4046.0	825	3
R-5	Price's Dairy.....	.....	.....	4059.3	.....	.....
R-6	El Paso Natural Gas Co.....	George McKenzie.....	1951	4030.3	750	.....
R-7	.....do.....	.....	.....	4031.2	630	.....
R-8	.....do.....	Folk & Bassett.....	1947	.....	771	10
R-9	Price's Dairy.....	.....	Old	4007.5	360	5
*R-10	City of El Paso.....	C. R. Jensen.....	1940	4048.1	788	4
*R-11	.....do.....	.....do.....	..do....	4046.2	1,202	4
R-12	Wholesome Dairy.....	.....	.....	4247.3	700	10
*R-13	U. S. Geological Survey.....	B. & W. Drilling Co. of Texas.	1953	3973.7	1,200	.....
R-14	J. K. Shearman.....	Layne-Texas Co. Ltd..	1942	3991.1	515	8, 6
*R-15	U. S. Army.....	.....do.....	1952	3972.5	450	6⅝

Tex., and Dona Ana and Otero Counties, N. Mex.— Continued

Water level		Method of lift	Use of water	Remarks
Below land surface datum (feet)	Date of measurements			
.....	.....	N	N	Reported no water-bearing sands to depth of 650 ft where igneous rock was penetrated
.....	.....	N	N	Well filled.
447.3	June 21, 1953	N	N	Test well. Electric log and drill-stem tests indicate no fresh-water sands. See sample and electric logs.
176.0 162.0	Aug. 9, 1935 Apr. 9, 1954	C, W	N	
452.9 411.7	July 19, 1938 June 26, 1941	N	N	Water reported hot and highly mineralized.
379.0	July 22, 1953	N	N	Test well. Electric log and drill-stem tests indicate fresh-water sands extend to 700 ft. See sample and electric logs.
317.7 318.4	May 27, 1940 Jan. 7, 1954	N	N	Casing: 4-in. to 520 ft, slotted from 419 to 520 ft. See driller's log.
347.2	May 26, 1953	N	N	Test well. Electric log and drill-stem tests indicate fresh-water sands extend to 380 ft. See sample and electric logs.
331.1	Jan. 7, 1954	N	N	Test well. Electric log and drill-stem tests indicate fresh-water sands extend to 430 ft. Three-inch casing to 520 ft, slotted from 500 to 520 ft. See sample and electric logs.
.....	.....	C, W	S	
[b]340	Oct. 1951	T, E, 25	In	Pump set at 540 ft.
340.2	June 12, 1953	T, E, 25	In	
.....	.....	N	In	See driller's log.
291.6 298.1	Aug. 9, 1935 Jan. 7, 1954	C, W	S	
338.7	June 21, 1940	N	N	Test well. Drill-stem tests indicate fresh-water sands extend to 510 ft. Casing: 4-in. from surface to 446 ft, 4-in. screen from 446 to 466 ft. See driller's log.
335.6 339.5	Apr. 23, 1940 Jan. 7, 1954	N	N	Test well. Casing: 4-in. from surface to 567 ft; slotted from 342 to 381, 440 to 461, 474 to 492, and from 501 to 524 ft. See driller's log.
[b]508	June 1954	C, W	S	
271.2	May 25, 1953	N	N	Test well. Electric log and drill-stem tests indicate fresh-water sands extend to 900 ft. See sample and electric logs.
286.3 288.5	Jan. 23, 1942 Apr. 7, 1953	T, E, 25	D, S, Ir	Casing: $8\frac{5}{8}$-in. from surface to 342 ft.; $6\frac{5}{8}$-in. from 342 to 515 ft; $6\frac{5}{8}$-in. screen from 342 to 386 ft and from 453 to 515 ft. Pump set at 320 ft. Yield reported 150 gpm. See driller's log.
274.0 274.6	Feb. 29, 1952 Jan. 6, 1954	N	N	Casing: $6\frac{5}{8}$-in. from surface to 450 ft, slotted from 320 to 360 ft. See electric and driller's logs.

See footnotes at end of table.

Table 5.— *Records of wells in Hueco Bolson area, El Paso County,*

Well	Owner	Driller	Date completed	Altitude of land surface (feet)	Depth of well (feet)	Diameter of well (inches)
*R-16	U. S. Army	Layne-Texas Co. Ltd.	1952	3972.3	550	6⅝
*R-17	City of El Paso	C. R. Jensen	1940	3976.5	990	.....
*R-18	.....do.....	.....do.....	..do....	3962.0	957	.....
R-19	Likins, Foster & Associates.....	.....	1950	.....	322	14
*R-20	City of El Paso	C. R. Jensen	1940	3911.6	1,007	.....
R-21	Alfredo Avila	.....	1953	.....	409	8
*R-22	City of El Paso	H M. Stanley	1936	3944.0	500	2
*R-23	.....do.....	Layne-Texas Co., ltd.	1953	3972.0	1,177	.....
R-24	Joe Crump	Jim Folk	1948	.....	480	.....
R-25	.....do.....	Wheeler Cass	1953	.....	515	12
R-26	.....do.....	.....do.....	1950	.....	500	14
R-27	— Boyd	.....do.....	1951	.....	544	16
*R-28	U. S. Geological Survey	B. & W. Drilling Co. of Texas.	1953	4120.1	1,635	3
*R-29	City of El Paso	Layne-Texas Co., ltd.	1952	3942.3	832	24, 18, 12¾
R-30	H. A. Gschwind	.....	.....	.....	.....	.....

Tex., and Dona Ana and Otero Counties, N. Mex.— Continued

Water level		Method of lift	Use of water	Remarks
Below land surface datum (feet)	Date of measurements			
273.4 274.1	Feb. 29, 1952 Jan. 6, 1954	N	N	Casing: 6⅝-in. from surface to 550 ft, slotted from 510 to 550 ft. See electric and driller's logs.
274.5	Sept. 27, 1940	N	N	Test well. Drill-stem tests indicate fresh-water sands extend to 445 ft. See driller's log.
265.9	Nov. 4, 1940	N	N	Test well. Drill-stem tests indicate fresh-water sands extend to 700 ft. See driller's log.
[b]216	.....	T, D	Ir	Casing: 14-in. from surface to 322 ft, slotted from 222 to 322 ft. Pump set at 290 ft. Yield reported 1,300 gpm. See driller's log.
210.8	Dec. 12, 1940	N	N	Test well. Drill-stem tests indicate fresh-water sands extend at least to 820 ft. See driller's log.
[b]220	1953	T, B	Ir	Casing: 8-in. from surface to 409 ft, slotted from 220 to 409 ft. Pump set at 260 ft. Reported drawdown 10 ft after 60 hr pumping 300 gpm.
244.4 255.0	July 24, 1936 Apr. 19, 1954	N	N	Casing: 2-in. to 400 ft. See driller's log.
288.0	Mar. 25, 1953	T, E	P	Casing: 24-in. to 350 ft, cemented to surface; 18-in. from surface to 467, 12¾-in. from 467 to 830, mill slotted from 360 to 820 ft. Pump set at 380 ft. Drawdown 56 ft after 24 hr pumping 1,500 gpm on Mar. 24, 1953. Gravel-walled. Electric log of test well drilled at this location in 1939 to 1,177 ft indicates fresh-water sands extend to 855 ft. See electric and driller's log of test well.
[b]295	.....	.....	Ir	Pumping equipment not installed. Reported yield 500 gpm.
281.9	Mar. 17, 1954	T, E, 5	D	Casing: 12-in. from surface to 515 ft, slotted from 315 to 515 ft. Pump set at 310 ft. Gravel-walled.
284.7	Mar. 18, 1954	T, B	Ir	Casing: 14-in. from surface to 500 ft, slotted from 320 to 500 ft. Pump set at 324 ft.
314.8	Mar. 17, 1954	T, Ng, 160	Ir	Casing: 16-in. from surface to 544 ft. Yield reported 1,000 gpm.
423.1	Jan. 7, 1954	N	N	Test well. Electric log and drill-stem tests indicate fresh-water sands extend to 1,260 ft. Three-inch casing to 630 ft, slotted from 610 to 630 ft. See sample and electric logs.
258.5 266.3	Jan. 15, 1953 Feb. 11, 1954	T, E	P	Casing: 24-in. from surface to 293 ft, cemented to surface; 18-in. from surface to 431 ft, 12¾-in. from 431 to 832 ft, mill slotted from 318 to 830 ft. Electric log of test well drilled at this location in 1939 to 1,206 ft indicates fresh-water sands extend to 922 ft. Pump set at 380 ft. Drawdown 55 ft after 24 hr pumping 1,337 gpm Feb. 12, 1954. Gravel-walled. See electric and driller's logs of test well.
259.6 264.3	Jan. 15, 1953 Feb. 10, 1954	T, G	Ir	

See footnotes at end of table.

Table 5.— *Records of wells in Hueco Bolson area, El Paso County,*

Well	Owner	Driller	Date completed	Altitude of land surface (feet)	Depth of well (feet)	Diameter of well (inches)
*R-31	City of El Paso	Layne-Texas Co., Ltd.	1952	3907.9	790	24, 18, 12¾
R-32	L. G. Rogers	—Prince	1949	.....	440	10
R-33	City of El Paso	C. R. Jensen	1939	3889.9	1,217	.....
*R-34	.....do.....	Layne-Texas Co., Ltd.	1952	3884.9	814	24, 18, 12¾
R-35	Jerome Martin	.....	1950	.....	440	16
R-36	G. L. Cook	W. L. Cass	.....	3936.2	300	6
*R-37	U. S. Geological Survey	B. & W. Drilling Co. of Texas.	1954	4094.0	1,220	.....
*R-38	Restlawn Cemetary	.....	1910	.....	640	.....
*R-39	City of El Paso	C. R. Jensen	1939	3875.4	1,137	.....
*R-40	.....do.....	Layne-Texas Co., Ltd.	1941	3879.1	806	24, 16, 13
R-41	—Anderson	Al Parker	1951	.....	500	14, 12
R-42	City of El Paso	C. R. Jensen	1939	3882.3	1,257	4
R-43	El Paso Natural Gas Co	Mountain Drilling Co.	1953	.....	722	.....

Tex., and Dona Ana and Otero Counties, N. Mex.—Continued

Water level		Method of lift	Use of water	Remarks
Below land surface datum (feet)	Date of measurements			
223.6	Jan. 15, 1953	T, E	P	Casing: 24-in. from surface to 240 ft, cemented to surface; 18-in. from surface to 411 ft, 12¾-in. from from 411 to 790 ft, mill slotted from 301 to 788 ft. Pump set at 380 ft. Drawdown 47 ft after 24 hr pumping 1,515 gpm on Nov. 9, 1952. Gravel-walled. Electric log of test well drilled at this location in 1939 to 1,357 ft indicates fresh-water sands extend to 1,165 ft. See electric and driller's log of test well.
228.2	Mar. 17, 1954	T, B	Ir	Casing: 10-in. from surface to 440 ft. Yield reported 450 to 500 gpm.
.....	.....	N	N	Test well. Electric log indicates fresh-water sands extend to bottom of well. See electric and driller's logs.
208.4 211.0	Jan. 15, 1953 Feb. 9, 1954	T, E	P	Casing: 24-in. from surface to 262 ft, cemented to surface; 18-in. from surface to 387 ft, 12¾-in. from 387 to 814 ft, mill slotted from 300 to 812 ft. Pump set at 360 ft. Drawdown 71 ft after 24 hr pumping 1,396 gpm on Feb. 10, 1954. Gravel-walled. Electric log of test well drilled at this location in 1939 to 1,217 ft indicates fresh-water sands extend to bottom of test well. See electric and driller's logs.
211.6	Feb. 8, 1954	T, Ng	Ir	Casing: 16-in. from surface to 440 ft, slotted from 200 to 279 ft, and from 295 to 400 ft. Yield reported 1,400 gpm.
245.0 264.5	Apr. 14, 1936 Jan. 7, 1954	N	N	Casing: 6-in. from surface to 300 ft.
416.6	Sept. 4, 1953	N	N	Test well. Electric log and drill-stem tests indicate fresh-water sands extend to bottom of well, but only 70 ft of water-bearing sand penetrated. See sample and electric logs.
213.3 211.7	Aug. 29, 1937 Nov. 8, 1938	.....	.....	
198.3	Apr. 8, 1939	N	N	Test well. Electric log indicates fresh-water sands extend to bottom of well. See electric and driller's logs.
197.4 210.0	June 25, 1941 Jan. 7, 1954	T, E, 250	P	Drawdown 51 ft after 24-hr pumping 1,585 gpm in 1941. Gravel-walled. Electric log of test well drilled at this location in 1939 to 1,237 ft indicates fresh-water sands extend to 1,085 ft. See electric and driller's logs of test hole.
212.1	Oct. 23, 1951	T, D	Ir	Casing: 12-in. from surface to 205 ft, 14-in. from 205 to 295 ft, 12-in. from 295 to 500 ft, slotted from 220 to 500 ft. Pump set at 300 ft. Yield measured 660 gpm on Oct. 23, 1951.
192.7 209.8	June 20, 1939 Jan. 7, 1954	N	N	Test well. Casing: 4-in. to 385 ft. Electric log indicates fresh-water sands extend to 1,160 ft. See electric and driller's logs.
.....	.....	.....	In	Yield reported 220 gpm in 1953. See electric log.

Table 5.—*Records of wells in Hueco Bolson area, El Paso County,*

Well	Owner	Driller	Date completed	Altitude of land surface (feet)	Depth of well (feet)	Diameter of well (inches)
R-44	El Paso Natural Gas Co.....	Mountain Drilling Co.	1948	.....	398	10⅝
R-45	Jerome Martin.....	.....	1952	.....	640	20,16
*R-46	U. S. Army.....	Bassett Drilling Co....	1953	.....	820	24,16
R-47	.....do.....	.....	Old	3902.2	400	10
R-48	.....do.....	Bassett Drilling Co....	1953	.....	810	24,16
*R-49	.....do.....	Layne-Texas Co., Ltd.	1952	.....	404	3
*R-50	City of El Paso.....	C. R. Jensen.....	1941	3932.6	950	4
R-51	U. S. Army.....	Bassett Drilling Co....	1953	.....	820	24,16
*R-52	.....do.....	.....do.....	..do....	.....	812	24,16
*R-53	City of El Paso.....	Layne-Texas Co., Ltd.	1937	3874.1	800	6
R-54	.....do.....	.....do.....	..do....	3869.9	698	.....
*R-55	.....do.....	.....do.....	..do....	3869.0	830	.....
*R-56	.....do.....	.....do.....	1941	3873.6	909	24, 16, 13

Tex., and Dona Ana and Otero Counties, N. Mex.—Continued

Water level		Method of lift	Use of water	Remarks
Below land surface datum (feet)	Date of measurements			
b205	Jan. 1948	T, E,15	In	Pump set at 280 ft. Yield reported 100 gpm.
.....	.....	.....	Ir	Casing: 20-in. from surface to 400 ft, 16-in. from 400 to 640 ft. Not equipped with pumping plant.
220.4	Mar. 22, 1954	T, E, 100	P	Casing: 24-in. from surface to 249 ft, cemented to surface; 16-in. from surface to 810 ft, 14-in. screen from 312 to 392 ft, 404 to 424 ft, 432 to 482 ft, 514 to 564 ft, 582 to 602 ft, 652 to 692 ft, and from 728 to 798 ft. Pump set at 289 ft. Drawdown reported 14 ft pumping 1, 200 gpm in 1953. Gravel-walled. See electric and sample log.
210.4 226.1	Aug. 7, 1935 Jan. 7, 1954	C, W	N	
229.0	Mar. 22, 1954	T, E 125	P	Casing: 24-in. from surface to 230 ft, cemented to surface; 16-in. from surface to 816 ft, 14-in. screen from 260 to 280 ft, 290 to 400 ft, 452 to 562 ft, 590 to 620 ft, and from 660 to 690 ft. Pump set at 300 ft. Drawdown reported 40 ft pumping 1, 200 gpm in 1953. Gravel-walled. See electric and sample logs.
253.6 254.2	Feb. 27, 1952 Jan. 6, 1954	N	N	Test well. Casing: 3-in. to 400 ft, screen from 390 to 400 ft. See electric and driller's logs.
242.3 243.7	Dec. 13, 1940 Oct. 26, 1942	N	N	Test well. Casing: 4-in. from surface to 603 ft, slotted from 379 to 401, 422 to 442, 479 to 501, 522 to 543, and from 582 to 603 ft. Drill-stem tests indicate fresh-water sands extend to at least 770 ft. See driller's log.
229.8	Mar. 22, 1954	T, E, 125	P	Casing: 24-in. from surface to 230 ft, cemented to surface; 16-in. from surface to 814 ft, 14-in. screens from 270 to 350 ft, 440 to 470 ft, 530 to 550 ft, 580 to 710 ft, and from 750 to 790 ft. Pump set at 300 ft. Drawdown reported 33 ft pumping 1, 200 gpm in 1953. Gravel-walled. See electric and driller's logs.
220.0	.....do.....	T, E, 100	P	Casing: 24-in. from surface to 219 ft, cemented to surface; 16-in. from surface to 810 ft, 14-in. screens from 306 to 506 ft, 552 to 572 ft, 617 to 637 ft, and from 696 to 756 ft. Pump set at 289 ft. Drawdown reported 47 ft pumping 1, 200 gpm in 1953. Gravel-walled. See sample and electric logs.
188.4 202.3	Aug. 24, 1937 Jan. 7, 1954	N	N	Test well. Casing: 6-in. from surface to 800 ft, slotted from 195 to 216 ft, 321 to 343 ft, 636 to 679 ft, and from 737 to 800 ft. Only 74 ft of water-bearing sand penetrated. See driller's log.
.....	.....	N	N	Test well. Estimated only 37 ft of water-bearing sand penetrated. See driller's log.
204.0	July 1937	N	N	Test well. Drill-stem tests indicate fresh-water sands extend to at least 505 ft. See driller's log.
207.1 211.0	June 21, 1941 Jan. 7, 1954	T, E	P	Electric log of test well drilled at this location in 1939 to 1,867 ft indicates fresh-water sands extend to 1,005 ft. See electric and driller's logs of test hole.

See footnotes at end of table.

Table 5.—*Records of wells in Hueco Bolson area, El Paso County,*

Well	Owner	Driller	Date completed	Altitude of land surface (feet)	Depth of well (feet)	Diameter of well (inches)
R-57	U. S. Army		Old	[a]3942		8
*S-1	U. S. Geological Survey	B. & W. Drilling Co. of Texas.	1953	3994.7	800	
*S-2	Navar Bros.		Old	4075.2	400	5
S-3	do.			4073.4		
S-4	U. S. Army			4043.3		
*S-5	U. S. Geological Survey	B. & W. Drilling Co. of Texas.	1953	3973.1	1,005	3
*S-6	U. S. Army			3975.1		6
*S-7	City of El Paso	C. R. Jensen	1940	3965.5	795	
*S-8	U. S. Geological Survey	B. & W. Drilling Co. of Texas.	1953	4012.4	1,020	3
*S-9	do.	do.	do.	4052.7	1,000	
S-10	U. S. Army	Layne-Texas Co., Ltd.	1943	4060.9	611	$10\frac{3}{4}$, $12\frac{3}{4}$
*S-11	Adelberto Navar			[a]4059	410	
S-12	U. S. Army			3996.5		7
*S-13	do.	Layne-Texas Co., Ltd.	1952		501	3
*S-14	U. S. Geological Survey	B. & W. Drilling Co. of Texas.	1953	4004.8	1,200	3
T-1	Farmer's Dairy	Al Parker	1952			8, 5
T-2	J. L. Davis				2,100	
V-1	City of El Paso	V. Chesney	1935		640	
V-2	do.	City of El Paso		3869.8	606	8

Tex., and Dona Ana and Otero Counties, N. Mex.—Continued

Water level		Method of lift	Use of water	Remarks
Below land surface datum (feet)	Date of measurements			
253.4	Oct. 4, 1950	N	N	
269.4	Jan. 6, 1954			
270.0	Mar. 21, 1953	N	N	Test well. Electric log and drill-stem tests indicate fresh-water sands extend to 285 ft. See electric and sample logs.
363.6	Aug. 10, 1935	C, W	N	Filled.
363.6	May 5, 1939			
366.0	Apr. 14, 1954	N	N	
337.5	.....do.....	N	N	
266.8	Jan. 6, 1954	N	N	Test well. Electric log and drill-stem tests indicate fresh-water sands extend to 530 ft. Three-inch casing from surface to 450 ft, slotted from 430 to 450 ft. See electric and sample logs.
267.2	Apr. 3, 1936	C, W	N	Drilled as an oil test.
268.9	Jan. 6, 1954			
265.7	Oct. 15, 1940	N	N	Test well. Drill-stem tests indicate fresh-water sands extend to 396 ft. See driller's log.
308.8	Jan. 6, 1954	N	N	Test well. Electric log and drill-stem tests indicate fresh-water sands extend to 415 ft. Three-inch casing from surface to 502 ft, slotted from 482 to 502 ft. See electric and sample logs.
308.4	Apr. 9, 1954			
357.6	July 29, 1953	N	N	Test well. Electric log and drill-stem tests indicate fresh-water sands extend to 455 ft. See electric and sample logs.
362.8	Mar. 4, 1954	N	N	Casing: $10\frac{3}{4}$-in. from surface to 448 ft, $12\frac{3}{4}$-in screen from 448 to 469 ft. Drawdown 54 ft pumping 125 gpm in Nov. 1943. Gravel-walled. See driller's log.
360.0	Mar. 30, 1936	C, W	N	Filled.
301.6	Apr. 25, 1952	C, W	N	
301.2	Mar. 5, 1954			
315.9	Mar. 24, 1952	N	N	Test well. Casing: 3-in. from surface to 500 ft, screen from 490 to 500 ft. See electric and driller's logs.
316.4	Jan. 1954			
314.2	Jan. 6, 1954	N	N	Test well. Electric log and drill-stem tests indicate fresh-water sands extend to 480 ft. Three-inch casing to 420 ft, slotted from 410 to 420 ft. See electric and sample logs.
497.0	Apr. 25, 1952	N	N	Oil test. Driller reports clay and "red beds" from surface to 348 ft where siliceous limestone was penetrated.
[b]675	Mar. 1954	N	N	Oil test. Pink granite reported at bottom of well.
[b]199	July 1936	N	N	Insufficient water for public supply. See log.
199.2	Aug. 6, 1935	N	N	See log.
216.1	Jan. 7, 1953			

See footnotes at end of table.

Table 5.—*Records of wells in Hueco Bolson area, El Paso County,*

Well	Owner	Driller	Date completed	Altitude of land surface (feet)	Depth of well (feet)	Diameter of well (inches)
*V-3	City of El Paso	L. Jensen	1928	3870.9	715	20, 15, 12
*V-4	do	V. Chesney	1930	.....	758	20, 15½, 12½
*V-5	do	do	1935	3879.8	780	20, 12
*V-6	do	C. R. Jensen	1937	3900.5	902	.....
*V-7	do	Layne-Texas Co., Ltd.	1938	3899.8	1,078	24, 16, 13
*V-8	U. S. Air Force	do	1951	.....	780	24, 16
*V-9	City of El Paso	do	1938	3913.2	905	24, 16, 12½
*V-10	U. S. Air Force	do	1951	.....	780	24, 16
*V-11	City of El Paso	H. M. Stanley	1936	3919.4	600	2
V-12	do	C. R. Jensen	1939	3928.3	1,117	.....
V-13	do	do	1938	3940.6	1,131	.....
*V-14	U. S. Air Force	Layne-Texas Co., Ltd.	1951	.....	550	6⅝
*V-15	do	do	1952	.....	750	6⅝
V-16	City of El Paso	C. R. Jensen	1939	3947.5	1,072	.....
*V-17	do	do	do	3925.9	1,097	.....
*V-18	do	do	do	3963.7	957	.....

Tex., and Dona Ana and Otero Counties, N. Mex.—Continued

Water level		Method of lift	Use of water	Remarks
Below land surface datum (feet)	Date of measurements			
189.2 214.5	Feb. 25, 1931 Jan. 7, 1954	T, E	P	Casing: 20-in. from surface to 302 ft, 15-in. from 302 to 625 ft, 12-in. from 625 to 715 ft, slotted from 242 to 715 ft. See driller's log.
[a]195 228.0	Oct. 1, 1931 June 6, 1952	T, E	P	Casing: 20-in. from surface to 306 ft, 15½-in. from 306 to 576 ft, and 12½-in. from 576 to 735 ft, slotted from 224 to 735 ft. See driller's log.
201.0 223.5	June 5, 1935 Jan. 6, 1954	T, E	P	Casing: 20-in. from surface to 300 ft, 12-in. from 278 to 774 ft, slotted from 288 to 774 ft. See driller's log.
.....	.....	N	N	Test well. See log.
221.8 238.5	May 4, 1938 Mar. 2, 1954	T, E	P	Casing: 24-in. from surface to 280 ft, cemented to surface; 16-in. from 262 to 368 ft, 13-in. from 368 to 1,055 ft, screens from 287 to 366 ft and from 375 to 1,040 ft. Drawdown 46 ft after 1 hr pumping 1,130 gpm on Mar. 3, 1954. Gravel-walled. Electric log and drill-stem tests indicate fresh-water sands extend to bottom of well. See electric and driller's logs.
.....	.....	T, E, 150	P	Drawdown reported 14 ft pumping 540 gpm in March 1954.
232.0 227.6	Oct. 14, 1938 Apr. 3, 1939	T, E	P	Casing: 24-in. from surface to 246 ft, cemented to surface; 16-in. from surface to 351 ft, 12½-in. from 351 to 905 ft, screen from 247 to 905 ft. Drawdown 30 ft after 13 hr pumping 1,720 gpm when drilled. Gravel-walled. Electric log of test well drilled to 1,211 ft indicates fresh-water sands extend to 905 ft. See electric and driller's log of test well.
256.2	Mar. 23, 1954	T, E	P	Drawdown reported 33 ft pumping 1,000 gpm in 1951. See electric log.
244.1 257.9	July 16, 1936 Apr. 19, 1954	N	N	Test well. Casing: 2-in. from surface to 400 ft. See driller's log.
.....	.....	N	N	Test well. Electric log indicates fresh-water sands extend to 815 ft. See electric and driller's logs.
.....	.....	N	N	Test well. Electric log indicates fresh-water sands extend to 780 ft. See electric and driller's logs.
268.1 270.0	Jan. 9, 1952 Jan. 6, 1954	N	N	Test well. Casing: 6⅝-in. from surface to 496 ft, slotted from 410 to 430 ft and from 473 to 494 ft. See electric and driller's logs.
266.7 267.2	Jan. 18, 1952 Jan. 6, 1954	N	N	Test well. Casing: 6⅝-in. from surface to 750 ft, slotted from 710 to 750 ft. See electric and driller's logs.
.....	.....	N	N	Test well. Electric log indicates fresh-water sands extend to 840 ft. See electric and driller's logs.
.....	.....	N	N	Test well. Electric log indicates fresh-water sands extend to 875 ft. See electric and driller's logs.
.....	.....	N	N	Test well. Electric log and drill-stem tests indicate fresh-water sands extend to 565 ft. See electric and driller's logs.

See footnotes at end of table.

Table 5.—*Records of wells in Hueco Bolson area, El Paso County,*

Well	Owner	Driller	Date completed	Altitude of land surface (feet)	Depth of well (feet)	Diameter of well (inches)
*V-19	City of El Paso	C. R. Jensen	.....	3907.7	950	.....
V-20	.....do	.....do	1938	3887.6	1,292	.....
*V-21	U. S. Army	Layne-Texas Co., Ltd.	1941	.....	800	20, 12
V-22	City of El Paso	C. R. Jensen	1938	3879.2	1,117	8
*V-23	U. S. Army	Layne-Texas Co., Ltd.	1937	.....	800	24, 12
*V-24	.....do	.....do	1931	3877.2	785	24, 12
*V-25	.....do	.....do	1942	.....	916	24, 12
*V-26	.....do	.....	1917	.....	600	12
*V-27	.....do	T. F. Hawkins	1913	3884.1	652	10
*V-28	.....do	.....do	..do....	.....	657	12, 10
*V-29	.....do	.....	1917	.....	600	12
V-30	City of El Paso	.....	Old	3995.8	500	5
V-31	.....do	P. D. Wynne	1919	3776.7	954	18, 12
V-32	.....do	V. C. Chesney	1930	.....	660	.....
*V-33	U. S. Geological Survey	B. & W. Drilling Co. of Texas.	1953	3886.2	905	4

Tex., and Dona Ana and Otero Counties, N. Mex.—Continued

Water level		Method of lift	Use of water	Remarks
Below land surface datum (feet)	Date of measurements			
232.4 249.4	Dec. 18, 1940 Jan. 6, 1954	T, E	P	Electric log of test well drilled in 1938 to 1,187 ft indicates fresh-water sands extend to 975 ft. See electric and driller's logs of test well.
.....	.....	N	N	Test well. See driller's log.
b225	1941	T, E	P	Casing: 20-in. from surface to 345 ft, 12-in. from 345 to 778 ft, screens from 304 to 314, 317 to 327, 345 to 366, 405 to 426, 456 to 497, 516 to 547, 590 to 601, 654 to 696, 712 to 732, and from 742 to 773 ft. Pump set at 295 ft. Drawdown 49 ft pumping 1,250 gpm on Sept. 15, 1941. Gravel-walled. See driller's log.
208.8 223.7	Aug. 24, 1938 Apr. 19, 1954	N	N	Test well. Casing: 8-in. from surface to 587 ft. See driller's log.
205.4 205.0	Oct. 15, 1937 Feb. 26, 1940	T, E, 125	P	Casing: 24-in. from surface to 347 ft, 12-in. from 312 to 784 ft, screens from 317 to 337, 314 to 334, 347 to 368, 450 to 492, 515 to 526, 556 to 598, 610 to 631, 638 to 649, 655 to 696, and from 760 to 781 ft. See driller's log.
b204 217.1	Mar. 1932 May 22, 1939	T, E, 100	P	Casing: 24-in. from surface to 351 ft, 12-in. from 285 to 776 ft, screens from 290 to 322, 436 to 468, 502 to 523, 533 to 565, 571 to 598, 621 to 663, and from 705 to 768 ft. Gravel-walled. See driller's log.
b230.8	1942	T, E, 150	P	Casing: 24-in. from surface to 235 ft, 18⅝-in. from 205 to 321 ft, 12-in. from 332 to 570 ft, screens from 272 to 302, 332 to 343, 350 to 376, 423 to 434, 476 to 487, 500 to 554, and from 570 to 591 ft. Pump set at 295 ft. Drawdown 65 ft pumping 870 gpm on Aug. 27, 1942. Gravel-walled. See driller's log.
b226	1917	T, E, 60	N	Casing: 12-in. from surface to 600 ft. Drawdown 76 ft pumping 250 gpm on Apr. 22, 1944.
b198.3 238.6	1913 Jan. 5, 1954	N	N	Casing: 10-in. from surface to 652 ft, slotted from 200 to 652 ft. See driller's log.
200.8	July 27, 1913	N	N	Casing: 12-in. from surface to 200 ft, 10-in. from surface to 657 ft. See driller's log.
b227	1917	N	N	Casing: 12-in. from surface to 600 ft, slotted 200 to 600 ft. See driller's log.
303.7 306.9	Nov. 20, 1935 Jan. 5, 1954	N	N	
b85 107.3	May 1919 Jan. 11, 1941	N	N	Casing: 18-in. from surface to 214 ft, 12-in. from 214 to 918 ft, slotted from 475 to 918 ft. See driller's log.
.....	.....	N	N	Drilled for public water supply, but never used because of poor quality of water.
230.3	Jan. 5, 1954	N	N	Test well. Casing: 4-in. to 736 ft, slotted from 716 to 736 ft. Electric log and drill-stem tests indicate fresh-water sands extend to bottom of well. See sample and electric logs.

See footnotes at end of table.

Table 5.—*Records of wells in Hueco Bolson area, El Paso County,*

Well	Owner	Driller	Date completed	Altitude of land surface (feet)	Depth of well (feet)	Diameter of well (inches)
*V-34	Texas and New Orleans Railroad Co.	P. D. Wynne.....	1922	.....	869	12
*V-35	.....do.....	Layne-Texas Co., Ltd.	1937	.....	860	12
V-36	.....do.....	.....do.....	...do...	.....	860	12, 10
*V-37	.....do.....	Semple & Wynne.....	1921	.....	864	12
*V-38	.....do.....	Layne-Texas Co., Ltd.	1941	.....	852	16, 13
*V-39	City of El Paso.....	C. R. Jensen.....	1938	.....	520	8, 6
*V-40	.....do.....	.....do.....	1944	3922.4	698	10
*V-41	.....do.....	Layne-Texas Co., Ltd.	1951	.....	766	24, 18, 12¾
*V-42	.....do.....	H. M. Stanley.....	1936	3942.7	623	6, 2
V-43	.....do.....	Holland Page, Jr.....	1951	.....	340	8, 4
V-44	— Ashley's.....	Layne-Texas Co., Ltd.	1952	.....	536	10, 8
*V-45	City of El Paso.....	P. D. Wynne.....	1922	3783.2	862	26, 12
V-46	Loretto College.....	.....	.....	3807.1	.....	7
*V-47	City of El Paso.....	Layne & Bowler.....	1918	3764.0	1,023	24, 13½
V-48	.....do.....	City of El Paso.....	1922	3771.4	856	20, 15½, 12

Tex., and Dona Ana and Otero Counties, N. Mex.—Continued

Water level		Method of lift	Use of water	Remarks
Below land surface datum (feet)	Date of measurements			
217.5 220.8	Nov. 20, 1935 Mar. 21, 1941	N	N	Casing: 12-in. from surface to 869 ft, slotted from 269 to 869 ft. See driller's log.
219.3 231.9	Jan. 25, 1939 June 21, 1941	N	N	Casing: 12-in. from surface to 860 ft.
226.0 218.9	Aug. 12, 1938 Jan. 14, 1947	N	N	Casing: 12-in. from surface to 740 ft, 10-in. from 740 to 860 ft.
b213	Aug. 1921	N	N	Casing: 12-in. from surface to 864 ft, slotted from 274 to 864 ft. See driller's log.
b218	Apr. 1941	T, E	D	Casing: 16-in. from surface to 345 ft, 13-in. from surface to 849 ft, screen from 337 to 849 ft. See driller's log. Drawdown 25 ft pumping 530 gpm on Apr. 22, 1941.
233.1 249.0	Apr. 27, 1938 Jan. 28, 1954	N	N	Casing: 8-in. from surface to 415 ft, 6-in. from 415 520 ft, slotted from 243 to 273, 283 to 308, 314 to 359, 378 to 388, and from 405 to 520 ft. See driller's log.
b250 264.8	Jan. 1944 Mar. 6, 1954	T, E, 30	P	Casing: 10-in. from surface to 680 ft, screens from 264 to 285, 307 to 365, 379 to 395, 429 to 451, 477 to 496, 513 to 531, 547 to 565, 586 to 622, and from 639 to 671 ft. Yield reported 200 gpm. Used as standby well only. See driller's log.
253.9 266.3	Jan. 22, 1952 Mar. 6, 1954	T, E	P	Casing: 24-in. from surface to 300 ft, cemented to surface, 18-in. from surface to 380 ft, 12¾-in. from 380 to 754 ft, slotted 289 to 754 ft. Drawdown 51 ft after 4 hr pumping 1,534 gpm on Mar. 6, 1954. Gravel-walled. See electric and driller's logs.
260.6 272.1	July 17, 1936 Apr. 19, 1954	N	N	Test well. Casing: 2-in. to 441 ft. See driller's log.
b308	July 1951	C, E	D	Casing: 8-in. from surface to 304 ft, 4-in. from 304 to 340 ft.
b297	1952	T, E	D, In	Casing: 10-in. from surface to 382 ft, 8-in from 382 to 536 ft, screen from 313 to 343 ft, 392 to 412, 476 to 496, and from 506 to 526 ft. Drawdown reported 20 ft pumping 250 gpm. See driller's log.
112.0 112.8	Oct. 19, 1934 Jan. 5, 1954	T, E	P	Casing: 26-in. from surface to 243 ft, 12-in. from 227 to 862 ft, slotted from 443 to 862 ft. See driller's log.
145.8 137.4	Nov. 11, 1935 Jan. 28, 1954	N	N	
b109 87.5	May 1931 Jan. 28, 1954	N	N	Casing: 24-in. from surface to 224 ft, 13½ in. from 205 to 885 ft, screen from 485 to 605, 695 to 715, and from 755 to 815 ft. Well filled with cement from 860 to 1,023 ft. See driller's log.
113 99.2	Apr. 1, 1926 Mar. 24, 1947	T, E	N	Casing: 20-in. from surface to 200 ft, 15½-in. from 200 to 482 ft, 12-in. from 482 to 840, slotted from 500 to 840 ft. See driller's log.

See footnotes at end of table.

Table 5.—*Records of wells in Hueco Bolson area, El Paso County,*

Well	Owner	Driller	Date completed	Altitude of land surface (feet)	Depth of well (feet)	Diameter of well (inches)
*V-49	City of El Paso	P. D. Wynne	1924	3743.8	882	24, 13
*V-50	do	Layne-Texas Co., Ltd.	1940	3702.9	643	24, 13
*V-51	Harry Mitchell Brewing Co	do	1934	3701.2	396	12, 10
*V-52	do	do	1944		354	12¾, 6⅝
*V-53	City of El Paso	V. Chesney	1928	3700.3	830	24, 15
*V-54	do	Layne-Texas Co., Ltd.	1937	3701.9	905	24, 13
*V-55	do	A. Stout	1927	3704.6	425	22, 12
V-56	Southern Pacific Co	Layne-Texas Co., Ltd.	1941		798	16, 10¾
V-57	do	do	1942		760	
V-58	Texas and Pacific Railway Co.	do	1944		624	12¾, 6⅝
*V-59	City of El Paso	do	1938	3705.1	851	24, 13
*V-60	do	A. Stout	1925	3704.5	646	24, 15
*V-61	El Paso Milling Co		1912	3707.1	398	10
*V-62	City of El Paso	V. Chesney	1930	3706.0	807	20, 12½

Tex., and Dona Ana and Otero Counties, N. Mex.—Continued

Water level		Method of lift	Use of water	Remarks
Below land surface datum (feet)	Date of measurements			
80.8 74.7	Nov. 19, 1934 Jan. 5, 1954	T, E	P	Casing: 24-in. from surface to 200 ft, 13-in. from 186 to 882 ft, slotted from 465 to 882 ft. See driller's log.
32.2 29.8	Feb. 28, 1940 Jan. 5, 1954	T, E, 150	P	Drawdown 59.5 ft pumping 2,200 gpm in 1940. See electric and driller's logs of test well drilled in 1938 to 902 ft.
25.2 37.7	Dec. 13, 1935 Jan. 22, 1945	T, E	N	Casing: 12-in. from surface to 205 ft, 10-in. from 205 to 325 ft, screen from 325 to 358 ft. See driller's log.
[b]40	Mar. 1944	T, E	In	Casing: 12¾-in. from surface to 326 ft, cemented to surface, 6⅝-in. from 289 to 354 ft, mill slotted from 317 to 352 ft. Pump set at 120 ft. Drawdown 49 ft pumping 120 gpm on Mar. 17, 1944. Gravel-walled. See driller's log.
21.1 28.8	Dec. 22, 1934 Jan. 5, 1954	T, E	P	Casing: 24-in. from surface to 118, 15-in. from 118 to 446, 12½-in. from 446 to 802 ft, slotted from 190 to 802 ft. See driller's log.
30.1 28.2	July 7, 1937 Jan. 5, 1954	T, E, 100	P	Casing: 24-in. from surface to 237 ft, cemented to surface, 13-in. from 207 to 703 ft, screen from 254 to 694 ft. Well filled with cement from 703 to 905 ft. Gravel-walled. See electric and driller's logs.
8.8 8.8	Jan. 28, 1939 Jan. 10, 1941	N	N	Casing: 22-in. from surface to 86 ft, 12-in. from 86 to 155 ft, 13-in. from 155 to 425 ft.
[b]44	1941	T, E	In	Casing: 16-in. from surface to 406 ft, cemented to surface, 10¾-in. from 340 to 798 ft, screen from 403 to 425 ft, 470 to 502, 512 to 607, 622 to 644, 692 to 724, and from 752 to 794 ft. Pump set at 100 ft. Drawdown 30 ft pumping 950 gpm on Dec. 15, 1941. Gravel-walled. See driller's log.
.....	.....	T, E	In	
[b]40	1944	T, E	In	Casing: 12¾-in. from surface to 450 ft, cemented to surface, 6⅝-in. from 350 to 624 ft, screens from 459 to 480 ft, 502 to 524 ft, 545 to 566, and from 586 to 623 ft. Pump set at 115 ft. Drawdown 20 ft after 8 hr pumping 20 gpm on Nov. 3, 1944. Gravel-walled. See driller's log.
36.7 31.1	Feb. 2, 1939 Jan. 5, 1954	T, E	P	Casing: 24-in. from surface to 295 ft, cemented to surface, 13-in. from 255 to 720 ft, screen from 294 to 717 ft. Gravel-walled. Well filled with cement from 720 to 851 ft. See electric and driller's logs.
14.8 16.8	Dec. 22, 1934 Dec. 11, 1940	N	N	Casing: 24-in. from surface to 89 ft, 15-in. from 89 to 480 ft, slotted from 169 to 480 ft. See driller's log.
12.6 32.1	Aug. 23, 1935 Jan. 5, 1954	N	N	Casing: 10-in. from surface to 398 ft.
16.6 27.0	Dec. 22, 1934 Jan. 5, 1954	N	N	Casing: 20-in. from surface to 210 ft, 16-in. from 210 to 358 ft, 16-in. screen from 358 to 579 ft, 12½-in. screen from 579 to 650 ft. See driller's log.

See footnotes at end of table.

Table 5.—*Records of wells in Hueco Bolson area, El Paso County,*

Well	Owner	Driller	Date completed	Altitude of land surface (feet)	Depth of well (feet)	Diameter of well (inches)
*V-63	City of El Paso	P. D. Wynne	1933	3707.8	52	20
V-64	El Paso Electric Co.	Layne-Texas Co., Ltd.	1924	3709.3	252	18,16
V-65	do	do	1925	3709.6	229	.....
*V-66	do	J. F. Hawkins	1914	3708.3	394	10
*V-67	do	Layne-Texas Co., Ltd.	1924	3709.9	304	10
*V-68	Peyton Packing Co.	Layne-Bowler Co.	1917	.....	775	8
*V-69	City of El Paso	C. R. Jensen	1940	3696.6	1,007	4
*V-70	El Paso County Water Control & Improvement District No. 1.	Layne-Texas Co., Ltd.	1946	.....	704	14, 8⅝
V-71	The Texas Co.	do	1954	.....	673	.....
*V-72	do	P. D. Wynne	1929	3715.9	694	.....
V-73	do	Layne-Texas Co., Ltd.	1954	.....	665	.....
V-74	Standard Oil Co. of Texas	do	1928	.....	590	10, 8
*V-75	do	do	1930	.....	607	12,10
*V-76	do	do	1950	.....	644	.....
V-77	do	do	1952	.....	652	.....
*V-78	do	.....	1928	.....	299	24, 13
*V-79	Phelps Dodge Refining Corp.	.....	1929	3739.8	706	20, 12
V-80	do	Layne-Texas Co., Ltd.	1947	.....	671	20, 12¾

Tex., and Dona Ana and Otero Counties, N. Mex.—Continued

Water level		Method of lift	Use of water	Remarks
Below land surface datum (feet)	Date of measurements			
9.6 18.2	Apr. 16, 1938 Jan. 5, 1954	Cf, E	.....	Casing: 20-in. screen from surface to 30 ft, 20-in. casing from 30 to 52 ft. Well used to lower water table below house basement levels in downtown El Paso. See driller's log.
7.3 20.5	Aug. 20, 1935 Jan. 5, 1954	T, E, 125	In	See driller's log.
7.8 20.9	Aug. 20, 1935 Jan. 5, 1954	T, E	In	Do.
12.3 31.9	Aug. 20, 1935 Jan. 5, 1954	T, E	In	Casing: 15-in. from surface to 254 ft, 10-in. from 294 to 394 ft, slotted from 254 to 294 ft, and from 334 to 394 ft. See driller's log.
9.6 17.0	Aug. 2, 1935 Jan. 6, 1953	T, E 150	In	See driller's log.
[b]60	1954	T, E	In	
22.9 32.0	Nov. 18, 1940 Apr. 19, 1954	N	N	Test well. Casing: 4-in. from surface to 623 ft. See driller's log.
[b]106	Oct. 1953	T, E, 30	P	Casing: 14-in. from surface to 541 ft, cemented to surface, $8\frac{5}{8}$-in. from 446 to 704 ft, screens from 544 to 574 ft and from 595 to 702 ft. Pump set at 210 ft. Drawdown 62 ft pumping 380 gpm on Dec. 18, 1946. Gravel-walled. See driller's log.
.....	.....	T, E	In	See electric log.
45.8 52.7	Mar. 20, 1929 Jan. 5, 1954	T, E	In	Drawdown reported 28 ft after $1\frac{3}{4}$ hr pumping 1,000 gpm on Oct. 22, 1951. See driller's log.
.....	.....	.....	In	
81.5	Aug. 28, 1935	T, E	In	Casing: 10-in. from surface to 455 ft, 8-in. from 444 to 590 ft, screens from 477 to 514 ft and from 546 to 588 ft. See driller's log.
66.6 60.8	June 6, 1930 Feb. 24, 1944	.....	.....	Casing: 12-in. from surface to 438 ft, 10-in. from 416 to 600 ft, screens from 437 to 483 ft, 503 to 547 ft, and from 557 to 598 ft. See driller's log.
[b]109	1950	T, E, 75	In	Drawdown reported 31 ft, pumping 945 gpm. See electric log.
[b]113	1952	T, E, 75	In	Drawdown reported 52 ft, pumping 1,230 gpm.
59.5	Aug. 28, 1935	N	N	See driller's log.
64.0 75.2	Jan. 2, 1931 Jan. 15, 1947	T, E	In	Do.
[b]75	Oct. 1947	T, E	In	Casing: 20-in. from surface to 473 ft, $12\frac{3}{4}$-in. from 390 ft to 647 ft, screens from 478 to 561 ft, 581 to 591 ft, and from 614 to 646 ft. Pump set at 160 ft. Drawdown 70 ft after 36 hr pumping 748 gpm on Oct. 31, 1947. Gravel-walled. See driller's log.

See footnotes at end of table.

Table 5.—*Records of wells in Hueco Bolson area, El Paso County,*

Well	Owner	Driller	Date completed	Altitude of land surface (feet)	Depth of well (feet)	Diameter of well (inches)
V-81	Phelps Dodge Refining Corp....	Layne-Texas Co., Ltd.	1940	3735.2	683	20, 12
*V-82	El Paso County Water Control & Improvement District No. 1.	.....do.....	1947	.....	689	14, 8⅝
V-83	.....do.....	El Paso Drilling Co...	1954	.....	.....	.....
V-84	.....do.....	Layne-Texas Co., Ltd.	1953	.....	555	.....
*V-85	.....do.....	.....do.....	1952	.....	490	.....
*V-86	.....do.....	.....do.....	1947	.....	786	14, 8⅝
*W-1	U. S. Geological Survey.....	B. & W. Drilling Co. of Texas.	1953	3977.0	950	.....
*W-2	U. S. Army.....	.....	1933	4009.8	378	6
*W-3	Hillcrest Country Club.....	El Paso Drilling Co..	1953	4017.7	600	10¼
*W-4	El Paso Natural Gas Co.....	Mountain Drilling Co.	...do...	4023.0	596	10¾
W-5	.....do.....	.....do.....	...do...	4023.6	500	10¾
*W-6	Lane Dairy.....	.....	.....	.....	350	.....
W-7	R. C. Sparks.....	J. T. Hatch.....	1945	4036.5	415	6
*W-8	.....do.....	.....do.....	1944	4029.5	440	6
*W-9	El Paso County Water Control & Improvement District No. 1.	Layne-Texas Co., Ltd.	1947	.....	600	14, 8⅝
*W-10	R. C. Sparks.....	J. T. Hatch.....	1944	4020.7	500	6
*X-1	U. S. Geological Survey.....	B. & W. Drilling Co. of Texas.	1953	4072.9	1,013	.....

Tex., and Dona Ana and Otero Counties, N. Mex.—Continued

Water level		Method of lift	Use of water	Remarks
Below land surface datum (feet)	Date of measurements			
67.2 68.6	June 4, 1940 June 26, 1945	T, E	In	Casing: 20-in. from surface to 485 ft, 12¾-in. from 482 to 683 ft, screens from 482 to 514 ft, 524 to 546 ft, 574 to 616, and from 649 to 682 ft. Gravel-walled. See driller's log.
b27.4	Oct. 1953	T, E, 25	P	Casing: 14-in. from surface to 252 ft, 8⅝-in. from 208 to 477 ft, screens from 265 to 308, 351 to 372, and from 394 to 477 ft. Pump set at 120 ft. Drawdown reported 35 ft pumping 610 gpm. Gravel-walled. See electric and driller's logs.
.....	.....	T, E	P	
.....	.....	T, E	P	
b87	Oct. 1953	T, E	P	Drawdown reported 30 ft pumping 600 gpm. See electric log.
b52	.....do.....	T, E, 25	P	Casing: 14-in. from surface to 230 ft, 8⅝-in. from 136 to 386 ft, screens from 242 to 310 ft and from 339 to 383 ft. Pump set at 130 ft. Drawdown reported 51 ft pumping 580 gpm. Gravel-walled. See electric and driller's logs.
319.3	Apr. 17, 1953	N	N	Test well. Electric logs and drill-stem tests indicate fresh-water sands to 555 ft. See sample and electric logs.
322.0 322.4	June 13, 1936 June 20, 1942	N	N	Casing: 6-in. to 378 ft.
332.0	Apr. 6, 1954	T, B	D	Casing: 10¼-in. to 600 ft. Pump set at 470 ft.
336.6	June 4, 1953	T, E	In	Casing: 10¾-in. to 591 ft, slotted from 345 to 376, 380 to 435, 439 to 454, 470 to 495, 510 to 514, and from 543 to 591 ft. See electric and driller's logs.
340.8	.....do.....	T, E	In	Casing: 10¾-in. to 500 ft, slotted from 320 to 445 ft, and from 465 to 485 ft. See electric and sample logs.
.....	.....	C, W	D, S	
359.4	Mar. 6, 1954	C, W	S	
356.9 357.3	Apr. 29, 1952 Mar. 6, 1954	C, W	S	
b52	Oct. 1953	T, E, 25	P	Casing: 14-in. from surface to 81 ft, 8⅝-in. from surface to 219 ft, screen from 86 to 210 ft. Pump set at 150 ft. Drawdown 26 ft pumping 243 gpm on June 5, 1947. Gravel-walled. See electric and driller's log.
370.6	Feb. 6, 1954	C, W	S	
394.4	July 19, 1953	N	N	Test well. Electric log and drill-stem test indicate freah-water sands extend to 510 ft. See electric and sample logs.

See footnotes at end of table.

Table 5.—*Records of wells in Hueco Bolson area, El Paso County,*

Well	Owner	Driller	Date completed	Altitude of land surface (feet)	Depth of well (feet)	Diameter of well (inches)
X-2	—Davis	Hughs Drilling Co.	1952	.....	1,557	.....
X-3	Davis & McMillian	Tillery & Parks	1954	.....	813	.....
*X-4	—Davis	.....	1903	.....	750	8
X-5	—Hays	.....	1952	.....	.....	7½
*X-6	R. C. Sparks	.....	1902	4056.6	1,150	6
X-7	.....do	J. R. Hatch	1943	4061.7	460	6
*X-8	El Paso Natural Gas Co	Tillery & Parks	1953	.....	526	26
X-9	.....do	.....do	...do...	.....	276	.....
*X-10	U. S. Geological Survey	B. & W. Drilling Co. of Texas.	...do...	4047.6	1,100	.....
*X-11	R. C. Sparks	.....	Old	4014.5	460	5
*Y-1	.....do	J. R. Hatch	1942	[a]4004	500	6
Y-2	Paul Thomas	Cass	1943	.....	162	6
*Z-1	R. C. Sparks	J. T. Hatch	1946	[a]4082	500	6
Z-2	S. O. Roberts	.....	...do...	.....	497	6
Z-3	.....do	.....	1937	.....	450	7
Z-4	—Orr	Anderson	.....	.....	450	10
*Z-5	S. O. Roberts	.....	1915	[a]4028	638	8, 6
*Z-6	.....do	.....	1946	.....	521	8
Z-7	.....	.....	Old	3789.5	241	5½
Z-8	Wyatt C. Hedrick	.....	.....	.....	420	7

[a] Altitude determined by aeneroid barometer. Other altitudes determined by instrumental leveling.

Tex., and Dona Ana and Otero Counties, N. Mex.—Continued

Water level		Method of lift	Use of water	Remarks
Below land surface datum (feet)	Date of measurements			
[b]600	Mar. 1954	.....	N	
.....	.....	N	N	No water-bearing material encountered. See sample log.
[b]725	.....	C, G	D, S	
332.0	Apr. 30, 1952	C, W	S	Well draws from limestone.
383.4 379.4	Apr. 10, 1936 Feb. 6, 1954	C, W	D, S	Casing: 6-in. from surface to 440 ft.
376.8	.....do.....	C, W	S	
488.6	Feb. 20, 1953	N	N	Well draws from limestone.
.....	.....	N	N	No water-bearing material encountered. See sample log.
397.2	Aug. 1, 1953	N	N	Test well. Electric log and drill-stem tests indicate no fresh-water sands. See electric and sample logs.
[b]362	.....	C, W	D	Casing: 5-in. from surface to 400 ft.
365.6 373.8	Apr. 10, 1936 Feb. 3, 1954	C, W	S	Casing: 6-in. from surface to 500 ft.
113.6	.....do.....	C, W	S	
[b]470	Apr. 1936	C, W	S	
[b]465	.....	C, W	D, S	
384.5	Feb. 3, 1954	C, W	S	
372.0	.....do.....	C, W	S	
400.0 401.7	Apr. 2, 1936 Feb. 8, 1954	C, W	S	Casing: 8-in. from surface to 500 ft, 6-in from 500 to 638 ft.
[b]450	.....	C, W	S	
162.5	July 11, 1936	N	N	
329.1	May 7, 1952	C, W	D, S	

[b] Water level reported by owner or driller.

Table 6.—*Chemical analyses of water from wells in the Hueco Bolson*

[Chemical constituents in

Well	Owner	Depth of well (feet)	Date of collection	Silica (SiO_2)	Iron (Fe)	Manganese (Mn)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)
F-1	U. S. Geological Survey.	[a]404-452	Apr. 4, 1953	58	0.00	.....	36	3.9	19	5.6
F-1	.....do.....	[a]470-510	Apr. 5, 1953	58	.08	.....	35	4.2	22	6.3
F-1	.....do.....	[a]636-660	Apr. 9, 1953	34	.00	.....	31	6.4	25	4.2
F-1	.....do.....	[a]715-744	Apr. 10, 1953	32	.02	.....	28	4.9	31	3.9
F-1	.....do.....	[a]827-865	Apr. 12, 1953	32	.01	.....	29	3.5	45	3.7
F-1	.....do.....	[a]962-1,012	May 3, 1953	34	.00	0.00	42	3.8	44	4.0
F-1	.....do.....	[a]1,162-1,216	May 6, 1953	32	.00	.65	640	57	421	14
F-2	U. S. Army.....	181	Apr. 23, 1936	.....	.....	.....	41	5.3	23	
F-3	U. S. Geological Survey.	[a]520-560	June 27, 1953	23	.06	.00	16	5.0	142	4.2
F-3	.....do.....	[a]685-721	June 28, 1953	26	.37	.00	12	3.8	121	3.7
F-3	.....do.....	[a]786-826	June 30, 1953	13	.15	.00	10	2.5	134	3.5
F-3	.....do.....	[a]842-882	July 1, 1953	17	.03	.00	13	4.1	120	4.1
F-3	.....do.....	[a]895-935	July 3, 1953	14	.14	.00	11	4.8	135	4.2
F-3	.....do.....	[a]1,155-1,205	July 8, 1953	16	.14	.00	14	4.2	134	4.1
F-5	.....do.....	[a]408-433	Apr. 4, 1953	9.8	.00	.....	155	8.3	126	8.0
F-5	.....do.....	[a]465-505	.....do.....	24	.01	.....	602	20	275	12
F-5	.....do.....	[a]505-580	Apr. 5, 1953	25	.02	.....	1,480	77	531	
G-1	.....do.....	[a]423-450	Mar. 30, 1953	.....	.....	.....	.....	.....	.....	.....
G-1	.....do.....	[a]584-650	.....do.....	.....	.....	.....	.....	.....	.....	.....
G-2	.....do.....	[a]400-447	July 13, 1953	14	.01	.00	22	2.8	336	3.7
K-3	Dairy Farms Co..	141	June 18, 1952	49	.....	.....	118	48	526	
K-7	Landers & Amos..	.....	.....do.....	56	.....	.....	119	51	235	
K-12	.....	.....	June 30, 1953	.....	.....	.....	.....	.....	.....	.....
K-13	U. S. Geological Survey.	[a]846-889	Nov. 24, 1953	25	.14	.....	99	30	261	
K-13	.....do.....	768	Dec. 6, 1953	38	.06	.01	137	29	219	9.8
K-14	.....do.....	[a]647-690	Jan. 3, 1954	14	.03	.00	22	6.4	146	6.2
K-14	.....do.....	[a]818-841	Jan. 6, 1954	18	.04	.05	26	6.2	90	6.7
K-14	.....do.....	610	Jan. 12, 1954	32	.07	.00	52	10	94	7.8
K-15	U. S. Army.....	798	Feb. 12, 1931	.....	.....	.....	.....	.....	.....	.....
K-15	.....do.....	798	Apr. 17, 1936	.....	.....	.....	39	23	68	
K-15	.....do.....	798	May 13, 1953	.....	.....	.....	.....	.....	.....	.....
K-16	U. S. Geological Survey.	[a]485-515	May 4, 1953	15	.01	.07	32	7.4	113	10
K-16	.....do.....	[a]545-580	.....do.....	28	.00	.00	33	8.1	89	8.1
K-16	.....do.....	[a]635-669	May 6, 1953	24	.00	.00	31	6.6	90	7.7
K-16	.....do.....	[a]688-721	May 7, 1953	24	.00	.00	31	7.1	80	6.8
K-16	.....do.....	[a]834-868	May 9, 1953	26	.01	.01	27	4.5	157	7.2

area, El Paso County, Tex., and Dona Ana and Otero Counties, N. Mex.

parts per million]

Bicarbonate (HCO_3)	Carbonate (CO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Phosphate (PO_4)	Boron (B)	Dissolved solids	Hardness as $CaCO_3$	Percent sodium	Specific conductance (micromhos at 25°C)	pH
104	0	35	17	0.6	5.0	.....	0.02	238	106	27	308	7.7
104	0	42	19	.6	4.2	.....	.08	246	105	30	324	7.6
102	0	37	24	.5	4.2	.....	.21	217	104	33	334	7.9
106	0	38	23	.5	4.3	.....	.06	218	90	41	326	7.7
107	0	59	26	.5	4.2	.....	.10	256	87	52	388	7.8
94	0	59	54	.5	4.0	0.00	.04	299	120	43	471	7.4
54	0	541	1,550	.1	1.5	.00	.40	3,280	1,830	33	5,440	7.0
86	0	68	18	.....	9.1	.....	.....	207	124	.....	.....	.....
226	0	66	74	8.0	1.0	.01	.11	458	60	82	761	7.7
212	0	49	56	5.0	1.5	.02	.15	384	46	84	628	8.2
232	0	42	66	4.0	1.5	.01	.16	395	36	88	669	8.1
221	0	37	60	6.0	1.0	.01	.16	371	50	83	631	8.1
241	0	48	59	6.0	.5	.02	.30	402	47	85	670	8.2
408	0	39	53	8.0	1.0	.01	.16	408	52	84	675	8.0
31	0	71	425	.4	4.0	.....	.05	823	420	39	1,630	6.9
27	0	159	1,410	.1	1.5	.....	.06	2,520	1,580	27	4,620	6.8
22	0	201	3,500	.0	.....	.....	.....	5,830	4,010	22	10,200	6.8
41	0	1,410	6,710	.....	.....	.....	.....	.....	7,950	.....	19,000	6.5
35	0	1,460	8,010	.....	.....	.....	.....	.....	8,950	.....	22,500	6.6
96	0	387	232	1.1	.5	.10	.34	1,050	66	91	1,800	7.7
518	0	536	462	.....	1.5	.....	.42	2,000	492	70	3,110	7.5
337	0	195	415	.6	5.0	.....	.39	1,240	506	50	2,200	7.5
243	0	183	392	.....	.....	.....	.....	.....	388	.....	1,970	8.1
310	0	185	348	.0	1.2	.....	.....	1,100	370	60	1,880	7.7
227	0	233	365	.0	.5	.01	.24	1,140	461	50	1,920	7.5
176	0	177	49	.5	6.0	.00	.11	514	82	78	818	8.0
194	0	85	32	.3	4.2	.02	.08	364	90	66	586	8.2
152	0	161	64	.3	5.1	.01	.14	503	170	53	772	7.9
.....	.....	.....	63	.....	.0	.....	.....	420	373	.....	.....	.....
232	0	67	54	.....	5.7	.....	.....	371	192	.....	.....	.....
231	0	.....	46	.....	.....	.....	.....	.....	186	.....	639	7.9
178	0	81	93	.3	4.0	.00	.16	444	110	67	750	7.6
175	0	70	68	.3	3.5	.00	.04	394	116	60	657	7.9
171	0	91	52	.3	3.5	.00	.07	394	104	63	631	7.9
174	0	69	50	.2	4.0	.00	.08	358	106	60	581	7.8
162	0	69	162	.9	4.5	.00	.13	538	86	78	934	8.0

See footnotes at end of table.

Table 6.—*Chemical analyses of water from wells in the Hueco Bolson area,*

Well	Owner	Depth of well (feet)	Date of collection	Silica (SiO_2)	Iron (Fe)	Manganese (Mn)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)
K-16	U. S. Geological Survey.	[a]901-935	May 10, 1953	16	0.00	0.40	220	28	713	17
K-16	.....do.....	[a]963-997	May 11, 1953	18	.01	.....	376	44	1,040	
K-16	.....do.....	[a]1,009-1,055	May 12, 1953	30	.02	.....	578	88	1,370	
K-16	.....do.....	544	May 23, 1953	30	.18	.02	37	8.8	93	8.4
L-1	.....do.....	[a]489-514	Mar. 31, 1953	24	.00	.....	1,250	282	824	
L-2	.....do.....	[a]494-539	June 2, 1953	18	.01	.00	14	3.3	101	5.8
L-2	.....do.....	[a]575-620	June 3, 1953	30	.42	.00	14	3.3	113	5.1
L-2	.....do.....	[a]823-855	June 5, 1953	22	.53	.00	25	3.3	99	4.1
L-2	.....do.....	[a]908-953	June 7, 1953	34	1.30	.00	8.6	.1	91	2.6
L-2	.....do.....	[a]1,015-1,060	June 8, 1953	15	.02	.05	12	2.2	166	5.6
L-2	.....do.....	[a]1,145-1,190	June 9, 1953	36	.14	.00	16	2.3	188	5.2
L-3	U. S. Army.....	462	Apr. 16, 1936	.....	.....	.....	34	9.8	77	
L-4	U. S. Geological Survey.	[a]453-463	May 2, 1953	2.2	.02	.00	196	28	372	13
L-4	.....do.....	[a]714-747	Apr. 27, 1953	31	.00	.24	192	42	920	20
L-5	U. S. Army.....	350	Apr. 3, 1936	.....	.....	.....	30	4.4	37	
L-6	U. S. Geological Survey.	[a]419-451	Apr. 10, 1953	8.8	.02	.....	48	8.7	111	8.2
L-6	.....do.....	[a]493-535	Apr. 11, 1953	21	.00	.....	150	21	149	11
L-6	.....do.....	[a]548-590	Apr. 13, 1953	22	.00	.....	166	37	448	14
L-6	.....do.....	[a]625-667	Apr. 14, 1953	13	.03	.....	672	161	2,810	
L-8	U. S. Army.....	440	Apr. 29, 1953	39	.09	.....	132	33	131	
L-11	W. F. Blythe.....	336	Apr. 17, 1936	.....	.....	.....	24	6.7	41	
L-12	U. S. Geological Survey.	[a]551-605	Dec. 15, 1953	10	.....	.....	12	3.5	89	
L-12	.....do.....	[a]706-755	Dec. 16, 1953	12	.04	.11	72	14	200	12
L-12	.....do.....	[a]855-905	Dec. 17, 1953	8.4	.08	.....	71	13	418	
L-12	.....do.....	525	Dec. 27, 1953	28	.80	.00	25	6.8	90	6.9
L-13	Prescott Colquitt..	400	Nov. 13, 1952	30	.....	.....	78	15	274	
M-2	U. S. Geological Survey.	[a]389-421	Apr. 17, 1953	35	.00	.....	298	106	461	24
M-2	.....do.....	[a]438-470	Apr. 18, 1953	20	.00	.26	314	92	417	23
M-2	.....do.....	[a]500-542	Apr. 19, 1953	30	.00	.19	384	110	409	24
M-2	.....do.....	[a]563-585	.....do.....	12	.00	.01	214	56	316	17
M-2	.....do.....	[a]603-645	Apr. 20, 1953	24	.00	.00	452	109	488	24
M-2	.....do.....	[a]672-710	Apr. 28, 1953	26	.00	.....	760	163	685	
M-5	.....do.....	[a]585-610	Mar. 19, 1953	5.3	.00	.26	113	26	534	9.4
M-5	.....do.....	[a]715-740	Mar. 20, 1953	14	.00	.....	34	5.7	336	4.5
M-5	.....do.....	[a]855-880	Mar. 22, 1953	21	.00	.08	90	5.5	541	5.6

El Paso County, Tex., and Dona Ana and Otero Counties, N. Mex.—Continued

Bicarbonate (HCO_3)	Carbonate (CO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Phosphate (PO_4)	Boron (B)	Dissolved solids	Hardness as $CaCO_3$	Percent sodium	Specific conductance (micromhos at 25°C)	pH
53	0	101	1,450	1.8	0.5	0.00	0.30	2,570	664	69	4,780	7.3
57	0	216	2,200	.4	.....	.....	.....	3,920	1,120	67	6,920	7.2
57	0	273	3,150	.2	.....	.....	.....	5,520	1,800	62	9,560	7.0
177	0	66	91	.3	4.1	.02	.24	429	128	59	743	7.9
36	0	1,210	3,390	.0	.....	.....	.....	7,000	4,280	30	11,000	6.7
171	2	57	47	1.4	3.0	.01	.16	342	48	80	596	8.4
187	0	72	47	1.4	2.5	.02	.12	381	48	82	661	7.9
222	0	74	24	1.3	.0	.11	.13	364	76	73	508	7.6
143	0	72	23	.8	.0	.05	.13	307	24	88	469	8.0
219	0	144	57	1.2	.2	.03	.17	528	39	89	836	8.0
117	0	66	216	.9	.0	.01	.13	609	50	88	1,060	7.6
182	0	72	45	.....	6.7	.....	.....	334	125	.....	.....	.....
44	0	43	970	.1	3.2	.04	.12	1,650	604	57	3,180	6.8
71	0	83	1,800	.6	1.0	.00	.09	3,120	652	75	5,710	7.5
98	0	30	39	.....	7.5	.....	.....	196	93	.....	.....	.....
72	0	63	200	.6	7.0	.....	.08	504	156	59	915	7.4
39	0	32	510	.3	4.7	.....	.06	918	461	41	1,790	7.4
44	0	28	1,050	.2	4.5	.....	.04	1,790	566	63	1,790	7.4
50	0	252	5,770	.1	.....	.....	.....	9,700	2,340	72	16,500	7.4
91	0	50	438	.4	6.3	.....	.....	875	465	38	1,640	7.5
104	0	44	28	.....	7.0	.....	.....	202	87	.....	.....	.....
135	0	55	47	.3	3.8	.....	.....	308	44	81	502	8.0
64	0	31	422	.1	3.2	.00	.10	798	237	63	1,540	7.4
104	0	90	680	.7	.8	.....	.....	1,330	230	80	2,410	7.6
160	0	73	61	.7	4.5	.00	.17	376	90	66	619	8.0
74	0	20	548	.....	3.5	.....	.....	1,000	256	70	1,900	7.5
92	0	779	940	.4	4.2	.....	.25	2,690	1,180	45	4,150	7.5
96	0	571	1,020	.4	3.5	.01	.28	2,510	1,160	43	4,130	7.4
53	0	663	1,120	.6	2.0	.00	.15	2,770	1,410	38	4,470	7.3
69	0	410	720	.2	.2	.06	.26	1,780	764	47	1,780	7.2
49	0	212	1,720	.0	1.0	.01	.28	3,050	1,580	40	5,490	7.1
35	0	211	2,700	.0	.....	.....	.....	4,560	2,570	37	8,240	7.1
59	0	622	610	.3	.0	.00	.22	1,950	389	74	3,210	7.3
81	0	70	505	.7	.0	.....	.35	1,010	108	86	1,930	7.4
47	0	44	950	1.0	.0	.00	.36	1,680	247	82	3,220	7.3

See footnotes at end of table.

Table 6.— *Chemical analyses of water from wells in the Hueco Bolson area,*

Well	Owner	Depth of well (feet)	Date of collection	Silica (SiO_2)	Iron (Fe)	Manganese (Mn)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)
M-5	U. S. Geological Survey.	435	May 3, 1953	21	0.01	.....	160	52	648	12
M-7	Southern Pacific Co.	332	Sept. 23, 1935	.....	.....	.....	70	17	133	
N-6	U. S. Geological Survey.	[a]645-690	June 21, 1953	8.7	.03	.....	119	17	880	9.3
N-6	.....do.....	[a]775-820	June 22, 1953	17	.02	.....	534	61	2,850	
N-7	Navar Bros.....	300	Sept. 11, 1952	34	.....	.....	50	12	83	
R-1	U. S. Geological Survey.	[a]607-665	June 25, 1953	2.6	.03	0.00	24	6.6	174	9.2
R-1	.....do.....	[a]793-839	July 19, 1953	17	.02	.....	102	21	484	
R-1	.....do.....	[a]938-969	July 20, 1953	14	.06	.....	62	14	501	13
R-1	.....do.....	[a]1,149-1,200	July 22, 1953	.....	.....	.....	.....	.....	.....	.....
[b]R-2	City of El Paso....	397	Apr. 28, 1940	28	.....	.....	33	8.5	109	
[b]R-2	.....do.....	350	Apr. 29, 1940	25	.....	.....	36	11	106	
[b]R-2	.....do.....	[a]425-517	Apr. 30, 1940	30	.....	.....	33	9.0	100	
[b]R-2	.....do.....	[a]585-595	May 3, 1940	25	.....	.....	22	4.3	5	7
[b]R-2	.....do.....	729	May 5, 1940	29	.....	.....	98	13	213	
[b]R-2	.....do.....	790	May 17, 1940	31	.....	.....	127	17	279	
R-3	U. S. Geological Survey.	[a]444-484	May 20, 1953	3.4	.01	.00	94	21	363	13
R-3	.....do.....	[a]555-595	May 21, 1953	5.5	.02	.....	176	44	1,050	
R-3	.....do.....	[a]740-783	May 26, 1953	9.2	.00	.10	141	23	789	12
R-4	.....do.....	[a]457-500	May 18, 1953	16	.00	.30	108	20	207	12
R-4	.....do.....	[a]542-586	.....do.....	18	.00	.11	222	51	638	18
R-4	.....do.....	[a]679-725	May 20, 1953	19	.09	.....	218	65	1,690	
R-4	.....do.....	[a]752-798	.....do.....	26	.26	.....	242	59	2,040	
R-4	.....do.....	520	June 10, 1953	33	.04	.04	133	27	330	11
[b]R-10	City of El Paso....	447	June 13, 1940	30	.....	.....	37	9.6	139	
[b]R-10	.....do.....	491	June 14, 1940	25	.....	.....	40	9.6	162	
[b]R-10	.....do.....	507	June 18, 1940	27	.....	.....	53	18	168	
[b]R-10	.....do.....	[a]535-555	June 19, 1940	.....	.....	.....	70	14	207	
[b]R-10	.....do.....	[a]579-611	June 21, 1940	.....	.....	.....	121	21	455	
[b]R-10	.....do.....	648	June 24, 1940	.....	.....	.....	200	30	644	
[b]R-10	.....do.....	697	June 26, 1940	.....	.....	.....	475	65	1,890	
[b]R-11	.....do.....	[a]554-577	Apr. 7, 1940	34	.....	.....	90	15	268	
[b]R-11	.....do.....	[a]342-524	Apr. 20, 1940	30	.....	.....	47	10	179	
R-13	U. S. Geological Survey.	[a]539-573	May 25, 1953	29	.05	.00	30	9.6	103	11
R-13	.....do.....	[a]662-708	May 27, 1953	28	.02	.00	24	6.9	93	9.4
R-13	.....do.....	[a]730-776	.....do.....	7.2	.01	.00	17	3.9	105	8.8
R-13	.....do.....	[a]870-916	May 28, 1953	22	.01	.00	38	11	154	12
R-13	.....do.....	[a]986-1,032	May 29, 1953	22	.03	.14	119	27	408	15

El Paso County, and Dona Ana and Otero Counties, N. Mex.—Continued

Bicarbonate (HCO_3)	Carbonate (CO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Phosphate (PO_4)	Boron (B)	Dissolved solids	Hardness as $CaCO_3$	Percent sodium	Specific conductance (micromhos at 25°C)	pH
86	0	901	710	0.5	1.0	0.02	0.24	2,550	613	69	3,890	7.6
98	0	38	290	.....	5.2	.....	.....	602	245	.....	.....	.....
53	0	163	1,450	.9	.5	.00	.33	2,670	367	83	4,860	7.4
62	0	611	5,030	.3	.....	.....	.....	9,130	1,580	80	15,100	7.3
134	0	136	41	.6	54	.....	.....	485	174	51	715	8.1
156	0	76	190	1.0	1.0	.01	.13	575	87	79	1,040	7.4
131	0	144	802	1.3	.5	.....	.01	1,640	341	76	3,040	7.4
151	0	195	708	.9	.0	.02	.29	1,580	212	83	2,870	7.4
46	.....	.....	9,000	.....	.....	.....	.....	.....	3,860	.....	25,200	7.0
188	0	82	81	.....	.....	.....	.....	413	118	.....	.....	.....
171	0	100	85	.....	.....	.....	.....	450	133	.....	.....	.....
181	0	78	76	.....	.....	.....	.....	395	120	.....	.....	.....
121	7	56	45	.....	.....	.....	.....	323	72	.....	.....	.....
54	0	23	474	.....	.....	.....	.....	1,100	299	.....	.....	.....
51	0	24	658	.....	.....	.....	.....	1,370	389	.....	.....	.....
101	0	107	60	.7	.2	.02	.14	1,310	321	70	2,490	7.4
61	0	280	1,820	.5	.0	.....	.....	3,410	620	79	6,190	7.0
56	0	305	1,300	.5	.2	.01	.32	2,610	446	79	4,720	7.3
91	0	36	492	.3	5.9	.01	.16	943	352	55	1,850	7.2
64	0	25	1,510	.0	3.0	.01	.09	2,520	764	64	4,850	7.3
94	0	233	2,950	.7	.....	.....	.....	5,220	812	82	9,260	7.0
163	0	617	3,700	.6	.....	.....	.....	6,260	846	84	10,500	7.0
60	.0	11	795	.0	5.4	.02	.09	1,380	443	61	2,700	7.5
185	.....	90	134	.....	.....	.....	.....	537	132	.....	.....	.....
163	0	83	191	.....	.....	.....	.....	608	139	.....	.....	.....
139	.....	77	269	.....	.....	.....	.....	722	206	.....	.....	.....
95	0	62	450	.....	.....	.....	.....	1,040	231	.....	.....	.....
94	0	96	830	.....	.....	.....	.....	1,830	389	.....	.....	.....
91	.....	110	1,300	.....	.....	.....	.....	2,700	623	.....	.....	.....
68	.....	304	3,600	.....	.....	.....	.....	7,300	1,460	.....	.....	.....
104	3	85	488	.....	.....	.....	.....	1,190	285	.....	.....	.....
119	5	74	259	.....	.....	.....	.....	697	159	.....	.....	.....
176	0	80	88	.7	4.3	.01	.32	447	114	64	756	7.9
152	0	61	79	.7	4.6	.03	.30	384	88	67	656	7.9
142	0	61	83	.7	5.2	.02	.13	370	58	77	651	7.8
98	0	38	258	.6	2.8	.02	.16	603	140	68	1,100	7.3
72	0	66	840	.3	.0	.04	.18	1,530	408	68	3,030	7.1

See footnotes at end of table.

Table 6.— *Chemical analyses of water from wells in the Hueco Bolson area,*

Well	Owner	Depth of well (feet)	Date of collection	Silica (SiO_2)	Iron (Fe)	Manganese (Mn)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)
R-13	U. S. Geological Survey.	[a]1,098-1,132	May 30, 1953	5.6	0.01	.....	208	55	712	18
R-13	.....do.....	[a]1,162-1,208	June 1, 1953	24	.02	.....	484	74	1,290	
R-15	U. S. Army.....	450	Feb. 6, 1952	27	.....	.....	31	8.7	132	.....
R-15	.....do.....	450	Mar. 28, 1952	.....	.....	.....	.....	.....	.....	.....
R-15	.....do.....	450	Aug. 26, 1952	.....	.....	.....	.....	.....	.....	.....
R-15	.....do.....	450	Jan. 12, 1953	.....	.....	.....	.....	.....	.....	.....
R-15	.....do.....	450	June 5, 1953	.....	.....	.....	.....	.....	.....	.....
R-15	.....do.....	450	Feb. 25, 1954	.....	.....	.....	.....	.....	.....	.....
R-16	.....do.....	550	Feb. 13, 1952	27	.....	.....	62	16	248	.....
R-16	.....do.....	550	Mar. 28, 1952	.....	.....	.....	.....	.....	.....	.....
R-16	.....do.....	550	Aug. 26, 1952	.....	.....	.....	.....	.....	.....	.....
R-16	.....do.....	550	Jan. 12, 1953	.....	.....	.....	.....	.....	.....	.....
R-16	.....do.....	550	June. 5, 1953	.....	.....	.....	.....	.....	.....	.....
R-16	.....do.....	550	Feb. 25, 1954	.....	.....	.....	.....	.....	.....	.....
[b]R-17	City of El Paso...	340	Sept. 27, 1940	22	.....	.....	29	8.5	105	
[b]R-17	.....do.....	388	Sept. 28, 1940	21	.....	.....	32	9.4	114	
[b]R-17	.....do.....	432	Oct. 1, 1940	22	.....	.....	44	14	155	
[b]R-17	.....do.....	537	Oct. 2, 1940	24	.....	.....	62	16	271	
[b]R-17	.....do.....	670	Oct. 4, 1940	23	.....	.....	101	30	344	
[b]R-17	.....do.....	738	Oct. 5, 1940	21	.....	.....	84	27	329	
[b]R-17	.....do.....	[a]781-811	Oct. 8, 1940	25	.....	.....	112	34	346	
[b]R-18	.....do.....	[a]303-346	Oct. 30, 1940	32	.....	.....	32	11	130	
[b]R-18	.....do.....	[a]354-437	Oct. 31, 1940	26	.....	.....	52	15	123	
[b]R-18	.....do.....	[a]447-500	Nov. 1, 1940	28	.....	.....	45	13	113	
[b]R-18	.....do.....	[a]515-550	Nov. 4, 1940	29	.....	.....	61	15	146	
[b]R-18	.....do.....	[a]573-630	Nov. 5, 1940	30	.....	.....	45	16	153	
[b]R-18	.....do.....	[a]651-697	Nov. 7, 1940	28	.....	.....	38	12	150	
[b]R-18	.....do.....	[a]714-746	Nov. 8, 1940	32	.....	.....	45	15	162	
[b]R-18	.....do.....	[a]835-855	Nov. 13, 1940	27	.....	.....	68	21	240	
[b]R-20	.....do.....	[a]304-324	Dec. 11, 1940	38	.....	.....	20	7.5	91	
[b]R-20	.....do.....	[a]354-387	Dec. 12, 1940	30	.....	.....	20	7.3	87	
[b]R-20	.....do.....	[a]469-495	Dec. 13, 1940	30	.....	.....	18	7.5	69	
[b]R-20	.....do.....	[a]523-565	Dec. 17, 1940	26	.....	.....	22	6.2	68	
[b]R-20	.....do.....	[a]585-605	Dec. 18, 1940	22	.....	.....	18	8.2	72	
[b]R-20	.....do.....	[a]622-695	Dec. 19, 1940	25	.....	.....	25	12	93	
[b]R-20	.....do.....	[a]706-746	Dec. 20, 1940	28	.....	.....	30	8.5	93	
[b]R-20	.....do.....	[a]787-820	Dec. 21, 1940	25	.....	.....	27	8.6	84	.....
[b]R-22	.....do.....	335	July 23, 1936	.....	.....	.....	36	13	140	
[b]R-23	.....do.....	500	July 12, 1939	12	.....	.....	42	19	64	
[b]R-23	.....do.....	830	Sept. 2, 1953	.....	[c]	.....	35	16	.....	.....
R-28	U. S. Geological Survey.	[a]597-640	May 13, 1953	20	0.00	0.00	22	11	100	3.7
R-28	.....do.....	[a]660-700	.....do.....	30	.00	.00	30	17	75	3.6

El Paso County, Tex., and Dona Ana and Otero Counties, N. Mex. — Continued

Bicarbonate (HCO_3)	Carbonate (CO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Phosphate (PO_4)	Boron (B)	Dissolved solids	Hardness as $CaCO_3$	Percent sodium	Specific conductance (micromhos at 25°C)	pH
61	0	148	1,520	0.6	0.0	0.00	0.25	2,700	745	67	4,980	6.9
45	0	255	2,850	.3	.....	.....	.....	5,000	1,510	65	8,780	7.1
122	0	34	187	.....	5.0	.....	.....	510	114	72	889	7.9
125	0	.....	178	.....	.....	.....	.....	.....	108	.....	872	7.6
129	0	.....	177	.....	.....	.....	.....	.....	114	.....	876	7.7
132	0	.....	177	.....	.....	.....	.....	.....	116	.....	876	7.9
133	0	.....	180	.....	.....	.....	.....	.....	124	.....	877	8.0
133	0	.....	177	.....	.....	.....	.....	.....	111	.....	851	8.2
90	0	23	465	.....	4.5	.....	.....	984	220	71	1,690	7.8
90	0	.....	460	.....	.....	.....	.....	.....	212	.....	1,680	7.6
93	0	.....	484	.....	.....	.....	.....	.....	227	.....	1,760	7.5
94	0	.....	462	.....	.....	.....	.....	.....	220	.....	1,700	7.5
94	0	.....	472	.....	.....	.....	.....	.....	234	.....	1,720	8.0
98	0	.....	470	.....	.....	.....	.....	.....	224	.....	1,700	8.0
123	0	35	156	.....	.....	.....	.....	492	108	.....	.....	.....
126	0	38	159	.....	.....	.....	.....	489	120	.....	.....	.....
98	0	42	268	.....	.....	.....	.....	655	166	.....	.....	.....
96	0	41	490	.....	.....	.....	.....	1,030	220	.....	.....	.....
75	0	35	728	.....	.....	.....	.....	1,435	378	.....	.....	.....
79	0	38	626	.....	.....	.....	.....	1,350	322	.....	.....	.....
88	0	46	746	.....	.....	.....	.....	1,530	420	.....	.....	.....
99	0	38	191	.....	.....	.....	.....	486	125	.....	.....	.....
94	0	28	250	.....	.....	.....	.....	592	190	.....	.....	.....
105	0	45	198	.....	.....	.....	.....	529	166	.....	.....	.....
94	0	39	293	.....	.....	.....	.....	677	214	.....	.....	.....
106	0	47	264	.....	.....	.....	.....	650	176	.....	.....	.....
121	0	52	224	.....	.....	.....	.....	573	142	.....	.....	.....
109	0	53	271	.....	.....	.....	.....	657	174	.....	.....	.....
96	0	53	455	.....	.....	.....	.....	983	255	.....	.....	.....
145	5	64	61	.....	.....	.....	.....	368	80	.....	.....	.....
138	7	63	58	.....	.....	.....	.....	350	81	.....	.....	.....
128	0	46	52	.....	.....	.....	.....	290	75	.....	.....	.....
128	0	47	52	.....	.....	.....	.....	294	79	.....	.....	.....
137	0	45	54	.....	.....	.....	.....	299	88	.....	.....	.....
156	6	69	71	.....	.....	.....	.....	404	109	.....	.....	.....
145	10	79	67	.....	.....	.....	.....	387	109	.....	.....	.....
155	7	65	58	.....	.....	.....	.....	366	103	.....	.....	.....
200	0	130	102	.....	5.2	.....	.....	525	143	.....	.....	.....
218	13	65	40	.....	.....	.....	.....	374	185	.....	.....	.....
230	0	78	67	1.4	.....	.....	.....	458	156	.....	.....	.....
214	0	85	34	1.8	4.0	.00	.06	390	100	68	639	8.1
246	0	61	28	2.0	2.5	.00	.06	370	145	52	587	8.1

See footnotes at end of table.

Table 6.— *Chemical analyses of water from wells in the Hueco Bolson area,*

Well	Owner	Depth of well (feet)	Date of collection	Silica (SiO_2)	Iron (Fe)	Manganese (Mn)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)
R-28	U. S. Geological Survey.	[a]793-833	May 14, 1953	34	0.01	0.00	30	16	65	5.1
R-28	.....do.....	[a]877-917	May 16, 1953	31	.00	.00	29	14	63	4.6
R-28	.....do.....	[a]977-1,017	May 18, 1953	33	.00	.00	30	15	73	5.2
R-28	.....do.....	[a]1,092-1,132	May 19, 1953	15	.01	.00	19	5.7	142	5.6
R-28	.....do.....	[a]1,152-1,200	May 23, 1953	26	.04	.....	22	7.1	160	
R-28	.....do.....	630	June 10, 1953	33	.01	.00	37	22	54	3.4
[b]R-29	City of El Paso....	497	June 30, 1939	12	.....	.....	51	20	67	
[b]R-29	.....do.....	832	Sept. 2, 1953	.....	(c)	.....	42	18	.....	.....
[b]R-31	.....do.....	503	June 20, 1939	19	.....	.....	53	16	52	
[b]R-31	.....do.....	790	Sept. 2, 1953	.....	(c)	.....	38	14	.....	.....
R-34	.....do.....	814	Oct. 6, 1952	30	.....	.....	40	13	50	
R-37	U. S. Geological Survey.	[a]968-1,016	Aug. 30, 1953	3.8	.04	.03	31	14	301	8.4
R-37	.....do.....	[a]1,068-1,114	Sept. 1, 1953	4.4	.01	.02	27	9.5	253	6.7
R-38	Restlawn Cemetary.	640	May 4, 1937	.....	.....	.....	36	14	33	
[b]R-39	City of El Paso....	569	Apr. 8, 1939	26	.....	.....	33	12	65	
R-40	.....do.....	806	Mar. 11, 1942	37	.01	.....	41	14	55	
R-40	.....do.....	806	Sept. 17, 1942	.....	.....	.....	39	13	56	
R-40	.....do.....	806	Mar. 25, 1943	.....	.....	.....	42	13	53	
R-40	.....do.....	806	Feb. 15, 1944	.....	.....	.....	43	14	51	
R-40	.....do.....	806	May 8, 1944	.....	.....	.....	40	13	59	
R-40	.....do.....	806	May 22, 1945	.....	.....	.....	43	14	55	
R-40	.....do.....	806	Mar. 25, 1946	.....	.....	.....	42	14	54	
R-40	.....do.....	806	Apr. 28, 1947	.....	.....	.....	.....	.....	.....	.....
R-40	.....do.....	806	June 7, 1948	39	.....	.....	42	15	63	
R-40	.....do.....	806	Apr. 21, 1949	37	.....	.....	43	14	60	
R-40	.....do.....	806	Feb. 9, 1950	.....	.....	.....	.....	.....	.....	.....
R-40	.....do.....	806	Mar. 24, 1951	.....	.....	.....	.....	.....	.....	.....
R-46	U. S. Army.....	812	May 10, 1951	42	.03	.....	29	11	126	
R-49	.....do.....	400	Feb. 25, 1952	24	.....	.....	23	7.0	110	.....
[b]R-50	City of El Paso....	[a]242-284	Nov. 18, 1940	27	.....	.....	18	7.0	95	
[b]R-50	.....do.....	[a]311-370	Nov. 20, 1940	30	.....	.....	20	7.0	68	
[b]R-50	.....do.....	[a]416-440	Nov. 22, 1940	34	.....	.....	25	8.2	65	
[b]R-50	.....do.....	[a]472-502	Nov. 23, 1940	22	.....	.....	21	7.5	66	
[b]R-50	.....do.....	[a]557-600	.....do.....	28	.....	.....	20	7.9	73	
[b]R-50	.....do.....	[a]637-670	Nov. 27, 1940	26	.....	.....	20	7.3	75	
[b]R-50	.....do.....	[a]693-718	Nov. 29, 1940	24	.....	.....	17	7.0	78	
[b]R-50	.....do.....	[a]749-770	Dec. 2, 1940	26	.....	.....	18	6.1	89	
R-52	U. S. Army.....	812	Feb. 16, 1953	38	.....	.....	27	9.8	130	
[b]R-53	City of El Paso....	[a]330-344	June 3, 1937	16	.....	.....	.....	.....	.....	.....
[b]R-55	.....do.....	214	July 1937	39	.....	.....	.....	.....	.....	.....
[b]R-55	.....do.....	[a]334-352	.....do.....	39	.....	.....	.....	.....	.....	.....
[b]R-55	.....do.....	[a]486-505	.....do.....	33	.....	.....	.....	.....	.....	.....
R-56	.....do.....	909	Mar. 11, 1942	32	.01	.....	36	13	40	
R-56	.....do.....	909	Sept. 17, 1942	.....	.....	.....	35	12	41	

El Paso County, Tex., and Dona Ana and Otero Counties, N. Mex. — Continued

Bicarbonate (HCO_3)	Carbonate (CO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Phosphate (PO_4)	Boron (B)	Dissolved solids	Hardness as $CaCO_3$	Percent sodium	Specific conductance (micromhos at 25°C)	pH
234	0	54	24	1.2	4.5	0.00	0.09	349	141	49	557	8.0
215	0	50	26	.8	3.5	.00	.03	328	130	50	527	8.0
227	0	63	29	1.2	3.0	.00	.05	364	136	53	581	8.1
203	0	139	52	1.1	4.5	.00	.00	496	71	80	790	7.5
232	0	102	92	.9	4.2	.....	.....	532	84	81	888	7.8
247	0	54	25	1.2	4.5	.01	.08	355	183	39	590	8.0
223	10	87	48	.....	.....	.....	.....	394	211	.....	.....	.....
228	0	72	5.7	1.3	.....	.....	.....	430	176	.....	.....	.....
194	13	70	41	.....	.....	.....	.....	372	200	.....	.....	.....
230	0	54	30	1.3	.....	.....	.....	354	154	.....	.....	.....
207	0	42	29	1.2	6.6	.....	.....	314	154	42	514	7.7
140	0	477	138	1.6	1.0	.01	.00	1,030	135	82	1,660	7.4
183	0	328	126	2.8	.0	.02	.34	848	106	83	1,380	7.9
172	0	50	14	.....	8.3	.....	.....	240	147	.....	.....	.....
183	0	99	16	.....	.....	.....	.....	295	130	.....	.....	7.5
204	0	49	38	1.6	5.0	.....	.....	340	160	.....	.....	.....
204	0	46	38	.....	5.0	.....	.....	298	151	.....	.....	.....
203	0	46	39	.....	5.8	.....	.....	299	158	.....	.....	.....
201	0	47	39	.....	8.4	.....	.....	301	165	.....	.....	.....
206	0	47	42	.....	5.5	.....	.....	308	154	.....	.....	.....
183	9	55	42	.....	5.1	.....	.....	360	165	.....	.....	.....
198	6	36	47	.....	3.8	.....	.....	386	162	.....	.....	.....
204	0	.....	48	.....	.....	.....	.....	.....	.....	.....	578	.....
210	0	52	52	.....	5.4	.....	.....	377	166	45	604	.....
198	0	55	50	.....	6.0	.....	.....	372	160	44	595	7.9
199	0	.....	.....	.....	.....	.....	.....	.....	162	.....	589	8.1
195	0	.....	53	.....	.....	.....	.....	.....	169	.....	595	7.5
194	0	95	90	1.1	5.2	.....	.....	482	118	70	809	8.1
142	0	50	112	.....	2.5	.....	.....	444	86	73	718	8.0
170	7	73	39	.....	.....	.....	.....	347	74	.....	.....	.....
142	5	58	29	.....	.....	.....	.....	284	79	.....	.....	.....
133	8	66	33	.....	.....	.....	.....	299	97	.....	.....	.....
126	6	53	42	.....	.....	.....	.....	247	83	.....	.....	.....
133	7	62	39	.....	.....	.....	.....	296	82	.....	.....	.....
127	6	58	48	.....	.....	.....	.....	303	80	.....	.....	.....
122	6	46	59	.....	.....	.....	.....	307	72	.....	.....	.....
106	7	58	74	.....	.....	.....	.....	338	70	.....	.....	.....
193	0	97	89	1.2	4.3	.....	.....	492	108	72	808	7.9
.....	.....	.....	93	.....	.....	.....	.....	481	172	.....	.....	.....
.....	.....	.....	62	.....	.....	.....	.....	568	242	.....	.....	.....
.....	.....	.....	92	.....	.....	.....	.....	574	341	.....	.....	.....
.....	.....	.....	29	.....	.....	.....	.....	315	187	.....	.....	.....
184	0	36	25	.8	6.8	.....	.....	276	143	.....	.....	.....
181	0	37	25	.....	5.0	.....	.....	.....	137	.....	.....	.....

See footnotes at end of table.

Table 6.— *Chemical analyses of water from wells in the Hueco Bolson area,*

Well	Owner	Depth of well (feet)	Date of collection	Silica (SiO_2)	Iron (Fe)	Manganese (Mn)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)
R-56	City of El Paso...	909	Mar. 25, 1943	.....	.....	.....	38	12	36	
R-56	.....do.....	909	Feb. 15, 1944	.....	.....	.....	36	12	39	
R-56	.....do.....	909	May 8, 1944	.....	.....	.....	34	13	34	
R-56	.....do.....	909	May 22, 1945	.....	.....	.....	35	12	38	
R-56	.....do.....	909	Mar. 25, 1946	.....	.....	.....	34	13	42	
R-56	.....do.....	909	Apr. 28, 1947	.....	.....	.....	.....	.....	.....	.....
R-56	.....do.....	909	June 7, 1948	32	.....	.....	34	14	44	
R-56	.....do.....	909	Apr. 21, 1949	29	.....	.....	34	13	43	
[b]R-56	.....do.....	909	Feb. 9, 1950	.....	.....	.....	.....	.....	.....	.....
R-56	.....do.....	909	Mar. 24, 1951	.....	.....	.....	.....	.....	.....	.....
S-1	U. S. Geological Survey.	[a]506-525	Mar. 4, 1953	22	0.01	.....	149	37	212	15
S-1	.....do.....	[a]707-732	Mar. 6, 1953	2.2	.00	.....	344	78	609	
S-2	.....	400	Aug. 10, 1935	.....	.....	.....	.....	.....	.....	.....
S-5	U. S. Geological Survey.	[a]461-507	Sept. 8, 1953	25	.01	0.00	36	8.3	124	7.8
S-5	.....do.....	[a]648-694	Sept. 9, 1953	26	.00	.....	162	51	508	
S-5	.....do.....	[a]927-973	Sept. 10, 1953	25	.00	.....	148	47	1,170	
S-5	.....do.....	450	Sept. 14, 1953	32	.06	.00	27	7.4	91	6.4
S-6	U. S. Army.....	.....	Apr. 3, 1936	.....	.....	.....	35	8.8	116	
[b]S-7	City of El Paso...	[a]295-321	Oct. 15, 1940	30	.....	.....	24	7.1	116	
[b]S-7	.....do.....	[a]325-396	Oct. 17, 1940	29	.....	.....	27	7.8	110	
[b]S-7	.....do.....	[a]425-536	Oct. 19, 1940	23	.....	.....	83	20	164	
[b]S-7	.....do.....	[a]585-643	Oct. 22, 1940	27	.....	.....	122	32	250	
[b]S-7	.....do.....	[a]755-795	Oct. 24, 1940	30	.....	.....	119	36	644	
S-8	U. S. Geological Survey.	[a]479-515	June 1, 1953	4.3	.03	.13	81	26	256	12
S-8	.....do.....	[a]772-808	June 3, 1953	14	.01	.06	122	26	357	8.3
S-8	.....do.....	[a]892-952	June 5, 1953	12	.02	.....	370	62	1,940	
S-8	.....do.....	[a]980-1,020	June 6, 1953	6.8	.02	.....	684	111	3,540	
S-8	.....do.....	502	Aug. 5, 1953	24	.03	.06	118	37	231	12
S-9	.....do.....	[a]511-557	July 27, 1953	12	.02	.00	58	12	422	7.2
S-9	.....do.....	[a]603-649	July 29, 1953	19	.03	.01	46	7.1	370	6.4
S-9	.....do.....	[a]895-946	July 30, 1953	3.9	.03	.....	535	40	1,980	
S-11	Adelberto Navar.	410	Aug. 17, 1935	.....	.....	.....	.....	.....	.....	.....
S-13	City of El Paso...	500	Feb. 21, 1952	4.8	.....	.....	35	12	161	.....
S-14	U. S. Geological Survey.	420	Mar. 30, 1953	28	.07	.....	59	21	185	10
V-3	City of El Paso...	715	Jan. 5, 1935	.....	.....	.....	.....	.....	.....	.....
V-3	.....do.....	715	Sept. 16, 1935	.....	.....	.....	44	16	49	
V-3	.....do.....	715	Apr. 22, 1936	.....	.....	.....	.....	.....	.....	.....
V-3	.....do.....	715	Oct. 28, 1936	.....	.....	.....	44	16	44	
V-3	.....do.....	715	Apr. 25, 1937	.....	.....	.....	45	17	50	
V-3	.....do.....	715	Oct. 27, 1937	.....	.....	.....	43	16	43	
V-3	.....do.....	715	Sept. 23, 1938	36	.....	.....	44	16	52	
V-3	.....do.....	715	June 10, 1940	.....	.....	.....	46	16	52	
V-3	.....do.....	715	Dec. 11, 1940	.....	.....	.....	46	16	52	
V-3	.....do.....	715	June 16, 1941	.....	.....	.....	44	16	51	
V-3	.....do.....	715	Sept. 19, 1941	.....	.....	.....	43	16	52	

El Paso County, Tex., and Dona Ana and Otero Counties, N. Mex.— Continued

Bicarbonate (HCO_3)	Carbonate (CO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Phosphate (PO_4)	Boron (B)	Dissolved solids	Hardness as $CaCO_3$	Percent sodium	Specific conductance (micromhos at 25°C)	pH
180	0	32	26	.....	6.0	.....	.....	.....	144	.....	.....	.....
163	7	34	25	.....	10	.....	.....	.....	139	.....	.....	.....
166	0	35	24	.....	6.0	.....	.....	.....	138	.....	.....	.....
157	10	35	25	.....	7.2	.....	.....	278	139	.....	.....	.....
152	18	28	29	.....	6.5	.....	.....	304	138	.....	.....	.....
184	.....	.....	28	.....	.....	.....	.....	.....	.....	.....	447	.....
180	0	39	32	.....	6.7	.....	.....	290	142	40	467	.....
178	0	37	30	.....	7.2	.....	.....	288	138	41	458	8.0
178	0	.....	29	.....	.....	.....	.....	.....	139	.....	457	8.1
176	0	.....	32	.....	.....	.....	.....	.....	139	.....	460	7.5
72	0	70	612	0.5	4.0	.....	0.36	1,160	524	46	2,180	7.5
37	0	72	1,700	.....	.5	.....	.....	2,820	1,180	53	5,160	7.2
146	15	.....	90	.....	.....	.....	.....	.....	33	.....	.....	.....
133	0	67	158	.6	4.5	0.01	.25	498	124	67	885	7.9
57	0	48	1,150	.2	.0	.....	.....	1,970	614	64	3,760	7.2
96	0	137	2,040	.6	.....	.....	.....	3,610	563	82	6,560	7.1
151	0	53	89	.5	5.0	.02	.16	386	98	65	651	7.6
146	0	54	139	.....	5.0	.....	.....	430	124	.....	.....	.....
170	0	74	88	.....	.....	.....	.....	407	88	.....	.....	.....
155	0	68	100	.....	.....	.....	.....	410	99	.....	.....	.....
94	0	50	367	.....	.....	.....	.....	844	290	.....	.....	.....
76	0	40	620	.....	.....	.....	.....	1,290	436	.....	.....	.....
101	0	177	1,110	.....	.....	.....	.....	2,260	445	.....	.....	.....
77	0	316	355	.3	3.0	.01	.25	1,090	309	63	1,900	6.9
64	0	569	405	.3	.0	.02	.32	1,530	412	65	2,460	7.1
54	0	1,110	2,980	.3	.....	.....	.....	6,500	1,180	78	10,500	7.3
53	0	1,990	5,490	.3	.....	.....	.....	11,800	2,160	78	18,200	7.1
124	0	340	355	.5	.0	.00	.25	1,180	446	52	1,950	7.5
106	0	212	560	.7	1.0	.00	.49	1,340	194	82	2,480	7.4
110	0	154	488	1.0	1.0	.01	.43	1,150	144	84	2,160	7.4
47	0	912	3,420	.4	.....	.....	.....	6,910	500	74	11,500	7.3
105	13	.....	280	.....	.....	.....	.....	.....	158	.....	.....	.....
90	0	101	225	.....	2.0	.....	.....	614	137	72	1,100	7.8
114	0	206	240	.4	4.2	.....	.19	810	234	62	1,380	7.7
190	.....	60	52	.....	.....	.....	.....	.....	196	.....	.....	.....
184	0	59	46	.....	6.7	.....	.....	311	176	.....	.....	.....
182	.....	.....	42	.....	.....	.....	.....	.....	206	.....	.....	.....
182	0	54	42	.....	8.8	.....	.....	298	176	.....	.....	.....
184	0	64	47	.....	9.4	.....	.....	323	182	.....	.....	.....
188	0	46	41	.....	8.3	.....	.....	289	173	.....	.....	.....
192	0	60	45	.....	7.5	.....	.....	355	176	.....	.....	.....
194	0	59	46	.....	9.4	.....	.....	324	181	.....	.....	.....
196	0	62	45	.....	7.0	.....	.....	325	181	.....	.....	.....
190	0	56	46	.7	7.8	.....	.....	315	176	.....	.....	.....
193	0	56	44	.....	9.0	.....	.....	315	174	.....	.....	.....

See footnotes at end of table.

Table 6.— *Chemical analyses of water from wells in the Hueco Bolson area,*

Well	Owner	Depth of well (feet)	Date of collection	Silica (SiO_2)	Iron (Fe)	Manganese (Mn)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)
V-3	City of El Paso...	715	June 3, 1942	.....	.....	.....	44	16		52
V-3	.....do.....	715	Sept. 16, 1942	.....	.....	.....	49	18		53
V-3	.....do.....	715	Mar. 25, 1943	.....	.....	.....	51	18		49
V-3	.....do.....	715	May 22, 1945	.....	.....	.....	51	19		52
V-3	.....do.....	715	June 7, 1948	42	.....	.....	46	17		58
V-3	.....do.....	715	Apr. 21, 1949	42	.....	.....	45	18		55
V-3	.....do.....	715	Feb. 10, 1950	.....	.....	.....	.....	.....	.....	.....
V-3	.....do.....	715	Mar. 27, 1951	40	.....	.....	48	19		51
V-4	.....do.....	730	Sept. 11, 1935	.....	.....	.....	56	21		73
V-4	.....do.....	730	Apr. 22, 1936	.....	.....	.....	.....	.....	.....	.....
V-4	.....do.....	730	June 25, 1937	36	0.13	.....	56	20	71	7.4
V-4	.....do.....	730	June 11, 1940	39	.04	.....	56	21		78
V-4	.....do.....	730	June 16, 1941	.....	.....	.....	56	20		81
V-4	.....do.....	730	Sept. 19, 1941	.....	.....	.....	55	21		82
V-4	.....do.....	730	Apr. 28, 1947	.....	.....	.....	.....	.....	.....	.....
V-4	.....do.....	730	Apr. 21, 1949	36	.....	.....	54	21		75
V-4	.....do.....	730	Apr. 5, 1951	36	.....	.....	56	21		78
V-5	.....do.....	776	Sept. 11, 1935	.....	.....	.....	51	21		114
V-5	.....do.....	776	Apr. 7, 1937	41	.03	.....	49	21	113	7.8
V-5	.....do.....	776	Sept. 23, 1938	43	.....	.....	49	22		115
V-5	.....do.....	776	Nov. 16, 1939	.....	.....	.....	.....	.....		115
V-5	.....do.....	776	June 10, 1940	.....	.....	.....	49	21		115
V-5	.....do.....	776	Nov. 28, 1940	.....	.....	.....	50	20		116
V-5	.....do.....	776	June 1941	.....	.....	.....	47	20		115
V-5	.....do.....	776	Sept. 19, 1941	.....	.....	.....	47	20		113
[b]V-6	.....do.....	[a]288-302	Dec. 1937	40	.....	.....	.....	.....	.....	.....
[b]V-7	.....do.....	[a]288-302	Nov. 23, 1937	40	.....	.....	.....	.....	.....	.....
[b]V-7	.....do.....	540	Jan. 4, 1938	15	.....	.....	.....	.....	.....	.....
V-7	.....do.....	1,055	Nov. 16, 1939	.....	.....	.....	32	12		154
V-7	.....do.....	1,055	Apr. 8, 1940	25	.....	.....	31	10		173
V-7	.....do.....	1,055	June 10, 1940	.....	.....	.....	34	12		155
V-7	.....do.....	1,055	June 16, 1941	34	.....	.....	32	11		154
V-7	.....do.....	1,055	June 3, 1942	.....	.....	.....	25	10		124
V-7	.....do.....	1,055	Sept. 16, 1942	.....	.....	.....	26	10		130
V-7	.....do.....	1,055	Mar. 25, 1943	.....	.....	.....	28	10		126
V-7	.....do.....	1,055	Feb. 15, 1944	.....	.....	.....	27	9.8		129
V-7	.....do.....	1,055	May 28, 1944	.....	.....	.....	26	10		127
V-7	.....do.....	1,055	May 22, 1945	.....	.....	.....	28	10		127
[b]V-7	.....do.....	1,055	Mar. 25, 1946	.....	.....	.....	27	10		138
V-7	.....do.....	1,055	Apr. 26, 1947	.....	.....	.....	.....	.....	.....	.....
V-7	.....do.....	1,055	June 7, 1948	39	.....	.....	25	12		132
V-7	.....do.....	1,055	Apr. 21, 1949	36	.....	.....	24	10		129
V-7	.....do.....	1,055	Aug. 2, 1949	.....	.....	.....	.....	.....	.....	.....
V-7	.....do.....	1,055	Feb. 10, 1950	.....	.....	.....	.....	.....	.....	.....
V-7	.....do.....	1,055	Mar. 24, 1951	.....	.....	.....	.....	.....	.....	.....
V-8	U. S. Air Force.	780	Mar. 4, 1952	29	.....	.....	21	7.1		107
V-8	.....do.....	780	Dec. 30, 1952	33	.02	.....	20	7.5		113
[b]V-9	City of El Paso...	909	Oct. 24, 1938	26	.....	.....	24	9.1		108
V-9	.....do.....	909	Nov. 4, 1938	43	.02	.....	23	8.6	101	10
[b]V-9	.....do.....	909	Aug. 11, 1939	22	.....	.....	21	12		106
V-9	.....do.....	909	June 3, 1942	.....	.....	.....	20	7.4		104
V-9	.....do.....	909	Aug. 3, 1949	42	.....	.....	18	6.4		108
V-9	.....do.....	909	Nov. 23, 1949	.....	.....	.....	.....	.....	.....	.....
V-9	.....do.....	909	June 23, 1950	.....	.....	.....	.....	.....	.....	.....
V-9	.....do.....	909	Mar. 27, 1951	45	.....	.....	20	7.4		116
V-10	U. S. Air Force..	780	Dec. 30, 1952	34	.03	.....	19	7.2		102
V-11	City of El Paso...	416	July 14, 1936	.....	.....	.....	22	8.1		91
V-14	U. S. Air Force..	501	Dec. 15, 1951	26	.....	.....	17	6.4		76
V-14	.....do.....	501	Mar. 28, 1952	.....	.....	.....	.....	.....	.....	.....
V-14	.....do.....	501	Sept. 2, 1952	.....	.....	.....	.....	.....	.....	.....
V-14	.....do.....	501	Jan. 7, 1953	.....	.....	.....	.....	.....	.....	.....

El Paso County, Tex., and Dona Ana and Otero Counties, N. Mex.—Continued

Bicarbonate (HCO_3)	Carbonate (CO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Phosphate (PO_4)	Boron (B)	Dissolved solids	Hardness as $CaCO_3$	Percent sodium	Specific conductance (micromhos at 25°C)	pH
194	0	55	46	.....	9.2	.....	.....	318	176	.....	.....	.....
201	0	68	52	.....	4.5	.....	.....	344	196	.....	.....	.....
202	0	65	49	.....	7.0	.....	.....	338	202	.....	.....	.....
200	0	69	51	.....	13	.....	.....	423	206	.....	.....	.....
200	0	60	54	.....	9.6	.....	.....	402	185	40	616	.....
198	0	64	48	.....	11	.....	.....	386	186	39	608	7.8
[d]192	.....	.....	48	.....	.....	.....	.....	.....	182	.....	596	8.3
194	0	65	52	.....	11	.....	.....	401	198	36	608	8.1
193	0	84	96	.....	4.5	.....	.....	430	226	.....	.....	.....
193	.....	.....	88	.....	.....	.....	.....	.....	264	.....	.....	.....
195	0	83	94	0.9	6.7	.....	.....	477	222	.....	.....	.....
204	0	92	92	.....	5.2	.....	.....	498	226	78	.....	.....
204	0	91	91	.9	6.8	.....	.....	447	222	81	.....	.....
208	0	97	88	.....	7.5	.....	.....	453	224	.....	.....	.....
204	.....	.....	92	.....	.....	.....	.....	.....	.....	.....	793	.....
196	0	86	91	.....	8.3	.....	.....	481	222	42	786	7.8
202	0	90	92	.....	8.7	.....	.....	509	226	43	797	7.9
195	0	106	134	.....	3.6	.....	.....	526	214	.....	.....	.....
195	0	108	129	1.0	7.5	.....	.....	570	209	53	.....	.....
204	0	112	126	.....	2.8	.....	.....	581	213	.....	.....	.....
194	0	105	125	.....	4.2	.....	.....	515	198	.....	.....	.....
204	0	106	125	.....	5.2	.....	.....	522	209	.....	.....	.....
204	0	108	122	.....	4.5	.....	.....	519	207	.....	.....	.....
199	0	104	121	1.5	4.3	.....	.....	511	200	.....	.....	.....
204	0	101	121	.....	4.5	.....	.....	507	200	.....	.....	.....
.....	.....	.....	49	.....	.....	.....	.....	117	.....	.....	.....	.....
.....	.....	.....	.....	.....	.....	.....	.....	498	117	.....	.....	.....
.....	.....	.....	.....	.....	.....	.....	.....	665	178	.....	.....	.....
172	0	89	162	.....	2.5	.....	.....	569	129	.....	.....	.....
177	.....	109	167	.....	.....	.....	.....	530	119	.....	.....	.....
180	0	91	162	.....	.....	.....	.....	543	134	.....	.....	.....
177	0	85	157	1.1	2.5	.....	.....	580	125	.....	.....	.....
202	0	73	90	.....	4.5	.....	.....	426	104	.....	.....	.....
202	0	92	89	.....	3.0	.....	.....	450	106	.....	.....	.....
202	0	91	87	.....	4.0	.....	.....	446	111	.....	.....	.....
182	8	93	90	.....	3.8	.....	.....	450	108	.....	.....	.....
202	0	85	89	.....	4.0	.....	.....	440	106	.....	.....	.....
172	13	92	89	.....	4.1	.....	.....	512	111	.....	.....	.....
182	19	92	92	.....	3.8	.....	.....	530	108	.....	.....	.....
146	26	.....	86	.....	.....	.....	.....	.....	.....	.....	793	.....
208	0	92	92	.....	3.8	.....	.....	498	112	72	809	.....
197	0	91	86	.....	4.4	.....	.....	482	101	73	793	8.0
.....	.....	91	86	.....	.....	.....	.....	.....	.....	.....	799	.....
195	0	.....	87	.....	.....	.....	.....	.....	99	.....	779	8.1
196	0	.....	86	.....	.....	.....	.....	.....	97	.....	778	7.8
174	0	75	68	.....	2.5	.....	.....	429	82	74	665	8.1
174	0	78	69	1.0	3.0	.....	.....	411	81	75	667	8.0
188	0	75	71	.....	.....	.....	.....	395	98	.....	.....	.....
176	4	75	63	.6	3.8	.....	.....	438	93	68	.....	.....
176	6	81	65	.....	.....	.....	.....	416	101	.....	.....	.....
186	0	64	58	.....	6.0	.....	.....	351	80	.....	.....	.....
165	8	69	57	.....	5.4	.....	.....	399	72	77	641	8.4
180	0	.....	58	.....	.....	.....	.....	.....	72	.....	621	8.0
181	0	56	.....	.....	.....	.....	.....	.....	78	.....	627	8.0
168	0	74	83	.....	2.5	.....	.....	440	80	76	688	8.2
168	0	68	61	.8	2.8	.....	.....	378	77	74	610	7.9
178	0	73	42	.....	5.6	.....	.....	329	88	.....	.....	.....
[d]167	.....	53	26	.0	5.5	.....	.....	301	69	71	475	8.3
169	0	.....	25	.....	.....	.....	.....	.....	66	.....	476	7.9
169	0	.....	25	.....	.....	.....	.....	.....	66	.....	470	8.1
169	0	.....	25	.....	.....	.....	.....	.....	66	.....	470	8.1

See footnotes at end of table.

Table 6.— *Chemical analyses of water from wells in the Hueco Bolson area,*

Well	Owner	Depth of well (feet)	Date of collection	Silica (SiO_2)	Iron (Fe)	Manganese (Mn)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)
V-14	U. S. Air Force..	501	Feb. 3, 1953	27	.....	.....	17	6.7	76	
V-14	.....do.....	501	Feb. 4, 1954	.....	.....	.....	.....	.....	.....	.....
V-15	.....do.....	750	Jan. 1952	29	.....	.....	16	4.9	79	
V-15	.....do.....	750	Mar. 28, 1952	.....	.....	.....	.....	.....	.....	.....
V-15	.....do.....	750	Sept. 2, 1952	.....	.....	.....	.....	.....	.....	.....
[b]V-17	City of El Paso...	608	Jan. 6, 1939	17	.....	.....	26	8.1	91	
[b]V-18	.....do.....	517	Feb. 23, 1939	31	.....	.....	44	9.1	139	
[b]V-18	.....do.....	652	Feb. 25, 1939	29	.....	.....	51	10	216	
[b]V-18	.....do.....	737	Mar. 3, 1939	34	.....	.....	64	16	364	
[b]V-18	.....do.....	877	Mar. 9, 1939	42	.....	.....	480	78	1,010	
V-19	.....do.....	950	Mar. 25, 1943	.....	.....	.....	34	12	117	
V-19	.....do.....	950	May 8, 1944	.....	.....	.....	28	10	130	
V-19	.....do.....	950	May 22, 1945	.....	.....	.....	27	9.8	127	
V-19	.....do.....	950	Mar. 25, 1946	.....	.....	.....	26	9.8	137	
V-19	.....do.....	950	June 7, 1948	40	.....	.....	24	9.5	133	
V-19	.....do.....	950	Apr. 21, 1949	40	.....	.....	24	9.8	134	
V-19	.....do.....	950	Mar. 24, 1951	.....	.....	.....	.....	.....	.....	.....
[b]V-19	.....do.....	950	Sept. 4, 1953	.....	(c)	.....	26	8.5	.....	.....
[b]V-21	U. S. Army.....	[a]231-240	June 10, 1941	.....	.....	.....	.....	.....	.....	.....
[b]V-21	.....do.....	[a]286-328	June 11, 1941	.....	.....	.....	.....	.....	.....	.....
[b]V-21	.....do.....	[a]342-367	June 12, 1941	.....	.....	.....	.....	.....	.....	.....
[b]V-21	.....do.....	[a]407-426	.....do.....	.....	.....	.....	.....	.....	.....	.....
[b]V-21	.....do.....	[a]457-498	June 13, 1941	.....	.....	.....	.....	.....	.....	.....
[b]V-21	.....do.....	[a]510-547	June 14, 1941	.....	.....	.....	.....	.....	.....	.....
[b]V-21	.....do.....	[a]589-603	June 15, 1941	.....	.....	.....	.....	.....	.....	.....
[b]V-21	.....do.....	[a]655-697	June 18, 1941	.....	.....	.....	.....	.....	.....	.....
[b]V-21	.....do.....	[a]710-734	June 20, 1941	.....	.....	.....	.....	.....	.....	.....
[b]V-21	.....do.....	[a]743-775	June 1941	.....	.....	.....	.....	.....	.....	.....
V-21	.....do.....	778	May 14, 1951	33	0.08	.....	48	22	100	
V-21	.....do.....	778	May 23, 1952	34	.00	.....	48	20	100	
V-21	.....do.....	778	Apr. 29, 1953	36	.01	.....	50	22	102	
V-23	.....do.....	784	Sept. 17, 1937	.....	.....	.....	43	16	53	
V-23	.....do.....	784	May 14, 1951	30	.12	.....	53	20	73	
V-23	.....do.....	784	May 23, 1952	32	.03	.....	45	16	63	
V-23	.....do.....	784	Apr. 29, 1953	32	.02	.....	48	17	68	
[b]V-24	.....do.....	785	July 6, 1932	.....	.....	.....	.....	.....	.....	.....
V-24	.....do.....	785	Jan. 5, 1935	.....	.....	.....	.....	.....	.....	.....
V-24	.....do.....	785	Apr. 23, 1936	.....	.....	.....	32	13	53	
V-24	.....do.....	785	Oct. 28, 1936	.....	.....	.....	34	13	49	
V-24	.....do.....	785	Apr. 17, 1937	32	.03	.....	33	12	51	5.4
V-24	.....do.....	785	Sept. 29, 1938	31	.....	.....	33	14	57	
V-24	.....do.....	785	Aug. 5, 1949	.....	.....	.....	.....	.....	.....	.....
V-24	.....do.....	785	Apr. 24, 1951	31	.....	.....	34	16	61	
V-24	.....do.....	785	May 14, 1951	42	.06	.....	42	18	41	
V-24	.....do.....	785	May 23, 1952	33	.03	.....	34	13	56	
V-24	.....do.....	785	Apr. 29, 1953	39	.01	.....	41	16	52	
V-25	.....do.....	653	May 14, 1951	46	.08	.....	41	24	45	
V-25	.....do.....	653	Sept. 22, 1951	.....	.....	.....	.....	.....	.....	.....
V-25	.....do.....	653	May 23, 1952	42	.02	.....	40	20	47	
V-25	.....do.....	653	Apr. 29, 1953	45	.01	.....	42	22	45	
[b]V-26	.....do.....	600	Jan. 6, 1932	.....	.....	.....	.....	.....	.....	.....
[b]V-27	.....do.....	652	July 6, 1932	.....	.....	.....	.....	.....	.....	.....

El Paso County, Tex., and Dona Ana and Otero Counties, N. Mex.—Continued

Bicarbonate (HCO_3)	Carbonate (CO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Phosphate (PO_4)	Boron (B)	Dissolved solids	Hardness as $CaCO_3$	Percent sodium	Specific conductance (micromhos at 25°C)	pH
170	0	51	26	.....	6.8	.....	.....	304	70	70	472	8.1
176	Tr.	.....	25	.....	.....	.....	.....	.....	62	.....	461	8.4
135	0	54	50	.....	2.5	.....	.....	329	60	74	511	7.9
138	0	.....	54	.....	.....	.....	.....	.....	61	.....	536	7.8
133	0	.....	58	.....	.....	.....	.....	.....	65	.....	542	8.0
60	26	50	72	.....	.....	.....	.....	423	98	.....	.....	.....
124	0	82	188	.....	.....	.....	.....	528	148	.....	.....	7.4
102	0	74	329	.....	.....	.....	.....	756	170	.....	.....	7.6
97	0	102	594	.....	.....	.....	.....	1,280	184	.....	.....	7.5
62	0	647	2,132	.....	.....	.....	.....	5,210	1,520	.....	.....	7.3
205	0	90	86	.....	6.0	.....	.....	446	134	.....	.....	.....
208	0	93	86	.....	5.5	.....	.....	455	111	.....	.....	.....
177	13	92	84	.....	4.5	.....	.....	494	108	.....	.....	.....
192	16	92	85	.....	4.7	.....	.....	538	106	.....	.....	.....
206	0	90	87	.....	4.9	.....	.....	492	99	75	800	.....
199	0	103	83	.....	5.6	.....	.....	502	100	74	783	8.1
198	0	.....	80	.....	.....	.....	.....	.....	96	.....	762	7.6
201	0	90	74	1.2	.....	.....	.....	492	100	.....	.....	.....
196	0	.....	99	.....	.....	.....	.....	589	225	.....	.....	.....
167	0	.....	122	.....	.....	.....	.....	553	252	.....	.....	.....
143	0	.....	101	.....	.....	.....	.....	437	238	.....	.....	.....
153	0	.....	80	.....	.....	.....	.....	371	173	.....	.....	.....
159	0	.....	108	.....	.....	.....	.....	483	191	.....	.....	.....
164	0	.....	89	.....	.....	.....	.....	412	178	.....	.....	.....
163	0	.....	73	.....	.....	.....	.....	386	164	.....	.....	.....
162	0	.....	135	.....	.....	.....	.....	654	210	.....	.....	.....
153	0	.....	163	.....	.....	.....	.....	676	212	.....	.....	.....
151	0	.....	151	.....	.....	.....	.....	498	191	.....	.....	.....
194	0	92	118	.9	4.5	.....	0.00	528	210	51	879	7.7
191	0	91	115	1.2	4.5	.....	.....	517	202	52	882	7.7
197	0	100	116	1.1	5.6	.....	.....	542	216	51	884	7.8
176	0	49	62	.5	5.5	.....	.....	316	173	.....	.....	.....
189	0	72	97	.7	4.5	.....	.02	461	214	43	762	7.8
177	0	58	74	1.0	5.0	5.0	.....	388	178	44	658	7.9
179	0	65	83	.9	5.4	.....	.....	422	190	44	688	7.8
.....	.....	.....	36	.....	.....	.....	.....	352	248	.....	.....	.....
173	5	40	38	.....	.....	.....	.....	.....	147	.....	.....	.....
178	0	39	41	.....	5.0	.....	.....	271	133	.....	.....	.....
178	0	36	39	.....	7.0	.....	.....	266	138	.....	.....	.....
178	0	36	40	.8	7.5	.....	.....	297	132	44	.....	.....
186	0	45	43	.....	5.3	.....	.....	308	140	.....	.....	.....
.....	.....	41	48	.....	.....	.....	.....	.....	.....	.....	539	.....
204	0	41	50	.....	5.0	.....	.....	338	151	47	533	7.5
186	0	48	41	.9	7.5	.....	.02	340	179	33	542	7.5
182	0	39	46	.9	4.5	.....	.....	321	138	47	537	7.6
187	0	48	50	.9	7.5	.....	.....	346	168	40	564	7.8
237	0	52	28	.5	12	.....	.13	366	201	33	573	7.7
226	0	.....	26	.....	.....	.....	.....	.....	184	.....	548	7.8
229	0	48	27	.8	7.8	.....	.....	349	182	36	568	7.6
232	0	50	28	.7	12	.....	.....	376	196	33	566	7.8
.....	.....	.....	.....	.....	.0	.....	.....	656	283	.....	.....	.....
.....	.....	.....	.....	.....	.0	.....	.....	365	279	.....	.....	.....

See footnotes at end of table.

Table 6.— *Chemical analyses of water from wells in the Hueco Bolson area,*

Well	Owner	Depth of well (feet)	Date of collection	Silica (SiO_2)	Iron (Fe)	Manganese (Mn)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)
bV-28	U. S. Army.....	657	July 6, 1932	.....	.....	.....	.....	.....	.....	.....
bV-29	.....do.....	600	.....do.....	.....	.....	.....	.....	.....	.....	.....
V-33	U. S. Geological Survey.	[a]299-339	Feb. 26, 1953	18	0.01	.....	22	12	177	9.7
V-33	.....do.....	736	Apr. 5, 1953	34	.05	.....	26	10	71	5.8
V-34	Texas and New Orleans Railroad Co.	869	May 6, 1937	.....	.....	.....	107	47	90	
V-34	.....do.....	869	Sept.16, 1942	.....	.....	.....	143	63	105	
V-34	.....do.....	869	Feb. 10, 1950	34	.....	.....	332	143	159	
V-34	.....do.....	869	Mar. 22, 1951	32	.....	.....	352	148	170	
V-35	.....do.....	860	Mar. 26, 1943	.....	.....	.....	144	71	83	
V-35	.....do.....	860	May 23, 1945	.....	.....	.....	240	124	95	
V-35	.....do.....	860	Mar. 26, 1946	.....	.....	.....	260	139	95	
V-35	.....do.....	860	Apr. 28, 1947	.....	.....	.....	.....	.....	.....	.....
V-37	.....do.....	864	Jan. 5, 1935	.....	.....	.....	.....	.....	.....	.....
V-37	.....do.....	864	Apr. 23, 1936	.....	.....	.....	88	39	73	
V-37	.....do.....	864	Oct. 28, 1936	.....	.....	.....	100	49	72	
V-37	.....do.....	864	Nov. 16, 1939	.....	.....	.....	108	55	71	
V-37	.....do.....	864	June 11, 1940	.....	.....	.....	124	64	66	
V-37	.....do.....	864	Nov. 29, 1940	.....	.....	.....	112	55	86	
V-37	.....do.....	864	June 17, 1941	.....	.....	.....	136	67	91	
V-37	.....do.....	864	June 2, 1942	.....	.....	.....	161	86	100	
V-37	.....do.....	864	Sept.15, 1942	.....	.....	.....	167	91	103	
V-37	.....do.....	864	Feb. 17, 1944	.....	.....	.....	208	109	90	
V-37	.....do.....	864	May 9, 1944	.....	.....	.....	196	111	111	
V-38	.....do.....	852	Sept.18, 1941	.....	.....	.....	136	57	80	
V-38	.....do.....	852	June 2, 1942	.....	.....	.....	125	53	96	
V-38	.....do.....	852	June 9, 1948	35	.....	.....	293	130	148	
V-38	.....do.....	852	Apr. 21, 1949	33	.....	.....	280	123	154	
V-38	.....do.....	852	Mar. 22, 1951	32	.....	.....	352	148	170	
V-38	.....do.....	852	Sept.22, 1951	32	.....	.....	328	170	244	
V-38	.....do.....	852	Mar. 25, 1952	32	.....	.....	398	179	187	
V-38	.....do.....	852	May 26, 1952	.....	.....	.....	393	172	195	
V-38	.....do.....	852	May 19, 1953	36	.....	.....	426	188	224	
bV-39	City of El Paso..	530	Jan. 7, 1935	.....	.....	.....	.....	.....	.....	.....
bV-39	.....do.....	530	Apr. 8, 1935	20	.....	.....	.....	.....	.....	.....
bV-39	.....do.....	530	Mar. 13, 1936	.....	.....	.....	25	9.9	135	
bV-39	.....do.....	530	Oct. 28, 1936	.....	.....	.....	24	9.4	138	
bV-39	.....do.....	530	June 3, 1938	26	.....	.....	27	3.4	145	
V-39	.....do.....	530	Sept.28, 1938	62	.....	.....	24	11	136	
V-39	.....do.....	530	Nov. 16, 1939	.....	.....	.....	.....	.....	143	
bV-39	.....do.....	530	Apr. 8, 1940	51	.....	.....	24	9.0	140	
V-39	.....do.....	530	June 12, 1940	.....	.....	.....	26	10	152	
V-39	.....do.....	530	Nov. 28, 1940	.....	.....	.....	24	8.8	141	
V-39	.....do.....	530	June 16, 1941	57	.....	.....	25	9.3	137	
V-39	.....do.....	530	Sept.18, 1941	.....	.....	.....	23	10	137	
V-39	.....do.....	530	June 3, 1942	.....	.....	.....	24	9.9	135	
V-39	.....do.....	530	Sept.16, 1942	.....	.....	.....	24	8.7	130	
V-39	.....do.....	530	Mar. 25, 1943	.....	.....	.....	26	9.9	131	
V-39	.....do.....	530	Mar. 27, 1946	.....	.....	.....	25	9.1	139	
V-39	.....do.....	530	Apr. 21, 1949	56	.....	.....	23	9.1	140	
V-39	.....do.....	530	Aug. 7, 1949	.....	.....	.....	.....	.....	.....	.....
V-40	.....do.....	715	May 26, 1952	50	.....	.....	20	8.0	110	
V-41	.....do.....	766	....do.....	39	.....	.....	18	7.3	115	
bV-41	.....do.....	766	Sept. 4, 1953	.....	(c)	.....	18	8.2	.....	.....
V-42	.....do.....	[a]289-293	June 1, 1936	.....	.....	.....	47	18	165	
V-42	.....do.....	[a]408-441	....do.....	.....	.....	.....	42	17	195	
V-45	.....do.....	862	Aug. 30, 1926	31	.....	.....	.....	.....	.....	.....
V-45	.....do.....	862	Aug. 30, 1930	14	.....	.....	.....	.....	.....	.....
V-45	.....do.....	862	Sept. 3, 1931	24	.....	.....	.....	.....	.....	.....

El Paso County, Tex., and Dona Ana and Otero Counties, N. Mex.—Continued

Bicarbonate (HCO_3)	Carbonate (CO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Phosphate (PO_4)	Boron (B)	Dissolved solids	Hardness as $CaCO_3$	Percent sodium	Specific conductance (micromhos at 25°C)	pH
.....	.....	.....	26	.....	0.0	.....	.....	408	216	.....	.....	.....
.....	.....	.....	.....	.....	.0	.....	.....	785	278	.....	.....	.....
262	0	178	58	2.0	18	.....	0.20	636	104	77	976	8.0
191	0	28	56	.5	4.2	.....	.10	330	106	58	545	8.1
228	0	56	288	.....	5.5	.....	.....	706	460	.....	.....	.....
178	0	55	452	.....	5.0	.....	.....	911	616	.....	.....	.....
155	0	115	1,070	.....	7.5	.....	.....	1,940	1,420	20	3,660	7.3
155	0	125	1,130	.....	5.5	.....	.....	2,040	1,490	20	3,820	7.2
196	0	64	425	.....	6.3	.....	.....	890	651	.....	.....	.....
152	14	95	755	.....	5.4	.....	.....	1,400	1,110	.....	.....	.....
141	13	99	840	.....	4.0	.....	.....	1,520	1,220	.....	.....	.....
174	.....	.....	1,020	.....	.....	.....	.....	.....	1,350	.....	3,420	.....
185	7	48	202	.....	.....	.....	.....	.....	218	.....	.....	.....
194	0	48	230	.....	6.3	.....	.....	580	380	.....	.....	.....
188	0	48	282	.....	7.3	.....	.....	651	451	.....	.....	.....
182	0	55	312	.....	3.2	.....	.....	737	496	.....	.....	.....
200	0	72	335	.....	4.4	.....	.....	764	572	.....	.....	.....
200	0	58	328	.....	5.6	.....	.....	743	506	.....	.....	.....
178	0	68	420	.3	4.0	.....	.....	875	615	.....	.....	.....
197	0	76	515	.....	7.5	.....	.....	1,040	756	.....	.....	.....
192	0	77	548	.....	5.0	.....	.....	1,090	791	.....	.....	.....
149	16	85	650	.....	12	.....	.....	1,240	967	.....	.....	.....
148	0	91	685	.....	5.5	.....	.....	1,270	946	.....	.....	.....
150	0	51	402	.....	5.2	.....	.....	805	574	.....	.....	.....
166	0	50	388	.....	5.6	.....	.....	799	530	.....	.....	.....
154	0	102	958	.....	4.3	.....	.....	1,750	1,270	20	3,360	.....
160	0	103	920	.....	5.9	.....	.....	1,700	1,200	22	3,210	7.4
155	0	125	1,130	.....	5.5	.....	.....	2,040	1,490	20	3,820	7.2
154	0	135	1,260	.....	5.0	.....	.....	2,250	1,520	26	4,210	7.3
150	0	141	1,320	.....	4.0	.....	.....	2,340	1,730	19	4,370	7.3
150	0	143	1,300	.....	8.0	.....	.....	2,360	1,690	20	4,390	7.7
150	0	159	1,440	.2	5.5	.....	.....	2,550	1,840	21	4,770	7.3
214	0	80	74	.....	.....	.....	.....	.....	117	.....	.....	.....
.....	.....	.....	80	.....	.....	.....	.....	507	274	.....	.....	.....
228	.....	100	68	.....	.....	.....	.....	460	103	.....	.....	.....
236	.....	101	66	.....	.....	.....	.....	463	99	.....	.....	.....
223	.....	105	74	.....	.....	.....	.....	475	81	.....	.....	.....
224	0	109	70	.....	5.0	.....	.....	534	105	.....	.....	.....
230	0	105	67	.....	6.7	.....	.....	455	87	.....	.....	.....
219	.....	99	76	.....	.....	.....	.....	525	97	.....	.....	.....
240	0	120	78	.....	6.8	.....	.....	511	106	.....	.....	.....
240	0	105	64	.....	9.0	.....	.....	470	96	.....	.....	.....
233	0	99	68	1.0	6.8	.....	.....	531	100	.....	.....	.....
228	0	100	71	.....	6.0	.....	.....	459	98	.....	.....	.....
230	0	98	70	.....	7.5	.....	.....	458	100	.....	.....	.....
216	0	97	69	.....	4.5	.....	.....	440	96	.....	.....	.....
234	0	99	64	.....	6.3	.....	.....	452	106	.....	.....	.....
210	11	100	73	.....	5.5	.....	.....	530	100	.....	.....	.....
228	0	102	71	.....	7.2	.....	.....	536	95	76	815	8.2
.....	.....	106	72	.....	.....	.....	.....	.....	.....	.....	827	.....
d204	.....	75	48	1.2	8.3	.....	.....	440	83	74	671	8.5
188	0	77	61	1.2	3.0	.....	.....	422	75	77	680	7.9
189	0	84	56	1.0	.....	.....	.....	433	78	.....	.....	.....
160	0	63	250	.....	.5	.....	.....	622	191	.....	.....	.....
166	0	75	273	.....	.2	.....	.....	684	175	.....	.....	.....
.....	.....	.....	196	.....	.....	.....	.....	588	133	.....	.....	.....
.....	.....	.....	220	.....	.....	.....	.....	659	157	.....	.....	.....
.....	.....	.....	189	.....	.....	.....	.....	648	151	.....	.....	.....

See footnotes at end of table.

Table 6.— *Chemical analyses of water from wells in the Hueco Bolson area,*

Well	Owner	Depth of well (feet)	Date of collection	Silica (SiO_2)	Iron (Fe)	Manganese (Mn)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)
V-45	City of El Paso...	862	Aug. 19, 1932	22	.....	.....	.....	.....	.....	.....
V-45	.....do.....	862	Aug. 30, 1933	.....	.....	.....	.....	.....	.....	.....
V-45	.....do.....	862	Aug. 18, 1934	.....	.....	.....	.....	.....	.....	.....
V-45	.....do.....	862	June 29, 1936	.....	.....	.....	43	18	120	
V-45	.....do.....	862	Aug. 15, 1936	36	.....	.....	.....	.....	.....	.....
V-45	.....do.....	862	Oct. 28, 1936	.....	.....	.....	50	17	168	
V-45	.....do.....	862	May 6, 1937	.....	.....	.....	49	19	128	
V-45	.....do.....	862	June 25, 1937	33	0.12	.....	48	16	166	9.6
V-45	.....do.....	862	Oct. 29, 1937	0	.....	.....	50	18	161	
V-45	.....do.....	862	Mar. 11, 1938	33	.....	.....	.....	.....	.....	.....
V-45	.....do.....	862	June 13, 1938	24	.....	.....	.....	.....	.....	.....
V-45	.....do.....	862	Sept. 23, 1938	32	.....	.....	48	18	174	
V-45	.....do.....	862	May 1, 1939	25	.....	.....	.....	.....	.....	.....
V-45	.....do.....	862	June 10, 1940	.....	.....	.....	54	19	168	
V-45	.....do.....	862	June 16, 1941	.....	.....	.....	53	17	164	
V-45	.....do.....	862	June 7, 1942	.....	.....	.....	57	21	172	
V-45	.....do.....	862	May 22, 1945	.....	.....	.....	60	20	175	
V-45	.....do.....	862	Mar. 25, 1946	.....	.....	.....	55	19	180	
V-45	.....do.....	862	June 7, 1948	36	.....	.....	42	17	172	
V-45	.....do.....	862	Apr. 22, 1949	36	.....	.....	56	21	172	
V-45	.....do.....	862	Aug. 2, 1949	.....	.....	.....	.....	.....	.....	.....
V-45	.....do.....	862	Feb. 15, 1950	.....	.....	.....	.....	.....	.....	.....
V-45	.....do.....	862	June 22, 1950	.....	.....	.....	.....	.....	.....	.....
V-45	.....do.....	862	Apr. 15, 1951	.....	.....	.....	.....	.....	.....	.....
V-45	.....do.....	862	May 2, 1951	.....	.....	.....	.....	.....	.....	.....
V-45	.....do.....	862	Sept. 19, 1951	.....	.....	.....	.....	.....	.....	.....
V-45	.....do.....	862	Mar. 19, 1952	.....	.....	.....	.....	.....	.....	.....
V-45	.....do.....	862	Oct. 3, 1952	.....	.....	.....	.....	.....	.....	.....
V-45	.....do.....	862	June 1953	.....	.....	.....	.....	.....	.....	.....
[b]V-45	.....do.....	862	Aug. 26, 1953	.....	.4	.....	66	23	.....	.....
V-47	.....do.....	860	Aug. 16, 1935	.....	.....	.....	.....	.....	.....	.....
V-47	.....do.....	860	Sept. 11, 1935	.....	.....	.....	46	16	157	
V-47	.....do.....	860	Apr. 22, 1936	.....	.....	.....	.....	.....	.....	.....
V-47	.....do.....	860	May 6, 1937	.....	.....	.....	51	19	158	
V-47	.....do.....	860	June 25, 1937	32	.24	.....	50	17	158	8.0
V-47	.....do.....	860	Sept. 11, 1939	.....	.....	.....	64	23	175	
V-49	.....do.....	882	Jan. 5, 1935	.....	.....	.....	.....	.....	.....	.....
V-49	.....do.....	882	Sept. 11, 1935	.....	.....	.....	45	15	170	
V-49	.....do.....	882	Apr. 22, 1936	.....	.....	.....	.....	.....	.....	.....
V-49	.....do.....	882	Oct. 28, 1936	.....	.....	.....	42	14	166	
V-49	.....do.....	882	Nov. 4, 1938	31	.02	.....	51	16	169	8.6
V-49	.....do.....	882	June 10, 1940	.....	.....	.....	52	17	185	
V-49	.....do.....	882	June 16, 1941	.....	.....	.....	52	17	178	
V-49	.....do.....	882	June 2, 1942	.....	.....	.....	52	17	187	
V-49	.....do.....	882	Sept. 14, 1942	.....	.....	.....	52	17	182	
V-49	.....do.....	882	May 22, 1945	.....	.....	.....	56	16	217	
V-49	.....do.....	882	Apr. 22, 1949	31	.....	.....	42	19	213	
V-49	.....do.....	882	Aug. 2, 1949	28	.....	.....	39	18	184	
V-49	.....do.....	882	Feb. 9, 1950	.....	.....	.....	.....	.....	.....	.....
V-49	.....do.....	882	May 31, 1950	34	.....	.....	49	18	173	
V-49	.....do.....	882	June 23, 1950	.....	.....	.....	.....	.....	.....	.....
V-49	.....do.....	882	Oct. 4, 1950	.....	.....	.....	.....	.....	.....	.....
V-49	.....do.....	882	Sept. 18, 1951	.....	.....	.....	.....	.....	.....	.....
V-49	.....do.....	882	Sept. 30, 1952	32	.....	.....	48	17	187	
[b]V-49	.....do.....	882	Aug. 27, 1953	.....	[c]	.....	44	16	.....	.....
[b]V-50	.....do.....	59	Nov. 14, 1938	39	.....	.....	129	30	254	
[b]V-50	.....do.....	127	Nov. 16, 1938	27	.....	.....	18	4.5	242	
[b]V-50	.....do.....	200	Nov. 17, 1938	25	.....	.....	16	7.5	197	
V-50	.....do.....	257	Nov. 18, 1938	22	.....	.....	31	12	219	
[b]V-50	.....do.....	337	Nov. 22, 1938	21	.....	.....	42	17	100	
[b]V-50	.....do.....	840	Nov. 30, 1938	30	.....	.....	51	11	315	
V-50	.....do.....	643	June 16, 1941	32	.....	.....	43	15	149	
V-50	.....do.....	643	June 2, 1942	.....	.....	.....	40	15	156	

El Paso County, Tex., and Dona Ana and Otero Counties, N. Mex.—Continued

Bicarbonate (HCO_3)	Carbonate (CO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Phosphate (PO_4)	Boron (B)	Dissolved solids	Hardness as $CaCO_3$	Percent sodium	Specific conductance (micromhos at 25°C)	pH
.....	.....	.....	246	.....	.....	.....	.....	694	162	.....	.....	.....
.....	.....	.....	284	.....	.....	.....	.....	.....	.....	.....	.....	.....
.....	.....	.....	397	.....	.....	.....	.....	984	.....	.....	.....	.....
184	0	72	152	.....	3.0	.....	.....	499	181	.....	.....	.....
.....	.....	.....	252	.....	.....	.....	.....	699	231	.....	.....	.....
162	0	66	253	.....	1.2	.....	.....	635	195	.....	.....	.....
174	0	66	188	.....	3.3	.....	.....	539	200	.....	.....	.....
158	0	65	252	1.0	1.7	.....	.....	672	186	64	.....	.....
162	0	66	246	.....	1.4	.....	.....	.....	199	64	.....	.....
.....	.....	.....	252	.....	.....	.....	.....	720	282	.....	.....	.....
.....	.....	.....	242	.....	.....	.....	.....	684	189	.....	.....	.....
162	0	71	258	.....	1.2	.....	.....	691	194	.....	.....	.....
.....	.....	.....	258	.....	.....	.....	.....	723	186	.....	.....	.....
168	0	72	258	.....	1.8	.....	.....	656	213	.....	.....	.....
163	0	65	252	.9	1.5	.....	.....	634	202	.....	.....	.....
162	0	70	280	.....	1.2	.....	.....	681	229	.....	.....	.....
146	6	71	289	.....	2.2	.....	.....	780	232	.....	.....	.....
145	12	67	282	.....	1.5	.....	.....	702	216	.....	.....	.....
170	0	82	228	.....	1.8	.....	.....	689	175	68	1,180	.....
161	0	76	274	.....	2.2	.....	.....	743	226	62	1,270	8.0
.....	.....	66	279	.....	.....	.....	.....	.....	.....	.....	1,310	.....
159	.....	.....	288	.....	.....	.....	.....	.....	250	.....	1,320	8.0
160	0	.....	292	.....	.....	.....	.....	.....	242	.....	1,310	8.0
.....	.....	76	290	.....	.....	.....	.....	.....	.....	.....	1,330	.....
.....	.....	74	290	.....	.....	.....	.....	.....	.....	.....	1,330	.....
162	0	.....	298	.....	.....	.....	.....	.....	260	.....	1,350	7.9
150	0	73	288	.....	.....	.....	.....	.....	185	.....	1,310	7.9
160	0	.....	308	.....	.....	.....	.....	.....	259	.....	1,350	7.9
160	0	.....	301	.....	.....	.....	.....	.....	255	.....	1,360	8.1
158	0	70	301	.2	.....	.....	.....	884	260	.....	.....	.....
128	6	.....	236	.....	.....	.....	.....	.....	170	.....	.....	.....
167	0	51	235	.....	1.7	.....	.....	589	181	.....	589	.....
164	.....	.....	235	.....	.....	.....	.....	.....	225	.....	.....	.....
166	0	57	249	.....	2.5	.....	.....	618	205	.....	.....	.....
166	0	51	250	.9	5.0	.....	.....	646	195	63	.....	.....
174	0	58	305	.....	2.6	.....	.....	757	254	.....	.....	.....
153	0	60	256	.....	.....	.....	.....	.....	204	.....	.....	.....
164	0	54	250	.....	1.1	.....	.....	616	174	.....	.....	.....
160	.....	.....	249	.....	.....	.....	.....	.....	210	.....	.....	.....
166	0	53	235	.....	.8	.....	.....	593	162	.....	.....	.....
158	0	56	274	.7	1.6	.....	.....	669	193	64	.....	.....
162	0	70	280	.....	1.0	.....	.....	685	200	.....	.....	.....
162	0	56	278	.7	.8	.....	.....	662	200	.....	.....	.....
157	0	60	295	.....	.5	.....	.....	689	200	.....	.....	.....
161	0	58	284	.....	2.5	.....	.....	675	200	.....	.....	.....
127	9	63	350	.....	.5	.....	.....	836	206	.....	.....	.....
136	0	144	282	.....	3.2	.....	.....	813	183	72	1,410	8.2
169	0	57	266	.....	.0	.....	.....	684	172	70	1,240	8.0
159	0	.....	268	.....	.....	.....	.....	.....	.....	.....	1,240	7.9
160	0	58	268	.7	1.0	.....	.....	688	196	66	1,250	7.6
160	0	.....	260	.....	.....	.....	.....	.....	180	.....	1,210	7.9
160	.....	.....	262	.....	.....	.....	.....	.....	192	.....	1,230	7.9
161	0	56	278	.....	.....	.....	.....	.....	200	.....	1,270	8.2
159	0	56	286	.6	3	.....	.....	736	190	68	1,280	8.1
155	0	73	270	.7	.....	.....	.....	732	174	.....	.....	.....
352	0	378	223	.....	.....	.....	.....	1,190	445	.....	.....	.....
273	20	155	115	.....	.....	.....	.....	677	63	.....	.....	.....
192	11	104	153	.....	.....	.....	.....	583	71	.....	.....	.....
225	12	128	201	.....	.....	.....	.....	736	127	.....	.....	.....
164	8	70	130	.....	.....	.....	.....	448	175	.....	.....	.....
108	0	101	471	.....	.....	.....	.....	1,000	173	.....	.....	.....
170	0	62	203	.4	.4	.....	.....	601	169	.....	.....	.....
180	0	68	200	.....	.2	.....	.....	568	162	.....	.....	.....

See footnotes at end of table.

Table 6.— *Chemical analyses of water from wells in the Hueco Bolson area,*

Well	Owner	Depth of well (feet)	Date of collection	Silica (SiO_2)	Iron (Fe)	Manganese (Mn)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)
V-50	City of El Paso...	643	Apr. 22, 1949	29	.....	.....	55	21	146	
V-50	.....do.....	643	Apr. 2, 1949	28	.....	.....	50	24	123	
V-50	.....do.....	643	Feb. 28, 1950	.....	.....	.....	.....	.....	.....	.....
V-50	.....do.....	643	June 22, 1950	.....	.....	.....	.....	.....	.....	.....
V-50	.....do.....	643	May 3, 1951	28	.....	.....	56	23	146	
V-50	.....do.....	643	Oct. 17, 1952	.....	.....	.....	.....	.....	.....	.....
V-50	.....do.....	643	May 19, 1953	.....	.....	.....	.....	.....	.....	.....
V-51	Harry Mitchell Brewing Co.	353	Jan. 5, 1935	.....	.....	.....	.....	.....	.....	.....
V-51	.....do.....	353	Aug. 27, 1935	.....	.....	.....	.....	.....	.....	.....
V-51	.....do.....	353	Apr. 22, 1936	.....	.....	.....	47	18	129	
V-51	.....do.....	353	Oct. 28, 1936	.....	.....	.....	50	19	136	
V-51	.....do.....	353	Mar. 19, 1937	29	0.06	.....	49	19	131	6.6
V-51	.....do.....	353	Oct. 29, 1937	.....	.....	.....	48	20	134	
V-51	.....do.....	353	Oct. 3, 1938	27	.....	.....	48	19	142	
V-51	.....do.....	353	Nov. 18, 1939	.....	.....	.....	50	19	140	
V-51	.....do.....	353	June 11, 1940	.....	.....	.....	49	20	152	
V-51	.....do.....	353	Nov. 28, 1940	.....	.....	.....	52	19	146	
V-51	.....do.....	353	June 16, 1941	.....	.....	.....	53	19	144	
V-51	.....do.....	353	Sept. 18, 1941	.....	.....	.....	50	20	149	
V-51	.....do.....	353	June 2, 1942	.....	.....	.....	52	19	159	
V-51	.....do.....	353	Sept. 15, 1942	.....	.....	.....	54	20	154	
V-51	.....do.....	353	Mar. 27, 1943	.....	.....	.....	59	21	163	
V-51	.....do.....	353	Feb. 11, 1944	.....	.....	.....	60	22	157	
V-51	.....do.....	353	May 8, 1944	.....	.....	.....	60	24	157	
V-51	.....do.....	353	July 27, 1949	28	.....	.....	65	31	186	
V-51	.....do.....	353	Feb. 9, 1950	28	.....	.....	71	27	190	
V-51	.....do.....	353	Apr. 24, 1951	29	.....	.....	75	30	188	
V-51	.....do.....	353	Sept. 24, 1951	.....	.....	.....	.....	.....	.....	.....
V-51	.....do.....	353	May 27, 1952	.....	.....	.....	.....	.....	.....	.....
V-51	.....do.....	353	June 3, 1953	.....	.....	.....	.....	.....	.....	.....
V-52	.....do.....	354	Apr. 24, 1951	28	.....	.....	47	20	136	
V-53	City of El Paso...	802	Aug. 19, 1935	.....	.....	.....	.....	.....	.....	.....
V-53	.....do.....	802	Sept. 16, 1935	.....	.....	.....	21	8.0	156	
V-53	.....do.....	802	Mar. 17, 1937	31	.06	.....	30	10	178	5.8
V-53	.....do.....	802	Sept. 24, 1938	35	.....	.....	20	8.1	156	
V-53	.....do.....	802	June 10, 1940	.....	.....	.....	22	8.0	158	
V-53	.....do.....	802	Nov. 28, 1940	.....	.....	.....	20	7.7	155	
V-53	.....do.....	802	June 16, 1941	.....	.....	.....	23	6.9	156	
V-53	.....do.....	802	Sept. 18, 1941	.....	.....	.....	18	7.3	158	
V-53	.....do.....	802	June 2, 1942	.....	.....	.....	20	7.4	152	
V-53	.....do.....	802	Mar. 23, 1943	.....	.....	.....	25	7.7	153	
V-53	.....do.....	802	Feb. 11, 1944	.....	.....	.....	22	7.0	155	
V-53	.....do.....	802	May 8, 1944	.....	.....	.....	20	6.7	158	
V-53	.....do.....	802	May 22, 1945	.....	.....	.....	23	7.3	153	
V-53	.....do.....	802	Mar. 25, 1946	.....	.....	.....	22	7.0	168	
V-53	.....do.....	802	Apr. 22, 1949	32	.....	.....	19	7.1	76	
V-53	.....do.....	802	Aug. 3, 1949	.....	.....	.....	.....	.....	.....	.....
V-53	.....do.....	802	Feb. 9, 1950	.....	.....	.....	.....	.....	.....	.....
V-53	.....do.....	802	Aug. 1950	.....	.....	.....	.....	.....	.....	.....
V-53	.....do.....	802	Mar. 22, 1951	.....	.....	.....	.....	.....	.....	.....
V-53	.....do.....	802	Oct. 16, 1952	.....	.....	.....	.....	.....	.....	.....
V-53	.....do.....	802	June 3, 1953	.....	.....	.....	.....	.....	.....	.....
bV-54	.....do.....	a90-100	Feb. 25, 1937	35	.....	.....	147	21	182	
bV-54	.....do.....	a109-142	Feb. 27, 1937	27	.....	.....	40	7.7	204	
bV-54	.....do.....	a207-223	Mar. 2, 1937	28	.....	.....	30	14	185	
bV-54	.....do.....	a290-322	Mar. 6, 1937	20	.....	.....	15	4.9	211	
bV-54	.....do.....	a397-418	Mar. 10, 1937	15	.....	.....	50	8.3	176	
bV-54	.....do.....	a250-689	Apr. 20, 1937	14	.....	.....	.....	.....	.....	.....

El Paso County, Tex., and Dona Ana and Otero Counties, N. Mex.—Continued

Bicarbonate (HCO_3)	Carbonate (CO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Phosphate (PO_4)	Boron (B)	Dissolved solids	Hardness as $CaCO_3$	Percent sodium	Specific conductance (micromhos at 25°C)	pH
159	0	89	225	.....	0.2	.....	.....	675	224	59	1,160	7.8
169	0	70	197	.....	1.8	.....	.....	590	224	54	1,060	7.9
159	0	.....	230	.....	.....	.....	.....	.....	229	.....	1,140	8.0
166	0	.....	201	.....	.....	.....	.....	.....	153	.....	1,030	8.0
162	0	90	230	.....	.5	.....	.....	719	234	58	1,170	8.1
160	0	.....	220	.....	.....	.....	.....	.....	189	.....	1,100	7.9
163	0	.....	208	.....	.....	.....	.....	.....	181	.....	1,090	7.9
176	.....	68	158	.....	.....	.....	.....	.....	189	.....	.....	.....
138	6	.....	175	.....	.....	.....	.....	.....	165	.....	.....	.....
168	0	71	185	.....	.0	.....	.....	533	191	.....	.....	.....
180	0	70	198	.....	.0	.....	.....	562	203	.....	.....	.....
167	0	73	200	0.6	.1	.....	.....	592	200	58	.....	.....
170	0	64	203	.....	.2	.....	.....	.....	202	59	.....	.....
170	0	79	202	.....	.0	.....	.....	605	198	.....	.....	.....
166	0	73	209	.....	.0	.....	.....	613	203	.....	.....	.....
172	0	80	220	.....	.0	.....	.....	606	204	.....	.....	.....
174	0	77	215	.....	.0	.....	.....	595	208	.....	.....	.....
170	0	73	218	.5	.2	.....	.....	591	210	.....	.....	.....
170	0	74	223	.....	.0	.....	.....	600	207	.....	.....	.....
172	0	78	235	.....	.0	.....	.....	628	208	.....	.....	.....
172	0	76	235	.....	1.0	.....	.....	625	217	.....	.....	.....
170	0	79	260	.....	.5	.....	.....	666	233	.....	.....	.....
170	0	78	256	.....	.2	.....	.....	657	240	.....	.....	.....
152	8	80	260	.....	1.0	.....	.....	665	248	.....	.....	.....
167	0	88	330	.....	.0	.....	.....	880	290	58	1,470	8.2
169	0	93	329	.....	1.0	.....	.....	878	288	59	1,500	7.8
172	0	94	340	.....	1.0	.....	.....	934	310	57	1,530	8.1
169	0	.....	330	.....	.....	.....	.....	.....	295	.....	1,510	7.9
168	0	89	340	.....	.....	.....	.....	.....	284	.....	1,520	7.6
167	0	.....	348	.....	.....	.....	.....	.....	298	.....	1,540	7.7
171	0	80	193	.....	.5	.....	.....	601	200	60	1,040	8.1
146	13	.....	138	.....	.....	.....	.....	.....	72	.....	.....	.....
171	6	76	139	.....	.1	.....	.....	490	85	.....	.....	.....
174	0	78	202	.8	.1	.....	.....	611	116	75	.....	.....
186	0	83	130	.....	.0	.....	.....	516	83	.....	.....	.....
188	0	90	130	.....	.0	.....	.....	501	88	.....	.....	.....
180	4	80	129	.....	.0	.....	.....	484	82	.....	.....	.....
176	6	74	136	.9	.0	.....	.....	489	86	.....	.....	.....
186	0	74	134	.....	.0	.....	.....	483	75	.....	.....	.....
184	0	66	135	.....	.0	.....	.....	471	80	.....	.....	.....
186	0	76	137	.....	.5	.....	.....	491	94	.....	.....	.....
157	14	75	136	.....	.2	.....	.....	486	84	.....	.....	.....
172	8	76	132	.....	1.0	.....	.....	486	78	.....	.....	.....
157	12	76	136	.....	.0	.....	.....	526	88	.....	.....	.....
157	24	77	142	.....	.0	.....	.....	544	84	.....	.....	.....
181	0	77	139	.....	.0	.....	.....	524	76	82	901	8.1
.....	.....	77	137	.....	.....	.....	.....	.....	.....	.....	901	.....
181	0	.....	133	.....	.....	.....	.....	.....	74	.....	895	8.1
d182	.....	.....	132	.....	.....	.....	.....	.....	74	.....	880	8.3
182	0	.....	131	.....	.....	.....	.....	.....	76	.....	864	7.7
181	0	.....	130	.....	.....	.....	.....	.....	74	.....	872	8.1
184	0	.....	134	.....	.....	.....	.....	.....	74	.....	884	8.2
290	.....	350	175	.....	.....	.....	.....	1,060	454	.....	.....	.....
218	.....	125	189	.....	.....	.....	.....	709	132	.....	.....	.....
203	.....	116	176	.....	.....	.....	.....	656	132	.....	.....	.....
217	.....	86	176	.....	.....	.....	.....	625	58	.....	.....	.....
194	.....	53	233	.....	.....	.....	.....	637	159	.....	.....	.....
.....	.....	.....	.....	.....	.....	.....	.....	475	86	.....	.....	.....

See footnotes at end of table.

Table 6.— *Chemical analyses of water from wells in the Hueco Bolson area,*

Well	Owner	Depth of well (feet)	Date of collection	Silica (SiO_2)	Iron (Fe)	Manganese (Mn)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)
V-54	City of El Paso...	703	Apr. 20, 1937	26	0.12	.....	23	8.6	120	6.6
V-54	.....do.....	703	Sept. 24, 1938	29	.02	.....	22	7.5	124	4.8
V-54	.....do.....	703	Nov. 16, 1939	.....	.....	.....	.....	.....	138	
V-54	.....do.....	703	June 10, 1940	.....	.....	.....	.....	.....	138	
V-54	.....do.....	703	June 16, 1941	.....	.....	.....	24	8.1	135	
V-54	.....do.....	703	Sept. 18, 1941	.....	.....	.....	24	9.7	141	
V-54	.....do.....	703	June 2, 1942	.....	.....	.....	22	8.5	134	
V-54	.....do.....	703	Sept. 15, 1942	.....	.....	.....	23	7.7	141	
V-54	.....do.....	703	Mar. 23, 1943	.....	.....	.....	26	8.1	133	
V-54	.....do.....	703	Feb. 11, 1944	.....	.....	.....	26	8.0	135	
V-54	.....do.....	703	May 22, 1945	.....	.....	.....	27	8.6	135	
V-54	.....do.....	703	Mar. 25, 1946	.....	.....	.....	25	8.7	152	
V-54	.....do.....	703	Apr. 26, 1947	.....	.....	.....	.....	.....	.....	.....
V-54	.....do.....	703	July 27, 1949	29	.....	.....	20	7.2	147	
V-54	.....do.....	703	Aug. 2, 1949	.....	.....	.....	.....	.....	.....	.....
V-54	.....do.....	703	Feb. 9, 1950	.....	.....	.....	.....	.....	.....	.....
V-54	.....do.....	703	June 22, 1950	.....	.....	.....	.....	.....	.....	.....
V-54	.....do.....	703	Mar. 23, 1951	.....	.....	.....	.....	.....	.....	.....
V-54	.....do.....	703	June 13, 1951	34	.00	.....	26	10	138	1.6
V-54	.....do.....	703	Oct. 15, 1952	.....	.....	.....	.....	.....	.....	.....
V-54	.....do.....	703	June 3, 1953	.....	.....	.....	.....	.....	.....	.....
V-55	.....do.....	425	Jan. 5, 1935	.....	.....	.....	.....	.....	.....	.....
V-55	.....do.....	425	Sept. 11, 1935	.....	.....	.....	84	17	75	
V-55	.....do.....	425	Feb. 28, 1936	.....	.....	.....	85	19	66	
V-55	.....do.....	425	Apr. 22, 1936	.....	.....	.....	.....	.....	.....	.....
V-55	.....do.....	425	Oct. 28, 1936	.....	.....	.....	95	22	74	
V-55	.....do.....	425	June 25, 1937	28	.78	.....	105	21	91	5.4
V-55	.....do.....	425	Aug. 15, 1938	38	.03	.....	115	23	93	7.2
V-55	.....do.....	425	Aug. 23, 1939	.....	.....	.....	133	28	88	
bV-59	.....do.....	134	Oct. 6, 1938	29	.....	.....	301	56	192	
bV-59	.....do.....	261	Oct. 13, 1938	23	.....	.....	42	16	66	
bV-59	.....do.....	350	Oct. 15, 1938	23	.....	.....	39	12	66	
bV-59	.....do.....	614	Oct. 19, 1938	37	.....	.....	17	5.3	133	
bV-59	.....do.....	720	Feb. 1, 1939	16	.....	.....	34	15	74	
V-59	.....do.....	720	June 10, 1940	.....	.....	.....	37	11	71	
V-59	.....do.....	720	Dec. 5, 1940	31	.03	.....	35	11	86	
V-59	.....do.....	720	June 16, 1941	26	.....	.....	36	11	89	
V-59	.....do.....	720	Sept. 18, 1941	.....	.....	.....	35	12	89	
V-59	.....do.....	720	June 2, 1942	.....	.....	.....	36	11	94	
V-59	.....do.....	720	Sept. 15, 1942	.....	.....	.....	36	11	94	
V-59	.....do.....	720	Mar. 24, 1943	.....	.....	.....	40	12	93	
V-59	.....do.....	720	May 22, 1945	.....	.....	.....	43	12	94	
V-59	.....do.....	720	Apr. 26, 1947	.....	.....	.....	.....	.....	.....	.....
V-59	.....do.....	720	Apr. 22, 1949	30	.....	.....	67	20	88	
V-59	.....do.....	720	Feb. 9, 1950	.....	.....	.....	.....	.....	.....	.....
V-59	.....do.....	720	June 23, 1950	.....	.....	.....	.....	.....	.....	.....
V-59	.....do.....	720	Mar. 24, 1951	.....	.....	.....	.....	.....	.....	.....
V-59	.....do.....	720	Mar. 24, 1952	.....	.....	.....	.....	.....	.....	.....
V-60	.....do.....	480	Jan. 5, 1935	.....	.....	.....	.....	.....	.....	.....
V-60	.....do.....	480	Sept. 16, 1935	.....	.....	.....	124	23	99	
V-60	.....do.....	480	Feb. 25, 1936	.....	.....	.....	130	26	92	
V-61	El Paso Milling Co.	400	Aug. 23, 1935	.....	.....	.....	.....	.....	.....	.....
V-62	City of El Paso...	650	June 25, 1937	29	.22	.....	30	10	130	7.0
V-62	.....do.....	650	June 10, 1940	30	.02	.....	29	10	128	
V-62	.....do.....	650	June 2, 1942	.....	.....	.....	29	10	130	
V-62	.....do.....	650	Sept. 17, 1942	.....	.....	.....	31	11	134	
V-63	.....do.....	52	Sept. 28, 1937	28	.45	.....	146	25	211	14
V-63	.....do.....	52	Sept. 29, 1938	20	.....	.....	153	28	200	
V-63	.....do.....	52	June 12, 1940	.....	.....	.....	154	29	223	
V-63	.....do.....	52	Dec. 3, 1940	.....	.....	.....	160	30	209	
V-63	.....do.....	52	Mar. 25, 1952	.....	.....	.....	.....	.....	.....	.....
V-63	.....do.....	52	Feb. 16, 1953	38	.....	.....	27	9.8	130	

El Paso County, Tex., and Dona Ana and Otero Counties, N. Mex. — Continued

Bicarbonate (HCO_3)	Carbonate (CO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Phosphate (PO_4)	Boron (B)	Dissolved solids	Hardness as $CaCO_3$	Percent sodium	Specific conductance (micromhos at 25°C)	pH
172	0	69	108	.....	0.0	.....	.....	450	93	73	.....	.....
161	5	63	112	0.0	.2	.....	.....	423	86	75	.....	.....
172	0	66	118	.0	.....	.....	.....	425	76	.....	.....	.....
176	0	68	121	.....	.0	.....	.....	435	86	.....	.....	.....
161	6	68	122	.3	.3	.....	.....	443	94	.....	.....	.....
170	0	73	136	.....	.0	.....	.....	467	100	.....	.....	.....
172	0	69	120	.....	.0	.....	.....	438	90	.....	.....	.....
161	16	67	118	.....	.0	.....	.....	452	89	.....	.....	.....
173	0	69	123	.....	.5	.....	.....	445	98	.....	.....	.....
152	9	69	128	.....	.2	.....	.....	450	98	.....	.....	.....
146	12	70	131	.....	.0	.....	.....	499	103	.....	.....	.....
148	22	71	139	.....	.0	.....	.....	519	98	.....	.....	.....
178	0	.....	156	.....	.....	.....	.....	.....	74	.....	948	.....
168	0	69	134	.....	.0	.....	.....	489	80	80	859	8.2
168	0	70	133	.....	.....	.....	.....	.....	.....	.....	855	8.2
168	0	.....	135	.....	.....	.....	.....	.....	95	.....	868	8.1
168	0	.....	137	.....	.....	.....	.....	.....	92	.....	858	8.2
167	0	.....	139	.....	.....	.....	.....	.....	99	.....	855	7.6
170	0	70	139	.....	.0	.....	.....	503	106	74	867	7.9
167	0	.....	149	.....	.....	.....	.....	.....	101	.....	911	7.8
165	0	.....	152	.....	.....	.....	.....	.....	105	.....	934	8.0
177	0	112	94	.....	.....	.....	.....	.....	260	.....	.....	.....
180	0	122	119	.....	.3	.....	.....	506	280	.....	.....	.....
181	0	130	106	.....	.1	.....	.....	496	290	.....	.....	.....
180	0	.....	120	.....	.....	.....	.....	.....	330	.....	.....	.....
186	0	133	140	.....	.0	.....	.....	556	328	.....	.....	.....
191	0	154	165	.8	.1	.....	.....	706	349	36	.....	.....
199	0	172	176	.0	.3	.....	.....	722	382	34	.....	.....
216	0	236	153	.....	.0	.....	.....	792	447	.....	.....	.....
255	0	498	473	.....	.....	.....	.....	1,750	987	.....	.....	.....
171	0	76	67	.....	.....	.....	.....	375	171	.....	.....	.....
166	0	68	59	.....	.....	.....	.....	318	146	.....	.....	.....
175	0	86	85	.....	.....	.....	.....	424	64	.....	.....	.....
88	0	62	69	.....	.....	.....	.....	426	143	.....	.....	.....
178	0	50	66	.....	.0	.....	.....	.....	138	.....	.....	.....
175	2	81	63	.....	.0	.....	.....	397	133	.....	.....	.....
178	0	81	68	.6	.0	.....	.....	397	135	.....	.....	.....
183	0	80	68	.....	.0	.....	.....	374	137	.....	.....	.....
188	0	80	72	.....	.0	.....	.....	386	135	.....	.....	.....
160	11	81	75	.....	.0	.....	.....	387	135	.....	.....	.....
186	0	85	79	.....	.0	.....	.....	401	150	.....	.....	.....
160	12	87	85	.....	.0	.....	.....	457	157	.....	.....	.....
188	0	.....	94	.....	.....	.....	.....	.....	148	.....	762	.....
197	0	123	107	.....	.0	.....	.....	552	249	43	896	7.8
187	0	.....	93	.....	.....	.....	.....	.....	169	.....	798	8.1
184	0	.....	92	.....	.....	.....	.....	.....	166	.....	790	8.0
184	0	.....	95	.....	.....	.....	.....	.....	184	.....	789	7.5
196	0	.....	102	.....	.....	.....	.....	.....	241	.....	876	7.7
273	.....	200	98	.....	.....	.....	.....	.....	444	.....	.....	.....
268	0	227	115	.....	.3	.....	.....	720	404	.....	.....	.....
272	0	238	113	.....	.3	.....	.....	733	432	.....	.....	.....
137	4	.....	64	.....	.....	.....	.....	.....	189	.....	.....	.....
180	0	97	111	.9	.1	.....	.....	499	116	68	.....	.....
182	0	97	100	.....	.0	.....	.....	488	114	.....	.....	.....
170	10	99	98	.....	.0	.....	.....	460	114	.....	.....	.....
188	0	103	109	.....	.0	.....	.....	481	123	.....	.....	.....
328	0	348	217	.1	2.9	.....	.....	1,170	468	48	.....	.....
308	0	355	218	.....	4.2	.....	.....	1,170	497	.....	.....	.....
344	0	370	225	.....	4.0	.....	.....	1,180	504	.....	.....	.....
336	0	371	220	.....	8.0	.....	.....	1,160	523	.....	.....	.....
196	0	.....	102	.....	.....	.....	.....	.....	241	.....	876	7.7
193	0	97	89	1.2	4.3	.....	.....	492	108	72	808	7.9

See footnotes at end of table.

Table 6.— *Chemical analyses of water from wells in the Hueco Bolson area,*

Well	Owner	Depth of well (feet)	Date of collection	Silica (SiO_2)	Iron (Fe)	Manganese (Mn)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)
V-66	El Paso Electric Co.	394	Aug. 20, 1935	.....	.....	.....	.....	.....	.....	.....
V-67	.....do.....	304	Feb. 28, 1936	.....	.....	.....	123	23	178	
V-67	.....do.....	304	Dec. 11, 1938	28	0.10	.....	136	24	196	9.1
V-68	Peyton Packing Co.	775	Aug. 26, 1935	.....	.....	.....	.....	.....	.....	.....
bV-69	City of El Paso...	60	Aug. 28, 1940	34	.....	.....	120	31	177	
bV-69	.....do.....	167	Aug. 30, 1940	28	.....	.....	89	30	94	
bV-69	.....do.....	343	Sept. 3, 1940	23	.....	.....	74	25	117	
bV-69	.....do.....	400	Sept. 4, 1940	20	.....	.....	45	18	143	
bV-69	.....do.....	460	Sept. 5, 1940	23	.....	.....	49	17	137	
bV-69	.....do.....	535	Sept. 6, 1940	24	.....	.....	20	7.7	92	
bV-69	.....do.....	617	Sept. 10, 1940	23	.....	.....	16	4.4	99	
bV-69	.....do.....	681	Sept. 11, 1940	28	.....	.....	14	3.6	120	
bV-69	.....do.....	729	Sept. 12, 1940	27	.....	.....	12	3.1	132	
bV-69	.....do.....	835	Sept. 14, 1940	30	.....	.....	16	4.8	182	
bV-69	.....do.....	622	Sept. 19, 1940	28	.....	.....	25	8.9	106	
V-70	El Paso County Water Control & Improvement District No. 1.	704	June 8, 1948	36	.....	.....	29	11	156	
V-70	.....do.....	704	Nov. 9, 1950	32	.....	.....	28	11	151	
V-72	The Texas Co....	694	Jan. 5, 1935	.....	.....	.....	.....	.....	.....	.....
V-72	.....do.....	694	Aug. 28, 1935	.....	.....	.....	.....	.....	.....	.....
V-72	.....do.....	694	Apr. 22, 1936	.....	.....	.....	33	11	172	
V-72	.....do.....	694	Dec. 15, 1939	.....	.....	.....	.....	.....	178	
V-72	.....do.....	694	Dec. 29, 1940	.....	.....	.....	35	11	176	
V-72	.....do.....	694	Sept. 18, 1941	.....	.....	.....	38	14	155	
V-72	.....do.....	694	June 3, 1942	.....	.....	.....	34	10	176	
V-72	.....do.....	694	Sept. 16, 1942	.....	.....	.....	.....	.....	.....	.....
V-72	.....do.....	694	Mar. 24, 1943	.....	.....	.....	47	15	171	
V-72	.....do.....	694	Feb. 15, 1944	.....	.....	.....	36	11	176	
V-72	.....do.....	694	May 9, 1944	.....	.....	.....	37	11	178	
V-72	.....do.....	694	May 22, 1945	.....	.....	.....	42	12	165	
V-72	.....do.....	694	Mar. 25, 1946	.....	.....	.....	36	11	181	
V-72	.....do.....	694	Apr. 26, 1947	.....	.....	.....	.....	.....	.....	.....
V-72	.....do.....	694	June 8, 1948	40	.....	.....	36	12	182	
V-72	.....do.....	694	Apr. 22, 1949	34	.....	.....	35	11	180	
V-72	.....do.....	694	Aug. 7, 1949	29	.....	.....	46	19	181	
V-72	.....do.....	694	Feb. 10, 1950	.....	.....	.....	.....	.....	.....	.....
V-72	.....do.....	694	Apr. 24, 1951	36	.....	.....	39	13	178	
V-72	.....do.....	694	May 26, 1952	.....	.....	.....	.....	.....	.....	.....
V-72	.....do.....	694	Oct. 2, 1952	.....	.....	.....	.....	.....	.....	.....
V-75	Standard Oil Co. of Texas.	606	Aug. 28, 1935	.....	.....	.....	.....	.....	.....	.....
V-76	.....do.....	644	May 27, 1952	34	.....	.....	28	9.5	150	
V-78	.....do.....	299	Mar. 13, 1936	.....	.....	.....	339	143	1,230	
V-79	Phelps Dodge Refining Co.	640	Aug. 29, 1935	.....	.....	.....	.....	.....	.....	.....
V-79	.....do.....	640	Sept. 23, 1935	.....	.....	.....	27	8.0	145	
V-79	.....do.....	640	Dec. 18, 1940	36	.03	.....	23	6.0	127	
V-82	El Paso County Water Control & Improvement District No. 1.	477	Sept. 20, 1948	28	.15	.....	26	10	122	7.2
V-82	.....do.....	477	Nov. 9, 1950	30	.....	.....	26	10	123	
V-85	.....do.....	490	June 10, 1952	34	.....	.....	12	2.9	103	
V-86	.....do.....	386	June. 8, 1948	34	.....	.....	15	5.4	191	
V-86	.....do.....	386	Nov. 9, 1950	27	.....	.....	21	5.9	210	
W-1	U. S. Geological Survey.	[a]484-520	Mar. 11, 1953	19	.01	.....	20	7.5	146	9.4
W-1	.....do.....	[a]879-899	Apr. 17, 1953	14	.01	.....	911	135	2,440	

El Paso County, Tex., and Dona Ana and Otero Counties, N. Mex.—Continued

Bicarbonate (HCO_3)	Carbonate (CO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Phosphate (PO_4)	Boron (B)	Dissolved solids	Hardness as $CaCO_3$	Percent sodium	Specific conductance (micromhos at 25°C)	pH
126	3	.....	99	.....	.....	.....	.....	.....	222	.....	.....	.....
277	0	281	190	0.1	0.9	.....	.....	933	402	.....	.....	.....
311	0	313	208	.0	.1	.....	.....	1,070	438	48	.....	.....
184	18	.....	51	.....	.....	.....	.....	.....	26	.....	.....	.....
268	0	286	208	.....	.....	.....	.....	1,050	426	.....	.....	7.9
201	.....	183	139	.....	.....	.....	.....	696	348	.....	.....	.....
138	.....	120	216	.....	.....	.....	.....	732	287	.....	.....	.....
160	.....	78	177	.....	.....	.....	.....	586	187	.....	.....	.....
148	.....	85	200	.....	.....	.....	.....	618	194	.....	.....	.....
174	.....	68	48	.....	.....	.....	.....	336	82	.....	.....	.....
176	.....	63	45	.....	.....	.....	.....	337	58	.....	.....	.....
191	.....	87	47	.....	.....	.....	.....	370	50	.....	.....	.....
198	0	94	51	.....	.....	.....	.....	398	44	.....	.....	.....
198	0	150	97	.....	.....	.....	.....	576	61	.....	.....	.....
170	0	78	77	.....	.....	.....	.....	390	99	.....	.....	.....
190	0	85	150	.....	1.2	.....	.....	582	118	74	957	.....
177	0	87	146	.....	1.5	.....	.....	550	115	74	923	7.9
146	4	80	206	.....	.....	.....	.....	.....	144	.....	.....	.....
120	10	.....	212	.....	.....	.....	.....	.....	117	.....	.....	.....
148	0	81	210	.....	.8	.....	.....	581	128	.....	.....	.....
151	0	79	218	.....	.7	.....	.....	586	126	.....	.....	.....
160	0	83	210	.....	2.0	.....	.....	596	133	.....	.....	.....
178	0	71	189	.....	2.5	.....	.....	557	152	.....	.....	.....
158	0	77	212	.....	.5	.....	.....	587	126	.....	.....	.....
172	0	75	208	.....	.5	.....	.....	.....	.....	.....	.....	.....
175	0	79	228	.....	4.0	.....	.....	630	179	.....	.....	.....
134	11	76	219	.....	.8	.....	.....	596	135	.....	.....	.....
163	0	79	217	.....	3.5	.....	.....	606	138	.....	.....	.....
132	11	77	217	.....	.5	.....	.....	642	154	.....	.....	.....
145	12	76	220	.....	.4	.....	.....	640	135	.....	.....	.....
138	10	.....	225	.....	.....	.....	.....	.....	.....	.....	1,120	.....
164	0	77	227	.....	.8	.....	.....	673	140	74	1,170	.....
152	0	77	225	.....	3.2	.....	.....	643	132	75	1,140	8.0
163	0	79	262	.....	1.2	.....	.....	706	193	67	1,290	8.0
150	0	.....	224	.....	.....	.....	.....	.....	134	.....	1,140	8.1
160	0	76	232	.....	1.5	.....	.....	663	151	72	1,160	8.2
155	0	73	231	.....	.....	.....	.....	.....	133	.....	1,150	7.8
155	0	.....	230	.....	.....	.....	.....	.....	132	.....	1,120	8.0
115	9	.....	174	.....	.....	.....	.....	.....	102	.....	.....	.....
155	0	83	155	1.0	1.0	.....	.....	576	109	75	937	8.0
284	0	579	2,310	.3	5.8	.....	.....	4,740	1,430	.....	.....	.....
111	11	.....	169	.....	.....	.....	.....	.....	106	.....	.....	.....
130	0	68	170	.....	.2	.....	.....	483	102	.....	.....	.....
124	6	65	128	.....	.0	.....	.....	453	83	.....	.....	.....
164	0	88	107	.8	1.2	.....	0.42	475	106	70	808	7.8
158	0	93	104	.....	1.5	.....	.....	466	106	72	783	7.8
153	0	76	39	2.4	.2	.....	.....	375	42	84	553	7.8
168	0	84	177	.....	.8	.....	.....	593	60	87	987	.....
135	0	98	228	.....	.0	.....	.....	656	77	86	1,130	7.8
111	0	80	168	.6	3.5	.....	.17	525	81	77	919	7.4
51	0	1,370	4,730	.2	.....	.....	.....	9,630	2,830	65	14,800	6.9

See footnotes at end of table.

Table 6.— *Chemical analyses of water from wells in the Hueco Bolson area,*

Well	Owner	Depth of well (feet)	Date of collection	Silica (SiO_2)	Iron (Fe)	Manganese (Mn)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)
W-2	U. S. Army.....	378	Mar. 13, 1936	.....	.....	.....	28	11	130	
W-3	Hillcrest Country Club.	600	Mar. 25, 1952	31	.....	.....	79	29	489	
W-4	El Paso Natural Gas Co.	591	June 17, 1953	33	0.04	.....	96	35	550	
W-6	Lane Dairy.....	200	Apr. 22, 1936	.....	.48	.....	54	17	488	
W-8	R. C. Sparks.....	440	Dec. 8, 1952	25	.....	.....	60	15	477	
W-9	El Paso County Water Control & Improvement District No. 1.	219	Nov. 9, 1950	28	.13	.....	40	9.8	200	
W-10	.....do.....	500	Dec. 8, 1952	21	.53	.....	25	8.2	318	
X-1	U. S. Geological Survey.	[a]475-495	July 19, 1953	12	.06	.....	20	2.1	128	3.0
X-4	Davis.....	750	Apr. 29, 1952	28	.....	.....	118	87	531	
X-6	R. C. Sparks.....	440	Aug. 20, 1935	.....	.....	.....	.....	.....	.....	.....
X-6	.....do.....	440	Apr. 10, 1936	.....	.40	.....	7.5	2.3	74	
X-8	El Paso Natural Gas Co.	526	Feb. 16, 1953	30	.....	.....	253	67	2,170	
X-10	U. S. Geological Survey.	[a]478-500	July 25, 1953	8.8	.04	0.00	22	4.3	315	4.7
X-10	.....do.....	[a]657-677	Aug. 1, 1953	16	.12	.02	28	3.1	369	3.5
X-11	R. C. Sparks.....	460	Apr. 2, 1936	.....	1.0	.....	29	15	134	
Y-1	.....do.....	500	Apr. 29, 1952	.....	.....	.....	.....	.....	.....	.....
Z-1	.....do.....	500	Apr. 2, 1936	.....	3.1	.....	136	45	905	
Z-5	S. O. Roberts....	643	.....do.....	.....	.....	.....	66	27	778	
Z-5	.....do.....	643	Apr. 29, 1952	14	.....	.....	50	24	786	
Z-6	.....do.....	521	Apr. 30, 1952	35	.....	.....	23	7.9	426	

[a]Drill-stem test, depth interval sampled.
[b]Analyzed by city of El Paso.

El Paso County, Tex., and Dona Ana and Otero Counties, N. Mex.— Continued

Bicarbonate (HCO_3)	Carbonate (CO_4)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Phosphate (PO_4)	Boron (B)	Dissolved solids	Hardness as $CaCO_3$	Percent sodium	Specific conductance (micromhos at 25°C)	pH
171	0	125	88	.....	4.6	.....	.....	471	115	.....	.....	.....
120	0	685	410	0.8	2.0	.....	0.22	1,780	316	77	2,790	8.2
124	0	940	350	1.3	2.2	.....	.....	2,070	384	76	2,950	7.8
202	0	179	648	.....	.8	.....	.....	1,490	205	.....	.....	.....
83	0	219	675	.....	.2	.....	.....	1,520	211	83	2,670	7.8
130	0	84	269	.....	1.0	.....	.....	704	140	76	1,220	7.8
134	0	146	370	.....	2.8	.....	.....	958	96	88	1,700	7.9
180	0	88	73	.9	1.5	0.00	.24	422	58	82	681	8.0
200	0	269	960	.....	11	.....	.....	2,100	652	64	3,870	8.0
117	12	.....	44	.....	.....	.....	.....	.....	4.5	.....	.....	.....
60	0	80	40	.....	1.0	.....	.....	234	28	.....	.....	.....
270	0	688	3,320	.....	.....	.....	.....	6,660	906	84	11,300	7.5
85	0	97	412	.8	1.5	.04	.24	930	72	89	1,780	7.2
84	0	65	520	1.0	1.0	.01	.36	1,050	82	90	2,070	7.7
163	16	132	75	.....	27	.....	.....	508	134	.....	.....	.....
57	.....	.....	1,530	.....	.....	.....	.....	.....	430	.....	5,210	7.7
237	0	478	1,260	.....	24	.....	.....	2,970	524	.....	.....	.....
246	0	668	758	.....	1.2	.....	.....	2,420	276	.....	.....	.....
212	0	661	760	.....	.0	.....	.....	2,400	224	88	3,980	8.1
[d]204	0	322	365	.....	.2	.....	.....	1,280	90	91	2,180	8.4

[c]Contains less than 0.1 ppm of iron (Fe).
[d]Includes carbonate (CO_3) as bicarbonate (HCO_3).

Sample logs of wells in the Hueco Bolson area, El Paso County, Tex., and Dona Ana and Otero Counties, N. Mex.

	Thickness (feet)	Depth (feet)
Well F-1		
Owner: U. S. Geological Survey. Driller: B. & W. Drilling Co. of Texas		
Sand, gravel, and caliche	20	20
Sand and gravel	10	30
Sand, fine to coarse, and fine gravel	20	50
Gravel, fine, and fine to very coarse sand	20	70
Sand, very coarse to fine, and fine gravel	10	80
Sand, very coarse, and fine gravel	10	90
Sand, very coarse to medium	10	100
Sand, very coarse	10	110
Sand, fine to coarse	20	130
Sand, fine to very coarse, and fine gravel	10	140
Sand, very coarse to fine	10	150
Sand, fine to very coarse	20	170
Sand, fine to coarse	10	180
Sand, fine to very coarse	10	190
Sand, fine to coarse	20	210
Sand, fine to very coarse	10	220
Gravel, fine, and very coarse sand	10	230
Sand, fine to very coarse, and fine gravel	10	240
Sand, fine to medium, and fine gravel	10	250
Sand, fine to coarse, and gravel	10	260
Clay, some sand, and gravel	10	270
Clay, sand, and gravel	30	300
Sand, gravel, and some clay	10	310
Sand, very fine to fine, and some gravel	20	330
Sand, fine; some gravel and clay	40	370
Sand, fine, and some gravel	10	380
Sand, fine to very coarse, and fine gravel	10	390
Sand, fine to coarse, and clay	10	400
Clay, sand, and gravel	4	404
Clay and sand	25	429
Sand, fine to coarse, and some clay	10	439
Sand, fine to coarse	10	449
Missing	3	452
Clay, brown, and fine to coarse sand	8	460
Clay, brown, and some fine to coarse sand	10	470
Sand, fine to coarse	10	480
Sand, very coarse to fine	10	490
Sand, fine to very coarse, and some shale	10	500
Clay and some sand	3	503
Clay and some fine to coarse sand	7	510
Sand, fine, and some clay	10	520
Clay and some fine sand	10	530
Clay and some very fine sand	40	570
Clay and fine to coarse sand	10	580
Clay and some sand	8	588
Clay	10	598
Missing	10	608
Clay and some sand	10	618
Clay	10	628
Clay and very fine sand	20	648
Sand, very fine to coarse, and some gravel	12	660
Sand and gravel	10	670
Gravel, sand, and brown clay	40	710
Gravel and sand	10	720
Sand, fine to very fine, and some pebbles	10	730
Sand, very fine to fine, and gravel	10	740
Sand, very fine to medium	4	744
Clay, brown; fine sand, and some pebbles	10	754
Clay and gravel	10	764
Clay, sandy, and some pebbles	10	774
Sand, very fine to fine, and some medium sand	20	794

Sample logs of wells in the Hueco Bolson area, El Paso County, Tex., and Dona Ana and Otero Counties, N. Mex.—Continued

	Thickness (feet)	Depth (feet)
Well F-1—Continued		
Sand, very fine to fine; some medium sand and some pebbles	10	804
Sand, fine to coarse, and gravel	10	814
Sand	7	821
Sand and gravel	9	830
Sand, fine to very coarse, and coarse gravel	20	850
Missing	10	860
Sand, fine to coarse, and fine gravel	5	865
Missing	5	870
Sand, fine to coarse, and fine gravel	14	884
Sand, medium to coarse; granules and pebbles	10	894
Sand, medium to coarse; granules, pebbles, and clay	10	904
Sand, medium to coarse, and granules	10	914
Clay, buff, and granules	10	924
Sand, very fine to medium, and granules	10	934
Clay, sandy; granules and caliche	10	944
Sand, very fine to medium; granules and clay	10	954
Sand, very fine to medium; granules, clay, and caliche	8	962
Granules and fine sand	10	972
Clay, granules, and sand	40	1,012
Sand, very fine to coarse; granules and black silt	10	1,022
Clay, buff, sandy	20	1,042
Clay, buff, and pebbles	10	1,052
Sand, fine to coarse; granules and some clay	10	1,062
Clay, very sandy, and granules	10	1,072
Sand, very fine to very coarse; granules and clay	10	1,082
Sand, fine to coarse; granules and clay	10	1,092
Sand, fine to coarse, and granules	10	1,102
Clay, buff, sandy	10	1,112
Sand, fine to coarse, and granules	10	1,122
Sand, fine to coarse; granules and clay	20	1,142
Sand, fine to coarse; granules, pebbles, and clay	10	1,152
Sand, very fine to medium; granules and clay	10	1,162
Sand, medium to very coarse; granules and clay	10	1,172
Sand, very fine to coarse; granules and clay	10	1,182
Sand, very fine to coarse; granules and pebbles	10	1,192
Sand, very fine to coarse; granules and clay	8	1,200
Well F-3		
Owner: U. S. Geological Survey. Driller: B. & W. Drilling Co. of Texas		
Sand, granules, and caliche	10	10
Sand, fine to coarse; granules and caliche	10	20
Sand, fine to coarse; granules and brown clay	20	40
Sand, very fine to medium; granules and clay	10	50
Sand, very fine to medium, and granules	10	60
Sand, very fine to coarse, and granules	10	70
Granules and medium sand	10	80
Granules and fine to coarse sand	10	90
Sand, fine to coarse, and granules	30	120
Sand, very fine to medium, and some granules	10	130
Sand, very fine to fine	10	140
Sand, very fine to medium	10	150
Sand, very fine to coarse	20	170
Sand, very fine to coarse, and some granules	20	190
Sand, very fine to coarse	10	200
Sand, very fine to medium	10	210
Sand, very fine to coarse	20	230
Sand, very fine to very coarse	40	270
Sand, very fine to coarse	30	300
Sand, very fine to very coarse	110	410
Sand, very fine to medium	20	430
Sand, very fine to coarse	70	500
Sand, medium	10	510

Sample logs of wells in the Hueco Bolson area, El Paso County, Tex., and Dona Ana and Otero Counties, N. Mex.—Continued

	Thickness (feet)	Depth (feet)
Well F-3—Continued		
Sand, very fine to medium	10	520
Sand, very fine to coarse	30	550
Sand, very fine to very coarse, and some granules	10	560
Clay, buff, sandy, and granules	10	570
Sand, very fine to coarse; granules, caliche, pebbles, and clay	30	600
Clay, buff, sandy; caliche pebbles and granules	30	630
Sand, very fine to very coarse; granules and clay	20	650
Sand, very fine to very coarse; granules, caliche, and clay	10	660
Sand, very fine to very coarse; granules, caliche, clay, and pebbles	10	670
Clay, buff, very sandy, and granules	30	700
Sand, very fine to very coarse, and granules	16	716
Sand, very fine to very coarse; granules and clay	24	740
Sand, very fine to very coarse; granules and pebbles	20	760
Granules and very fine sand	30	790
Sand, very fine; sandstone and granules	10	800
Granules and very fine sand	10	810
Sand, very fine to coarse; granules, pebbles, and clay	10	820
Sand, very fine to fine, and granules	6	826
Sand, very fine to coarse, and granules	54	880
Granules, arkose, and some chert	10	890
Granules, pebbles, and some sand	20	910
Granules, pebbles, arkose, and some sand	10	920
Missing	10	930
Granules, pebbles, arkose, and some sand	50	980
Sand, medium to coarse; granules and pebbles	10	990
Granules, pebbles, arkose, and some sand	20	1,010
Granules, pebbles, and arkose	10	1,020
Granules, pebbles, arkose, and fine sand	10	1,030
Granules, pebbles, arkose	10	1,040
Granules, pebbles, arkose, and fine sand	10	1,050
Granules, pebbles, and arkose	40	1,090
Granules, pebbles, arkose, and medium sand	10	1,100
Sand, medium to very coarse; granules and pebbles	10	1,110
Granules, pebbles, arkose, and some sand	10	1,120
Granules, pebbles, and arkose	50	1,170
Granules and arkose	20	1,190
Granules, pebbles, and arkose	10	1,200
No record	5	1,205

Well F-5

Owner: U. S. Geological Survey. Driller: B. & W. Drilling Co. of Texas

Sand, red, medium	10	10
Sand, white, medium	10	20
Sand, medium to very fine	10	30
Sand, very fine to coarse, and gravel	10	40
Sand, very fine to very coarse	10	50
Sand, very fine to fine	10	60
Sand, fine to very coarse	10	70
Sand, fine to medium	20	90
Sand, fine to coarse	10	100
Sand, medium to very coarse	10	110
Gravel, subangular, and some sand	10	120
Sand, medium to very coarse	40	160
Gravel, subangular, and medium sand	20	180
Gravel, subangular, and coarse sand	10	190
Gravel, subangular, and clay	10	200
Sand, medium to very coarse, and gravel	10	210
Gravel, very coarse, subangular, and pebbles	8	218
Limestone and pebbles	2	220
Sand, medium to very coarse, and gravel	20	240

Sample logs of wells in the Hueco Bolson area, El Paso County, Tex., and Dona Ana and Otero Counties, N. Mex.—Continued

	Thickness (feet)	Depth (feet)
Well F-5—Continued		
Gravel, subangular; medium sand, and clay	9	249
Sand, fine to medium, and some gravel	11	260
Sand, very fine to medium, and some gravel	20	280
Sand, medium to very coarse, and gravel	10	290
Sand, fine to medium, and gravel	20	310
Sand, fine to very coarse	7	317
Sand, medium to very coarse, and fine gravel	3	320
Sand, medium to very coarse, and medium gravel	9	329
Sand, very fine to medium, and medium gravel	21	350
Sand, medium to very coarse	20	370
Sand, reddish, medium to very coarse, and gravel	10	380
Gravel, very coarse, subangular	10	390
Clay, pink, and sand	10	400
Clay, pink; sand and coarse gravel	10	410
Sand, very fine to fine	10	420
Sand, fine to very coarse, and coarse gravel	10	430
Sand, medium to coarse, and some gravel	10	440
Sand, medium to coarse	10	450
Sand, medium to coarse, and pink clay	10	460
Sand, medium to coarse	10	470
Sand, medium to very coarse	10	480
Sand, medium, and gravel	10	490
Sand, medium to very coarse	10	500
Clay, sandy, pink, and gravel	5	505
Shale, pink, sandy, and rounded gravel	5	510
Sand, medium to very coarse	10	520
Sand, medium to very coarse, and angular gravel	20	540
Clay, buff, sandy	10	550
Clay, brown, sandy	10	560
Clay, brown; pebbles and caliche	20	580
Well G-1		
Owner: U. S. Geological Survey. Driller: B. & W. Drilling Co. of Texas		
Sand and caliche	10	10
Sand, red, medium	10	20
Sand, red, fine to coarse	10	30
Sand, red, fine to medium	10	40
Sand, red, fine, and some caliche	20	60
Sand, red, very fine, and some caliche	10	70
Sand and gravel	10	80
Clay and some sand	10	90
Clay and gravel	10	100
Sand and gravel	40	140
Sand, fine, and clay	10	150
Sand, fine	10	160
Sand, fine, and gravel	20	180
Sand, fine to coarse	13	193
Sand, fine, and clay	16	209
Sand, fine to coarse	38	247
Missing	3	250
Sand, fine	10	260
Sand, fine, and clay	10	270
Sand, fine; gravel and clay	19	289
Sand, medium	7	296
Sand, fine to medium, and clay	4	300
Sand, fine to medium; clay and gravel	20	320
Sand, fine to medium	26	346
Sand and gravel	34	380
Sand, gravel, and clay	10	390
Sand and fine gravel	5	395
Sand, fine to very fine	19	414

Sample logs of wells in the Hueco Bolson area, El Paso County, Tex., and Dona Ana and Otero Counties, N. Mex.—Continued

	Thickness (feet)	Depth (feet)
Well G-1—Continued		
Sand, gravel, and clay	6	420
Sand, fine to medium	15	435
Sand, fine to coarse	15	450
Sand, fine to medium	18	468
Clay and fine sand	12	480
Sand, fine, and some gravel	10	490
Sand, fine; some gravel and clay	11	501
Sand, fine, and clay	9	510
Clay, sandy	10	520
Clay	10	530
Clay and some gravel	8	538
Sand, some gravel, and clay	2	540
Clay and some sand	20	560
Sand, fine to medium	12	572
Sand, medium, and clay	8	580
Clay	5	585
Sand, medium, and some clay	15	600
Sand, fine to coarse	10	610
Sand and clay	20	630
Sand, medium to coarse	10	640
Clay and sand	10	650
Well G-2		
Owner: U. S. Geological Survey. Driller: B. & W. Drilling Co. of Texas		
Sand, some granules, and caliche	10	10
Sand, fine to medium	20	30
Sand, very fine to medium, and some clay	10	40
Sand, very fine to medium, and some granules	10	50
Sand, fine to coarse, and some caliche	10	60
Sand, fine to coarse; some caliche and mica	20	80
Sand, fine to coarse; some caliche and clay	10	90
Sand, fine to coarse; some caliche, clay, and mica	10	100
Sand, fine to coarse; some caliche and clay	10	110
Sand, fine to coarse, and some caliche	10	120
Sand, clay, and some caliche	100	220
Clay, sandy, silty, and some caliche	40	260
Clay, dark-brown, silty; some sand and caliche	50	310
Clay, reddish-brown and gray, and some caliche	90	400
Clay, medium-brown, silty; some sand and caliche	90	490
Clay, light- to medium-brown, and some caliche	130	620
Clay, reddish-brown, and some caliche	280	900
Clay, medium-brown, silty	309	1,209
Well K-13		
Owner: U. S. Geological Survey. Driller: B. & W. Drilling Co. of Texas		
Sand, caliche, and medium gravel	10	10
Sand, coarse, and coarse gravel	20	30
Sand, fine to coarse, and coarse gravel	70	100
Sand, fine to coarse, and some fine gravel	20	120
Sand, very fine to coarse, and fine gravel	40	160
Sand, very fine to coarse	20	180
Sand, very fine to coarse, and some fine gravel	20	200
Sand, very fine to fine	10	210
Sand, very fine to fine, and fine to medium gravel	10	220
Sand, very fine to fine; medium gravel and caliche	30	250
Sand, very fine to medium, and fine to medium gravel	60	310
Sand, very fine to medium, and fine to medium gravel	50	360

Sample logs of wells in the Hueco Bolson area, El Paso County, Tex., and Dona Ana and Otero Counties, N. Mex.—Continued

	Thickness (feet)	Depth (feet)
Well K-13—Continued		
Sand, medium	10	370
Sand, fine to medium, and fine gravel	10	380
Sand, fine to medium	20	400
Sand, very fine, and coarse gravel	20	420
Sand, very fine to medium, and fine to coarse gravel	10	430
Gravel, fine to medium, well-rounded	10	440
Gravel, fine to medium, subangular	10	450
Gravel, fine to coarse, rounded to subangular	10	460
Gravel, fine to medium, rounded	10	470
Sand, very fine to medium; fine to medium subangular gravel	10	480
Sand, very fine to medium; fine to medium gravel and caliche	20	500
Sand, fine to coarse; round to subangular gravel and arkose	10	510
Gravel, fine to coarse	10	520
Gravel, fine to coarse; sand and calcite	10	530
Gravel, fine; chert, quartz, and sand	20	550
Sand, medium, and fine gravel	10	560
Gravel, fine to medium, and medium sand	80	640
Sand, very fine to fine; fine gravel and black shale	10	650
Gravel, fine to coarse, round, and medium sand	10	660
Gravel, fine to coarse, round, and medium sand	10	670
Gravel, fine to coarse, round, and coarse sand	30	700
Sand, fine to coarse, and medium round gravel	10	710
Sand, very fine to medium, and medium angular gravel	20	730
Gravel, fine, and some sand	20	750
Gravel, medium, round to angular	20	770
Gravel, medium, angular	80	850
Gravel, medium; dolomite and some arkose	10	860
Sand, fine to very coarse, and some gravel	30	890
Gravel, medium to coarse, and sandy clay	10	900
Gravel, medium to coarse, subangular	10	910
Gravel, medium to coarse, subangular	10	920
Gravel, medium; dolomite and round to subangular arkose	20	940
Gravel, medium; some limestone and some angular arkose	20	960
Gravel, medium; limestone and some angular arkose	10	970
Limestone, light-colored, fine, crystalline	7	977
Well K-14		
Owner: U. S. Geological Survey. Driller: B. & W. Drilling Co. of Texas		
Sand, medium to coarse, and medium gravel	40	40
Sand, very fine to coarse	80	120
Sand, fine to coarse, and some fine gravel	30	150
Sand, very fine; clay and caliche	60	210
Clay, buff, very sandy, and some caliche	10	220
Sand, coarse; some clay and caliche	20	240
Sand, fine to medium, and caliche	10	250
Sand, fine to medium; gravel and caliche	10	260
Sand, fine to medium, and some fine gravel	10	270
Sand, very fine to medium; gravel and andesite	10	280
Sand, very fine to medium, and gravel	10	290
Sand, very fine to fine, and some medium angular gravel	50	340
Sand, very fine to fine, and some medium angular gravel	40	380
Sand, very fine to coarse, and some medium angular gravel	40	420
Sand, very fine to medium; gravel and caliche	20	440
Clay, very sandy, and some fine gravel	30	470
Sand, fine to medium, and fine gravel	40	510
Sand, very fine to fine	10	520
Sand, very fine to medium	60	580
Gravel, medium to fine, and sand	10	590
Gravel, medium, granitic, and sand	40	630
Gravel, medium, granitic; sand and red shale	10	640

Sample logs of wells in the Hueco Bolson area, El Paso County, Tex., and Dona Ana and Otero Counties, N. Mex.—Continued

	Thickness (feet)	Depth (feet)
Well K-14—Continued		
Sand, fine to medium, and medium gravel	10	650
Gravel, medium to coarse	40	690
Gravel, medium to coarse, subangular	20	710
Gravel, medium to coarse, round to subangular, and sand	30	740
Sand, fine to medium, and gravel	10	750
Sand, very fine to coarse, and medium gravel	10	760
Sand, very fine to coarse, and medium to coarse gravel	30	790
Gravel, medium to coarse, and sand	10	800
Gravel, fine to coarse, and sand	30	830
Sand, fine to medium, and medium gravel	40	870
Gravel, granitic, medium to coarse, subangular	20	890
Granite	12	902
Well K-16		
Owner: U. S. Geological Survey. Driller: B. & W. Drilling Co. of Texas		
Sand and caliche	20	20
Sand, very coarse; gravel and pebbles	30	50
Sand, very coarse; gravel and clay	30	80
Pebbles, round; boulders, some coarse sand, and gravel	20	100
Gravel, round; very coarse sand and pebbles	10	110
Sand, very coarse	30	140
Sand, very coarse, and gravel	40	180
Sand, very coarse	10	190
Sand, fine to very coarse	10	200
Sand, fine to medium	20	220
Sand, fine to coarse	10	230
Sand, coarse to very coarse	10	240
Sand, medium to very coarse	30	270
Sand, fine to medium	10	280
Sand, very coarse, and gravel	10	290
Sand, very coarse	20	310
Sand, medium to coarse	10	320
Sand, very coarse	20	340
Sand, medium	20	360
Sand, medium to coarse	10	370
Sand, fine to coarse	20	390
Sand, very coarse	10	400
Sand, fine to medium; angular granules and clay	10	410
Sand, medium to coarse	10	420
Sand, medium	10	430
Sand, medium to coarse	10	440
Sand, medium to very coarse, and granules	20	460
Sand, very coarse; granules and caliche	20	480
Sand, very coarse; granules, caliche, and buff clay	10	490
Sand, very coarse; granules and pebbles	10	500
Sand, fine to very coarse; granules and pebbles	10	510
Sand, fine to very course; round pebbles and granules	5	515
Sand, coarse to very coarse, and granules	5	520
Sand, medium to coarse, and granules	10	530
Sand, medium to coarse	20	550
Sand, medium to coarse, and clay	10	560
Sand, fine to medium	10	570
Sand, very fine to medium	20	590
Sand, coarse	10	600
Sand, coarse to very coarse	10	610
Sand, medium to coarse	10	620
Sand, medium to coarse, and clay	20	640
Sand, medium to coarse	8	648
Sand, fine to medium, and caliche	12	660
Sand, fine to medium, and granules	9	669
Sand, fine to medium, and clay	11	680

Sample logs of wells in the Hueco Bolson area, El Paso County, Tex., and Dona Ana and Otero Counties, N. Mex.—Continued

	Thickness (feet)	Depth (feet)
Well K-16—Continued		
Sand, fine to medium	10	690
Sand, fine to coarse	10	700
Sand, fine to medium	50	750
Sand, medium	10	760
Sand, fine to medium	10	770
Sand, fine to medium	10	780
Sand, very fine to medium	10	790
Sand, very fine to fine	30	820
Sand, very fine to fine, and granules	10	830
Sand, fine to coarse; granules and clay	10	840
Sand, very fine to fine	10	850
Sand, very fine to medium, and granules	10	860
Sand, very fine to medium, and some clay	8	868
Clay, buff	2	870
Sand, very fine to medium; buff shale and granules	6	876
Sand, very fine to coarse, and granules	4	880
Sand, very fine to fine	10	890
Sand, very fine to coarse, and granules	10	900
Sand, very fine to coarse, and granules	10	910
Sand, very fine to medium; caliche, granules, and clay	10	920
Sand, very fine to medium; granules and caliche	14	934
Sand, very fine to medium; granules, caliche, and clay	16	950
Sand, very fine to coarse, and pebbles	10	960
Sand, very fine to medium; granules and pebbles	20	980
Sand, very fine to very coarse; granules and pebbles	10	990
Sand, very fine to medium; pebbles and some clay	10	1,000
Sand, very fine to medium; pebbles and some sandstone	20	1,020
Sand, very fine to coarse, and granules	10	1,030
Sand, very fine to medium, and granules	10	1,040
Sand, very fine to coarse; limestone and granules	10	1,050
Sand, very fine to very coarse; pebbles and granules	10	1,060
Sand, fine to coarse; cobbles, pebbles, and granules	20	1,080
Sand, very coarse; boulders, cobbles, and pebbles	5	1,085
Well L-1		
Owner: U. S. Geological Survey. Driller: B. & W. Drilling Co. of Texas		
Sand, fine	20	20
Sand, very fine, and clay	20	40
Sand, fine; gravel and caliche	10	50
Clay, buff, sandy	10	60
Clay, buff	40	100
Clay, buff, and sandstone	40	140
Clay, buff, sandy	10	150
Clay, buff, and coarse gravel	12	162
Sand, fine	8	170
Clay, buff	39	209
Sand, fine	19	228
Clay, buff	12	240
Sand, medium	10	250
Clay, buff	1	251
Sand, medium	10	261
Sand, very coarse to medium	10	271
Sand, fine	20	291
Sand, very fine	10	301
Sand, very coarse, and gravel	20	321
Clay, very sandy	10	331
Sand, very coarse, and clay	10	341
Clay, sandy, and angular gravel	12	353
Clay, sandy	3	356
Clay, buff	15	371
Clay and sand	10	381

Sample logs of wells in the Hueco Bolson area, El Paso County, Tex., and Dona Ana and Otero Counties, N. Mex.—Continued

	Thickness (feet)	Depth (feet)
Well L-1—Continued		
Sand, and some clay	10	391
Sand, fine	10	401
Sand, medium	10	411
Sand, medium, and clay	10	421
Sand, medium	10	431
Sand, fine to medium	10	441
Sand, fine to medium, and clay	20	461
Sand, medium	10	471
Clay, sandy	14	485
Clay, brown, and angular gravel	10	495
Gravel, coarse, angular; sand and clay	10	505
Sand, coarse; clay and gravel	10	515
Clay, sandy	16	531
Clay, sandy, and very coarse gravel	10	541
Sand, fine to medium, and some clay	10	551
Clay, buff, sandy	10	561
Clay, sandy, and gray shale	10	571
Clay, buff, sandy	10	581
Clay, buff, sandy, and caliche	10	591
Clay, buff, and some very fine sand	10	601
Sand, very fine to medium, and clay	10	611
Sand, very fine to medium, and gravel	5	616
Clay, buff, and sand	20	636
Clay, buff; sand and gravel	10	646
Clay, buff, and sand	20	666
Sand, medium; gravel and clay	10	676
Clay, buff, and sand	13	689
Clay, buff, and bentonite	10	699
Clay, buff, sandy	10	709
Clay, buff, and medium sand	10	719
Sand, very fine, and clay	10	729
Sand, fine to coarse, and clay	10	739
Sand, very fine, and clay	20	759
Sand, very fine to coarse, and clay	4	763
Clay, buff, sandy	10	773
Sand, very fine, and clay	10	783
Clay, buff, and some sand	25	808
Clay, buff	20	828
Clay, buff, and some fine sand	20	848
Sand, medium, and clay	10	858
Clay, buff	10	868
Clay, buff, and medium sand	20	888
Sand, medium to fine, and clay	10	898
Sand, fine, and clay	10	908
Sand, very fine to medium; clay and gravel	10	918
Clay, buff, sandy	10	928
Sand, very fine, and clay	10	938
Sand, very fine	10	948
Sand, very fine, and clay	10	958
Clay and very fine sand	10	968
Sand, very fine, and clay	20	988
Clay and very fine sand	40	1,028
Clay, very fine to coarse sand, and gravel	10	1,038
Shale, brown	10	1,048
Shale, brown, and fine gravel	38	1,086
Clay, buff, and fine sand	10	1,096
Shale, brown; fine sand and gravel	9	1,105
Sand, very fine; gravel and clay	11	1,116
Clay, buff, sandy	20	1,136
Clay, buff, and very fine sand	20	1,156
Clay, buff	10	1,166
Sand, very fine, and clay	10	1,176
Sand, medium, and clay	10	1,186

Sample logs of wells in the Hueco Bolson area, El Paso County, Tex., and Dona Ana and Otero Counties, N. Mex.—Continued

	Thickness (feet)	Depth (feet)
Well L-1—Continued		
Sandstone, very fine	10	1,196
Clay, buff	9	1,205
No record	3	1,208
Well L-2		
Owner: U. S. Geological Survey. Driller: B. & W. Drilling Co. of Texas		
Sand, fine to very coarse; caliche, granules, and pebbles	10	10
Sand, very fine to very coarse; granules and pebbles	20	30
Sand, fine to medium	20	50
Sand, fine to very coarse	20	70
Clay and very fine sand	10	80
Clay, silt, and very fine sand	10	90
Sand, medium to coarse	10	100
Sand, very fine to coarse; clay and granules	10	110
Sand, fine to coarse, and some granules	10	120
Sand, very fine to very coarse; granules and pebbles	10	130
Sand, medium to very coarse	10	140
Sand, fine to coarse	20	160
Sand, medium to coarse	10	170
Sand, medium to very coarse	20	190
Sand, medium to very coarse, and granules	30	220
Granules, pebbles, clay, and fine to coarse sand	20	240
Granules and very fine to very coarse sand	10	250
Sand, very fine to coarse, and granules	10	260
Sand, very fine to coarse; granules and clay	20	280
Granules and medium to coarse sand	20	300
Sand, fine to very coarse, and granules	10	310
Granules, very fine to medium sand, and clay	10	320
Granules and fine to very coarse sand	20	340
Granules, very fine to medium sand, and clay	20	360
Clay, granules, and very fine to medium sand	20	380
Granules, fine to very coarse sand, and clay	10	390
Clay, very fine to medium sand, and granules	20	410
Sand, very fine to medium; clay and granules	20	430
Clay, silt, fine sand, and some granules	20	450
Clay, sandy	10	460
Clay, fine to medium sand, granules, and pebbles	10	470
Clay, red, and pebbles	20	490
Clay, red, sandy	20	510
Clay, silt, very fine to coarse sand, and caliche	30	540
Clay, very fine to medium sand, granules, and pebbles	10	550
Clay, very fine to medium sand, granules, pebbles, and caliche	30	580
Clay, very fine to coarse sand, granules, and pebbles	10	590
Sand, very fine to coarse; clay, granules, and pebbles	20	610
Clay, very fine to coarse sand, granules, and pebbles	10	620
Sand, fine to coarse; clay and granules	10	630
Sand, very fine to very coarse, and granules	10	640
Sand, very fine to medium; clay, granules, and pebbles	20	660
Clay, very fine to medium sand, silt, and caliche	10	670
Sand, very fine to medium; clay and caliche	10	680
Sand, very fine to coarse; clay and caliche	20	700
Sand, very fine to medium; silt, clay, and granules	10	710
Sand, very fine to medium; clay and granules	10	720
Sand, very fine to medium, and clay	10	730
Clay and very fine to medium sand	20	750
Clay, red	10	760
Clay, red; fine to medium sand and caliche	10	770
Clay, red, sandy, and some caliche	20	790
Clay, red, and very fine to fine sand	10	800
Clay, brown; very fine to fine sand and caliche	10	810

Sample logs of wells in the Hueco Bolson area, El Paso County, Tex., and Dona Ana and Otero Counties, N. Mex.—Continued

	Thickness (feet)	Depth (feet)
Well L-2—Continued		
Clay and fine to medium sand	10	820
Clay, fine to medium sand, caliche, and some granules	10	830
Sand, fine to coarse, and some clay	10	840
Clay, fine to medium sand, and caliche	10	850
Sand, gray, medium, and some clay	5	855
Sand, fine to very coarse; some granules, clay, and caliche	25	880
Clay, brown, sandy	20	900
Clay, brown, and fine to medium sand	20	920
Clay, brown; fine to medium sand and caliche	20	940
Sand, fine to medium; clay and caliche	8	948
Clay, red; medium to coarse sand, granules, pebbles, and caliche	5	953
Sand, fine to very coarse; granules, pebbles, and some clay	10	963
Sand, gray, fine to medium, and some granules	7	970
Sand, fine to coarse; granules and clay	10	980
Sand, fine to very coarse; some granules, clay, and caliche	20	1,000
Sand, very fine to medium, and some clay	10	1,010
Sand, very fine to very coarse; granules and some clay	10	1,020
Clay, fine to medium sand, and some granules	10	1,030
Sand, fine to medium, and some clay	10	1,040
Sand, fine to very coarse, and some granules	10	1,050
Sand, fine to very coarse; some granules and clay	10	1,060
Granules, pebbles, caliche, some sand, and clay	20	1,080
Clay, very fine to medium sand, and caliche	10	1,090
Clay, medium to very coarse sand, granules, and some caliche	10	1,100
Clay, very fine to coarse sand, some granules, and caliche	10	1,110
Sand, very fine to medium	30	1,140
Clay, buff, and caliche	10	1,150
Sand, very fine to coarse; granules and caliche	10	1,160
Sand, fine to medium, and clay	10	1,170
Sand, very fine to coarse; clay, some granules, and pebbles	10	1,180
Sandstone, hard; clay and some caliche	10	1,190
Clay, hard; medium to coarse sand and some granules	10	1,200
Clay and fine to medium sand	20	1,220
Clay, brown, sandy	10	1,230
Clay, brown; fine to coarse sand and caliche	40	1,270
Clay, brown; fine to coarse sand and caliche	30	1,300
Clay, brown; fine to medium sand, some granules, and caliche	10	1,310
Sand, fine to medium, and some clay	10	1,320
Sand, very fine to very coarse, and clay	10	1,330
Clay, brown, and very fine to medium sand	20	1,350
Sand, very fine to fine, and some clay	20	1,370
Sand, very fine to fine; clay and granules	30	1,400
Sand, fine to coarse; some clay, granules, and pebbles	10	1,410
Clay, very fine to fine sand, and caliche	30	1,440
Clay, brown, very fine to fine sand, caliche, and some granules	30	1,470
Sand, very fine to medium; some clay and caliche	20	1,490
Sand, very fine to fine; clay and caliche	20	1,510
Clay, very fine to medium sand, caliche, and some granules	10	1,520
Clay, brown; sandstone and caliche	10	1,530
Clay, brown; very fine to fine sand and caliche	10	1,540
Clay, brown; very fine to very coarse sand, granules, and caliche	10	1,550
Clay, brown; very fine to very coarse sand and some granules	10	1,560
Clay, brown; very fine to very coarse sand, and caliche	20	1,580
Clay, brown; sandstone, very coarse sand, and caliche	10	1,590
Clay, brown; very fine to very coarse sand, some granules, and caliche	10	1,600
Clay, brown; very fine to fine sand, caliche, pebbles, and granules	10	1,610
Clay, brown; very fine sand and caliche	10	1,620
Clay, brown; very fine to medium sand, some granules, and caliche	10	1,630
Sand, fine to medium, and caliche	20	1,650
Sand, fine to medium; caliche and clay	10	1,660
Clay, brown; very fine to very coarse sand, granules, and caliche	10	1,670
Sand, fine to medium; granules and caliche	10	1,680
No record	6	1,686

Sample logs of wells in the Hueco Bolson area, El Paso County, Tex., and Dona Ana and Otero Counties, N. Mex.—Continued

	Thickness (feet)	Depth (feet)
Well L-4		
Owner; U. S. Geological Survey. Driller: B. & W. Drilling Co. of Texas		
Sand, fine to coarse, and caliche	10	10
Clay, brown; granules, coarse to very coarse sand, and caliche	10	20
Granules and coarse to very coarse sand	10	30
Clay, buff; granules, fine to very coarse sand, and caliche	10	40
Sand, fine to very coarse, and granules	10	50
Granules, pebbles, and fine to very coarse sand	10	60
Clay, buff, and fine to coarse sand	10	70
Clay and very fine to coarse sand	10	80
Clay, buff; fine to very coarse sand and granules	30	110
Sand, fine to very coarse; granules and pebbles	30	140
Sand, fine to very coarse, and some granules	30	170
Sand, very fine to very coarse	30	200
Sand, very fine to very coarse, and some granules	10	210
Sand, very fine to very coarse, and some caliche	10	220
Sand, very fine to coarse, and some caliche	30	250
Sand, very fine to very coarse; granules and caliche	60	310
Clay, sandy; very fine to very coarse sand, granules, and some caliche	30	340
Sand, very fine to very coarse; granules and sandy clay	10	350
Sand, very fine to very coarse, and some granules	30	380
Sand, very fine to very coarse, and caliche	60	440
Sand, very fine to very coarse	10	450
Clay, sandy; very fine to very coarse sand and granules	20	470
Missing	17	487
Sand, very fine to very coarse; sandy clay and caliche	10	497
Sand, very fine to coarse, and caliche	3	500
Clay, sandy; very fine to very coarse sand, granules, pebbles, and caliche	10	510
Sand, very fine to very coarse; granules, caliche, and sandy clay	13	523
Sand, very fine to very coarse; granules and caliche	15	538
Clay, sandy; very fine to very coarse sand, granules, and caliche	10	548
Clay and some fine to very coarse sand	2	550
Clay, very fine to very coarse sand, granules, pebbles, and caliche	20	570
Clay, sandy; very fine to very coarse sand, granules, pebbles, and caliche	10	580
Clay, sandy; very fine to very coarse sand, some granules, and caliche	20	600
Sand, very fine to very coarse; granules, pebbles, and caliche	5	605
Clay, sandy; very fine to very coarse sand and caliche	17	622
Clay, sandy; very fine to fine sand and caliche	10	632
Clay, very fine to fine sand, some pebbles, and caliche	10	642
Missing	10	652
Clay, sandy; very fine to fine sand, some granules, and caliche	20	672
Clay, sandy; very fine to fine sand and some caliche	30	702
Clay, silty, and medium to very coarse sand	20	722
Clay, sandy, and very fine to fine sand	10	732
Clay, sandy; very fine to very coarse sand and caliche	10	742
Clay, sandy; very fine to very coarse sand, granules, pebbles, and caliche	10	752
Clay, very fine to very coarse sand, granules, pebbles, and caliche	10	762
Clay, sandy; very fine to very coarse sand, granules, pebbles, and caliche	10	772
Sand, very fine to very coarse; granules, pebbles, and caliche	10	782
Clay, sandy; very fine to very coarse sand, granules, and caliche	10	792
Sand, very fine to very coarse; some granules and caliche	10	802
Clay, sandy; very fine to fine sand and caliche	40	842
Sand, very fine to very coarse; caliche and sandy clay	10	852
Clay, sandy; very fine to very coarse sand and caliche	10	862
Clay, sandy; very fine to very coarse sand, granules, and caliche	20	882
Clay, sandy; very fine to fine sand, granules, and caliche	10	892
Clay, sandy; very fine to fine sand and caliche	58	950

Sample logs of wells in the Hueco Bolson area, El Paso County, Tex., and Dona Ana and Otero Counties, N. Mex.—Continued

	Thickness (feet)	Depth (feet)
Well L-6		
Owner: U. S. Geological Survey. Driller: B. & W. Drilling Co. of Texas		
Clay, pink, and fine sand	10	10
Sand, medium to coarse	10	20
Sand, very coarse	10	30
Clay, buff; very coarse sand and gravel	10	40
Clay, buff, sandy, and caliche	10	50
Sand, coarse	20	70
Sand, coarse; gravel and caliche	10	80
Sand, medium	10	90
Sand, coarse to very coarse	10	100
Clay, buff	20	120
Sand, medium	10	130
Sand, fine to medium	10	140
Sand, medium to coarse	10	150
Sand, coarse to very coarse	10	160
Sand, medium	20	180
Sand, coarse to very coarse, and gravel	62	242
Sand, medium to coarse, and pebbles	10	252
Sand, medium to coarse, and gravel	10	262
Sand, coarse to very coarse, and gravel	30	292
Sand, coarse to very coarse; gravel and clay	10	302
Sand, fine to medium	10	312
Sand, medium to coarse	10	322
Sand, coarse to very coarse	10	332
Sand, very coarse, and gravel	10	342
Sand, medium to very coarse	10	352
Sand, medium to coarse, and gravel	10	362
Sand, fine to very coarse, and gravel	30	392
Clay, buff, sandy, and gravel	10	402
Sand, fine to coarse, and gravel	30	432
Sand, fine to coarse, and coarse angular gravel	10	442
Sand, fine to coarse; clay and gravel	9	451
Clay, sand, and coarse gravel	5	456
Clay, sand, coarse gavel, and pebbles	4	460
Clay, buff, sandy, and pebbles	17	477
Sand, fine to coarse; gravel and clay	20	497
Sand, coarse to very coarse, and clay	5	502
Sand, medium to coarse	10	512
Sand, medium	8	520
Gravel, coarse, angular, and medium sand	5	525
Gravel, coarse, angular; medium sand and clay	5	530
Sand, fine to coarse, and gravel	15	545
Sand, medium to very coarse	10	555
Sand, fine to coarse, and gravel	7	562
Sand, very fine to very coarse, and gravel	13	575
Sand, very fine to medium, and clay	10	585
Sand, very fine to coarse, and gravel	5	590
Sand, coarse to very coarse, and gravel	10	600
Sand, very fine to fine	10	610
Sand, medium to very coarse	10	620
Sand, fine to coarse	10	630
Sand, very fine to medium	10	640
Sand, very fine to coarse	10	650
Gravel and medium to coarse sand	10	660
Gravel, medium sand, and some clay	7	667
Clay, sandy; gravel and pebbles	3	670
Sand, fine to very coarse; gravel and clay	3	673
Shale, buff, and gravel	5	678
Clay, sandy, and gravel	12	690

Sample logs of wells in the Hueco Bolson area, El Paso County, Tex., and Dona Ana and Otero Counties, N. Mex.—Continued

	Thickness (feet)	Depth (feet)
Well L-12		
Owner: U. S. Geological Survey. Driller: B. & W. Drilling Co. of Texas		
Sand, fine to medium	20	20
Sand, medium to coarse	10	30
Sand, medium to very coarse	10	40
Sand, medium to coarse	10	50
Gravel and pebbles	40	90
Sand, very coarse; gravel and pebbles	50	140
Sand, very fine to fine; some gravel and pebbles	20	160
Gravel, pebbles, and some coarse to very coarse sand	30	190
Sand, medium to very coarse; gravel and pebbles	40	230
Sand, medium to very coarse; some gravel and pebbles	10	240
Sand, fine to medium	30	270
Sand, fine to medium; some gravel and pebbles	10	280
Sand, fine to coarse	20	300
Sand, fine to medium	10	310
Sand, fine to coarse	60	370
Sand, fine to very coarse, and gravel	10	380
Clay	20	400
Clay and fine to medium sand	10	410
Sand, fine to medium, and some clay	20	430
Sand, fine to very coarse; some gravel and pebbles	20	450
Sand, fine to very coarse, and gravel	10	460
Gravel and pebbles	20	480
Sand, medium to very coarse, and gravel	10	490
Clay and sand, medium to very coarse	10	500
Sand, medium to coarse, and some clay	10	510
Sand, fine to medium	10	520
Missing	10	530
Sand, fine to medium	30	560
Sand, coarse to very coarse, and gravel	10	570
Missing	10	580
Sand, fine to medium	20	600
Missing	5	605
Sand, fine to medium	5	610
Sand, medium to very coarse	10	620
Sand, fine to very coarse	40	660
Sand, fine to medium	90	750
Missing	10	760
Clay	80	840
Clay and very fine to fine sand	10	850
Missing	10	860
Sand, fine to medium	40	900
Missing	10	910
Sand, medium to coarse	20	930
Clay and very fine to medium sand	20	950
Sand, fine to medium	40	990
Clay and very fine to fine sand	10	1,000
Clay and very fine to medium sand	10	1,010
Clay and very fine to fine sand	40	1,050
Missing	10	1,060
Clay and very fine to fine sand	149	1,209
Well M-2		
Owner: U. S. Geological Survey. Driller: B. & W. Drilling Co. of Texas		
Sand, fine to medium, and caliche	20	20
Sand, fine to very coarse; gravel and caliche	10	30
Gravel, pebbles, and caliche	10	40
Pebbles, gravel, and caliche	10	50
Sand, very coarse; quartz and gravel	20	70
Sand, fine to very coarse, and gravel	10	80

Sample logs of wells in the Hueco Bolson area, El Paso County, Tex., and Dona Ana and Otero Counties, N. Mex.—Continued

	Thickness (feet)	Depth (feet)
Well M-2—Continued		
Shale, brown, and gravel	10	90
Sand, fine to coarse, and gravel	10	100
Shale, brown; sand and gravel	10	110
Sand, very fine to very coarse, and gravel	20	130
Sand, very fine to medium	30	160
Sand, very fine to medium; gravel and clay	10	170
Shale, brown	10	180
Shale, brown, and caliche	6	186
Clay, buff, sandy	4	190
Clay, buff, and pebbles	10	200
Shale, brown, and gravel	6	206
Sand, coarse, and some clay	4	210
Sand, medium to coarse, and gravel	5	215
Shale, brown; sand and gravel	2	217
Sand, very fine to coarse	3	220
Sand, fine to very coarse, and gravel	10	230
Sand, fine to coarse; gravel and shale	10	240
Shale, buff, and coarse gravel	14	254
Sand, coarse to very coarse, and clay	6	260
Shale, buff, and pebbles	10	270
Sand, coarse to very coarse, and some clay	10	280
Gravel, angular, and caliche	10	290
Clay, buff, sandy	10	300
Gravel, angular, and some clay	10	310
Sand, buff, very fine to medium, and clay	6	316
Clay, buff	4	320
Shale, brown; buff clay and caliche	10	330
Sand, fine to coarse	6	336
Shale, buff	4	340
Shale, buff, and gravel	6	346
Sand, fine	7	353
Shale, buff	3	356
Sand, medium	4	360
Shale, buff, and coarse gravel	10	370
Shale, buff	20	390
Sand, medium	10	400
Sand, very fine to fine	10	410
Sand, fine; gravel and caliche	11	421
Sand, fine to medium, and caliche	19	440
Sand, very fine to fine	11	451
Clay, buff, sandy, and caliche	9	460
Clay, buff, sandy; gravel and caliche	10	470
Sand, very fine to fine, and clay	10	480
Clay, buff, sandy, and caliche	10	490
Clay, buff; coarse sand and gravel	10	500
Sand, very coarse; gravel and clay	20	520
Sand, very fine to fine	10	530
Sand, medium to coarse; gravel and caliche	12	542
Sand, fine to coarse, and caliche	18	560
Sand, medium to coarse; gravel, caliche, and clay	10	570
Clay, buff, sandy; gravel and caliche	10	580
Clay, coarse sand, and gravel	5	585
Sand, fine to coarse, and gravel	10	595
Clay, very sandy, and gravel	10	605
Clay, sandy, and much caliche	3	608
Clay, sandy; gravel and caliche	7	615
Clay, buff	10	625
Sand, very fine	20	645
Sand, medium to coarse, and caliche	20	665
Sand, very coarse, and gravel	12	677
Clay, sandy, and caliche	13	690
Sand, medium to coarse, and clay	10	700
Sand, medium, and clay	10	710
Sand, medium, and granules	10	720
Sand, medium to coarse, and granules	15	735

Sample logs of wells in the Hueco Bolson area, El Paso County, Tex., and Dona Ana and Otero Counties, N. Mex.—Continued

	Thickness (feet)	Depth (feet)
Well M-5		
Owner: U. S. Geological Survey. Driller: B. & W. Drilling Co. of Texas		
Caliche	20	20
Gravel, coarse; red clay and caliche	30	50
Gravel, coarse, angular, and caliche	10	60
Shale, brown, and caliche	10	70
Clay, brown, sandy, and caliche	10	80
Shale, brown; sand and caliche	20	100
Gravel, very coarse, angular	20	120
Sand, reddish, fine	2	122
Sand, coarse; clay and caliche	8	130
Caliche	10	140
Sand, very coarse to coarse	10	150
Shale, brown, and caliche	10	160
Sand, very fine to very coarse, and coarse angular gravel	30	190
Sand, very fine to coarse; coarse angular gravel, and caliche	10	200
Clay, buff, sandy	20	220
Shale, brown, sandy, and caliche	10	230
Clay, buff; fine angular gravel	10	240
Sand, very coarse; angular gravel and brown shale	10	250
Gravel, fine to coarse, angular	10	260
Sand, fine to coarse	10	270
Sand, coarse, and angular gravel	10	280
Sand, fine to coarse	10	290
Clay, buff, sandy	10	300
Sand, fine to coarse	10	310
Sand, coarse; some gravel and pink shale	10	320
Clay, brown, sandy	10	330
Clay, brown; coarse sand and gravel	10	340
Sand, very fine	8	348
Clay, buff, and coarse sand	2	350
Clay, brown, and very fine sandstone	20	370
Gravel, angular, and very fine sand	10	380
Sand, very fine to fine	10	390
Clay, buff, sandy	7	397
Shale, brown, and bentonite	3	400
Clay, pink, and coarse sand	10	410
Clay, pink, sandy	4	414
Sand and clay	6	420
Sand, fine to medium	10	430
Sand, fine to medium, and clay	10	440
Clay, pink, sandy	20	460
Sand, medium, and clay	10	470
Sand, fine to medium	10	480
Sand, fine to medium, and clay	10	490
Clay, pink, and some sand	20	510
Clay, pink, sandy	10	520
Clay, pink	24	544
Clay and sand	6	550
Sand, medium, and clay	10	560
Clay, pink	20	580
Sand, fine to medium	4	584
Clay, pink, sandy	6	590
Sand, fine to medium	10	600
Clay, pink, sandy	10	610
Sand, very fine to medium, and clay	10	620
Gravel, angular; quartz, sand, and clay	4	624
Sand, fine to medium	6	630
Sand, medium	5	635
Shale, red, and coarse sand	5	640
Sandstone, fine, and sand	10	650
Sand, coarse; gravel and clay	10	660
Shale, brown, and sandy clay	10	670
Sand, medium to coarse	3	673

Sample logs of wells in the Hueco Bolson area, El Paso County, Tex., and Dona Ana and Otero Counties, N. Mex.—Continued

	Thickness (feet)	Depth (feet)
Well M-5—Continued		
Shale, brown	17	690
Shale, brown, sandy, and caliche	10	700
Shale, brown, and sandstone	10	710
Sand, fine to medium	8	718
Sand, medium; sandstone and clay	2	720
Sand, medium to coarse	10	730
Sand, medium to coarse, and gravel	10	740
Sand, very fine to fine	10	750
Sand, fine to medium	5	755
Clay, brown, and bentonite	5	760
Clay, sandy, and bentonite	9	769
Sand, fine to medium	5	774
Clay, brown	3	777
Sand, medium	3	780
Sand, very fine to medium	10	790
Sand, very fine to medium, and clay	3	793
Clay, brown, and gray shale	7	800
Clay, brown, sandy	10	810
Sand, medium, and clay	12	822
Clay, brown, and very fine sandstone	18	840
Clay, brown, sandy	4	844
Sand, very fine to fine	5	849
Clay, brown	11	860
Sandstone, very fine, and brown clay	10	870
Sandstone, very fine, and medium sand	10	880
Well N-1		
Owner: U. S. Geological Survey. Driller: B. & W. Drilling Co. of Texas		
Sand, buff; clay and caliche	10	10
Clay, light-red, sandy, and caliche	10	20
Clay, red	10	30
Clay, light-brown	10	40
Clay, light-brown, sandy, and caliche	14	54
Sand, red, fine	10	64
Clay, light-brown, sandy, and caliche	10	74
Sand, buff, clayey, and caliche	18	92
Sand, gray, fine, clayey	10	102
Sand, gray, fine, and caliche	22	124
Clay, light-red	20	144
Clay, red, hard	10	154
Clay, red, and caliche	40	194
Clay, light-red, sandy	10	204
Clay, light-red, hard, and caliche	60	264
Missing	3	267
Clay, light-red, very hard	7	274
Clay, light-red, and caliche	10	284
Clay, light-red, sandy, and caliche	20	304
Clay, light-red, hard, and caliche	10	314
Clay, light-red, and caliche	10	324
Clay, buff	30	354
Clay, light-red, and caliche	20	374
Clay, dark-red, and caliche	10	384
Clay, red, shaly, and caliche	20	404
Shale, red, and caliche	10	414
Shale, red, hard	50	464
Shale, red, hard, sandy	8	472
Shale, red, hard	32	504
Shale, red, sandy	6	510
Shale, light-red, sandy, and caliche	10	520
Shale, light-red; very fine sandstone and caliche	10	530

Sample logs of wells in the Hueco Bolson area, El Paso County, Tex., and Dona Ana and Otero Counties, N. Mex.—Continued

	Thickness (feet)	Depth (feet)
Well N-1—Continued		
Shale, light-red, sandy, and caliche	10	540
Shale, light-red, calcareous, sandy	40	580
Shale, light-red and gray, calcareous, sandy	24	604
Shale, light-red, sandy	34	638
Clay, buff to reddish-brown	132	770
Shale, reddish-brown	120	890
Missing	40	930
Shale and limestone	15	945
Well N-6		
Owner: U. S. Geological Survey. Driller: B. & W. Drilling Co. of Texas		
Sand, medium to coarse, and caliche	30	30
Sand, medium to coarse	20	50
Sand, very fine to fine	40	90
Sand, very fine to medium	10	100
Sand, fine to coarse	10	110
Sand, very fine to medium	60	170
Sand, very fine to very coarse	30	200
Sand, very fine to coarse, and some clay	30	230
Sand, very fine; silt and some clay	20	250
Sand, very fine to medium, and some clay	10	260
Sand, very fine to medium, and clay	10	270
Clay, brown, and very fine sand	10	280
Clay, brown	10	290
Clay, brown, and some very fine sand	10	300
Clay, red; some silt and fine sand	10	310
Clay, red, and some fine sand	30	340
Clay, red; very fine sand and gray silt	30	370
Clay, red, and medium to coarse sand	10	380
Clay, red, and medium to very coarse sand	10	390
Sand, medium to very coarse; clay and some granules	10	400
Sand, medium to very coarse, and red clay	10	410
Clay, red, and very coarse sand	10	420
Clay, red; very coarse sand and some granules	10	430
Clay, red, and very fine to coarse sand	10	440
Clay, red; gray silt and some granules	10	450
Clay, red, and silt	10	460
Clay, red; silt, very coarse sand, and some granules	20	480
Clay, red; silt, very coarse sand, some granules, and lime	10	490
Clay, red, and silt	10	500
Clay, red; silt and some calcite	10	510
Clay, red; silt, caliche, and some coarse sand	10	520
Clay, red; silt and some caliche	10	530
Clay, red; silt, some caliche, and some coarse sand	10	540
Clay, red; medium to coarse sand, silt, and some granules	10	550
Clay, brown; medium to coarse sand and silt	20	570
Clay, brown, and very fine to medium sand	10	580
Clay, brown; very fine to medium sand and some granules	10	590
Clay, brown; very fine to coarse sand and granules	10	600
Clay, red and brown; silt and very fine to medium sand	10	610
Clay, red and brown; silt, very fine to medium sand, and granules	10	620
Clay, brown; very fine to medium sand and granules	10	630
Clay, brown; very fine to coarse sand, granules, and pebbles	10	640
Sand, very fine to very coarse; clay, granules, and pebbles	10	650
Clay, brown; very fine to very coarse sand and granules	20	670
Clay, brown; very fine sand, granules, and pebbles	10	680
Granules, pebbles, lime, very fine to medium sand, and clay	5	685
Granules and pebbles	5	690
Granules, pebbles, red clay, and fine to medium sand	10	700
Conglomerate of granules, lime shell, and fine sand	10	710
Conglomerate of granules, very fine to coarse sand, and lime shell	20	730

Sample logs of wells in the Hueco Bolson area, El Paso County, Tex., and Dona Ana and Otero Counties, N. Mex.—Continued

	Thickness (feet)	Depth (feet)
Well N-6—Continued		
Conglomerate of granules, pebbles, and fine sand	10	740
Conglomerate of granules and pebbles	40	780
Conglomerate of granules, pebbles, some red clay, and very fine sand	30	810
Conglomerate of granules, pebbles, and very fine to coarse sand	10	820
Well R-1		
Owner: U. S. Geological Survey. Driller: B. & W. Drilling Co. of Texas		
Sand	10	10
Granules, limestone, pebbles, and clay	10	20
Granules, pebbles, and black limestone	10	30
Sand, very coarse; granules and pebbles	100	130
Clay, buff; very coarse sand, granules, and pebbles	20	150
Sand, coarse to very coarse; granules and clay	20	170
Sand, coarse to very coarse; granules and pebbles	20	190
Sand, coarse to very coarse; granules and clay	10	200
Sand, coarse to very coarse, and granules	20	220
Granules, coarse sand, and pebbles	30	250
Granules, coarse sand, pebbles, and clay	10	260
Sand, very coarse; granules and clay	50	310
Sand, medium to very coarse; granules and pebbles	10	320
Sand, medium to very coarse; granules, pebbles, and clay	50	370
Sand, fine to very coarse, and granules	10	380
Sand, fine to very coarse; granules and clay	20	400
Sand, coarse to very coarse; granules and clay	30	430
Clay, very sandy, and granules	10	440
Sand, medium to very coarse; granules and clay	30	470
Clay, white, very sandy; caliche, granules, and pebbles	10	480
Sand, fine to very coarse; white clay and granules	10	490
Sand, very fine to coarse, and granules	10	500
Granules and fine sand	6	506
Sand, very fine to coarse, and granules	4	510
Sand, very fine to coarse; granules, pebbles, and clay	20	530
Sand, medium to very coarse; granules, pebbles, and caliche	10	540
Sand, fine to very coarse; granules and clay	10	550
Sand, fine to very coarse; granules and clay	10	560
Sand, fine to very coarse, and clay	10	570
Sand, medium to very coarse; granules and pebbles	10	580
Sand, medium to very coarse, and granules	90	670
Sand, very fine to very coarse; granules and caliche	10	680
Sand, very fine to very coarse; granules and pebbles	10	690
Pebbles, granules, and fine to coarse sand	10	700
Sand, very fine to coarse, and some clay	10	710
Sand, very fine to very coarse, and some clay	10	720
Clay, gray; sand and caliche	10	730
Sand, very fine to very coarse, and some clay	40	770
Sand, medium to coarse; granules and caliche	10	780
Caliche, sand, and granules	10	790
Sand, very fine to coarse, and caliche	5	795
Sand, very fine to coarse; granules and caliche	10	805
Missing	10	815
Sand, fine to very coarse	24	839
Sand, fine to coarse, and granules	11	850
Sand, fine to coarse; granules and clay	20	870
Clay, sandy; granules and caliche	10	880
Clay, granules, and caliche	10	890
Clay, sandy; granules and caliche	30	920
Clay, very sandy	10	930
Sand, fine to coarse	20	950
Clay, sandy, and very fine sand	10	960
Clay, very sandy, and very fine sand	30	990

Sample logs of wells in the Hueco Bolson area, El Paso County, Tex., and Dona Ana and Otero Counties, N. Mex.—Continued

	Thickness (feet)	Depth (feet)
Well R-1—Continued		
Sand, very fine, and clay	20	1,010
Clay and very fine sand	10	1,020
Clay, buff, sandy, and fine sand	40	1,060
Clay, buff; fine sand, gravel, and pebbles	30	1,090
Clay, buff; fine sand, gravel, pebbles, and lignite	10	1,100
Gravel, very fine sand, and clay	10	1,110
Clay, buff; fine sand, gravel, and pebbles	30	1,140
Sand, very fine to coarse, and gravel	20	1,160
Sand, very fine to medium	40	1,200
Well R-3		
Owner: U. S. Geological Survey. Driller: B. & W. Drilling Co. of Texas		
Sand, fine; caliche and granules	10	10
Sand, fine; granules and pebbles	10	20
Gravel	10	30
Gravel and sand, medium to coarse	10	40
Sand, medium to coarse, and gravel	10	50
Sand, fine to coarse, and gravel	10	60
Gravel, sand, and clay	10	70
Gravel, fine sand, and clay	10	80
Sand, fine to coarse, and gravel	20	100
Sand, medium to coarse, and gravel	70	170
Sand, gray, fine to coarse, and gravel	10	180
Sand, gray, fine to medium, and gravel	4	184
Sand, fine to coarse, and gravel	6	190
Sand, fine to medium	10	200
Sand, fine to medium, and gravel	10	210
Sand, medium to coarse, and gravel	10	220
Sand, fine to coarse, and gravel	20	240
Sand, fine to coarse, gravel, and clay	10	250
Sand, fine to medium, and gravel	10	260
Sand, fine to coarse; gravel and clay	10	270
Sand, fine to medium, and some gravel	20	290
Sand, fine to medium; some clay and gravel	10	300
Sand, medium to very coarse	10	310
Sand, fine to coarse; some clay and gravel	10	320
Sand, fine to coarse, and gravel	10	330
Sand, fine to coarse, and some gravel	10	340
Sand, fine to coarse; some gravel and caliche	10	350
Sand, fine to very coarse	20	370
Sand, fine to very coarse, and some caliche	10	380
Sand, fine, and some gravel	10	390
Sand, fine to coarse, and some gravel	50	440
Sand, fine to medium, and clay	10	450
Missing	10	460
Sand, fine to medium	10	470
Sand, fine to medium, and caliche	10	480
Sand, fine to coarse, and caliche	20	500
Sand, fine to medium	20	520
Sand, clayey	10	530
Sand, fine to medium	20	550
Sand, fine to medium, and some gravel	45	595
Clay and gravel, very coarse	5	600
Sand, medium to coarse; granules and pebbles	10	610
Sand, fine to medium, and granules	10	620
Sand, very fine; silt, clay, and some granules	10	630
Sand, very fine; silt, clay, and caliche	10	640
Sand, very fine to medium, and caliche	10	650
Sand, very fine to fine, and caliche	6	656
Sand, fine to medium, and caliche	3	659

Sample logs of wells in the Hueco Bolson area, El Paso County, Tex., and Dona Ana and Otero Counties, N. Mex.—Continued

	Thickness (feet)	Depth (feet)
Well R-3—Continued		
Sandstone, fine to medium, and granules	10	669
Sand, very fine to medium; caliche and granules	10	679
Sand, fine to coarse; caliche and clay	10	689
Sand, fine to medium, indurated; granules and pebbles	11	700
Silt, clay, and fine to medium indurated sand	10	710
Clay, sandy, and caliche	20	730
Sand, fine to medium; some clay and caliche	10	740
Silt, clay, and very fine sand	20	760
Silt, clay, very fine to fine sand, and caliche	10	770
Silt, clay, very fine sand, and caliche	10	780
Missing	3	783
Clay, sandy; granules, caliche, and pebbles	7	790
Clay, silt, and very fine sand	30	820
Clay and silt	20	840
Clay, silt, and very fine sand	30	870
Clay, silt, and very fine indurated sand	10	880
Sand, fine to medium, and some clay	10	890
Sand, fine to medium; caliche and some clay	30	920
Sandstone, fine to medium; granules and caliche	10	930
Sand, fine to coarse, and granules	10	940
Sand, fine to coarse; clay, granules, and caliche	10	950
Well R-4		
Owner: U. S. Geological Survey. Driller: B. & W. Drilling Co. of Texas		
Sand, and clay	10	10
Sand, silt, and caliche	10	20
Sand, medium to coarse	10	30
Sand, medium to very coarse; granules and pebbles	10	40
Sand, medium to very coarse; some granules and clay	10	50
Sand, some granules, pebbles, and clay	40	90
Sand, fine to very coarse, and sandy clay	10	100
Sand, fine to coarse; some clay and silt	10	110
Clay, sand, and some gravel	20	130
Clay, silt, medium to very coarse sand, granules, and pebbles	40	170
Sand, fine to very coarse; some granules, clay, and silt	30	200
Sand, fine to very coarse, and granules	50	250
Sand, fine to very coarse; granules and pebbles	10	260
Sand, fine to very coarse; granules, pebbles, clay, and silt	10	270
Sand, fine to very coarse	20	290
Sand, fine to very coarse; granules, some silt, and clay	10	300
Sand, fine to medium, and sandy clay	10	310
Clay, sandy, and fine to medium sand	10	320
Sand, medium to coarse	10	330
Sand, fine to coarse, and a few granules	10	340
Sand, sandy clay, and clay	10	350
Sand, fine to very coarse; some clay and silt	20	370
Sand, fine to medium; some silt and clay	10	380
Sand, fine to coarse, and some granules	20	400
Sand, fine to very coarse, and some clay	20	420
Sand, sandy clay, and clay	10	430
Sand, fine to very coarse; granules and clay	10	440
Sand, clay, and sandy clay	10	450
Clay, sandy	10	460
Clay and sandy clay	10	470
Clay, sandy, and clay	10	480
Sand and sandy clay	10	490
Sand, fine to coarse; granules and clay	10	500
Sand, medium to coarse, and some granules	10	510
Sand, fine to very coarse; granules and silt	20	530
Sand, fine to coarse, and clay	10	540
Sand, fine to medium, and clay	20	560

Sample logs of wells in the Hueco Bolson area, El Paso County, Tex., and Dona Ana and Otero Counties, N. Mex.—Continued

	Thickness (feet)	Depth (feet)
Well R–4—Continued		
Sand, very fine to coarse	10	570
Sand, fine to coarse, and granules	10	580
Sand, fine to coarse; granules and pebbles	5	585
Sand, medium to very coarse; granules and pebbles	5	590
Sand, fine to very coarse, and some clay	10	600
Sand, fine to coarse, and some clay	30	630
Sand, medium to very coarse; granules and pebbles	10	640
Sand, and clay	10	650
Sand, fine to very coarse; granules and pebbles	10	660
Sand, fine to coarse; granules and clay	10	670
Sand, fine to medium, and pebbles	10	680
Sand, sandy clay, and some pebbles	10	690
Sand, fine to very coarse; granules and pebbles	10	700
Sand, medium to very coarse	20	720
Sand, medium to very coarse, and granules	20	740
Sand, fine to medium; clay and sandy clay	10	750
Sand, fine to medium, and some clay	10	760
Sand, medium to very coarse	20	780
Sand, very fine to medium, and some clay	10	790
Sand, very fine to coarse	17	807
Sand, very fine to medium	3	810
Sand, very fine to coarse	15	825
Well R–13		
Owner: U. S. Geological Survey. Driller: B. & W. Drilling Co. of Texas		
Sand, fine to very coarse, and caliche	10	10
Sand, medium to very coarse	10	20
Sand, medium to very coarse, and caliche	10	30
Sand, fine to coarse, and caliche	10	40
Sand, fine to very coarse, and caliche	10	50
Sand, fine to very coarse; granules and pebbles	50	100
Sand, fine to very coarse; clay, granules, and pebbles	10	110
Sand, fine to medium; clay and granules	10	120
Sand, very fine to medium; caliche and pebbles	30	150
Sand, fine to coarse; granules, pebbles, and caliche	30	180
Sand, very fine to medium; granules, pebbles, caliche, and clay	10	190
Sand, very fine to medium; granules, pebbles, and caliche	10	200
Sand, very fine to coarse; granules and caliche	10	210
Sand, fine, and caliche	10	220
Sand, very fine to medium; some caliche and granules	10	230
Sand, very fine to medium	10	240
Sand, very fine to fine, and silt	10	250
Sand, very fine to coarse, and red clay	10	260
Sand, very fine to medium; caliche and some clay	10	270
Sand, fine to coarse; granules and pebbles	10	280
Sand, fine to medium; granules and pebbles	10	290
Sand, very fine to very coarse	20	310
Sand, very fine to very coarse	10	320
Sand, very fine to medium	10	330
Sand, very fine to medium, and some clay	10	340
Sand, very fine to fine	10	350
Sand, very fine to coarse, and some clay	10	360
Clay, silt, and very fine sand	20	380
Sand, very fine to coarse	10	390
Sand, fine to coarse	10	400
Sand, fine to very coarse	30	430
Sand, fine to coarse, and some granules	10	440
Sand, fine to coarse, and caliche	10	450
Sand, fine to coarse, and some granules	10	460
Sand, fine to coarse	10	470

Sample logs of wells in the Hueco Bolson area, El Paso County, Tex., and Dona Ana and Otero Counties, N. Mex.—Continued

	Thickness (feet)	Depth (feet)
Well R-13—Continued		
Sand, very fine to coarse, and some clay	10	480
Sand, very fine to very coarse	10	490
Sand, very fine to very coarse, and some granules	10	500
Sand, very fine to coarse	20	520
Sand, very fine to very coarse	10	530
Sand, very fine to coarse	10	540
Sand, very fine to medium	10	550
Sand, very fine to very coarse	20	570
Sand, very fine to very coarse, and some granules	3	573
Sand, fine to very coarse, and granules	7	580
Sand, fine to very coarse; granules and clay	10	590
Sand, very fine to coarse, and granules	10	600
Sand, very fine to very coarse; granules and clay	10	610
Sand, fine to very coarse; granules and pebbles	10	620
Sand, very fine to coarse, and clay	10	630
Sand, very fine to very coarse	10	640
Sand, fine to coarse; granules and clay	10	650
Sand, fine to very coarse; granules and pebbles	10	660
Sand, very fine to very coarse, and some granules	30	690
Sand, fine to very coarse, and clay	10	700
Sand, fine to very coarse; granules, some pebbles, and clay	10	710
Sand, fine to very coarse; granules and pebbles	10	720
Sand, fine to very coarse; granules and clay	8	728
Sand, fine to very coarse; granules, pebbles, and clay	2	730
Sand, very fine to medium, and granules	10	740
Sand, fine to medium; granules, pebbles, and clay	10	750
Sand, fine to medium, and some granules	10	760
Sand, gray, fine to medium	10	770
Sand, very fine to coarse, and some granules	6	776
Sand, fine to medium	14	790
Sand, medium to coarse, and granules	10	800
Sand, very fine to medium, and some granules	10	810
Sand, fine to medium, and some clay	10	820
Sand, fine to medium	10	830
Sand, fine to medium; clay and granules	10	840
Sand, fine to medium, and clay	10	850
Sand, fine to medium; granules and pebbles	10	860
Sand, fine to medium; granules, pebbles, and clay	10	870
Sand, very fine to medium, and clay	4	874
Sand, very fine to medium; granules and clay	6	880
Sand, very fine to coarse; granules, pebbles, and clay	10	890
Sand, very fine to coarse, and clay	10	900
Silt, very fine to medium sand, and clay	10	910
Silt, very fine to medium sand, and clay	6	916
Sand, fine to coarse; granules and pebbles	4	920
Sandstone, granules, pebbles, clay, and medium to coarse sand	20	940
Sand, fine to coarse; granules, pebbles, and clay	10	950
Sandstone, hard, fine to coarse; granules, pebbles, and clay	30	980
Silt, very fine to medium sand, sandstone, and clay	10	990
Silt, very fine to medium sand, granules, pebbles, and clay	20	1,010
Silt, sandstone, and clay	22	1,032
Silt, very fine to medium; granules and clay	8	1,040
Sand, very fine to very coarse; granules and some clay	10	1,050
Sand, very fine to medium; granules and clay	10	1,060
Clay, very sandy	10	1,070
Clay, sand, granules, and caliche	10	1,080
Sand, very fine to fine; granules and some clay	10	1,090
Sand, very fine to fine	10	1,100
Sand, very fine to coarse	10	1,110
Sand, very fine to medium	20	1,130
Sand, very fine to medium; granules and pebbles	2	1,132
Sand, very fine to medium; pebbles and clay	8	1,140
Sand, fine to medium; granules and some clay	10	1,150

Sample logs of wells in the Hueco Bolson area, El Paso County, Tex., and Dona Ana and Otero Counties, N. Mex.—Continued

	Thickness (feet)	Depth (feet)
Well R-13—Continued		
Sand, very fine to fine; granules, pebbles, and some clay	10	1,160
Sand, fine to coarse, and granules	10	1,170
Sand, very fine to fine, and granules	10	1,180
Sand, very fine to very coarse; granules and clay	10	1,190
Sand, very fine to very coarse, and granules	10	1,200
Well R-28		
Owner: U. S. Geological Survey. Driller: B. & W. Drilling Co. of Texas		
Sand, brown, medium to coarse, and some granules	10	10
Sand, medium to coarse, and brown granules	10	20
Sand, fine to coarse, and some granules	10	30
Granules, very coarse sand, pebbles, quartz, and ferromagnesium	20	50
Pebbles, granules, and coarse sand	10	60
Granules, pebbles, and very coarse sand	10	70
Pebbles, granules, and coarse sand	20	90
Sand, coarse to very coarse, and some granules	10	100
Sand, medium to very coarse	10	110
Sand, coarse to very coarse, and some granules	10	120
Granules, pebbles, and medium to very coarse sand	10	130
Granules, pebbles, and coarse to very coarse sand	10	140
Sand, very coarse; granules and pebbles	10	150
Granules, coarse to very coarse sand, and pebbles	20	170
Pebbles, granules, and very coarse sand	10	180
Pebbles and granules	10	190
Granules, coarse to very coarse sand, pebbles, and clay	10	200
Pebbles, granules, coarse to very coarse sand, and clay	20	220
Pebbles, granules, medium to very coarse sand, and some clay	10	230
Granules, pebbles, and medium to very coarse sand	10	240
Pebbles, granules, and coarse to very coarse sand	10	250
Pebbles, granules, medium to very coarse sand, some silt, and clay	10	260
Sand, coarse to very coarse; granules and some clay	20	280
Granules and coarse to very coarse sand	10	290
Sand, medium to very coarse, and granules	10	300
Sand, coarse to very coarse	10	310
Sand, medium, and some coarse	10	320
Sand, medium to coarse	10	330
Sand, coarse to very coarse, and granules	20	350
Sand, medium to very coarse; granules and some clay	10	360
Sand, medium to very coarse; some granules and clay	10	370
Sand, medium to very coarse, and granules	10	380
Sand, clay, and some granules	10	390
Clay, sandy, and granules	20	410
Sand, coarse to very coarse, and some granules	10	420
Sand, medium to very coarse; granules and pebbles	10	430
Sand, coarse to very coarse; granules and pebbles	20	450
Sand, medium to very coarse; granules and clay	10	460
Sand, coarse to very coarse; granules, pebbles, and clay	10	470
Sand, medium to very coarse; granules, pebbles, and some clay	10	480
Sand, medium to very coarse; granules and pebbles	10	490
Sand, medium to very coarse; granules, pebbles, and some clay	10	500
Sand, medium to very coarse; some granules and pebbles	20	520
Sand, coarse to very coarse; granules and pebbles	20	540
Sand, coarse to very coarse; granules and rounded pebbles	10	550
Sand, fine to very coarse; granules and clay	10	560
Sand, medium to very coarse, and some clay	10	570
Sand, coarse to very coarse, and granules	10	580
Sand, medium to very coarse	17	597
Clay, sandy; fine to very coarse sand and some granules	3	600
Clay, sandy, fine to coarse	10	610
Sand, fine to coarse, and clay	10	620

Sample logs of wells in the Hueco Bolson area, El Paso County, Tex., and Dona Ana and Otero Counties, N. Mex.—Continued

	Thickness (feet)	Depth (feet)
Well R-28—Continued		
Clay, sandy; very fine to very coarse sand, granules, and pebbles	30	650
Clay, very fine to very coarse sand, granules, pebbles, and caliche	20	670
Clay, sandy; very fine to very coarse sand, granules, pebbles, and caliche	10	680
Sand, very fine to very coarse; granules, pebbles, caliche, and sandy clay	10	690
Clay, sandy; very fine to very coarse sand, granules, pebbles, and caliche	10	700
Clay, sandy; granules and pebbles	10	710
Clay, and some pebbles	10	720
Clay, sandy	30	750
Clay, sandy; granules and pebbles	10	760
Clay, sandy; fine to medium sand	10	770
Clay and some sand	10	780
Clay, sandy, and some fine to medium sand	10	790
Clay, sandy, and fine to coarse sand	10	800
Sand, medium to coarse, and sandy clay	10	810
Sand, medium to very coarse; granules, pebbles, and sandy clay	10	820
Sand, fine to coarse; some granules and sandy clay	10	830
Sand, medium to coarse; granules and some pebbles	10	840
Sand, medium to coarse; granules, some pebbles, and clay	5	845
Sand, fine to very coarse; granules and sandy clay	10	855
Clay, sandy, and fine to coarse sand	10	865
Clay, sandy; fine to very coarse sand, granules, and pebbles	10	875
Clay, sandy, and fine to medium sand	10	885
Clay, sandy; some granules and pebbles	10	895
Sand, fine to very coarse; sandy clay, granules, and some pebbles	10	905
Clay, medium to very coarse sand, and granules	10	915
Clay, sandy, and some granules	22	937
Sand, fine to very coarse; granules and some clay	8	945
Sand, fine to coarse; clay and some granules	10	955
Clay, sandy, and fine to medium sand	10	965
Clay and fine to medium sand	5	970
Clay, sandy	10	980
Clay, sandy, and fine to coarse sand	25	1,005
Clay, fine to coarse sand, and granules	9	1,014
Clay, sand, granules, and pebbles	3	1,017
Sand, fine to very coarse; granules and some pebbles	13	1,030
Sand, medium to very coarse; granules and some pebbles	10	1,040
Sand, fine to medium; some granules and clay	20	1,060
Sand, fine to very coarse, and a few granules	10	1,070
Sand, fine to coarse	10	1,080
Sand, medium to very coarse; some lime and some granules	15	1,095
Sand, fine to very coarse, and clay	10	1,105
Sand, fine to coarse; sandy clay and clay	10	1,115
Sand, fine to very coarse; granules and some clay	10	1,125
Sand, very fine to medium, and some clay	7	1,132
Sand, fine to very coarse; some granules, pebbles, and clay	10	1,142
Sand, fine to very coarse; granules, pebbles, and some clay	20	1,162
Clay, sandy, and fine to medium sand	20	1,182
Sand, clayey, fine to medium	10	1,192
Clay and sand	8	1,200
Clay, sandy; fine to very coarse sand, granules, and pebbles	14	1,214
Sand, fine to very coarse; granules and some clay	10	1,224
Sand, fine to coarse; some granules and silt	10	1,234
Clay, sandy; medium to very coarse sand, granules, and pebbles	10	1,244
Sand, fine to coarse	16	1,260
Clay and sandy clay	10	1,270
Clay, silt, and sandy clay	10	1,280
Sand, medium to very coarse; some granules and silt	10	1,290
Clay, sandy, and silt	10	1,300
Clay, sandy; sand and some granules	10	1,310
Clay, sandy; silt and fine to coarse sand	10	1,320
Sand, fine to medium; some granules, pebbles, and sandy clay	10	1,330
Sand, medium to coarse	10	1,340
Sand, fine to medium; some granules and clay	10	1,350

Sample logs of wells in the Hueco Bolson area, El Paso County, Tex., and Dona Ana and Otero Counties, N. Mex.—Continued

	Thickness (feet)	Depth (feet)
Well R-28—Continued		
Sand, fine to coarse; granules and silt	10	1,360
Sand, medium to coarse	20	1,380
Sand, very fine to medium	10	1,390
Sand, medium to coarse	10	1,400
Clay and sandy clay	10	1,410
Clay, sandy, and fine to medium sand	10	1,420
Sand, fine to medium, and sandy clay	20	1,440
Missing	20	1,460
Sand, fine to medium, and some sandy clay	10	1,470
Sand, fine to medium, and clay	20	1,490
Sand, medium	10	1,500
Sand, fine to medium	30	1,530
Sand, medium, and some clay	10	1,540
Sand, medium to coarse	10	1,550
Sand, fine to medium	30	1,580
Sand, medium to coarse	10	1,590
Sand, fine to coarse, and clay	10	1,600
Sand, coarse	10	1,610
Sand, medium to coarse	8	1,618
No record	17	1,635
Well R-37		
Owner: U. S. Geological Survey. Driller: B. & W. Drilling Co. of Texas		
Sand, very fine to coarse; gravel and pebbles	10	10
Sand, pebbles, and boulders	10	20
Sand, gravel, and pebbles	180	200
Gravel, medium, angular, and fine sand	30	230
Gravel, medium, angular to subangular, and arkose	20	250
Gravel, medium to coarse, and arkose	10	260
Gravel and fine to very fine sand	30	290
Gravel, medium to coarse, and arkose	10	300
Gravel, medium, and arkose	20	320
Pebbles and arkose	10	330
Gravel, medium	20	350
Gravel and medium to fine arkose	10	360
Gravel, medium arkose, and very fine sand	40	400
Gravel, medium; some clay and caliche	40	440
Gravel, medium, and arkose	10	450
Gravel, medium, and clay	10	460
Gravel, medium; some clay and sand	10	470
Gravel, medium, and clay	10	480
Clay, buff; some caliche and gravel	10	490
Clay, buff; caliche, gravel, and fine sand	10	500
Caliche, some sand, gravel, and clay	20	520
Clay, buff, sandy; some caliche and gravel	20	540
Caliche, some sandy clay, and gravel	10	550
Clay, sandy; some caliche and gravel	20	570
Clay, some caliche, and gravel	10	580
Clay, sandy; some caliche and gravel	20	600
Clay, some caliche, and some gravel	50	650
Clay, some caliche, and gravel	10	660
Caliche and clay	30	690
Clay and caliche	20	710
Clay, buff	20	730
Clay and gravel	10	740
Clay, buff	180	920
Clay and white sandstone	10	930
Clay, buff	10	940
Clay, some white sandstone, and brown shale	10	950
Clay and white sandstone	10	960
Gravel, coarse, and some clay	10	970

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Sample logs of wells in the Hueco Bolson area, El Paso County, Tex., and Dona Ana and Otero Counties, N. Mex.—Continued

	Thickness (feet)	Depth (feet)
Well R-37—Continued		
Gravel, coarse, and arkose	10	980
Gravel, fine to coarse, and arkose	10	990
Gravel, fine to coarse; arkose and medium sand	10	1,000
Gravel, fine to coarse; arkose and fine to coarse sand	10	1,010
Gravel, medium; some sandy clay and pebbles	5	1,015
Clay, some coarse gravel, and pebbles	5	1,020
Caliche, some clay, and pebbles	20	1,040
Gravel, clay and caliche	10	1,050
Caliche, some clay, and some pebbles	20	1,070
Gravel, fine to coarse; some pebbles and coarse sand	10	1,080
Gravel, medium	10	1,090
Gravel, fine to coarse	10	1,100
Gravel	10	1,110
Gravel and clay	10	1,120
Gravel and some clay	10	1,130
Clay and gravel	40	1,170
Sand, clay, and some gravel	10	1,180
Clay and gravel	10	1,190
Clay and some gravel	30	1,220
Well R-46		
Owner: U. S. Army. Driller: Bassett Drilling Co.		
Sand, medium	30	30
Sand, medium to very coarse	10	40
Sand, coarse to very coarse	20	60
Sand, fine	30	90
Sand, fine to coarse	10	100
Sand, medium	10	110
Sand, fine to very coarse	30	140
Sand, fine	50	190
Sand, fine to medium	10	200
Sand, fine	10	210
Sand, medium to coarse	10	220
Sand, coarse	10	230
Sand, fine to coarse	10	240
Sand, very fine to medium	10	250
Sand, fine	10	260
Sand, medium	90	350
Sand, very fine to fine	10	360
Sand, medium to coarse	10	370
Sand, very fine to medium	20	390
Sand, very fine to fine	60	450
Sand, fine to medium	10	460
Sand, very fine to fine	50	510
Sand, very fine to medium	30	540
Sand, very fine to fine	20	560
Sand, very fine to medium	40	600
Sand, medium	10	610
Sand, very fine to medium	20	630
Sand, medium	30	660
Sand, very fine to coarse	10	670
Sand, very fine to medium	10	680
Sand, medium	20	700
Sand, fine to medium	10	710
Sand, fine to coarse	60	770
Sand, very fine to medium	20	790
Sand, fine to coarse	30	820

Sample logs of wells in the Hueco Bolson area, El Paso County, Tex., and Dona Ana and Otero Counties, N. Mex.—Continued

	Thickness (feet)	Depth (feet)
Well R-48		
Owner: U. S. Army. Driller: Bassett Drilling Co.		
Sand, medium to coarse	10	10
Sand, fine to coarse	50	60
Sand, very fine to fine	10	70
Clay, very fine to very coarse sand, and granules	40	110
Sand, medium to very coarse	10	120
Sand, fine to coarse	10	130
Sand, fine to very coarse	10	140
Sand, fine to very coarse; granules and pebbles	30	170
Sand, very fine to coarse	10	180
Clay and very fine to very coarse sand	20	200
Clay	10	210
Clay and very fine to very coarse sand	30	240
Clay and very fine to medium sand	20	260
Sand, fine to coarse	50	310
Sand, very fine to very coarse	90	400
Sand, very fine to very coarse	10	410
Clay and very fine to coarse sand	40	450
Sand, very fine to coarse, and some clay	40	490
Sand, very fine to coarse	160	650
Sand, very fine to medium	10	660
Sand, very fine to very coarse, and some clay	10	670
Sand, very fine to coarse	30	700
Sand, very fine to very coarse	40	740
Sand, very fine to coarse	40	780
Clay and very fine to coarse sand	10	790
Clay and some very fine to coarse sand	20	810
Well R-52		
Owner: U. S. Army. Driller: Bassett Drilling Co.		
Sand, coarse to very coarse, and granules	60	60
Sand, coarse to very coarse; granules and pebbles	10	70
Granules and pebbles	20	90
Sand, medium to very coarse; granules and pebbles	50	140
Sand, coarse to very coarse, and granules	20	160
Granules and pebbles	40	200
Clay and very fine to fine sand	30	230
Sand, very fine to fine	20	250
Clay and very fine to fine sand	10	260
Clay, very fine to very coarse sand, and some granules	40	300
Clay	20	320
Clay, very fine to coarse sand, and some granules	10	330
Sand, medium to very coarse; some granules and pebbles	130	460
Sand, medium to coarse	10	470
Sand, medium to very coarse	10	480
Sand, fine to coarse	10	490
Sand, medium to very coarse, and granules	10	500
Clay and very fine to medium sand	20	520
Clay, brown	10	530
Sand, very fine to very coarse, and granules	40	570
Sand, very fine to very coarse; granules and pebbles	30	600
Clay and very fine to coarse sand	30	630
Sand, fine to very coarse, and some granules	10	640
Clay and very fine to coarse sand	10	650
Clay, brown	10	660
Clay and very fine to very coarse sand, and some granules	20	680
Sand, medium to very coarse, and granules	70	750
Clay, brown, and very fine to medium sand	20	770
Clay, brown	40	810
No record	2	812

Sample logs of wells in the Hueco Bolson area, El Paso County, Tex., and Dona Ana and Otero Counties, N. Mex.—Continued

	Thickness (feet)	Depth (feet)
Well S-1		
Owner: U. S. Geological Survey. Driller: B. & W. Drilling Co. of Texas		
Sand, medium; caliche and pink clay	20	20
Sand, medium, and very coarse gravel	10	30
Sand, medium to coarse; caliche and pebbles	10	40
Sand, medium	10	50
Sand, coarse; red shale and caliche	20	70
Sand, medium to coarse	10	80
Clay, pink	10	90
Clay, pink, sandy	10	100
Sand, coarse	10	110
Sand, medium to coarse	30	140
Sand, medium to coarse, and some large gravel	40	180
Clay, buff, sandy	10	190
Clay, buff	23	213
Sand, medium to coarse	7	220
Sand, medium to fine	30	250
Sand, fine to medium; some clay and caliche	10	260
Sand, fine to medium	10	270
Sand, fine to medium; some clay and gravel	20	290
Sand, fine	1	291
Sand, fine to medium, and clay	9	300
Sand, medium, and clay	5	305
Sand, coarse to very coarse	15	320
Sand, coarse to very coarse	10	330
Sand, fine to medium	10	340
Sand, medium to coarse, and clay	10	350
Clay, buff, sandy	19	369
Sand, fine to very fine	6	375
Sand, medium to coarse	5	380
Sand, fine to medium	20	400
Clay, sandy	2	402
Sand, medium to coarse	7	409
Sand, medium and clay	11	420
Clay, pink	10	430
Clay, pink, sandy	20	450
Sand, coarse	10	460
Sand, medium to coarse	12	472
Sand, very coarse; caliche and pebbles	8	480
Shale, red	7	487
Sand, fine to medium	3	490
Shale, red	5	495
Sand, fine to medium, and clay	5	500
Sand, fine to coarse, and quartz	5	505
Sand, fine to coarse, and some gravel	5	510
Sand, fine to medium	10	520
Sand, fine, and some red shale	5	525
Clay, pink, sandy	5	530
Gravel, coarse, and clay	22	552
Clay, pink, sandy	4	556
Clay, pink	4	560
Clay, pink, sandy	9	569
Sand, coarse	35	604
Clay, pink, sandy	24	628
Clay, pink	12	640
Sand, very coarse	10	650
Sand, very coarse, and some clay	20	670
Clay, pink, sandy	10	680
Clay, sandy; some caliche and gravel	10	690
Sand, coarse to very coarse	10	700
Clay, pink, sandy	7	707
Sand, fine to medium	3	710
Sand, medium to coarse	10	720

Sample logs of wells in the Hueco Bolson area, El Paso County, Tex., and Dona Ana and Otero Counties, N. Mex.—Continued

	Thickness (feet)	Depth (feet)
Well S-1—Continued		
Sand, fine to coarse	15	735
Clay, pink, sandy	5	740
Clay, some coarse gravel, and boulders	2	742
Sand, medium, and red shale	8	750
Sand, very coarse	10	760
Sand, very coarse, and gray shale	10	770
Sand, very coarse; some gravel and shale	3	773
Clay, pink, and some very coarse gravel	7	780
Clay, pink, sandy	20	800
Well S-5		
Owner: U. S. Geological Survey. Driller: B. & W. Drilling Co. of Texas		
Sand and caliche	10	10
Sand, medium to coarse	40	50
Sand, medium to coarse; some clay and gravel	10	60
Clay, buff, and some coarse gravel	10	70
Sand, coarse, and some coarse gravel	10	80
Sand, coarse; some clay and gravel	10	90
Sand, fine to coarse, and some clay	30	120
Clay, buff, and some coarse gravel	10	130
Clay, buff, sandy, and some coarse gravel	20	150
Sand, very fine to fine	10	160
Sand, medium to coarse	30	190
Sand, very fine to coarse, and some fine gravel	10	200
Sand, fine to medium	90	290
Sand, medium to coarse	60	350
Sand, very fine to medium	10	360
Sand, very fine to medium, and some gravel	10	370
Gravel, medium, and some medium sand	10	380
Gravel, medium, and some clay	10	390
Sand, very fine; clay and gravel	10	400
Clay, buff, and some sand	10	410
Sand, very fine to medium, and some gravel	10	420
Clay, buff, and some sand	10	430
Sand, fine to medium, and some caliche	10	440
Sand, very fine to fine, and some gravel	20	460
Sand, very fine to fine	10	470
Clay, buff, sandy, and some coarse gravel	10	480
Gravel, coarse; some pebbles and clay	10	490
Sand, medium	10	500
Clay, buff	5	505
Pebbles, subangular; gravel and sandy clay	15	520
Sand, very fine to coarse; some gravel and pebbles	10	530
Clay, sandy; some brown sandstone and angular pebbles	10	540
Sand, medium to coarse; round gravel and pebbles	20	560
Sand, very fine to medium, and some round gravel	10	570
Sand, medium to coarse; round gravel and pebbles	10	580
Sand, medium to coarse; round gravel and pebbles	10	590
Sand, fine to coarse; clay and gravel	30	620
Clay, sandy, and some gravel	10	630
Clay, sandy	10	640
Sand, fine to medium; gravel and pebbles	10	650
Clay, sandy, and gravel	10	660
Sand, very fine to coarse; clay and gravel	20	680
Sand, fine to coarse; clay and gravel	20	700
Sand, very fine to fine, and clay	20	720
Sand, medium	10	730
Clay, sandy, and subangular pebbles	10	740
Sand, fine to medium; clay and gravel	30	770
Clay, sandy, and some subangular gravel	10	780

Sample logs of wells in the Hueco Bolson area, El Paso County, Tex., and Dona Ana and Otero Counties, N. Mex.—Continued

	Thickness (feet)	Depth (feet)
Well S–5—Continued		
Clay, sandy	140	920
Sand, fine to medium, and some clay	20	940
Sand, fine to coarse	40	980
Sand, very fine to coarse, and some clay	10	990
Sand, very fine to fine	15	1,005
Well S–8		
Owner: U. S. Geological Survey. Driller: B. & W. Drilling Co. of Texas		
Caliche and some sand	10	10
Sand, very fine to very coarse, and caliche	10	20
Sand, very fine to very coarse	40	60
Granules	20	80
Granules and pebbles	50	130
Granules, pebbles, clay, and sand	10	140
Granules, pebbles, and clay	60	200
Granules, pebbles, and coarse sand	20	220
Sand, medium to very coarse; granules and pebbles	40	260
Sand, fine to very coarse, and granules	10	270
Clay, buff, sandy, and some granules	20	290
Sand, medium to very coarse, and granules	10	300
Sand, fine to medium, and some clay	10	310
Sand, fine to very coarse; granules and clay	10	320
Sand, fine to medium; granules and clay	10	330
Sand, medium to very coarse, and some granules	10	340
Granules	20	360
Sand, medium to very coarse, and granules	30	390
Sand, medium to very coarse; granules and some clay	10	400
Sand, fine to coarse, and some granules	10	410
Clay, buff, sandy	20	430
Sand, fine to coarse; chert, quartz, and clay	10	440
Clay, buff, and sand	10	450
Clay, buff; sand and granules	40	490
Sand, fine to very coarse	10	500
Sand, very fine to very coarse, and granules	10	510
Clay, red, and some granules	5	515
Clay, buff, sandy; some granules and pebbles	10	525
Sand, fine; some granules, pebbles, and clay	25	550
Clay, buff, sandy, and some granules	50	600
Clay, buff, sandy	10	610
Clay, gray, sandy	10	620
Clay, gray, sandy, and some granules	20	640
Clay, gray; some sand and granules	20	660
Clay, gray, sandy, and some granules	10	670
Sand, fine to medium, and clay	10	680
Sand, fine to medium; granules and clay	10	690
Sand, fine to medium; granules and some clay	10	700
Sand, fine to medium, and some granules	10	710
Sand, fine to medium; granules and clay	10	720
Sand, very fine; some granules and clay	10	730
Sand, very fine, and some granules	10	740
Sand, very fine to very coarse	10	750
Sand, very fine to very coarse, and some granules	10	760
Sand, very fine to very coarse; granules and clay	10	770
Sand, very fine to coarse, and some granules	10	780
Sand, very fine to very coarse; some granules and clay	10	790
Sand, fine to very coarse, and some granules	10	800
Sand, coarse to very coarse, and granules	10	810
Granules and pebbles	10	820
Clay, gray, sandy	70	890
Sand, very fine to coarse; some granules and clay	10	900

Sample logs of wells in the Hueco Bolson area, El Paso County, Tex., and Dona Ana and Otero Counties, N. Mex.—Continued

	Thickness (feet)	Depth (feet)
Well S-8—Continued		
Clay, gray, sandy	20	920
Clay, buff	10	930
Clay, buff, sandy	10	940
Sand, very fine to fine, and some clay	10	950
Clay, buff; some sand and granules	10	960
Clay, buff, sandy, and some granules	10	970
Sand, fine to coarse; some granules and clay	10	980
Sand, fine to medium, and some clay	10	990
Sand, fine to medium; granules and some clay	10	1,000
Clay, buff, sandy	20	1,020
Well S-9		
Owner: U. S. Geological Survey. Driller: B. & W. Drilling Co. of Texas		
Clay, brown; sand and caliche	10	10
Sand, fine to very coarse; gravel, caliche, and some clay	110	120
Sand, clayey, fine to medium	60	180
Sand, fine to very coarse; gravel, caliche, and some clay	20	200
Clay, brown, sandy; some gravel and caliche	10	210
Sand, fine to very coarse; some gravel and caliche	30	240
Sand, very fine to coarse; some granules and caliche	110	350
Clay, sandy; clayey sand, brown clay, and fine to coarse sand	30	380
Clay, sandy, and reddish-brown clay	20	400
Clay, brown, sandy; fine to medium sand and caliche	110	510
Sand, very fine to coarse; some clay and caliche	40	550
Sand, clayey; sandy brown clay, fine sand, some gravel, and caliche	50	600
Clay, brown, sandy, and some caliche	30	630
Sand, fine to medium	20	650
Clay, brown, sandy	30	680
Clay, brown, silty; some sand and some caliche	100	780
Clay, grayish-brown, silty; some sand and caliche	30	810
Clay, brown, sandy, silty, and some caliche	30	840
Clay, tan, sandy, silty; some gravel and caliche	70	910
Clay, sandy; clayey fine to medium sand; some gravel and caliche	20	930
Clay, brown, silty; some sand and caliche	70	1,000
Well S-14		
Owner: U. S. Geological Survey. Driller: B. & W. Drilling Co. of Texas		
Caliche	10	10
Clay and very fine silty sand	16	26
Gravel and fine to coarse sand	4	30
Clay, red, sandy, and gravel	20	50
Clay, red; fine sand and gravel	10	60
Clay, red	10	70
Sand, very fine, and red clay	4	74
Gravel and fine to medium sand	6	80
Sand, medium to coarse, and some gravel	12	92
Clay, sandy, and gravel	8	100
Clay, sandy, very fine, and some gravel	10	110
Clay, red, silty, and some caliche	20	130
Gravel, coarse to medium sand, and clay	5	135
Sandstone, very fine, and gravel	10	145
Clay, red, silty	21	166
Clay, red, sandy; gravel and caliche	34	200
Sand, medium to coarse, and gravel	10	210
Sand, gray, fine to medium	90	300
Sand, very fine	10	310
Sand, very fine, and gravel	30	340

Sample logs of wells in the Hueco Bolson area, El Paso County, Tex., and Dona Ana and Otero Counties, N. Mex.—Continued

	Thickness (feet)	Depth (feet)
Well S-14—Continued		
Sand, very fine, and some clay	20	360
Sand, medium to very coarse	60	420
Sand, medium to coarse	10	430
Sand, medium to coarse, and some clay	20	450
Sand, medium to coarse; some clay and caliche	10	460
Sand and clay	10	470
Sand, medium to coarse	10	480
Clay, pink, sandy, and some caliche	20	500
Clay, pink, sandy	20	520
Clay, buff, sandy	20	540
Clay, brown, sandy	29	569
Clay, brown	31	600
Sand, fine to medium, and some caliche	10	610
Clay, brownish-gray, sandy	10	620
Sandstone and gray shale	10	630
Shale, gray, sandy, and some caliche	20	650
Shale, gray, sandy	10	660
Sandstone and gray shale	20	680
Shale, sandy, very fine, and some gravel	30	710
Sand and very fine hard shale	7	717
Sandstone, very fine, and caliche	34	751
Sandstone, hard, and gravel	3	754
Sandstone and hard sandy clay	6	760
Clay, red, silty	17	777
Clay, red, silty, and gravel	17	794
Gravel, sand, and red clay	3	797
Shale, red, silty	23	820
Shale, red, silty, and caliche	10	830
Shale, red, sandy, and caliche	10	840
Shale, red, silty, and caliche	7	847
Shale, red, sandy	13	860
Shale, red, and caliche	20	880
Shale, red, sandy, and caliche	2	882
Gumbo, red	8	890
Shale, red, and caliche	10	900
Shale, red, sandy	20	920
Shale, red	10	930
Shale, red, sandy	20	950
Shale, red, silty	10	960
Shale, sandy, and caliche	20	980
Shale, red	20	1,000
Sand, very fine; shale and caliche	20	1,020
Shale, red, sandy	10	1,030
Sand, very fine; shale and caliche	20	1,050
Shale, red, sandy, and caliche	10	1,060
Shale, red	10	1,070
Sandstone, shale, and caliche	10	1,080
Shale, red, and caliche	10	1,090
Shale, sandy	10	1,100
Shale, red, and caliche	10	1,110
Sandstone, very fine	10	1,120
Shale, red sand, and caliche	23	1,143
Shale, red, hard	7	1,150
Shale, buff, hard	40	1,190
Shale, red, hard	10	1,200

Sample logs of wells in the Hueco Bolson area, El Paso County, Tex., and Dona Ana and Otero Counties, N. Mex.—Continued

	Thickness (feet)	Depth (feet)
Well V-33		
Owner: U. S. Geological Survey. Driller: B. & W. Drilling Co. of Texas		
Caliche and very fine sand	10	10
Sand, very fine	20	30
Sandstone, fine	20	50
Sand, fine, and caliche	10	60
Gravel, coarse; caliche and sand	10	70
Sandstone, fine	50	120
Sand, fine to medium, and caliche	20	140
Sand, coarse	10	150
Sand, coarse to medium	10	160
Sand, very coarse, and gravel	10	170
Sand, fine	10	180
Sand, fine, and clay	10	190
Sand, fine; clay and caliche	10	200
Clay, buff, sandy	27	227
Sand, very coarse	2	229
Clay, buff	13	242
Caliche, hard, and gravel	4	246
Gravel and fine sand	8	254
Gravel, coarse sand, and caliche	4	258
Caliche and fine sand	2	260
Shale, red	19	279
Clay, buff, and some gravel	20	299
Sand, coarse; clay and gravel	11	310
Clay, buff, sandy	10	320
Sand, coarse and gravel	10	330
Sand, fine	10	340
Clay, buff, sandy	10	350
Clay, buff	20	370
Clay, buff, and caliche	20	390
Clay, buff, sandy	15	405
Sand, fine, and buff clay	5	410
Clay, pink	40	450
Clay, pink, sandy	10	460
Clay, pink	100	560
Clay, pink, sandy	30	590
Clay, pink, sandy, and caliche	10	600
Clay, pink	15	615
Clay, pink, sandy, and some caliche	9	624
Clay, pink	6	630
Clay, pink, sandy	10	640
Clay, pink, and some caliche	10	650
Clay, pink, sandy	20	670
Clay, pink	10	680
Sand, fine, and red shale	10	690
Clay, pink	10	700
Shale, red	10	710
Clay, pink	10	720
Clay, pink, and some sandstone	10	730
Clay, pink	10	740
Sand, medium, and some clay	40	780
Sand, fine, and some clay	10	790
Clay, buff	20	810
Clay, gray	10	820
Clay, pink	40	860
Clay, pink, and some black shale	20	880
Shale, black, and red shale	19	899
Sand	6	905

Sample logs of wells in the Hueco Bolson area, El Paso County, Tex., and Dona Ana and Otero Counties, N. Mex.—Continued

	Thickness (feet)	Depth (feet)
Well W-1		
Owner: U. S, Geological Survey. Driller: B & W Drilling Co.		
Sand	5	5
Caliche	5	10
Gravel, sand, and caliche	15	25
Clay, red, and sand	5	30
Clay, red	10	40
Clay, red, and gravel	20	60
Gravel, coarse to medium; sand and clay	10	70
Gravel and coarse to medium sand	17	87
Clay, red	13	100
Clay, red; gravel and sand	7	107
Sand, fine to coarse, and gravel	23	130
Gravel, sand, and clay	10	140
Clay, red	9	149
Clay, red, and caliche	11	160
Clay, red, and gravel	10	170
Clay, red; sandstone and gravel	10	180
Gravel, coarse sand, and caliche	8	188
Clay, red, and some gravel	52	240
Sandstone, clay, gravel, and caliche	10	250
Clay, red; sandstone and gravel	10	260
Clay, red, sandy	10	270
Sand, clayey, fine to medium	14	284
Sand, gray, fine to medium, and caliche	20	304
Sand, gray, fine, and caliche	10	314
Sand, fine to coarse, and caliche	10	324
Sand, gray; gravel and gray clay	6	330
Sand, gray, fine, and caliche	6	336
Sand, gray, clayey, fine	10	346
Clay, gray, sandy	10	356
Sand, gray, fine	10	366
Clay, gray, sandy	10	376
Sand, gray, fine to medium	6	382
Sand, medium to coarse; some gravel and caliche	6	388
Sand, fine to coarse; caliche and clay	10	398
Sandstone, gray, and some gravel	10	408
Sand, red, silty	10	418
Sandstone, fine, silty, and some clay	20	438
Sand, gray, clayey, fine, and caliche	20	458
Sand, gray, fine	10	468
Clay, red, sandy	8	476
Clay, red, plastic	3	479
Clay, red, sandy	5	484
Sand, fine to coarse	10	494
Sand, gravel, and caliche	6	500
Sand, gray, medium	10	510
Sand, clayey, very fine	10	520
Sand, medium to coarse; gravel and caliche	8	528
Clay, red, sandy, and caliche	30	558
Clay, red, silty	30	588
Clay, red, sandy	30	618
Clay, red, sandy	30	648
Sand, gray, clayey, fine to medium	10	658
Clay, red, sandy	10	668
Clay, calcareous, silty, and fine sand	10	678
Sandstone, brownish-gray, clayey	10	688
Sand, gray, very fine	50	738
Sand, gray, very fine, and red clay	10	748
Sand, gray, and reddish-brown shale	20	768
Sand, gray, and red and green shale	10	778
Sand, gray, clayey, fine to medium	20	798
Sand, gray, fine to medium, and shale	10	808
Sand, gray, very fine	5	813

Sample logs of wells in the Hueco Bolson area, El Paso County, Tex., and Dona Ana and Otero Counties, N. Mex.—Continued

	Thickness (feet)	Depth (feet)
Well W-1—Continued		
Sand, gray, clayey, very fine	10	823
Sand, silty; brown shale and some gravel	10	833
Shale, red	50	883
Missing	17	900
Clay, buff, and coarse gravel	28	928
Clay, buff, and some pebbles	2	930
Clay, buff, and some gravel	20	950
Well W-4		
Owner: El Paso Natural Gas Co. Driller: Mountain Drilling Co.		
Missing	30	30
Sand, fine to medium, and caliche	10	40
Sand, very fine to fine	10	50
Sand, fine to medium, and caliche	10	60
Sand, fine to coarse, and caliche	10	70
Sand, fine to medium	20	90
Sand, medium to coarse	10	100
Sand, coarse to very coarse, and caliche	20	120
Sand, very fine to very coarse, and granules	10	130
Sand, very fine to very coarse	10	140
Sand, fine to medium	20	160
Sand, fine to medium, and caliche	20	180
Sand, very coarse; granules and caliche	10	190
Sand, fine to very coarse; granules and caliche	10	200
Sand, medium to coarse	10	210
Sand, fine to coarse	10	220
Sand, fine to very coarse; granules and caliche	10	230
Sand, fine to very coarse; granules, small pebbles, and caliche	10	240
Sand, fine to very fine, and granules	10	250
Sand, fine to very coarse	10	260
Sand, fine to coarse, and some caliche	10	270
Sandstone, caliche, and some fine sand	20	290
Sand, coarse; pebbles and brown clay	10	300
Sand, fine to medium	10	310
Sand, medium to coarse; granules and brown sandy clay	10	320
Sand, fine to medium, and caliche	10	330
Sand, fine to coarse; caliche and clay	10	340
Clay, brown, sandy; silt and caliche	20	360
Clay, brown, sandy; fine sand and caliche	10	370
Sand, fine, and caliche	10	380
Sand, very fine	10	390
Sand, fine, and caliche	10	400
Silt, some granules, and pebbles	20	420
Clay, silty	10	430
Sand, very fine to coarse, and some clay	10	440
Clay, reddish-brown, and some fine sand	10	450
Clay, brown, sandy	10	460
Clay, brown, silty	20	480
Clay, brown, silty, and caliche	20	500
Clay, brown, silty, granules, and caliche	10	510
Clay, brown, sandy, and caliche	10	520
Clay, red-brown, and fine sand	10	530
Clay, red-brown, and some caliche	10	540
Clay, red-brown	20	560
Clay, red-brown, and some caliche	10	570
Missing	26	596

Sample logs of wells in the Hueco Bolson area, El Paso County, Tex., and Dona Ana and Otero Counties, N. Mex.—Continued

	Thickness (feet)	Depth (feet)
Well W-5		
Owner: El Paso Natural Gas Co. Driller: Mountain Drilling Co.		
Missing	50	50
Sand, fine to very coarse; some granules and pebbles	10	60
Sand, fine to coarse; some granules and caliche	10	70
Sand, fine to very coarse	10	80
Sand, fine to very coarse, and some angular caliche	10	90
Sand, very fine, very coarse, and some clay	10	100
Sand, fine to coarse, and some angular caliche	10	110
Sand, very fine to medium, and some angular caliche	10	120
Sand, very coarse; granules and some clay	10	130
Sand, medium	10	140
Sand, medium to coarse, and some granules	10	150
Sand, fine to coarse, and some angular caliche	10	160
Sand, very coarse, very fine; some caliche and clay	10	170
Granules, pebbles, and caliche	10	180
Sand, very coarse; granules, some pebbles, and caliche	5	185
Sand, fine to coarse	5	190
Sand, fine to medium	10	200
Sand, very fine to medium	10	210
Sand, fine to coarse, and some angular caliche	30	240
Sand, very fine to coarse, and angular caliche	10	250
Sand, very coarse; granules and angular caliche	10	260
Sand, very coarse; granules, pebbles, some sandstone, and caliche	10	270
Sand, very coarse, and clay	10	280
Sand, fine to very coarse; caliche and some clay	10	290
Sand, fine to medium; some clay and angular caliche	10	300
Sand, fine to coarse; angular caliche and sandstone	10	310
Sand, fine to coarse; clay and sandstone	10	320
Sand, medium to coarse	10	330
Sand, fine to medium	10	340
Sand, fine; some coarse sand and clay	10	350
Sand, fine to coarse; some caliche and clay	10	360
Sand, fine to medium; some caliche and clay	10	370
Sand, fine to medium; caliche and sandstone	10	380
Sand, fine to very coarse; caliche and sandstone	10	390
Granules, caliche, and some very fine sand	10	400
Sand, very fine to medium, and some clay	10	410
Clay, tan, silt, and some granules	10	420
Clay, tan, soft; caliche and fine sand	10	430
Clay, tan; brown fine sand and some caliche	10	440
Clay, tan, sandy; fine sand and nodular caliche	10	450
Clay, red, brown, and some nodular caliche	10	460
Clay, tan	20	480
Sand, fine; some tan sandy clay and caliche	10	490
Clay, tan, sandy; some caliche and fine sand	10	500
Well X-1		
Owner: U. S. Geological Survey. Driller: B. & W. Drilling Co.		
Caliche	10	10
Caliche and some fine to medium sand	10	20
Granules, some medium to coarse sand, pebbles, and caliche	20	40
Granules, medium to coarse sand, pebbles, and caliche	20	60
Pebbles, fine to coarse sand, granules, and caliche	40	100
Sand, very fine to very coarse; granules and some pebbles	20	120
Sand, very fine to very coarse; granules, some pebbles, and clay	20	140
Sand, very fine to very coarse, and some granules	20	160
Sand, fine to coarse	40	200
Sand, fine to coarse; some silt and clay	20	220
Sand, fine to very coarse	10	230

Sample logs of wells in the Hueco Bolson area, El Paso County, Tex., and Dona Ana and Otero Counties, N. Mex.—Continued

	Thickness (feet)	Depth (feet)
Well X-1—Continued		
Sand, fine to coarse; some granules and caliche	20	250
Clay, sand, and caliche	20	270
Clay, some sand, and caliche	130	400
Clay, brown, sandy, and some caliche	150	550
Clay, brown, silty; some sand and caliche	20	570
Clay, brown, silty; sand and caliche	30	600
Clay, reddish-brown, silty; some sand and caliche	20	620
Clay, reddish-brown, silty	90	710
Clay, reddish-brown, silty, and some sand	40	750
Clay, light-brown, silty, and some sand	80	830
Clay, light-brown, sandy	10	840
Clay, light-brown, silty, and some sand	80	920
Clay, light-brown, silty; some sand and caliche	10	930
Clay, light-brown, silty, and some sand	10	940
Clay, light-brown, silty; some sand and caliche	10	950
Clay, light-brown, silty, and some sand	50	1,000
Clay, light-brown, silty, and limestone	10	1,010
Limestone, light-gray, dense	3	1,013
Well X-3		
Owner: Davis and McMillion. Driller: Tillery and Parks		
Missing	118	118
Limestone, black	34	152
Clay	18	170
Limestone, black	12	182
Shale, black	10	192
Shale, black, hard	8	200
Shale, black, and speckled ore	20	220
Shale, buff, and limestone	40	260
Shale, buff	13	273
Chert, buff	12	285
Shale, buff	15	300
Shale, buff, and buff limestone	15	315
Limestone, buff	15	330
Clay, buff	10	340
Clay, buff, and chert	14	354
Quartzite	76	430
Sand, quartz	10	440
Limestone, brown to dark-gray	10	450
Limestone, buff	35	485
Limestone, buff to pink	15	500
Limestone, buff	10	510
Limestone, buff to white	44	554
Quartzite, pink	6	560
Limestone, buff	8	568
Sand and limestone	7	575
Limestone, white	5	580
Limestone, white, and red quartzite	25	605
Limestone, white	208	813
Well X-9		
Owner: El Paso Natural Gas Co. Driller: Tillery & Parks		
Caliche	10	10
Caliche and gravel	30	40
Caliche, sand, and gravel	10	50
Sandstone and gravel	10	60
Clay, brown, and gravel	10	70

Sample logs of wells in the Hueco Bolson area, El Paso County, Tex., and Dona Ana and Otero Counties, N. Mex.—Continued

	Thickness (feet)	Depth (feet)
Well X-9—Continued		
Sand, fine; clay and gravel	20	90
Sand, fine	40	130
Gravel, coarse, and clay	20	150
Sand, fine, and gravel	15	165
Limestone, brown, hard	25	190
Limestone and brown clay	20	210
Limestone and caliche	10	220
Limestone and sand	10	230
Limestone and quartz	20	250
Limestone, brown, hard	26	276
Well X-10		
Owner: U. S. Geological Survey. Driller: B. & W. Drilling Co.		
Caliche, granules, clay, and sand	10	10
Sand, fine to very coarse; granules and pebbles	10	20
Sand, fine to very coarse, and some granules	10	30
Sand, medium, and some granules	10	40
Sand, medium	40	80
Clay, buff, sandy	10	90
Sand, fine to medium	100	190
Sand, fine to medium, and some clay	10	200
Sand, medium; some caliche and clay	40	240
Clay, buff, sandy	20	260
Clay, buff, and some sand	20	280
Clay, buff	10	290
Clay, buff; some sand and granules	20	310
Granules and some buff shale	10	320
Shale, buff, and some granules	10	330
Shale, buff, sandy	100	430
Sand, medium, and some clay	10	440
Clay, buff, sandy, and granules	20	460
Clay, buff, and some granules	10	470
Clay, buff, sandy, and some granules	30	500
Clay, buff, and some sand	10	510
Clay, buff	70	580
Clay, buff, sandy, and some granules	20	600
Clay, buff, and some sand	90	690
Sand, very fine to fine; some clay and caliche	10	700
Sand, very fine, and clay	20	720
Clay, buff; some caliche and sand	30	750
Clay, buff, sandy	100	850
Sand, fine, and some clay	10	860
Clay, sandy	40	900
Clay, gray, sandy, and some caliche	40	940
Sand, very fine to fine, and some clay	10	950
Clay, sandy	100	1,050
Clay, buff, sandy	40	1,090
No record	10	1,100

Drillers' logs of wells in the Hueco Bolson area, El Paso County, Tex., and Dona Ana and Otero Counties, N. Mex.

	Thickness (feet)	Depth (feet)		Thickness (feet)	Depth (feet)

Well K-15

Owner: U. S. Army

Sand	6	6	Sand and boulders	40	470
Caliche	2	8	Clay	6	476
Sand	73	81	Sand and boulders	24	500
Clay	39	120	Sand and gravel	9	509
Gravel	14	134	Clay, sandy	5	514
Clay	9	143	Sand, gravel, and boulders	15	529
Sand and boulders	57	200	Clay, sandy	12	541
Clay	8	208	Sand	32	573
Sand and gravel	22	230	Clay, sandy	16	589
Sand	34	264	Sand and boulders	18	607
Sand and gravel	17	281	Clay, sandy	12	619
Clay	4	285	Sand and gravel	11	630
Sand and boulders	11	296	Sand and clay	6	636
Sand and rock	3	299	Sand and boulders	26	662
Sand and boulders	20	319	Sand and gravel	11	673
Sand	10	329	Rock	2	675
Clay	3	332	Sand and clay	6	681
Sand and boulders	13	345	Sand and boulders	12	693
Clay	30	375	Clay, sandy	9	702
Sand and boulders	28	403	Sand rock	5	707
Sand and clay	7	410	Sand and boulders	67	774
Sand and boulders	11	421	Sand	20	794
Clay	9	430	Sand rock	4	798

Well L-7

Owner: U. S. Army. Driller: Layne-Texas Co., Ltd.

Sand	3	3	Clay	15	270
Caliche	2	5	Sand, hard, and gravel	23	293
Sand	21	26	Boulders	7	300
Clay	8	34	Clay and sand	9	309
Sand	20	54	Clay sandy	28	337
Sand and clay	68	122	Sand	32	369
Clay	31	153	Sand and clay	13	382
Sand	4	157	Clay	22	404
Clay	27	184	Sand, hard, and gravel	15	419
Shale	65	249	Sand and boulders	16	435
Sand and boulders	6	255	Shale, hard	4	439

Well L-8

Owner: U. S. Army. Driller: Layne-Texas Co., Ltd.

Sand, clay, and caliche	17	17	Clay and sand	10	318
Sand	13	30	Boulders	7	325
Sand and clay	21	51	Sand	29	354
Clay	31	82	Clay and sand	36	390
Sand and clay	90	172	Sand and clay	14	404
Clay	42	214	Boulders	8	412
Sand	52	266	Clay	10	422
Clay	12	278	Sand	14	436
Sand, hard, and gravel	18	296	Shale	4	440
Clay	12	308			

Drillers' logs of wells in the Hueco Bolson area, El Paso County, Tex., and Dona Ana and Otero Counties, N. Mex. —Continued

	Thickness (feet)	Depth (feet)		Thickness (feet)	Depth (feet)
Well R-2					
Owner: City of El Paso. Driller: C. R. Jensen					
Clay	20	20	Sand	71	647
Clay and gravel	17	37	Clay and boulders	2	649
Sand and gravel	40	77	Sand	35	684
Sand	20	97	Clay	15	699
Sand and gravel	29	126	Sand	23	722
Clay	2	128	Clay, sandy	4	726
Sand and gravel	23	151	Clay	11	737
Clay	16	167	Sand	49	786
Sand	14	181	Rock	1	787
Clay, sandy	14	195	Clay	15	802
Sand and boulders	4	199	Sand	16	818
Sand	17	216	Clay and boulders	2	820
Clay	5	221	Sand	27	847
Clay, sandy	15	236	Boulders	1	848
Clay	1	237	Clay	2	850
Clay, sandy	7	244	Clay, sandy	10	860
Sand	41	285	Sand	14	874
Clay	2	287	Clay	8	882
Sand	29	316	Sand	10	892
Clay	1	317	Clay, sandy	9	901
Clay, sandy	3	320	Sand	26	927
Sand	2	322	Clay, sandy	18	945
Clay	1	323	Sand	10	955
Sand	14	337	Clay	2	957
Clay, sandy	12	349	Sand	4	961
Sand	7	356	Sand and clay	7	968
Clay	19	375	Sand	5	973
Sand	29	404	Sand and clay	9	982
Clay	1	405	Rock	1	983
Sand	20	425	Sand	10	993
Clay	3	428	Sand and clay	4	997
Sand	90	518	Sand	5	1,002
Clay	10	528	Clay	7	1,009
Sand	46	574	Sand and clay	4	1,013
Clay	2	576	Clay	5	1,018
Well R-8					
Owner: El Paso Natural Gas Co. Driller: Folk and Bassett					
Soil	3	3	Rock, hard	17	297
Caliche	18	21	Sand and gravel	38	335
Sand	33	54	Sand	25	360
Sand and gravel	26	80	Rock	37	397
Sand, gravel, and some boulders	25	105	Sand and gravel	15	412
Sand	20	125	Rock	46	458
Sand and gravel	50	175	Gravel	46	504
Boulders	20	195	Rock, hard	66	570
Sand	15	210	Sand and gravel	60	630
Sand rock	18	228	Rock, hard	60	690
Sand and gravel	36	264	Sand and gravel	40	730
Sand and boulders	16	280	Rock, hard	22	752
			Sand and gravel	19	771

Drillers' logs of wells in the Hueco Bolson area, El Paso County, Tex., and Dona Ana and Otero Counties, N. Mex.—Continued

	Thickness (feet)	Depth (feet)		Thickness (feet)	Depth (feet)

Well R-10

Owner: City of El Paso. Driller: C. R. Jensen

Sand	20	20	Sand	17	466
Sand and gravel	67	87	Clay	14	480
Sand	60	147	Sand	9	489
Clay and boulders	8	155	Clay and boulders	2	491
Sand	12	167	Sand	15	506
Clay	22	189	Clay	5	511
Sand	33	222	Sand	24	535
Sand and clay	19	241	Clay	3	538
Sand	10	251	Sand	17	555
Sand and clay	6	257	Clay	6	561
Sand	39	296	Sand	4	565
Clay	4	300	Clay	2	567
Sand	7	307	Sand	11	578
Clay	5	312	Clay	8	586
Sand	11	323	Sand	25	611
Clay	6	329	Clay	6	617
Sand	5	334	Sand	6	623
Clay	6	340	Clay, sandy	3	626
Sand	31	371	Sand	8	634
Clay	6	377	Clay, sandy	3	637
Sand and clay	5	382	Clay	9	646
Sand	11	393	Sand	29	675
Boulders	1	394	Clay	6	681
Clay, sandy	5	399	Sand	14	695
Sand	12	411	Clay	4	699
Clay	10	421	Sand	16	715
Sand	8	429	Clay	16	731
Clay, sandy	4	433	Sand	9	740
Clay	16	449	Clay	48	788

Well R-11

Owner: City of El Paso. Driller: C. R. Jensen

Sand	2	2	Clay, sandy	7	407
Clay, red	3	5	Clay	6	413
Sand and gravel	82	87	Sand	7	420
Sand	58	145	Clay	1	421
Clay	4	149	Sand	9	430
Sand	31	180	Clay	5	435
Clay	2	182	Sand	22	457
Sand	39	221	Clay, sandy	15	472
Clay, sandy	20	241	Sand	18	490
Sand	7	248	Clay, sandy	7	497
Clay, sandy	9	257	Clay	3	500
Sand	14	271	Sand	23	523
Clay	6	277	Clay	3	526
Sand	5	282	Clay, sandy	13	539
Clay, sandy	5	287	Sand	3	542
Sand	27	314	Clay	12	554
Clay, sandy	3	317	Sand	23	577
Sand	6	323	Sand and hard clay	21	598
Clay	3	326	Clay	4	602
Sand	5	331	Sand	20	622
Clay	8	339	Rock and hard sand	1	623
Sand	29	368	Sand	6	629
Clay	2	370	Clay	8	637
Sand	3	373	Sand	32	669
Clay	2	375	Clay	8	677
Sand	14	389	Sand	13	690
Clay	11	400	Clay, sandy	19	709

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Drillers' logs of wells in the Hueco Bolson area, El Paso County, Tex., and Dona Ana and Otero Counties, N. Mex. —Continued

	Thickness (feet)	Depth (feet)		Thickness (feet)	Depth (feet)
Well R-11—Continued					
Sand	4	713	Sand	20	969
Clay	4	717	Clay	11	980
Sand	29	746	Sand	6	986
Clay	6	752	Clay	14	1,000
Sand	6	758	Sand	23	1,023
Clay	49	807	Clay	4	1,027
Sand	15	822	Sand	10	1,037
Clay	6	828	Clay	6	1,043
Clay, sandy	4	832	Sand	10	1,053
Clay	5	837	Clay	13	1,066
Sand	5	842	Sand	15	1,081
Clay	5	847	Clay	6	1,087
Sand	12	859	Sand	3	1,090
Clay	18	877	Clay	16	1,106
Clay, sandy	4	881	Sand	20	1,126
Sand	6	887	Clay	14	1,140
Clay	30	917	Sand	24	1,164
Clay and sand	9	926	Clay	16	1,180
Clay	13	939	Rock and hard sand	1	1,181
Sand	5	944	Sand	14	1,195
Clay	5	949	Clay	7	1,202
Well R-14					
Owner: J. K. Shearman. Driller: Layne-Texas Co., Ltd.					
Sand	3	3	Sand, hard	33	261
Clay and caliche	9	12	Clay	5	266
Sand and gravel	18	30	Sand, hard	54	320
Gravel	12	42	Clay	30	350
Clay	88	130	Sand	46	396
Sand	20	150	Clay	12	408
Clay	20	170	Sand	14	422
Sand, hard	29	199	Clay	12	434
Rock	1	200	Sand and gravel	81	515
Sand and boulders	28	228			
Well R-15					
Owner: U. S. Army. Driller: Layne-Texas Co., Ltd.					
Clay, sandy, and caliche	13	13	Shale, sand, and gravel	43	317
Sand and gravel	64	77	Sand	34	351
Clay	15	92	Sand, coarse; gravel and clay	34	385
Gravel and sand	65	157	Clay, sandy	23	408
Sand	28	185	Sand	33	441
Gravel and sand	15	200	Clay, red	9	450
Sand	74	274			
Well R-16					
Owner: U. S. Army. Driller: Layne-Texas Co., Ltd.					
Sand	4	4	Sand and clay	13	207
Gravel	10	14	Sand, gravel, and clay	30	237
Sand and gravel	64	78	Gravel and clay	6	243
Clay	12	90	Sand and gravel	41	284
Sand and gravel	37	127	Sand, clay, and gravel	12	296
Clay, sandy, and gravel	30	157	Clay, sandy, and gravel	14	310
Sand and gravel	37	194	Shale and gravel	3	313

Drillers' logs of wells in the Hueco Bolson area, El Paso County, Tex., and Dona Ana and Otero Counties, N. Mex. —Continued

	Thickness (feet)	Depth (feet)		Thickness (feet)	Depth (feet)
Well R-16—Continued					
Clay, sandy, and gravel	57	370	Clay	6	452
Sand and gravel	23	393	Clay, sandy	16	468
Shale	12	405	Sand	23	491
Shale, sandy, hard, and caliche	41	446	Sand	14	505
			Sand and sand rock	45	550
Well R-17					
Owner: City of El Paso. Driller: C. R. Jensen					
Sand	2	2	Sand	31	539
Caliche	13	15	Boulders	4	543
Sand and gravel	18	33	Sand	17	560
Clay	16	49	Rock	1	561
Sand and clay	13	62	Sand	16	577
Clay	10	72	Clay, sandy	2	579
Sand and gravel	8	80	Clay	13	592
Clay	49	129	Boulders	1	593
Sand and clay	24	153	Clay	10	603
Clay	16	169	Sand	6	609
Sand	18	187	Clay	5	614
Clay, sandy	19	206	Clay, sandy	4	618
Sand	2	208	Sand	8	626
Clay	2	210	Clay	3	629
Sand	23	233	Sand	3	632
Clay	19	252	Clay	19	651
Clay, sandy	15	267	Sand	28	679
Clay	6	273	Clay	2	681
Clay, sandy	9	282	Sand	19	700
Clay	11	293	Clay	12	712
Clay, sandy	6	299	Sand	14	726
Clay	18	317	Boulders	2	728
Clay, sandy	5	322	Sand	5	733
Sand	10	332	Clay	2	735
Clay	1	333	Sand	38	773
Sand	5	338	Clay	15	788
Clay	1	339	Sand	40	828
Sand	2	341	Clay	5	833
Clay	3	344	Sand	32	865
Clay, sandy	7	351	Clay	1	866
Clay	6	357	Sand	3	869
Sand	24	381	Clay	4	873
Clay	14	395	Sand	11	884
Sand	10	405	Clay	15	899
Clay	8	413	Clay, sandy	12	911
Sand	15	428	Clay	3	914
Clay	1	429	Sand	17	931
Sand	9	438	Clay	3	934
Clay	11	449	Sand	30	964
Sand	41	490	Clay	7	971
Clay	10	500	Sand	16	987
Sand	4	504	Clay	3	990
Clay, sandy	4	508			

Drillers' logs of wells in the Hueco Bolson area, El Paso County, Tex., and Dona Ana and Otero Counties, N. Mex. —Continued

	Thickness (feet)	Depth (feet)		Thickness (feet)	Depth (feet)
Well R-18					
Owner: City of El Paso. Driller: C. R. Jensen					
Sand	2	2	Clay	7	561
Caliche	9	11	Sand	4	565
Sand and gravel	17	28	Clay	2	567
Clay	83	111	Sand	6	573
Sand	5	116	Clay	3	576
Clay	6	122	Sand	7	583
Sand	13	135	Clay	4	587
Clay	40	175	Sand	13	600
Sand	12	187	Clay	8	608
Clay	3	190	Sand	42	650
Sand	32	222	Clay	12	662
Clay	11	233	Sand	5	667
Sand	66	299	Clay	7	674
Clay	1	300	Sand	27	701
Clay, sandy	2	302	Clay	19	720
Clay	2	304	Sand	12	732
Clay, sandy	4	308	Clay	2	734
Clay	7	315	Sand	42	776
Clay, sandy	8	323	Clay and boulders	1	777
Clay	6	329	Clay	5	782
Sand	17	346	Sand	4	786
Clay	4	350	Clay	7	793
Sand	3	353	Sand	15	808
Clay	4	357	Clay	14	822
Sand	7	364	Sand	13	835
Clay	12	376	Clay	7	842
Sand	11	387	Sand	34	876
Clay	16	403	Clay	3	879
Sand	43	446	Sand	23	902
Clay	12	458	Clay and boulders	23	925
Sand	51	509	Sand	27	952
Clay	11	520	Clay	5	957
Sand	34	554			
Well R-20					
Owner: City of El Paso. Driller: C. R. Jensen					
Sand	3	3	Sand	18	285
Caliche	5	8	Clay	2	287
Sand	21	29	Sand	26	313
Gravel	2	31	Clay	7	320
Clay, sand	7	38	Sand	43	363
Sand and gravel	12	50	Clay	17	380
Clay, sandy	7	57	Sand	25	405
Clay	6	63	Clay, sand	4	409
Sand	14	77	Sand	53	462
Clay	16	93	Boulders and sand	2	464
Sand	29	122	Sand	15	479
Clay	6	128	Clay	6	485
Sand	9	137	Clay and sand	4	489
Gravel	5	142	Sand	16	505
Clay	13	155	Clay	3	508
Sand	13	168	Sand	9	517
Clay	3	171	Clay	3	520
Sand	36	207	Sand	12	532
Clay, sandy	7	214	Clay	3	535
Clay	22	236	Sand and clay	1	536
Sand	21	257	Sand	39	575
Clay	3	260	Clay	3	578
Clay, sandy	7	267	Clay, sandy	2	580

Drillers' logs of wells in the Hueco Bolson area, El Paso County, Tex., and Dona Ana and Otero Counties, N. Mex. —Continued

	Thickness (feet)	Depth (feet)		Thickness (feet)	Depth (feet)
Well R-20—Continued					
Sand	4	584	Sand	25	874
Rock	3	587	Clay	9	883
Sand and boulders	7	594	Sand	9	892
Clay	10	604	Clay	7	899
Sand	26	630	Sand	17	916
Clay	27	657	Clay	6	922
Clay, sandy	10	667	Sand	5	927
Sand	49	716	Clay	4	931
Clay	18	734	Sand	7	938
Sand	62	796	Clay	14	952
Clay	3	799	Sand	13	965
Sand	17	816	Sand and clay	2	967
Clay	1	817	Clay	5	972
Sand	13	830	Sand	29	1,001
Clay	19	849	Clay	6	1,007
Well R-22					
Owner: City of El Paso. Driller: H. M. Stanley					
Clay	4	4	Gravel	1	254
Clay, sandy	6	10	Sand, clayey, silty	39	293
Sand, coarse	36	46	Sand, fine	30	323
Clay	2	48	Sand, coarse	13	336
Gravel	24	72	Clay and sand	24	360
Clay	11	83	Sand, fine	23	383
Sand	3	86	Sand	5	388
Sand, coarse, and gravel	24	110	Clay, sand, and gravel	3	391
Clay	9	119	Clay, sandy, and sand	8	399
Sand and gravel	23	142	Clay, sandy	15	414
Clay	6	148	Clay	7	421
Sand and gravel	23	171	Sand, medium	11	432
Clay	19	190	Clay	7	439
Sand	14	204	Clay, sandy	5	444
Sand and gravel	13	217	Sand	3	447
Clay	3	220	Clay, sandy	13	460
Sand and gravel	4	224	Sand and gravel	4	464
Clay	15	239	Clay, sandy	17	481
Sand	3	242	Sand	9	490
Clay, sandy	6	248	Clay	2	492
Clay	5	253	Sand, coarse	8	500
Well R-23					
Owner: City of El Paso. Driller: Layne-Texas Co., Ltd.					
Sand	2	2	Clay	10	220
Clay, red	5	7	Sand	37	257
Sand and gravel	25	32	Clay	10	267
Clay	1	33	Sand	21	288
Sand and gravel	36	69	Clay and boulders	9	297
Clay	9	78	Sand	24	321
Sand	45	82	Clay and boulders	16	337
Clay	6	88	Sand	3	340
Sand	18	106	Rock	1	341
Clay	8	114	Clay	6	347
Sand	57	171	Sand	5	352
Clay	12	183	Clay	7	359
Sand	12	195	Sand	14	373
Clay	2	197	Clay	4	377
Sand and clay	7	204	Sand	5	382
Sand	6	210	Sand and clay	12	394

Drillers' logs of wells in the Hueco Bolson area, El Paso County, Tex., and Dona Ana and Otero Counties, N. Mex. —Continued

	Thickness (feet)	Depth (feet)		Thickness (feet)	Depth (feet)
Well R-23—Continued					
Sand	20	414	Sand, hard	20	777
Rock	1	415	Sand	10	787
Sand	8	423	Clay	15	802
Clay	14	437	Sand	5	807
Clay and sand	17	454	Clay	3	810
Sand	15	469	Sand	22	832
Rock	1	470	Clay	5	837
Sand	14	484	Sand and clay	19	856
Clay	7	491	Clay	21	877
Sand	21	512	Sand and clay	17	894
Clay	5	517	Sand	3	897
Sand and clay	16	533	Sand and clay	30	927
Sand	52	585	Clay	10	937
Clay	5	590	Sand and clay	15	952
Sand	19	609	Sand	10	962
Boulders	2	611	Clay	15	977
Sand	6	617	Sand and clay	32	1,009
Clay	9	626	Sand	18	1,027
Sand	11	637	Sand and clay	39	1,066
Clay	20	657	Clay	6	1,072
Sand and clay	15	672	Sand and clay	25	1,097
Clay	14	686	Clay	15	1,112
Sand	11	697	Sand and clay	5	1,117
Sand and clay	15	712	Sand	10	1,127
Sand	9	721	Clay	5	1,132
Clay	26	747	Sand and clay	25	1,157
Rock	1	748	Clay	20	1,177
Sand	9	757			

Well R-29[1]

Owner: City of El Paso. Driller: Layne-Texas Co., Ltd.

Soil	6	6	Sand	9	432
Sand	14	20	Clay	15	447
Sand and gravel	22	42	Sand	24	471
Sand and clay	6	48	Clay	13	484
Sand and gravel	24	72	Sand	29	513
Clay	5	77	Clay	6	519
Sand and gravel	45	122	Sand	22	541
Clay	15	137	Clay	16	557
Sand	35	172	Clay, sandy	14	571
Clay	11	183	Sand	8	579
Sand	30	213	Rock	2	581
Clay	10	223	Sand	43	624
Sand	10	233	Clay and boulders	13	637
Clay	10	243	Sand	17	654
Sand	8	251	Clay	10	664
Sand and boulders	3	254	Sand	36	700
Sand	8	262	Clay	13	713
Clay	4	266	Sand	4	717
Sand	17	283	Clay, sandy	35	752
Clay	14	297	Pack sand	19	771
Sand	10	307	Clay	2	773
Clay	5	312	Sand	8	781
Sand	11	323	Clay	2	783
Clay	14	337	Sand and clay	9	792
Sand	23	360	Clay and boulders	5	797
Clay	4	364	Pack sand	15	812
Sand	21	385	Clay	5	817
Clay	4	389	Sand	14	831
Sand	32	421	Clay	16	847
Clay	2	423	Sand and clay	5	852

[1]Drillers' log is for test well drilled in 1939 at same location as well R-29.

Drillers' logs of wells in the Hueco Bolson area, El Paso County, Tex., and Dona Ana and Otero Counties, N. Mex. —Continued

Well R-29—Continued

	Thickness (feet)	Depth (feet)		Thickness (feet)	Depth (feet)
Clay	15	867	Sand	10	1,016
Sand	16	883	Clay and boulders	17	1,033
Clay	4	887	Sand	10	1,043
Sand	10	897	Sand and clay	24	1,067
Rock	2	899	Pack sand	21	1,088
Sand	3	902	Clay	15	1,103
Rock	2	904	Sand	3	1,106
Sand	6	910	Rock	1	1,107
Rock	1	911	Pack sand	22	1,129
Sand	12	923	Clay	8	1,137
Clay	18	941	Pack sand	34	1,171
Sand	36	977	Sand and clay	13	1,184
Sand, clay, and boulders	20	997	Sand	19	1,203
Clay	9	1,006	Clay	3	1,206

Well R-31[1]

Owner: City of El Paso. Driller: C. R. Jensen

Sand	1	1	Clay	5	668
Clay	5	6	Sand	5	673
Sand	14	20	Clay	4	677
Sand and gravel	37	57	Sand	20	697
Sand	8	65	Clay	31	728
Clay	6	71	Sand	2	730
Sand	15	86	Rock	1	731
Clay	4	90	Sand	33	764
Sand	18	108	Clay	3	767
Clay	13	121	Sand	22	789
Sand	32	153	Clay	28	817
Clay	24	177	Sand	8	825
Sand	10	187	Clay	14	839
Clay	9	196	Sand	13	852
Sand	5	201	Clay	5	857
Clay	5	206	Clay, sandy	16	873
Sand	20	226	Clay and boulders	19	892
Clay	11	237	Clay	5	897
Sand and clay	16	253	Sand	20	917
Clay	4	257	Clay	10	927
Sand	27	284	Sand	7	934
Clay	16	300	Clay	11	945
Sand	47	347	Sand	36	981
Clay	7	354	Clay and boulders	16	997
Sand	23	377	Clay	20	1,017
Clay	16	393	Sand and clay	40	1,057
Sand	7	400	Clay	50	1,107
Clay	4	404	Sand	8	1,115
Sand	3	407	Clay	15	1,130
Boulders	2	409	Rock	4	1,134
Sand	60	469	Clay, sandy	43	1,177
Clay	34	503	Clay	20	1,197
Sand	20	523	Clay and boulders	15	1,212
Clay	14	537	Sand	14	1,226
Sand	24	561	Rock	1	1,227
Clay, sandy	16	577	Sand and clay	45	1,272
Clay	4	581	Sand	5	1,277
Sand and clay	12	593	Sand and clay	20	1,297
Clay	6	599	Sand	8	1,305
Sand	12	611	Clay	32	1,337
Clay	14	625	Clay, sandy	20	1,357
Sand	38	663			

[1]Drillers' log is for test well drilled in 1939 at same location as well R-31.

Drillers' logs of wells in the Hueco Bolson area, El Paso County, Tex., and Dona Ana and Otero Counties, N. Mex. —Continued

	Thickness (feet)	Depth (feet)		Thickness (feet)	Depth (feet)
Well R-33					
Owner: City of El Paso. Driller: C. R. Jensen					
Sand	1	1	Clay	7	630
Clay	5	6	Sand	24	654
Sand and gravel	4	10	Clay	3	657
Sand and clay	27	37	Sand	9	666
Sand and gravel	20	57	Clay	15	681
Clay, sandy	10	67	Sand	16	697
Clay	10	77	Clay	10	707
Clay and gravel	20	97	Sand	30	737
Sand and gravel	14	111	Clay	25	762
Clay	18	129	Sand and clay	10	772
Sand	48	177	Sand	40	812
Clay	4	181	Clay	9	821
Sand	42	223	Sand	12	833
Clay	4	227	Clay	13	846
Sand	20	247	Sand	11	857
Clay, sandy	10	257	Clay	4	861
Clay	5	262	Sand	11	872
Sand	13	275	Clay	15	887
Clay	46	321	Clay, sandy	10	897
Sand	10	331	Clay and boulders	20	917
Clay	4	335	Clay	22	939
Sand	51	386	Sand	13	952
Clay	7	393	Clay	40	992
Sand	63	456	Sand	5	997
Rock	1	457	Clay, sandy	30	1,027
Sand	29	486	Clay	30	1,057
Clay	17	503	Sand	16	1,073
Sand	9	512	Clay	4	1,077
Clay	7	519	Sand	10	1,087
Sand	4	523	Clay	10	1,097
Clay	17	540	Sand	14	1,111
Sand	20	560	Clay	14	1,125
Clay	6	566	Sand	5	1,130
Sand	10	576	Clay	29	1,159
Clay	16	592	Sand	28	1,187
Sand	12	604	Clay	15	1,202
Clay	8	612	Sand	15	1,217
Sand	11	623			
Well R-34[1]					
Owner: City of El Paso. Driller: Layne-Texas Co., Ltd.					
Clay	16	16	Clay	31	272
Sand and gravel	31	47	Sand	7	279
Sand	10	57	Clay	15	294
Sand and clay	14	71	Sand	7	301
Sand	22	93	Clay	7	308
Clay	28	121	Sand	4	312
Sand	12	133	Clay	4	316
Clay	9	142	Sand	1	317
Sand	13	155	Clay	13	330
Clay	13	168	Sand	62	392
Sand	19	187	Clay	9	401
Clay	6	193	Sand	29	430
Sand	6	199	Clay	10	440
Clay	8	207	Sand	32	472
Sand	7	214	Clay	8	480
Clay	6	220	Sand	19	499
Sand	21	241	Clay	9	508

[1]Drillers' log is for test well drilled in 1939 at same location as well R-34.

Drillers' logs of wells in the Hueco Bolson area, El Paso County, Tex., and Dona Ana and Otero Counties, N. Mex. —Continued

Well R-34 —Continued

	Thickness (feet)	Depth (feet)		Thickness (feet)	Depth (feet)
Sand	6	514	Sand	5	884
Clay	6	520	Clay	41	925
Sand	20	540	Sand	8	933
Clay	13	553	Clay	34	967
Sand	27	580	Sand	14	981
Clay	20	600	Sand and clay	11	992
Sand	30	630	Sand	14	1,006
Clay	14	644	Clay	36	1,042
Sand	3	647	Sand	16	1,058
Rock	1	648	Rock	1	1,059
Clay	19	667	Sand	18	1,077
Sand	5	672	Rock	1	1,078
Clay	35	707	Sand	12	1,090
Sand	6	713	Clay	14	1,104
Clay	34	747	Sand	6	1,110
Sand and clay	6	753	Clay	33	1,143
Sand	60	813	Sand	24	1,167
Clay	14	827	Clay	24	1,191
Sand	10	837	Rock	1	1,192
Clay	5	842	Sand	2	1,194
Sand	5	847	Clay	3	1,197
Clay	32	879	Sand and clay	20	1,217

Well R-39

Owner: City of El Paso. Driller: C. R. Jensen

Sand	5	5	Clay	8	524
Boulders	1	6	Sand	22	546
Clay	12	18	Clay	11	557
Sand and gravel	23	41	Sand	12	569
Clay	16	57	Clay	3	572
Sand and clay	20	77	Sand	18	590
Sand	10	87	Clay	20	610
Clay	10	97	Sand	37	647
Sand and clay	36	133	Clay	2	649
Clay	7	140	Sand	8	657
Sand and clay	37	177	Clay	34	691
Clay	10	187	Sand	4	695
Sand	22	209	Clay	7	702
Clay	28	237	Sand	20	722
Sand	14	251	Clay	11	733
Boulders	1	252	Sand	9	742
Clay	25	277	Clay	25	767
Sand	6	283	Sand	25	792
Clay	24	307	Clay	9	801
Sand	13	320	Sand	5	806
Clay	5	325	Clay	6	812
Clay, sandy	12	337	Sand	24	836
Sand	16	353	Clay	79	915
Clay	34	387	Sand	6	921
Sand	6	393	Clay	60	981
Clay	9	402	Sand	8	989
Sand	12	414	Rock	1	990
Clay	3	417	Sand	27	1,017
Sand	10	427	Clay	55	1,072
Clay, sandy	7	434	Sand	5	1,077
Clay	8	442	Clay and boulders	5	1,082
Sand	5	447	Clay	10	1,092
Clay	34	481	Sand	11	1,103
Sand	14	495	Clay	14	1,117
Clay	11	506	Sand	13	1,130
Sand	10	516	Clay	7	1,137

Drillers' logs of wells in the Hueco Bolson area, El Paso County, Tex., and Dona Ana and Otero Counties, N. Mex. —Continued

	Thickness (feet)	Depth (feet)		Thickness (feet)	Depth (feet)
Well R-40[1]					
Owner: City of El Paso. Driller: Layne-Texas Co., Ltd.					
Sand	2	2	Clay	6	657
Caliche	3	5	Sand	8	665
Clay, sandy	12	17	Clay	42	707
Sand	3	20	Sand	32	739
Sand and gravel	8	28	Clay	29	768
Sand and clay	8	36	Sand	4	772
Sand and gravel	16	52	Clay	4	776
Clay	12	64	Sand	12	788
Sand	16	80	Clay	23	811
Clay	22	102	Sand	16	827
Sand	31	133	Boulders	2	829
Clay	6	139	Sand	12	841
Sand	44	183	Sand and clay	16	857
Clay	2	185	Clay	36	893
Sand	40	225	Sand	4	897
Clay	12	237	Clay	25	922
Sand	23	260	Sand	10	932
Clay	17	277	Clay	5	937
Sand	16	293	Sand	2	939
Clay	8	301	Clay	3	942
Sand	26	327	Sand	5	947
Clay	4	331	Clay	10	957
Sand	25	356	Sand and clay	20	977
Clay	10	366	Sand	22	999
Sand	15	381	Clay	3	1,002
Clay	26	407	Sand	10	1,012
Sand	6	413	Clay	20	1,032
Clay	6	419	Sand	5	1,037
Sand	9	428	Sand and clay	30	1,067
Clay	4	432	Sand	14	1,081
Sand	5	437	Rock	1	1,082
Clay	20	457	Sand	3	1,085
Sand	5	462	Rock	1	1,086
Clay	25	487	Clay	6	1,092
Sand	10	497	Sand	9	1,101
Clay	31	528	Clay	16	1,117
Sand	21	549	Sand	16	1,133
Clay	12	561	Clay	22	1,155
Sand	20	581	Sand	14	1,169
Clay	16	597	Clay	28	1,197
Sand	6	603	Sand and clay	30	1,227
Clay	38	641	Sand	3	1,230
Sand	10	651	Sand and clay	7	1,237

[1]Drillers' log is for test well drilled in 1939 at same location as well R-40.

Well R-42

Owner: City of El Paso. Driller: C. R. Jensen

Soil	3	3	Clay	21	187
Caliche	7	10	Sand	30	217
Sand and gravel	57	67	Clay	4	221
Sand	10	77	Sand	8	229
Sand and gravel	10	87	Clay	18	247
Sand and clay	10	97	Sand	17	264
Clay	8	105	Clay	41	305
Sand	34	139	Sand	12	317
Clay	7	146	Clay	10	327
Sand	16	162	Sand	37	364
Clay and boulders	4	166	Clay	8	372

Drillers' logs of wells in the Hueco Bolson area, El Paso County, Tex., and Dona Ana and Otero Counties, N. Mex. —Continued

	Thickness (feet)	Depth (feet)		Thickness (feet)	Depth (feet)
Well R-42—Continued					
Sand	45	417	Sand	28	767
Clay	5	422	Clay	18	785
Sand	10	432	Sand	14	799
Clay	62	494	Clay	35	834
Sand	13	507	Sand	19	853
Clay	5	512	Clay	62	915
Sand	10	522	Sand	10	925
Clay	6	528	Clay	8	933
Sand	14	542	Sand	4	937
Clay	1	543	Clay	20	957
Sand	4	547	Sand and clay	20	977
Sand and clay	10	557	Clay	5	982
Sand	10	567	Sand	52	1,034
Clay	10	577	Clay	15	1,049
Sand	16	593	Sand and clay	12	1,061
Clay	18	611	Clay	16	1,077
Rock	1	612	Clay, sandy	45	1,122
Sand	7	619	Sand	23	1,145
Sand and clay	18	637	Sand and clay	12	1,157
Clay	57	694	Clay	35	1,192
Sand	23	717	Sand	8	1,200
Clay	10	727	Clay	37	1,237
Sand	4	731	Clay, sandy	20	1,257
Clay	8	739			

Well R-49

Owner: U. S. Army. Driller: Layne-Texas Co., Ltd.

Sand	2	2	Clay	6	120
Clay, red, and caliche	11	13	Sand and gravel	29	149
Gravel	24	37	Clay, red	21	170
Clay, red	5	42	Sand and gravel	100	270
Sand and gravel	17	59	Clay and sand	8	278
Clay and sand	3	62	Sand and gravel	49	327
Sand and gravel	16	78	Clay, sandy	20	347
Clay and sand	7	85	Sand and gravel	28	375
Sand	29	114	Sand and clay	29	404

Well R-50

Owner: City of El Paso. Driller: C. R. Jensen

Soil, sandy	3	3	Sand	7	264
Caliche	4	7	Clay	4	268
Sand	30	37	Sand	27	295
Clay	5	42	Clay	18	313
Sand	4	46	Sand	3	316
Clay	11	57	Clay	9	325
Sand	21	78	Sand	2	327
Clay	6	84	Clay	10	337
Sand and gravel	19	103	Sand	2	339
Clay	10	113	Clay	18	357
Sand	10	123	Sand	50	407
Clay	81	204	Clay	4	411
Sand	2	206	Sand	4	415
Clay	9	215	Clay	4	419
Sand	26	241	Sand	27	446
Clay	4	245	Clay	41	487
Sand	10	255	Sand	22	509
Clay	2	257	Clay	6	515

Drillers' logs of wells in the Hueco Bolson area, El Paso County, Tex., and Dona Ana and Otero Counties, N. Mex. —Continued

	Thickness (feet)	Depth (feet)		Thickness (feet)	Depth (feet)
Well R-50—Continued					
Clay, sandy	5	520	Clay	21	701
Sand	35	555	Sand	35	736
Clay	30	585	Clay	23	759
Sand	21	606	Sand	56	815
Clay	8	614	Clay	11	826
Sand	21	635	Sand	14	840
Clay	3	638	Clay	2	842
Clay, sandy	1	639	Sand	10	852
Sand	3	642	Clay	20	872
Clay	2	644	Sand	24	896
Sand	17	661	Clay, sandy	11	907
Clay	1	662	Clay	4	911
Sand	13	675	Sand	19	930
Clay	2	677	Clay	20	950
Sand	3	680			
Well R-51					
Owner: U. S. Army. Driller: Bassett Drilling Co.					
Caliche, gravel, and sand	52	52	Sand and gravel	70	480
Sand and gravel	78	130	Clay and rock	30	510
Clay and rock	31	161	Sand and gravel	20	530
Sand	25	186	Clay and gravel	19	549
Clay	22	208	Clay	38	587
Sand	13	221	Boulders and gravel	4	591
Clay	2	223	Gravel	28	619
Sand and gravel	7	230	Clay and gravel	17	636
Missing	10	240	Sand and gravel	14	650
Sand	28	268	Boulders and gravel	10	760
Clay and rock	22	290	Sand and gravel	20	780
Sand and gravel	89	379	Clay and gravel	93	873
Clay and gravel	4	383	Clay and rock	47	920
Sand	27	410			
Well R-53					
Owner: City of El Paso. Driller: Layne-Texas Co., Ltd.					
Soil	8	8	Boulders	1	355
Sand and caliche	17	25	Sand, packed, and clay	76	431
Sand and gravel	27	52	Clay	70	501
Clay	12	64	Sand, packed	43	544
Sand	9	73	Sand, packed, and clay	5	549
Clay	65	138	Clay, hard	12	561
Sand and gravel	55	193	Sand, packed, and clay	26	587
Clay	2	195	Clay, soft	22	609
Sand and gravel	22	217	Shale, hard	28	637
Clay	17	234	Sand	12	649
Sand	2	236	Shale, sandy	31	680
Clay, sandy	30	266	Rock	1	681
Clay	64	330	Shale, sandy	38	719
Sand	12	342	Shale	41	760
Sand	2	344	Sand	33	793
Clay, sandy	10	354	Shale	7	800

Drillers' logs of wells in the Hueco Bolson area, El Paso County, Tex., and Dona Ana and Otero Counties, N. Mex. —Continued

	Thickness (feet)	Depth (feet)		Thickness (feet)	Depth (feet)

Well R-54

Owner: City of El Paso. Driller: Layne-Texas Co., Ltd.

Clay	20	20	Clay and boulders	5	400
Sand	26	46	Clay	6	406
Sand, packed	114	160	Clay and sand	34	440
Clay and gravel	19	179	Clay	14	454
Sand, packed	92	271	Rock	1	455
Clay	25	296	Clay and boulders	90	545
Clay, sandy	6	302	Clay	31	576
Clay	42	344	Boulders and clay	9	585
Sand	10	354	Clay	33	618
Clay and sand	14	368	Clay, sand	12	630
Sand	6	374	Rock	1	631
Sand, fine	21	395	Clay	67	698

Well R-55

Owner: City of El Paso. Driller: Layne-Texas, Co., Ltd.

Soil	14	14	Clay and boulders	19	389
Sand and caliche	4	18	Clay, sandy	56	445
Sand	34	52	Clay	6	451
Clay and gravel	6	58	Clay, sandy	14	465
Clay	17	75	Clay and boulders	18	483
Sand, packed	67	142	Sand	3	486
Clay and sand	37	179	Sand, hard, and shale	19	505
Clay	25	204	Shale, sandy	27	532
Sand	16	220	Shale, hard	62	594
Clay	4	224	Shale, sandy, and boulders	11	605
Clay and sand	30	254	Sand, packed	10	615
Clay, sandy	51	305	Boulders	2	617
Sand	14	319	Rock	1	618
Clay	15	334	Shale, hard, and sand	40	658
Sand	18	352	Shale, hard	41	699
Clay and boulders	13	365	Shale, sandy	61	760
Sand	5	370	Shale	70	830

Well R-56[1]

Owner: City of El Paso. Driller: Layne-Texas Co., Ltd.

Sand and clay	4	4	Clay and sand	14	277
Sand and caliche	11	15	Sand	5	282
Gravel	5	20	Clay	18	300
Clay	7	27	Sand	7	307
Sand and gravel	14	41	Clay	13	320
Clay	25	66	Sand	17	337
Sand and gravel	19	85	Clay	9	346
Clay	8	93	Sand	15	361
Sand and gravel	4	97	Clay	11	372
Gravel	2	99	Sand	8	380
Clay	4	103	Clay	13	393
Sand and gravel	4	107	Sand	34	427
Sand	10	117	Clay	28	455
Clay	4	121	Sand	4	459
Sand	16	137	Clay	16	475
Sand and clay	20	157	Sand	17	492
Clay	20	177	Clay	14	506
Sand and clay	20	197	Sand	5	511
Sand	8	205	Clay	18	529
Clay	14	219	Sand	14	543
Sand	44	263	Clay	6	549

[1]Drillers' log is for test well drilled in 1939 at same location as well R-56.

Drillers' logs of wells in the Hueco Bolson area, El Paso County, Tex., and Dona Ana and Otero Counties, N. Mex.—Continued

Well R-56 —Continued

	Thickness (feet)	Depth (feet)		Thickness (feet)	Depth (feet)
Sand	26	575	Sand	25	992
Sand rock	1	576	Sand and boulders	12	1,004
Sand	9	585	Clay	25	1,029
Clay	16	601	Sand	4	1,033
Sand	7	608	Clay	59	1,092
Clay	47	655	Sand	17	1,109
Sand	10	665	Clay	40	1,149
Clay	17	682	Sand	4	1,153
Sand	15	697	Clay	34	1,187
Clay	18	715	Sand	15	1,202
Sand	22	737	Sand and clay	11	1,213
Sand rock	10	747	Clay	9	1,222
Clay	12	759	Sand	7	1,229
Sand	9	768	Clay	2	1,231
Clay	9	777	Sand	6	1,237
Clay and boulders	25	802	Clay	70	1,307
Sand and boulders	15	817	Sand	9	1,316
Clay	27	844	Boulders	3	1,319
Sand	3	847	Sand	10	1,329
Clay	7	854	Clay	12	1,341
Sand	2	856	Sand	21	1,362
Clay	26	882	Sand and clay	75	1,437
Sand	27	909	Clay	20	1,457
Clay	58	967	Clay, sandy	10	1,467

Well S-7

Owner: City of El Paso. Driller: C. R. Jensen

Sand	4	4	Sand	8	467
Caliche	20	24	Clay	3	470
Clay	5	29	Sand	3	473
Sand and gravel	8	37	Clay	43	516
Sand	90	127	Sand	3	519
Clay	16	143	Clay	5	524
Sand	10	153	Sand	59	583
Clay	3	156	Clay	10	593
Sand	13	169	Sand	33	626
Clay	2	171	Clay	1	627
Sand	4	175	Sand	14	641
Clay	25	200	Clay	7	648
Sand	31	231	Sand	5	653
Clay	8	239	Clay	2	655
Sand	6	245	Sand	8	663
Clay	10	255	Clay	8	671
Sand	31	286	Sand	3	674
Clay	7	293	Clay	2	676
Clay and boulders	2	295	Sand	19	695
Sand	26	321	Clay	1	696
Clay and boulders	9	330	Sand	18	714
Sand	66	396	Clay	6	720
Rock	1	397	Sand	3	723
Clay	1	398	Clay	5	728
Clay and boulders	3	401	Sand	18	746
Clay	1	402	Clay	14	770
Sand	26	428	Sand	11	771
Boulders	1	429	Clay	4	775
Sand	6	435	Sand	18	793
Sand and boulders	14	449	Clay	2	795
Clay	10	459			

Drillers' logs of wells in the Hueco Bolson area, El Paso County, Tex., and Dona Ana and Otero Counties, N. Mex.—Continued

	Thickness (feet)	Depth (feet)		Thickness (feet)	Depth (feet)
Well S-10					
Owner: U. S. Army. Driller: Layne-Texas Co., Ltd.					
Sand	1	1	Sand and clay	30	337
Caliche	2	3	Clay	41	378
Clay, sandy, and caliche	17	20	Clay, sandy	20	398
Sand	25	45	Clay	24	422
Clay	40	85	Shale, sandy	25	447
Sand and clay	60	145	Sand	19	466
Clay	4	149	Shale, hard	106	572
Sand, gravel, and clay	51	200	Sand and clay	21	593
Clay and boulders	9	209	Clay	6	599
Sand, hard, and clay	28	237	Sand	7	606
Clay, hard	70	307	Clay	5	611
Well S-13					
Owner: U. S. Army. Driller: Layne-Texas Co., Ltd.					
Sand	2	2	Sand and clay	13	98
Clay, red	9	11	Clay	30	128
Gravel	25	36	Sand and clay	277	405
Clay, red	15	51	Clay	52	457
Sand	6	57	Sand	8	465
Clay, red	8	65	Clay and sand	20	485
Sand and clay	12	77	Sand	16	501
Clay	8	85			
Well V-1					
Owner: City of El Paso. Driller: V. C. Chesney					
Soil	35	35	Sand and gravel	11	322
Gravel, coarse	5	40	Clay	2	324
Sand	46	86	Sand and gravel	24	348
Clay	16	102	Sand, fine, hard	1	349
Sand and boulders	28	130	Sand	4	353
Sand, coarse	18	148	Sand and boulders	4	357
Sand rock	1	149	Clay	3	360
Sand and boulders	11	160	Sand and boulders	7	367
Sand rock	2	162	Clay	14	381
Sand and gravel	8	170	Sand and boulders	19	400
Sand rock	1	171	Clay	15	415
Sand and gravel	32	203	Sand and boulders	12	427
Sand, gravel, and boulders	15	218	Clay	35	462
Clay	3	221	Sand rock	1	463
Sand and gravel	14	235	Clay	22	485
Clay	2	237	Sand and boulders	5	490
Gravel	4	241	Clay	45	535
Gravel and sand	14	255	Sand and boulders	10	545
Clay	3	258	Clay	40	585
Sand and gravel	20	278	Clay and boulders	14	599
Clay	3	281	Clay	13	612
Sand and gravel	27	308	Sand rock and fine sand	16	628
Clay	3	311	Clay	12	640
Well V-2					
Owner: City of El Paso. Driller: City of El Paso.					
Clay, yellow	4	4	Clay, yellow, sandy	97	120
Caliche	10	14	Sand	11	131
Sand	9	23	Gravel	9	140

Drillers' logs of wells in the Hueco Bolson area, El Paso County, Tex., and Dona Ana and Otero Counties, N. Mex.—Continued

	Thickness (feet)	Depth (feet)		Thickness (feet)	Depth (feet)
Well V-2—Continued					
Sand	36	176	Clay, yellow	4	418
Clay, yellow	26	202	Sand, water	8	426
Sand, water	6	208	Clay, yellow	5	431
Shale, hard	2	210	Sand, water, and gravel	12	443
Sand, water	40	250	Clay, yellow	28	471
Clay, yellow	5	255	Sand, water	17	488
Sand, water	11	266	Rock	5	493
Clay, yellow	12	278	Sand, water	17	510
Sand, water	37	315	Clay, yellow	2	512
Clay, yellow	12	327	Rock	2	514
Sand, water, and gravel	35	362	Sand, water	7	521
Clay, yellow	8	370	Rock	4	525
Sand, water	7	377	Clay, yellow	21	546
Clay, yellow	9	386	Sand, water, and gravel	37	583
Sand, water, and gravel	26	412	Rock, hard	6	589
Boulders	2	414	Clay, yellow, hard	17	606
Well V-3					
Owner: City of El Paso. Driller: L. Jensen					
Soil	4	4	Sand and gravel	12	417
Caliche	12	16	Clay	12	429
Sand	55	71	Sand	4	433
Clay	8	79	Clay, hard	26	459
Gravel	15	94	Sand and gravel	40	499
Clay	6	100	Clay	6	505
Sand	64	164	Sand, packed, hard	17	522
Clay	4	168	Sand and gravel	44	566
Sand	39	207	Clay	2	568
Clay	16	223	Sand	8	576
Sand	34	257	Sand rock, hard	2	578
Clay	19	276	Sand and gravel	10	588
Sand	18	294	Clay	8	596
Clay	8	302	Sand and gravel	6	602
Sand and gravel	44	346	Clay	4	606
Clay	15	361	Sand	6	612
Sand and boulders	9	370	Clay	3	615
Clay	10	380	Sand and gravel	17	632
Sand and gravel	10	390	Clay	8	640
Clay	5	395	Sand and gravel	20	660
Sand and gravel	9	404	Clay	15	675
Rock	1	405	Sand and boulders	40	715
Well V-4					
Owner: City of El Paso. Driller: V. C. Chesney					
Soil	4	4	Sand and boulders	38	350
Caliche	12	16	Rock	1	351
Sand	54	70	Sand	17	368
Clay	10	80	Clay	4	372
Gravel	20	100	Sand and boulders	38	410
Clay	6	106	Clay	4	414
Sand	58	164	Sand, gravel, and boulders	54	468
Clay	6	170	Clay	3	471
Sand	30	200	Rock	1	472
Clay	24	224	Sand, gravel, and boulders	22	494
Sand	36	260	Clay	5	499
Clay	15	275	Sand, gravel, and boulders	29	528
Sand	33	308	Clay	5	533
Clay	4	312	Sand, boulders, and gravel	57	590

Drillers' logs of wells in the Hueco Bolson area, El Paso County, Tex., and Dona Ana and Otero Counties, N. Mex.—Continued

	Thickness (feet)	Depth (feet)		Thickness (feet)	Depth (feet)
Well V-4—Continued					
Clay	12	602	Clay	4	692
Sand, boulders, and gravel	26	628	Sand	16	708
Clay	3	631	Sand, boulders, and gravel	50	758
Sand, boulders, gravel	57	688			
Well V-5					
Owner: City of El Paso. Driller: V. Chesney					
Sand	35	35	Sand, gravel, and boulders	35	535
Gravel, coarse	5	40	Clay	3	538
Sand and gravel	80	120	Sand and boulders	21	559
Sand and clay	25	145	Clay	6	565
Sand and boulders	70	215	Sand, gravel, and boulders	36	601
Clay	7	222	Clay	4	605
Sand, fine, and boulders	38	260	Sand, gravel, and boulders	13	618
Clay	5	265	Clay	4	622
Sand, fine	36	301	Sand, gravel, and boulders	11	633
Clay	23	324	Clay	3	636
Boulders	3	327	Sand, gravel, and boulders	6	642
Sand, fine, and boulders	22	349	Clay	3	645
Clay and sand	13	362	Sand and gravel	10	655
Sand, coarse, and gravel	22	384	Clay	3	658
Clay	5	389	Sand, gravel, and boulders	17	675
Boulders, sand, and gravel	23	412	Sand and rock	1	676
Sand and rock	1	413	Sand and gravel	22	698
Clay, sand, and boulders	17	430	Clay	3	701
Clay	6	436	Sand and gravel	14	715
Sand and boulders	19	455	Clay	3	718
Sand, gravel, and boulders	15	470	Sand and gravel	14	732
Clay	5	475	Clay	4	736
Sand, gravel, and boulders	7	482	Sand and gravel	29	765
Clay	3	485	Clay	2	767
Sand, gravel, and boulders	7	492	Sand and rock	1	768
Sand rock	1	493	Sand, gravel, and boulders	5	773
Boulders and sand	2	495	Clay	7	780
Clay	5	500			
Well V-6					
Owner: City of El Paso. Driller: C. R. Jensen					
Soil, sandy	3	3	Sand	15	447
Sand and caliche	7	10	Clay	2	449
Sand, coarse, and gravel	27	37	Sand	6	455
Gravel, coarse, and clay	30	67	Clay	6	461
Sand	12	79	Sand	5	466
Clay	18	97	Clay, sandy	5	471
Sand	32	129	Sand	13	484
Sand and clay	78	207	Clay, sandy	11	495
Clay	8	215	Sand	6	501
Sand	49	264	Clay	2	503
Clay	24	288	Sand	13	516
Sand	19	307	Clay	9	525
Clay	20	327	Sand	10	535
Sand	3	330	Clay	6	541
Clay	14	344	Sand	40	581
Sand	14	358	Clay	17	598
Clay	43	401	Sand	60	658
Sand	5	406	Clay and sand	12	670
Clay	26	432	Clay and boulders	57	727

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Drillers' logs of wells in the Hueco Bolson area, El Paso County, Tex., and Dona Ana and Otero Counties, N. Mex.—Continued

	Thickness (feet)	Depth (feet)		Thickness (feet)	Depth (feet)
Well V-6—Continued					
Clay and sand	29	756	Clay	5	842
Sand	27	783	Sand	34	876
Clay and sand	47	830	Clay	3	879
Sand	7	837	Clay	23	902
Well V-7					
Owner: City of El Paso. Driller: Layne-Texas Co., Ltd.					
Soil, sandy	2	2	Clay	27	600
Caliche	6	8	Sand	24	624
Sand, coarse, and gravel	70	78	Clay	3	627
Clay	20	118	Sand	24	651
Sand and clay	100	218	Clay	16	667
Clay	8	226	Rock	1	668
Sand	18	244	Sand	8	676
Clay	14	258	Clay	12	688
Clay, sandy	12	270	Clay, sandy	15	703
Clay	17	287	Sand	27	730
Sand	25	312	Clay	8	738
Clay	15	327	Clay, sandy	10	748
Sand	17	344	Sand	10	758
Sand, hard	6	350	Clay, sandy	44	802
Clay	82	432	Sand	12	814
Sand	15	447	Clay	21	835
Clay	4	451	Sand	28	863
Sand	10	461	Clay	15	878
Clay, sandy	54	515	Clay, sandy	50	928
Sand	18	533	Sand	10	938
Clay	6	539	Clay and boulders	60	998
Sand	9	548	Sand	25	1,023
Clay	2	550	Clay, sandy	55	1,078
Sand	23	573			
Well V-9					
Owner: City of El Paso. Driller: Layne-Texas Co., Ltd.					
Soil, sandy	2	2	Clay, sandy	73	649
Sand and caliche	4	6	Sand	25	674
Clay	41	47	Clay	18	692
Sand and gravel	20	67	Sand	16	708
Clay	10	77	Clay	7	715
Sand and gravel	30	107	Sand	14	729
Sand	42	149	Rock	2	731
Clay	28	177	Sand	5	736
Clay, sandy	60	237	Clay	111	847
Clay	12	249	Sand	25	872
Sand	83	332	Clay	5	877
Clay	5	337	Sand	30	907
Clay, sandy	40	377	Clay	12	919
Sand	12	389	Sand	16	935
Clay	11	400	Clay	17	952
Sand	14	414	Sand	7	959
Clay	3	417	Clay	12	971
Sand	40	457	Sand	8	979
Clay	34	491	Clay	2	981
Sand	13	504	Sand	11	992
Clay	8	512	Clay	10	1,002
Sand	25	537	Sand	4	1,006
Clay	30	567	Clay	2	1,008
Sand, packed	9	576	Clay, sandy	9	1,017

Drillers' logs of wells in the Hueco Bolson area, El Paso County, Tex., and Dona Ana and Otero Counties, N. Mex.—Continued

	Thickness (feet)	Depth (feet)		Thickness (feet)	Depth (feet)
Well V-9—Continued					
Sand	4	1,021	Clay	6	1,082
Clay	32	1,053	Sand	17	1,099
Sand	6	1,059	Clay, sandy	48	1,147
Clay	13	1,072	Sand	10	1,157
Sand	4	1,076	Clay, sandy	54	1,211
Well V-11					
Owner: City of El Paso. Driller: H. M. Stanley					
Sand and caliche	19	19	Sand, medium, and sandy clay	15	327
Sand, coarse, and gravel	23	42	Clay	24	351
Sand	5	47	Sand, fine	2	353
Sand, coarse, and gravel	6	53	Clay	2	355
Clay	23	76	Sand, fine	15	370
Gravel	20	96	Sand, clayey	1	371
Clay	8	104	Sand, coarse	6	377
Sand, coarse, and gravel	37	141	Clay	6	383
Clay	29	170	Sand	1	384
Sand, fine, and sandy clay	7	177	Clay	23	407
Clay	25	202	Sand, medium	9	416
Gravel and clay	1	203	Clay and sandy clay	23	439
Clay	2	205	Sand	23	462
Sand, fine	2	207	Clay	11	473
Clay	18	225	Sand	33	506
Sand, fine, and some gravel	25	250	Clay	10	516
Sand, coarse	6	256	Clay, sandy	7	523
Clay, white, chalky	14	270	Sand	59	582
Sand, fine	10	280	Clay	11	593
Clay	6	286	Sand, very fine	7	600
Sand	13	299			
Clay and sandy clay	13	312			
Well V-12					
Owner: City of El Paso. Driller: C. R. Jensen					
Sand	2	2	Sand	16	317
Caliche	4	6	Clay	17	334
Sand and gravel	14	20	Sand	24	358
Clay	11	31	Clay	21	379
Clay and gravel	6	37	Sand	5	384
Clay	25	62	Clay	2	386
Sand and gravel	27	89	Sand	13	399
Clay	14	103	Clay	18	417
Sand	10	113	Sand	10	427
Clay	9	122	Clay	5	432
Sand and gravel	6	128	Sand	7	439
Clay	9	137	Clay	13	452
Sand and clay	20	157	Sand	27	479
Clay	15	172	Clay	11	490
Sand	11	183	Sand	33	523
Clay	14	197	Clay	9	532
Sand	30	227	Sand	10	542
Clay	3	230	Clay	10	552
Sand	18	248	Sand	3	555
Clay	8	256	Clay	7	562
Sand	1	257	Sand	2	564
Clay	20	277	Clay	11	575
Sand	22	299	Sand	4	579
Clay	2	301	Clay	7	586

Drillers' logs of wells in the Hueco Bolson area, El Paso County, Tex., and Dona Ana and Otero Counties, N. Mex.—Continued

Well V-12—Continued

	Thickness (feet)	Depth (feet)		Thickness (feet)	Depth (feet)
Sand	12	598	Clay	5	887
Clay	6	604	Sand	39	926
Sand	23	627	Clay	34	960
Clay	6	633	Sand	14	974
Sand	23	656	Clay	7	981
Clay	5	661	Sand	8	989
Sand	38	699	Clay	5	994
Clay	13	712	Clay, sandy	3	997
Sand	24	736	Clay	36	1,033
Clay	33	769	Sand	11	1,044
Sand	16	785	Clay	3	1,047
Sand and clay	8	793	Sand	20	1,067
Clay	4	797	Clay	16	1,083
Sand	16	813	Sand	4	1,087
Clay	20	833	Clay	7	1,094
Sand	4	837	Sand	3	1,097
Clay	20	857	Clay	20	1,117
Sand	25	882			

Well V-13

Owner: City of El Paso. Driller: C. R. Jensen

Sand and caliche	24	24	Sand	10	586
Clay and gravel	38	62	Clay	6	592
Sand and gravel	10	72	Sand	15	607
Clay and gravel	14	86	Clay	2	609
Sand and gravel	16	102	Sand	53	662
Clay	15	117	Clay	15	677
Sand and clay	53	170	Sand	44	721
Clay	41	211	Clay	16	737
Sand	22	233	Sand and clay	20	757
Sand and clay	4	237	Sand	25	782
Sand	16	253	Clay	15	797
Clay	11	264	Sand and clay	55	852
Sand	9	273	Clay	5	857
Clay	23	296	Sand	35	892
Sand	17	313	Clay	10	902
Clay	18	331	Sand	49	951
Sand	3	334	Clay	39	990
Clay	3	337	Sand	5	995
Sand	7	344	Clay	8	1,003
Clay	11	355	Sand	6	1,009
Sand	20	375	Clay	21	1,030
Clay	22	397	Sand	7	1,037
Sand and clay	20	417	Clay	4	1,041
Clay	19	436	Sand	6	1,047
Sand	9	445	Clay	4	1,051
Clay	32	477	Sand	8	1,059
Sand	16	493	Clay	23	1,082
Clay	7	500	Sand	2	1,084
Sand	17	517	Clay	9	1,093
Clay	2	519	Sand	4	1,097
Sand	14	533	Clay	3	1,100
Clay	6	539	Sand	12	1,112
Sand	13	552	Clay	13	1,125
Clay	4	556	Sand	4	1,129
Sand	15	571	Clay	2	1,131
Clay	5	576			

Drillers' logs of wells in the Hueco Bolson area, El Paso County, Tex., and Dona Ana and Otero Counties, N. Mex.—Continued

	Thickness (feet)	Depth (feet)		Thickness (feet)	Depth (feet)
Well V-14					
Owner: U. S. Air Force. Driller: Layne-Texas Co., Ltd.					
Sand	2	2	Sand	25	366
Sand, gravel, and caliche	48	50	Clay	7	373
Sand and clay	35	85	Sand, gravel, and clay	22	395
Sand, clay, and gravel	105	190	Clay	10	405
Sand, gravel, and clay	16	206	Sand	26	431
Clay	5	211	Sand	5	436
Sand	13	224	Clay	22	458
Clay and sandy clay	15	239	Sand and clay	10	468
Sand	26	265	Sand	22	490
Clay	10	275	Clay	5	495
Sand and sandy clay	36	311	Sand	7	502
Sand	20	331	Caliche, sand, and gravel	48	550
Sand, hard, and clay	10	341			
Well V-15					
Owner: U. S. Air Force. Driller: Layne-Texas., Ltd.					
Sand, gravel, and caliche	40	40	Shale and sandy shale	37	465
Sand and gravel	60	100	Sand and boulders	20	485
Sand	7	107	Shale	9	494
Clay and sand	40	147	Sand and shale	48	542
Sand	20	167	Shale	3	545
Clay and sand	43	210	Sand, hard, and boulders	109	654
Sand	20	230	Shale and boulders	46	700
Clay and sand	45	275	Shale	25	725
Sand	153	428	Sand, hard, and boulders	25	750
Well V-16					
Owner: City of El Paso. Driller: C. R. Jensen					
Sand and caliche	23	23	Sand	41	433
Clay	37	60	Clay	19	452
Sand	14	74	Sand	25	477
Clay	7	81	Clay	2	479
Sand and gravel	19	100	Sand	19	498
Clay	15	115	Clay	7	505
Sand	4	119	Sand	14	519
Clay	14	133	Clay	13	532
Sand	8	141	Sand	9	541
Clay	13	154	Clay	4	545
Sand	16	170	Sand	12	557
Clay	34	204	Clay	16	573
Sand	18	222	Sand	14	587
Clay	2	224	Clay	8	595
Sand	19	243	Sand	2	597
Clay	2	245	Clay	4	601
Sand	45	290	Sand	12	613
Clay	2	292	Clay	2	615
Sand	10	302	Sand	28	643
Clay	17	319	Clay	17	660
Sand	8	327	Sand	27	687
Clay	6	333	Clay	25	712
Sand	2	335	Sand	22	734
Clay	8	343	Clay	8	742
Sand	16	359	Sand	13	755
Clay	14	373	Clay	2	757
Sand	7	380	Sand and clay	37	794
Clay	12	392	Sand	48	842

Drillers' logs of wells in the Hueco Bolson area, El Paso County, Tex., and Dona Ana and Otero Counties, N. Mex.—Continued

	Thickness (feet)	Depth (feet)		Thickness (feet)	Depth (feet)
Well V-16—Continued					
Clay	4	846	Clay	6	943
Sand	8	854	Sand	8	951
Clay	6	860	Clay	17	968
Sand	19	879	Sand	4	972
Clay	6	885	Clay	25	997
Sand	18	903	Sand	9	1,006
Clay	2	905	Clay	2	1,008
Sand	14	919	Sand	22	1,030
Clay	4	923	Clay	42	1,072
Sand	14	937			
Well V-17					
Owner: City of El Paso. Driller: C. R. Jensen					
Sand and caliche	20	20	Sand	40	577
Sand	10	30	Clay	2	579
Sand and gravel	19	49	Sand	10	589
Clay	8	57	Clay	4	593
Sand	14	71	Sand	15	608
Sand and clay	26	97	Clay	3	611
Gravel	8	105	Sand	38	649
Sand	10	115	Clay	2	651
Gravel	2	117	Sand	9	660
Sand and clay	10	127	Clay	7	667
Clay	16	143	Sand	13	680
Sand	7	150	Clay	13	693
Clay	11	161	Sand	11	704
Sand	16	177	Clay	33	737
Clay	9	186	Sand and clay	16	753
Sand	16	202	Clay	26	779
Clay	12	214	Sand	18	797
Sand	33	247	Clay	2	799
Clay	8	255	Sand	10	809
Sand	27	282	Clay	4	813
Clay	12	294	Sand	4	817
Sand	10	304	Clay	5	822
Clay	7	311	Sand	10	832
Sand	11	322	Clay	23	855
Clay	3	325	Sand	18	873
Sand	5	330	Clay	4	877
Clay	14	344	Sand	47	924
Sand	6	350	Clay	9	933
Clay	14	364	Sand	16	949
Sand	8	372	Clay	2	951
Clay	7	379	Sand	10	961
Sand	10	389	Sand and clay	16	977
Clay	20	409	Sand	29	1,006
Sand	18	427	Clay	7	1,013
Clay	22	449	Sand	10	1,023
Sand	8	457	Clay	4	1,027
Clay	8	465	Sand	19	1,046
Sand	14	479	Clay	4	1,050
Clay	18	497	Sand	6	1,056
Sand	12	509	Clay	11	1,067
Clay	8	517	Sand	20	1,087
Sand	12	529	Sand and clay	8	1,095
Clay	8	537	Clay	2	1,097

Drillers' logs of wells in the Hueco Bolson area, El Paso County, Tex., and Dona Ana and Otero Counties, N. Mex.—Continued

	Thickness (feet)	Depth (feet)		Thickness (feet)	Depth (feet)
Well V-18					
Owner: City of El Paso. Driller: C. R. Jensen					
Soil	1	1	Sand	130	625
Caliche	2	3	Clay	4	629
Clay and sand	17	20	Sand	8	637
Sand	15	35	Clay	4	641
Clay	28	63	Sand	23	664
Sand and gravel	22	85	Clay	7	671
Clay	15	100	Sand	15	686
Sand	22	122	Clay	9	695
Clay	10	132	Sand	13	708
Sand	50	182	Clay	2	710
Clay	10	192	Sand and clay	6	716
Sand	109	301	Sand	45	761
Clay	17	318	Clay	3	764
Sand	13	331	Sand	5	769
Clay	9	340	Clay	8	777
Sand	17	357	Sand	55	832
Clay	9	366	Clay	34	866
Sand	16	382	Sand	15	881
Clay	25	407	Clay	6	887
Sand	26	433	Sand	10	897
Clay	3	436	Clay	25	922
Sand	54	490	Sand	17	939
Clay	5	495	Clay	18	957
Well V-19[1]					
Owner: City of El Paso. Driller: C. R. Jensen					
Sand	2	2	Sand	10	652
Caliche	4	6	Clay	7	659
Sand and gravel	9	15	Sand	18	677
Clay	5	20	Clay	16	693
Sand and gravel	31	51	Sand	7	700
Clay	16	67	Clay	2	702
Clay and sand	50	117	Sand	9	711
Sand	54	171	Clay	6	717
Clay and sand	76	247	Sand and clay	25	742
Clay	39	286	Clay	35	777
Sand	23	309	Sand and clay	35	812
Clay	8	317	Clay	25	837
Sand	14	331	Sand and clay	10	847
Clay	5	336	Clay	4	851
Sand	20	356	Sand	16	867
Clay	38	394	Clay	10	877
Sand	16	410	Sand and clay	40	917
Clay	27	437	Sand and clay	15	932
Sand	10	447	Clay	21	953
Clay	16	463	Sand	4	957
Clay, sandy	4	467	Clay	15	972
Clay	6	473	Sand	21	993
Sand	7	480	Clay	32	1,025
Clay	17	497	Sand	27	1,052
Sand	7	504	Clay	3	1,055
Clay	25	529	Sand	10	1,065
Sand	6	535	Clay	67	1,132
Clay	2	537	Sand	6	1,138
Sand	40	577	Clay, sandy	12	1,150
Clay	25	602	Sand	17	1,167
Sand	35	637	Clay, sandy	16	1,183
Clay	5	642	Clay	4	1,187

[1]Drillers' log is for test well drilled in 1938 at same location as well V-19.

Drillers' logs of wells in the Hueco Bolson area, El Paso County, Tex., and Dona Ana and Otero Counties, N. Mex.—Continued

	Thickness (feet)	Depth (feet)		Thickness (feet)	Depth (feet)

Well V-20

Owner: City of El Paso; Driller: C. R. Jensen

Cinders	3	3	Clay	27	573
Sand and caliche	8	11	Sand	33	606
Sand and gravel	26	37	Clay	19	625
Clay	20	57	Clay, sandy	12	637
Sand and gravel	40	97	Sand	13	650
Sand	34	131	Clay	7	657
Clay	13	144	Clay, sandy	30	687
Clay, sand, and gravel	53	197	Clay	10	697
Clay	10	207	Sand	69	766
Sand and gravel	30	237	Clay	55	821
Clay, sandy	15	252	Sand	11	832
Sand and gravel	34	286	Rock, hard	1	833
Clay	31	317	Clay, sandy	64	897
Sand	10	327	Sand	12	909
Clay	10	337	Sand and clay	68	977
Sand	10	347	Sand	15	992
Clay	56	403	Clay	39	1,031
Sand	26	429	Sand	10	1,041
Clay	5	434	Clay, sandy	12	1,053
Sand	3	437	Sand	24	1,077
Clay	20	457	Clay, sandy	40	1,117
Sand	11	468	Sand	40	1,157
Clay, sandy	14	482	Clay	67	1,224
Sand	12	494	Sand	15	1,239
Clay	14	508	Clay	13	1,252
Sand	11	519	Sand	30	1,282
Clay	2	521	Clay	8	1,290
Sand	25	546	Sand	2	1,292

Well V-21

Owner: U. S. Army. Driller: Layne-Texas Co., Ltd.

Surface sand	2	2	Sand and clay	22	407
Caliche	3	5	Sand, coarse	19	426
Sand and clay	6	11	Clay	31	457
Sand and gravel	5	16	Sand	41	498
Sand and clay	26	42	Clay	12	510
Clay	39	81	Sand	37	547
Sand and clay	90	171	Clay	42	589
Clay	49	220	Sand	14	603
Sand and clay	11	231	Clay	52	655
Sand	9	240	Sand and clay	42	697
Clay	33	273	Clay	13	710
Sand and clay	13	286	Sand	24	734
Sand	42	328	Clay	9	743
Clay	14	342	Sand and clay	30	773
Sand	25	367	Clay	27	800
Clay	18	385			

Well V-22

Owner: City of El Paso. Driller: C. R. Jensen

Soil	3	3	Clay	16	142
Caliche	2	5	Sand and gravel	29	171
Sand	10	15	Clay	11	182
Sand and gravel	22	37	Sand	9	191
Clay	35	72	Clay	32	223
Sand and gravel	54	126	Sand	28	251

Drillers' logs of wells in the Hueco Bolson area, El Paso County, Tex., and Dona Ana and Otero Counties, N. Mex.—Continued

	Thickness (feet)	Depth (feet)		Thickness (feet)	Depth (feet)
Well V-22—Continued					
Clay	4	255	Sand	6	572
Sand	8	263	Clay	3	575
Clay	15	278	Sand	10	585
Sand	15	293	Clay	4	589
Clay	23	316	Sand	11	600
Sand	12	328	Clay	36	636
Clay	12	340	Clay, sandy	20	656
Sand	6	346	Sand	8	664
Clay	14	360	Clay	6	670
Sand	6	366	Sand	16	686
Clay	45	411	Clay	22	708
Sand	10	421	Sand	17	725
Clay	7	428	Clay	7	732
Sand	9	437	Sand	41	773
Clay	25	462	Clay	51	824
Sand	10	472	Sand	20	844
Clay	17	489	Clay	51	895
Sand	8	497	Sand	16	911
Clay	3	500	Clay, sandy	97	1,008
Sand	15	515	Rock	1	1,009
Clay	3	518	Clay	8	1,017
Sand	14	532	Clay, sandy	100	1,117
Clay	34	566			

Well V-23

Owner: U. S. Army. Driller: Layne-Texas, Co., Ltd.

Soil	9	9	Sand and clay	9	364
Caliche	7	16	Sand	10	374
Sand	15	31	Clay, hard	27	401
Sand, coarse, and gravel	11	42	Sand and clay	9	410
Clay and gravel	14	56	Clay	39	449
Clay	10	66	Clay and boulders	8	457
Sand and gravel	10	76	Sand and clay	36	493
Clay	19	95	Sand	3	496
Sand	7	102	Clay, hard	21	517
Clay	10	112	Sand	10	527
Sand	30	142	Clay	11	538
Clay	5	147	Sand	33	571
Sand	19	166	Sand and some clay	27	598
Clay, hard	11	177	Clay	13	611
Sand	9	186	Sand	21	632
Clay	4	190	Clay	7	639
Sand	26	216	Sand	13	652
Clay	9	225	Clay	9	661
Sand, coarse	50	275	Sand	28	699
Clay	4	279	Clay	9	708
Sand	16	295	Clay, sandy	15	723
Clay	13	308	Clay	38	761
Sand	37	345	Sand and boulders	19	780
Clay	10	355	Clay	20	800

Well V-24

Owner: U. S. Army. Driller: Layne-Texas Co., Ltd.

Soil	1	1	Clay and gravel	5	39
Caliche	2	3	Clay	14	53
Chalk and caliche	5	8	Sand	15	68
Sand, fine	16	24	Clay	39	107
Sand, coarse, and gravel	10	34	Sand	59	166

Drillers' logs of wells in the Hueco Bolson area, El Paso County, Tex., and Dona Ana and Otero Counties, N. Mex.—Continued

	Thickness (feet)	Depth (feet)		Thickness (feet)	Depth (feet)
Well V-24—Continued					
Clay	5	171	Sand	14	469
Sand	23	194	Clay	6	475
Clay	22	216	Sand	5	480
Sand	19	235	Clay and boulders	7	487
Clay	4	239	Clay	15	502
Sand	61	300	Sand	22	524
Boulders	2	302	Clay	7	531
Sand	23	325	Sand	47	578
Clay	14	339	Clay	2	580
Sand and clay	10	349	Sand	32	612
Clay	15	364	Clay	17	629
Sand and clay	7	371	Sand	37	666
Clay	1	372	Clay	24	690
Sand and clay	6	378	Sand, hard	2	692
Clay	23	401	Clay	2	694
Sand and clay	6	407	Sand and shale	35	729
Clay	30	437	Sand and gravel	41	770
Sand	15	452	Clay	15	785
Clay	3	455			
Well V-25					
Owner: U. S. Army. Driller: Layne-Texas Co., Ltd.					
Caliche	3	3	Sand and boulders	17	548
Sand and gravel	59	62	Clay	8	556
Clay and sand	48	110	Clay, sandy	20	576
Sand	6	116	Sand	14	590
Clay and sand	14	130	Clay	31	621
Sand	26	156	Clay, sandy	8	629
Clay and sand	32	188	Sand	18	647
Sand	6	194	Clay and sand	77	724
Clay and sand	41	235	Sand	6	730
Sand	20	255	Clay	26	756
Clay, sandy	3	258	Sand	6	762
Sand	44	302	Clay and sand	46	808
Clay	29	331	Sand	4	812
Sand	9	340	Clay, sandy	25	837
Clay	9	349	Clay	8	845
Sand, gravel, and clay	25	374	Clay, sandy	5	850
Clay	48	422	Clay	12	862
Sand and clay	11	433	Clay, sandy	8	870
Clay	41	474	Clay	5	875
Sand and clay	13	487	Shale, sandy, and sand	17	892
Clay	13	500	Sand	7	909
Sand and gravel	31	531	Shale	7	916
Well V-27					
Owner: U. S. Army. Driller: T. F. Hawkins					
Caliche	6	6	Sand	23	263
Sand	46	52	Clay	9	272
Clay	16	68	Sand	35	307
Sand	18	86	Clay	28	335
Clay	24	110	Sand	8	343
Clay and gravel	22	132	Clay	6	349
Rock	2	134	Sand and gravel	17	366
Sand	64	198	Sand, boulders, and gravel	4	370
Clay	29	227	Clay	13	383
Sand	11	238	Gravel and boulders	14	397
Clay	2	240	Clay	27	424

Drillers' logs of wells in the Hueco Bolson area, El Paso County, Tex., and Dona Ana and Otero Counties, N. Mex.—Continued

	Thickness (feet)	Depth (feet)		Thickness (feet)	Depth (feet)
Well V-27—Continued					
Rock	1	425	Clay	8	535
Sand	6	431	Sand and gravel	24	559
Clay	39	470	Clay	11	570
Sand	10	480	Sand and gravel	26	596
Rock	4	484	Clay	31	627
Sand	22	506	Sand	11	638
Gravel and boulders	21	527	Clay	14	652
Well V-28					
Owner: U. S. Army. Driller: T. F. Hawkins					
Caliche	5	5	Sand	11	464
Sand	50	55	Clay	16	480
Clay	7	62	Gravel and boulders	6	486
Sand	125	187	Clay	13	499
Clay	38	225	Sand	31	530
Sand	122	347	Clay	8	538
Clay	5	352	Sand	12	550
Sand	12	364	Clay	12	562
Clay	17	381	Sand, gravel, rock, and boulders	16	578
Sand	11	392	Clay	4	582
Clay	19	411	Sand	14	596
Sand	15	426	Clay	12	608
Rock	1	427	Sand	35	643
Sand	13	440	Clay	14	657
Clay	13	453			
Well V-29					
Owner: U. S. Army					
Soil and soft rock	3	3	Clay	60	360
Sand	45	48	Sand, water	5	365
Clay	7	55	Clay	7	372
Sand	35	90	Shale	8	380
Clay	10	100	Clay	50	430
Sand	36	136	Shale and sand	20	450
Sand, coarse	19	155	Clay	20	470
Clay	7	162	Shale and sand	15	485
Sand	23	185	Sand, water	15	500
Clay	10	195	Clay	10	510
Sand	14	209	Sand, water	15	525
Clay	8	217	Clay	10	535
Sand, water	18	235	Sand, water	5	540
Clay	3	238	Clay	20	560
Sand, water	8	246	Shale	10	570
Clay	9	255	Clay	10	580
Sand	15	270	Sand, water	16	596
Clay	5	275	Clay	4	600
Sand, water	25	300			
Well V-31					
Owner: City of El Paso. Driller: P. D. Wynne					
Sand and boulders	16	16	Clay, yellow, hard	60	161
Sand, coarse, and gravel	54	70	Sand, water	11	172
Clay, yellow, hard	16	86	Clay, yellow, hard	22	194
Sand and gravel	15	101	Sand, water, and boulders	15	209

Drillers' logs of wells in the Hueco Bolson area, El Paso County, Tex., and Dona Ana and Otero Counties, N. Mex.—Continued

	Thickness (feet)	Depth (feet)		Thickness (feet)	Depth (feet)
Well V-31—Continued					
Clay, yellow, hard	11	220	Sand, water	22	680
Sand, water, coarse and gravel	163	283	Clay, yellow	12	692
Clay, yellow, hard	17	300	Sand, water	19	711
Sand, water, and gravel	19	319	Clay, yellow, hard	8	719
Clay, yellow, hard	21	340	Sand, water	9	728
Sand, brown; salt water	53	393	Clay, yellow, hard	32	760
Clay, yellow	38	431	Sand, hard, dry	12	772
Sand and gravel	19	450	Shale, brown	13	785
Clay, red	13	463	Sand, blue, fine	7	792
Sand and gravel; salt water	38	501	Clay, yellow, hard	14	806
Sand rock	29	530	Sand, water	13	819
Sand; salt water	6	536	Clay, yellow, soft	9	828
Clay, yellow, hard	34	570	Sand, water, and boulders	27	855
Sand, water, and boulders	40	610	Clay, yellow, hard	8	863
Clay, red	17	627	Sand, water, and gravel	34	897
Rock, soft	6	633	Clay, yellow, hard	18	915
Sand, water	11	644	Sand, water	17	932
Clay and gravel	14	658	Clay, yellow, soft	22	954
Well V-32					
Owner: City of El Paso. Driller: V. C. Chesney					
Sand	8	8	Sand, gravel, and boulders	53	344
Gravel and sand	3	11	Sand	7	351
Sand and gravel	75	86	Clay	9	360
Clay	5	91	Sand, gravel, and boulders	85	445
Sand	29	120	Clay	4	449
Rock	1	121	Sand, gravel, and boulders	51	500
Sand	77	198	Clay	5	505
Rock	1	199	Sand	4	509
Sand, gravel, and boulders	47	246	Clay	5	514
Clay	5	251	Sand	5	519
Sand, gravel, and boulders	39	290	Clay, sandy	141	660
Rock	1	291			
Well V-34					
Owner: Texas and New Orleans Railroad Co. Driller: P. D. Wynne					
Caliche	3	3	Sand, soft	29	335
Sand and gravel	37	40	Clay, soft	15	350
Clay, yellow	4	44	Sand	32	382
Sand and gravel	19	63	Clay and boulders	5	387
Clay, yellow, hard	12	75	Sand, water, and boulders	14	401
Sand and gravel	19	94	Clay, soft	11	412
Clay, yellow, hard	25	119	Sand, water, and boulders	21	433
Sand	11	130	Clay, hard	9	442
Clay, yellow, hard	5	135	Sand, water, and boulders	14	456
Sand	5	140	Clay	6	462
Clay, yellow, hard	11	151	Boulders	6	468
Sand and gravel	12	163	Clay, soft	12	480
Clay, hard, and gravel	35	198	Sand, water, and boulders	19	499
Hardpan	4	202	Clay, soft	12	511
Sand, soft	19	221	Sand, water	13	524
Clay, soft	8	229	Sand	6	530
Sand, water, and boulders	3	232	Clay	15	545
Sand	19	251	Sand, water	23	568
Sand and boulders	4	255	Clay and boulders	16	584
Clay	7	262	Sand Rock	6	590
Sand, water, and boulders	44	306	Sand	7	597

Drillers' logs of wells in the Hueco Bolson area, El Paso County, Tex., and Dona Ana and Otero Counties, N. Mex.—Continued

	Thickness (feet)	Depth (feet)		Thickness (feet)	Depth (feet)
Well V-34—Continued					
Clay, yellow, hard	23	620	Sand, water	19	772
Sand, water, and boulders	10	630	Clay	2	774
Clay, hard, and boulders	24	654	Sand	9	783
Sand, water	7	661	Clay, hard	9	792
Clay, yellow, hard and boulders	46	707	Sand, water	46	838
Sand, water	35	742	Clay, yellow, hard	10	848
Clay, yellow	11	753	Sand, water, and boulders	11	859
			Clay and boulders	10	869
Well V-37					
Owner: Texas and New Orleans Railroad Co. Driller: Semple and Wynne					
Caliche	5	5	Clay and boulders	15	455
Sand	43	48	Clay, soft	9	464
Clay	30	78	Sand, water	9	473
Sand and gravel	11	89	Clay, hard	17	490
Clay	23	112	Sand, water, and boulders	50	540
Sand and gravel	15	127	Sand rock	2	542
Clay	14	141	Clay	4	546
Sand	29	170	Sand, water, and boulders	16	562
Clay	5	175	Clay and boulders	14	576
Sand	30	205	Sand	12	588
Clay	5	210	Clay	14	602
Sand and gravel	15	225	Sand, water	28	630
Clay	6	231	Clay	20	650
Sand, water	29	260	Sand, water	27	677
Clay, sandy	16	276	Clay	5	682
Sand, water, and gravel	44	320	Sand	21	703
Clay, soft	20	340	Clay	7	710
Sand, water, and gravel	20	360	Sand, water, and boulders	44	754
Clay, gravel, and boulders	36	396	Clay and boulders	40	794
Clay, yellow, hard	14	410	Sand, water	26	820
Sand and gravel	6	416	Clay, yellow	17	837
Clay, hard	5	421	Sand, water, and boulders	27	864
Sand, water, and gravel	19	440			
Well V-38					
Owner: Texas and New Orleans Railroad Co. Driller: Layne-Texas Co., Ltd.					
Soil	1	1	Sand	5	428
Caliche	3	4	Sand and clay	14	442
Sand and clay	6	10	Clay, hard, and boulders	5	447
Clay and gravel	17	27	Clay and sand	13	460
Clay	25	52	Sand	19	479
Sand and gravel	12	64	Clay	25	504
Clay	19	83	Sand	32	536
Sand	14	97	Clay	3	539
Clay	31	128	Sand and boulders	11	550
Sand	9	137	Clay and sand	30	580
Clay and sand	73	210	Sand and boulders	5	585
Sand and gravel	19	229	Clay and sand	9	594
Clay	5	234	Clay	37	631
Sand and gravel	9	243	Sand	10	641
Clay	10	253	Sand and clay	15	656
Sand, hard, coarse	73	326	Clay and boulders	10	666
Clay and sand	35	361	Clay	2	668
Sand and gravel	16	377	Sand, hard	35	703
Sand	23	400	Clay, sandy	12	715
Sand	18	418	Sand and clay	26	741
Clay	5	423	Boulders	1	742

Drillers' logs of wells in the Hueco Bolson area, El Paso County, Tex., and Dona Ana and Otero Counties, N. Mex.—Continued

Well V-38—Continued

	Thickness (feet)	Depth (feet)		Thickness (feet)	Depth (feet)
Clay and boulders	10	752	Sand and clay	15	793
Clay	2	754	Clay	16	809
Sand and gravel	9	763	Sand	22	831
Boulders	1	764	Sand and boulders	10	841
Sand	9	773	Sand	5	846
Clay	5	778	Clay	6	852

Well V-39

Owner: City of El Paso. Driller: C. R. Jensen

Soil and sand	3	3	Sand	24	307
Caliche	2	5	Clay	7	314
Clay, sandy	13	18	Sand	44	358
Sand and gravel	17	35	Clay, sandy	19	377
Clay	8	43	Sand	12	389
Sand and gravel	14	57	Clay	14	403
Sand and clay	30	87	Sand	14	417
Sand and gravel	28	115	Clay	18	435
Clay	2	117	Sand	5	440
Sand and clay	23	140	Clay	11	451
Clay	14	154	Sand	18	469
Sand	49	203	Clay	17	486
Clay	40	243	Sand	11	497
Sand	30	273	Missing	23	520
Clay	10	283			

Well V-40

Owner: City of El Paso. Driller: C. R. Jensen

Sand, soily	2	2	Sand	4	399
Caliche	6	8	Clay	11	410
Sand and gravel	46	54	Sand	27	437
Clay	10	64	Clay	2	439
Sand	8	72	Sand	1	440
Clay	15	87	Clay	16	456
Sand	8	95	Sand	13	469
Clay, sandy	8	103	Clay, sandy	4	473
Sand	14	117	Sand	24	497
Sand and clay	40	157	Clay	20	517
Sand	16	173	Sand	5	522
Clay and boulders	4	177	Clay, sandy	5	527
Clay	18	195	Clay	3	530
Sand	25	220	Sand	19	549
Clay	6	226	Clay	20	569
Sand	14	240	Sand	21	590
Clay	6	246	Clay	4	594
Sand	22	268	Sand	14	608
Clay	7	275	Clay	4	612
Sand	5	280	Sand	7	619
Clay	3	283	Clay	1	620
Sand	67	350	Sand	13	633
Clay	3	353	Clay	1	634
Sand	7	360	Sand	29	663
Clay	3	363	Clay	4	667
Sand	14	377	Sand	28	695
Clay	18	395	Clay	3	698

Drillers' logs of wells in the Hueco Bolson area, El Paso County, Tex., and Dona Ana and Otero Counties, N. Mex.—Continued

	Thickness (feet)	Depth (feet)		Thickness (feet)	Depth (feet)

Well V-41

Owner: City of El Paso. Driller: Layne-Texas Co., Ltd.

Sand and caliche	20	20	Sand, gravel, and clay	20	388
Gravel and sand	45	65	Sand and gravel	13	401
Clay and gravel	25	90	Clay, sandy, and gravel	45	446
Gravel and sand	23	113	Sand, gravel, and clay	57	503
Gravel	47	160	Clay	3	506
Clay and gravel	87	247	Clay	26	532
Sand and gravel	12	259	Gravel	20	552
Caliche and gravel	5	264	Sand, gravel, and sandy clay	91	643
Sand and sandy gravel	104	368	Clay, sandy, and gravel	123	766

Well V-42

Owner: City of El Paso. Driller: H. M. Stanley

Sand	3	3	Clay	32	377
Caliche	8	11	Clay	22	399
Clay	24	35	Sand	9	408
Sand, fine	28	63	Gravel	3	411
Sand	15	78	Clay	5	416
Sand, gravel, and clay	55	133	Sand	5	421
Sand and gravel	10	143	Clay, sandy	10	431
Clay, sandy	15	158	Sand	15	446
Sand	9	167	Sand	5	451
Clay, sandy	5	172	Clay, sandy	7	458
Sand	13	185	Sand	6	464
Sand and coarse gravel	10	195	Clay	16	480
Clay	15	210	Gravel	1	481
Gravel, coarse	1	211	Clay	9	490
Clay	10	221	Sand	13	503
Sand	20	241	Sandstone	3	506
Clay, sandy	2	243	Clay, sandy	11	517
Clay and gravel	12	255	Sand, fine, and clay	6	523
Clay, sandy	14	269	Clay, sandy, and gravel	10	533
Sand, coarse	26	295	Clay	4	537
Clay, sandy	10	305	Sand	26	563
Clay	3	308	Clay	2	565
Gravel	2	310	Sand	6	571
Sand, fine	19	329	Clay	2	573
Sand, coarse	1	330	Sand	16	589
Clay, sandy	5	335	Clay, sandy	11	600
Sand	5	340	Sand	12	612
Clay, sandy	5	345	Clay	11	623

Well V-44

Owner: Ashley's. Driller: Layne-Texas Co., Ltd.

Sand	1	1	Sand and clay	14	359
Caliche	9	10	Clay	3	362
Sand and gravel	23	33	Sand	4	366
Clay, gravel, and sand	85	118	Clay	5	371
Sand and gravel	57	175	Sand and clay	18	389
Clay and gravel	20	195	Sand, hard	23	412
Sand and gravel	10	205	Clay	15	427
Clay	32	237	Sand, hard, and clay	14	441
Sand	55	292	Clay	28	469
Clay	2	294	Sand	27	496
Sand	13	307	Clay	8	504
Clay	5	312	Sand	22	526
Sand	28	340	Clay	10	536
Clay	5	345			

Drillers' logs of wells in the Hueco Bolson area, El Paso County, Tex., and Dona Ana and Otero Counties, N. Mex.—Continued

Well V-45

Owner: City of El Paso. Driller: P. D. Wynne

	Thickness (feet)	Depth (feet)		Thickness (feet)	Depth (feet)
Sand	45	45	Sand	19	462
Clay	6	51	Clay	2	464
Sand and clay	22	73	Sand	16	480
Clay, yellow	6	79	Clay, yellow, hard	9	489
Sand and gravel	12	91	Sand and boulders	8	497
Sand, water	35	126	Clay, yellow, hard	2	499
Clay, yellow	3	129	Clay	4	503
Sand and gravel	18	147	Sand	42	545
Clay, yellow	5	152	Clay	6	551
Sand and gravel	32	184	Sand and boulders	12	563
Clay	5	189	Clay, yellow, hard	8	571
Sand, water, coarse	51	240	Sand and gravel	20	591
Clay, red, hard	49	289	Sand, clay, and gravel	37	628
Sand and boulders	27	316	Sand	3	631
Clay, yellow, hard	10	326	Clay and gravel	4	635
Sand and boulders	11	337	Sand and boulders	3	638
Clay, yellow, hard	5	342	Clay, hard	8	646
Sand	2	344	Sand and boulders	39	685
Clay	3	347	Clay, sandy	6	691
Sand	23	370	Sand and boulders	4	695
Clay, yellow, hard	6	376	Clay and boulders	4	699
Sand	37	413	Sand and clay	12	711
Clay, yellow, hard	8	421	Clay and boulders	6	717
Sand and boulders	4	425	Sand	20	737
Sand	4	429	Sand and clay	8	745
Clay, hard	2	431	Sand and boulders	64	809
Sand	6	437	Sand and clay	7	816
Sand and boulders	1	438	Sand and gravel	46	862
Clay, hard	5	443			

Well V-47

Owner: City of El Paso. Driller: Layne and Bowler

Surface sand	38	38	Rock	4	348
Gravel, fine, and clay	5	43	Clay, hard	7	355
Clay, sandy	38	81	Clay, sandy	8	363
Clay, hard	3	84	Sand	13	376
Clay, sandy	41	125	Clay	3	379
Clay, hard	18	143	Gumbo	21	400
Clay, sandy	9	152	Clay	7	407
Clay and gravel	12	164	Sand and gravel	38	445
Clay, hard	4	168	Clay	5	450
Clay, sandy	12	180	Sand	4	454
Clay and boulders	3	183	Clay, sandy	3	457
Clay, sandy	30	213	Rock	2	459
Clay, hard	4	217	Clay, sandy	2	461
Clay, sandy	6	223	Sand and clay	22	483
Gumbo	4	227	Clay, rock, and boulders	2	485
Clay and gumbo	7	234	Sand and gravel	40	525
Clay	10	244	Clay	1	526
Clay, sandy	14	258	Clay and gumbo	20	546
Clay and gumbo	10	268	Sand, gravel, and boulders	14	560
Sand, packed	27	295	Clay	3	563
Rock and boulders	4	299	Sand and boulders	13	576
Clay	6	305	Clay	8	584
Clay, sandy	12	317	Sand	20	604
Boulders and sand rock	2	319	Clay, soft, and gumbo	6	610
Clay, sandy	5	324	Gumbo, hard	16	626
Sand and boulders	20	344	Rock and shale	13	639

Drillers' logs of wells in the Hueco Bolson area, El Paso County, Tex., and Dona Ana and Otero Counties, N. Mex. —Continued

	Thickness (feet)	Depth (feet)		Thickness (feet)	Depth (feet)
Well V-47—Continued					
Rock	2	641	Sand, gravel, and boulders	12	827
Clay and boulders	9	650	Clay and gumbo	12	839
Gravel and boulders	11	661	Gravel and boulders	12	851
Gumbo and clay	32	693	Gumbo	4	855
Sand, gravel, and boulders	11	704	Gravel and boulders	22	877
Shale, hard	4	708	Clay and boulders	9	886
Boulders	13	721	Sand and gravel	8	894
Clay, sandy	3	724	Clay and gumbo	3	897
Clay and boulders	4	728	Sand, gravel, and boulders	26	923
Gumbo	3	731	Gumbo	4	927
Boulders and clay	15	746	Sand and sand rock	15	942
Gumbo, hard	7	753	Gumbo	19	961
Rock	3	756	Sand and sand rock	12	973
Sand and sand rock	14	770	Gumbo	14	987
Rock	5	775	Gravel and boulders	10	997
Sand and gravel	14	789	Rock	1	998
Gravel and boulders	21	810	Sand, gravel, and boulders	25	1,023
Clay and gumbo	5	815			

Well V-48

Owner: City of El Paso. Driller: City of El Paso

Sand	15	15	Gumbo	22	453
Clay, red	27	42	Sand and gravel; salt water	45	498
Sand, brown	6	48	Gumbo	9	507
Clay, red	13	61	Sand and gravel	31	538
Sand and gravel	12	73	Gumbo	2	540
Gumbo	12	85	Sand and gravel	6	546
Sand and coarse gravel	12	97	Gumbo	31	577
Gumbo	5	102	Sand and gravel	29	606
Sand and gravel	48	150	Gumbo	6	612
Gumbo	28	178	Sand and gravel	18	630
Sand and gravel	24	202	Gumbo and boulders	8	638
Gumbo	12	214	Gumbo	12	650
Sand and gravel	5	219	Sand	7	657
Gumbo	14	233	Boulders	3	660
Sand and gravel	12	245	Sand	15	675
Gumbo	6	251	Gumbo	18	693
Sand and gravel	7	258	Gravel	10	703
Gumbo	9	267	Sand and gravel	14	717
Sand and gravel	22	289	Gumbo	3	720
Gumbo	21	310	Sand and gravel	84	804
Boulders and gumbo	32	342	Gumbo	10	814
Sand, gravel, and boulders	35	377	Sand and gravel	26	840
Gumbo	36	413	Gumbo	4	844
Sand and salt	18	431	Sand and gravel	12	856

Well V-49

Owner: City of El Paso. Driller: P. D. Wynne

Sand	12	12	Sand and boulders	9	123
Sand and clay	15	27	Clay, yellow	6	129
Sand	2	29	Sand and boulders	7	136
Adobe	5	34	Clay, yellow, soft	5	141
Gravel	26	60	Sand, water	56	197
Sand and clay	5	65	Clay, yellow	9	206
Sand and gravel	3	68	Sand and boulders	25	231
Clay, yellow, hard	13	81	Clay, yellow	8	239
Sand and gravel	29	0	Sand and gravel	7	246
Clay, yellow, hard	4	4	Clay, yellow	7	253

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Drillers' logs of wells in the Hueco Bolson area, El Paso County, Tex., and Dona Ana and Otero Counties, N. Mex.—Continued

	Thickness (feet)	Depth (feet)		Thickness (feet)	Depth (feet)
Well V-49—Continued					
Sand and boulders	25	278	Sand and boulders	30	626
Clay	7	285	Clay, yellow, hard	5	631
Sand, white	23	308	Sand and gravel	7	638
Clay, yellow	6	314	Clay, hard	17	655
Sand and gravel	49	363	Sand, boulders, and gravel	17	672
Clay, yellow	24	387	Clay	3	675
Sand and gravel; salt water	25	412	Sand and boulders	22	697
Clay, yellow	16	428	Clay, yellow	8	705
Boulders and fine sand	22	450	Sand, red, and boulders	24	729
Clay	4	454	Clay, red	5	734
Sand and boulders	6	460	Sand and boulders	22	756
Clay	5	465	Rock, sandy	4	760
Sand and boulders	92	557	Clay, hard	3	763
Clay	6	563	Sand and boulders	23	786
Sand and boulders	9	572	Clay, hard	7	793
Clay, yellow, soft	24	596	Sand and gravel	89	882

Well V-50[1]

Owner: City of El Paso. Driller: Layne-Texas Co., Ltd.

Soil	2	2	Clay	10	499
Sand	18	20	Sand	8	507
Sand and gravel	27	47	Clay	26	533
Sand, coarse, and gravel	37	84	Sand	21	554
Clay	2	86	Clay	6	560
Sand and clay	11	97	Sand	59	619
Clay and gravel	20	117	Sand and clay	8	627
Clay and sand	20	137	Sand	15	642
Clay	39	176	Sand and clay	10	652
Sand	24	200	Clay	5	657
Clay	21	221	Sand	70	727
Sand	39	260	Clay	2	729
Sand and clay	16	276	Sand	6	735
Clay	3	279	Clay	5	740
Sand	25	304	Sand	12	752
Clay	20	324	Clay	12	764
Sand	23	347	Sand	48	812
Clay	8	355	Clay	4	816
Sand	12	367	Sand	11	827
Clay	15	382	Clay	4	831
Sand	10	392	Sand	36	867
Clay	7	399	Clay	3	870
Sand	20	419	Sand and clay	3	873
Sand and clay	11	430	Sand	4	877
Clay	17	447	Clay	3	880
Sand	15	462	Sand	10	890
Sand and clay	10	472	Clay	12	902
Sand	17	489			

[1]Drillers' log is for test well drilled in 1938 at same location as well V-50.

Well V-51

Owner: Harry Mitchell Brewing Co. Driller: Layne-Texas Co., Ltd.

Sand	19	19	Clay	9	86
Adobe	3	22	Sand, red	15	101
Sand	5	27	Clay, yellow	3	104
Clay	13	40	Sand, coarse	15	119
Sand and gravel	37	77	Clay	1	120

Drillers' logs of wells in the Hueco Bolson area, El Paso County, Tex., and Dona Ana and Otero Counties, N. Mex.—Continued

	Thickness (feet)	Depth (feet)		Thickness (feet)	Depth (feet)
Well V-51—Continued					
Sand, water	2	122	Sand, coarse, and gravel	4	295
Clay	1	123	Clay, red	28	323
Sand, fine	14	137	Sand, water	30	353
Clay, yellow	5	142	Clay, yellow	1	354
Sand, red	23	165	Sandstone	1	355
Sand, coarse	8	173	Sand	9	364
Clay	7	180	Clay, yellow	1	365
Sand, water	5	185	Sand	4	369
Clay	3	188	Clay, yellow	8	377
Sand, water	58	246	Sand	2	379
Clay, yellow	19	265	Sandstone	4	383
Clay, red	1	266	Sand, fine	2	385
Sand, water	9	275	Clay, red	4	389
Clay, red	5	280	Sand, fine	1	390
Rock and gravel	9	289	Sandstone	6	396
Sand	2	291			
Well V-52					
Owner: Harry Mitchell Brewing Co. Driller: Layne-Texas Co., Ltd.					
Sand	2	2	Sand	35	220
Clay	3	5	Clay	14	234
Sand	20	25	Sand	6	240
Clay	14	39	Clay	26	266
Sand, gravel, and boulders	51	90	Sand and gravel	27	293
Sand and gravel	34	124	Clay	31	324
Clay and boulders	9	133	Sand	29	353
Sand	39	172	Clay	1	354
Clay and boulders	13	185			
Well V-53					
Owner: City of El Paso. Driller: V. Chesney.					
Soil	4	4	Sand and soft rock	20	320
Sand	56	60	Clay	20	340
Sand, hard-packed	3	63	Sand	50	390
Sand	55	118	Sand, clay, and boulders	16	406
Sand and rock	1	119	Sand	46	452
Sand	101	220	Sand, clay, and rock	2	454
Sand, rock, and clay	1	221	Sand	6	460
Sand and gravel	63	284	Clay	8	468
Clay	4	288	Sand	27	495
Shale and clay	6	294	Missing	335	830
Shale, clay, and rock	6	300			
Well V-54					
Owner: City of El Paso. Driller: Layne-Texas Co., Ltd.					
Soil, sandy	6	6	Clay	32	251
Sand and gravel	34	40	Sand	9	260
Clay and gravel	28	68	Clay and sand	26	286
Sand and gravel	30	98	Sand	42	328
Clay	7	105	Clay	8	336
Sand and gravel	79	184	Sand and gravel	5	341
Boulders	1	185	Sand and clay	29	370
Sand	11	196	Sand	11	381
Clay	7	203	Clay and boulders	12	393
Sand	16	219	Sand	68	461

Drillers' logs of wells in the Hueco Bolson area, El Paso County, Tex., and Dona Ana and Otero Counties, N. Mex.—Continued

	Thickness (feet)	Depth (feet)		Thickness (feet)	Depth (feet)
Well V-54—Continued					
Clay and boulders	4	465	Sand	10	715
Sand	41	506	Clay and sand	5	720
Sand and boulders	59	565	Clay, sandy	59	779
Clay, hard	9	574	Clay, sandy, hard	60	839
Sand	16	590	Sand, hard	14	853
Clay, sandy	24	614	Clay, sandy, and boulders	19	872
Sand	42	656	Sand and boulders	28	900
Clay, sandy	49	705	Clay and boulders	5	905
Well V-56					
Owner: Southern Pacific Co. Driller: Layne-Texas Co., Ltd.					
Sand, gravel, and boulders	68	68	Clay	6	402
Clay and boulders	13	81	Sand	23	425
Clay	20	101	Clay and sand	44	469
Sand and clay	19	120	Sand	34	503
Clay	27	147	Clay	9	512
Sand and gravel	70	217	Sand and boulders	89	601
Clay and boulders	15	232	Sand, clay, and boulders	14	615
Clay, sandy, and boulders	20	252	Clay and boulders	11	626
Sand	10	262	Sand	20	646
Sand and clay	34	296	Clay and boulders	7	653
Clay and some boulders	11	307	Sand, hard, and boulders	6	659
Sand	12	319	Clay and sand	16	675
Clay	17	336	Clay	18	693
Sand	17	353	Sand	35	728
Sand and boulders	7	360	Clay	19	747
Clay	19	379	Sand and boulders	35	782
Sand	5	384	Clay, sandy	3	785
Clay	6	390	Sand	10	795
Sand and boulders	6	396	Clay	3	798
Well V-58					
Owner: Texas and Pacific Railway. Driller: Layne-Texas Co., Ltd.					
Soil	2	2	Clay	4	312
Sand	20	22	Sand	43	355
Sand, gravel, and boulders	38	60	Clay	10	365
Clay	36	96	Clay, sandy	22	387
Sand and gravel	11	107	Sand	16	403
Clay and sand	30	137	Clay, sandy	15	418
Sand and gravel	89	226	Clay, tough	30	448
Clay	5	231	Sand	37	485
Sand and gravel	36	267	Clay	7	492
Rock	4	271	Sand and clay	36	528
Sand and gravel	7	278	Clay and boulders	8	536
Rock	1	279	Sand and clay	40	576
Clay	12	291	Clay	5	581
Sand	17	308	Sand, hard	43	624
Well V-59					
Owner: City of El Paso. Driller: Layne-Texas Co., Ltd.					
Soil	1	1	Clay	10	104
Sand	28	29	Sand	106	210
Sand and gravel	45	74	Clay	6	216
Clay	3	77	Sand and clay	17	233
Sand and gravel	17	94	Clay	4	237

Drillers' logs of wells in the Hueco Bolson area, El Paso County, Tex., and Dona Ana and Otero Counties, N. Mex.—Continued

	Thickness (feet)	Depth (feet)		Thickness (feet)	Depth (feet)
Well V-59—Continued					
Sand and clay	10	247	Clay and boulders	2	613
Sand	20	267	Sand	4	617
Clay	7	274	Clay	2	619
Sand	5	279	Sand	6	625
Clay	16	295	Clay and sand	6	631
Sand	10	305	Sand	9	640
Sand and clay	32	337	Clay	4	644
Sand	15	352	Sand	27	671
Clay	5	357	Clay	2	673
Sand and clay	15	372	Sand	44	717
Clay	5	377	Sand and clay	10	727
Sand and clay	15	392	Sand	34	761
Sand	36	428	Boulders	1	762
Sand and clay	8	436	Sand and clay	6	768
Sand	84	520	Clay	6	774
Clay	1	521	Sand	43	817
Clay and boulders	3	524	Clay	5	822
Sand	47	571	Sand	15	837
Clay	9	580	Clay	4	841
Sand and clay	11	591	Sand	10	851
Sand	20	611			
Well V-60					
Owner: City of El Paso. Driller: A. Stout					
Sand and soil	34	34	Clay	20	302
Gravel	44	78	Sand	23	325
Clay	22	100	Clay	51	376
Sand and gravel	87	187	Sand and boulders	19	395
Clay	3	190	Boulders	21	416
Sand and gravel	15	205	Clay	19	435
Clay	1	206	Sand	5	440
Sand and gravel	9	215	Sand, gravel, and rock	63	503
Clay	8	223	Clay	12	515
Sand and gravel	15	238	Sand and gravel	20	535
Clay	15	253	Clay	10	545
Gravel and boulders	13	266	Sand and gravel	17	562
Clay and boulders	6	272	Clay	8	570
Sand	10	282	Sand	76	646
Well V-62					
Owner: City of El Paso. Driller: V. Chesney					
Surface sand	50	50	Sand, coarse	6	464
Sand, rock, and gravel	16	66	Clay	4	468
Clay	6	72	Sand	54	522
Sand, fine, loose	152	224	Sand rock	1	523
Clay	5	229	Sand	13	536
Sand, loose, and boulders	108	337	Clay	4	540
Clay	6	343	Sand, coarse, and boulders	24	564
Sand, loose	44	387	Sand rock	1	565
Clay	6	393	Clay	3	568
Sand and rock	1	394	Sand, coarse, and boulders	58	626
Sand	6	400	Sand rock	1	627
Shell, sandy	1	401	Clay	2	629
Sand and gravel	15	416	Clay	2	631
Clay	4	420	Sand, coarse	22	653
Sand, coarse; sand rocks and caliche	33	453	Clay	4	657
Clay	5	458			

Drillers' logs of wells in the Hueco Bolson area, El Paso County, Tex., and Dona Ana and Otero Counties, N. Mex.—Continued

	Thickness (feet)	Depth (feet)		Thickness (feet)	Depth (feet)
Well V-62—Continued					
Sand and gravel	10	667	Sand, coarse, and boulders	37	709
Sand rock, hard	1	668	Sand	98	807
Clay	4	672			
Well V-64					
Owner: El Paso Electric Co. Driller: Layne-Texas Co., Ltd.					
Sand	11	11	Clay	1	182
Sand, river	9	20	Sand	9	191
Gravel	8	28	Clay	1	192
Clay	4	32	Sand	6	198
Sand and gravel	35	67	Clay	1	199
Clay, red	4	71	Sand	1	200
Gravel	4	75	Clay	9	209
Clay, red	6	81	Rock	2	211
Clay and gravel	9	90	Sand	23	234
Sand, water	81	171	Boulders	6	240
Clay and ledge	3	174	Sand	12	252
Sand	7	181			
Well V-65					
Owner: El Paso Electric Co. Driller: Layne-Texas Co., Ltd.					
Sand	16	16	Sand, fine, and clay	6	132
Sand and boulders	5	21	Sand, medium to coarse	12	144
Sand, boulders, and clay	14	35	Sand, coarse	1	145
Sand, gravel, and boulders	7	42	Clay	8	153
Sand and boulders	7	49	Sand and some clay	12	165
Sand, gravel, and boulders	29	78	Sand, coarse, and gravel	15	180
Clay, hard	20	98	Sand, medium to coarse, and some clay	15	195
Sand, medium to coarse	8	106	Sand, coarse, angular	34	229
Sand, coarse	16	122			
Sand, coarse, and gravel	4	126			
Well V-66					
Owner: El Paso Electric Co. Driller: J. F. Hawkins					
Soil	4	4	Sand and fine gravel	23	220
Sand	15	19	Sand	68	288
Sand, gravel, and boulders	45	64	Gravel	8	296
Sand	9	73	Sand	9	305
Gravel	6	79	Clay	19	324
Sand	7	86	Gravel	8	332
Sand and gravel	4	90	Sand	15	347
Clay	2	92	Clay	4	351
Sand and gravel	11	103	Sand and gravel	6	357
Sand	36	139	Sand	14	371
Sand and gravel	33	172	Gravel	11	382
Clay	11	183	Sand	11	393
Sand and gravel	14	197	Boulders	1	394
Well V-67					
Owner: El Paso Electric Co. Driller: Layne-Texas Co., Ltd.					
Sand	14	14	Clay	1	26
Gravel and rocks	11	25	Gravel and rocks	4	30

Drillers' logs of wells in the Hueco Bolson area, El Paso County, Tex., and Dona Ana and Otero Counties, N. Mex.—Continued

	Thickness (feet)	Depth (feet)		Thickness (feet)	Depth (feet)
Well V-67—Continued					
Clay	1	31	Caliche	1	154
Gravel	1	32	Clay, red	4	158
Clay, sandy	2	34	Sand	4	162
Gravel	17	51	Clay and sand	15	177
Clay	1	52	Sand and rocks	3	180
Sand, coarse	21	73	Clay, yellow	1	181
Sand, red, silty	6	79	Sand	1	182
Sand	5	84	Clay, red	4	186
Clay	1	85	Sand, coarse	20	206
Sand	9	94	Clay, red	5	211
Clay, red	9	103	Sand	17	228
Sand	8	111	Caliche	1	229
Clay, sandy, hard	4	115	Clay and boulders	14	243
Sand	11	126	Sand	41	284
Sand rock, soft	2	128	Clay and boulders	3	287
Gravel	25	153	Sand, coarse	17	304
Well V-69					
Owner: City of El Paso. Driller: C. R. Jensen					
Soil, sand, and clay	46	46	Sand	42	574
Sand and gravel	19	65	Clay	13	587
Clay	22	87	Sand	10	597
Clay, sandy	25	112	Clay, sandy	5	602
Clay	35	147	Sand	20	622
Sand	3	150	Clay	25	647
Clay	3	153	Clay, sandy	10	657
Sand	7	160	Clay	8	665
Clay	2	162	Sand	38	703
Sand	1	163	Clay	8	711
Clay	1	164	Sand	31	742
Sand	19	183	Clay	3	745
Clay	1	184	Sand	27	772
Sand	7	191	Clay, sandy	20	792
Clay	63	254	Sand	11	803
Sand	2	256	Clay, sandy	5	808
Clay	16	272	Sand	3	811
Sand	8	280	Clay	6	817
Clay	41	321	Sand	23	840
Sand	2	323	Clay	21	861
Clay	1	324	Sand	19	880
Sand	35	359	Clay	2	882
Clay, sandy	9	368	Sand	8	890
Clay	11	379	Clay	36	926
Sand	46	425	Sand	21	947
Sand and boulders	9	434	Clay	7	954
Clay	15	449	Sand	2	956
Sand	32	481	Clay	4	960
Clay	2	483	Sand	6	966
Sand	2	485	Clay	7	973
Clay	14	499	Sand	9	982
Sand	29	528	Boulders	1	983
Boulders	1	529	Clay	24	1,007
Clay	3	532			

Drillers' logs of wells in the Hueco Bolson area, El Paso County, Tex., and Dona Ana and Otero Counties, N. Mex.—Continued

	Thickness (feet)	Depth (feet)		Thickness (feet)	Depth (feet)

Well V-70

Owner: El Paso County Water Control & Improvement District No. 1. Driller: Layne-Texas Co., Ltd.

Sand, gravel, and caliche	81	81	Clay	9	445
Caliche and clay	29	110	Sand	15	460
Sand	60	170	Clay	2	462
Clay	5	175	Sand	55	517
Sand	10	185	Clay	6	523
Clay	3	188	Sand	8	531
Sand	58	246	Clay	13	544
Clay	3	249	Sand	26	570
Sand	6	255	Clay and boulders	7	577
Sand and clay	9	264	Clay	6	583
Clay	9	273	Clay, sandy	8	591
Sand	40	313	Sand	20	611
Clay	5	318	Clay, sandy	4	615
Sand	16	334	Sand and boulders	25	640
Clay and sand	9	343	Clay	2	642
Clay	14	357	Clay and sandy clay	22	664
Sand	43	400	Sand and boulders	5	669
Clay	13	413	Sand	12	681
Sand	4	417	Sand and boulders	22	703
Boulders	1	418	Clay	1	704
Sand	18	436			

Well V-72

Owner: The Texas Co. Driller: P. D. Wynne

Sand	27	27	Sand, water, and gravel	11	370
Clay	6	33	Clay, yellow, hard	10	380
Sand	17	50	Sand, water, and gravel	26	406
Clay	3	53	Clay, yellow, hard	14	420
Sand, water, and gravel	27	80	Sand and rock	4	424
Clay	4	84	Sand, water, boulders, and gravel	13	437
Gravel and sand	23	107	Clay, yellow, hard	9	446
Clay	13	120	Sand, water, and gravel	34	480
Sand, water, and gravel	11	131	Clay, yellow, hard	12	492
Clay	8	139	Sand, water, and boulders	23	515
Sand, water, and gravel	55	194	Clay, yellow, hard	20	535
Clay, yellow, hard	43	237	Sand, water, and boulders	67	602
Sand, water, and boulders	53	290	Clay, sandy	8	610
Clay, yellow, hard	17	307	Sand, water, and gravel	50	660
Sand and gravel	18	325	Clay, yellow, hard	11	671
Clay, yellow, hard	12	337	Sand, water, and gravel	17	688
Sand, water, and gravel	14	351	Clay	6	694
Clay, yellow, hard	8	359			

Well V-74

Owner: Standard Oil Co. of Texas. Driller: Layne-Texas Co., Ltd.

Sand	47	47	Clay	12	316
Sand and gravel	53	100	Sand	10	326
Clay and rocks	15	115	Clay	25	351
Sand	88	203	Sand	28	379
Clay	20	223	Gumbo	23	402
Sand	66	289	Sand	13	415
Clay	3	292	Clay	5	420
Sand	12	304	Sand	34	454

Drillers' logs of wells in the Hueco Bolson area, El Paso County, Tex., and Dona Ana and Otero Counties, N. Mex.—Continued

	Thickness (feet)	Depth (feet)		Thickness (feet)	Depth (feet)
Well V-74—Continued					
Clay	7	461	Sand	39	517
Sand	10	471	Clay and sand	28	545
Clay	7	478	Sand	45	590
Well V-75					
Owner: Standard Oil Co. of Texas. Driller: Layne-Texas Co., Inc.					
Soil and sand	84	84	Sand	118	422
Gravel	41	125	Gumbo	3	425
Sand and gravel	55	180	Sand	15	440
Gumbo	14	194	Gumbo	5	445
Sand	15	209	Sand	49	494
Gumbo	4	213	Gumbo	17	511
Sand	49	262	Sand	46	557
Gumbo	6	268	Gumbo	8	565
Sand	26	294	Sand	41	606
Gumbo	10	304	Gumbo	1	607
Well V-78					
Owner: Standard Oil Co. of Texas					
Sand	99	99	Sand	13	225
Sand and boulders	12	111	Clay	13	238
Sand and gravel	88	199	Sand	58	296
Clay	13	212	Clay	3	299
Well V-79					
Owner: Phelps Dodge Refining Corp.					
Sand	96	96	Gumbo	10	481
Sand and boulders	8	104	Sand	8	489
Sand	74	178	Gumbo	9	498
Clay	8	186	Sand	47	545
Sand	57	243	Gumbo and boulders	8	553
Clay, tough	6	249	Sand	32	585
Sand	41	290	Gumbo	6	591
Gumbo	10	300	Sand	13	604
Sand	111	411	Gumbo	4	608
Gumbo	8	419	Sand	36	644
Sand	7	426	Gumbo	14	658
Gumbo	2	428	Sand	41	699
Sand	13	441	Rock	1	700
Gumbo	11	452	Sand	6	706
Sand	19	471			
Well V-80					
Owner: Phelps Dodge Refining Corp. Driller: Layne-Texas Co., Ltd.					
Sand and gravel	40	40	Sand	77	348
Sand and clay	10	50	Sand and boulders	12	360
Sand	25	75	Sand	10	370
Gravel	29	104	Rock	1	371
Sand	46	150	Clay	13	384
Clay	14	164	Sand	6	390
Sand	94	258	Clay	30	420
Clay	13	271	Sand	25	445

Drillers' logs of wells in the Hueco Bolson area, El Paso County, Tex., and Dona Ana and Otero Counties, N. Mex.—Continued

	Thickness (feet)	Depth (feet)		Thickness (feet)	Depth (feet)
Well V-80—Continued					
Clay	12	457	Sand	57	588
Sand	13	470	Clay	13	601
Clay	4	474	Sand	39	640
Sand	11	485	Clay	2	642
Rock	1	486	Sand	16	658
Sand and boulders	16	502	Sand and boulders	12	670
Sand and clay	29	531	Clay	1	671
Well V-81					
Owner: Phelps Dodge Refining Corp. Driller: Layne-Texas Co., Ltd.					
Sand	102	102	Clay	11	526
Sand and gravel	14	116	Sand	26	552
Sand	41	157	Clay	2	554
Clay and gravel	9	166	Clay, sandy	5	559
Sand	79	245	Clay	2	561
Clay	8	253	Clay and sand	19	580
Sand	7	260	Sand	19	599
Clay	23	283	Clay	2	601
Sand and gravel, fine	43	326	Sand	14	615
Clay and boulders	9	335	Clay	10	625
Sand, hard	45	380	Sand	4	629
Clay and boulders	14	394	Clay	3	632
Sand	59	453	Sand	9	641
Boulders	3	456	Clay	10	651
Sand	18	474	Sand	31	682
Clay	10	484	Clay	1	683
Sand	31	515			
Well V-82					
Owner: El Paso County Water Control & Improvement District No. 1. Driller: Layne-Texas Co., Ltd.					
Sand	20	20	Clay	30	405
Sand and clay	20	40	Sand	39	444
Gravel	30	70	Clay	6	450
Clay	45	115	Sand	90	540
Sand and clay	25	140	Clay	14	554
Sand	40	180	Sand	66	620
Clay	30	210	Clay	8	628
Sand	40	250	Sand	32	660
Clay	10	260	Clay	5	665
Sand	50	310	Sand	20	685
Clay and sand	50	360	Clay	4	689
Sand	15	375			
Well V-86					
Owner: El Paso County Water Control & Improvement District No. 1. Driller: Layne-Texas Co., Ltd.					
Sand	59	59	Sand	44	382
Sand, clay, and boulders	21	80	Clay	21	403
Gravel	78	158	Sand	37	440
Clay	5	163	Clay	10	450
Gravel and sand	55	218	Sand	79	529
Clay	19	237	Sand	49	578
Sand	71	308	Clay	3	581
Clay and sandy clay	30	338	Sand	45	626

Drillers' logs of wells in the Hueco Bolson area, El Paso County, Tex., and Dona Ana and Otero Counties, N. Mex.—Continued

	Thickness (feet)	Depth (feet)		Thickness (feet)	Depth (feet)
Well V-86—Continued					
Clay	45	671	Clay	75	786
Sand	40	711			
Well W-9					
Sand	130	130	Clay, sandy	27	468
Clay	4	134	Clay	17	485
Clay, sandy	5	139	Clay, sandy	8	493
Sand	77	216	Sand	8	501
Clay	8	224	Clay	2	503
Sand	22	246	Clay, sandy	11	514
Clay	187	433	Clay and sand	48	562
Sand	5	438	Clay and sandy clay	15	577
Clay	3	441	Clay	23	600

Owner: El Paso County Water Control & Improvement District No. 1. Driller: Layne-Texas Co., Ltd.

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