TEXAS WATER COMMISSION

BULLETIN 6203

GROUND-WATER RESOURCES OF THE LOWER MESILLA VALLEY, TEXAS AND NEW MEXICO

Prepared in cooperation with the Geological Survey
United States Department of the Interior
and the City of El Paso

March 1962

TEXAS WATER COMMISSION

Bulletin 6203

GROUND-WATER RESOURCES OF THE LOWER MESILLA VALLEY, TEXAS AND NEW MEXICO

By

E. R. Leggat, M. E. Lowry,
and J. W. Hood, Geologists
United States Geological Survey

Prepared in cooperation with the Geological Survey
United States Department of the Interior
and the City of El Paso

March 1962

TABLE OF CONTENTS

	Page
ABSTRACT	1
INTRODUCTION	3
Purpose and Scope of Investigation	3
Location and Extent of Area	3
Previous Investigations	5
Acknowledgments	5
Topography	5
Climate	6
GEOLOGY	6
Consolidated Rocks	9
Unconsolidated Deposits	10
Santa Fe Group	10
Alluvium	15
GROUND WATER	15
History of Development	15
Occurrence and Movement	16
Recharge	17
Discharge	18
Fluctuations of Water Levels	20
Characteristics of Wells	31
Hydrologic Characteristics of Water-Bearing Materials	32
Ground Water in Storage	38

TABLE OF CONTENTS (Cont'd.)

Page

QUALITY OF WATER.. 39

Ground Water.. 39

Santa Fe Group.. 40

Alluvium.. 41

Consolidated Rocks.................................... 43

Surface Water.. 44

FUTURE DEVELOPMENT.. 48

SUMMARY AND CONCLUSIONS.. 50

SELECTED REFERENCES.. 53

TABLES

1. Records of wells in lower Mesilla Valley, El Paso County, Texas, and Dona Ana County, New Mexico.................................. 55

2. Drillers' logs of wells in lower Mesilla Valley, El Paso County, Texas, and Dona Ana County, New Mexico.......................... 77

3. Sample logs of wells in lower Mesilla Valley, El Paso County, Texas, and Dona Ana County, New Mexico.......................... 117

4. Water levels in wells in lower Mesilla Valley, El Paso County, Texas, and Dona Ana County, New Mexico.......................... 150

5. Analyses of water from wells in lower Mesilla Valley, El Paso County, Texas, and Dona Ana County, New Mexico.................. 174

ILLUSTRATIONS

Figures

1. Physiographic map of parts of Texas, New Mexico, and Mexico showing the location of the lower Mesilla Valley................ 4

2. Monthly temperature at El Paso and monthly evaporation at Ysleta... 7

3. Maximum, minimum, and mean monthly precipitation at El Paso, 1878-1958.. 8

4. Geologic section A-A', lower Mesilla Valley........................ 11

5. Geologic section B-B', lower Mesilla Valley........................ 13

		Page
6.	Annual pumpage of ground water in the lower Mesilla Valley, 1953-58	21
7.	Fluctuations of water levels due to variations in the load on an aquifer in selected wells in the El Paso city well field northwest of Canutillo	23
8.	Fluctuation of water level in well Q-176 (deep aquifer) due to pumping of well Q-180 (medium aquifer) in the El Paso city well field northwest of Canutillo, Nov. 10-Dec. 31, 1958	24
9.	Fluctuations of water levels in shallow wells in the lower Mesilla Valley, 1946-58	26
10.	Mean annual discharge of the Rio Grande below Caballo Dam, New Mexico, 1945-58	27
11.	Fluctuations of water levels in wells in the El Paso city well field northwest of Canutillo, 1957-58	29
12.	Fluctuations of water levels in wells in the El Paso city well field northwest of Canutillo, 1958-59	30
13.	Theoretical distance-drawdown relation for an infinite aquifer having the hydraulic characteristics determined for the alluvium (shallow well field)	35
14.	Theoretical drawdown 1,600 feet from a well pumping 1,000 gpm	36
15.	Theoretical drawdown in an infinite aquifer (Santa Fe group) due to pumping	37
16.	Chloride content of water from wells in the alluvium and from the Rio Grande, 1952-57	42
17.	Average chemical quality of water from the Rio Grande at Leasburg Dam, New Mexico, and at El Paso, Texas, 1930-57	45
18.	Quality and discharge of water in Montoya Drain, 1949-58	46
19.	Quality and discharge of water in Anthony Drain, 1949-58	47
20.	Increase in mineralization of water from the upper to the lower end of West Drain	49

Plates

		Follows
1.	Map showing locations of wells and drains in the lower Mesilla Valley	192

TABLE OF CONTENTS (Cont'd.)

Follows

2. Approximate altitude of water levels in wells in the lower Mesilla Valley, Jan. 1957 .... Plate 1

3. Approximate change of the water table in the lower Mesilla Valley, 1953-59 .... Plate 2

GROUND-WATER RESOURCES OF THE LOWER MESILLA VALLEY, TEXAS AND NEW MEXICO

ABSTRACT

The lower Mesilla Valley extends southward from the vicinity of Anthony, Texas, to the gorge of the Rio Grande north of El Paso, and westward from the Franklin Mountains to the east edge of La Mesa. The increase in the use of ground water for the public water supply of El Paso and for supplemental irrigation, when the surface-water allotments were inadequate, emphasized the need for an investigation of the ground-water resources of the lower Mesilla Valley.

The deep and medium aquifers, in the Santa Fe group, whose maximum thickness is at least 2,000 feet, are the major sources of ground water for public supply. The alluvium (shallow aquifer), which supplies water chiefly for irrigation and to a lesser extent for industrial and municipal supply, has a maximum thickness of about 150 feet.

The Santa Fe group is recharged by precipitation on the surface of the uplands. The alluvium is recharged by seepage from drains, irrigation canals, and the Rio Grande, from excess surface water applied to the land, from precipitation on the valley floor, and from the upward movement of water from the Santa Fe group.

Ground water is discharged by evapotranspiration in areas of high water table, by seepage to the drains and river, by underflow at the south end of the valley, and by wells. Except in the uplands, water in the Santa Fe is under confined (artesian) conditions; water in the alluvium is under unconfined (water-table) conditions.

Pumpage of ground water for irrigation and for the public supply of El Paso increased from 1951 through 1956. Irrigation pumpage decreased in 1957 and 1958, when surface-water allotments were increased. In 1958 the city of El Paso pumped an average of 6.8 million gallons per day from the deep and medium aquifers of the Santa Fe, an increase of 4.3 million gallons per day from the quantity pumped in 1957. The 1958 pumpage from the medium and deep aquifers is estimated to be about 50 percent of the annual recharge to the Santa Fe.

Aquifer tests in the El Paso city well field northwest of Canutillo indicate substantial leakage between the shallow, medium, and deep aquifers. The coefficients of transmissibility averaged about 60,000 gallons per day per foot in the deep aquifer, 35,000 in the medium aquifer, and 150,000 in the shallow aquifer.

The quantity of fresh water in storage in the Texas part of the valley is estimated to be 560,000 acre-feet, of which 150,000 acre-feet is in the alluvium. However, less than half the fresh water in storage may be recovered by wells, owing to the possibility of salt-water contamination.

North and west of Canutillo, water in the medium and deep aquifers of the Santa Fe is satisfactory for municipal use. The water in the alluvium is relatively fresh but more mineralized than that in the Santa Fe. South of Canutillo, the water in the alluvium is highly mineralized but, generally, is of better quality than the water in the underlying Santa Fe.

Pumping from the medium and deep aquifers may result in the percolation of water of poor quality from the shallow aquifer. Large-scale pumping from the alluvium is possible, because of large amounts of recharge from seepage of excess surface water applied to the land and from drain flow.

GROUND-WATER RESOURCES OF THE LOWER MESILLA VALLEY, TEXAS AND NEW MEXICO

INTRODUCTION

Purpose and Scope of Investigation

The purpose of the investigation was to determine the quantity and quality of ground water available in the lower Mesilla Valley for the public supply of El Paso and for industrial and irrigation use. Fieldwork was begun in 1952 but was interrupted in December 1953. The investigation was resumed in 1957 and completed in December 1958. Well records, drillers' logs, sample logs, water-level measurements, and chemical analyses of samples of water on which this report is based are given in Tables 1 to 5. The report contains maps showing the location of wells, the altitude of water levels in various wells, the approximate decline of the water table, and hydrographs showing the fluctuations of water levels in selected wells. Aquifer tests were made at the sites of 15 wells to determine the hydraulic characteristics of the water-bearing formations in the valley. During the course of the investigation, the geology of the valley was studied and geologic sections were prepared. Diagrams and tables show the quality of samples of water from selected wells, the Rio Grande, and drains. Wells are numbered to conform to a 10-minute grid system established during the ground-water investigation of the Hueco bolson in 1954. The grids are identified by letters of the alphabet. Inside the grids the individual wells are numbered consecutively, beginning in the northwest corner. However, because the fieldwork and preparation of the report were interrupted, it was not possible to maintain the consecutive numbering of the individual wells.

The cooperative investigation by the U. S. Geological Survey, the Texas Water Commission (formerly the Texas Board of Water Engineers), and the city of El Paso is part of a statewide program of ground-water investigations. The investigation was made under the administrative direction of A. N. Sayre and P. E. LaMoreaux, successive chiefs of the Ground Water Branch of the U. S. Geological Survey, and under the supervision of R. W. Sundstrom, district engineer in charge of ground-water investigations in Texas.

Location and Extent of Area

The report area includes about 135 square miles in the southern part of the Mesilla Valley, extending from the vicinity of Anthony to the gorge of the Rio Grande about 4 miles north of El Paso. (See Figure 1 and Plate 1.) The lower Mesilla Valley is divided approximately in half by the Texas-New Mexico

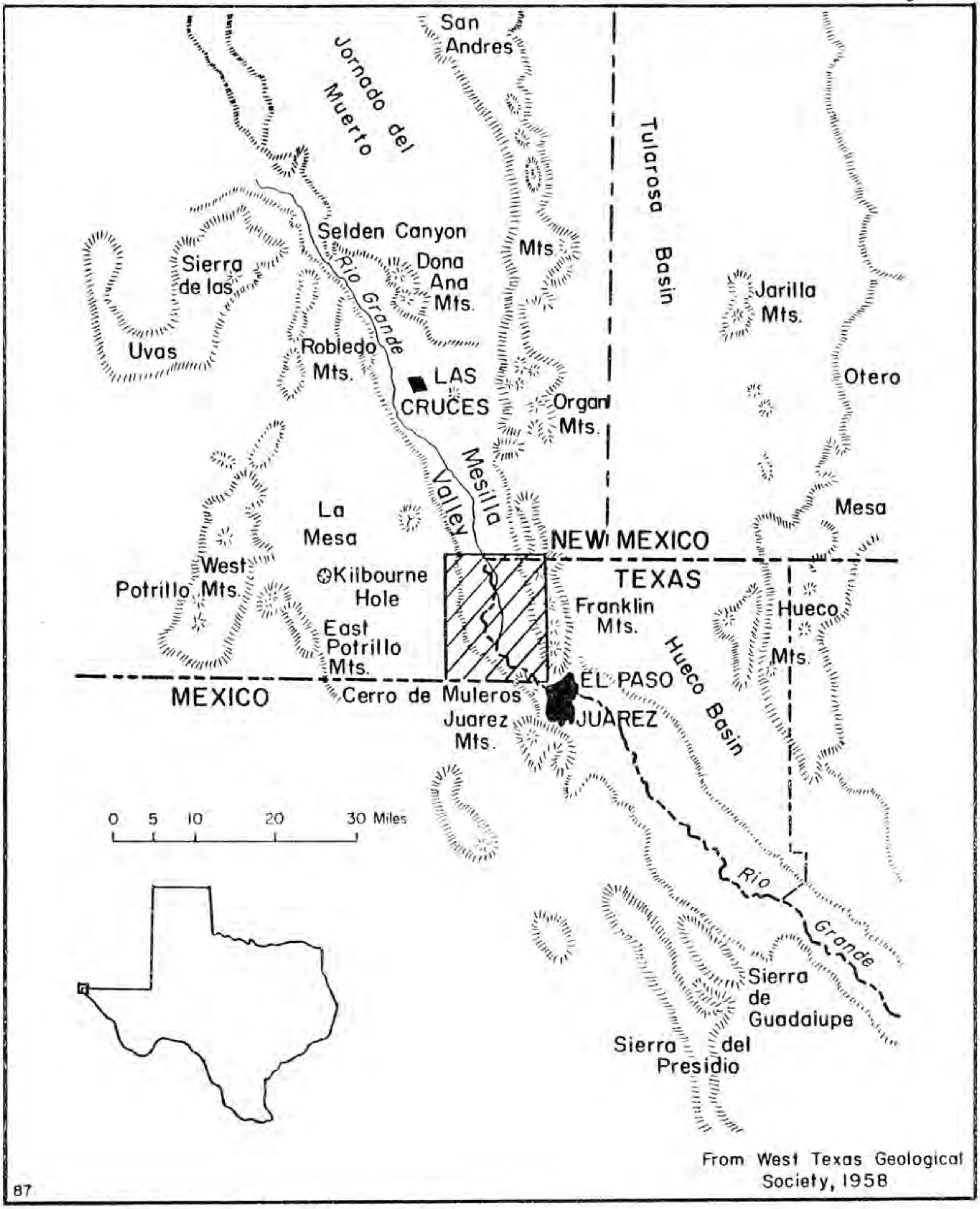


FIGURE 1.- Physiographic map of parts of Texas, New Mexico, and Mexico showing the location of the lower Mesilla Valley

boundary line; data on several wells in New Mexico are included in the report. The towns of White Spur, Anthony, and Canutillo are near the east edge of the valley in Texas. The village of La Union, New Mexico, near the west edge, is across the valley from Canutillo. The valley is served by the Atchison, Topeka, and Santa Fe Railway, by U. S. Highway 80, and by several county roads.

El Paso, the largest city on the United States-Mexico border, lies on the south and southeast flanks of the Franklin Mountains. The population of the metropolitan area in 1957 was estimated to be 250,000. El Paso is a business, livestock, and railroad center, a port of entry from Mexico, and the headquarters of Fort Bliss and Biggs Air Force Base. Industries include smelters, oil refineries, cotton gins, oil mills, textile mills, breweries and soft-drink plants, food-processing plants, and creameries.

Previous Investigations

Ground-water conditions in the gorge of the Rio Grande north of El Paso and in parts of the Mesilla Valley were first described by Slichter (1905). He investigated the underflow of the Rio Grande at the narrows above El Paso, the site of a proposed international dam. Lee (1907) in his report on the water resources of the Rio Grande Valley gave data on wells in the Mesilla Valley. He also discussed the quantity, source, and probable discharge of ground water in the Mesilla Valley. Sayre and Livingston (1945) discussed in detail the geology and ground-water resources of the El Paso area. The geologic descriptions of Sayre and Livingston have been most helpful and have been used freely in the geologic discussion in this report.

Other useful reports are Dunham's (1935) on the geology of the Organ Mountains; Bryan's (1938) to the Rio Grande Joint Investigation; Conover's (1954) on the Rincon and Mesilla Valleys in New Mexico; and the West Texas Geological Society Guidebook of the 1958 field trip to the Franklin and Hueco Mountains, which contains Kottlowski's report on the geologic history of the Rio Grande near El Paso.

Ground-water studies at the Federal Correctional Institution near La Tuna were made in 1930, 1935, and 1937, but the reports were not published. Sundstrom (1952) prepared a report on the investigation made in 1952, which incorporated some of the data collected in the earlier investigations.

Acknowledgments

The writers appreciate the cooperation and the information contributed by officials of the El Paso Public Service Board, the U. S. Bureau of Reclamation, the U. S. Soil Conservation Service, the International Boundary and Water Commission, and the El Paso Electric Co. The landowners and drillers in the area cooperated generously by furnishing well logs and data.

Topography

The lower Mesilla Valley is cut into the unconsolidated deposits of La Mesa bolson. The steep-walled valley slopes at the rate of 4.5 feet per mile from the town of Anthony to the gorge of the Rio Grande. The relatively level valley floor ranges in width from less than a thousand feet at the gorge of the Rio Grande to 4.5 miles at Anthony. At the south end of the valley, the Rio Grande flows through a narrow gorge between the Franklin Mountains, which form the eastern boundary of the valley, and the Cerro de Muleros, a conical hill. Mount Franklin, the highest peak of the Franklin Mountains, rises to an altitude of 7,149 feet, about 3,400 feet above the Rio Grande flood plain. Sierra del Cristo Rey, altitude 4,576 feet, the highest point of the Cerro de Muleros, rises 845 feet above the Rio Grande.

The La Mesa surface, which is the second highest of four erosional surfaces recognized by Dunham (1935, p. 178-185), is a broad plain that extends as a nearly unbroken surface from Las Cruces, New Mexico, southward into Mexico. East of the Rio Grande the La Mesa surface consists of dissected pediments on the flanks of the Franklin Mountains. The various erosional surfaces are due to pediment-like planation and local stream terracing, built up and dissected by tributary streams from the uplands and graded to particular flood-plain levels of the Rio Grande. The lower surfaces are terrace levels, which are almost entirely the work of tributary streams (Kottlowski, 1958, p. 53).

Climate

The lower Mesilla Valley is arid, and its climate is characterized by a wide range in temperature, low humidity, high evaporation, and low precipitation. According to U. S. Weather Bureau records, the mean annual temperature at El Paso from 1887 to 1958 was about 63°F. Figure 2 shows the average monthly temperature during this period. Large diurnal temperature changes are common: summer temperatures are frequently above 90°F and occasionally above 100°F during the day and in the 60's at night. Winter temperatures below freezing average about 45 days a year. Small amounts of snow fall nearly every year but seldom remain on the ground for more than a few hours. The average growing season, from the last killing frost in the spring to the first killing frost in the fall, is about 200 days. Sandstorms occur at any time during the year; however, storm frequency and intensity are greatest in March and April.

The average relative humidity is less than 50 percent, indicating a high rate of evaporation. The average annual evaporation from a free-water surface is 107.43 inches, or about 12 times the average annual precipitation. Figure 2 shows the average monthly evaporation at Ysleta from 1948 to 1958.

Rainfall is insufficient for the growth of any except desert vegetation; irrigation is necessary for crops, gardens, and lawns. The average annual precipitation at El Paso for the 1878-1958 period was 8.71 inches. More than half the precipitation is concentrated during the summer in brief but at times heavy thundershowers. Although the time distribution of rainfall is advantageous for agriculture, the amount is inadequate and must be supplemented by irrigation from surface- or ground-water supplies. Figure 3 shows the maximum, minimum, and mean monthly precipitation at El Paso from 1878 to 1958.

GEOLOGY

The Mesilla Valley was formed by the downcutting of the Rio Grande in La Mesa bolson. La Mesa is a structural basin filled with unconsolidated or

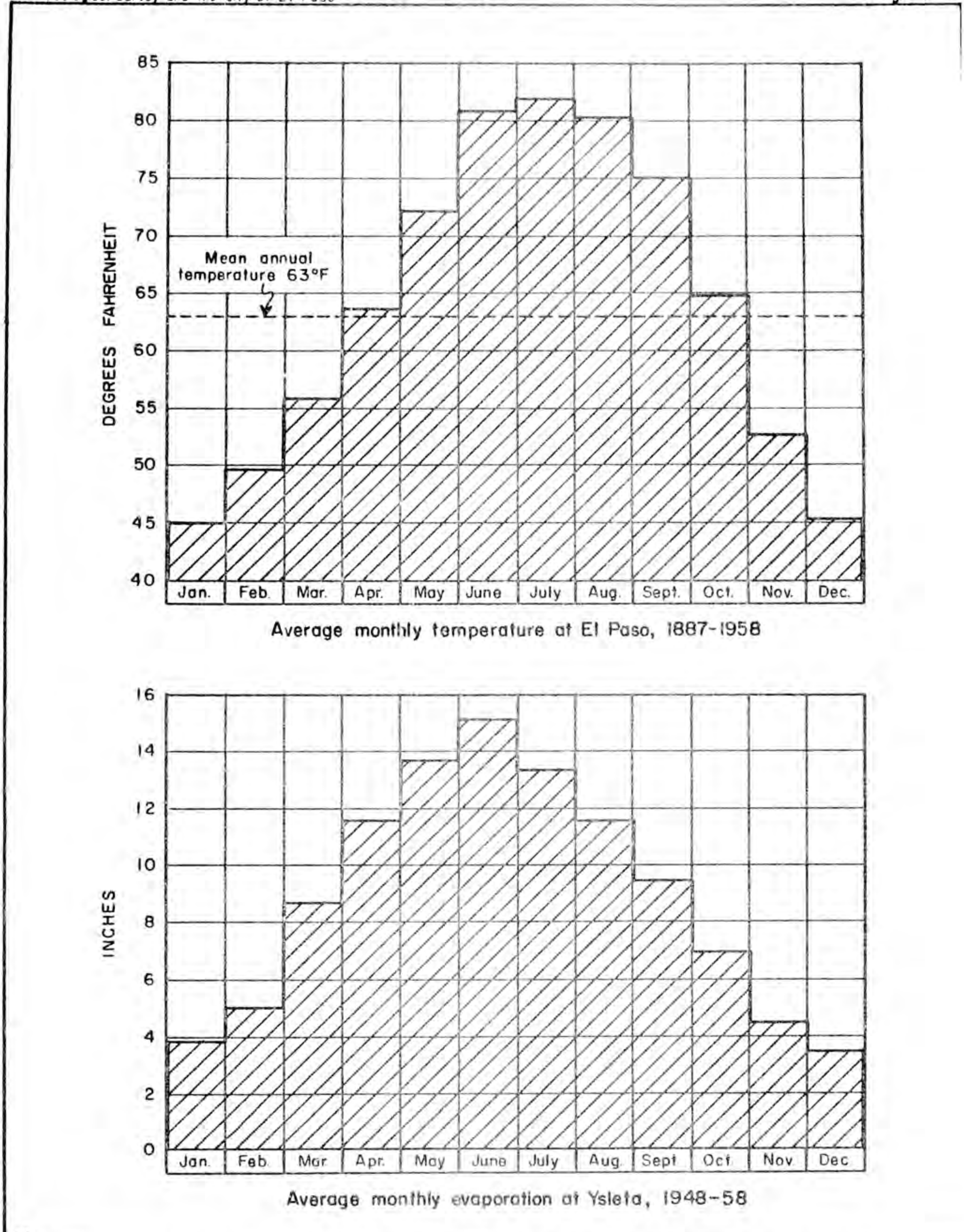
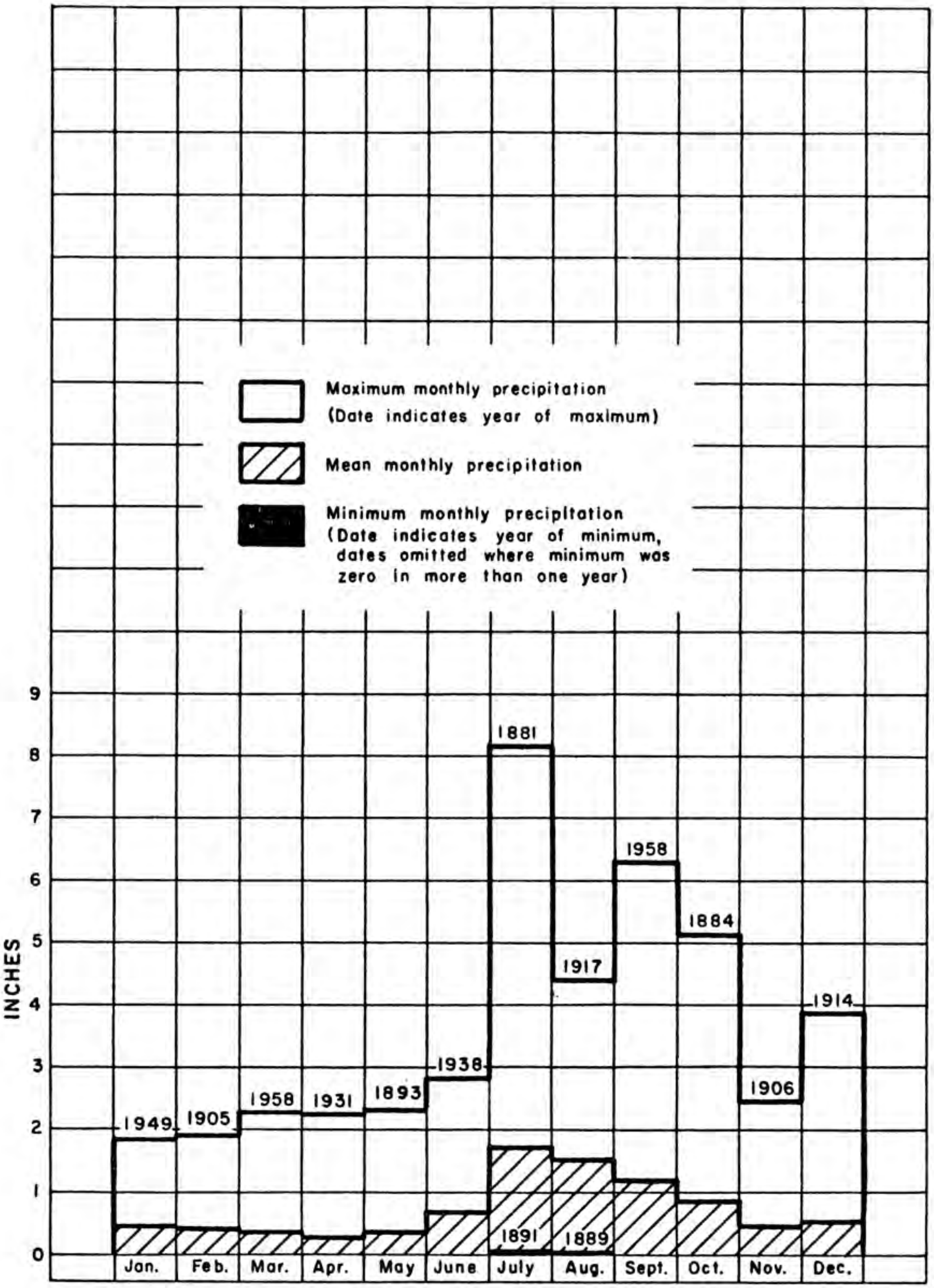


FIGURE 2. – Monthly temperature at El Paso and monthly evaporation at Ysleta

(From records of U. S. Weather Bureau)



87

FIGURE 3. – Maximum, minimum, and mean monthly precipitation at El Paso, 1878–1958

(From records of the U.S. Weather Bureau) slightly consolidated deposits of Tertiary and Quaternary age derived from the erosion of bordering highlands. The highlands were reduced in late Tertiary time and later rejuvenated to form the present ranges.

The main body of sediments in the lower Mesilla Valley belong to the Santa Fe group of middle(?) Miocene to Pleistocene(?) age (Spiegel and Baldwin, in preparation). Sediments of more recent age overlie the Santa Fe group as outwash-fan deposits, windblown deposits, and alluvium laid down by the Rio Grande. As the alluvium is derived from the erosion of the Santa Fe group and consequently shows similar characteristics, it is difficult to determine the contact between the alluvium and the Santa Fe.

Consolidated Rocks

Consolidated rocks in and near the lower Mesilla Valley include both igneous and sedimentary rocks ranging in age from Precambrian to Tertiary. Most of the igneous rocks are Precambrian or Tertiary in age; the sedimentary deposits are pre-Tertiary. The largest areas of outcrop are in the Franklin and Organ Mountains. In the area between the Franklin Mountains and the Cerro de Muleros, andesite porphyry crops out. Cretaceous limestone and shale are exposed on the flanks of the igneous core of the Cerro de Muleros. The obstruction of the lower end of the valley by andesite, which was intruded prior to deposition of the Santa Fe group, materially affects the quality of water in the valley. Cretaceous sedimentary rocks are exposed around cores of Tertiary volcanic rocks (andesite porphyry) about 2 miles northeast of White Spur.

Most of the wells that penetrate consolidated rocks are either on the uplands between the flood plain and the Franklin Mountains north and northwest of the Cerro de Muleros or in the Rio Grande gorge. Several wells ranging in depth from 83 to 1,573 feet, which have been drilled to the bedrock beneath the water-bearing Santa Fe group north and northwest of the Cerro de Muleros, do not obtain water from consolidated rocks. Well U-59 in the gorge obtains a moderate supply of water satisfactory for industrial use from consolidated rocks of Cretaceous age.

Several wells penetrated bedrock below varied thicknesses of alluvium in the upland east and southeast of White Spur. Well U-12, depth 1,690 feet, obtained water from limestone and sandstone at 1,590 feet. The well, which reportedly yielded 200 gpm (gallons per minute), was abandoned because of the high fluoride content of the water. Six wells (Q-158 to Q-163) probably obtain small quantities of water from bedrock. However, it is possible that some of them obtain water from the overlying alluvium.

Well Q-138, depth 1,074 feet, known as Lippincott well and located in the south-central part of the valley, is reported to have flowed salty water. According to the driller's log, well Q-138 penetrated sandy zones in the bedrock below 822 feet that contained small quantities of water.

On the upland east of U. S. Highway 80, eight wells penetrated bedrock at depths ranging from 177 feet (Q-77) to 820 feet (Q-72). Only well Q-76 was tested; it yielded small quantities of potable water from "black rock," probably of Pennsylvanian age.

An abnormally high thermal gradient of ground water in the medium and deep aquifers of the Santa Fe group suggests that the temperature of the ground water is affected by the latent heat of the igneous rocks that are scattered throughout the area. In six wells in the medium and deep aquifers the thermal gradient ranged from 1° per 33 feet to 1° per 41 feet, which is considerably greater than the thermal gradient in the Hueco bolson.

In general, the consolidated rocks in the lower Mesilla Valley are not a source for moderate or large supplies of ground water.

Unconsolidated Deposits

Unconsolidated deposits in the lower Mesilla Valley consist of sand, gravel, clay, silt, caliche, and conglomerate. According to Bryan (1938, p. 205), the bulk of sediments in La Mesa bolson belong to the Santa Fe group. The unconsolidated deposits contain the shallow, medium, and deep aquifers. Although these aquifers are discussed as separate water-bearing units, they are hydraulically connected. The shallow alluvial deposits and a part of the underlying Santa Fe group form the shallow aquifer. The bulk of the Santa Fe group comprises the medium and deep aquifers.

Santa Fe Group

The Santa Fe group underlies the lower Mesilla Valley and is exposed in nearly all the arroyos between the flood plain and the Franklin Mountains and in the bluffs at the east edge of La Mesa. In the uplands east of the Rio Grande, the top of the Santa Fe, mostly coarse sand and gravel containing some caliche-cemented boulders, probably is correlative with the Pleistocene cap of the Santa Fe, as defined by Spiegel and Bladwin (in preparation). A thick series of reddish to brown silty clay, fine to medium sand or poorly consolidated sandstone, and thick-bedded conglomerate underlies the coarse sediments.

Characteristic responses in electric logs of eight wells northwest of Canutillo suggest that the Santa Fe may be subdivided into two units. (See Figures 4 and 5.) In electric logs, the curve on the right side of the base line represents the relative resistivity of the individual beds. A deflection of the resistivity curve to the right (increase in resistance) usually is indicative of a fresh-water-bearing sand. Sand beds containing brackish or salty water have low resistance and cause little or no deflection of the resistivity curve. It is not possible to determine on the basis of available data if the units can be correlated over a large part of the valley.

The lower unit (the deep aquifer of the well field northwest of Canutillo) is composed of unconsolidated fine to medium sand; the percentage of clay is smaller than in the upper unit. The low, but uniform, resistivity response in the well field suggests that the sand in the lower unit is uniform, thick bedded, and relatively free of interbedded shale or clay. The lower unit reaches a maximum thickness of at least 1,000 feet in well Q-178; electric logs indicate that the lower unit thickens to the north and west. The spontaneous-potential curve (on the left side of the base line) of well Q-144 suggests that the lower unit in the south end of the valley is much thinner.

The upper unit of the Santa Fe, which contains the medium aquifer and a part of the shallow aquifer of the El Paso well field, is exposed in arroyos above the flood plain and in the bluffs of La Mesa. It consists of alternating

Texas Water Commission in cooperation with the U.S. Geological Survey and the city of El Paso

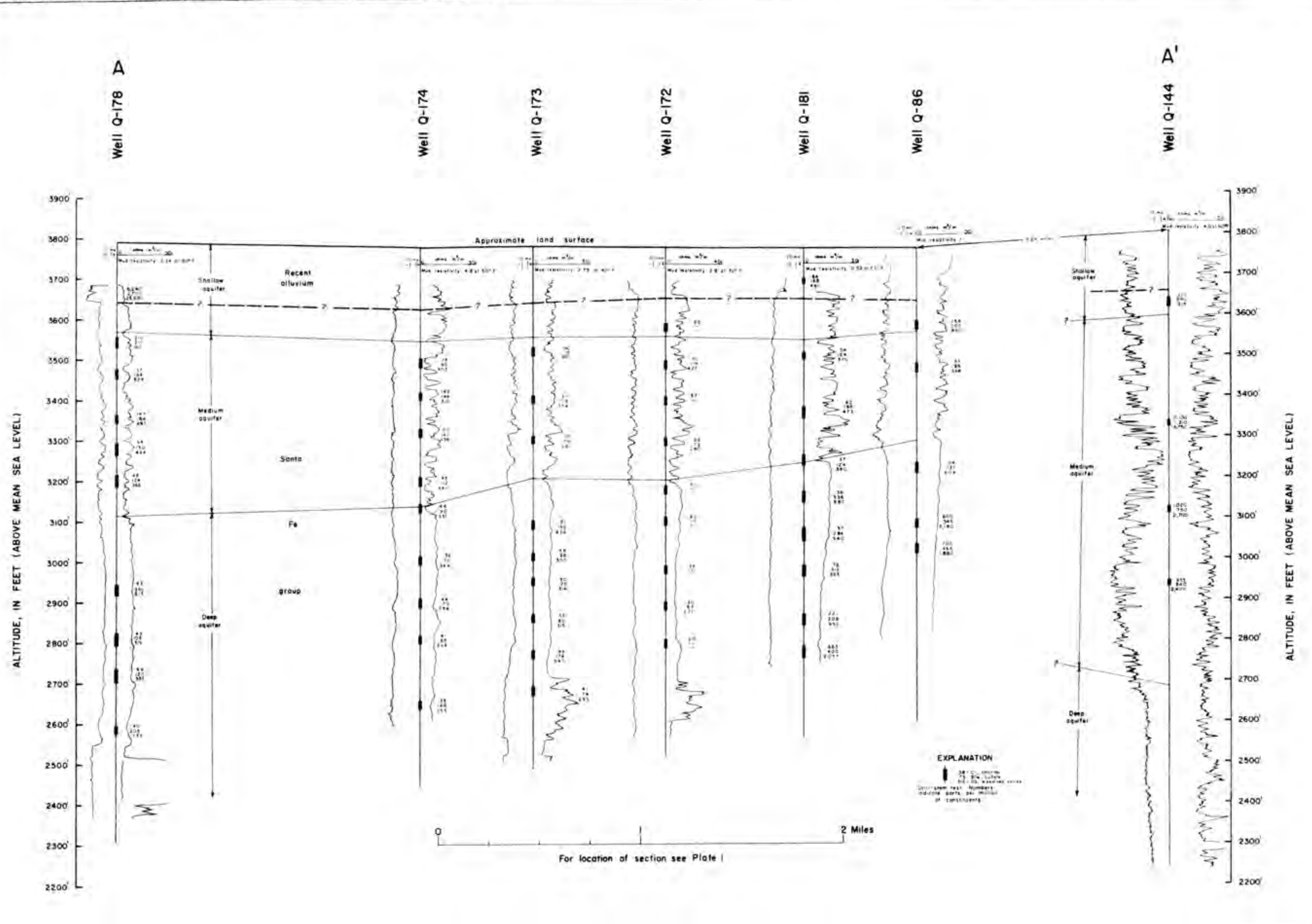


FIGURE 4. - Geologic section A-A', lower Mesilla Valley

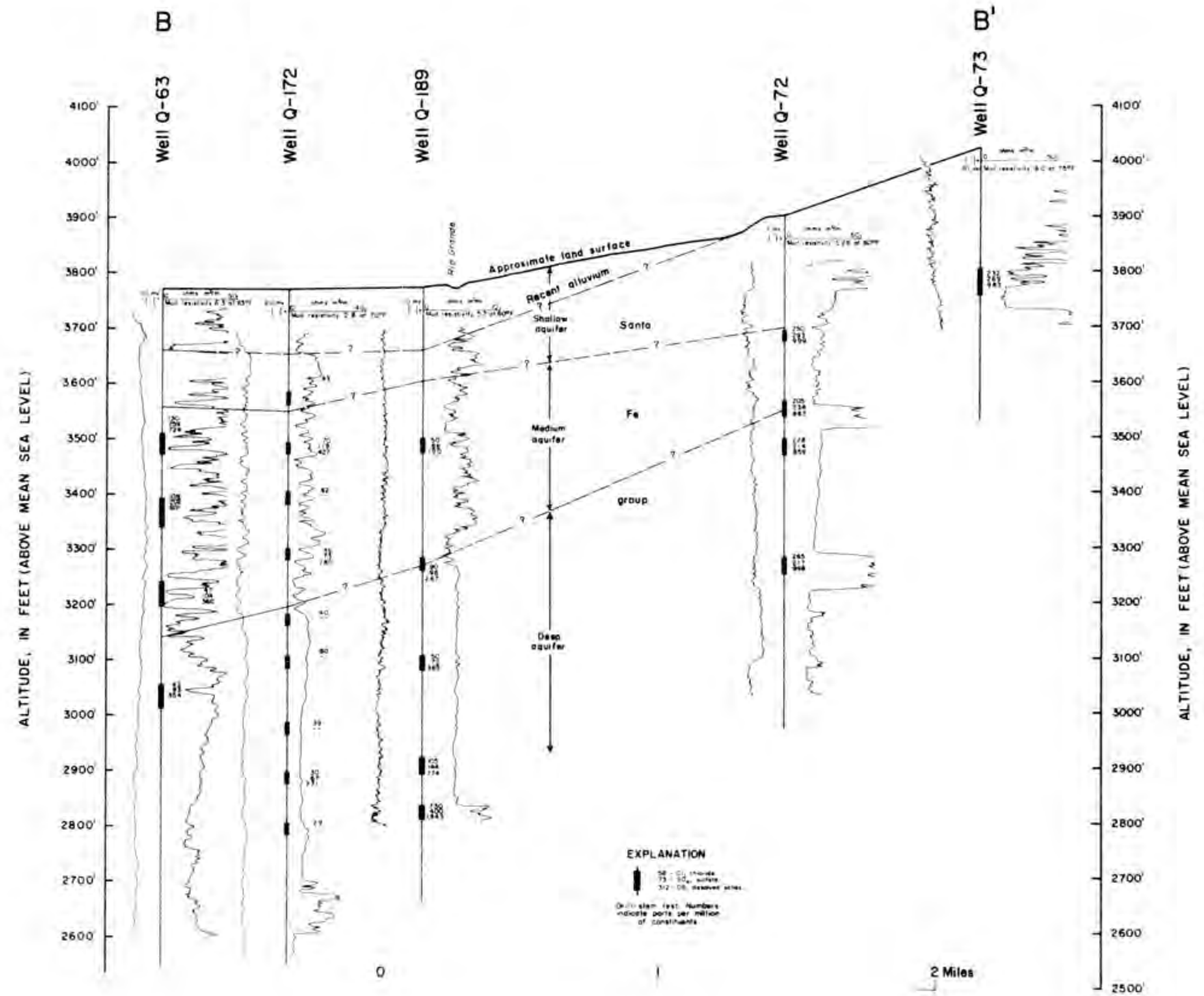
layers of varied thickness of fine to coarse sand, gravel, and reddish-brown silty clay. Locally the sand is crossbedded, lenticular, and predominantly medium-grained. The clay is evenly bedded in many exposures along Mesa Road (U. S. 80), indicating that clay layers may extend laterally for considerable distances.

The following section near Anapra, Dona Ana County, New Mexico, was measured by Sayre (Sayre and Livingston, 1945, p. 32). The top 7 feet, consisting of sediments of Recent and Pleistocene age, is underlain by sediments of the upper part of the upper unit of the Santa Fe. The sand and gravel underlying the Recent and Pleistocene sediments may be equivalent to the Pleistocene cap of the Santa Fe group.

	Thickness (feet)
Topsoil, very sandy, reddish-buff; partly removed-----------	
Caliche, hard, dense, white; grades downward into very fine gray sand--	7
Sand, moderately fine, light-gray, uncemented; contains layers of gravel and igneous-rock pebbles, mostly derived from lava flows--	5
Clay, sandy, brown---	1
Quartz sand, medium, mixed with pellets of calcium carbonate-	.5
Sand, medium to coarse, salt and pepper--------------------	6
Clay, sandy, brown to gray---------------------------------	2
Sand, medium to coarse, light-gray, crossbedded; contains some coarse gravel---------------------------------------	45
Sand, clayey, fine, massive, light-buff; contains irregular lenses of clean sand. Tubes of sand cemented with calcium carbonate are near the base----------------------------	9
Sand, extremely fine, gray; layers of coarse sand near middle	14
Clay, gray, much disturbed and broken----------------------	1.3
Sand, medium, gray; laminated layers of alternating black and white sand near base-----------------------------------	30
Sand, clayey, light-buff, crossbedded----------------------	1.5
Sand, medium, loose, gray----------------------------------	6
Sand, fine, buff to gray, crossbedded; pellets of clay and caliche on bedding planes-------------------------------	2.5
Covered, mostly sand---------------------------------------	25

(Continued on page 14)

Figure 5


B
B'
Well Q-63
Well Q-172
Well Q-189
Well Q-72
Well Q-73
ALTITUDE, IN FEET (ABOVE MEAN SEA LEVEL)
4100'
4000'
3900'
3800'
3700'
3600'
3500'
3400'
3300'
3200'
3100'
3000'
2900'
2800'
2700'
2600'
2500'
Rio Grande
Approximate land surface
Recent alluvium
Shallow aquifer
Medium aquifer
Deep aquifer
Santa
Fe
group
EXPLANATION
Drill-stem test. Numbers indicate parts per million of constituents
0
1
2 Miles

	Thickness (feet)
Clay, light-buff, and sandy clay----------------------------	6
Sand, fine, light-gray, crossbedded-------------------------	5
Clay, laminated, light-buff, and sandy clay-----------------	2.5
Sand, fine, gray, crossbedded-------------------------------	3
Clay, massive, light-buff-----------------------------------	2.5
Sand, fine, massive, yellowish-buff, cemented; grades into gray sand near base; partly covered----------------------	30
Clay, chocolate-brown, and interbedded light-buff massive sandstone--	11
Sand, brown, crossbedded, partly covered--------------------	10
Clay, silty, buff to chocolate-brown------------------------	9
Total-------------------	234.8

In the flood plain, the upper unit reaches a depth of 470 feet in well Q-86, 678 feet in well Q-178, and possibly 1,100 feet in well Q-144. According to electric logs and drillers' logs, the maximum thickness of the upper unit is at least 1,000 feet and perhaps as much as 1,400 feet.

Electric logs and drillers' logs reveal that in the flood plain a thick-bedded limestone conglomerate underlies the lower unit but that east of the flood plain the conglomerate occurs within the Santa Fe. The conglomerate, derived from limestone that probably is of Cretaceous age (Virgil Barnes, oral communication, Feb. 27, 1957), has a maximum observed thickness of 160 feet in well Q-173. According to the electric and driller's logs of well Q-173, the conglomerate is underlain by clay, sand, and gravel. Although the sediments underlying the conglomerate probably are Santa Fe in age, they are not included in the lower unit. Figures 4 and 5 show that the conglomerate lies at a greater depth north and west of well Q-173. Well Q-178, depth 1,705 feet, did not penetrate the conglomerate. The highly resistive zone between 1,280 and 1,380 feet in well Q-178 is an igneous sill underlain by sand, shale, and clay of the lower unit of the Santa Fe. The igneous rock penetrated by well Q-178 may be associated with the series of volcanic rocks interbedded with the Santa Fe group of sediments near Las Cruces, New Mexico.

The maximum thickness of the Santa Fe group in the lower Mesilla Valley is not known; unconsolidated sediments were penetrated to a depth of 1,705 feet in well Q-178. The original thickness of the unconsolidated sediments in the area, the surface being about 300 feet lower than La Mesa, may have been about 2,000 feet. However, as the sediments thicken toward the center of the basin, it is probable that the maximum thickness of the Santa Fe is considerably greater.

The medium and deep aquifers of the Santa Fe group are the major sources of ground water for public supply in the valley. Many wells obtain water from both the Santa Fe and the alluvium. Yields as large as 3,000 gpm of fresh water have been obtained from the Santa Fe north and northwest of Canutillo. South and southwest of Canutillo, the water in the Santa Fe is brackish or salty. Small to moderate quantities of fresh water have been obtained from the Santa Fe in the upland east of the Rio Grande, where the saturated thickness is much less.

Alluvium

The alluvium consists of poorly sorted sand, gravel, clay, and silt, the thickest section of which is the valley fill in the flood plain. On La Mesa and the lower terraces the alluvium is thin, generally consisting of a veneer of windblown sand or a cap of coarse gravel.

The maximum thickness of the alluvium is not known. Bryan (1938, p. 218) stated that the depth of gravel in the riverbed may be taken as a rough measure of the depth of scour in great floods. Because of the shifting riverbed, the gravel may be penetrated at different depths in wells that are relatively near together; thus, individual beds cannot be correlated from well to well. Conover (1954, p. 25) reported that the alluvium near Las Cruces, New Mexico, is about 220 feet thick. Slichter (1905, Figure 2) showed the maximum depth of the fill in the gorge to be not more than 86 feet. Gravel or very coarse sand was penetrated in 29 wells at depths ranging from 42 to 130 feet. Therefore, it may be assumed that the thickness of the alluvium probably does not exceed 150 feet.

The alluvium in the valley is the major source of ground water for irrigation and industry. Yields as large as 3,015 gpm have been obtained. The water in the alluvium varies in quality. Generally, it is more mineralized than the water in the river or in the underlying Santa Fe, but south of Canutillo, the water in the alluvium is less mineralized than the water in the Santa Fe.

GROUND WATER

History of Development

Prior to 1950, the principal use of ground water in the lower Mesilla Valley was domestic. In 1922 the city of El Paso drilled two test wells in the south end of the valley. Chemical analyses of samples showed that the water in the two wells, one of which is known as the Lippincott well (Q-138), was too highly mineralized for most purposes. Mr. Paul Harvey, owner of the waterworks at White Spur, drilled several wells in the vicinity in search of water suitable for public supply. Of 11 wells drilled in 1946, 8 produced water of satisfactory quality. In 1951 and 1952, the city of El Paso drilled 6 wells in the shallow aquifer about 1 mile northwest of Canutillo. The water was pumped into the river for delivery to the treatment plant in El Paso. However, because of excessive transmission losses, a pipeline capable of delivering 20 mgd (million gallons per day) was built. In 1955, 6 more wells were drilled in the shallow well field. The total capacity of the wells in the shallow well field is about 15 mgd.

In 1953 nine test wells were drilled in the valley as a part of the cooperative exploratory program in the Hueco bolson. The wells were electrically logged, and chemical analyses were made of water samples from various depths. As a result of the program, the city in the period from 1956 to 1958 drilled 5 wells, ranging in depth from 1,072 to 1,262 feet, and 1 well, 550 feet deep, about 3 miles northwest of Canutillo. The wells, which obtain water from the deep and medium aquifers, have a total capacity of about 16 mgd.

Small quantities of ground water were used as supplemental supplies for irrigation for many years before 1954. In 1946 only 2 large-capacity wells were being used; during the 1946-50 period the number of irrigation wells increased to 16. Because of the decrease of surface water in storage in Elephant Butte and Caballo Reservoirs, New Mexico, the use of ground water as a supplement to the surface-water-irrigation supply increased rapidly. During 1951, 54 irrigation wells were drilled; by the end of 1954, about 250 wells were used to irrigate 15,000 acres of cotton and alfalfa with 40,000 acre-feet of water (Smith, 1956, p. 10). In October 1957, the Bureau of Reclamation reported that approximately 205 irrigation wells were in operation.

The large-scale use of ground water for industry began in 1951, when the American Smelting and Refining Co. and the El Paso Electric Co. drilled 40 test wells in the south end of the valley. As a result of this program, a well field of 10 wells was developed. The industrial use of ground water increased each year, except in 1958, when the American Smelting and Refining Co. abandoned its well field.

Occurrence and Movement

The principles of the occurrence and movement of ground water in rocks have been described by Meinzer (1923a, p. 2-192; 1923b; 1942, p. 385-497) and Wenzel (1942) among others. The occurrence and movement of ground water in the lower Mesilla Valley are discussed briefly here.

In the lower Mesilla Valley, ground water occurs under water-table (unconfined) and artesian (confined) conditions. In the alluvium of the flood plain and in the Santa Fe group in the uplands, water is unconfined and does not rise in wells above the level at which it is first encountered.

In the valley, where the relatively impermeable clay of the Santa Fe group probably retards the movement of water between the deep and shallow aquifers, the water is confined under sufficient pressure to cause it to rise above the water table in the shallow deposits and in some wells to cause it to flow. For example, in January 1957 the water level in well Q-172 rose 1.25 feet above the land surface and about 8 feet above the water table in the alluvium.

The general direction of ground-water flow in the uplands is toward the Rio Grande. Conover (1954, p. 32) stated, "...ground water does not flow southward under La Mesa to Mexico but rather, from the Mexican boundary ... northward and eastward to the Rio Grande." There is a ground-water divide in the pass between the Organ and Franklin Mountains. West of the divide, ground water flows toward the Rio Grande.

Plate 2 shows by contour lines the configuration of the water table in the alluvium in the lower Mesilla Valley in 1957. The movement of ground water, which is at right angles to the contours, generally is toward the south, except where large or concentrated withdrawals of ground water have formed cones of depression. The cone of depression is roughly conical in shape, produced in a water table or piezometric surface by pumping. The gradient of the water table in the alluvium from the town of Anthony to the 3,736-foot contour near the gorge is about 4 feet per mile, approximately the same as that of the river. On

La Mesa, the water-table gradient from Strauss, New Mexico, eastward to the 3,745-foot contour was about 7 feet per mile in 1953. In the deep well field 3 miles northwest of Canutillo, the gradient of the piezometric surface of the deeper aquifer was not obtained because of interference from pumping. The piezometric surface is the imaginary surface to which the artesian water will rise in tightly cased wells that penetrate the aquifer. It is probable, however, that the gradient approximates that of the water table in the shallow aquifer.

Recharge

Ground water in the lower Mesilla Valley is derived from direct infiltration of precipitation; by seepage from canals, laterals, and irrigation water applied to the land; by seepage from the Rio Grande; and by ground-water flow from the uplands.

Precipitation on the valley floor probably does not contribute appreciable quantities of water to the ground-water reservoir. Most of the precipitation is in the form of showers during the summer, when the evaporation rate is high; it does not reach the water table except during wet periods.

Most of the recharge to the shallow ground-water reservoir is derived from seepage from canals, laterals, and irrigation water applied to the land. The quantity derived from each source is difficult to determine, but Conover (1954, p. 77) estimated that during an average year the irrigation water applied to the land in excess of crop requirements was about 17 percent of the gross diversion from the Rio Grande. Guyton and Scalapino in a consulting report to the El Paso Public Service Board estimated the annual recharge from canals, laterals, and irrigated lands to be at least 2 acre-feet per acre of land irrigated and generally somewhat more, or at least 36,000 acre-feet. This amounts to about 50 percent of the water applied for irrigation. Before large withdrawals of ground water for irrigation, the water derived from seepage from canals, laterals, and irrigated lands actually was in transit to the drains and to the river. Conover (1954, p. 44) estimated that from 1930 to 1946 the average return of drain flow in the Mesilla Valley was 52 percent of the reported net diversion from the river.

When surface-water supplies are adequate, the Rio Grande is an effluent, or gaining, stream during most of the year and in effect is a drain for La Mesa bolson. However, as a result of large-scale pumping, the river temporarily becomes an influent, or losing, stream locally, where the water table is lower than the riverbed. In January 1953 the Rio Grande was effluent from Anthony south to the gorge. Losses from the river to the ground-water reservoir became evident in 1955; in 1957 they were considerable, owing to the large increase in the withdrawal of ground water for irrigation and public supply. For example, Duisberg (1957, p. 67) reported that transmission losses for the Rio Grande project below Caballo Reservoir were low before 1950, but that in 1955 they were about 65 percent and in 1956 about 75 percent of the flow.

In addition, the city of El Paso in 1955 pumped about 10 mgd into the river for delivery to the treatment plant in the city. Duisberg (1957, p. 67) reported that the water flowed in the river for about 5 miles before returning to the ground-water reservoir. Plate 2 shows that the river in 1957 continued to lose water between Vinton Bridge and Canutillo, although it is effluent between Anthony and Vinton Bridge.

The river between Vinton Bridge and Canutillo forms the east edge of the El Paso shallow well field and is within the cone of depression created by withdrawals from the field. Because losses to or gains from the river change seasonally and yearly in response to pumping and other factors, it is not possible to determine the amount of recharge to the ground-water reservoir that is derived from the Rio Grande.

The accretion of ground water to the lower Mesilla Valley from the adjoining uplands and from the upper Mesilla Valley is about 12,000 acre-feet per year, or 11 mgd. The average gradient of the water table in La Mesa between Strauss and the flood plain is approximately 7 feet per mile. If the transmissibility (defined on p. 32) of the sediments in this area is about 50,000 gpd per foot, somewhat less than the transmissibility of the Santa Fe group in the valley, the flow toward the valley would be about 0.5 cfs (cubic feet per second) per lineal mile, or about 5 mgd from La Mesa to the river. The accretion of ground water from the uplands on the east side of the valley may be somewhat higher because of greater precipitation in the mountains and the greater permeability of the arroyo beds. Conover (1954, p. 36) estimated the average accretion from the uplands on the east side of the valley to be about 0.7 cfs per mile, or about 6 mgd.

In addition to the flow from the adjoining uplands, ground water from New Mexico enters the Texas part of the valley. It is estimated that approximately 5.3 mgd moves across the New Mexico line at Anthony into the Texas part of the lower Mesilla Valley. The estimate is based on a gradient of 4.5 feet per mile and a transmissibility of 260,000 gpd per foot. If it is assumed that the gradient in the Santa Fe group is equivalent to that in the alluvium, approximately 2.2 mgd or about 40 percent of the water that enters the valley near Anthony is in the Santa Fe. Inasmuch as most of the recharge from the adjoining uplands is into the Santa Fe, it is estimated that the total natural recharge to the Santa Fe is about 13 mgd, or about 14,500 acre-feet a year. Thus, the annual natural recharge to the ground-water reservoir in the lower Mesilla Valley is at least 16 mgd, or nearly 18,000 acre-feet.

The three aquifers, as defined on page 10, function as a single hydrologic system, and water may move from one aquifer to another in response to a change in pressure. Before 1957, water discharged from the shallow aquifer was replaced in part by water leaking from the underlying aquifers. Since pumping began from the medium and deep aquifers, however, water may move from the shallow to the deeper aquifers.

When the ground-water reservoir is full, any water added to the reservoir is rejected and becomes drain flow. When storage space is created by lowering the water table below the bed of the drains, drain flow represents a potential source of recharge to the ground-water reservoir.

Discharge

Ground water is discharged from the lower Mesilla Valley by drains; seepage into the Rio Grande; evaporation from the drains, the river, and water-table ponds; transpiration; underflow at the south end of the valley; and wells.

After release of water from Elephant Butte Reservoir in 1916 for irrigation, seepage from the river and canals caused a rise in the water table that necessitated construction of drains to prevent waterlogging. Conover (1954, p. 66) stated that the average gradient of the water table down the valley in 1954 was the same as it was in 1917, the effect of the drains having been an overall lowering of the water table. Thus, the net effect of the drains did not change the balance between natural recharge to and discharge from the ground-water reservoir.

The annual discharge in acre-feet of the Montoya Drain, which includes drain flow from the Nemexas and West Drains, is shown in the following table, taken from records of the U. S. Bureau of Reclamation.

Year	Nemexas	West	Montoya*
1946	16,690	54,810	77,760
1947	13,610	42,550	58,890
1948	14,910	40,210	65,830
1949	16,460	46,630	76,580
1950	18,190	43,780	73,100
1951	12,020	25,350	43,760
1952	10,240	16,950	26,940
1953	9,370	14,760	30,920
1954	2,380	3,700	10,200
1955	695	1,080	4,420
1956	490	824	3,210
1957	908	1,006	4,300
1958	3,740	3,630	15,660
Average	9,200	22,700	37,000

*Also contains flow from Nemexas and West Drains

In the 1946-58 period, drain flow ranged from 3,210 acre-feet in 1956 to 77,760 acre-feet in 1946, averaging 37,000 acre-feet. The average discharge from drain flow seems to be in the same order of magnitude as the recharge estimated from seepage from canals and laterals and excess irrigation water applied to the land. From 1946 to 1950, when surface-water supplies for irrigation were adequate, drain flow was relatively uniform. Between 1950 and 1957, drain flow decreased because of the decrease in surface-water allotments and the increase in use of ground water as a supplemental irrigation supply.

The amount of discharge of ground water by seepage into the Rio Grande in the lower Mesilla Valley has not been determined. Since 1950 the amount of ground water discharged by seepage into the river probably has decreased because of the increase in ground-water withdrawals for irrigation and the concomitant decline in the water table. In 1953 ground water was discharged to the river from north of Vinton Bridge to the gorge, but in 1957 seepage to the Rio Grande was confined to that part of the river north of Vinton Bridge.

Discharge of ground water by underflow at the gorge is small. According to Slichter (1905, p. 13), ground-water flow in the alluvium in the gorge did not exceed 11,200 cubic feet per day, or 94 acre-feet annually.

Prior to large-scale irrigation with surface water, a great part of the ground water in the valley was discharged by evapotranspiration. The average annual discharge of ground water by evapotranspiration was balanced approximately by the average annual natural recharge.

Before 1951 the amount of water pumped from wells was small because most of the irrigated land had surface-water rights, and the surface-water supply from Elephant Butte Reservoir was adequate. From 1951 to 1957, pumpage for irrigation increased markedly because of a shortage of surface water available for irrigation. In addition, large amounts of ground water were pumped for municipal and industrial supplies.

Annual irrigation pumpage of ground water is considered to be the difference between the surface-water allotment and the quantity of water required for irrigation. Figure 6 shows the total annual pumpage from the ground-water reservoir in the lower Mesilla Valley from 1953 to 1958, including municipal and industrial pumpage.

The increase in pumpage of ground water from 24,000 acre-feet in 1953 to 59,500 acre-feet in 1956 is due mainly to the decrease in surface-water allotment from 1.9 acre-feet to 0.39 acre-foot per acre during this period. In 1957 and 1958, ground-water pumpage was estimated to be 46,000 and 17,000 acre-feet, respectively. This decrease was due to the above-normal precipitation and a concomitant increase in surface-water allotment during this period. According to the records of the U. S. Bureau of Reclamation, surface-water allotments in 1957 and 1958 were 1.1 and 4.0 acre-feet per acre, respectively.

Before 1957 most of the pumpage in the lower Mesilla Valley was from the alluvium. In 1957 the city of El Paso pumped approximately 3,120 acre-feet of water from the deep and medium aquifers of the Santa Fe. In 1958 pumpage from the Santa Fe by the city increased to 8,100 acre-feet, or about 6.8 mgd.

Fluctuations of Water Levels

The water levels in wells in the lower Mesilla Valley fluctuate almost continuously, the magnitude of the fluctuations being greater in the medium and deep aquifers than in the shallow. Fluctuations that are not the result of pumping generally are smaller than those caused by pumping. These include fluctuations caused by changes in atmospheric pressure, loading and unloading the aquifer, earthquakes, and changes in the rates of natural recharge and discharge.

Fluctuations caused by changes of atmospheric pressure have a rhythmic pattern and are inverse to the change in pressure, that is, as the barometric pressure rises, water levels decline. The effect of the changes of atmospheric pressure on water levels is due to the ability of the less permeable beds in the aquifer to resist the transmission of changes in barometric pressure. The full effect of the pressure change is transmitted directly down the well, however, and the water level fluctuates accordingly. This is due to intervening relatively impermeable clay layers that act as partial barriers to the passage of water between the aquifers.

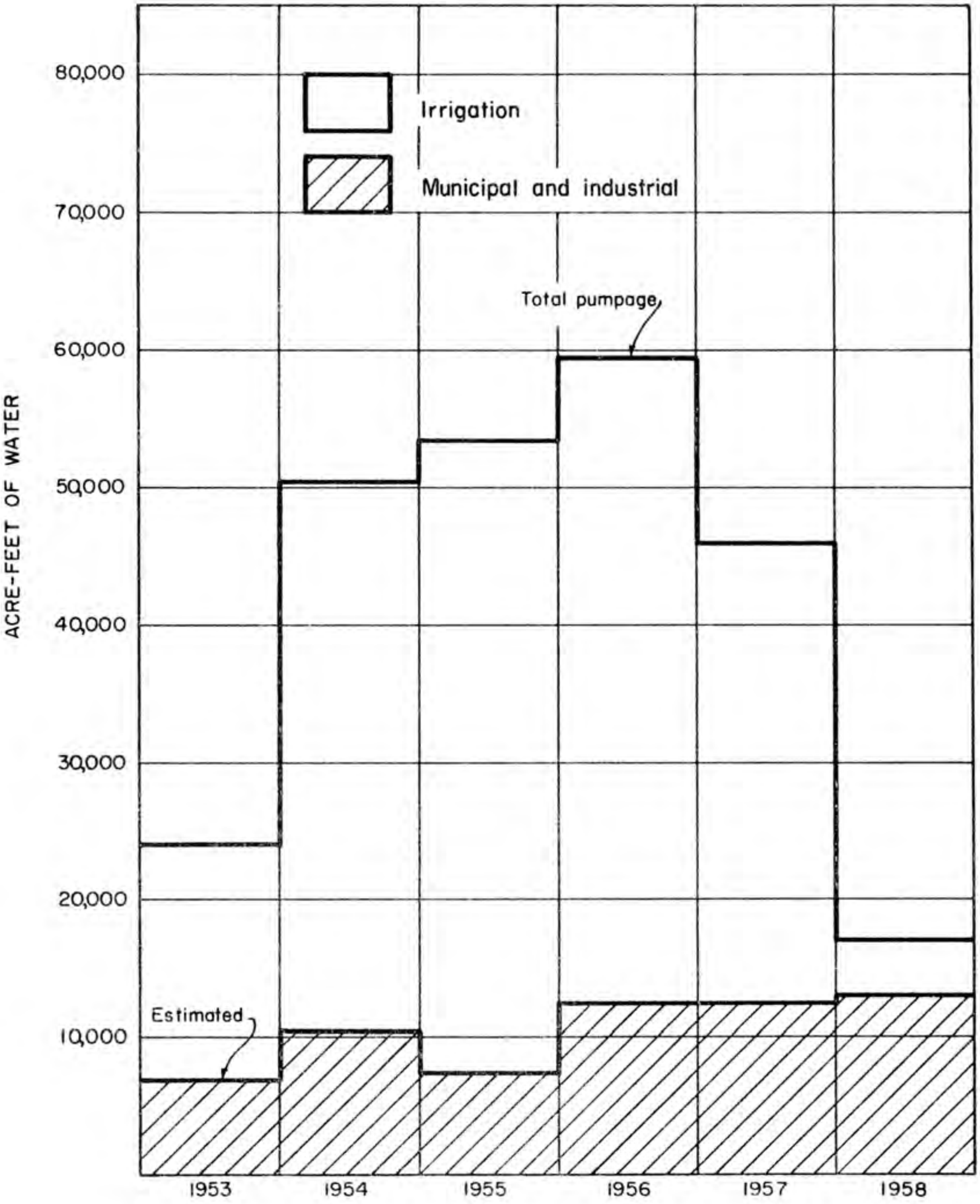


FIGURE 6.-Annual pumpage of ground water in the lower Mesilla Valley, 1953-58

Figure 7 shows fluctuations of water level due to variations in the load on an aquifer in selected wells in the city of El Paso well field. The water levels in wells Q-176 (deep aquifer), Q-180 (medium), and Q-182 (shallow) fluctuate in response to wells pumping from different aquifers.

Figure 7 shows that when well Q-173 in the deep aquifer was shut down the water level instantly declined in well Q-182 in the shallow aquifer. Soon after well Q-173 was shut down, the water level in Q-182 gradually returned to approximately its initial position. The starting of well Q-180 in the medium aquifer caused a sharp rise of 0.85 foot in the water level in Q-182. Within 15 minutes after pumping began in Q-180, the water level in Q-182 started to decline; within 24 hours the water level returned to its initial position. While pumping from the medium aquifer continued, the water level in the alluvium continued to decline. During the same test, the water level in Q-176 in the deep aquifer at first declined, but within a few minutes rose about 0.6 foot; about 9 hours after pumping started from the medium aquifer, the water level in Q-176 began a gradual decline.

Figure 8 shows that after 15 days of continuous pumping from the medium aquifer, the water level in Q-176 declined 1.6 feet below a point extrapolated on the trend of the water level prior to the start of pumping, indicating the movement of water from the deep aquifer to the medium. The water level in well Q-180 (medium aquifer) responded instantly to the shutting down of well Q-173 in the deep aquifer (Figure 7). At first the decline in well Q-180 was rapid but decreased slowly until shortly after pumping started. The absence of decline in the water level in well Q-180 soon after the sharp initial decline is due to a decrease in barometric pressure. The water level then resumed its decline, although at a rate somewhat less than before Q-173 was shut down.

Similar fluctuations have been observed in New Jersey (Barksdale, Sundstrom, and Brunstein, 1936), in Long Island, New York (Jacob, 1939), and also in Easton, Maryland, and in Houston, Texas. Thompson (in Barksdale, Sundstrom, and Brunstein, 1936, p. 88) explained the phenomenon on the basis of dilatancy, which is the property of a compacted granular material to expand in total volume when subjected to lateral pressure. Barksdale, Sundstrom, and Brunstein (1936, p. 90) suggested that starting of a well places a sudden load on the foundation of the pump, due primarily to the force required to lift the water to the surface and also for a brief time to the force required to accelerate the water. The effect of the loading would, of course, not appear in observation wells drawing from the same sand as the pumped well, but it might be observed in wells drawing from deeper or shallower sands. The compressive force exerted when a well is turned on or off, although small, results in a compression of the relatively impermeable sediments in the water-bearing sand; as a consequence, the hydrostatic pressure increases instantaneously to the maximum. As pumping continues the aquifer adjusts to the load, and the water level approaches asymptotically its initial position. When the pump is shut down, representing an instantaneous removal of the load, the reverse action takes place. Although the load exerted on the pump foundation is small, the instantaneous rate at which the load is applied on the foundation may account for the large rise or fall in the water level in the Canutillo area.

On Long Island, where the fluctuations were due to the passing of heavily loaded trains near the well, the magnitude of the water-level fluctuations, according to Jacob (1939, p. 668), should depend on the weight and the velocity of the train. In the Canutillo area, however, the magnitude of the fluctuations depends on the rate of application of the load and on the distance from the impressed load to the affected well. If the distance is too great, the confined

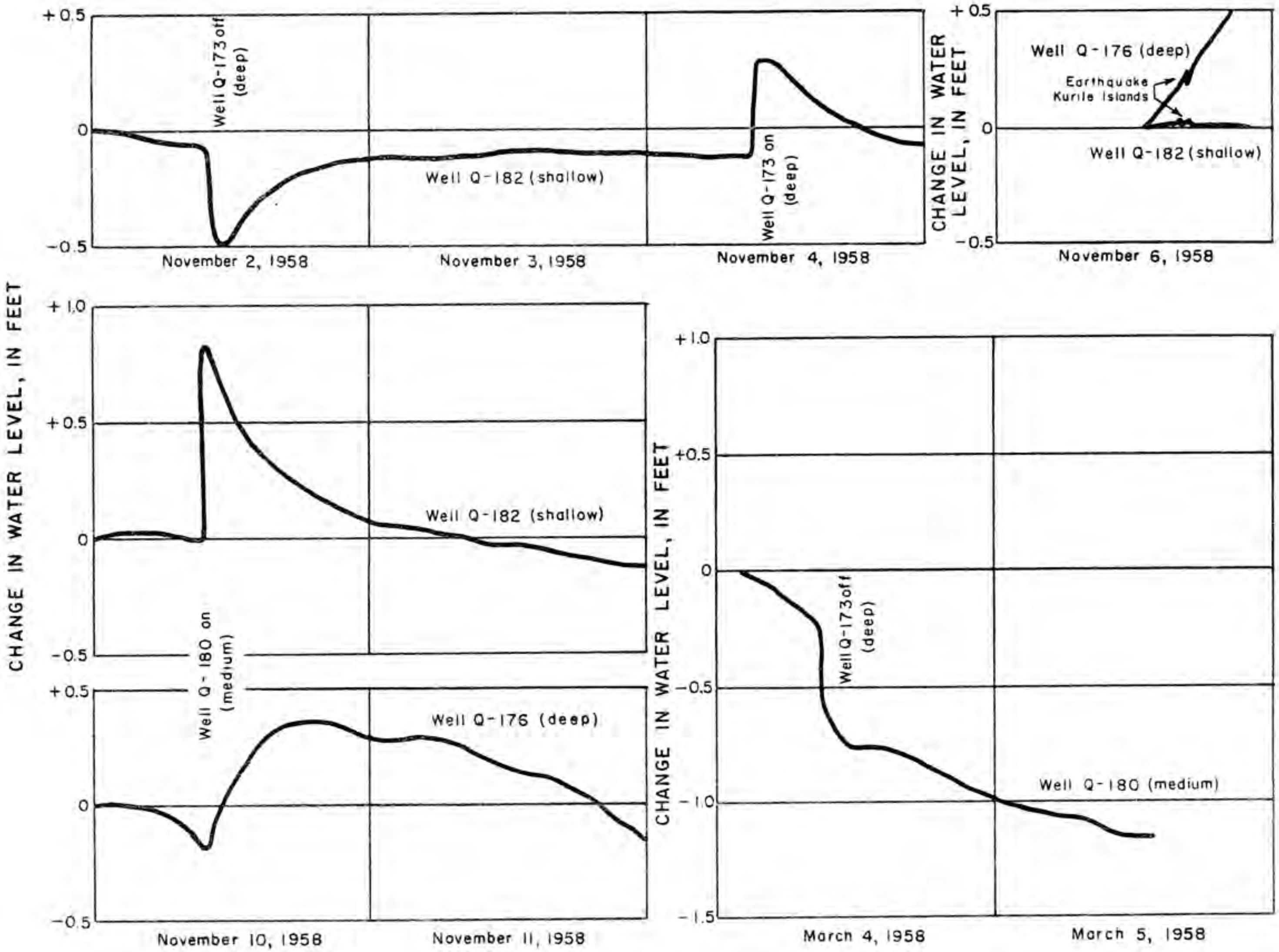


FIGURE 7.– Fluctuations of water levels due to variations in the load on an aquifer in selected wells in the El Paso city well field northwest of Canutillo

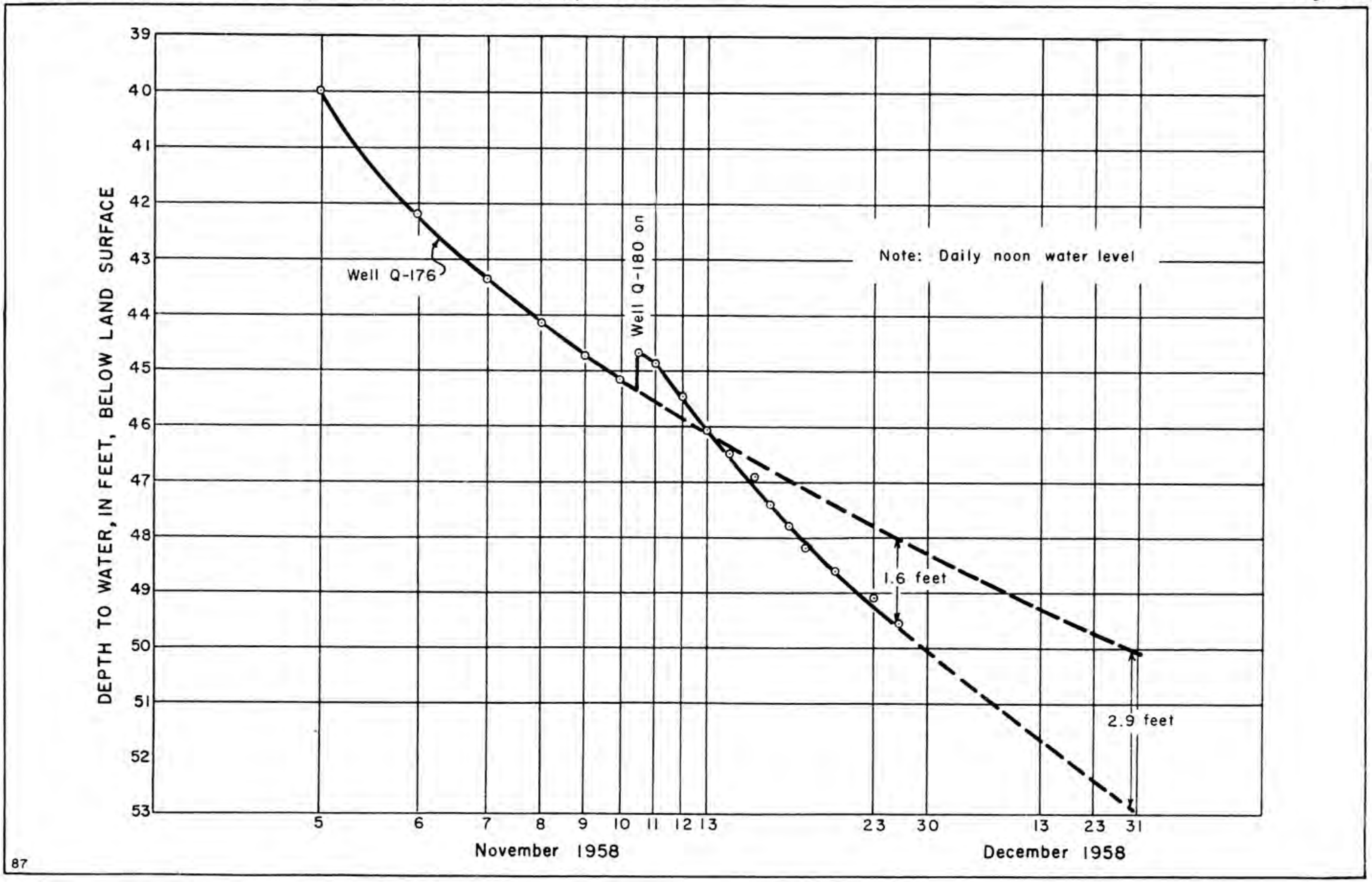


FIGURE 8.- Fluctuation of water level in well Q-176 (deep aquifer) due to pumping of well Q-180 (medium aquifer) in the El Paso city well field northwest of Canutillo, Nov. 10-Dec. 31, 1958

water has sufficient time to escape laterally and the pressure is dissipated. These fluctuations, resulting from variations in the load, indicate that the elasticity of the aquifer is not perfect and that the aquifers are imperfectly connected.

Fluctuations in water levels due to earthquakes have been observed in several wells equipped with recording gages. For example, Figure 7 shows a maximum displacement of water level of less than 0.02 foot in well Q-182 in the shallow aquifer caused by the earthquake of November 6, 1958, which had its epicenter in the Kurile Islands in the North Pacific. The water level in well Q-176 in the deep aquifer had a maximum displacement of about 0.07 foot. These data indicate that the magnitude of the change varies with different aquifers in the same locality according to the depth of the aquifer and the degree of confinement.

Large fluctuations of water levels usually result from withdrawals of ground water, the magnitude of the fluctuations diminishing with distance from the point of withdrawal. The fluctuations of water levels in 10 observation wells measured monthly by the U. S. Bureau of Reclamation are shown in Figure 9. The approximate change of the water table in the lower Mesilla Valley from 1953 to 1959 is shown in Plate 3.

The hydrographs of 10 observation wells (Figure 9), which are scattered throughout the valley, show a general agreement but differ in the magnitude of fluctuations. In most wells the water levels generally were relatively stable through 1950 except for seasonal variations, although in several wells a downward trend started in 1948 and 1949. The uniformity in the water levels suggests that the supply of surface water for irrigation was adequate. The water level in each well indicates the yearly cycle; the highest water levels are during the growing season because of recharge from infiltration of surface water applied to the land, and the lowest are during the winter in response to the discharge of ground water to the drains and to the river. In any well the minimum level, which is controlled largely by the elevation of the bottom of a nearby drain or the river, occurs just before irrigation begins in the spring. The net yearly changes in the water levels, therefore, are based on the measurements made in January and February before irrigation begins.

In 1950 when it was apparent that the supply of surface water in Elephant Butte Reservoir would be insufficient to allot a full water supply to lands in the lower Mesilla Valley, many wells were drilled to obtain a supplemental supply of water for irrigation. Figure 10 shows that the annual discharge of the Rio Grande below Caballo Dam averaged about 700 cfs from 1951 to 1953, as compared to an average annual discharge of 1,000 cfs from 1946 to 1950. Coincident with the reduction in diversion of surface water for irrigation and the accompanying increase in the use of ground water as a supplemental supply, the water levels in 10 observation wells declined an average of 0.6 foot from January 1951 to January 1954. The area of greatest decline was in the northern part of the valley.

As the supply of surface water for irrigation continued to decrease through 1956, ground-water withdrawals increased and were accompanied by a marked decline in the water table in the alluvium. Records of the U. S. Bureau of Reclamation show that the discharge of the Rio Grande below Caballo Dam from 1954 to 1956 decreased to an annual average of about 320 cfs; consequently, the diversions from the river decreased from 1.9 acre-feet per acre in 1953 to 0.39 acre-foot per acre in 1956. As a result, the decline of water levels in 10 wells ranged from 0.5 foot to 7.3 feet, averaging 3.5 feet from 1954 through 1956 (Figure 9). Figure 9 shows also that owing to the large withdrawals of ground water for

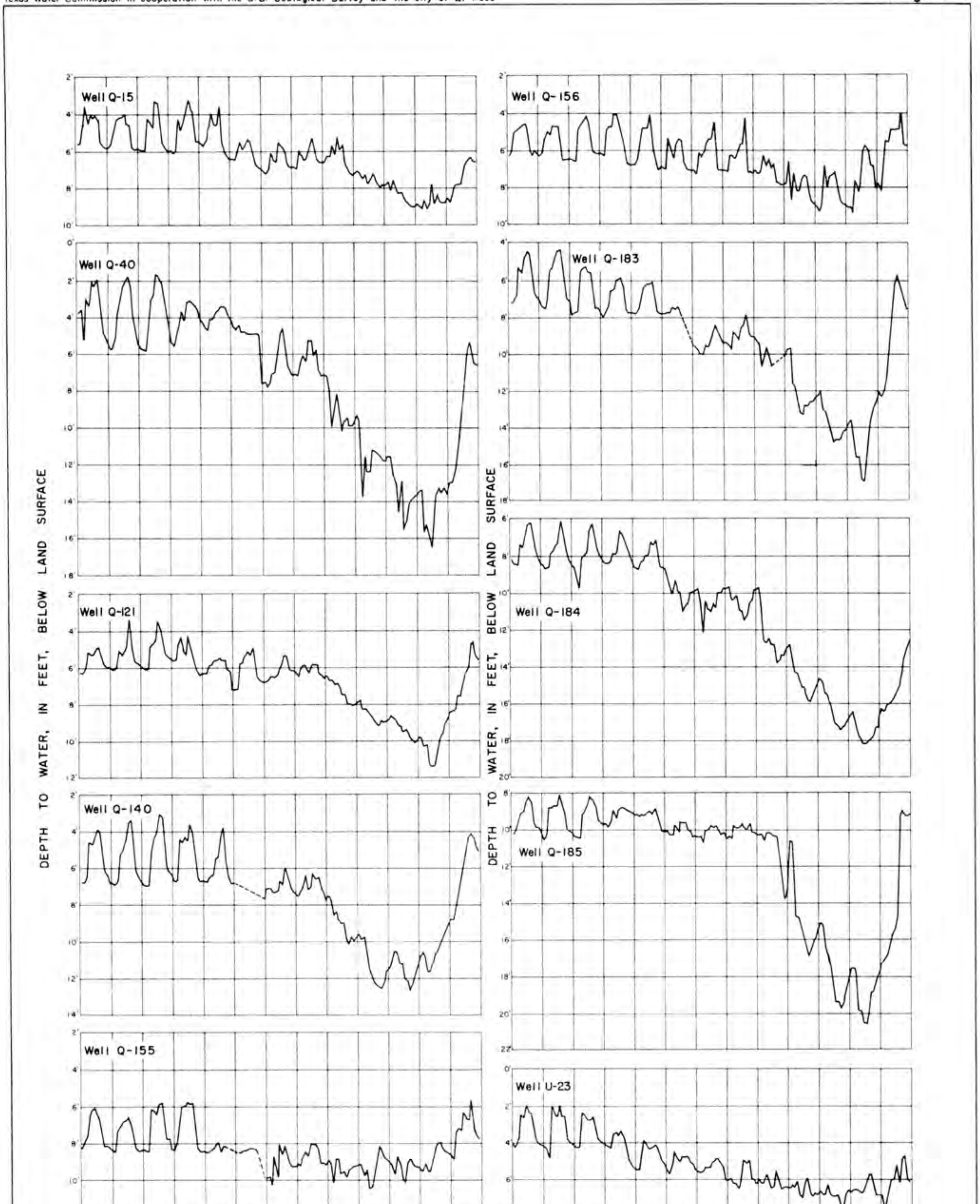
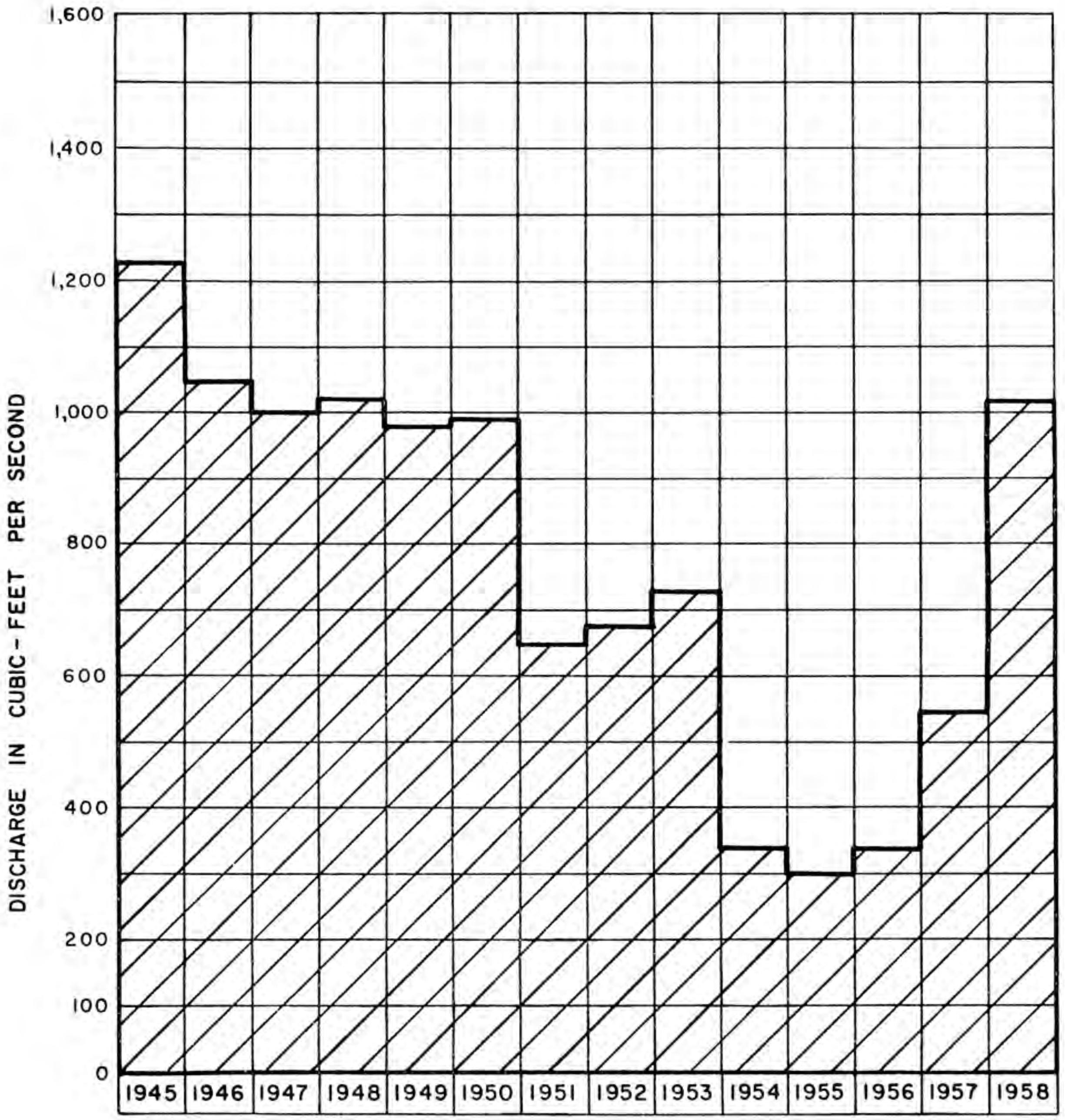


FIGURE 9.- Fluctuations of water levels in shallow wells in the lower Mesilla Valley, 1946-58



87

FIGURE 10.-Mean annual discharge of the Rio Grande below Caballo Dam, New Mexico, 1945-58

irrigation, the water levels generally were highest just before irrigation began in the spring and lowest during the growing season. Most water levels rose in 1957 and 1958 owing to the above-normal precipitation and the accompanying increase in the surface-water allotment for irrigation and the substantial decrease in the withdrawal of ground water. According to the Bureau of Reclamation, the surface-water allotment was 1.3 acre-feet per acre in 1957 and 4.0 acre-feet in 1958. As a result, the withdrawals of ground water for irrigation decreased from 47,000 acre-feet in 1956, the highest of record, to 33,000 acre-feet in 1957 and to 4,100 acre-feet in 1958. From 1957 through 1958 the rise in the water levels in 10 wells ranged from 0.5 foot to 8.4 feet and averaged 4.3 feet (Figure 9).

The water levels in 92 wells measured during the period January 1957 through January 1959 showed an average rise of 5.5 feet, of which 3.8 feet was in 1958. The maximum rise, 16.6 feet, was in the vicinity of the shallow well field northwest of Canutillo. In the south end of the valley, the water table rose a maximum of 6.0 feet. In a small area northeast of the shallow well field and east of U. S. Highway 80, where surface-water rights are not available and irrigation was from ground water only, the water declined a maximum of 6.4 feet.

In summary, between 1946 and 1956, water levels in 10 wells declined an average of 0.6 foot. These data show that large quantities of ground water can be pumped from the alluvium over a considerable period of drought without seriously depleting the ground-water supply, owing to the substantial recharge when surface-water allotments are adequate.

The hydrographs of the daily fluctuations of water levels in five wells in the city of El Paso well field, 1957-58, are shown in Figure 11. Wells Q-86 and Q-182 are in the alluvium (shallow aquifer); well Q-180 is in the medium aquifer; and wells Q-176 and Q-181 are in the deep aquifer. The similarity of water-level fluctuations in these wells indicates a degree of interconnection of the three aquifers. On February 4, 1958, when wells Q-172 and Q-174 were shut down, water levels rose in Q-180 and Q-86. On November 1, 1958, when pumping began in wells Q-173 and Q-174, water levels declined in wells Q-180 in the medium aquifer and Q-182 in the shallow aquifer. The more pronounced decline in Q-180 than in Q-182 is due to the more direct hydraulic connection between the medium and deep aquifers. The withdrawal of water from the deep aquifer results in a reduction of pressure, consequently water moves from the medium aquifer into the deep in response to the change in pressure. Moreover, this pressure change is reflected in the shallow aquifer and water moves vertically into the medium aquifer but at a considerably lower rate. The decline in water levels in Q-180 and Q-182, due to pumping wells Q-173 and Q-174 in contrast to the rise in water levels in these wells when well Q-172 was started, is due to the distance of the wells that imposed the load on the aquifer from the observation wells.

Figure 12 shows the fluctuations of the water levels in four wells in 1958 and part of 1959, three of which (Q-172, Q-173, and Q-174) are in the deep aquifer and one (Q-180) in the medium aquifer. The data show that water levels in the wells become relatively stable soon after pumping begins, indicating that interformational leakage is substantial; also that in the vicinity of the wells, the movement of water in the three aquifers has been altered. Prior to the start of pumping from the medium and deep aquifers, the hydraulic pressure gradient was upward--that is, water moved from the deep to the medium aquifer and, in turn, moved upward into the shallow aquifer replacing water that was discharged naturally or artificially. Pumping from the deep aquifer reverses this direction of movement. Water then moves from the shallow into the medium thence into the deep aquifer. When pumping began from the medium aquifer, however, the pressure head in the deep aquifer as well as the shallow was greater, thus causing water to move from the shallow and deep aquifers into the medium.

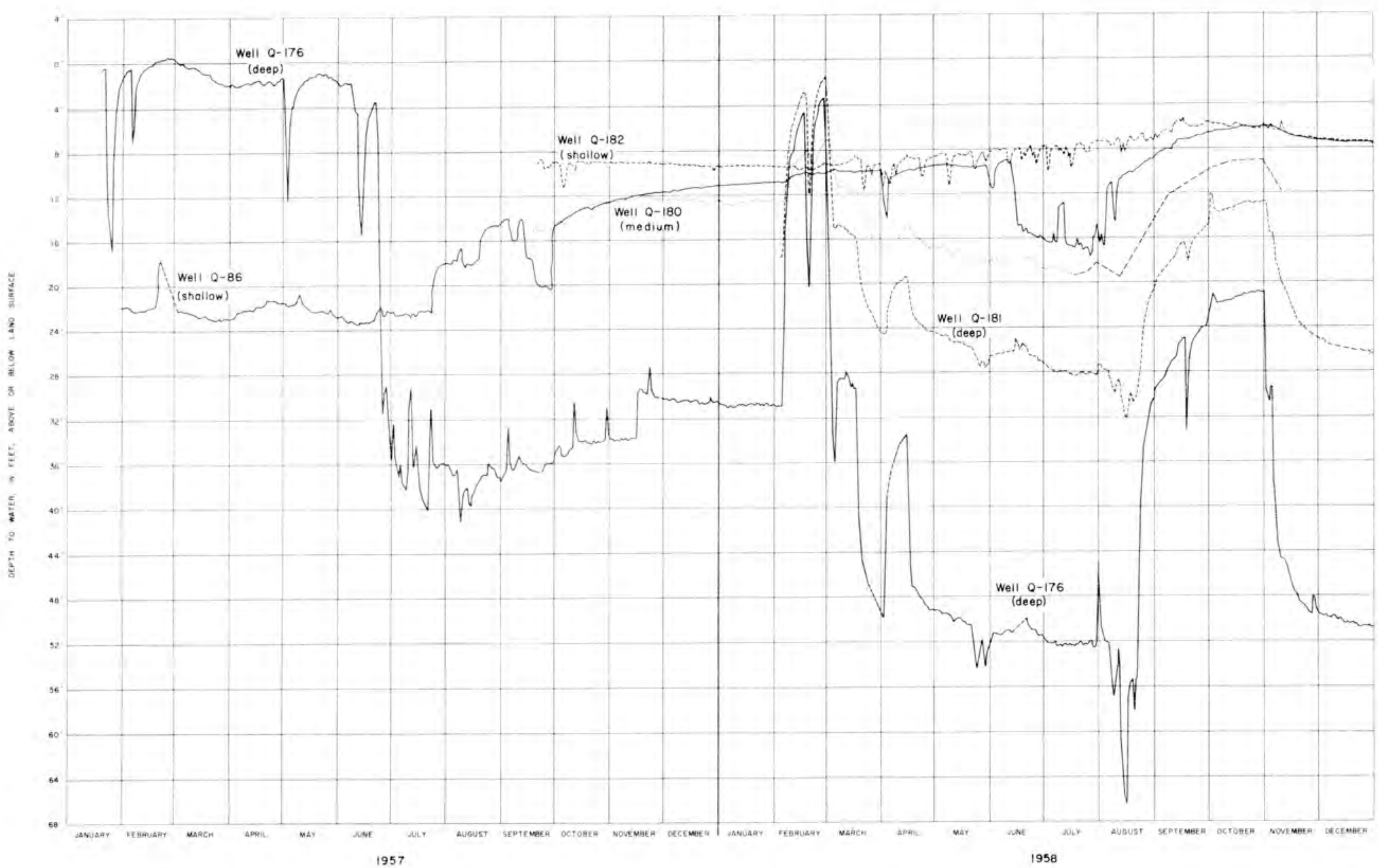


FIGURE 11.—Fluctuations of water levels in wells in the El Paso city well field northwest of Canutillo, 1957-58

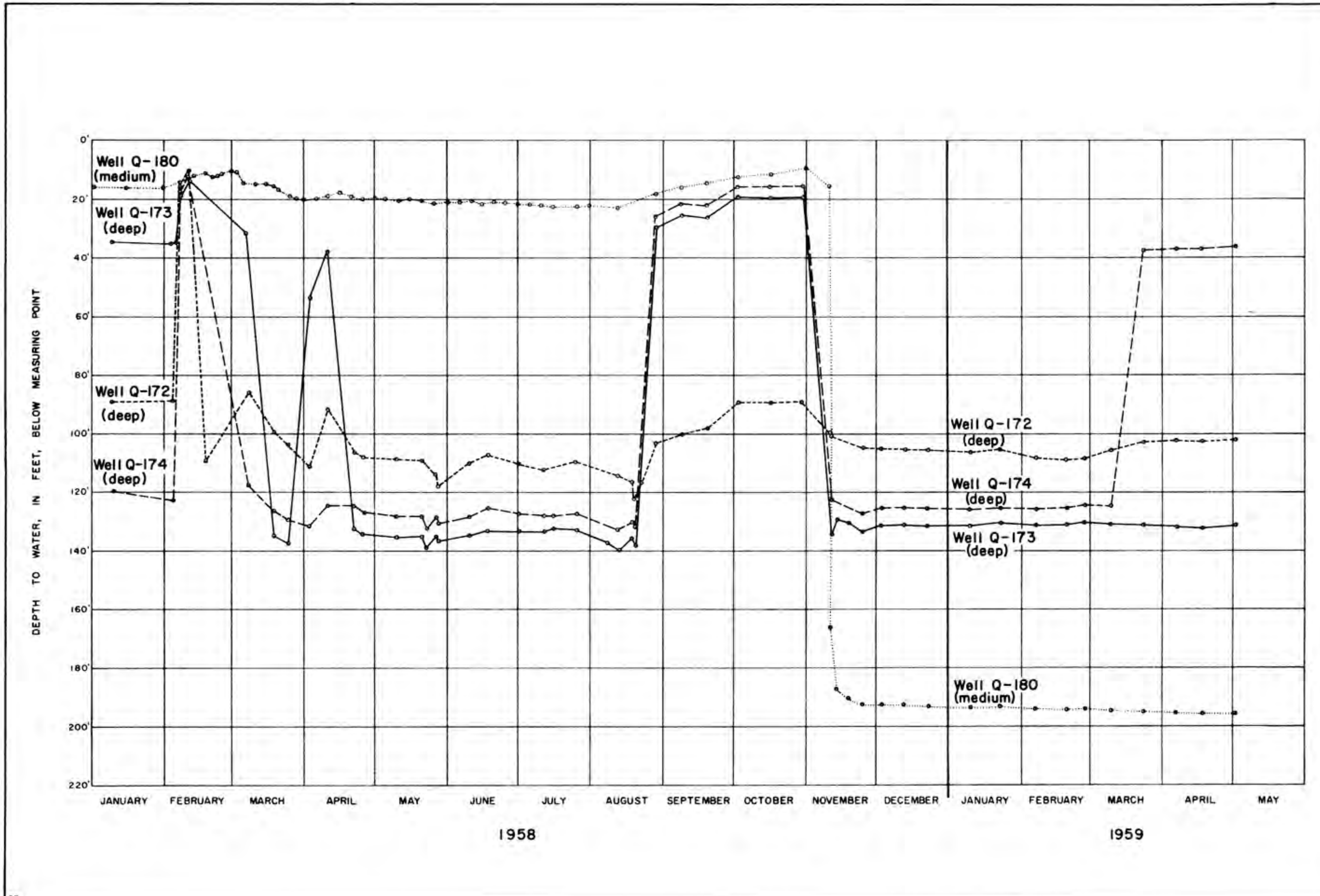


FIGURE 12.- Fluctuations of water levels in wells in the El Paso city well field northwest of Canutillo, 1958-59

Characteristics of Wells

Data concerning the yields and specific capacities are available for 75 wells, 61 of which obtain water from the shallow aquifer, 6 from the medium and deep aquifers of the Santa Fe group, and 8 from the Santa Fe and consolidated sediments underlying the uplands.

The yields of the 61 wells in the shallow aquifer, either measured or reported, ranged from 25 to 3,015 gpm. Most of the wells used for irrigation and for which records are available had yields greater than 1,000 gpm. In the south end of the valley, the yields of 13 wells (U grid) in the alluvium ranged from 35 to 1,025 gpm. In the upland area east of the flood plain, the yields of 8 wells ranged from 40 to 660 gpm. Three of these wells obtain water from the Santa Fe; the yields averaging about 500 gpm. The yields of the remaining 5 wells, which draw from the consolidated sediments, are considerably smaller, averaging about 75 gpm. In the well field northwest of Canutillo, the yields of 4 wells in the deep aquifer of the Santa Fe ranged from 2,025 to more than 3,000 gpm. The yield of one well in the medium aquifer was 2,205 gpm.

The specific capacity of a well generally is expressed as the ratio of the yield, in gallons per minute, to the drawdown, in feet. The term might imply that the ratio of yield to drawdown is constant, but the specific capacity of a well is only an approximation because of the effects imposed by the rate of withdrawal and the element of time. Moreover, a comparison of the specific capacities as an indication of aquifer productivity is subject to considerable error unless the methods of well construction and the degree of development are taken into account. The use of a gravel envelope and of screens increases the effective diameter of the well by offering a larger open area for the passage of water than is provided by slotted casing. This results in reduced entrance velocities, thereby decreasing the drawdown and increasing the specific capacity. The specific capacities of properly developed wells having gravel envelopes and screens probably best represent the capacity of the aquifer to transmit water.

The specific capacities of wells in the alluvium vary widely. The specific capacities of 13 irrigation wells ranged from 5.4 to 108, averaging 46 gpm per foot of drawdown. In the south end of the valley (U grid), the specific capacities of 15 wells used for public supply and industry ranged from 3.0 to 22 gpm per foot of drawdown. These data indicate that the permeability of the alluvium decreases southward.

In the shallow well field northwest of Canutillo, the specific capacities of 6 wells equipped with gravel envelope and mill-slotted casing ranged from 13 to 61 gpm per foot of drawdown. It is probable that the low specific capacities in 3 of the wells is due to incomplete development of the wells. Five wells in the deep aquifer equipped with gravel envelope and mill-slotted casing had specific capacities ranging from 19.7 to 30.7, averaging 25.3 gpm per foot of drawdown. The specific capacity of well Q-180 in the medium aquifer was 14.0 gpm per foot of drawdown. The low specific capacity of well Q-180, as compared to the average for wells in the shallow and deep aquifers, probably is due to the character of the sand in the medium aquifer. Electric and sample logs show that the sand in the medium aquifer is finer than that in the shallow aquifer, and that it contains more clay than the sand in the deep aquifer. It is probable that the specific capacities of the wells in the deep aquifer have been reduced because of a decrease in the size of the screen openings necessitated by the fine sand. Records show that well Q-172 had a specific capacity of 27.4, but, because of the quantity of sand pumped during operation of the well, screen with smaller openings was used in newer wells drilled in the deep sand. The specific capacities of the 4 wells drilled after well Q-172 averaged 23.2 gpm per foot of drawdown.

Wells capable of yielding large volumes of water may be drilled in almost every part of the flood plain in the lower Mesilla Valley. In the southern part of the valley, however, the yields of most wells may be expected to be small. Wells drilled in the uplands probably will produce only small to moderate quantities of water because of a lesser saturated thickness of the aquifer.

Hydrologic Characteristics of Water-Bearing Materials

Aquifer tests were made at the sites of 8 municipal wells in the shallow aquifer, 6 wells in the deep aquifer, and 1 well in the medium aquifer to determine the coefficients of transmissibility and storage, which govern the ability of an aquifer to transmit and to yield water. The results of the tests are shown in the following table.

Well	Aquifer	Coefficient of transmissibility (gpd per ft.)	Coefficient of storage	Well	Aquifer	Coefficient of transmissibility (gpd per ft.)	Coefficient of storage
Q- 82	Alluvium	158,000	--	Q-180	Santa Fe (medium)	34,000	--
Q- 83	do	145,000	--	Q-172	Santa Fe (deep)	60,000	0.0007
Q- 84	do	110,000	--	Q-173	do	59,000	--
Q- 86	do	155,000	0.001	Q-174	do	73,500	--
Q- 90	do	140,000	--	Q-175	do	49,500	--
Q- 91	do	150,000	--	Q-176	do	60,000	.0007
Q-165	do	121,000	--	Q-178	do	57,000	--
Q-166	do	104,000	--				

The coefficient of transmissibility (T) may be defined as the rate of flow of water in gallons per day at the prevailing water temperature through a vertical strip of the aquifer 1 foot wide extending the full height of the aquifer under a unit hydraulic gradient. The volume of water that will flow each day through each foot of the aquifer is the product of the coefficient of transmissibility and the hydraulic gradient. The smaller the coefficient of transmissibility, the greater the hydraulic gradient must be for water to move through the aquifer at a given rate.

The coefficient of storage (S) is the volume of water released from or taken into storage per unit surface area of the aquifer per unit change in the component of head normal to that surface. Under artesian conditions, the volume of water released from or taken into storage is determined by the compressibility of the aquifer and expansion of the water. Under water-table conditions, the coefficient of storage is practically equal to the specific yield, which is defined as the volume of water released from or taken into storage in response to a change in head attributed partly to the gravity drainage or refilling and partly to compressibility of the water and aquifer material in the saturated zone.

The coefficients of storage and transmissibility were computed from the results of the pumping tests by means of a formula developed by Theis (1935, p. 519-524). A discussion of the formula, the assumptions upon which it is based, and its application is given by Wenzel (1942).

Recovery tests in 8 wells in the shallow well field show that the coefficients of transmissibility ranged from 104,000 to 158,000 gpd per foot, averaging 135,000. These coefficients probably are representative of the alluvium, although some water is obtained from the underlying Santa Fe. Aquifer tests of the alluvium failed to show conclusively the connection between the Rio Grande and the ground-water reservoir. Analyses of the test data showed that the water levels in the observation wells were higher than the theoretical water levels. Although the Rio Grande is a contributing stream when the water table is below the stream bed, it is probable that slow drainage of excess irrigation water applied to the land has retarded the expansion of the cone of depression. However, the relation between ground and surface water is clearly shown by the absence of flow in the river between Vinton Bridge and Canutillo Bridge during periods of heavy ground-water withdrawals from the shallow well field. The large withdrawals of ground water from the shallow aquifer reduces the drain flow; in some places, the entire drain flow has been intercepted. The river as well as the drains performs as a line source of recharge, and the effect of a pumping well upon the flow of a drain or the river may be computed on the basis of the formula developed by Theis (1941, p. 736). Conover (1954, p. 119) showed diagrammatically that the flow of a drain would be reduced by 63 percent of the pumping rate after 3 months of continuous pumping of a well 0.25 mile from the drain, by 73 percent after 6 months, and 81 percent after 1 year. The effect of the pumping of a well upon the flow of the drain or the river decreases with distance from the line source.

Aquifer tests at the Federal Correctional Institution at Anthony reported by Sundstrom (1952, p. 6) indicated that the coefficient of transmissibility ranged from 30,000 to 60,000 gpd per foot. In the southern part of the valley, the coefficient of transmissibility determined at the site of well U-38 was about 63,000 gpd per foot. These tests indicate that the wells are screened principally in the Santa Fe.

Aquifer tests at the sites of 6 wells screened in the deep aquifer showed that the coefficients of transmissibility ranged from 49,500 to 73,500 gpd per foot, averaging about 60,000. The relatively wide range in transmissibility is due to the varied thicknesses of the contributing sections of the aquifer. The small range in coefficients of permeability, from 146 to 150 gpd per square foot, in 5 of the tests indicates that throughout most of the well field the Santa Fe group is composed of relatively homogeneous sediments. The coefficient of permeability is defined as the rate of flow of water in gallons per day through a cross section of 1 square foot under a unit hydraulic gradient, or through a section 1 foot high and 1 mile wide under a gradient of 1 foot per mile.

In September 1957 an aquifer test was made at the site of well Q-180 in the medium aquifer. The coefficients of transmissibility and of permeability determined from the test were 34,000 gpd per foot and 128 gpd per square foot, respectively.

Specific yield is difficult to determine from short-term aquifer tests under water-table conditions, as it depends on the time involved in dewatering the part of the aquifer within the cone of depression. Although most of the cone may be dewatered in a relatively short period of time, dewatering may continue at a decreasing rate for years. Thus, specific yields obtained from aquifer tests of short duration generally are too low. The specific yield of the shallow aquifer, as determined from the tests, ranged from 0.0006 to 0.001. A specific yield of 0.0006 may be low for alluvium, but it is probable that the water-bearing material contained clay layers that were fairly well distributed and widespread. Fine-grained sediments retain a considerable part of the water against the pull of gravity, hence a low specific yield. Sundstrom (1952, p. 4) reported a specific yield of about 5 percent in tests made at the Correctional Institution. As the duration of pumping increases, however, the specific yield should increase to 10 or 15 percent. Conover (1954, p. 103) estimated that the specific yield of the valley fill in the Rincon and Mesilla Valleys was about 25 percent.

The coefficient of storage obtained from tests at the sites of wells Q-172 and Q-176 in the deep aquifer averaged 0.0007. The data from well Q-176 showed that after pumping the well for 24 hours the drawdown was less than the predicted drawdown, indicating recharge to the aquifer. The coefficient of storage for the deep and medium aquifers ultimately may reach the specific yield estimated for the shallow aquifer (0.1).

If geologic and hydrologic conditions are favorable, the coefficient of transmissibility and specific yield may be used to predict the performance of the well field.

The curves in Figure 13 show the theoretical drawdown in water levels in the alluvium at the end of various periods or time (t), 1 year, 3 years, 5 years, and 10 years, at various distances from a well pumping 1,000 gpm. The decline at any point is directly proportional to the rate of pumping (Q). The curve is based on a probably conservative specific yield of 10 percent and on the assumption of no recharge to the aquifer, consequently, drawdowns should be less than those indicated on the graph.

The results of aquifer tests of the deep aquifer and the absence of a confining bed as shown by the electric logs indicate that considerable quantities of water may leak from water-bearing sediments through varied thicknesses of clay and into the deep aquifer. Although the clay beds are relatively impermeable, water may pass through or around them in response to a change in pressure. As the head in the deep aquifer is lowered by pumping, the pressure differential may be sufficient to change the direction of movement of water. Before pumping began in June 1957, water moved upward from the deep to the shallow aquifer. A change in pressure in the deep aquifer may reduce or reverse the movement, if the change is sufficiently large. This effect was considered in preparing Figure 14. The curves show the effect on water levels with respect to time at a distance of 1,600 feet from a well pumping 1,000 gpm for varying hydraulic conditions.

Curve A assumes that water is leaking into the deep aquifer while the head in the overlying aquifer remains constant. Curve B assumes that all water comes from artesian storage in the deep aquifer, which is assumed to be infinite in areal extent. Curve C assumes leakage between aquifers accompanied by a declining head in the overlying aquifers based on a leakance factor determined from the test at the site of well Q-172 in the deep aquifer. Curve C represents more fully the conditions in the deep well field. After 24 hours of pumping, the curve is based on the studies made by Hantush and Jacob (1955, p. 95) on nonsteady flow in leaky systems. Figure 15 shows the theoretical drawdown at various distances from a

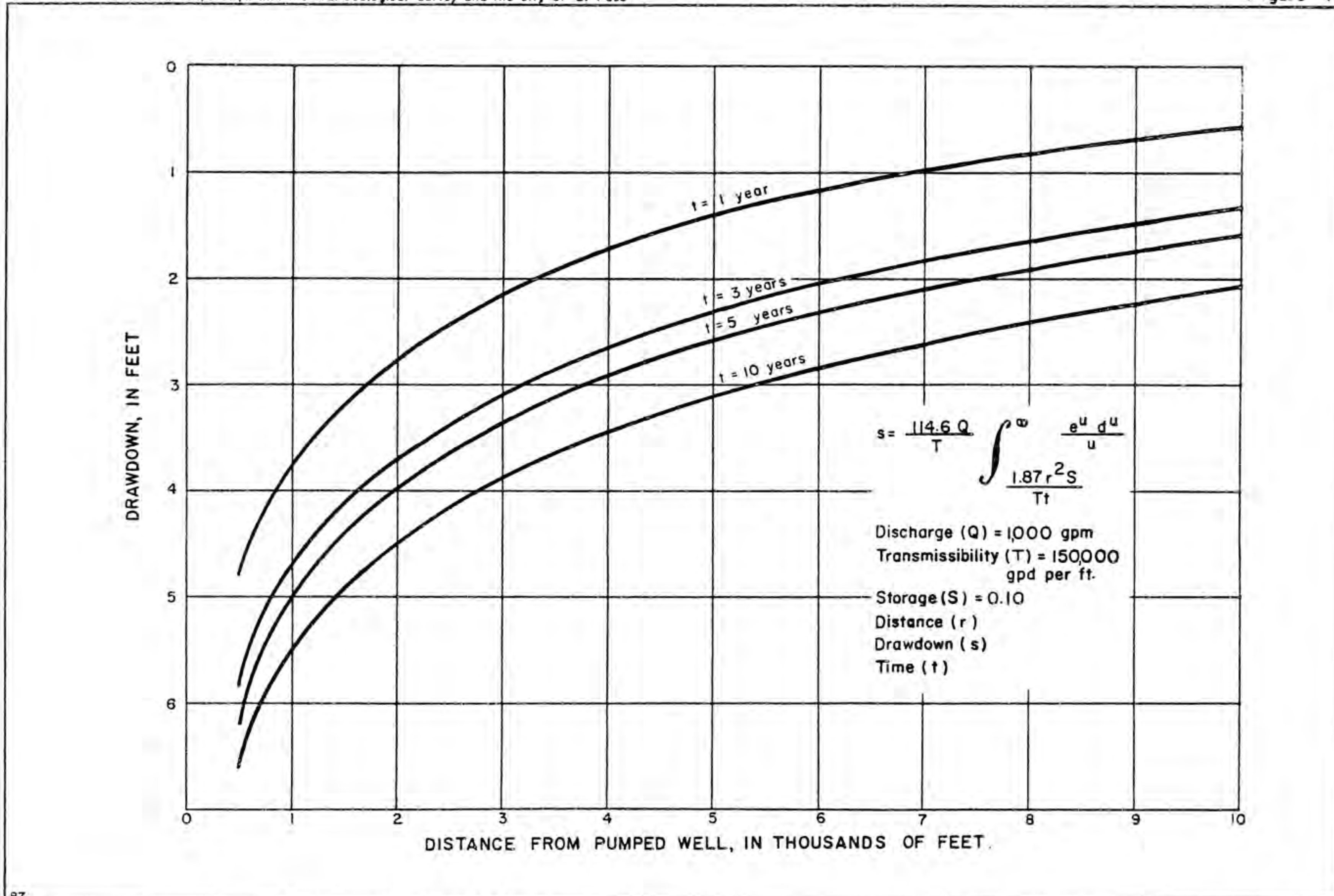


FIGURE 13.-- Theoretical distance-drawdown relation for an infinite aquifer having the hydraulic characteristics determined for the alluvium (shallow well field)

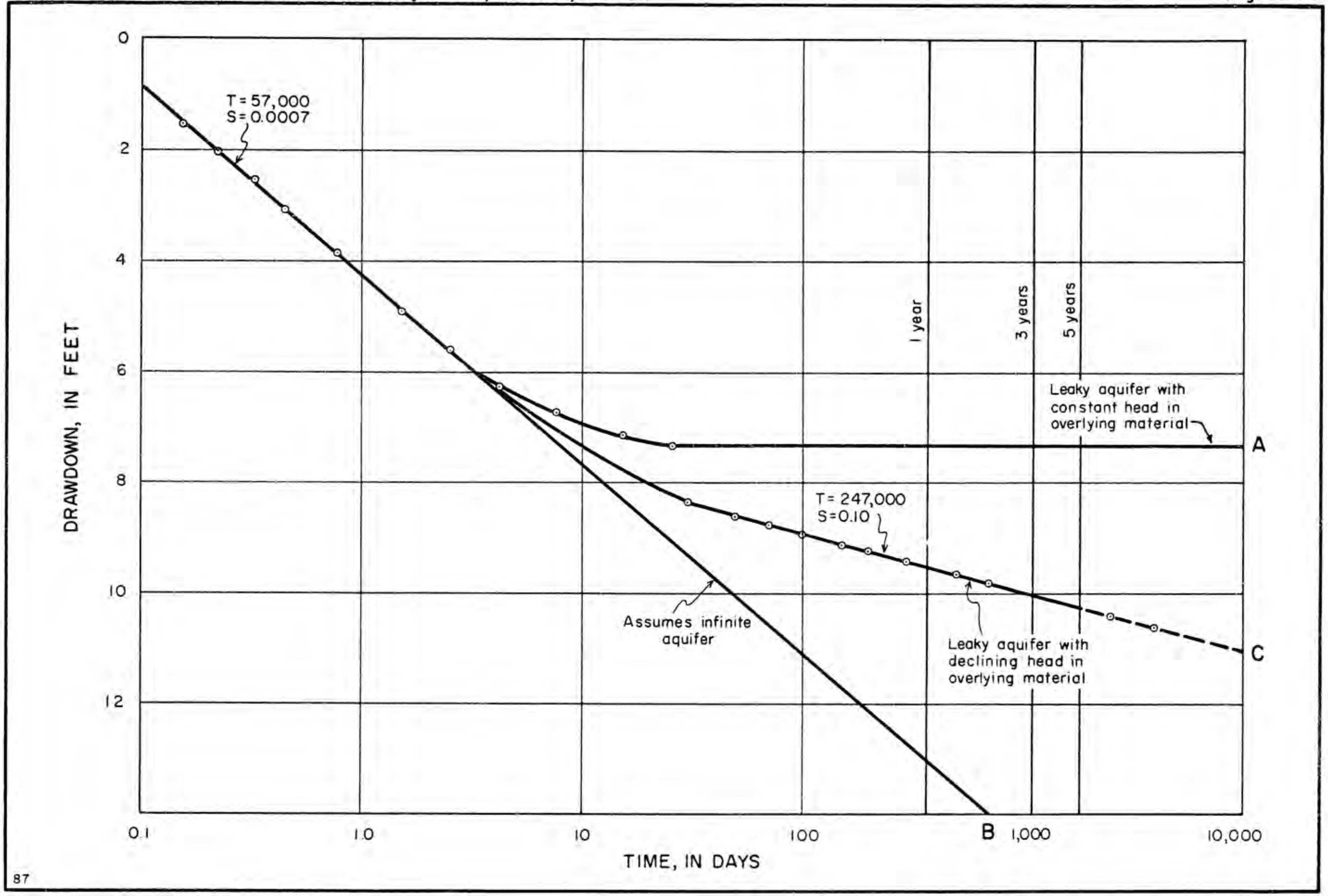


FIGURE 14.- Theoretical drawdown 1,600 feet from a well pumping 1,000 gpm

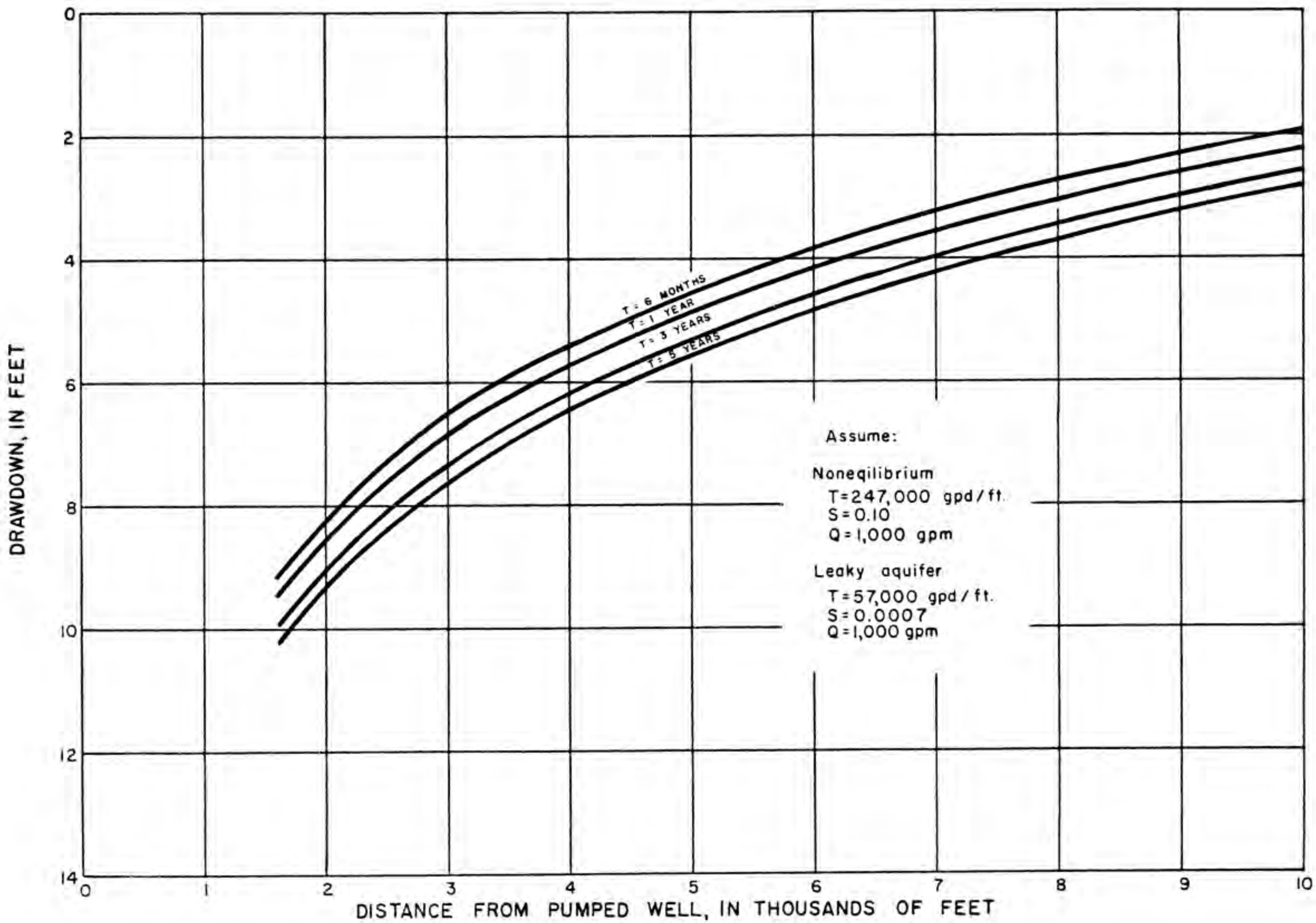


FIGURE 15.- Theoretical drawdown in an infinite aquifer (Santa Fe group) due to pumping (Computed according to the formulas for nonequilibrium and leaky-aquifer conditions)

well pumping 1,000 gpm for various periods of time. When the well is pumped, the rate of decline of water level is rapid at first. As pumping continues, leakage from the overlying sediments is sufficient to reduce the rate of decline; thus, equilibrium in the cone of depression is approached. If pumping continues for a long period of time, water from the shallow aquifer will replace water pumped from the medium or deep aquifers.

A comparison of the theoretical and the actual drawdown of the water level in the observation well Q-176 from February 1957 through December 1958 due to pumping from the deep and medium aquifers is shown in the following table. The distance from well Q-176 is given in feet.

Well pumped	Aquifer	Discharge (gpm)	Time of pumping (days)	Distance from well Q-176	Drawdown in well Q-176 (feet)
Q-172	Deep	2,075	531	1,600	19.9
Q-173	Deep	2,075	354	1,600	19.6
Q-174	Deep	2,075	318	4,350	10.2
Q-180	Medium	2,180	51	1,600	2.9
					Theoretical 52.6
					Measured 51.9

The difference of 0.7 foot between the theoretical and the measured drawdown may be attributed to the substantial rise of the water table in the shallow aquifer during 1958.

Ground Water in Storage

According to available data, at least 45,000,000 acre-feet of saturated sediments underlies the lower Mesilla Valley. Chemical analyses of samples of water from 127 wells show that about 65 percent of the ground water in the Santa Fe group and alluvium in the valley is too high in mineral content for municipal supplies. In this report, fresh water is defined as water that contains less than 250 ppm (parts per million) of chloride. Water that contains more than 250 ppm of chloride is considered to be highly mineralized and, according to standards of the U. S. Public Health Service, is not suitable for municipal supplies. In several small areas, ground water is considered fresh, although the sulfate and dissolved-solids content is somewhat in excess of the limits recommended by the Public Health Service of 250 and 1,000 ppm, respectively.

Analyses of samples of water from wells and test wells indicate that the greatest volume of fresh ground water is in the area northwest of Canutillo and that fresh water-bearing sand thins toward the south and east. The volume of fresh water in storage in the alluvium and Santa Fe in the Texas part of the valley is at least 560,000 acre-feet, and in the New Mexico part the volume of fresh water is at least 980,000 acre-feet. More than 1,540,000 acre-feet of fresh water is in storage in the lower Mesilla Valley; approximately 150,000 acre-feet is in the alluvium in the Texas part of the valley.

The estimate of the volume of fresh water in storage in the lower Mesilla Valley probably is conservative. The specific yield of 10 percent used in the estimate probably is low; the area of the Santa Fe group used for computation extends only to the west edge of the irrigated area. The estimate of the volume of saturated material is based on known thicknesses of materials; it does not include water-bearing sediments that may lie at great depth in the northwestern part. If the specific yield of the saturated material is as much as 25 percent, as estimated by Conover (1954, p. 103), the volume of fresh water would total at least 3,850,000 acre-feet, of which 1,400,000 acre-feet is in Texas.

All the fresh water in storage cannot be withdrawn by wells. In those parts of the aquifer where fresh water is underlain by highly mineralized water, perhaps less than half the fresh water can be recovered before the remainder becomes unsatisfactory for municipal supply.

Sufficient data are not available to determine the volume of water in storage that is suitable for irrigation or industry. A substantial part of the water that is unsuitable for public supply might be used for irrigation, particularly if the chloride content is not excessive and if large quantities of water can be applied for leaching the salts from the soils. Some industries may be able to use part of the more highly mineralized water.

QUALITY OF WATER

The results of the chemical analyses of water samples from 127 wells in the lower Mesilla Valley are shown in Table 5.

Except for specific conductance, pH, and percent sodium, the analyses are given in parts per million, an expression of the concentration by weight of each constituent in a million unit weights of water. Hardness is expressed as equivalent calcium carbonate ($CaCO_3$). Generally, water having a hardness of less than 60 ppm is classified as soft; from 61 to 120 ppm as moderately hard; and more than 120 ppm as hard. Specific conductance, which is the electrical conductivity of the water, and pH are expressed in appropriate units for the property measured.

Ground Water

It is not possible to define exact limits of mineral content beyond which ground water cannot be used for specific purposes. However, water for municipal and domestic supplies should conform as nearly as possible to the standards established by the U. S. Public Health Service (1946) for use on interstate carriers. The concentrations of chemical substances preferably should not exceed the indicated limits:

Constituent	Parts per million (ppm)
Iron (Fe) and Manganese (Mn) together	0.3
Magnesium (Mg)	125
Sulfate (SO_4)	250
Chloride (Cl)	250
Fluoride (F)	1.5
Nitrate (NO_3)	45
Dissolved solids	500 (1,000 permitted)

Fluoride content of water in domestic supplies should not exceed 1.5 ppm. Water exceeding this amount may cause a mottling of tooth enamel if the water is used continuously (Dean, Dixon, and Cohen, 1935). Data collected by various agencies have demonstrated that fluoride in drinking water in quantities less than 1.5 ppm reduces the incidence of tooth decay (Dean, Arnold, and Elvove, 1942). The Texas State Department of Health recommends as desirable a fluoride content of 1.0 to 1.5 ppm.

The more important factors that affect the quality of ground water for irrigation are dissolved-solids content, percent sodium, residual sodium carbonate (equivalents per million of carbonate and bicarbonate in excess of calcium and magnesium), and boron. An equivalent per million (epm) is the expression of the concentration in terms of chemical equivalents rather than by weight. Water having a percent sodium of more than 80 (Wilcox, 1948, p. 27), a residual sodium carbonate of more than 2.5 epm, or a boron content greater than 1.25 ppm for sensitive crops and 3.75 ppm for tolerant crops is generally considered unsuitable for irrigation (U. S. Salinity Laboratory Staff, 1954, p. 81). Other factors, such as climate, soil type, crop, and quantity of water used may be equally significant and under optimum conditions may permit the satisfactory use of water with a high percent sodium or a high boron content.

In the lower Mesilla Valley, the quality of ground water varies both areally and with depth. Samples of water collected from wells near the south end of the valley and from wells along the east boundary were high in dissolved-solids content. It was not possible to ascertain if certain samples from the shallow aquifer were from the alluvium or from the Santa Fe group. Many shallow wells obtain water from both sources.

Santa Fe Group

Fresh water in the Santa Fe group extends to a depth of at least 1,200 feet in well Q-178. Electric logs and drill-stem tests indicate that the base of fresh water is progressively shallower toward the south and east. Figure 4 shows the progressive thinning southward of the fresh-water-bearing sands in the Santa Fe.

In the city of El Paso deep well field, water from below 200 feet is satisfactory for municipal use. Analyses of water from well Q-172 show that the water is soft and low in dissolved-solids content. Drill-stem samples from depths between 200 and 500 feet in the deep wells and a sample of water from well Q-180 in the medium aquifer contained more dissolved solids than the deep aquifer.

Fresh water from the Santa Fe probably could be used for irrigation. Analyses of samples of water from the deep well fields suggest that the water may be used for irrigation. Although the percent sodium generally exceeds 80, the residual sodium-carbonate and the boron content of the samples from well Q-172 are lower than the recommended limits. Chemical analyses of more water samples will be necessary in order to determine the suitability of fresh water for irrigation from the Santa Fe.

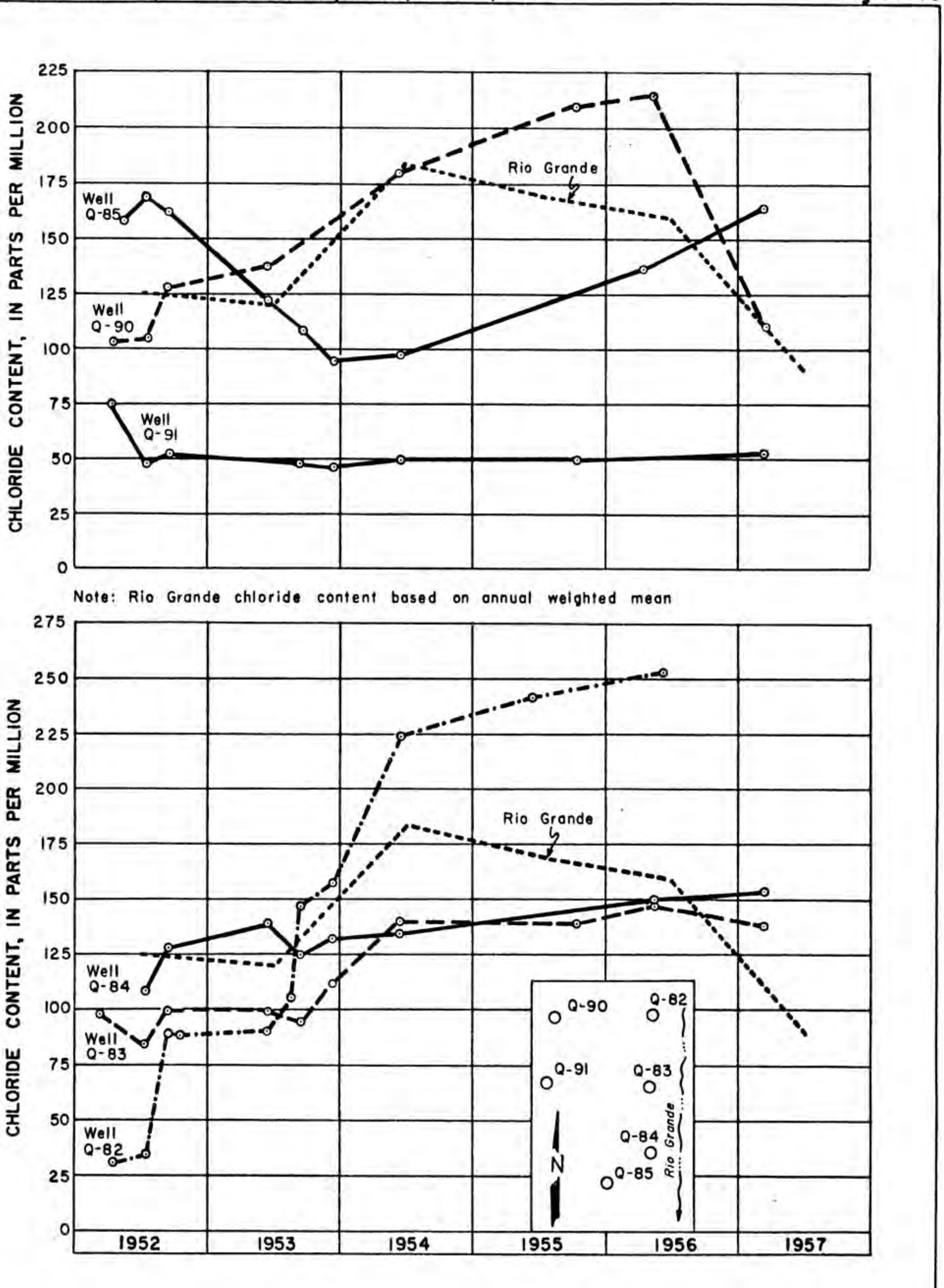
The south edge of the body of fresh water in the deep aquifer extends to a line through Canutillo. South of Canutillo, the water from the Santa Fe increases in mineral content until it becomes unfit for most uses. Sayre and Livingston (1945, p. 7) report that two test wells in the lower Mesilla Valley drilled in 1922 yielded salt water. The El Paso Electric Co. reported that water from well U-65, depth 600 feet, contained 1,750 ppm of sulfate, 790 ppm of chloride, and 4,080 ppm of dissolved solids.

The southward increase in mineral content of the water in the Santa Fe may be partly due to incomplete flushing from the Santa Fe and to the concentration of the ground water in the alluvium by evapotranspiration. Playa lakes probably occupied the Rio Grande depression. Owing to the Rio Grande cutting through the gorge into the Mesilla Valley and the damming by andesite intrusive rocks, salt water in the ancient lake sediments probably was not flushed out at the south end of the valley. According to Slichter (1905, Figure 3), "The rapid rate of increase in the dissolved solids at a depth of about 40 feet [in the gorge near El Paso] indicates that the water below such depth is stagnant or without appreciable movement."

The flow through the gorge was estimated by Slichter as not exceeding 11,200 cubic feet per day, or about 50 gpm. The largest part of the natural discharge of ground water from the valley is by evapotranspiration, resulting in concentration of the mineral content of the ground water. On La Mesa, well P-6 (depth 950 feet) yielded water that was suitable for municipal and domestic supply. On the upland east of the flood plain, water from the Santa Fe ranges from fresh to brackish. In the area between Canutillo and Vinton Bridge, water in most wells is satisfactory for domestic use, although the chloride or sulfate content may slightly exceed the recommended limits. South and north of this area the water is high in chloride and dissolved-solids content.

Alluvium

Most wells in the flood plain range in depth from 80 to 200 feet. Therefore, many of these wells yield a mixture of water from the Santa Fe group and the alluvium. North of Canutillo and west of the Rio Grande in the area of the city well field, water from the alluvium is relatively fresh but contains more dissolved solids than the water in the Santa Fe. The quality of the water in the shallow well field varies laterally and also at different periods of time. The marked change in the quality of water in the shallow well field from 1952 to 1957 was due partially to the infiltration of water from the Rio Grande and the infiltration of surface water applied to the land. Figure 16 shows the



87

FIGURE 16.– Chloride content of water from wells in the alluvium and from the Rio Grande, 1952-57

chloride content of water from six wells in the shallow well field and of water from the Rio Grande. The greatest increase in the chloride content was in wells Q-82 and Q-90, which are in the center of heavily irrigated areas. The chloride content in wells Q-83 and Q-84 increased at a rate similar to the increase in the chloride content of the river.

During periods of large flow, the river water may be more dilute in mineral content than ground water in the shallow well field. For example, in 1957 the weighted average of chloride content of the water in the Rio Grande was less than 100 ppm (the lowest from 1952 to 1957). Because of the decrease in the quantity of ground water pumped for irrigation and the application of large quantities of surface water of low chloride content, the water in well Q-90 decreased in chloride content. No records are available to show the change in the quality of the water in well Q-82 in 1957. In the area east of the Rio Grande between Vinton Bridge and Anthony, water in the alluvium is more highly mineralized than that in the alluvium northwest of Canutillo. Records show that water at a depth less than 200 feet ranges in chloride content from 190 ppm in well Q-27 to 6,240 ppm in well Q-178. In most of the wells, the chloride content exceeded 300 ppm. The area between Vinton Bridge and Anthony is drained by the East Drain, which, according to Conover (1954, p. 87) "...apparently has water of higher concentrations than found in the irrigation water...". In explaining the poor quality of the water in the East Drain, he proposed that "...water east of the valley toward the Franklin Mountains also has a high concentration of dissolved solids and enters the drain, or that similar water occurs in the valley in this area and has not been completely flushed by excess irrigation water applied to the lands." Because of the shallow water table in the area, mineralization of the ground water probably was increased further by evapotranspiration.

South of Canutillo, the alluvium contains water that is rather high in dissolved solids but generally of better quality than the water in the underlying Santa Fe group. In the south end of the valley, the El Paso Electric Co. and the American Smelting and Refining Co. obtained water from the alluvium. The water in 4 wells had a chloride and sulfate content of less than 250 ppm. Fresh water in this area is attributed to recharge from precipitation on the surficial sandy deposits overlying the alluvium. Until November 1955, the White Water Works supplied water to the community of White Spur and nearby residential areas. Analyses of water from 5 wells, U-1, U-2, U-4, U-6, and U-7, had a chloride content exceeding 340 ppm, except well U-4, which had a chloride content of 92 ppm but a sulfate content of 288 ppm.

Consolidated Rocks

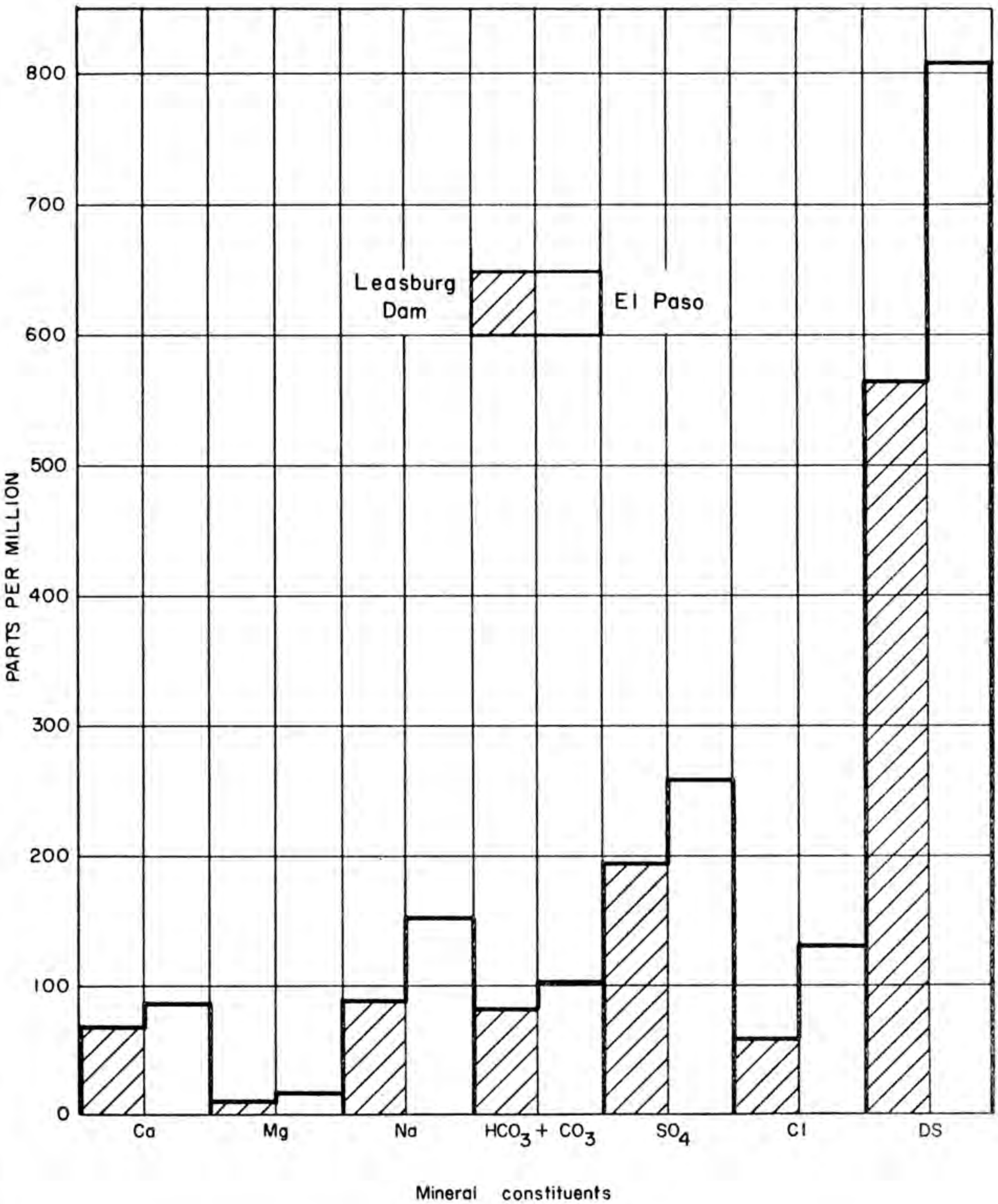
Several wells on the uplands bordering the Franklin Mountains and at the south end of the valley yield water from consolidated rocks. Well Q-76 obtained hard water for stock use from a black rock, probably of Pennsylvanian age. Chemical analysis of a sample of the water showed more than 300 ppm of chloride and 1,000 ppm of dissolved solids. At the south end of the valley, well U-59 yielded hard water high in dissolved-solids content, chloride, and sulfate. Water that is unsuitable for domestic or municipal uses but satisfactory for some industrial uses is obtained from sand and limestone of Early Cretaceous age. On the west slope of the Franklin Mountains, well U-12 yielded water high in calcium, magnesium and iron content from a limestone of undetermined age between 1,600 and 1,690 feet deep. The well was abandoned and plugged in 1953 because of the high fluoride content (5.6 ppm) of the water.

Surface Water

Records of the chemical data from the International Boundary and Water Commission's files show that the water of the Rio Grande increases in dissolved solids content between Leasburg, New Mexico, and El Paso, Texas. (See Figure 17.) During the 1930-57 period, the dissolved-solids content increased from an average of 0.77 ton per acre-foot at Leasburg Dam to 1.10 tons per acre-foot at El Paso, an increase of nearly 45 percent in 50 miles. A ton per acre-foot is equivalent to 735.5 ppm of dissolved solids. Most of the increase in sodium salts of sulfate and chloride is attributed to the accretion of drain water. The following table shows that the chloride content of water (in parts per million) in the Rio Grande at El Paso is highest during the nongrowing season and is lowest from March to September, when surface water is released for irrigation. During the winter, the water in the Rio Grande consists largely of return flow from the drains.

Month	1952	1953	1954	1955	1956	1957	1958
Jan.	288	281	377	490	705	710	830
Feb.	309	312	318	570	805	815	870
Mar.	246	88	230	259	169	375	83
Apr.	198	93	169	172	126	227	78
May	142	124	171	234	262	490	69
June	92	92	175	185	142	126	69
July	80	96	167	124	137	57	74
Aug.	76	110	124	153	172	45	76
Sept.	112	128	286	131	176	65	87
Oct.	246	259	190	274	775	375	175
Nov.	260	293	525	507	770	1,090	268
Dec.	268	330	505	700	742	920	---
Weighted mean	125	119	184	170	160	90	---

The quality of water in the drains in the lower Mesilla Valley varies widely. However, this water usually is higher in dissolved-solids content than the river water at El Paso. However, during part of 1955 and 1956, the water in the river at El Paso was higher in dissolved solids than the water in Montoya Drain owing to the low flow of the river and the discharge into the river of concentrated effluent from the El Paso electric plant. Figures 18 and 19 show that the quality of the water, expressed as specific conductance (micromhos), in Montoya and Anthony Drains varies more or less inversely with the quantity of drain flow. The specific conductance is a measure of the ability of the water to carry an electric current



87

FIGURE 17.- Average chemical quality of water from the Rio Grande at Leasburg Dam, New Mexico, and at El Paso, Texas, 1930—57

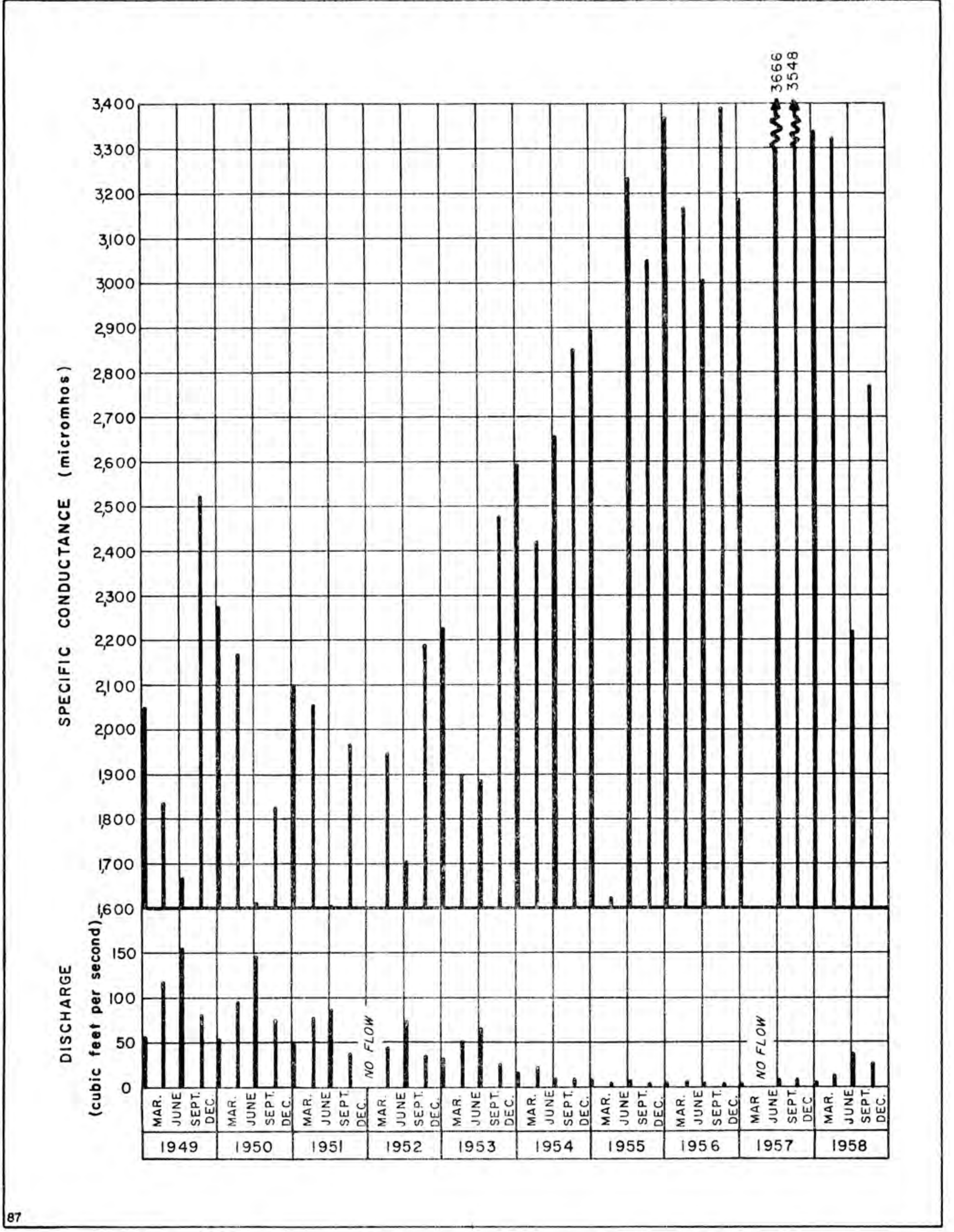
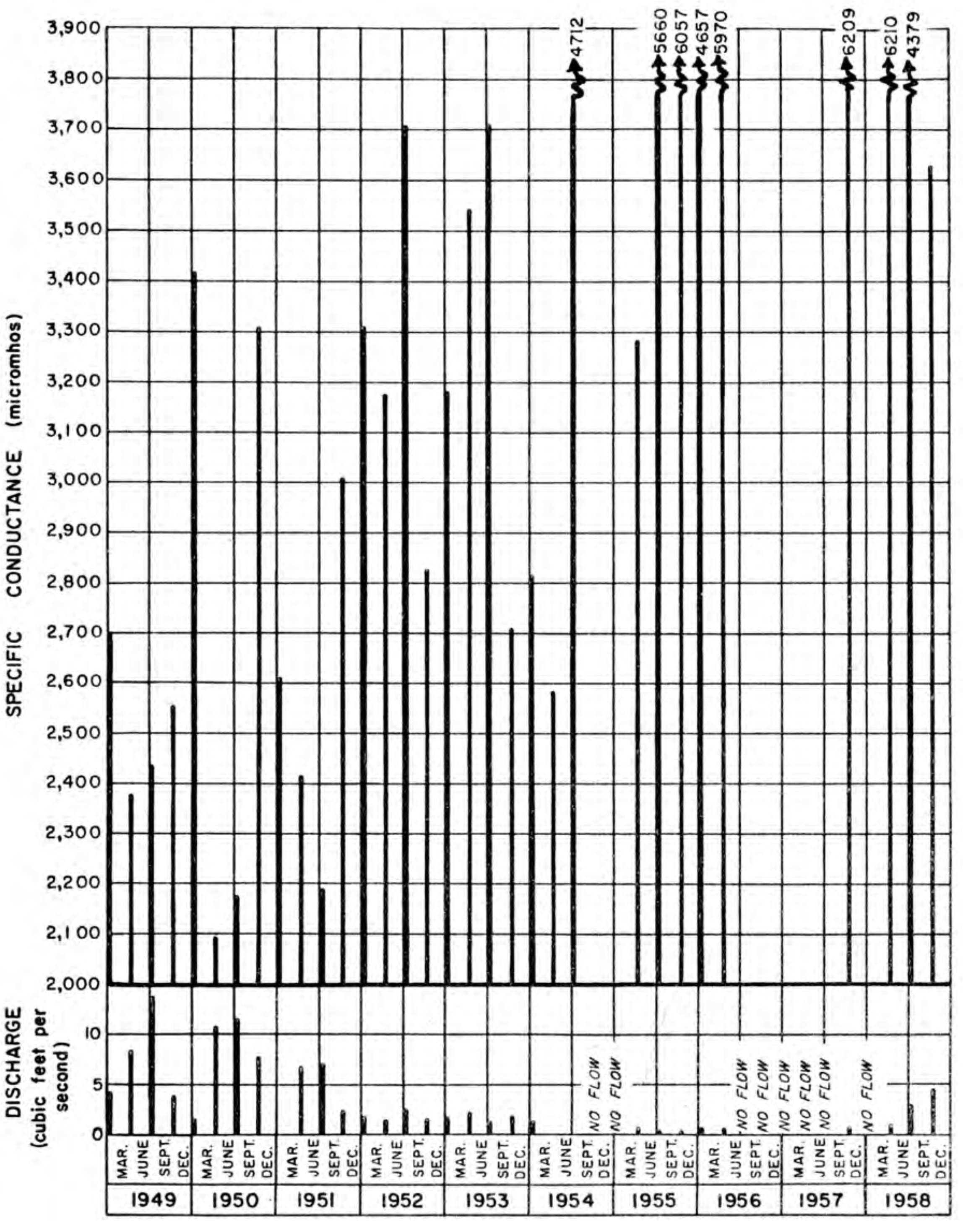


FIGURE 18.—Quality and discharge of water in Montoya Drain, 1949–58



87

FIGURE 19.-Quality and discharge of water in Anthony Drain, 1949-58

and is therefore an indication, within rather wide limits, of the ionic strength of the water. These data show that water in Anthony Drain is higher in mineral content than that in Montoya Drain.

In general, the drain water increases in dissolved-solids content from the upper to the lower end of the West Drain (Figure 20). The increase is due principally to the accretion of ground water in which mineralization increases toward the lower end of the valley, and also to the concentration of the dissolved salts in the drain water by evapotranspiration.

FUTURE DEVELOPMENT

The quantity of ground water discharged as drain flow from the lower Mesilla Valley indicates that additional supplies can be developed from wells in the shallow, medium, and deep aquifers, with little permanent loss of ground-water storage. Unmeasured, but substantial, amounts of reclaimable ground water are discharged by seepage into the Rio Grande and by evapotranspiration. If the water table is lowered below river level, seepage from the Rio Grande will add to recharge of the ground-water reservoir.

Several factors affect the future development of ground water in the lower Mesilla Valley: (1) The demand for ground water for irrigation is extremely variable because it depends upon the availability of surface water; (2) the quality of most of the water in the shallow aquifer is unsuitable for public supplies and for some industrial uses; (3) the quality of water in the medium and deep aquifers may deteriorate as a result of leakage of water of poor quality from the shallow aquifer and from encroachment of salt water from underlying and adjoining beds, if withdrawals from the deep aquifer are excessive; (4) the surface-water supply will be reduced if ground-water withdrawals in the valley are increased; and (5) the salt content of the water in the shallow aquifer will increase if the drain flow is reduced substantially.

Drain flow is directly related to the allotment of surface water for irrigation and to the withdrawals of ground water from any of the three aquifers. If surface-water supplies are inadequate, ground-water withdrawals may become so large that drain flow will cease, and the water in the shallow aquifer will increase in dissolved-solids content. Thus, if the shallow aquifer is to remain a source of supplemental supply for irrigation, withdrawals of water must not be so great that the drain flow is stopped or is reduced to a point that would result in an unfavorable salt balance in the irrigated area.

The rated capacity of wells drilled in the shallow aquifer during the period 1951-56 probably is adequate to meet the demands for supplemental irrigation water even during prolonged periods of severe shortage of surface water. The demand for irrigation water reached a maximum in 1958 when nearly all the land was being irrigated in this area. On about 5 percent of the irrigated land, or about 1,000 acres, ground water exclusively is used for irrigation; on 95 percent surface water is supplemented by ground water when allotments are inadequate. The crops require about 3 feet of water annually; thus the demand for ground water ranges from about 3,000 acre-feet per year, when surface-water supplies are adequate (as in 1958), to as much as 50,000 acre-feet per year during extended periods of surface-water shortages.

Development of additional water supplies from the shallow aquifer for uses other than irrigation appears feasible. However, withdrawals of water for public

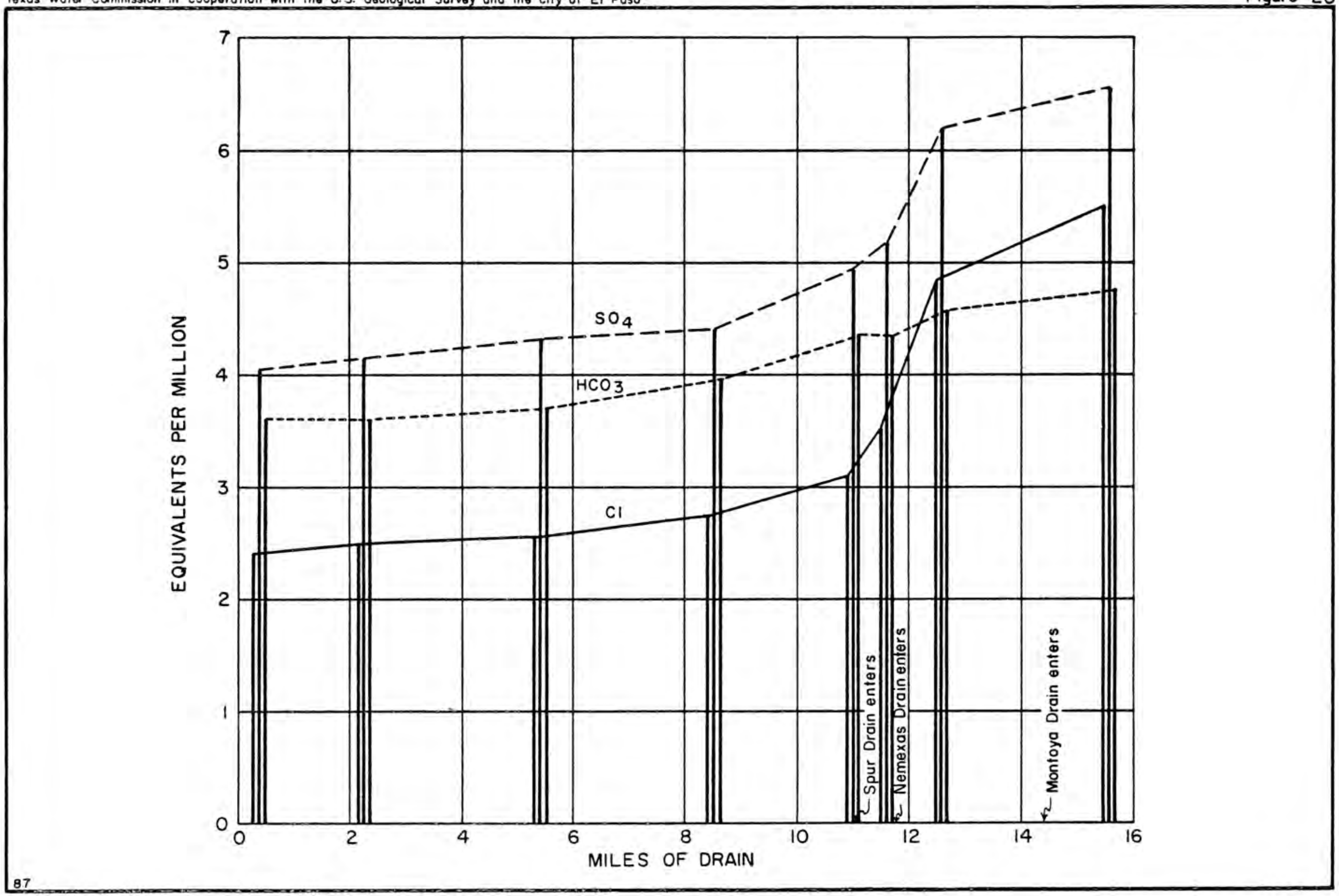


FIGURE 20 - Increase in mineralization of water from the upper to the lower end of West Drain

supply from the shallow aquifer should not exceed the capacity of the present El Paso shallow well field, about 17,000 acre-feet per year, or 15 mgd. The field includes nearly all the area underlain by water suitable in quality for public supply. Additional development from the shallow aquifer should be limited to water of poor quality which can be used by industries.

The flow from Montoya Drain represents a large part of the water that could be pumped from wells without seriously depleting the amount of water in storage. The records of flow for the period 1946-50 show that about 70,000 acre-feet per year of ground water could be pumped when surface-water allotments are adequate. Surface water was in short supply every year from 1951 to 1957; an increase in pumpage and a decrease in the recharge rate to the ground-water reservoir reduced the average drain flow for the period to 17,000 acre-feet per year, a loss of 53,000 acre-feet per year from the rate of the 1946-50 period. The average pumping rate from 1951 to 1957 was 36,000 acre-feet per year. About one-third of the water pumped was returned to the aquifer as seepage. Ground water used for irrigation and municipal supplies accounted for about half of the drain-flow loss or about 26,000 acre-feet per year; the other half was caused by a decrease in the recharge rate caused by the application of less surface water to the land. The average decrease in the recharge rate was greater than 26,000 acre-feet per year because part of the water pumped was withdrawn from storage. In 1958, when surface water was adequate, the drain flow did not increase as much as expected because the ground-water storage was being replenished.

The greatest potential source of water for municipal and industrial supplies is the medium and deep aquifers. In 1958 the city of El Paso pumped an average of 6.8 mgd from the medium and deep aquifers. The rated capacities of the pumps is 19 mgd or about 6 mgd greater than recharge to the aquifers. Pumping at capacity rates might result ultimately in the encroachment of salt water which overlies, underlies, or adjoins the fresh water. Encroachment may be kept to a minimum if, (1) withdrawals of ground water do not exceed the rate of recharge, (2) if withdrawals are as remote as possible from salt-water bodies, and (3) if they are chiefly from the deep aquifer. Large withdrawals of ground water from the medium aquifer might accelerate the contamination of the fresh-water body by increasing the rate of downward movement from the shallow aquifer.

As a conservative estimate, at least 200,000 acre-feet of fresh water can be recovered from storage in the Texas part of the valley. This estimate does not include ground water in the New Mexico part of the valley, which would replace the water withdrawn from the Texas part of the valley. The rate at which fresh water in the medium and deep aquifers is depleted will depend upon the withdrawal rate.

On the basis of past records, it appears that from all three aquifers development of ground-water supplies in addition to irrigation supplies could total about 30,000 acre-feet per year, 14,500 acre-feet of which may be safely obtained from the medium and deep aquifers.

SUMMARY AND CONCLUSIONS

The middle and deep aquifers of the Santa Fe group are the most important sources of ground water in the lower Mesilla Valley for the municipal supply of El Paso. The shallow aquifer, which consists of Recent alluvium and a part of the Santa Fe, is used extensively as a supplemental supply for irrigation and to some extent as a source for municipal and industrial supplies.

Recharge to the Santa Fe, estimated to be 13 mgd, is derived from precipitation on the bordering uplands and from the valley in New Mexico north of Anthony. The amount of recharge to the Recent alluvium from infiltration of irrigation water varies in accordance with the amount of water applied to the land. During periods when the surface-water supply is normal, the potential annual accretion to the alluvium is at least 36,000 acre-feet. When the water table is high and the drains are flowing, most of the 36,000 acre-feet of recharge will be returned to the river as drain flow.

Aquifer tests indicate that the three aquifers (deep, medium, and shallow) in the city of El Paso well field near Canutillo are hydraulically connected; pumpage from one affects the water levels in the others. The tests showed substantial leakage between the aquifers. Therefore, water higher in dissolved-solids content will percolate from the shallow aquifer into the medium and subsequently into the deep aquifer to replace the water of better quality that has been withdrawn.

Fresh water occurs in the Santa Fe from at least the New Mexico-Texas state line southward to a line approximately through Canutillo. South of this line, the dissolved-solids content of the water in the Santa Fe increases until it becomes unfit for most uses. The quality of water in the Recent alluvium varies widely. North of Canutillo and west of U. S. Highway 80, the water in the alluvium is of good quality but its dissolved-solids content is greater than that of the water in the underlying Santa Fe. Because most of the recharge to the alluvium is from infiltration of water applied to the land and from seepage from drains, canals, and the river, the quality of the ground water varies according to the quantity and quality of the surface water available for irrigation. South of Canutillo, the water in the Recent alluvium is high in mineral content but generally is of better quality than the water in the underlying Santa Fe.

The use of ground water for irrigation in the lower Mesilla Valley is inversely related to the supply of surface water. During periods when surface-water storage in Elephant Butte Reservoir is normal, pumpage for irrigation is negligible. Since 1957, pumpage of ground water for the municipal supply of El Paso has increased each year, and in 1958 water usage for municipal supply exceeded the pumpage of ground water for irrigation. In 1958 the city of El Paso pumped an average of 6.8 mgd from the medium and deep aquifers of the Santa Fe, or about 50 percent of the estimated recharge to the Santa Fe.

It is estimated that 560,000 acre-feet of fresh water is stored in the alluvium and the Santa Fe in the Texas part of the valley, and an additional 980,000 acre-feet in the part of the valley in New Mexico. Approximately 150,000 acre-feet is in the alluvium in Texas. In those areas where the fresh-water beds are overlain or underlain by salt water, less than half of the fresh water can be recovered.

The large amount of ground water discharged as drain flow from the lower Mesilla Valley indicates that additional supplies can be obtained from wells in the shallow, medium, and deep aquifers. In addition to irrigation supplies, the three aquifers can furnish long-term sustained supplies of about 30,000 acre-feet per year, 14,500 acre-feet of which may be safely developed from the medium and deep aquifers.

Results of the investigation indicate that the ground-water resources of the lower Mesilla Valley are insufficient to furnish a large sustained supply of ground water for the annually increasing needs of the city of El Paso. Detailed planning and proper development will be necessary to obtain maximum recovery without serious contamination of the water supply. Such planning should include the collection of (1) records of well construction, (2) records of well performance, (3) periodic water-level measurements, (4) pumpage records, and (5) chemical analyses of water samples.

SELECTED REFERENCES

Barksdale, H. C., Sundstrom, R. W., and Brunstein, M. S., 1936, Supplementary report on the ground-water supplies of the Atlantic City region: New Jersey State Water Policy Comm. Spec. Rept. 6.

Bryan, Kirk, 1938, Geology and ground-water conditions of the Rio Grande depression in Colorado and New Mexico, in Natl. Resources Comm., Regional Plan., pt. 6, Upper Rio Grande, v. 1, pt. 2: Washington, U. S. Govt. Printing Office.

Conover, C. S., 1954, Ground-water conditions in the Rincon and Mesilla Valleys and adjacent areas in New Mexico: U. S. Geol. Survey Water-Supply Paper 1230.

Darton, N. H., 1933, Guidebook of the western United States, part F, The Southern Pacific lines, New Orleans to Los Angeles: U. S. Geol. Survey Bull. 845.

Dean, H. T., Arnold, F. A., and Elvove, Elias, 1942: Domestic water and dental caries: Public Health Repts., v. 57, p. 1155-1179.

Dean, H. T., Dixon, R. M., and Cohen, Chester, 1935, Mottled enamel in Texas: Public Health Repts., v. 50, p. 424-442.

Duisberg, P. C., 1957, Post-symposium developments and the job ahead, in Symposium on problems of the upper Rio Grande: U. S. Comm. for Arid Resources Improvement and Development, pub. no. 1, p. 65-69.

Dunham, K. C., 1935, Geology of the Organ Mountains: New Mexico School of Mines, Bur. Mines and Mineral Resources Bull. 11.

Gatewood, J. S., Robinson, T. W., Colby, B. R., Hem, J. D., and Halpenny, L. C., 1950, Use of water by bottom-lane vegetation in lower Safford Valley, Arizona: U. S. Geol. Survey Water-Supply Paper 1103.

Hantush, M. S., and Jacob, C. E., 1955, Non-steady radial flow in an infinite leaky aquifer: Am. Geophys. Union Trans., v. 36, no. 1, p. 95-100.

International Boundary and Water Commission, United States and Mexico, 1938-56, Flow of the Rio Grande and related data, from Elephant Butte Dam, New Mexico, to the Gulf of Mexico: Water Bulls. 8 to 26.

Jacob, C. E., 1939, Fluctuations in artesian pressure produced by passing railroad trains as shown in a well on Long Island, New York: Am. Geophys. Union Trans., pt. IV, p. 666-674.

Knowles, D. B., and Kennedy, R. A., 1956, Ground-water resources of the Hueco bolson, northeast of El Paso, Texas: Texas Board of Water Engineers* Bull. 5615; also 1958, U. S. Geol. Survey Water-Supply Paper 1426 [1959].

Kottlowski, F. E., 1958, Geological history of the Rio Grande near El Paso, in West Texas Geol. Soc. Guidebook 1958 Field Trip, Franklin and Hueco Mountains, Texas: p. 46-54.

Lee, W. T., 1907, Water resources of the Rio Grande Valley in New Mexico and their development: U. S. Geol. Survey Water-Supply Paper 188.

Meinzer, O. E., 1923a, The occurrence of ground water in the United States, with a discussion of principles: U. S. Geol. Survey Water-Supply Paper 489.

_______1923b, Outline of ground-water hydrology, with definitions: U. S. Geol. Survey Water-Supply Paper 494.

_______ed., 1942, Hydrology, v. 9 of Physics of the earth: New York, McGraw-Hill Book Co., Dover Publications, Repr. 1949.

Nye, S. S., 1930, Pumping test of well at site of proposed Federal Detention Prison about one mile south of La Tuna, Texas: U. S. Geol. Survey open-file rept.

Sayre, A. N., and Livingston, Penn, 1945, Ground-water resources of the El Paso area, Texas: U. S. Geol. Survey Water-Supply Paper 919.

Scalapino, R. A., 1949, Ground-water resources of the El Paso area, Texas, Prog. rept. 6: Texas Board Water Engineers* dupl. rept.

Slichter, C. S., 1905, Observations on the ground water of the Rio Grande Valley: U. S. Geol. Survey Water-Supply Paper 141.

Smith, R. E., 1956, Ground-water resources of the El Paso district, Texas, Prog. rept. 7: Texas Board Water Engineers* Bull. 5603.

Spiegel, Zane, and Baldwin, Brewster, 19 , Geology and water resources of the Santa Fe area, New Mexico: U. S. Geol. Survey Water-Supply Paper 1525, in preparation.

Sundstrom, R. W., 1945, Ground-water resources of the El Paso, Texas, area: U. S. Geol. Survey open-file rept.

_______1952, Ground water for irrigation at the Federal Correctional Institution, La Tuna, Texas: U. S. Geol. Survey open-file rept.

Theis, C. V., 1935, The relation between the lowering of the piezometric surface and the rate and duration of discharge of a well using ground-water storage: Am. Geophys. Union Trans., v. 16, pt. 2, p. 519-524.

_______1941, The effect of a well on the flow of a nearby stream: Am. Geophys. Union Trans., v. 22, pt. 3, p. 734-738.

U. S. Public Health Service, 1946, Public Health Service drinking water standards: Public Health Repts., v. 61, no. 11, p. 371-384.

U. S. Salinity Laboratory Staff, 1954, Diagnosis and improvement of saline and alkali soils: U. S. Dept. Agriculture, Agriculture Handb. 60, p. 69-82.

Wenzel, L. K., 1942, Methods for determining permeability of water-bearing materials, with special reference to discharging-well methods: U. S. Geol. Survey Water-Supply Paper 887.

Wilcox, L. V., 1948, The quality of water for irrigation use: U. S. Rept. of Agriculture Tech. Bull. No. 962, p. 1-40.

---

*Name of agency changed to Texas Water Commission January 30, 1962.

Table 1.--Records of wells in lower Mesilla Valley, El Paso County, Texas, and Dona Ana County, New Mexico

All wells are drilled unless otherwise noted in Remarks column.

Water level : Reported water levels given in feet; measured water levels given in feet and tenths.

Method of lift and type of power: C, cylinder; Cf, centrifugal; E, electric; G, gasoline, butane, or diesel; J, jet; N, none; T, turbine; W, windmill. Number indicates horsepower.

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

Well	Owner	Driller	Date completed	Depth of well (ft.)	Diameter of well (in.)	Altitude of land surface (ft.)	Water level: Below land surface datum (ft.)	Water level: Date of measurement	Method of lift	Use of water	Remarks
J-1	Mrs. M. L. Somerville	Dickinson Bros.	1951	115	16	3,815	27.1 26.0	June 16, 1952 Jan. 14, 1959	T,G	Irr	Cased to bottom, perforated from 35 ft. to bottom. Gravel-walled. Pump set at 70 ft. 1/
J-2	Jack Cox	--	--	--	--	3,801	15.2 17.2	June 16, 1952 Jan. 9, 1957	T,G	Irr	Pumps into surface reservoir. 1/
J-3	Mrs. W. H. Haas	Boyd & Ewing	1951	103	18	3,793	9.1 7.8	June 16, 1952 Jan. 14, 1959	T,G	Irr	Cased to bottom. Gravel-walled. 1/
K-1	E. W. Moore	--	1950	138	15	3,796	10.0 8.6	Feb. 13, 1953 Jan. 14, 1959	T,G	Irr	Cased to bottom, perforated from 118 ft. to bottom. Gravel-walled. Pump set at 70 ft. 1/
K-2	Dairy Farm Co.	--	1951	--	--	3,795	--	--	T,G	Irr	
*K-3	do	--	1951	141	20	3,794	9.8 9.9	Jan. 18, 1952 Jan. 13, 1959	T,G	Irr	Casing perforated from surface to bottom. Gravel-walled. Temp. 66°F. 1/
K-4	-- Colquitt	--	--	--	14	3,791	7.5 9.9	June 18, 1952 Jan. 9, 1957	T,G	Irr	1/
K-5	E. N. Crossett	--	--	--	--	--	--	--	T,-	D,Irr	Pumps into swimming pool.
K-6	Landers & Amos	--	--	111	16	3,811	24.7 24.8	Jan. 18, 1952 Feb. 10, 1953	T,G	Irr	Gravel-walled.
*K-7	do	--	1952	--	18	3,818	29.5 34.3	Feb. 10, 1953 Jan. 13, 1959	T,G	Irr	Pumps into surface reservoir. Temp. 73°F. 1/
K-8	do	--	1949	81	14	3,817	31.6 31.8	Jan. 18, 1952 Jan. 13, 1959	N	N	Formerly used for irrigation. 1/
K-9	Claude Edmonds	Payne-Ballard	1949	225	16	--	--	--	N	N	Gravel-walled.
K-10	Anthony Cemetery	--	--	--	10	3,812	28.6 28.1	Feb. 10, 1953 Jan. 13, 1959	T,E	Irr	1/
K-11	B. G. Donaldson	B. G. Donaldson	--	--	36x48, 10	--	--	--	T,G	Irr	Dug to 40 ft. Casing: 10-in. from 40 ft. to bottom. Pumps into surface reservoir.
*K-12	--	--	1953	--	--	--	--	--	T,G	Irr	Temp. 73°F.

See footnotes at end of table.

Table 1.--Records of wells in lower Mesilla Valley, El Paso County, Texas, and Dona Ana County, New Mexico--Continued

Well	Owner	Driller	Date completed	Depth of well (ft.)	Diameter of well (in.)	Altitude of land surface (ft.)	Water level: Below land surface datum (ft.)	Water level: Date of measurement	Method of lift	Use of water	Remarks
K-17	Chas. F. Davis	Brown & Ledford	1955	220	8	--	71	1957	T,E	P	Screened from 198 to 218 ft. Pump set at 110 ft.
*P-1	C. D. Little	--	1951	90	16	3,802	17.3 20.7 16.9	Feb. 13, 1953 Jan. 9, 1958 Jan. 22, 1959	T,G	Irr	Cased to bottom. Perforated from 30 to 80 ft. Pump set at 60 ft. Temp. 73°F.
P-2	do	Jack Morris	1947	119	12	3,793	10.9 9.8	Nov. 13, 1953 Jan. 14, 1959	T,G	Irr	Cased to bottom. Casing perforated from 60 to 80 ft. 1/
P-3	--	--	--	--	18	3,786	--	--	T,G	Irr	
P-4	M. L. Thomas	--	--	149	16	3,797	18.5 17.9	Nov. 13, 1953 Jan. 14, 1959	T,G	Irr	1/
P-5	J. C. Dykes	Morales Bros.	1951	94	8	3,797	--	--	T,G	Irr	Cased to bottom. Casing perforated from 25 ft. to bottom. Pumps into surface reservoir.
*P-6	Southern Pacific Lines	--	1907	950	14	4,110	--	--	N	N	Abandoned. 2/
*P-7	do	Layne-Texas Co.	1945	481	--	4,110	328	July 1956	C,E	D	Screened from 381 ft. to bottom. Replacement well for P-6.
*Q-1	Ralph Haas	Boyd & Ewing	1951	115	16	3,792	9.6 8.0	June 16, 1952 Jan. 14, 1959	T,G	Irr	Cased to bottom. Casing perforated from 30 ft. to bottom. Gravel-walled. Temp. 66°F. 1/
Q-2	W. H. Haas	do	1947	100	14	3,795	--	--	T,G	Irr	Cased to bottom. Casing slotted.
Q-3	Mrs. Whip Robinson	--	--	139	16	3,794	13.7 11.7	June 12, 1952 Jan. 14, 1959	T,G	Irr	Discharge reported 2,400 gpm. Gravel-walled. 1/
Q-4	--	--	--	--	18	--	--	--	T,G	Irr	
Q-5	William Davis	--	--	--	18	3,790	--	--	T,G	Irr	Gravel-walled.
Q-6	L. G. Little	Jack Morris	1947	87	14	3,790	12.5	June 16, 1952	T,G	Irr	Cased to bottom. Casing perforated from 40 ft. to bottom. Gravel-walled.
Q-7	J. F. Foster	--	1951	148	16	3,792	13.0	Feb. 13, 1953	T,G	Irr	Cased to bottom. Casing perforated from 50 ft. to bottom. Gravel-walled.
Q-8	do	--	1951	143	16	3,792	12.8	June 12, 1952	T,G	Irr	Cased to bottom. Casing perforated from 50 ft. to bottom. Gravel-walled.

See footnotes at end of table.

Well	Owner	Driller	Date com-plet-ed	Depth of well (ft.)	Diam-eter of well (in.)	Altitude of land surface (ft.)	Water level: Below land surface datum (ft.)	Water level: Date of measurement	Method of lift	Use of water	Remarks
*Q-9	T. S. White	Chas. Dickinson	--	132	16	3,792	13.2 11.2	Feb. 13, 1953 Jan. 13, 1959	T,G	Irr	Cased to bottom. Casing perforated from 20 ft. to bottom. Pump set at 70 ft. Temp. 67°F. 1/
*Q-10	E. Tellez	-- Sullivan	1950	93	14	3,790	12.4 11.7	Jan. 17, 1952 Jan. 13, 1959	T,G	Irr	Casing perforated to bottom. Pump set at 70 ft. 1/
Q-11	J. W. Edmunsen	--	--	--	--	3,791	11.2 10.1	Feb. 12, 1953 Jan. 13, 1959	N	N	Gravel-walled. 1/
Q-12	E. Alvarez	--	--	--	12	3,783	4.8	Jan. 11, 1952	T,G	Irr	
Q-13	M. Baca	--	--	103	16	3,782	4.2 4.6	Nov. 8, 1954 Jan. 13, 1959	N	N	1/
Q-15	U. S. Bureau of Reclamation	--	1945	--	2	3,788	--	--	--	--	Auger hole cased with galvanized iron pipe. Observation well.
Q-16	C. C. Woodward	Morrison Bros.	1951	92	18	3,785	9.8 10.1	Jan. 11, 1952 Jan. 15, 1959	T,G	Irr	Pump set at 80 ft. Gravel-walled. 1/
*Q-17	--	--	1953	100	12	--	--	--	T,G	Irr	Temp. 70°F.
*Q-18	Mrs. Anna L. Andreas	Hayvanor Drilling Co.	1951	185	18	3,799	22.9 22.6	Jan. 10, 1952 Jan. 13, 1959	T,G	Irr	Cased to bottom. Casing perforated from 85 ft. to bottom. Pump set at 70 ft. Temp. 75°F. 1/
*Q-19	C. P. Davis	--	1936	136	3	--	--	--	T,E	P	Supplies water to town of Anthony.
*Q-20	do	--	1944	196	--	--	--	--	N	N	Abandoned.
Q-21	do	--	1944	120	3	--	--	--	T,E	P	Supplies water to town of Anthony.
Q-22	do	--	1934	165	3	--	--	--	T,E	P	Discharge reported 30 gpm. Supplies water to town of Anthony.
*Q-23	do	--	1948	104	4	--	--	--	T,E	P	Discharge reported 25 gpm. Supplies water to town of Anthony.
Q-24	C. P. Davis	--	1938	104	3	--	--	--	T,E	P	Discharge reported 25 gpm. Supplies water to town of Anthony.
*Q-25	U. S. Geological Survey	B & W Drilling Co.	1953	620	6	3,862	84.7	Oct. 2, 1953	N	N	Test well. Electric log and drill-stem tests indicate fresh-water sands extend to 120 ft. Bedrock indicated at 590 ft. 2/ 3/ 4/

See footnotes at end of table.

Table 1.--Records of wells in lower Mesilla Valley, El Paso County, Texas, and Dona Ana County, New Mexico--Continued

Well	Owner	Driller	Date completed	Depth of well (ft.)	Diameter of well (in.)	Altitude of land surface (ft.)	Water level: Below land surface datum (ft.)	Water level: Date of measurement	Method of lift	Use of water	Remarks
Q-26	U. S. Bureau of Prisons well 3	W. L. Cass	1936	176	12	--	44.3 45.8 47.1	Oct. 16, 1936 May 27, 1937 Feb. 10, 1953	N	N	Drawdown measured 91 ft. after pumping 24 hours at 495 gpm Oct. 16, 1936.
*Q-27	U. S. Bureau of Prisons	do	1952	264	20	3,821	43.9 48.8	June 2, 1952 Jan. 10, 1958	T,G	Irr	Cased to bottom. Slotted from 40 ft. to bottom. Gravel-walled. Drawdown reported 43 feet after pumping 24 hours at 1,783 gpm. Temp. 73°F. 1/ 2/
*Q-28	U. S. Bureau of Prisons well 4	Layne-Texas Co.	1937	252	24, 12	3,880	97.5 100.9	Oct. 12, 1937 Jan. 16, 1952	T,E	Ind	Casing: 24-in. to 155 ft., 12-in. from 136 ft. to bottom. Screened from 158 to 246 ft., underreamed from 155 ft. to bottom. Gravel-walled. Drawdown measured 37 ft. after pumping 25 hours at 660 gpm Oct. 13, 1937. Temp. 76°F. 2/
Q-29	U. S. Bureau of Prisons well 5	do	--	250	36	3,883	106.6	Jan. 16, 1952	T,E	D, Ind, Irr	Casing: 36-in. to 100 ft. Discharge reported 500 gpm.
Q-30	U. S. Bureau of Prisons well 2	do	1935	285	12	3,879	98.0	Sept. 28, 1935	T,E	D, Ind, Irr	Casing: 12-in. to 189 ft. Drawdown measured 71 ft. after pumping 24 hours at 219 gpm Sept. 28, 1937. Well deepened from 219 ft. to 285 in 1940. Discharge reported 300 gpm.
*Q-31	D. and L. Holquin	Morrison Bros.	1950	190	16	3,838	63.4	Apr. 28, 1951	T,G	Irr	Gravel-walled. Temp. 80°F.
*Q-32	Tom Donaldson	do	1950	225	16	3,844	69.1 68.4 73.9	Apr. 28, 1951 Jan. 10, 1952 Feb. 12, 1953	T,G	Irr	Cased to bottom. Pump set at 150 ft. Drawdown measured 64 ft. at 1,170 gpm July 10, 1953. Temp. 79°F.
Q-33	Brown Realty Co.	J. S. Merriwether	1947	408	7	--	--	--	N	N	Oil test. Cased to 325 ft. Water reported in sand at 200 ft. Limestone at bottom.
Q-34	Tom Donaldson	Payne-Ballard	1949	100	16	3,822	53.1	Apr. 28, 1951	N	N	Cased to 48 ft. Screened from 48 ft. to bottom. Discharge reported 600 gpm. Formerly used for irrigation.
Q-35	Emory White	do	1950	190	14	3,821	49.1	Jan. 10, 1952	T,E	Irr	Cased to bottom. Casing perforated from 47 ft. to bottom. Pump set at 90 ft. Discharge reported 900 gpm.
*Q-36	Davis Greenwood	W. L. Cass	1953	300	20, 16	--	--	--	T,G	Irr	Casing: 20-in. to 160 ft., 16-in. from 140 to 200 ft. Casing perforated from 60 to 200 ft. Gravel-walled. Pumps into surface reservoir. Temp. 82°F.

See footnotes at end of table.

Table 1.--Records of wells in lower Mesilla Valley, El Paso County, Texas, and Dona Ana County, New Mexico--Continued

Well	Owner	Driller	Date completed	Depth of well (ft.)	Diameter of well (in.)	Altitude of land surface (ft.)	Water level: Below land surface datum (ft.)	Water level: Date of measurement	Method of lift	Use of water	Remarks
*G-37	M. R. Hemley	Rayford Guffy	1951	135	18	3,780	16.3 9.2	Aug. 28, 1951 Jan. 13, 1959	T,G	Irr	Drilled and cased to 150 ft., plugged back to 135 ft. Casing perforated from 20 ft. to bottom. Gravel-walled. Temp. 68°F. 1/
G-38	Gus Eminger	Geo. E. McKenzie	1951	122	16	3,778	5.2 7.3	Jan. 17, 1952 Jan. 13, 1959	T,G	Irr	Cased to 121 ft. Casing perforated from 21 ft. to 121. Gravel-walled. Pump set at 50 ft. Discharge reported 800 gpm. Temp. 67°F. 1/ 2/
G-39	W. C. Huber	--	1951	100	16	3,779	8.8 7.3	Jan. 17, 1952 Jan. 14, 1959	T,G	Irr	Gravel-walled. 1/
G-40	U. S. Bureau of Reclamation	--	1945	--	2	3,779	--	--	--	--	Auger hole cased with galvanized iron pipe. Observation well.
G-41	H. A. Sexton	Geo. E. McKenzie	1951	146	20	3,785	10.6	Jan. 17, 1952	T,G	Irr	Cased to bottom. Casing perforated from 55 ft. to bottom. Gravel-walled. Pump set at 90 ft. 1/ 2/
*G-42	Davis Greenwood	Boyd & Ewing	1951	122	22	3,786	11.6	Feb. 13, 1953	T,G	Irr	Cased to bottom. Casing slotted from 42 ft. to bottom. Gravel-walled. Pump set at 70 ft. Discharge reported 2,060 gpm. Temp. 70°F.
*G-43	U. S. Geological Survey	B & W Drilling Co.	1953	1,206	6	3,787	12.8	Nov. 13, 1953	N	N	Test well. Electric log and drill-stem tests indicate fresh water extends to depth of well. 3/ 4/
G-44	Marvin Hayes	Wheeler Cass	--	--	18	--	14.1	Feb. 13, 1953	T,G	Irr	Gravel-walled.
*G-45	A. C. Riley	--	--	--	16	--	--	--	T,G	Irr	Temp. 70°F.
G-46	Caroline Hayes	--	--	--	--	3,786	12.9 10.3	Feb. 13, 1953 Jan. 14, 1959	T,G	Irr	Gravel-walled. 1/
G-47	Marvin Hayes	--	--	--	18	3,784	10.4 9.1	Feb. 13, 1953 Jan. 14, 1959	T,G	Irr	Gravel-walled. 1/
G-48	Beckley & Whittington	--	1952	132	16	3,783	10.7 17.5	Feb. 13, 1953 Jan. 9, 1958	T,G	Irr	Pump set at 80 ft. Drawdown reported 28 ft. at 3,015 gpm. Gravel-walled. 1/
G-49	R. J. Wright	-- Cass	1951	--	16	--	--	--	T,G	Irr	Gravel-walled. Temp. 68°F.
G-50	-- Lamar	--	--	--	14	3,783	11.7 11.6	Feb. 16, 1953 Jan. 13, 1959	T,-	Irr	Gravel-walled. 1/

See footnotes at end of table.

Well	Owner	Driller	Date completed	Depth of well (ft.)	Diameter of well (in.)	Altitude of land surface (ft.)	Water level: Below land surface datum (ft.)	Water level: Date of measurement	Method of lift	Use of water	Remarks
Q-51	J. R. Alvarez	Wheeler Cass	1951	115	16	3,781	14.1 13.1	Feb. 16, 1953 Jan. 13, 1959	T,G	Irr	Cased to bottom. Casing perforated from 35 ft. to bottom. Gravel-walled. 1/
Q-52	L. K. Thompson	Frank Dickinson	1951	110	16	3,780	14.6 13.4	June 3, 1952 Jan. 13, 1954	T,G	Irr	Cased to bottom. Casing perforated from 25 ft. to bottom. Discharge reported 1,600 gpm. Gravel-walled. 1/
*Q-53	E. H. Crossett	Hayvanor Drilling Co.	1951	146	16	3,816	46.3 44.8	June 13, 1952 Jan. 13, 1959	T,G	Irr	Temp. 76°F. 1/
Q-54	Billy Hallas	--	1952	--	16	3,776	14.6 13.4	June 13, 1952 Feb. 18, 1953	T,G	Irr	Gravel-walled.
Q-55	L. K. Thompson	Frank Dickinson	1952	100	16	3,775	14.0 13.1	June 13, 1952 Jan. 13, 1959	T,G	Irr	Cased to bottom. Casing perforated from 20 ft. to bottom. Drawdown reported 50 ft. at 1,600 gpm. Gravel-walled. 1/
Q-56	S. C. Allison	--	--	--	16	3,777	--	--	T,G	Irr	Gravel-walled.
Q-57	W. C. Mandell	--	--	140	20	3,776	--	--	T,G	Irr	Discharge reported 2,295 gpm. Pump set at 75 ft. Gravel-walled.
Q-58	Mrs. J. F. Bennett	Chas. Dickinson	--	130	18	3,777	12.2 11.3	Feb. 18, 1953 Jan. 13, 1959	T,G	Irr	Pump set at 80 ft. Gravel-walled. 1/
Q-59	M. E. Garcia	--	--	122	16	3,782	14.5 12.8	June 13, 1952 Jan. 13, 1959	T,G	Irr	Cased to bottom. Discharge reported 2,180 gpm. Pump set at 80 ft. Gravel-walled. 1/
Q-60	Louis H. Brandt	Geo. E. McKenzie	1951	141	20	3,776	9.0 7.9	Feb. 16, 1953 Jan. 13, 1959	T,G	Irr	Tested to 141 ft. Cased to 100 ft. Discharge reported 2,300 gpm. Gravel-walled. 1/ 2/
*Q-61	Price's Dairy Farm	--	1952	--	20	--	--	--	T,G	Irr	Gravel-walled. Temp. 66°F.
Q-62	do	--	--	91	16	3,778	--	--	N	N	Discharge reported 1,000 gpm. Gravel-walled. Formerly used for irrigation.
*Q-63	U. S. Geological Survey	B & W Drilling Co.	1953	1,200	6	3,770	1.5	Dec. 4, 1953	N	N	Test well. Electric logs and drill-stem tests indicate fresh water extends to depth of well. 2/ 3/ 4/
*Q-64	Emilio Chavez	--	1951	160	24	--	10.3	Feb. 16, 1953	T,G	Irr	Cased to 160 ft. Casing perforated from 80 ft. to bottom. Gravel-walled. Temp. 68°F.

See footnotes at end of table.

Well	Owner	Driller	Date completed	Depth of well (ft.)	Diameter of well (in.)	Altitude of land surface (ft.)	Water level: Below land surface datum (ft.)	Water level: Date of measurement	Method of lift	Use of water	Remarks
Q-65	M. R. Hemley	Rayford Guffy	1951	160	18	3,775	6.8 7.2	Aug. 28, 1951 Jan. 13, 1959	T,G	Irr	Cased to bottom. Casing perforated from 20 ft. to bottom. Drawdown measured 37 ft. at 1,430 gpm Mar. 13, 1953. Gravel-walled. Temp. 69°F. 1/
*Q-66	C. P. Heffenger	Morales Bros.	1953	86	8	--	--	--	T,E,5	S	Cased to bottom. Casing perforated from 60 ft. to bottom. Water level 55 ft. after pumping about 30 days at 210 gpm. Pumps into commercial trout pond. Temp. 75°F.
*Q-67	Baxter Carruth	-- Beule	1952	131	8	3,824	--	--	T,E	D,Irr	Cased to bottom. Casing perforated from 50 ft. to bottom. Temp. 81°F.
*Q-68	E. and V. Holquin	Morrison Bros.	1952	142	16	3,825	61.4 68.5	Apr. 28, 1951 Jan. 13, 1959	T,G	Irr	Drilled to 160 ft., plugged back to 142. Casing perforated from 40 ft. to bottom. Discharge reported 1,440 gpm. Pump set at 132 ft. Temp. 82°F. 1/
Q-69	Donald Keily	--	1952	--	10	3,845	77.0 88.1	Feb. 12, 1953 Jan. 13, 1959	T,G	Irr	1/
Q-70	Gomez & Hernandez	Mountain Drilling Co.	1953	170	16	--	61.5	Mar. 13, 1953	T,-	Irr	Cased to bottom. Casing perforated from 90 ft. to bottom. Gravel-walled.
*Q-71	Ellison Lott	--	--	190	12	3,820	54.1 63.6	Jan. 10, 1952 Jan. 13, 1959	T,E	Irr	Cased to bottom. Casing perforated from 47 ft. to bottom. Pump set at 90 ft. Temp. 90°F. 1/
*Q-72	U. S. Geological Survey	B & W Drilling Co. Co.	1953	874	6	3,900	134.5	Aug. 26, 1953	N	N	Test well. Electric log and drill-stem tests indicate fresh water extends to 434 ft. Bedrock 820 ft. 2/ 3/ 4/
*Q-73	do	do	1953	320	6	4,023	217.8	Aug. 31, 1953	N	N	Test well. Bedrock at 290 ft. 2/ 3/ 4/
Q-74	Luis Bobadillo	J. S. Merriwether	1945	1,578	6, 4	4,025	--	--	N	N	Oil test. 2/
Q-75	U. S. Geological Survey	B & W Drilling Co.	1953	320	6	4,111	--	--	N	N	Test well. No water-bearing sand. Bedrock at 310 feet. 2/ 3/
*Q-76	State of Texas	W. L. Cass	1945	517	6	4,268	467.0	May 7, 1953	C,G	S	Casing: 6-in. to 130 ft., 4-in. to 508 ft. Driller reported "caliche-like rock from 200 to 508 ft. and hard black rock from 508 to 517 ft."

See footnotes at end of table.

Well	Owner	Driller	Date com-plet-ed	Depth of well (ft.)	Diam-eter of well (in.)	Altitude of land surface (ft.)	Water level: Below land surface datum (ft.)	Water level: Date of measurement	Method of lift	Use of water	Remarks
[illegible]-77	Tri-State Oil Co.	Tri-State Oil Co.	1934	3,401	18, 10, 6, 5	4,160	--	--	N	N	Oil test. 2/
[illegible]-78	Southwest Oil Co.	do	1934	3,571	--	3,977	--	--	N	N	Oil test.
*[illegible]-79	Ted White	Mountain Drilling Co.	1953	160	16	--	60.9	Mar. 13, 1953	T,G	Irr	Gravel-walled. Temp. 85°F.
[illegible]-80	Roy Goodin	--	1951	62	2	3,795	31.2	Aug. 29, 1952	N	N	Drilled and cased to 65 ft., plugged back to 62 ft.
*[illegible]-81	L. D. Snell	--	--	35	2	--	--	--	C,W	D,S	
*[illegible]-82	City of El Paso well 103	Layne-Texas Co.	1952	152	16	3,771	5.6 8.0	Apr. 18, 1952 Jan. 14, 1959	T,E	P	Cased to 150 ft., perforated from 63 ft. to 150. Discharge measured 1,315 gpm Oct. 10, 1952. Temp. 75°F. 1/ 2/
*[illegible]-83	City of El Paso well 102	do	1952	182	16	3,771	5.5 10.0	Apr. 18, 1952 Jan. 14, 1959	T,E	P	Tested to 182 ft. Casing 24-in. to 47 ft., 16-in. to 160 ft., perforated 59 to 121 ft. and 140 to 160 ft. Production well drilled to 160 ft. Discharge measured 1,260 gpm, Oct. 16, 1952. Gravel-walled. Temp. 84°F. 1/ 2/
*[illegible]-84	City of El Paso well 101	Geo. E. McKenzie	1951	122	24	3,769	5.8 9.1	Jan. 10, 1952 Jan. 14, 1959	T,E	P	Cased to 120 ft. Discharge measured 970 gpm Oct. 1, 1952. Gravel-walled. Temp. 74°F. 1/ 2/
*[illegible]-85	City of El Paso well 106	Layne-Texas Co.	1952	160	16	3,765	2.9 6.1	Apr. 25, 1952 Jan. 14, 1959	T,E	P	Casing: 16-in. to bottom, perforated from 76 ft. to 155. Discharge measured 1,150 gpm Oct. 3, 1952. Gravel-walled. Temp. 76°F. 1/ 2/
*[illegible]-86	U. S. Geological Survey	B & W Drilling Co.	1953	951	6	3,767	--	--	N	N	Well filled in to 19 ft. Redrilled 1957 to 200 ft. Electric log and drill-stem tests indicate fresh water extends from 207 ft. to 560. Observation well CR-1. 2/ 3/ 4/
[illegible]-87	City of El Paso	--	--	112	2	3,766	3.5 5.0	Feb. 28, 1952 Nov. 18, 1958	--	--	Old well. Observation well. 1/
[illegible]-88	do	--	--	90	2	3,767	3.8 3.6	Feb. 16, 1953 Feb. 28, 1958	--	--	do

See footnotes at end of table.

Table 1.--Records of wells in lower Mesilla Valley, El Paso County, Texas, and Dona Ana County, New Mexico--Continued

Well	Owner	Driller	Date com-plet-ed	Depth of well (ft.)	Diam-eter of well (in.)	Altitude of land surface (ft.)	Water level: Below land surface datum (ft.)	Water level: Date of measurement	Method of lift	Use of water	Remarks
G-89	City of El Paso	--	--	8	1	3,766	3.1 2.6	May 29, 1952 June 3, 1959	--	--	Old well. Observation well. 1/
*G-90	City of El Paso well 104	Layne-Texas Co.	1952	160	16	3,770	5.5 8.3	Apr. 18, 1952 Jan. 14, 1959	T,E	P	Casing: 16-in. to 155 ft., perforated from 76 ft. to 155. Discharge measured 1,250 gpm Oct. 9, 1952. Gravel-walled. Temp. 72°F. 1/ 2/
*G-91	City of El Paso	do	1952	202	16	3,771	6.5 9.7	Apr. 18, 1952 Jan. 14, 1959	T,E	Irr, P	Casing: 16-in. to 155 ft., perforated from 73 ft. to 150. Discharged measured 1,000 gpm Oct. 9, 1952. Gravel-walled. Temp. 72°F. 1/ 2/
G-92	Sam B. Gillette, Jr.	Rayford Guffy	1951	117	16	3,768	7.8 8.1	Jan. 10, 1952 Jan. 14, 1959	T,G	Irr	Pump set at 70 ft. Very rough shale from 88 to 157 ft. interbedded with thin lenses of sand. Drilled to 157 ft., plugged back to 117. Gravel-walled. 1/
G-93	I. T. Gillette	W. L. Cass	1951	107	16	3,767	9.2 10.2	Jan. 10, 1952 Jan. 14, 1959	T,G	Irr	Drilled to 120 ft., plugged back to 107. Casing slotted from 44 to 120 ft. Gravel-walled. 1/
G-94	do	--	--	--	--	3,768	9.0 11.4	Feb. 18, 1953 Jan. 22, 1959	T,G	Irr	Gravel-walled. 1/
G-95	Pete Beckley	--	--	--	18	--	10.8	Feb. 16, 1953	T,G	Irr	Gravel-walled.
G-96	W. S. Wallace	Geo. E. McKenzie	1951	96	24	3,776	16.0 15.3	Feb. 18, 1953 Jan. 13, 1959	T,G	Irr	Cased to bottom, perforated from 51 ft. to 83. Drawdown reported 28 ft. at 2,070 gpm. Pump set at 80 ft. Gravel-walled. 1/ 2/
*G-97	Horton Miller	do	1951	136	20	3,773	13.3 12.7	June 13, 1952 Jan. 13, 1959	T,G	Irr	Cased to bottom, perforated from 20 ft. to bottom. Pump set at 90 ft. Gravel-walled. 1/ 2/
G-98	H. Casad	--	1947	216	16	3,775	13.1 13.3	June 13, 1952 Jan. 13, 1959	T,G	Irr	1/
G-99	Mary F. Burt	McAlbee Drilling Co.	1951	132	16	3,776	--	--	T,G	Irr	Cased to bottom. Discharge reported 1,800 gpm. Gravel-walled.
G-100	F. Guerrero	Willard Cass	1951	177	16	3,795	30.9 31.8	June 13, 1952 Jan. 13, 1959	T,G	Irr	Cased to bottom, perforated from 40 ft. to bottom. Pump set at 110 ft. Gravel-walled. 1/

See footnotes at end of table.

Well	Owner	Driller	Date completed	Depth of well (ft.)	Diameter of well (in.)	Altitude of land surface (ft.)	Water level: Below land surface datum (ft.)	Water level: Date of measurement	Method of lift	Use of water	Remarks
*Q-101	B. L. Hall	Payne-Ballard	1952	178	18	3,802	37.0	June 13, 1952	T,G	Irr	Cased to bottom, perforated from 30 ft. to bottom. Drawdown measured at 1,500 gpm June 16, 1952. Pump set at 90 ft. Temp. 78°F.
Q-102	B. L. Hall	Morrison Bros.	1951	156	16	3,774	12.5 13.5	June 13, 1952 Jan. 13, 1959	T,G	Irr	Cased to bottom, perforated from 30 ft. to bottom. Pump set at 104 ft. Gravel-walled. 1/
Q-103	C. Deerman	Geo. E. McKenzie	--	162	18	3,773	12.3 13.1	June 13, 1952 Jan. 13, 1959	T,G	Irr	Cased to bottom, perforated from 60 ft. to 81, and from 102 ft. to bottom. Pump set at 90 ft. Drawdown reported 56 ft. at 1,980 gpm. Gravel-walled. 1/ 2/
Q-104	J. Deerman, Jr.	do	1951	140	--	--	--	--	N	N	Formerly used for irrigation.
Q-105	do	do	1951	140	16	3,770	11.0 11.6	June 11, 1952 Jan. 13, 1959	T,G	Irr	Cased to bottom. 1/ 2/
*Q-106	C. H. Tallmon	do	1951	122	16	3,768	9.7 10.6	Feb. 18, 1953 Jan. 13, 1959	T,G	Irr	Cased to bottom, perforated from 60 ft. to bottom. Drawdown measured 24 ft. at 1,097 gpm July 9, 1953. Gravel-walled. Temp. 71°F. 1/
*Q-107	H. C. Mandell	do	1951	125	16	3,763	--	--	T,G	Irr	Cased to bottom, perforated from 74 ft. to bottom. Temp. 71°F. 2/
*Q-108	D. D. McFaul	do	1951	162	16	3,766	9.7 9.6	June 11, 1952 Jan. 13, 1959	T,G	Irr	Casing perforated from 50 ft. to 103. Drawdown measured 53 ft. at 1,630 gpm July 1, 1953. Pump set at 90 ft. Temp. 70°F. 1/ 2/
Q-109	Mary Goggin	--	--	--	16	3,765	10.7 9.5	June 11, 1952 Jan. 13, 1959	T,G	Irr	Gravel-walled. 1/
Q-110	Annie Appelzoller	--	--	--	--	3,757	--	--	T,G	Irr	
Q-111	C. M. Tallmon	Geo. E. McKenzie	1951	100	16	3,760	13.7 7.7	Mar. 26, 1952 Jan. 13, 1959	T,G	Irr	Cased to bottom, perforated from 52 ft. to bottom. Pump set at 80 ft. 1/
Q-112	R. A. Gardner	do	1952	104	20	3,762	--	--	T,G	Irr	Cased to bottom, perforated from 44 ft. to bottom. Pump set at 80 ft. Gravel-walled.
Q-113	H. L. Cordell	Wheeler Cass	--	130	16	--	10.2 10.8	Feb. 19, 1953 Jan. 8, 1954	T,G	Irr	Pump set at 80 ft. Gravel-walled.

See footnotes at end of table.

Table 1.--Records of wells in lower Mesilla Valley, El Paso County, Texas, and Dona Ana County, New Mexico--Continued

Well	Owner	Driller	Date completed	Depth of well (ft.)	Diameter of well (in.)	Altitude of land surface (ft.)	Water level: Below land surface datum (ft.)	Water level: Date of measurement	Method of lift	Use of water	Remarks
Q-114	Mountain Pass Canning Co.	J. Morales	1957	160	8	3,768	--	--	T,E	Ind	
Q-115	Nellie Morse	--	--	--	--	3,765	--	--	T,-	Irr	
Q-116	R. A. Gardner	Geo. E. McKenzie	1952	178	16	3,762	--	--	T,G	Irr	Cased to bottom, perforated from 58 ft. to 118 and from 142 to bottom. Pump set at 100 ft. Gravel-walled. 2/
Q-117	W. L. Seymour	do	--	72	16	--	--	--	T,-	Irr	Cased to bottom, perforated from 16 ft. to bottom. Discharge reported 800 gpm. Pump set at 50 ft. 2/
Q-118	do	do	1951	70	--	3,761	--	--	T,G	Irr	Cased to bottom, perforated from 35 ft. to bottom. 2/
*Q-119	O. C. Cole	--	1951	72	--	3,759	9.7	Feb. 19, 1953	T,G	Irr	Gravel-walled. Temp. 67°F.
Q-120	R. A. Gardner	Boyd & Ewing	1951	100	16	3,759	9.0	do	T,G	Irr	Cased to bottom, perforated from 20 ft. to bottom. Pump set at 80 ft.
Q-121	U. S. Bureau of Reclamation	--	1945	--	2	3,762	--	--	--	--	Auger hole cased with galvanized iron pipe. Observation well.
*Q-122	C. L. Ezell	Remedial Oil Service	1951	141	18	3,763	5.7 6.8	Aug. 31, 1951 Feb. 18, 1953	T,G	Irr	Drilled and cased to 136 ft., perforated from 41 ft. to bottom. Casing settled 5 ft. Discharge reported 2,816 gpm. Pump set at 90 ft.
Q-123	W. E. Jackson	Geo. E. McKenzie	1951	116	18	3,764	8.7 6.8	June 11, 1952 Jan. 13, 1959	T,G	Irr	Cased to bottom, slotted from 55 ft. to 115. Drawdown reported 45 ft. at 2,780 gpm. Pump set at 90 ft. Gravel-walled. 1/ 2/
Q-124	V. M. Fike	-- Ledford	1950	83	6	3,814	55.0	Jan. 11, 1952	J,E	D,S, Irr	
*Q-125	Vinton School	--	--	167	48x72, 3	--	--	--	J,E	P, Irr	Dug to 47 ft. Supplies school at Canutillo.
Q-126	--	--	--	--	--	--	--	--	T,G	Irr	
*Q-127	U. S. Geological Survey	B & W Drilling Co.	1953	550	6	3,819	64.0	Aug. 9, 1953	N	N	Test well. Electric log and drill-stem tests indicate fresh water extends to 150 ft. 2/ 4/
Q-128	Nick Abraham	Geo. E. McKenzie	1951	129	16	3,760	6.5	June 11, 1952	T,G	Irr	Cased to bottom. Discharge reported 1,200 gpm. Gravel-walled. Temp. 68°F.

See footnotes at end of table.

Well	Owner	Driller	Date completed	Depth of well (ft.)	Diameter of well (in.)	Altitude of land surface (ft.)	Water level: Below land surface datum (ft.)	Water level: Date of measurement	Method of lift	Use of water	Remarks
Q-129	I. Singh	Wheeler Cass	1951	150	20	3,758	7.5 7.0	Mar. 26, 1952 Jan. 13, 1959	T,G	Irr	Cased to bottom, slotted from 40 ft. to bottom. Pump set at 90 ft. 1/
*Q-130	do	Remedial Oil Service	--	128	16	--	6.5	Apr. 28, 1954	N	N	Discharge reported 1,170 gpm. Formerly used for irrigation.
*Q-131	Victor H. Lavcek	-- Beule	1951	62	3	--	--	--	Cf,E	D	
*Q-132	J. J. Farrell	--	--	80	--	3,788	--	--	J,E	D,S	
Q-133	J. Brewington	--	--	--	9	3,782	31.2 30.1	Apr. 28, 1951 June 12, 1958	N	N	1/
*Q-134	U. S. Geological Survey	B & W Drilling Co.	1953	407	6	3,800	54.9	Nov. 9, 1953	N	N	Test well. Electric log and drill-stem tests indicate no fresh water below 1[illegible] ft. 3/ 4/
*Q-135	Barry Hagedon	-- Cass	1951	140	16	3,753	4.3 3.7	Jan. 16, 1953 Jan. 13, 1959	T,G	Irr	Cased to bottom, slotted from 40 ft. to bottom. Pump set at 90 feet. Temp. 67°F. 1/
Q-136	Martin & Davis	--	--	110	16	3,754	5.5 5.8	Apr. 28, 1951 Jan. 13, 1959	T,G	Irr	Discharge reported 986 gpm. 1/
*Q-137	Erich Brandes	Geo. E. McKenzie	1951	123	18	3,753	6.9 6.3	June 10, 1952 Jan. 13, 1959	T,G	Irr	Cased to bottom. Discharge reported 1,800 gpm. Pump set at 80 ft. Gravel-walled. 1/ 2/
*Q-138	--	--	1922	1,074	--	3,757	--	--	N	N	Reported to have flowed when drilled. Bedrock encountered at 822 ft. Known as the Lippincott well. 2/
*Q-139	Ord Gary	Geo. E. McKenzie	--	124	16	3,757	7.5 6.1	Feb. 18, 1953 Jan. 13, 1959	T,G	Irr	Cased to bottom, perforated from 47 ft. to bottom. Discharge reported 1,500 gpm. Gravel-walled. 1/ 3/
Q-140	U. S. Bureau of Reclamation	--	1945	--	2	--	--	--	--	--	Auger hole, galvanized-iron casing. Observation well.
*Q-141	Cathcart & Mason	Payne-Ballard	1952	148	18	3,760	8.6 6.7	June 11, 1952 Jan. 14, 1959	T,G	Irr	Cased to bottom, perforated from 30 ft. to 144. Drawdown measured 44 ft. at 1,400 gpm June 9, 1953. Pump set at 90 ft. Gravel-walled. Temp. 77°F. 1/
Q-142	do	do	1951	148	18	3,756	7.4 4.3	June 11, 1952 Jan. 14, 1959	T,G	Irr	Cased to bottom, perforated from 40 ft. to bottom. Pump set at 90 ft. Gravel-walled. 1/

See footnotes at end of table.

Well	Owner	Driller	Date completed	Depth of well (ft.)	Diameter of well (in.)	Altitude of land surface (ft.)	Water level: Below land surface datum (ft.)	Water level: Date of measurement	Method of lift	Use of water	Remarks
*Q-143	C. H. Mason	Payne-Ballard	1948	87	12	--	--	--	T,E	Irr	Cased to bottom. Temp. 75°F.
*Q-144	R. A. Gardner	Layne-Texas Co.	1952	1,573	--	3,803	47	Mar. 1952	N	N	Test well. 2/
*Q-145	W. Deerman	--	1951	128	16	3,751	7.6 6.1	Apr. 28, 1951 Jan. 13, 1959	T,G	Irr	Discharge reported 1,000 gpm. Gravel-walled. 1/
Q-146	M. M. Friedmann	Morrison Bros.	1952	--	--	3,751	7.5 5.3	Jan. 16, 1953 Jan. 13, 1959	T,G	Irr	Gravel-walled. Temp. 67°F. 1/
Q-147	do	--	--	205	16	3,751	7.8 7.7	Apr. 28, 1951 Feb. 19, 1953	N	N	Discharge reported 2,000 gpm. Gravel-walled. Formerly used for irrigation.
Q-148	Payne-Taylor	Payne-Ballard	1950	120	16	3,749	8.2 9.4	Apr. 28, 1951 Jan. 10, 1958	T,G	Irr	1/
*Q-149	do	--	--	235	--	3,745	4.8 4.6	Jan. 15, 1953 Jan. 13, 1959	T,G	Irr	1/
Q-150	L. T. Cox	--	1951	65	16	3,747	8.3 6.9	Mar. 14, 1952 Jan. 13, 1959	T,G	Irr	Pump set at 50 ft. Gravel-walled. 1/
Q-151	Erich Brandes	--	1948	64	--	3,749	--	--	--	N	
*Q-152	L. T. Stock	Geo. E. McKenzie	1951	92	22	3,751	--	--	T,G	Irr	Cased to bottom. Gravel-walled. Temp. 66°F.
*Q-153	I. Singh	-- Cass	1951	130	20	3,751	7.3 5.8	Jan. 16, 1953 Jan. 18, 1959	T,G	Irr	Cased to bottom. Pump set at 100 ft. Temp. 67°F. 1/
*Q-154	J. E. Padgett	Remedial Oil Service	1951	125	16	3,750	9.5 8.7 8.1	Mar. 14, 1952 Jan. 16, 1953 Jan. 18, 1956	T,G	Irr	Discharge reported 1,400 gpm. Pump set at 70 ft. 1/
Q-155	U. S. Bureau of Reclamation	U. S. Bureau of Reclamation	1945	--	--	--	--	--	--	--	Auger hole cased with galvanized-iron pipe. Observation well.
Q-156	do	do	1945	--	2	3,748	--	--	--	--	do
Q-157	El Paso Country Club	--	--	--	--	3,747	10.4 9.4	Jan. 15, 1953 Jan. 22, 1959	T,E	Irr	1/
*Q-158	Westerner Motel	--	--	203	--	3,840	104.7 104.8 105.0 105.5	Jan. 16, 1953 Jan. 8, 1954 Nov. 12, 1954 Aug. 31, 1956	T,E	--	Discharge reported 40 gpm. Supplies water for swimming pool.

Table 1.--Records of wells in lower Mesilla Valley, El Paso County, Texas, and Dona Ana County, New Mexico--Continued

Well	Owner	Driller	Date completed	Depth of well (ft.)	Diameter of well (in.)	Altitude of land surface (ft.)	Water level: Below land surface datum (ft.)	Water level: Date of measurement	Method of lift	Use of water	Remarks
Q-159	Paul Harvey	Layne-Texas Co.	1938	1,245	--	--	--	--	N	N	Test well drilled for White Water Works. Bedrock at 208 ft. 2/
*Q-160	Penn's Dairy	do	1951	540	10, 8	3,980	246.0 246.1 246.3 251.5	Jan. 16, 1953 Nov. 12, 1954 Jan. 21, 1955 Jan. 23, 1956	T,E	D,S, Ind	Casing: 10-in. to 275 ft. Screened from 310 to 330 ft. Deepened to 540 ft. in 1952. Temp. 77°F. 2/
Q-161	do	do	1946	383	8, 6	3,981	--	--	T,E	D,S, Ind	Casing: 8-in. to 242 ft., 6-in. from 232 ft. to bottom. Screened from 251 ft. to 259, and 360 to 381 ft. Drawdown reported 50 ft. at 40 gpm. Pump set at 300 ft.
Q-162	do	--	--	280	--	3,983	--	--	-,E	D,S, Ind	Discharge reported 40 gpm.
*Q-163	Broadus & McGrath	--	--	425	--	4,106	--	--	-,E	P	Discharge reported 33 gpm. Supplies Coronado Heights Subdivision. 2/
Q-164	L. G. Little	--	1952	120	18	--	12.9 10.0	Feb. 13, 1953 Jan. 14, 1959	T,G	Irr	Replacement well for Q-6. 1/
*Q-165	City of El Paso well 110	B. Greenwood	1955	170	18	3,766	11.4 4.9	Dec. 5, 1955 Jan. 14, 1959	T,E	P	Discharge measured 270 gpm May 29, 1956. Temp. [illegible]°F. 1/
*Q-166	City of El Paso well 108	do	1955	194	18	3,767	14.4 6.3	Dec. 6, 1955 Jan. 14, 1959	T,E	P	Discharge measured 1,300 gpm May 29, 1956. Screened from 60 ft. to bottom. Drawdown measured 16.9 ft. after pumping 24 hours at 580 gpm Dec. 7, 1955. Temp. 72°F. 1/
*Q-167	City of El Paso well 109	do	1955	156	20, 18	3,770	10.7 16.6 13.2	June 3, 1955 Dec. 5, 1955 Jan. 13, 1956	T,E	Irr, P	Screened from 37 ft. to bottom. Discharge measured 1,380 gpm June 19, 1956. Temp. 77°F.
*Q-168	City of El Paso well 111	do	1955	200	18	3,767	15.5 7.4	Nov. 23, 1955 Jan. 14, 1959	T,E	P	Screened from 61 ft. to bottom. Discharge measured 1,225 gpm May 29, 1956. Temp. 69°F. 1/
*Q-169	City of El Paso well 112	do	1955	200	18	3,768	16.2 8.7	Dec. 19, 1955 Jan. 14, 1959	T,E	P	Screened from 62 ft. to bottom. Discharge measured 1,270 gpm May 29, 1956. Temp. 69°F. 1/
*Q-170	City of El Paso	do	1955	200	18	3,765	8.4 5.4	Jan. 13, 1956 Jan. 14, 1959	T,E	P	Discharge measured 1,270 gpm May 29, 1956. Screened from 62 ft. to bottom. Temp. 72°F. 1/

Well	Owner	Driller	Date completed	Depth of well (ft.)	Diameter of well (in.)	Altitude of land surface (ft.)	Water level: Below land surface datum (ft.)	Water level: Date of measurement	Method of lift	Use of water	Remarks
Q-171	-- Dunlap	--	1955	125	--	--	11.1 19.6 11.7 6.9	Jan. 18, 1956 Jan. 15, 1957 Feb. 5, 1958 Jan. 14, 1959	T,-	Irr	
*Q-172	City of El Paso well 201	City of El Paso	1956	1,060	24, 18, 12	3,769	--	--	T,E, 150	P	Casing: 24-in. to 578 ft., 18-in. to 511 ft., 12-in. from 511 to bottom. Screened from 586 ft. to bottom. Drawdown measured 90.8 ft. after pumping 2,498 gpm 120 hours Jan. 21, 1957. Drilled to 1,201 ft., plugged back to 1,060 ft. Pump set at 150 ft. Temp. 96°F. 3/ 4/
*Q-173	City of El Paso well 202	do	1956	1,090	24, 18, 12	3,774	--	--	T,E, 150	P	Casing: 24-in. to 576 ft. cemented, 18-in. to 544 ft., 12-in. from 544 ft. to bottom. Screened from 544 ft. to bottom. Drawdown 96.5 ft. after pumping 96 hours at 2,045 gpm June 15, 1957. Pump set at 150 ft. Drilled to 1,262 ft., plugged back to 1,090 ft. Temp. 95°F. 3/ 4/
*Q-174	City of El Paso well 203	do	1956	1,150	24, 18, 12	3,778	--	--	T,E	P	Casing: 24-in. to 646 ft. cemented, 18-in. to 500 ft., 12-in. from 500 ft. to bottom. Screened from 650 ft. to bottom. Drawdown 100 ft. after pumping 24 hours at 2,500? gpm Aug. 12, 1957. Pump set at 150 ft. Drilled to 1,160 ft., deepened to 1,277 ft., plugged back to 1,150 ft. Temp. 94°F. 3/ 4/
*Q-175	City of El Paso well 204	do	1956	950	24, 18, 12	3,775	39.3 39.2	May 20, 1958 Jan. 9, 1959	T,E	P	Casing: 24-in. to 535 ft. cemented, 18-in. to 440 ft., 12-in. from 440 ft. to bottom. Screened from 544 ft. to bottom, underreamed from 535 ft. to bottom. Drawdown 103.8 ft. after 36 hours pumping at 2,020 gpm May 28, 1958. Drilled to 1,230 ft., plugged back to 950 ft. Temp. 91°F. 1/ 2/ 4/
Q-176	City of El Paso	do	1957	1,050	6	3,773	--	--	--	--	Screened from 585 ft. to bottom. Drilled to 1,072 ft., plugged back to 1,050. Canutillo recorder 2. Observation well. 3/

See footnotes at end of table.

Well	Owner	Driller	Date completed	Depth of well (ft.)	Diameter of well (in.)	Altitude of land surface (ft.)	Water level: Below land surface datum (ft.)	Water level: Date of measurement	Method of lift	Use of water	Remarks
Q-177	A. D. Martinez	--	1955	98	20	3,775	8.1	Aug. 17, 1958	T,-	Irr	Discharge reported 2,000 gpm. Pump set at 50 ft.
*Q-178	City of El Paso	City of El Paso	1957	1,705	--	3,790	--	--	N	N	Test well to be redrilled as production well. 3/ 4/
*Q-179	J. E. Mann	--	1954	150	10	--	65	Feb. 1954	T,E	Irr	Discharge reported 1,600 gpm.
*Q-180	City of El Paso well 301	City of El Paso	1957	550	18	3,774	--	--	T,E	P	Casing: 18-in. to 550 ft. Screened from 285 ft. to bottom. Drawdown 157 ft. after 24 hours pumping at 2,200 gpm Sept. 5, 1957. Temp. 81°F.
*Q-181	City of El Paso	do	1957	1,013	6	3,768	--	--	--	--	Screened from 528 ft. to bottom. Canutillo recorder 3. Observation well. 2/ 4/
*Q-182	do	do	1957	202	6	3,776	--	--	--	--	Screened from 102 ft. to bottom. Canutillo recorder 4. Observation well.
Q-183	U. S. Bureau of Reclamation	--	--	--	2	3,790	--	--	--	--	Auger hole cased with galvanized iron pipe. Observation well.
Q-184	do	--	--	--	2	3,773	--	--	--	--	do
Q-185	do	--	--	--	2	3,771	--	--	--	--	do
*Q-186	McKee Construction Co.	Oliver-Houston	1957	204	12	3,869	112.6 114.4 112.0	Jan. 10, 1958 June 12, 1958 Jan. 15, 1959	N	N	Cased from 164 ft. to bottom.
*Q-187	Town of Anthony well 1	Layne-Texas Co.	1954	277	10	--	--	--	T,E, 20	P	Screened from 145 to 160, 205 to 230, and 240 to 265 ft. Drawdown reported 37 ft. after pumping at 350 gpm.
*Q-188	Town of Anthony well 2	do	1954	260	10	--	--	--	T,E, 20	P	Casing: 10-in. to bottom. Screened from 147 to 170, 221 to 226, and 239 to 254 ft. Drawdown reported 36 ft. after pumping 3 hours at 300 gpm. Drilled to 287 ft., plugged back to 260. 2/

See footnotes at end of table.

Well	Owner	Driller	Date completed	Depth of well (ft.)	Diameter of well (in.)	Altitude of land surface (ft.)	Water level: Below land surface datum (ft.)	Water level: Date of measurement	Method of lift	Use of water	Remarks
*Q-189	City of El Paso well 205	City of El Paso	1958	900	18, 12	--	42.8 41.8	July 15, 1958 Jan. 9, 1959	T,E	P	Casing: 18-in. to 400 ft., 12-in. to bottom. Screened from 510 ft. to bottom, underreamed from 500 ft. to bottom. Drawdown 75 ft. after 24 hours pumping at 2,150 gpm. Drilled to 958 ft.; deepened to 1,115 ft., plugged back to 900. Temp. 93°F. 1/ 2/ 4/
*Q-190	McKee Construction Co.	Oliver-Houston	1957	226	12	3,908	139.5	Jan. 15, 1959	T,G, 32	Ind	
*Q-191	do	do	1957	224	12	3,906	146.5	Feb. 11, 1959	T,G, 32	Ind	
Q-192	do	do	1957	224	12	3,837	97.9	Aug. 17, 1958	T,G, 32	Ind	
*U-1	White Water Works well 1	Layne-Texas Co.	1946	127	12, 6	3,743	8	Feb. 1946	T,E	P	Casing: 12-in. to 101 ft., 6-in. to 115 ft. Screened from 103 ft. to 114. Drawdown reported 21 ft. after pumping at 66 gpm Feb. 14, 1946. 2/
*U-2	White Water Works well 6	--	--	--	--	3,743	--	--	T,E	P	
U-3	White Water Works	Layne-Texas Co.	1938	211	10, 5	--	4	Sept. 1948	N	N	Casing: 10-in. to 170 ft., 5-in. from 130 ft. to 196. Screened from 172 ft. to 193. Drawdown reported 32 ft. after pumping 160 gpm Sept. 23, 1938. Water reported salty. 2/
*U-4	White Water Works well 5	Layne-Texas Co.	1946	92	12, 6	3,741	11	Mar. 1946	T,E	P	Casing: 12-in. to 74 ft. cemented, 6-in. from surface to bottom, underreamed. Screened from 80 to 90 ft. Drawdown reported 10 ft. at 35 gpm Feb. 19, 1946.
U-5	White Water Works well 2	do	1946	108	12, 6	3,742	2	Feb. 1946	T,E	P	Casing: 12-in. to 93 ft. cemented, 6-in. from surface to bottom. Screened from 96 ft. to 106, underreamed from 93 ft. to 108. Drawdown reported 13 ft. at 60 gpm, Feb. 19, 1946. Gravel-walled.
*U-6	White Water Works	do	1946	127	--	--	--	--	N	N	Test well. 2/

Table 1.--Records of wells in lower Mesilla Valley, El Paso County, Texas, and Dona Ana County, New Mexico--Continued

Well	Owner	Driller	Date completed	Depth of well (ft.)	Diameter of well (in.)	Altitude of land surface (ft.)	Water level: Below land surface datum (ft.)	Water level: Date of measurement	Method of lift	Use of water	Remarks
*U-7	White Water Works	Layne-Texas Co.	1946	107	12, 6	3,742	9	Feb. 1946	T,E	P	Casing: 12-in. to 97 ft. cemented, 6-in. from surface to bottom. Screened from 96 to 106 ft., underreamed from 97 ft. to bottom. Drawdown reported 13 ft. at 60 gpm Feb. 25, 1946. Gravel-walled.
U-8	White Water Works well 4	do	1946	130	12, 6	3,741	8	Mar. 1946	T,E	P	Casing: 12-in. to 84 ft. cemented, 6-in. from surface to 100 ft. Screened from 87 to 98 ft., underreamed from 84 to 100 ft. Drawdown 14 ft. at 55 gpm Mar. 4, 1946. Gravel-walled. 2/
U-9	Paul Harvey	--	--	100	--	3,742	6.9 4.9 6.1	Mar. 14, 1952 Jan. 15, 1953 Jan. 13, 1959	T,G	Irr	
*U-10	do	--	--	--	18	3,742	8.3 7.5 8.0	Mar. 14, 1952 Jan. 15, 1953 Jan. 10, 1958	T,G	Irr	Temp. 70°F.
U-11	Yucca Council Boy Scouts of America	--	--	48	12	--	9.1	Mar. 17, 1953	T,E	Irr	Cased to bottom. Drawdown measured 22 ft. after pumping 15 min. at 250 gpm Mar. 17, 1953. Gravel-walled. Temp. 66°F.
*U-12	Broadus & McGrath	Layne-Texas Co.	1953	1,690	8, 6	3,994	238.2	Jan. 16, 1953	N	N	Oil-test well drilled to 2,500 ft., reamed out to 1,690. Casing: 8-in. to 1,600 ft., 6-in. pipe from 1,600 ft. to bottom. Drawdown reported 102 ft. at 200 gpm. Heavy iron precipitates on rocks where test pump discharged water. Discharge reported 40 gpm. Temp. 99°F. Abandoned because of high fluoride content.
*U-13	do	El Paso Drilling Co.	1953	502	14, 10	4,075	220.9	Oct. 13, 1953	N	N	Drilled for public supply. Casing: 14-in. to 50 ft., 10-in. from surface to 500 ft. Drawdown measured 92 ft. after pumping 29½ hours at 60 gpm Oct. 10, 1953. Bedrock at 75 ft. 2/
U-14	--	--	--	660	--	4,106	--	--	N	N	Abandoned. 2/
*U-15	Buena Vista Cooperative Water System	--	1947	169	8	--	--	--	T,E	P	Discharge reported 60 gpm.

See footnotes at end of table.

Well	Owner	Driller	Date completed	Depth of well (ft.)	Diameter of well (in.)	Altitude of land surface (ft.)	Water level: Below land surface datum (ft.)	Water level: Date of measurement	Method of lift	Use of water	Remarks
U-16	Farmers' Independent Cotton Oil Mill	Layne-Texas Co.	1951	550	--	3,747	--	--	N	N	2/
*U-17	El Paso Electric Co.	do	1951	118	--	--	--	--	N	N	Test well 3.
U-18	do	do	1951	282	--	--	--	--	N	N	Test well 1. 2/
U-19	do	do	1951	60	--	--	--	--	N	N	Test well 4.
U-20	do	do	1951	60	--	--	--	--	N	N	Test well 5.
*U-21	do	do	1951	142	--	--	--	--	N	N	Test well 2. 2/
U-22	do	do	1951	60	--	--	--	--	N	N	Test well 6.
U-23	U. S. Bureau of Reclamation	--	1945	--	2	3,735	--	--	--	--	Auger hole cased with galvanized iron pipe. Observation well.
U-24	L. D. McComas	--	--	--	18	3,738	7.8 7.5	Jan. 10, 1952 Jan. 13, 1959	T,G	Irr	Gravel-walled. 1/
U-25	Frank D. Stewart	--	--	--	14	3,736	--	--	T,G	Irr	
*U-26	El Paso Electric Co.	Layne-Texas Co.	1952	351	3	3,748	12 12.9	Jan. 1951 Dec. 31, 1958	--	--	Cased to 155 ft. Test well 25. Observation well G. 1/ 2/
U-27	American Smelting & Refining Co.	W. H. Mize	1951	--	--	--	--	--	N	N	Test well 11. Well ended in andesite.
*U-28	do	do	1951	389	--	3,890	--	--	N	N	Test well 6. 2/
*U-29	do	do	1951	296	28, 12	3,797	--	--	T,E, 50	Ind	Casing: 28-in. to 18 ft. cemented, 12-in. to 144 ft., slotted from 112 to 139 ft. Pump set at 138 ft. Gravel-walled. 2/
U-30	do	do	1951	300	--	--	--	--	N	N	Test well 7.
*U-31	do	do	1951	83	33	3,780	--	--	N	N	Test well 4. 2/
*U-32	El Paso Electric Co.	Layne-Texas Co.	1951	242	24, 16	3,796	59	Aug. 1951	T,E	Ind	Casing: 24-in. to 50 ft., 16-in. to 178 ft., screened from 94 to 174 ft. Drawdown reported 64 ft. at 375 gpm Aug. 16, 1951. Gravel-walled. Test well 13. 2/

See footnotes at end of table.

Well	Owner	Driller	Date completed	Depth of well (ft.)	Diameter of well (in.)	Altitude of land surface (ft.)	Water level: Below land surface datum (ft.)	Water level: Date of measurement	Method of lift	Use of water	Remarks
U-33	El Paso Electric Co.	Layne-Texas Co.	1951	232	--	3,753	40.9 43.7 37.4 41.1	Jan. 23, 1956 Dec. 31, 1956 Dec. 31, 1957 Dec. 31, 1958	--	--	Test well 12. Observation well E.
U-34	do	do	1951	--	--	3,762	43.8 47.2 37.0 49.6	Jan. 23, 1956 Dec. 31, 1956 Dec. 31, 1957 Dec. 31, 1958	--	--	Test well 15. Observation well F.
U-35	do	do	1951	166	3	3,772	35 47.4	Sept. 1951 Dec. 31, 1958	--	--	Test well 16. Observation well A. 1/
*U-36	do	do	1951	232	24, 16	3,791	--	--	T,E	Ind	Casing: 24-in. to 50 ft., 16-in. to 182 ft., screened from 54 to 84 ft., and 127 to 177. Drawdown reported 88 ft. at 671 gpm Aug. 26, 1951. Test well 11. 2/
*U-37	do	do	1952	370	--	3,778	--	--	T,E	Ind	Well ended in andesite. Test well 7.
U-38	do	do	1951	182	3	3,774	63.5 63.0	Nov. 12, 1954 Dec. 31, 1958	--	--	Cased to 181 ft. Test well 17. Observation well B. 1/
*U-39	do	do	1951	262	16	3,762	--	--	T,E	Ind	Cased to 126 ft., screened from 56 to 76 and 96 to 124 ft. Drawdown reported 44 ft. at 990 gpm July 16, 1951. 2/
*U-40	F. A. McKnight	--	--	80	--	3,735	6.2	Jan. 15, 1953	C,-	N	Formerly used for domestic supply.
*U-41	L. D. McComas	--	--	72	--	--	--	--	Cf,G	Irr	
U-42	El Paso Electric Co.	Layne-Texas Co.	1951	161	16	3,754	11.0	Aug. 13, 1951	T,E	Ind	Drawdown reported 105 ft. while pumping 1,023 gpm after pumping 48 hours at varied rates of discharge. Owner's well 4.
U-43	do	do	1951	--	--	3,764	--	--	N	N	Test well 18.
U-44	do	do	1951	232	--	3,790	--	--	N	N	Test well 23.
U-45	American Smelting & Refining Co.	--	--	--	--	--	--	--	N	N	Test well 8. Andesite at 3,478 ft. above mean sea level.
U-46	do	Layne-Texas Co.	--	--	--	--	--	--	N	N	Test well 10.

See footnotes at end of table.

Table 1.--Records of wells in lower Mesilla Valley, El Paso County, Texas, and Dona Ana County, New Mexico--Continued

Well	Owner	Driller	Date completed	Depth of well (ft.)	Diameter of well (in.)	Altitude of land surface (ft.)	Water level: Below land surface datum (ft.)	Water level: Date of measurement	Method of lift	Use of water	Remarks
U-47	American Smelting & Refining Co.	Layne-Texas Co.	--	--	--	--	--	--	N	N	Test well 9. Andesite at 3,318 ft. above mean sea level.
*U-48	El Paso Electric Co.	do	1951	202	16	3,785	46	Sept. 1951	T,E	Ind	Drawdown reported 76 ft. after pumping 48 hours at 810 gpm Sept. 6, 1951. Well 6. 2/
*U-49	do	do	1951	182	16	3,760	--	--	T,E	Ind	Drawdown reported 80 ft. after pumping 48 hours at 700 gpm Sept. 6, 1951. Well 5. 2/
U-50	do	do	1951	122	--	3,758	26	July 1951	N	N	Test well 10.
*U-51	do	do	1952	281	--	3,736	--	--	N	N	Test well 26. 2/
U-52	do	do	1951	162	--	--	--	--	N	N	Test well 9.
*U-53	do	do	1952	246	--	3,733	--	--	N	N	Test well 27. 2/
*U-54	do	do	1951	420	3	3,768	39.3 40.7	Jan. 15, 1953 Dec. 31, 1958	N	N	Test well 7. 1/ 2/
*U-55	do	W. H. Mize	1951	393	--	3,860	--	--	N	N	Test well 3. 2/
*U-56	Southern Pacific Lines	--	1942	200	6	--	120	1942	C,E, 3/4	D	Discharge reported 35 gpm. Supplies railroad siding at Anapra, N. Mex.
*U-57	American Smelting & Refining Co.	W. H. Mize	1951	266	--	3,850	--	--	N	N	Test well 2. 2/
*U-58	do	do	1951	163	--	3,810	--	--	N	N	Test well 10. 2/
*U-59	Southwestern Portland Cement Co.	Southwestern Portland Cement Co.	1951	140	6	--	49.0	Nov. 21, 1955	T,E, 7½	D,Ind	Drilled in hard limestone; produces from sand beds.
U-60	do	do	1951	240	8	--	44.9	Nov. 21, 1955	T,E	D	Used only for drinking.
U-61	El Paso Electric Co.	--	--	218	3	3,824	96.8 103.1 91.4 90.2	Jan. 23, 1956 Dec. 31, 1956 Dec. 31, 1957 Dec. 31, 1958	--	--	Cased to 201 ft. Observation well C.
U-62	do	--	--	206	3	3,784	70.1 76.9 65.9 98.2	Jan. 23, 1956 Dec. 31, 1956 Dec. 31, 1957 Dec. 31, 1958	--	--	Observation well D.

See footnotes at end of table.

Well	Owner	Driller	Date completed	Depth of well (ft.)	Diameter of well (in.)	Altitude of land surface (ft.)	Water level: Below land surface datum (ft.)	Water level: Date of measurement	Method of lift	Use of water	Remarks
*U-63	El Paso Electric Co.	Valley Drilling Co.	1956	274	18, 16	3,778	55.6	Jan. 15, 1957	T,E	Ind	Drawdown 38.4 ft. while pumping 600 gpm. Well 8.
U-64	do	--	1956	177	3	--	--	--	--	--	Observation well H.
*U-65	Erich Brandes	--	--	600	3	--	Flowed	Sept. 1957	N	N	Old well. Abandoned.

* See Table 5 for chemical analysis of the water.
1/ See Table 4 for water levels.
2/ See Table 2 for drillers' log.
3/ See Table 3 for sample logs.
4/ See electric log in files of Texas Water Commission.

Table 2.--Drillers' logs of wells in lower Mesilla Valley, El Paso County, Texas, and Dona Ana County, New Mexico

Well P-6

Owner: Southern Pacific Lines. Driller: --

	Thickness (feet)	Depth (feet)		Thickness (feet)	Depth (feet)
Sand	3	3	Clay, yellow	38	450
Soil, sandy	3	6	Sand	25	475
Caliche	6	12	Clay, blue	3	478
Sand	8	20	Sand	7	485
Clay, yellow	85	105	Clay, yellow	3	488
Sand, cemented	15	120	Sand	10	498
Clay, yellow	50	170	Clay, yellow	20	518
Sand	15	185	Sand	5	523
Clay, red	25	210	Clay, yellow	4	527
Sand	5	215	Sand	3	530
Clay, red	22	237	Clay, yellow and blue	10	540
Sand, cemented	13	250	Sand, black	70	610
Clay, yellow	5	255	Clay, blue	20	630
Sand	10	265	Sand, black	20	650
Clay, sandy	30	295	Clay, blue and red	120	770
Sand	2	297	Sand, black	60	830
Clay, red	23	320	Clay, yellow	40	870
Sand	10	330	Sand, black	25	895
Clay, red	20	350	Clay, red	45	940
Sand	5	355	Sand, black	10	950
Clay, yellow	5	360	Clay, red	30	980
Sand, water	52	412	Sand	10	990

(Continued on next page)

Table 2.--Drillers' logs of wells in lower Mesilla Valley, El Paso County, Texas, and Dona Ana County, New Mexico--Continued

	Thickness (feet)	Depth (feet)		Thickness (feet)	Depth (feet)
Well P-6--Continued					
Clay, red----------------	20	1,010	Sand and gravel, water--	15	1,140
Sand--------------------	5	1,015	Clay--------------------	10	1,150
Clay, red----------------	20	1,035	Sand--------------------	125	1,275
Sand--------------------	5	1,040	Clay, sandy-------------	50	1,325
Clay, red----------------	40	1,080	Sandstone---------------	2	1,327
Sand--------------------	10	1,090	Sand--------------------	3	1,330
Clay--------------------	35	1,125			

Well Q-25

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

Surface-----------------	10	10	Sand streaks and clay---	20	310
Gravel and boulders-----	20	30	Sand--------------------	20	330
Sand--------------------	90	120	Sand and clay-----------	20	350
Clay--------------------	10	130	Clay, sandy-------------	40	390
Sand--------------------	10	140	Sand--------------------	20	410
Clay, sandy-------------	60	200	Clay, sandy-------------	140	550
Sand--------------------	6	206	Clay and sand streaks---	20	570
Sand and clay-----------	24	230	Sand, gravel, and clay--	20	590
Sand--------------------	20	250	Lime, sandy-------------	30	620
Clay, sandy-------------	40	290			

Well Q-27

Owner: U. S. Bureau of Prisons. Driller: W. L. Cass.

Sand and clay-----------	10	10	Sand and gravel---------	30	40

(Continued on next page)

Table 2.--Drillers' logs of wells in Lower Mesilla Valley, El Paso County, Texas, and Dona Ana County, New Mexico--Continued

	Thickness (feet)	Depth (feet)		Thickness (feet)	Depth (feet)
Well Q-27--Continued					
Clay, blue--------------	5	45	Sand and boulders-------	13	185
Boulders and gravel-----	5	50	Clay--------------------	10	195
Clay--------------------	30	80	Sand--------------------	12	207
Sand streaks and clay---	30	110	Clay--------------------	3	210
Clay and gravel---------	5	115	Sand--------------------	8	218
Sand and gravel---------	15	130	Clay--------------------	2	220
Clay, blue--------------	20	150	Sand--------------------	42	262
Sand--------------------	22	172	Clay, blue--------------	2	264

Well Q-28

Owner: U. S. Bureau of Prisons. Driller: Layne-Texas Co.

Soil, sandy-------------	6	6	Shale, gravel, and lime-rock-----------------	15	158
Caliche-----------------	10	16	Sand--------------------	42	200
Sand and gravel---------	39	55	Clay and gravel---------	5	205
Clay--------------------	3	58	Shale, blue, and sand---	10	215
Sand, loose-------------	17	75	Sand, blue, and shale---	12	227
Clay--------------------	8	83	Sand and shale----------	11	238
Clay, sandy-------------	29	112	Sand, blue, and shale in bottom------------	2	240
Clay--------------------	9	121	Sand, blue--------------	6	246
Clay, sandy-------------	10	131	Clay, tough-------------	6	252
Sandstone and limerock--	2	133	No record---------------	12	264
Clay, sandy-------------	10	143			

Well Q-38

Owner: Gus Eminger. Driller: Geo. E. McKenzie.

	Thickness (feet)	Depth (feet)
Soil	9	9
Clay	6	15
Sand, gray	3	18
Sand and scattered gravel	5	23
Gravel, pea	3	26
Sand, gray, and scattered gravel	5	31
Gravel, pea	4	35
Sand, gray	3	38
Gravel, pea	1	39
Gravel, coarse	2	41
Sand, fine	2	43
Gravel, coarse	4	47
Sand, coarse, and gravel	1	48
Sand, coarse	2	50
Gravel, coarse	2	52
Sand, hard-packed	16	68
Clay, sandy	1	69
Clay, brown	2	71
Clay, sandy	2	73
Clay, brown	9	82
Sand, coarse, brown	4	86
Sand, gray	17	103
Clay, sandy, brown	2	105
Sand, hard, gray	17	122

Well Q-41--partial log

Owner: H. A. Sexton. Driller: Geo. E. McKenzie.

	Thickness (feet)	Depth (feet)
Soil	3	3
Clay	2	5
Sand, fine	2	7
Clay, sand, and scattered gravel	13	20
Sand, fine gravel, and caliche	2	22
Sand	4	26
Clay and gravel	1	27
Clay, sand, and gravel	4	31
Sand, clay, and gravel	5	36
Gravel, fine, and sand	1	37
Clay and gravel	6	43
Sand	4	47
Clay and some gravel	8	55

(Continued on next page)

Table 2.--Drillers' logs of wells in Lower Mesilla Valley, El Paso County, Texas, and Dona Ana County, New Mexico--Continued

Well Q-41--Continued

	Thickness (feet)	Depth (feet)		Thickness (feet)	Depth (feet)
Gravel, fine------------	1	56	Clay, hard, red---------	2	91
Gravel------------------	5	61	Clay, red, caliche, and packsand-------------	3	94
Gravel, fine------------	7	68	Packsand----------------	5	99
Gravel------------------	2	70	Clay, red---------------	9	108
Sand, packed with scattered gravel and sandstone----------------	10	80	Total depth-------------		146
Packsand----------------	9	89			

Well Q-60

Owner: Louis H. Brandt. Driller: Geo. E. McKenzie.

	Thickness (feet)	Depth (feet)		Thickness (feet)	Depth (feet)
Soil--------------------	7	7	Gravel, large-----------	2	68
Clay, adobe, red--------	6	13	Sand and pea gravel-----	6	74
Gravel and packsand-----	16	29	Clay--------------------	2	76
Gravel, small, and fine sand------------------	3	32	Sand--------------------	9	85
Clay, gray, and gravel--	4	36	Packsand----------------	12	97
Sand, fine--------------	2	38	Clay--------------------	5	102
Gravel, pea, and sand---	2	40	Sand and clay-----------	4	106
Gravel, 1 to 3 inches in diameter-----------	1	41	Shale, hard-------------	1	107
Sand and pea gravel-----	5	46	Sand and clay-----------	2	109
Gravel, 1 to 4 inches in diameter-----------	2	48	Sand--------------------	15	124
Sand--------------------	1	49	Clay and sand-----------	2	126
Clay and gravel---------	2	51	Sand--------------------	14	140
Gravel, 1 to 6 inches in diameter-----------	15	66	Sand, hard--------------	1	141

Table 2.--Drillers' logs of wells in lower Mesilla Valley, El Paso County, Texas, and Dona Ana County, New Mexico--Continued

Well Q-63

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

	Thickness (feet)	Depth (feet)		Thickness (feet)	Depth (feet)
Sand	25	25	Shale and sandy clay	10	360
Sand and gravel	7	32	Shale streaks and sandy clay	10	370
Clay, blue, and sand	3	35	Clay, sandy	10	380
Clay, blue	2	37	Clay	10	390
Gravel and sand	14	51	Clay, sandy	200	590
Gravel	24	75	Clay, sandy, a little gravel	10	600
Clay and gravel	10	85	Clay, sandy	10	610
Gravel and sand	15	100	Clay	20	630
Clay, sand, and gravel	5	105	Clay and sand streaks	10	640
Clay	15	120	Clay and sand	10	650
Clay and gravel	30	150	Clay, sandy, and gravel	10	660
Clay and sand	50	200	Clay, sandy	10	670
Clay, hard, and sand	10	210	Clay and sand	20	690
Clay, hard	10	220	Clay and gravel streaks	10	700
Clay	10	230	Clay, sand, and gravel streaks	10	710
Clay and sand	10	240	Clay and sand	20	730
Clay	30	270	Red beds, clay, and sand	30	760
Clay and sand	10	280	Clay, sandy	220	980
Clay, sandy	40	320	Clay	218	1,198
Sand, fine gravel, and shale	10	330	Bedrock (probably conglomerate)	2	1,200
Clay, hard, and shale streaks	10	340			
Clay	10	350			

Table 2.--Drillers' logs of wells in lower Mesilla Valley, El Paso County, Texas, and Dona Ana County, New Mexico--Continued

Well Q-72

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

	Thickness (feet)	Depth (feet)		Thickness (feet)	Depth (feet)
Caliche and boulders----	10	10	Conglomerate, sandy-----	52	432
Caliche and gravel------	8	18	Clay, sandy------------	8	440
Sand-------------------	2	20	Clay, sandy, and conglomerate---------	10	450
Lime and sand-----------	15	35	Clay, sandy------------	20	470
Sand-------------------	28	63	Sand, a little clay-----	50	520
Sand and caliche, hard--	5	68	Sand, caliche, and clay-	50	570
Sand and caliche streaks	2	70	Clay, sandy------------	37	607
Sand and caliche--------	120	190	Conglomerate-----------	68	675
Sand and clay streaks---	40	230	Clay-------------------	110	785
Sand and clay-----------	40	270	Clay and sandstone------	5	790
Clay and gravel---------	10	280	Clay, yellow-----------	10	800
Clay and sand streaks---	10	290	Clay, yellow, and gravel	10	810
Clay shells, sandy------	30	320	Clay, yellow, sand and gravel---------------	10	820
Clay, sand and lime streaks--------------	10	330	Clay and conglomerate---	10	830
Clay shells------------	10	340	Clay, gypsum, and sand--	10	840
Conglomerate-----------	40	380	Clay and gravel---------	34	874

Well Q-73

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

Boulders---------------	60	60	Sand-------------------	70	160
Gravel-----------------	10	70	Sand, a little clay-----	20	180
Sand and gravel---------	20	90	Sand and caliche--------	10	190

(Continued on next page)

Table 2.--Drillers' logs of wells in lower Mesilla Valley, El Paso County, Texas, and Dona Ana County, New Mexico--Continued

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

Well Q-73--Continued

	Thickness (feet)	Depth (feet)		Thickness (feet)	Depth (feet)
Sand, gravel, and caliche	10	200	Clay, sandy------------	10	250
Sand, gravel, and clay--	20	220	Clay------------------	30	280
Sand and clay----------	20	240	Shale, black, and white lime----------------	40	320

Well Q-74

Owner: Luis Bobadillo. Driller: J. S. Merriwether.

	Thickness (feet)	Depth (feet)		Thickness (feet)	Depth (feet)
Caliche----------------	24	24	Lime, brown------------	216	818
Sand (water)-----------	241	265	Lime, light-brown------	135	953
Shale, brown-----------	43	308	Shale, maroon----------	19	972
Gravel and sand (water)-	2	310	No record--------------	606	1,578
Lime, dark-brown-------	292	602			

Well Q-75

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

	Thickness (feet)	Depth (feet)		Thickness (feet)	Depth (feet)
Rock, hard-------------	10	10	Sand and silt----------	40	210
Gravel-----------------	40	50	Sand and clay----------	10	220
Clay and gravel--------	20	70	Clay------------------	50	270
Sand and gravel--------	40	110	Conglomerate-----------	40	310
Sand-------------------	60	170	Bedrock----------------	10	320

Well Q-77--partial log

Owner: Tri-State Oil Co. Driller: Tri-State Oil Co.

	Thickness (feet)	Depth (feet)		Thickness (feet)	Depth (feet)
Caliche----------------	12	12	Shale, brown-----------	8	28
Shale, hard, yellow-----	8	20	Shale------------------	27	55

(Continued on next page)

Table 2.--Drillers' logs of wells in lower Mesilla Valley, El Paso County, Texas, and Dona Ana County, New Mexico--Continued

	Thickness (feet)	Depth (feet)
Well Q-77--Continued		
Shale, brown	10	65
Sand	16	81
Shale, pink	44	125
Shale, yellow	13	138
Sand	39	177
Lime	78	255
Lime and shale	105	360
Shale, sandy (one bailer of water per hour)	15	375
Lime, shale, and sand	50	425
Lime, anhydrite, and shale	10	435
Shale and lime	90	525
Lime, brown	15	540
Shale, pink	10	550
Shale, pink and brown	10	560
Lime, black	10	570
Lime, black and brown	10	580
Lime, brown	20	600
Lime, black and brown	10	610
Lime, hard, gray	7	617
Lime	43	660
Shale, broken	10	670
Sand (fresh water)	8	678
Lime	16	694
Sand	6	700
Lime, brown	40	740
Sand	17	757
Lime	15	772
Sand	23	795
Lime	50	845
Sand and lime	12	857
Lime	55	912
Shale, brown	3	915
Lime	45	960
Sand	5	965
Lime	65	1,030
Lime and shale	5	1,035
Lime	75	1,110
Sand	15	1,125
Lime	240	1,365
Lime and shale	5	1,370
Lime	35	1,405
Lime and shale	2	1,407
Lime	23	1,430
Shale, blue, and lime shells	15	1,445

(Continued on next page)

Table 2.--Drillers' logs of wells in lower Mesilla Valley, El Paso County, Texas, and Dona Ana County, New Mexico--Continued

	Thickness (feet)	Depth (feet)		Thickness (feet)	Depth (feet)
Well Q-77--Continued					
Lime and shale----------	46	1,491	Lime and shale----------	17	1,835
Lime--------------------	3	1,494	Lime, brown, and shale--	8	1,843
Shale, blue-------------	11	1,505	Shale-------------------	5	1,848
Lime--------------------	15	1,520	Lime, brown, and sand---	10	1,858
Sand (water)------------	30	1,550	Shale, blue, and lime---	37	1,895
Sand and lime-----------	27	1,577	Lime and blue sand (water)	35	1,930
Shale, blue-------------	3	1,580	Sand, gray--------------	15	1,945
Lime--------------------	5	1,585	Lime, sandy, gray-------	10	1,955
Shale, blue-------------	21	1,606	Shale, brown------------	12	1,967
Lime--------------------	14	1,620	Lime, hard--------------	8	1,975
Shale-------------------	1	1,621	Lime--------------------	48	2,023
Lime and shale----------	33	1,654	Shale, blue-------------	20	2,043
Lime--------------------	13	1,667	Lime--------------------	85	2,128
Lime and shale----------	13	1,680	Lime, brown-------------	29	2,157
Lime, black-------------	15	1,695	Lime--------------------	105	2,262
Lime--------------------	8	1,703	Lime and shale----------	6	2,268
Lime and shale----------	18	1,721	Lime, brown-------------	14	2,282
Lime--------------------	9	1,730	Sand (water)------------	43	2,325
Lime, gray--------------	12	1,742	Lime, sandy, black------	5	2,330
Sand (water)------------	8	1,750	Sand (water)------------	5	2,335
Sand, brown-------------	5	1,755	Lime, broken------------	5	2,340
Lime, sandy, brown------	23	1,778	Lime, brown-------------	45	2,385
Lime, sandy-------------	40	1,818	Total depth-------------		3,401

Table 2.--Drillers' logs of wells in lower Mesilla Valley, El Paso County, Texas, and Dona Ana County, New Mexico--Continued

Well Q-82

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

	Thickness (feet)	Depth (feet)		Thickness (feet)	Depth (feet)
Clay, sandy, red--------	6	6	Clay-------------------	3	117
Sand and clay streaks---	10	16	Sand and small clay streaks--------------	22	139
Gravel and sand---------	26	42	Clay-------------------	1	140
Clay and sand streaks---	16	58	Sand-------------------	10	150
Sand and clay-----------	20	78	Clay-------------------	2	152
Sand, gray--------------	36	114			

Well Q-83

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

	Thickness (feet)	Depth (feet)		Thickness (feet)	Depth (feet)
Clay, sandy-------------	11	11	Gravel and sand---------	32	119
Gravel and clay breaks--	36	47	Clay and broken sand----	13	132
Sand and clay breaks----	33	80	Sand-------------------	28	160
Clay and gravel---------	5	85	Clay-------------------	22	182
Rock-------------------	2	87			

Well Q-84

Owner: City of El Paso. Driller: Geo. E. McKenzie.

	Thickness (feet)	Depth (feet)		Thickness (feet)	Depth (feet)
Soil and clay-----------	6	6	Gravel and sandy clay---	2	26
Sand, soft, and tree roots----------------	6	12	Clay, gravel, and sand--	1	27
Sand and scattered gravel	2	14	Gravel, coarse, and boulders-------------	3	30
Gravel and fine sandy gravel---------------	8	22	Gravel, small----------	2	32
Gravel, coarse----------	2	24	Gravel, coarse, and boulders-------------	2	34

(Continued on next page)

Table 2.--Drillers' logs of wells in lower Mesilla Valley, El Paso County, Texas, and Dona Ana County, New Mexico--Continued

Well Q-84--Continued

	Thickness (feet)	Depth (feet)		Thickness (feet)	Depth (feet)
Clay and gravel---------	2	36	Packsand----------------	14	90
Clay, sandy-------------	14	50	Sand, fine, and scattered packsand--------------	16	106
Sand, coarse------------	9	59	Packsand----------------	2	108
Clay, sandy-------------	3	62	Clay, hard, blue--------	4	112
Clay, hard--------------	6	68	Clay and scattered sand-	1	113
Packsand----------------	1	69	Sand and scattered clay-	7	120
Clay, hard, red---------	3	72	Sand--------------------	1	121
Packsand----------------	2	74	Clay--------------------	1	122
Clay, hard, gray, packsand, and sandrock----	2	76			

Well Q-85

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

Soil--------------------	2	2	Clay--------------------	12	95
Sand--------------------	20	22	Sand and clay streaks---	27	122
Gravel, coarse, and sand	42	64	Clay and sand-----------	3	125
Clay and sand streaks---	19	83	Sand and clay streaks---	35	160

Well Q-86

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

Sand and clay-----------	10	10	Gravel and clay---------	10	90
Clay--------------------	10	20	Clay--------------------	10	100
Clay, sand, and gravel--	20	40	Clay and gravel---------	10	110
Sand and gravel---------	30	70	Sand and gravel---------	50	160
Gravel------------------	10	80	Sand--------------------	10	170

(Continued on next page)

Table 2.--Drillers' logs of wells in lower Mesilla Valley, El Paso County, Texas, and Dona Ana County, New Mexico--Continued

Well Q-86--Continued

	Thickness (feet)	Depth (feet)
Sand and shale streaks--	40	210
Clay and gravel---------	20	230
Clay-------------------	20	250
Clay and gravel---------	30	280
Clay, sandy------------	60	340
Clay, sandy, and gravel-	20	360
Sand, hard, and shale streaks--------------	20	380
Sand, a little shale----	10	390
Clay, sandy------------	20	410
Clay, sandy, and gravel-	10	420
Clay and caliche--------	10	430
Clay-------------------	10	440
Clay, hard-------------	40	480
Clay-------------------	20	500
Clay and sand----------	40	540
Clay, sandy------------	10	550
Sand and clay----------	10	560
Clay, sandy------------	30	590
Clay, sandy, and gravel-	10	600
Clay, sandy------------	10	610
Sand and clay----------	10	620
Clay, sandy------------	80	700
Clay, sandy, and gravel-	40	740
Clay and sand----------	10	750
Clay-------------------	200	950
Conglomerate-----------	1	951

Well Q-90

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

	Thickness (feet)	Depth (feet)
Clay, sandy------------	6	6
Sand-------------------	8	14
Gravel and sand---------	55	69
Clay, sandy------------	10	79
Sand-------------------	18	97
Clay, sandy------------	10	107
Clay and sand streaks---	7	114
Sand-------------------	4	118
Clay and sand streaks---	14	132
Sand and clay streaks---	23	155
Clay, sandy------------	5	160

Well Q-91

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

	Thickness (feet)	Depth (feet)		Thickness (feet)	Depth (feet)
Clay, sandy-------------	24	24	Sand and clay streaks---	62	172
Gravel and clay streaks-	46	70	Clay-------------------	30	202
Clay and sand streaks---	40	110			

Well Q-96

Owner: W. S. Wallace. Driller: Geo. E. McKenzie.

	Thickness (feet)	Depth (feet)		Thickness (feet)	Depth (feet)
Soil-------------------	2	2	Sand, scattered gravel and caliche----------	8	46
Sand-------------------	3	5	Gravel, sand, and clay--	4	50
Clay and streaks of sand	9	14	Gravel and boulders-----	32	82
Sand, small gravel, and caliche--------------	8	22	Clay, brown-------------	12	94
Sand-------------------	16	38	Sand and clay-----------	2	96

Well Q-97

Owner: Horton Miller. Driller: Geo. E. McKenzie.

	Thickness (feet)	Depth (feet)		Thickness (feet)	Depth (feet)
Soil-------------------	3	3	Sand, clay, and caliche-	3	92
Clay-------------------	14	17	Packsand---------------	5	97
Sand and scattered gravel	9	26	Sand and scattered gravel	3	100
Clay, gray, and gravel and sand-------------	13	39	Clay, scattered sand, and caliche--------------	2	102
Sand and scattered gravel	15	54	Sand-------------------	2	104
Gravel and coarse sand--	19	73	Clay and sand-----------	2	106
Sand-------------------	9	82	Clay, green-------------	4	110
Gravel and coarse sand--	7	89	Sand and clay-----------	4	114

(Continued on next page)

Well Q-97--Continued

	Thickness (feet)	Depth (feet)		Thickness (feet)	Depth (feet)
Sand	3	117	Clay, sandy, hard	4	131
Sand and scattered boulders	3	120	Packsand	3	134
Packsand and clay balls	7	127	Clay, hard	2	136

Well Q-103

Owner: C. Deerman. Driller: Geo. E. McKenzie.

	Thickness (feet)	Depth (feet)		Thickness (feet)	Depth (feet)
Soil	15	15	Clay, gray	2	92
Sand and gravel	7	22	Sand, soft	16	108
Sand	1	23	Clay, hard, gray	4	112
Gravel	3	26	Sand, soft	13	125
Sand and scattered gravel	6	32	Clay	2	127
Clay	11	43	Sand	3	130
Sand and coarse gravel	10	53	Sand, hard	3	133
Gravel, coarse	17	70	Clay	1	134
Caliche, hard	5	75	Sand	24	158
Clay, brown	3	78	Clay	4	162
Sand, soft	12	90			

Well Q-105

Owner: J. Deerman, Jr. Driller: Geo. E. McKenzie.

	Thickness (feet)	Depth (feet)		Thickness (feet)	Depth (feet)
Soil	4	4	Clay	3	37
Clay	10	14	Gravel	7	44
Sand, soft, fine	7	21	Sand, fine	4	48
Gravel, coarse	13	34	Gravel and rock	7	55

(Continued on next page)

Table 2.--Drillers' logs of wells in lower Mesilla Valley, El Paso County, Texas, and Dona Ana County, New Mexico--Continued

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

Well Q-105--Continued

	Thickness (feet)	Depth (feet)		Thickness (feet)	Depth (feet)
Sand-------------------	20	75	Sandstone, hard---------	10	115
Gravel and rock---------	7	82	Quicksand, fine, and clay	3	118
Clay-------------------	4	86	Sand-------------------	1	119
Sand, hard--------------	1	87	Sandstone--------------	4	123
Gravel, coarse----------	6	93	Sandstone and clay------	8	131
Sand, fine--------------	2	95	Sand-------------------	9	140
Shale, hard-------------	10	105			

Well Q-107

Owner: H. C. Mandell. Driller: Geo. E. McKenzie.

	Thickness (feet)	Depth (feet)		Thickness (feet)	Depth (feet)
Clay, red---------------	4	4	Packsand---------------	3	65
Sand-------------------	2	6	Caliche----------------	6	71
Sand and adobe----------	4	10	Clay and gravel---------	1	72
Sand-------------------	4	14	Clay, red---------------	1	73
Sand and gravel---------	1	15	Packsand---------------	3	76
Gravel-----------------	9	24	Clay, green-------------	6	82
Clay, gravelly----------	6	30	Sand-------------------	6	88
Sand and gray clay------	3	33	Caliche----------------	6	94
Clay and gravel---------	9	42	Clay, hard--------------	8	102
Sand-------------------	6	48	Sand-------------------	4	106
Gravel-----------------	4	52	Caliche----------------	6	112
Gravel and sand---------	10	62	Sand-------------------	13	125

Table 2.--Drillers' logs of wells in lower Mesilla Valley, El Paso County, Texas, and Dona Ana County, New Mexico--Continued

Well Q-108

Owner: D. D. McFaul. Driller: Geo. E. McKenzie.

	Thickness (feet)	Depth (feet)		Thickness (feet)	Depth (feet)
Topsoil, clay----------	9	9	Sand and clay----------	8	103
Sand-------------------	7	16	Clay, hard-------------	4	107
Sand and scattered gravel	27	43	Clay and sand streaks---	5	112
Clay-------------------	7	50	Clay, hard, red, and streaks of fine sand--	13	125
Packsand and gravel-----	5	55	Packsand and clay-------	6	131
Gravel-----------------	4	59	Clay-------------------	10	141
Sand and gravel, coarse (water)--------------	6	65	Packsand---------------	2	143
Gravel, coarse (water)--	5	70	Sand and clay----------	8	151
Sand and clay, hard-----	5	75	Clay and sand streaks---	11	162
Sand and packsand, clay balls-----------------	20	95			

Well Q-116

Owner: R. A. Gardner. Driller: Geo. E. McKenzie.

	Thickness (feet)	Depth (feet)		Thickness (feet)	Depth (feet)
Soil-------------------	8	8	Clay, soft, and scattered pea gravel------------	16	59
Sand-------------------	5	13	Sand and gravel---------	1	60
Sand and scattered pea gravel---------------	9	22	Gravel, coarse----------	10	70
Sand, fine-------------	13	35	Sand, hard-packed-------	3	73
Sand and scattered pea gravel---------------	3	38	Clay-------------------	2	75
Gravel, pea, and clay balls-----------------	3	41	Packsand---------------	3	78
			Clay, hard-------------	3	81
Gravel, coarse----------	2	43	Sand-------------------	4	85

(Continued on next page)

Well Q-116--Continued

	Thickness (feet)	Depth (feet)		Thickness (feet)	Depth (feet)
Clay-------------------	2	87	Clay-------------------	9	129
Sand-------------------	9	96	Packsand and clay, white	16	145
Clay-------------------	9	105	Sand, black------------	3	148
Packsand---------------	5	110	Clay, blue-------------	3	151
Clay-------------------	5	115	Packsand---------------	25	176
Packsand---------------	2	117	Clay-------------------	2	178
Boulders, sandrock------	3	[illegible]			

Well Q-117

Owner: W. L. Seymour. Driller: Geo. E. McKenzie.

Soil, clay-------------	9	9	Clay, sandy------------	2	36
Sand, fine-------------	5	14	Gravel, pea------------	8	44
Sand, coarse-----------	3	17	Sand and gravel--------	2	46
Gravel, pea------------	2	19	Clay, sandy------------	2	48
Sand-------------------	3	22	Sand, fine-------------	5	53
Clay-------------------	4	26	Gravel, pea------------	2	55
Sand-------------------	4	30	Gravel, coarse---------	14	69
Gravel, pea------------	4	34	Sand-------------------	3	72

Well Q-118

Owner: W. L. Seymour. Driller: Geo. E. McKenzie.

Soil-------------------	7	7	Gravel, sand, and clay--	6	38
Clay-------------------	8	15	Sand-------------------	4	42
Gravel and sand--------	3	18	Gravel and sand--------	12	54
Gravel-----------------	4	22	Sand-------------------	2	56
Sand-------------------	10	32	Gravel, coarse---------	14	70

Table 2.--Drillers' logs of wells in lower Mesilla Valley, El Paso County, Texas, and Dona Ana County, New Mexico--Continued

Well Q-123

Owner: W. E. Jackson. Driller: Geo. E. McKenzie.

	Thickness (feet)	Depth (feet)
Clay and adobe----------	5	5
Clay, brown------------	5	10
Sand-------------------	5	15
Clay, brown------------	3	18
Sand and small gravel---	3	21
Gravel, small-----------	3	24
Sand-------------------	4	28
Gravel and brown clay---	3	31
Sand-------------------	2	33
Gravel and brown clay---	3	36
Gravel and packsand-----	4	40
Sand and small gravel---	5	45
Sand-------------------	1	46
Gravel-----------------	2	48
Sand and small gravel---	1	49
Gravel-----------------	4	53
Sand and small gravel---	2	55
Gravel-----------------	15	70
Clay-------------------	3	73
Packsand---------------	25	98
Clay, hard-------------	5	103
Packsand---------------	5	108
Clay, hard-------------	4	112
Packsand and caliche----	2	114
Packsand and sandstone (clay at bottom)------	2	116

Well Q-127

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

	Thickness (feet)	Depth (feet)
Gravel and boulders-----	30	30
Clay streaks, gravel, and boulders----------	10	40
Clay and gravel---------	30	70
Clay, sandy, and gravel-	10	80
Clay-------------------	10	90
Clay, sandy------------	20	110
Sand-------------------	21	131
Clay, sandy------------	5	136
Clay, sandy, and gravel-	24	160
Clay, sandy------------	75	235
Clay and gravel---------	30	265
Clay, sand, and gravel--	10	275

(Continued on next page)

Table 2.--Drillers' logs of wells in lower Mesilla Valley, El Paso County, Texas, and Dona Ana County, New Mexico--Continued

	Thickness (feet)	Depth (feet)		Thickness (feet)	Depth (feet)
Well Q-127--Continued					
Sand-------------------	10	285	Conglomerate-----------	92	420
Clay-------------------	10	295	Sand-------------------	40	460
Clay and gravel---------	15	310	Conglomerate-----------	70	530
Clay-------------------	8	318	Conglomerate, sandy-----	10	540
Sand-------------------	2	320	Conglomerate-----------	10	550
Gravel-----------------	8	328			

Well Q-137

Owner: Erich Brandes. Driller: Geo. E. McKenzie.

	Thickness (feet)	Depth (feet)		Thickness (feet)	Depth (feet)
Soil-------------------	1	1	Clay-------------------	3	71
Sand-------------------	19	20	Packsand---------------	1	72
Sand and fine gravel----	11	31	Sand, gray-------------	9	81
Gravel-----------------	2	33	Clay, sticky, gray------	14	95
Sand-------------------	6	39	Clay, sandy------------	5	100
Gravel-----------------	3	42	Sandstone, hard---------	2	102
Sand and fine gravel----	3	45	Sand-------------------	17	119
Clay-------------------	2	47	Clay and sandstone------	4	123
Gravel, coarse, and boulders-------------	21	68			

Well Q-138

Owner: -- Driller: --

	Thickness (feet)	Depth (feet)		Thickness (feet)	Depth (feet)
Sand-------------------	49	49	Sand-------------------	24	85
Gravel-----------------	5	54	Gravel-----------------	5	90
Sand, compact----------	7	61	Sand-------------------	9	99

(Continued on next page)

Table 2.--Drillers' logs of wells in lower Mesilla Valley, El Paso County, Texas, and Dona Ana County, New Mexico--Continued

	Thickness (feet)	Depth (feet)		Thickness (feet)	Depth (feet)
Well Q-138--Continued					
Gravel and sand, broken-	190	289	Lime, blue, and sand seam	6	963
Gravel and sand, coarse-	21	310	Lime, very hard---------	1	964
Gravel and sand, very coarse (water)--------	23	333	Limestone, sandy--------	1	965
			Lime, blue--------------	2	967
Gravel, broken shale and sand-----------------	12	345	Lime, siliceous---------	3	970
Gravel, sand, and lime--	10	355	Lime, blue--------------	4	974
Sand, coarse, brown------	13	368	Lime, siliceous---------	3	977
Sand, fine, brown-------	42	410	Lime, blue, and sand seam	9	986
Shale, sandy, blue------	43	453	Quartz, hard------------	3	989
Gumbo------------------	17	470	Lime, blue, and sand seam	8	997
Sand, fine-------------	10	480	Sand, very hard, cemented	7	1,004
Lime shell-------------	2	482	Lime, blue, and sand seam	3	1,007
Gumbo------------------	65	547	Clay, yellow, and sand seam (small flow of water)----------------	10	1,017
Shale, sandy-----------	57	604			
Gumbo and sand---------	218	822	Sandstone, soft, yellow-	9	1,026
Lime, sandy, hard-------	3	825	Limestone, blue---------	1	1,027
Gumbo------------------	40	865	Clay and soft sandstone-	7	1,034
Lime, sandy, hard-------	3	868	Clay and yellow sand----	3	1,037
Lime, very hard, black--	1	869	Sandstone, soft---------	20	1,057
Lime, broken, and coarse gravel----------------	71	940	Quicksand---------------	5	1,062
			Clay, blue, and sand----	2	1,064
Lime, hard, gray--------	11	951	Quicksand---------------	10	1,074
Limestone, sandy (water)	3	954			
Lime, blue--------------	3	957			

Table 2.--Drillers' logs of wells in lower Mesilla Valley, El Paso County, Texas, and Dona Ana County, New Mexico--Continued

Well Q-139

Owner: Ord Gary. Driller: Geo. E. McKenzie.

	Thickness (feet)	Depth (feet)		Thickness (feet)	Depth (feet)
Soil	2	2	Sand, coarse	1	52
Sand, fine	13	15	Gravel, coarse, and boulders	13	65
Sand and scattered pea gravel	12	27	Clay	2	67
Gravel, small, and sand	7	34	Sand and fine gravel	4	71
Clay	1	35	Clay	16	87
Sand, soft	3	38	Packsand	10	97
Gravel, small	4	42	Clay	5	102
Gravel, coarse, and clay	9	51	Sand and clay	22	124

Well Q-144

Owner: R. A. Gardner. Driller: Layne-Texas Co.

	Thickness (feet)	Depth (feet)		Thickness (feet)	Depth (feet)
Sand	18	18	Clay	10	348
Clay	8	26	Sand and clay streaks	18	366
Sand and fine gravel	17	43	Sand	80	446
Sand	27	70	Sand, broken	16	462
Clay	10	80	Sand	28	490
Sand and clay streaks	29	109	Sand and clay streaks	26	516
Clay	11	120	Shale, sandy	32	548
Sand, broken	25	145	Shale	21	569
Clay	2	147	Sand	14	583
Sand	126	273	Shale	4	587
Clay and broken sand	59	332	Sand, broken	53	640

(Continued on next page)

Table 2.--Drillers' logs of wells in lower Mesilla Valley, El Paso County, Texas, and Dona Ana County, New Mexico--Continued

Well Q-144--Continued

	Thickness (feet)	Depth (feet)		Thickness (feet)	Depth (feet)
Sand and shale layers---	42	682	Shale, tough, and clay--	42	1,107
Sand, broken-----------	65	747	Sand, coarse, and shale-	98	1,205
Sand, hard-------------	29	776	Clay, tough------------	10	1,215
Sand-------------------	96	872	Sand and clay layers----	96	1,311
Shale------------------	7	879	Sand, coarse, shale and clay-----------------	35	1,346
Sand and shale streaks--	24	903	Sand, hard, and shale---	165	1,511
Sand, hard, and shale layers---------------	46	949	Sandstone and lime------	45	1,556
Shale and sand streaks--	47	996	Limestone, hard---------	12	1,568
Shale, hard, and clay streaks---------------	69	1,065	Shale, hard, gray; grades to gray limestone-----	5	1,573

Well Q-159

Owner: Paul Harvey. Driller: Layne-Texas Co.

Sand and rock-----------	10	10	Sand-------------------	9	118
Clay-------------------	12	22	Clay, sandy------------	6	124
Clay and gravel---------	7	29	Clay-------------------	17	141
Sand and gravel---------	22	51	Clay, sandy------------	17	158
Boulders---------------	5	56	Clay and gravel---------	9	167
Sand-------------------	10	66	Boulders---------------	10	177
Sand and boulders-------	6	72	Shale and boulders------	31	208
Rock-------------------	4	76	Rock-------------------	17	225
Clay and boulders-------	4	80	Shale------------------	2	227
Rock-------------------	4	84	Shale, hard, yellow-----	19	246
Clay and layers of sand-	25	109			

(Continued on next page)

Table 2.--Drillers' logs of wells in lower Mesilla Valley, El Paso County, Texas, and Dona Ana County, New Mexico--Continued

Well Q-159--Continued

	Thickness (feet)	Depth (feet)
Rock and thin shale breaks----------------	65	311
Rock-------------------	5	316
Shale, hard, and rock---	14	330
Shale, hard------------	29	359
Rock-------------------	2	361
Rock and hard shale-----	29	390
Rock and sand-----------	8	398
Shale and rock----------	18	416
Shale, hard------------	6	422
Rock-------------------	14	436
Shale, hard------------	13	449
Rock-------------------	2	451
Shale, hard layers------	4	455
Rock-------------------	6	461
Shale and limerock------	8	469
Rock-------------------	38	507
Shale and rock----------	118	625
Shale and rock, sandy---	13	638
Shale and rock----------	29	667
Rock-------------------	22	689
Rock and hard lime------	55	744
Shale------------------	3	747
Shale and limerock------	15	762
Rock-------------------	20	782
Sand, hard, and limerock	4	786
Lime, sandy------------	3	789
Sandstone and lime------	12	801
Shale------------------	4	805
Rock, hard-------------	8	813
Rock, broken, lime, and sandstone------------	8	821
Rock-------------------	7	828
Rock and hard shale-----	10	838
Rock-------------------	50	888
Rock, hard, and shale---	20	908
Rock and sand-----------	5	913
Sand, hard-------------	9	922
Rock-------------------	7	929
Rock, sand, and shale---	50	979
Shale, hard, and rock---	52	1,031
Sand and shale, hard----	11	1,042
Shale, hard, black------	38	1,080
Shale, hard------------	7	1,087
Shale, hard, and rock---	23	1,110
Shale, hard------------	2	1,112
Rock-------------------	11	1,123
Rock and hard shale-----	8	1,131

(Continued on next page)

Well Q-159--Continued

	Thickness (feet)	Depth (feet)
Rock and lime	88	1,219
Rock and sand	6	1,225
Rock, sand, and limerock	18	1,243
Shale, hard, blue	2	1,245

Well Q-160

Owner: Penn's Dairy. Driller: Layne-Texas Co.

	Thickness (feet)	Depth (feet)
Caliche and boulders	3	3
Caliche, boulders, and clay	3	6
Boulders	1	7
Clay and boulders	8	15
Sand, large gravel, and boulders	24	39
Clay, sand, and boulders	22	61
Boulders	5	66
Clay, sandy	13	79
Clay, sandy, and boulders	15	94
Sand and clay	7	101
Clay, sandy, boulders, and caliche	15	116
Rock	1	117
Clay, sandy, and boulders	14	131
Rock and boulders	3	134
Clay, sandy, and boulders	10	144
Rock and boulders	11	155
Boulders and caliche	9	164
Rock and boulders	6	170
Clay, caliche, and boulders	5	175
Rock	2	177
Boulders	48	225
Clay and boulders	19	244
Rock	9	253
Clay and boulders	4	257
Clay, sandy, and boulders	9	266
Clay	5	271
Boulders	4	275
Clay and boulders	12	287
Clay, sandy, caliche, and boulders	4	291
Clay and boulders	6	297
Boulders	8	305
Boulders, sand streaks, and clay	9	314
Boulders	7	321
Boulders and sand streaks	7	328

(Continued on next page)

Well Q-160--Continued

	Thickness (feet)	Depth (feet)		Thickness (feet)	Depth (feet)
Boulders----------------	2	330	Shale-------------------	2	369
Clay and boulders-------	9	339	Sand--------------------	2	371
Clay, sandy, and boulders	6	345	Sand and boulders-------	3	374
Shale and boulders------	10	355	Sand, clay, and boulders	8	382
Sand, broken------------	12	367			

Well Q-163

Owner: Broadus & McGrath. Driller: --

	Thickness (feet)	Depth (feet)		Thickness (feet)	Depth (feet)
Caliche and limestone conglomerate----------	25	25	Limestone, gray (small seep)-----------------	92	352
Sand--------------------	29	54	Shale-------------------	49	401
Clay--------------------	5	59	Limestone, gray, and some shale------------	19	420
Sand and clay-----------	86	145	Sandstone (water)-------	5	425
Conglomerate, limestone-	115	260			

Well Q-175

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

	Thickness (feet)	Depth (feet)		Thickness (feet)	Depth (feet)
No record---------------	60	60	Sand--------------------	2	173
Gravel and boulders-----	20	80	Clay--------------------	2	175
Clay--------------------	8	88	Sand, some boulders-----	7	182
Sand and gravel, some boulders--------------	12	100	Clay--------------------	2	184
Clay--------------------	10	110	Sand--------------------	13	197
Sand and few clay streaks	5	115	Clay and boulders-------	3	200
Clay--------------------	56	171	Sand, some boulders-----	8	208

(Continued on next page)

Table 2.--Drillers' logs of wells in lower Mesilla Valley, El Paso County, Texas, and Dona Ana County, New Mexico--Continued

	Thickness (feet)	Depth (feet)		Thickness (feet)	Depth (feet)
Well Q-175--Continued					
Sand	21	229	Sand	14	480
Clay	2	231	Clay, medium hard, and sand	3	483
Sand	3	234	Sand and clay, soft	17	500
Clay, medium hard	16	250	Sand, hard, and some clay	5	505
Sand	8	258	Sand, clay, and gravel	15	520
Clay and sand	4	262	Sand	7	527
Sand	11	273	Clay, hard	6	533
Clay and sand	6	279	Sand and some boulders	2	535
Sand	8	287	Clay, hard, and some gravel	16	551
Sand, soft, and clay streaks	38	325	Sand and some boulders	4	555
Clay, soft	9	334	Clay, hard	26	581
Sand and some boulders	46	380	Sand	4	585
Clay, soft, and sand	3	383	Clay, hard	5	590
Sand	7	390	Sand	10	600
Shale, hard, clay, and some limestone	2	392	Sand and little sandstone	20	620
Sand	6	398	Sand, little clay, and sandstone	10	630
Sand and boulders	4	402	Sand and little sandstone	20	650
Sand, hard	12	414	Sand and little soft clay	25	675
Sandstone, hard, boulders, and clay	3	417	Sand and layers of clay	11	686
Sand	44	461	Sand and little soft clay	8	694
Clay, sandy, medium hard	5	466	Sand, hard	31	725

(Continued on next page)

Table 2.--Drillers' logs of wells in lower Mesilla Valley, El Paso County, Texas, and Dona Ana County, New Mexico--Continued

Well Q-175--Continued

	Thickness (feet)	Depth (feet)		Thickness (feet)	Depth (feet)
Sand and sandstone------	21	746	Sand, very fine---------	20	930
Sand and hard brittle clay-----------------	4	750	Sand and little sandstone	25	955
Sand, hard, and little clay-----------------	65	815	Limestone and boulders--	35	990
Sand, medium hard, and little clay-----------	26	841	Shale and sand----------	1	991
Sand and some hard brittle clay----------	16	857	Limestone and boulders--	119	1,110
Sand, soft--------------	14	871	Limestone, boulders, and some clay-------------	30	1,140
Sand, sandstone, and clay	29	900	Limestone and clay------	40	1,180
Sand and little sandstone	10	910	Limestone and black clay	50	1,230

Well Q-181--partial log

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

	Thickness (feet)	Depth (feet)		Thickness (feet)	Depth (feet)
No record---------------	5	5	Sand, gravel, and little clay------------------	7	158
Sand--------------------	20	25	Gravel, shale, sand, and little clay-----------	10	168
Sand and small gravel---	12	37	Sand, gravel, shale, and clay------------------	30	198
Gravel, sand, and shale-	3	40	Sand, gravel, and shale-	27	225
Sand and gravel---------	54	94	Gravel, clay, and shale-	9	234
Clay, sandy, soft-------	14	108	Sand, gravel, and clay--	17	251
Sand and gravel---------	9	117	Sand, little gravel, and clay------------------	14	265
Sand--------------------	9	126	Gravel, clay, and sand--	3	268
Sand and gravel---------	15	141			
Gravel, clay, and little sand------------------	10	151			

(Continued on next page)

Table 2.--Drillers' logs of wells in lower Mesilla Valley, El Paso County, Texas, and Dona Ana County, New Mexico--Continued

Well Q-181--Continued

	Thickness (feet)	Depth (feet)
Sand, gravel, and clay--	8	276
Sand and fine gravel----	13	289
Clay, hard, and gravel--	8	297
Sand and fine gravel----	7	304
Sand and clay-----------	13	317
Clay, gravel, some sand-	4	321
Sand and clay, some gravel	23	354
Shale, clay, and sand---	14	368
Sand, clay, and shale---	9	377
Sand and clay-----------	10	387
Clay-------------------	2	389
Clay, sandy------------	2	391
Sand-------------------	10	401
Boulders---------------	1	402
Sand and gravel, fine---	2	404
Clay-------------------	1	405
Sandstone--------------	2	407
Sand and sandstone layers	14	421
Sand-------------------	19	440
Sand and some clay------	39	479
Clay, medium hard-------	4	483
Sand, some soft clay, and fine gravel-------	25	508
Clay, sandy, medium hard	13	521
Sand and some soft clay-	20	541
Sand-------------------	21	562
Sand and some soft clay-	108	770
Sand and some hard clay-	22	792
Sand-------------------	141	933
Total depth------------		1,013

Well Q-188

Owner: Town of Anthony. Driller: Layne-Texas Co.

	Thickness (feet)	Depth (feet)
Surface soil-----------	4	4
Gravel-----------------	4	8
Sand, coarse, yellow, gravel, and hard layers	32	40
Sand, sandy clay, and hard layers----------	24	64
Sand, gravel, and boulders	17	81
Clay, layers of gravel--	11	92
Clay-------------------	8	100
Sand, gravel, and boulders	18	118
Clay-------------------	5	123
Clay and sandy clay-----	25	148
Sand, packed-----------	12	160

(Continued on next page)

Table 2.--Drillers' logs of wells in lower Mesilla Valley, El Paso County, Texas, and Dona Ana County, New Mexico--Continued

Well Q-188--Continued

	Thickness (feet)	Depth (feet)		Thickness (feet)	Depth (feet)
Clay layers-------------	2	162	Shale, brown------------	14	240
Sand, gray, and gravel--	55	217	Sand--------------------	14	254
Shale layers------------	5	222	Shale, hard-------------	16	270
Sand--------------------	4	226	Clay and boulders-------	17	287

Well Q-189

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

	Thickness (feet)	Depth (feet)		Thickness (feet)	Depth (feet)
Clay--------------------	5	5	Sand, coarse, and medium and small gravel------	29	199
Sand--------------------	7	12	Sand, coarse, some clay, and gravel------------	9	208
Sand and coarse gravel--	11	23	Sand, coarse, some gravel, increase in clay------	3	211
Gravel, boulders, and clay------------------	5	28	Clay and coarse gravel--	3	214
Sand and gravel---------	9	37	Clay, sandy, and gravel-	4	218
Clay--------------------	3	40	Sand and gravel---------	6	224
Sand and gravel and layers of sandy clay--	9	49	Clay--------------------	1	225
Clay and some gravel----	10	59	Sand and gravel---------	2	227
Sand and gravel---------	16	75	Clay--------------------	1	228
Sand and layers of clay and gravel------------	28	103	Sand and gravel---------	10	238
Sand, clay, and gravel--	4	107	Clay--------------------	20	258
Sand, coarse, and gravel	34	141	Sand--------------------	16	274
Sand, coarse, gravel, and traces of clay----	10	151	Clay, soft--------------	1	275
Sand, coarse; decrease in gravel-------------	19	170	Sand--------------------	4	279
			Clay, sandy-------------	2	281

(Continued on next page)

Table 2.--Drillers' logs of wells in lower Mesilla Valley, El Paso County, Texas, and Dona Ana County, New Mexico--Continued

	Thickness (feet)	Depth (feet)		Thickness (feet)	Depth (feet)
Well Q-189--Continued					
Sand--------------------	22	303	Clay and some sand------	33	525
Clay, soft--------------	10	313	Sand and some fine gravel	88	613
Sand and soft clay------	9	322	Clay, sandy-------------	2	615
Sand--------------------	8	330	Sand and fine gravel----	22	637
Sand and soft clay------	6	336	Sand, fine gravel, and some clay-------------	50	687
Sand, some gravel and boulders--------------	12	348	Sand, fine gravel, and soft clay------------	21	708
Clay, soft--------------	7	355	Sand and fine gravel, scattered boulders----	16	724
Sand and some fine gravel	32	387	Sand, soft clay, and thin streaks of hard clay--	53	777
Clay and scattered boulders--------------	15	402	Sand and soft clay------	31	808
Sand and some fine gravel	29	431	Sand, soft clay, and some gravel-----------	30	838
Clay, soft and medium---	9	440	Sand, fine--------------	60	898
Clay, hard, and shale---	6	446	Sand, fine, and some hard clay-------------	30	928
Sand and clay-----------	9	455	Gravel, boulders, and lime------------------	30	958
Clay, hard; soft layers-	25	480			
Sand and gravel---------	10	490			
Clay--------------------	2	492			

Well U-1

Owner: White Water Works. Driller: Layne-Texas Co.

Soil--------------------	6	6	Gravel------------------	8	65
Clay, gray--------------	1	7	Clay, yellow------------	38	103
Sand (water)------------	25	32	Sand--------------------	11	114
Clay, blue--------------	3	35	Sand, gray, and gravel--	13	127
Sand--------------------	22	57			

Table 2.--Drillers' logs of wells in lower Mesilla Valley, El Paso County, Texas, and Dona Ana County, New Mexico--Continued

Well U-3

Owner: White Water Works. Driller: Layne-Texas Co.

	Thickness (feet)	Depth (feet)
Soil and clay-----------	10	10
Sand and gravel---------	20	30
Clay, soft, black-------	5	35
Sand and gravel---------	31	66
Clay, red---------------	14	80
Clay, sandy-------------	43	123
Clay, red---------------	11	134
Clay, sandy-------------	17	151
Clay, sandy, hard, dry--	8	159
Clay, red---------------	11	170
Sand--------------------	26	196
Sand and thin layers of shale----------------	13	209
Shale-------------------	2	211

Well U-6

Owner: White Water Works. Driller: Layne-Texas Co.

	Thickness (feet)	Depth (feet)
Soil--------------------	10	10
Clay, blue--------------	1	11
Sand--------------------	16	27
Clay, blue--------------	9	36
Gravel------------------	2	38
Sand--------------------	19	57
Sand and gravel---------	9	66
Clay, yellow------------	20	86
Sand--------------------	4	90
Clay, yellow------------	8	98
Sand--------------------	6	104
Sand and gravel in layers	23	127

Well U-8

Owner: White Water Works. Driller: Layne-Texas Co.

	Thickness (feet)	Depth (feet)
Soil--------------------	10	10
Clay, blue--------------	2	12
Sand--------------------	42	54
Gravel------------------	7	61
Clay, yellow------------	24	85
Sand--------------------	18	103
Clay--------------------	3	106
Sand--------------------	11	117
Clay, yellow------------	13	130

Table 2.--Drillers' logs of wells in lower Mesilla Valley, El Paso County, Texas, and Dona Ana County, New Mexico--Continued

Well U-13

Owner: Broadus & McGrath. Driller: El Paso Drilling Co.

	Thickness (feet)	Depth (feet)		Thickness (feet)	Depth (feet)
Gravel and rock	5	5	Lime, sandy, medium hard, brown	35	195
No record	10	15	Clay	5	200
Boulders, loose	15	30	Shale, blue	48	248
No record	4	34	Lime, hard, brown	8	256
Boulders, loose	6	40	Shale, blue, and gravel	8	264
No record	14	54	Sand	27	291
Lime, hard, white	21	75	Shale, sandy	6	297
Lime, hard	20	95	Shale, blue	15	312
Lime, hard, and streaks of clay	10	105	Rock, very hard, broken	3	315
Lime, hard, and streaks of clay and gravel	13	118	Shale, hard	15	330
Lime and gravel	12	130	Lime, shelly	26	356
Gravel and sand	9	139	Shale, hard	146	502
Lime, sandy	21	160			

Well U-14

Owner: -- Driller: --

	Thickness (feet)	Depth (feet)		Thickness (feet)	Depth (feet)
Boulders	50	50	Shale, blue	40	305
Limestone, soft	130	180	Limestone	2	307
Shale, yellow	10	190	Shale, blue	27	334
Shale, blue (seep)	55	245	Sandstone	2	336
Shale, brown	15	260	Shale	139	475
Coal	5	265	Shale, blue, and some limestone	185	660

Table 2.--Drillers' logs of wells in lower Mesilla Valley, El Paso County, Texas, and Dona Ana County, New Mexico--Continued

Well U-16

Owner: Farmers' Independent Cotton Oil Mill. Driller: Layne-Texas Co.

	Thickness (feet)	Depth (feet)		Thickness (feet)	Depth (feet)
Sand and boulders-------	25	25	Rock-------------------	6	345
Sand, hard, and gravel--	59	84	Shale, soft, and rock---	5	350
Rock-------------------	10	94	Shale, hard streaks-----	23	373
Sand and gravel---------	12	106	Shale, hard, and rock---	70	443
Rock-------------------	2	108	Shale, sandy, hard, and rock-----------------	13	456
Clay-------------------	20	128	Rock, hard--------------	10	466
Sand, hard, and dark shale-----------------	13	141	Shale, sandy, hard------	10	476
Shale, dark------------	46	187	Sand, hard, and shale---	14	490
Rock-------------------	140	327	Sand, hard, and shale streaks--------------	60	550
Sand and rock----------	12	339			

Well U-18

Owner: El Paso Electric Co. Driller: Layne-Texas Co.

	Thickness (feet)	Depth (feet)		Thickness (feet)	Depth (feet)
Sand and silt----------	58	58	Lime, hard--------------	2	94
Gravel-----------------	12	70	Gravel and boulders-----	25	119
Gravel and boulders-----	2	72	Shale------------------	4	123
Gravel and sand---------	10	82	Shale, limy, hard-------	159	282
Gravel, coarse----------	10	92			

Well U-21

Owner: El Paso Electric Co. Driller: Layne-Texas Co.

	Thickness (feet)	Depth (feet)		Thickness (feet)	Depth (feet)
Sand and silt----------	6	6	Sand and gravel---------	19	64
Sand (water)-----------	14	20	Clay, sandy, red--------	62	126
Sand-------------------	25	45	Sand and gravel---------	16	142

Table 2.--Drillers' logs of wells in lower Mesilla Valley, El Paso County, Texas, and Dona Ana County, New Mexico--Continued

Well U-26

Owner: El Paso Electric Co. Driller: Layne-Texas Co.

	Thickness (feet)	Depth (feet)
Sand	40	40
Clay, red	24	64
Sand	38	102
Clay and sandy streaks	4	106
Sand	13	119
Clay and red sand streaks	11	130
Sand	50	180
Clay	8	207
Clay and sand	19	199
Sand	38	245
Clay, sandy	5	250
Sand and clay streaks	30	280
Clay, sandy	37	317
Sand and clay streaks	6	323
Clay	5	328
Sand and clay streaks	16	344
Lime, broken	7	351

Well U-28

Owner: American Smelting & Refining Co. Driller: W. H. Mize.

	Thickness (feet)	Depth (feet)
Sand and caliche	28	28
Clay, brown	319	347
Sand, fine	37	384
Clay, red	5	389

Well U-29

Owner: American Smelting & Refining Co. Driller: W. H. Mize.

	Thickness (feet)	Depth (feet)
Sand and caliche	17	17
Clay, red	28	45
Sand	3	48
Clay, brown	59	107
Sand, fine	37	144
Clay, brown	1	145
Sand	2	147
Clay, red	2	149
Sand, fine	21	170
Clay, red	2	172
Clay, sandy	62	234
Clay, brown	23	257
Clay, sandy, dry, and gravel streaks	35	292
Andesite, fresh	4	296

Table 2.--Drillers' logs of wells in lower Mesilla Valley, El Paso County, Texas, and Dona Ana County, New Mexico--Continued

Well U-31

Owner: American Smelting & Refining Co. Driller: W. H. Mize.

	Thickness (feet)	Depth (feet)		Thickness (feet)	Depth (feet)
Sand and silt----------	34	34	Sand, fine-------------	2	82
Clay, brown------------	46	80	Andesite---------------	1	83

Well U-32

Owner: El Paso Electric Co. Driller: Layne-Texas Co.

	Thickness (feet)	Depth (feet)		Thickness (feet)	Depth (feet)
Silt and caliche--------	26	26	Clay-------------------	1	162
Clay and sand streaks---	72	98	Sand-------------------	12	174
Sand-------------------	38	136	Clay and sand streaks---	36	210
Sand and clay streaks---	4	140	Sand-------------------	32	242
Sand-------------------	21	161			

Well U-36

Owner: El Paso Electric Co. Driller: Layne-Texas Co.

	Thickness (feet)	Depth (feet)		Thickness (feet)	Depth (feet)
Sand and silt----------	22	22	Sand and clay----------	18	196
Sand-------------------	100	122	Sand-------------------	34	230
Clay, sandy, red--------	24	146	Clay-------------------	2	232
Sand-------------------	32	178			

Well U-39

Owner: El Paso Electric Co. Driller: Layne-Texas Co.

	Thickness (feet)	Depth (feet)		Thickness (feet)	Depth (feet)
Sand-------------------	6	6	Sand, fine, brown, (water 15 gpm)--------	8	82
Clay, sandy, red-------	40	46	Sand, fine, and red clay	10	92
Sand and clay streaks---	19	65	Sand-------------------	22	114
Clay, hard, red---------	9	74			

(Continued on next page)

Table 2.--Drillers' logs of wells in lower Mesilla Valley, El Paso County, Texas, and Dona Ana County, New Mexico--Continued

	Thickness (feet)	Depth (feet)		Thickness (feet)	Depth (feet)
Well U-39--Continued					
Clay, sandy, red--------	12	126	Sand and clay streaks---	5	202
Packsand and clay streaks	16	142	Clay, sandy------------	3	205
Clay, sandy------------	20	162	Sand------------------	52	257
Sand------------------	30	192	Clay------------------	5	262
Clay, sandy------------	5	197			

Well U-48

Owner: El Paso Electric Co. Driller: Layne-Texas Co.

Sand and silt----------	11	11	Sand------------------	17	122
Caliche and clay--------	32	43	Sand and clay streaks---	6	128
Sand------------------	5	48	Clay------------------	8	136
Clay------------------	15	63	Sand (water 20 gpm)-----	50	186
Sand------------------	23	86	Clay------------------	2	188
Sand and clay----------	14	100	Sand, broken (water 5 gpm)	12	200
Clay, sandy------------	5	105	Clay------------------	2	202

Well U-49

Owner: El Paso Electric Co. Driller: Layne-Texas Co.

Sand------------------	1	1	Clay------------------	5	85
Caliche and hard clay---	17	18	Sand and clay streaks---	6	91
Caliche, clay, and sand-	32	50	Clay, sandy------------	6	97
Sand and clay----------	10	60	Sand------------------	66	163
Sand------------------	20	80	Clay, sandy------------	19	182

Table 2.--Drillers' logs of wells in lower Mesilla Valley, El Paso County, Texas, and Dona Ana County, New Mexico--Continued

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

Well U-51

Owner: El Paso Electric Co. Driller: Layne-Texas Co.

	Thickness (feet)	Depth (feet)		Thickness (feet)	Depth (feet)
Sand-------------------	2	2	Clay-------------------	49	220
Sand, coarse-----------	57	59	Sand and gravel--------	22	242
Gravel, coarse---------	10	69	Clay-------------------	2	244
Sand-------------------	21	90	Sand and clay----------	2	246
Clay, sandy------------	44	134	Sand and gravel--------	6	252
Sand and clay streaks---	23	157	Sand and clay breaks----	14	266
Clay-------------------	5	162	Lime, broken-----------	15	281
Sand and clay----------	9	171			

Well U-53

Owner: El Paso Electric Co. Driller: Layne-Texas Co.

	Thickness (feet)	Depth (feet)		Thickness (feet)	Depth (feet)
Sand-------------------	2	2	Clay and sand streaks---	78	170
Sand and clay----------	54	56	Sand and clay streaks---	30	200
Gravel, coarse---------	7	63	Sand and gravel----------	42	242
Sand and clay----------	29	92	Lime, broken-----------	4	246

Well U-54

Owner: El Paso Electric Co. Driller: Layne-Texas Co.

	Thickness (feet)	Depth (feet)		Thickness (feet)	Depth (feet)
Sand-------------------	6	6	Clay, red--------------	17	76
Clay, sandy, red--------	12	18	Sand and clay streaks---	24	100
Gravel, coarse, and sand	5	23	Clay, red--------------	2	102
Clay, sandy, red--------	29	52	Sand streaks, some clay-	20	122
Sand and clay streaks---	7	59	Gravel, coarse, and sand	10	132

(Continued on next page)

Table 2.--Drillers' logs of wells in lower Mesilla Valley, El Paso County, Texas, and Dona Ana County, New Mexico--Continued

Well U-54--Continued

	Thickness (feet)	Depth (feet)		Thickness (feet)	Depth (feet)
Gravel and boulders-----	10	142	Lime and shale streaks--	19	340
Lime and boulders-------	10	152	Shale, dark, coal-like--	8	348
Lime, sandy, hard-------	48	200	Lime and shale streaks--	13	361
Lime, hard--------------	61	261	Lime, hard--------------	38	399
Lime, hard, and shale---	9	270	Quartz------------------	8	407
Lime, hard--------------	48	318	Shale, limy-------------	8	415
Shale, dark, coal-like--	3	321	Lime, sandy, hard-------	5	420

Well U-55

Owner: El Paso Electric Co. Driller: W. H. Mize.

	Thickness (feet)	Depth (feet)		Thickness (feet)	Depth (feet)
Sand and some gravel streaks---------------	44	44	Clay, hard, red---------	8	246
Clay, sandy, red--------	84	128	Clay, gray--------------	36	282
Clay, white-------------	5	133	Clay, red---------------	28	310
Clay, gray--------------	7	140	Clay, gray--------------	30	340
Clay, hard, red---------	12	152	Gravel, fine, and clay streaks, dry----------	30	370
Gravel and clay streaks-	69	221	Clay, brown-------------	15	385
Clay, sandy, brown------	10	231	Limestone, blue, and streaks of brown shale	8	393
Clay, sandy, and gravel streaks---------------	7	238			

Well U-57

Owner: American Smelting & Refining Co. Driller: W. H. Mize.

	Thickness (feet)	Depth (feet)		Thickness (feet)	Depth (feet)
Sand and thin gravel streaks---------------	60	60	Clay, sandy, white------	10	135
Clay, sandy, red--------	65	125	Clay, sandy, red--------	9	144

(Continued on next page)

Table 2.--Drillers' logs of wells in lower Mesilla Valley, El Paso County, Texas, and Dona Ana County, New Mexico--Continued

	Thickness (feet)	Depth (feet)		Thickness (feet)	Depth (feet)
Well U-57--Continued					
Clay, hard, red---------	10	154	Andesite boulders-------	13	248
Clay, sandy, brown------	6	160	Clay, yellow------------	1	249
Clay, red---------------	57	217	Andesite, altered-------	15	264
Gravel, fine------------	13	230	Andesite, fresh---------	2	266
Clay, green, and gravel streaks---------------	5	235			

Well U-58

Owner: American Smelting & Refining Co. Driller: W. H. Mize.

Sand and thin gravel streaks---------------	17	17	Gravel, fine------------	3	101
Clay, sandy-------------	5	22	Shale-------------------	7	108
Clay, hard, red---------	3	25	Clay, brown-------------	2	110
Clay, sandy-------------	23	48	Shale, dark-brown-------	23	133
Clay, hard, red---------	9	57	Shale, black------------	19	152
Clay, sandy, and thin gravel streaks--------	41	98	Limestone, dark-blue----	11	163

Table 3.--Sample logs of wells in lower Mesilla Valley, El Paso County, Texas, and Dona Ana County, New Mexico

	Thickness (feet)	Depth (feet)
Well Q-25		
Owner: U. S. Geological Survey. Driller: B & W Drilling Co.		
Sand, fine to very coarse, gravel, small pebbles, and a little brown clay	10	10
Sand, fine to very coarse, and gravel	10	20
Gravel and pebbles	60	80
Clay, sandy, brown, and pebbles	60	140
Clay, hard, brown, fine sand, and pebbles	20	160
Sand, fine to coarse, brown clay, and pebbles	20	180
Clay, sandy, brown, and pebbles	10	190
Sand, fine to coarse, brown clay, and pebbles	10	200
Clay, sandy, brown	20	220
Sand, very fine to coarse, brown clay, caliche, and pebbles	10	230
Clay, sandy, brown, caliche, and pebbles	20	250
Sand, very fine to medium, brown clay, and pebbles	10	260
Sand, brown, caliche, and pebbles	10	270
Clay, sandy, brown, and pebbles	10	280
Clay, sandy, brown, caliche, sandstone, and pebbles	10	290
Sand, fine to medium, brown clay, and gravel	10	300
Clay, brown, and caliche	10	310
Clay, sandy, brown, and caliche	10	320
Clay, brown	20	340
Clay, sandy, brown, and caliche	20	360
Clay, sandy, brown, coarse sand, and caliche	10	370
Sand, fine to very coarse, brown clay, and gravel	10	380

(Continued on next page)

Table 3.--Sample logs of wells in lower Mesilla Valley, El Paso County, Texas, and Dona Ana County, New Mexico--Continued

	Thickness (feet)	Depth (feet)
Well Q-25--Continued		
Sand, very fine to very coarse, caliche, and gravel----------	10	390
Sand, fine to coarse, caliche, and gravel--------------------	10	400
Sand, fine to coarse, caliche, gravel, and red clay----------	10	410
Clay, sandy, brown, and caliche------------------------------	10	420
Clay, sandy, brown, caliche, and gravel----------------------	20	440
Sand, very fine to medium, brown clay, and caliche-----------	20	460
Sand, fine to coarse---	10	470
Sand, very fine to medium, caliche, and gravel---------------	10	480
Sand, very fine to coarse, caliche, gravel, and partly bit cut pebbles--	10	490
Sand, very fine to very coarse, gravel, caliche, and pebbles--	10	500
Sand, very fine to very coarse, gravel, and caliche----------	10	510
Clay, sandy, brown, fine sand, and caliche-------------------	30	540
Sand, very fine to medium, gravel, pebbles, and caliche-------	20	560
Clay, brown, gravel, pebbles, and caliche--------------------	20	580
Sand, very coarse, and partly bit cut pebbles of weathered limestone--	2	582
Sand, very coarse, gravel, and partly bit cut pebbles of varicolored weathered limestone----------------------------	8	590
Sand, very coarse, gravel, and bit cut, mostly brown limestone	10	600
Limestone, brown, bit cut------------------------------------	20	620

Well Q-43

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

Sand, medium, and thin layer of soil-------------------------	10	10
Sand, fine to very coarse, gray and brown clay, and gravel----	10	20

(Continued on next page)

Table 3.--Sample logs of wells in lower Mesilla Valley, El Paso County, Texas, and Dona Ana County, New Mexico--Continued

	Thickness (feet)	Depth (feet)
Well Q-43--Continued		
Sand, fine to very coarse, gravel, pebbles, and caliche-------	20	40
Sand, medium to very coarse, gravel, pebbles, and a little dark-brown clay--	10	50
Sand, medium to very coarse, gravel, and pebbles-------------	10	60
Gravel and pebbles---	10	70
Sand, fine to coarse, gravel, and pebbles--------------------	10	80
Sand, medium to very coarse, gravel, and pebbles-------------	10	90
Clay, sandy, tan, and a little medium to coarse sand---------	10	100
Clay, light-brown--	20	120
Clay, sandy, light-brown, and caliche------------------------	10	130
Clay, gray and light-brown, and caliche----------------------	20	150
Sand, medium to coarse, gravel, caliche, and light-brown clay-	10	160
Clay, light-brown medium to coarse sand, and nodular caliche--	10	170
Clay, light-brown, medium to coarse sand, nodular caliche, and a little gravel---	10	180
Clay, sandy, light-brown-------------------------------------	10	190
Clay, light-brown, very coarse sand, and gravel--------------	10	200
Clay, light-brown, a little sand, and gravel-----------------	10	210
Clay, light-brown, caliche, and a little sand and gravel------	20	230
Sand, medium to coarse, light-brown clay, caliche, and a little gravel---	20	250
Clay, sandy, light-brown, a little caliche and gravel---------	20	270
Clay, silty, light-brown, caliche, a little sand, and small gravel---	20	290
Clay, light-brown, and a little small gravel-----------------	10	300
Clay, sandy, light-brown, and small gravel-------------------	10	310

(Continued on next page)

	Thickness (feet)	Depth (feet)
Well Q-43--Continued		
Clay, gray, and caliche	10	320
Clay, sandy, gray and tan, caliche, and small gravel	10	330
Sand, very fine to coarse, small gravel, and some light-brown clay	10	340
Sand, very fine to coarse, small gravel, some light-brown clay, and some caliche	10	350
Clay, sandy, brown	10	360
Sand, fine to coarse, sandstone, caliche, and clay	20	380
Sand, fine to medium, and caliche	10	390
Sand, fine to medium, caliche, and small gravel	10	400
Sand, fine to medium, caliche, small gravel, and light-brown clay	20	420
Clay, sandy, light-brown, and a little small gravel	10	430
Sand, fine to very coarse, and light-brown clay	20	450
Sand, fine to very coarse, light-brown clay, and caliche	20	470
Clay, light-brown	10	480
Clay, sandy, light-brown, small gravel, and sandstone	20	500
Clay, sandy, light-brown, caliche, and sandstone	40	540
Sand, very fine to coarse, caliche, and sandstone	10	550
Sand, very fine to medium, caliche, sandstone, and clay	10	560
Sand, very fine to medium, caliche, clay, sandstone, and small gravel	10	570
Sand, fine to coarse, light-brown clay, nodular caliche, and large cuttings of soft sandstone	10	580
Clay, sandy, light-brown, sandstone, caliche, and small gravel	20	600
Sand, fine to coarse, light-brown clay, sandstone, and caliche	10	610

(Continued on next page)

Table 3.--Sample logs of wells in lower Mesilla Valley, El Paso County, Texas, and Dona Ana County, New Mexico--Continued

	Thickness (feet)	Depth (feet)
Well Q-43--Continued		
Sand, very fine to very coarse, clay, caliche, and small gravel	10	620
Clay, sandy, light-brown, sandstone, caliche, and small gravel	10	630
Sand, fine to coarse, sandstone, caliche, small gravel, and clay	10	640
Clay, sandy, brown, small gravel, and sandstone	10	650
Clay, brown to gray, fine sand, and caliche	10	660
Sand, fine to coarse, sandstone, caliche, and small gravel	10	670
Clay, very sandy, light-brown, and caliche	10	680
Sand, fine, and caliche	20	700
Clay, sandy, light-brown, caliche, and sandstone	10	710
Sand, fine to very coarse, small gravel, and caliche	10	720
Sand, fine to very coarse, small gravel, caliche, and some grayish-brown clay	10	730
Clay, sandy, gray and brown, and caliche	10	740
Clay, sandy, gray and brown, caliche, and small gravel	10	750
Clay, silty, light-brown, sandstone, and caliche	10	760
Sand, very fine to medium, caliche, clay, and small gravel	10	770
Clay, sandy, reddish-brown, sandstone, and gravel	20	790
Sand, fine to coarse, small gravel, reddish-brown clay, and large fragments of caliche and sandstone	7	797
Clay, sandy, light-brown, caliche, and sandstone	23	820
Clay, sandy, light-brown, caliche, sandstone, and small gravel	10	830
Clay, sandy, light-brown and gray	10	840
Clay, sandy, light-brown and gray, and caliche	10	850
Sand, fine to coarse, small gravel, and caliche	10	860

(Continued on next page)

Table 3.--Sample logs of wells in lower Mesilla Valley, El Paso County, Texas, and Dona Ana County, New Mexico--Continued

	Thickness (feet)	Depth (feet
Well Q-43--Continued		
Sand, fine to coarse, small gravel, caliche, and some light-brown clay--	10	870
Sand, fine to coarse, small gravel, caliche, light-brown clay and sandstone---	30	900
Clay, sandy, reddish-brown, small gravel, and some caliche----	40	940
Clay, very sandy, reddish-brown, gravel, small pebbles of black limestone, and caliche--------------------------------	20	960
Clay, very sandy, brown, sandstone, and caliche--------------	10	970
Sand, fine to medium, brown clay, caliche, and small gravel---	20	990
Gravel, small, very fine to coarse sand, caliche, and clay----	20	1,010
Sand, fine to coarse, small gravel, brown clay, and caliche---	20	1,030
Sand, fine, reddish-brown clay, caliche, and small gravel-----	20	1,050
Sand, fine to medium, caliche, clay, and a little small gravel	7	1,057
Clay, sandy, tan and brown, caliche, and a little small gravel	13	1,070
Clay, sandy, reddish-brown, caliche, and a little small gravel	10	1,080
Clay, very sandy, reddish-brown, and small gravel------------	10	1,090
Clay, very sandy, reddish-brown, small gravel, and some sandstone--	20	1,110
Sand, very fine to medium, small gravel, caliche, and clay----	20	1,130
Sand, very fine to medium, small gravel, and sandstone--------	10	1,140
Sand, very fine to medium, brown clay, and caliche-----------	10	1,150
Sand, very fine to medium, brown clay, caliche, and a little fine gravel. Abundance of finely divided white grains give salt-and-pepper appearance to sand-------------------------	10	1,160
Sand, very fine to medium, and some brown clay. Sand has salt-and-pepper appearance. White grains appear to be the cement of a very loosely cemented sandstone----------------------	10	1,170

(Continued on next page)

	Thickness (feet)	Depth (feet)
Well Q-43--Continued		
Silt, gray, and very fine to fine sand. Sand has salt-and-pepper appearance	10	1,180
Silt, gray, very fine to fine sand, a little red clay and small gravel. Sand has salt-and-pepper appearance	10	1,190
Silt, gray, and very fine to fine sand	16	1,206

Well Q-63

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

	Thickness (feet)	Depth (feet)
Sand, fine to very coarse, and small gravel	20	20
Sand, medium to coarse, and blue and brown tough clay	10	30
Clay, sandy, bluish-gray	10	40
Sand, fine to very coarse, and small gravel	10	50
Gravel and very coarse sand	10	60
Pebbles and small gravel	40	100
Pebbles	10	110
Pebbles and brown clay	30	140
Pebbles and brown sandy clay	30	170
Clay, sandy, gray	10	180
Clay, sandy, gray and brown	10	190
Clay, sandy, brown	40	230
Clay, sandy, brown, and a little caliche	20	250
Sand, fine, brown sandy clay, and caliche	10	260
Sand, fine to medium, brown clay, and caliche	10	270
Sand, fine to coarse, brown clay, and caliche	20	290
Clay, brown, and some fine to medium sand	10	300

(Continued on next page)

	Thickness (feet)	Depth (feet)
Well Q-63--Continued		
Clay, sandy, brown	70	370
Clay, sandy, brown, and caliche	10	380
Sand, medium to coarse, brown clay, and caliche	20	400
Sand, fine to coarse, brown clay, and caliche	30	430
Clay, sandy, brown	10	440
Clay, sandy, brown, and medium sand	20	460
Sand, very fine to coarse, and brown clay	20	480
Clay, hard, brown and gray, and fine to coarse sand	10	490
Clay, sandy, brown	30	520
Clay, gray, and fine sand	10	530
Clay, sandy, brown, and fine sand	10	540
Clay, hard, brown, and fine to medium sand	10	550
Clay, sandy, brown	10	560
Clay, sandy, brown and red	15	575
Sand, fine to very coarse, gravel, and gray soft sandy clay	25	600
Sand, medium to very coarse, and brown hard clay	10	610
Clay, sandy, soft, brown, and caliche	10	620
Clay, sandy, soft, brown	10	630
Clay, sandy, hard, red and brown	10	640
Clay, sandy, soft, brown, and fine to medium sand	30	670
Clay, sandy, hard, red and brown, and fine sand	10	680
Clay, red, brown, and light-gray, and fine sand	20	700
Clay, brown, caliche, and fine to medium sand	10	710

(Continued on next page)

Table 3.--Sample logs of wells in lower Mesilla Valley, El Paso County, Texas, and Dona Ana County, New Mexico--Continued

	Thickness (feet)	Depth (feet)
Well Q-63--Continued		
Clay, hard, brown, caliche, and very fine sand	10	720
Sand, very fine to medium, and brown soft sandy clay	10	730
Clay, very hard, chocolate-brown	10	740
Clay, very hard, chocolate-brown, and fine sand	30	770
Clay, sandy, gravel, and fragments of black limestone	20	790
Clay, sandy, coarse sand, gravel, and fragments of black limestone	20	810
Sand, very fine to very coarse, gravel, fragments of black limestone, and clay	10	820
Sand, very fine to very coarse, gravel, and pebbles (hole is caving)	30	850
Sand, very fine to very coarse, gravel, pebbles, and some tan clay	10	860
Clay, sandy, tan, coarse sand, and gravel	30	890
Gravel (hole is caving)	10	900
Clay, sandy, tan, and gravel	10	910
Clay, fine to medium sand, and pebbles (hole is caving)	10	920
Clay, hard, red, fine to medium sand, and caliche	10	930
Clay, sandy, tan	20	950
Clay, sandy, tan, and pebbles (hole is caving)	50	1,000
Clay, sandy, tan, and pebbles (hole is caving); fragments of black limestone appear to be native to formation	20	1,020
Clay, sandy, tan, caliche-cemented sandstone, and gravel	20	1,040
Clay, sandy, tan	20	1,060
Clay, sandy, tan, and pebbles (hole is caving)	20	1,080
Clay, sandy, tan, sand, and pebbles (hole is caving)	20	1,100

(Continued on next page)

	Thickness (feet)	Depth (feet)
Well Q-63--Continued		
Clay, sandy, tan, coarse sand, gravel, pebbles, and caliche (hole is caving)	20	1,120
Clay, sandy, tan, coarse sand, gravel, pebbles, and caliche (hole is caving)	10	1,130
Clay, sandy, tan, coarse sand, and pebbles of black limestone	30	1,160
Clay, sandy, tan, fine to medium black sand, gravel, fragments of black limestone, and pebbles	10	1,170
Clay, sandy, tan, fine to medium black sand, gravel, black limestone, pebbles, and caliche (hole is caving)	20	1,190
Clay, sandy, tan, fine to medium black sand, and black gray limestone, gravel, pebbles, and caliche	10	1,200

Well Q-72

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

	Thickness (feet)	Depth (feet)
Gravel, dark-colored limestone cemented with caliche, and sand	20	20
Sand, fine to medium, angular	50	70
Sand, fine to coarse	40	110
Sand, very fine to medium	10	120
Sand, very fine to fine	10	130
Sand, very fine to medium	20	150
Sand, fine to coarse	10	160
Sand, very fine to very coarse	70	230
Sand, fine to coarse, and gravel	10	240
Sand, clayey, fine to very coarse	30	270
Sand, clayey, very fine to coarse	10	280
Sand, very fine to medium, and caliche	10	290

(Continued on next page)

Table 3.--Sample logs of wells in lower Mesilla Valley, El Paso County, Texas, and Dona Ana County, New Mexico--Continued

	Thickness (feet)	Depth (feet)
Well Q-72--Continued		
Sand, clayey, very fine to medium, gravel, and caliche--------	30	320
Sand, very fine to fine, clay, and caliche-------------------	10	330
Clay, sandy, and caliche--------------------------------------	10	340
Limestone cuttings, dark-gray, cemented with caliche----------	10	350
Limestone cuttings, dark- and light-colored, rounded----------	20	370
Limestone cuttings, dark- and light-colored, rounded, and some pebbles--	10	380
Limestone cuttings, dark-colored------------------------------	50	430
Clay, sandy, and limestone cuttings---------------------------	10	440
Sand, clayey, and limestone cuttings--------------------------	40	480
Sand, very fine, and limestone cuttings-----------------------	10	490
Sand, fine to medium, and limestone cuttings------------------	20	510
Sand, very fine to fine, clay, and limestone cuttings---------	30	540
Sand, fine, clay, and limestone cuttings----------------------	10	550
Clay, sandy, buff---	10	560
Sand, fine, silt, some clay, and limestone cuttings-----------	30	590
Sand, very fine to fine, silt, and some clay------------------	10	600
Sand, very fine to fine, silt, and many cuttings--------------	10	610
Limestone cuttings, angular, dark-colored, and caliche--------	20	630
Conglomerate, mostly varicolored poorly sorted limestone cuttings, and caliche--	30	660
Clay, buff, and poorly sorted cuttings of conglomerate and caliche--	30	690
Clay, buff, and some fine-grained conglomerate cuttings-------	20	710
Conglomerate of dark- and light-colored cuttings, caliche, and fine to medium sand-------------------------------------	10	720

(Continued on next page)

	Thickness (feet)	Depth (feet)
Well Q-72--Continued		
Clay, buff, cuttings of fine-grained conglomerate, and sand---	10	730
Clay, reddish-brown, sandy, conglomerate cuttings, and caliche	10	740
Clay, very sandy, reddish-brown-------------------------------	30	770
Clay, buff, and sandstone cuttings----------------------------	10	780
Clay, reddish-brown, sandy clay, and limestone cuttings-------	10	790
Clay, brown and yellow, and conglomerate cuttings-------------	20	810
Clay, buff to brown, and some conglomerate cuttings-----------	10	820
Shale, very hard, dark-gray, reddish-brown clay, and some gypsum--	20	840
Shale, very hard, angular, dark-gray, some clay and gypsum----	10	850
Shale, very hard, subangular, dark-gray, and gypsum-----------	10	860
Shale, very hard, brittle, dark-gray to gray, angular, and gypsum--	14	874

Well Q-73

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

	Thickness (feet)	Depth (feet)
Pebbles and gravel, cuttings mostly of limestone, medium sand and some caliche--	20	20
Cuttings of limestone, quartz, and chert, and some clay-------	10	30
Sand, medium, pebbles, and clay-------------------------------	10	40
Pebbles of limestone, quartz, and chert, and some clay--------	10	50
Pebbles of limestone, quartz, and chert, some clay, and medium sand--	20	70
Pebbles of limestone, quartz, and chert, brown clay, and some medium sand---	20	90
Sand, fine to very coarse, mostly angular quartz, and some pebbles---	30	120

(Continued on next page)

Table 3.--Sample logs of wells in lower Mesilla Valley, El Paso County, Texas, and Dona Ana County, New Mexico--Continued

	Thickness (feet)	Depth (feet)
Well Q-73--Continued		
Sand, very fine to coarse, and caliche	80	200
Sand, fine to medium, buff clay, and caliche	30	230
Clay, sandy, buff, and caliche	20	250
Clay, buff, caliche, and a few pebbles	30	280
Shale, very hard, angular, dark-gray to gray	40	320

Well Q-75

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

	Thickness (feet)	Depth (feet)
Conglomerate, bit cut fragments of caliche-cemented pebbles, and cobbles and boulders of limestone	50	50
Conglomerate, bit cut fragments of caliche-cemented pebbles, cobbles, and boulders, and brown sandy clay	30	80
Pebbles, gravel, and very coarse sand	20	100
Gravel, and fine to coarse sand	10	110
Sand, fine to coarse	10	120
No record	10	130
Sand, fine to coarse	10	140
Sand, very fine to coarse, and caliche	40	180
Sand, medium to very coarse, and caliche	10	190
Sand, very fine to coarse, caliche, and a little red clay	10	200
Gravel, small, fine to very coarse sand, caliche, and a little red clay	10	210
Clay, sandy, brown, caliche, very fine to medium sand, and red clay	30	240
Clay, sandy, brown, and very fine to fine sand	30	270
Clay, sandy, brown	10	280

(Continued on next page)

Table 3.--Sample logs of wells in lower Mesilla Valley, El Paso County, Texas, and Dona Ana County, New Mexico--Continued

	Thickness (feet)	Depth (feet)
Well Q-75--Continued		
Limestone, weathered, brown, bit cut fragments, caliche, and small gravel	30	310
Limestone fragments, angular, brown, bit cut	10	320

Well Q-86

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

	Thickness (feet)	Depth (feet)
Soil, adobe, sand, and small gravel	10	10
Sand, fine, small gravel, and clay	10	20
Pebbles, small, and a little buff clay	10	30
Clay, tough, bluish-gray, and medium pebbles	10	40
Pebbles, small to medium, some bit cut	10	50
Pebbles and cobbles, about 75 percent bit cut	10	60
Pebbles, small to large, about 20 percent bit cut	20	80
Pebbles and small cobbles, about 20 percent bit cut, and some sandy clay	10	90
Clay, buff, pebbles and small cobbles, bit cut	10	100
Clay, gray, gravel, and pebbles	10	110
Sand, fine to coarse, caliche, small pebbles, and a little red clay	20	130
Clay, sandy, gray, caliche, and a few small pebbles	10	140
Sand, fine to medium, sandy clay, and caliche	10	150
Sand, fine to coarse, and caliche	10	160
Sand, fine, and buff clay	10	170
Clay, sandy, fine to medium sand, and caliche	10	180
Sand, fine to coarse, and caliche	27	207

(Continued on next page)

Table 3.--Sample logs of wells in lower Mesilla Valley, El Paso County, Texas, and Dona Ana County, New Mexico--Continued

	Thickness (feet)	Depth (feet)
Well Q-86--Continued		
Clay, sandy, fine sand, and a few small pebbles----------------	3	210
Clay, sandy, fine sand, small pebbles, and caliche------------	10	220
Clay, silty, a few pebbles, and a little caliche--------------	20	240
Clay, sandy, a few pebbles, and a little caliche--------------	20	260
Clay---	10	270
Clay, silty, and a few pebbles-------------------------------	10	280
Sand, fine, and clay---	10	290
Sand, very fine to medium, clay, and caliche-----------------	20	310
Clay, sandy--	10	320
Sand, fine, and clay---	10	330
Sand, fine, and a little clay--------------------------------	10	340
Sand, fine, and clay---	10	350
Clay, medium sand, and some gravel---------------------------	10	360
Clay, fine to medium sand, and caliche-----------------------	40	400
Sand, fine to medium, caliche, and some gravel---------------	30	430
Clay, fine sand, and black subangular gravel-----------------	10	440
Sand, very fine to coarse, clay, caliche, and gravel---------	10	450
Clay, sandy--	20	470
Clay, and very fine sand-------------------------------------	20	490
Sand, very fine, and some clay-------------------------------	20	510
Sand, very fine to medium, and sandstone fragments-----------	10	520
Sand, very fine--	10	530
Sand, very fine to fine--------------------------------------	20	550

(Continued on next page)

Table 3.--Sample logs of wells in lower Mesilla Valley, El Paso County, Texas, and Dona Ana County, New Mexico--Continued

	Thickness (feet)	Depth (feet)
Well Q-86--Continued		
Sand, fine to coarse, and a little gravel	10	560
Sand, fine to coarse, clay, small gravel, and caliche	20	580
Sand, very fine to fine	10	590
Sand, fine to coarse, and a little gravel	30	620
Sand, very fine to coarse, clay, gravel, and caliche	30	650
Sand, very fine to coarse, and silt	20	670
Sand, very fine to fine, and silt	10	680
Sand, very fine to coarse, and some gravel	10	690
Sand, very fine to coarse	10	700
Clay and gravel	10	710
Clay, gravel, and fine sand	30	740
Sand, fine to coarse, and gravel	10	750
Clay, sandy	40	790
Sand, fine, and sandy clay	50	840
Sand, fine to medium, sandy clay, and a little gravel	30	870
Sand, fine, and sandy clay	50	920
No record	20	940
Sand, fine to very coarse, gravel and small partly bit cut pebbles	10	950
Limestone, gray to black and brown	1	951

Well Q-134

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

	Thickness (feet)	Depth (feet)
Gravel, pebbles, cobbles, and boulders	10	10
Gravel and pebbles	10	20

(Continued on next page)

Table 3.--Sample logs of wells in lower Mesilla Valley, El Paso County, Texas, and Dona Ana County, New Mexico--Continued

	Thickness (feet)	Depth (feet)
Well Q-134--Continued		
Gravel, pebbles, and pink clay	10	30
Gravel, pebbles, and tan clay	10	40
Sand, fine to coarse, gravel, pebbles, and pink clay	10	50
Clay, tan	10	60
Clay, sandy, tan, gravel, and caliche	20	80
Clay, tan and pink	10	90
Clay, sandy, tan	40	130
Clay, sandy, hard, tan and pink	10	140
Clay, sandy, gray, and pink hard clay, and nodular caliche	20	160
Clay, sandy, tan	10	170
Clay, sandy, tan, caliche, and soft sandstone	20	190
Clay, sandy, tan, and caliche	10	200
Clay, sandy, tan and gray, and nodular caliche	20	220
Clay, sandy, tan, and caliche	10	230
Clay, tan and gray, coarse to very coarse sand, and small gravel	10	240
Clay, sandy, tan, and soft gray clay, small gravel, and caliche	10	250
Clay, sandy, tan	20	270
Sand, fine to medium, and tan hard clay	10	280
Clay, sandy, tan	10	290
Clay, sandy, tan and gray, caliche	10	300
Sand, very fine, clay, and some gravel	20	320
Sand, very fine to very coarse, some clay and gravel	10	330
Clay, sandy, tan, coarse sand, and some gravel	10	340

(Continued on next page)

Table 3.--Sample logs of wells in lower Mesilla Valley, El Paso County, Texas, and Dona Ana County, New Mexico--Continued

	Thickness (feet)	Depth (feet)
Well Q-134--Continued		
Clay, tough, tan, fine to very coarse sand, and gravel--------	10	350
Conglomerate of partly bit cut gravel and pebbles-------------	20	370
Conglomerate of very coarse sand, gravel, and pebbles---------	10	380
Conglomerate of partly bit cut gravel, pebbles, and caliche---	20	400
Limestone, gray and brown, bit cut---------------------------	7	407

Well Q-172

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

	Thickness (feet)	Depth (feet)
Sand, coarse to medium------------------------------------	20	20
Sand and fine gravel--------------------------------------	10	30
Gravel, fine--	20	50
Gravel coarse, and coarse sand----------------------------	10	60
Boulders and coarse gravel--------------------------------	10	70
Sand, coarse--	10	80
Sand, fine, and gravel------------------------------------	10	90
Sand, medium--	10	100
Sand, fine, and clay streaks------------------------------	10	110
Sand, fine--	20	130
Sand, medium--	40	170
Clay, buff, and sand--------------------------------------	10	180
Sand, medium--	20	200
Sand, very fine, and caliche------------------------------	10	210
Sand, fine, and gravel------------------------------------	10	220
Sand, medium--	10	230

(Continued on next page)

Table 3.--Sample logs of wells in lower Mesilla Valley, El Paso County, Texas, and Dona Ana County, New Mexico--Continued

	Thickness (feet)	Depth (feet)
Well Q-172--Continued		
Gravel, fine, and sand	10	240
Sand, fine	10	250
Sand, fine, and shale	10	260
Sand, medium	10	270
Sand and caliche	10	280
Sand, medium	10	290
Sand and clay stringers	10	300
Sand and buff and blue shale	10	310
Clay, buff	10	320
Sand, medium	10	330
Sand, coarse	30	360
Sand, biotite, and shale	10	370
Sand, medium	10	380
Sand and shale breaks	10	390
No record	10	400
Sandstone, coarse	20	420
Sand, medium	10	430
Sand and caliche	10	440
Sand and small gravel	10	450
Sand, fine, and caliche	10	460
Sand, fine, and gravel	10	470
Sand, medium	10	480
Clay, buff	20	500

(Continued on next page)

Table 3.--Sample logs of wells in lower Mesilla Valley, El Paso County, Texas, and Dona Ana County, New Mexico--Continued

	Thickness (feet)	Depth (feet)
Well Q-172--Continued		
Clay, sand, and gravel	10	510
Clay, buff	10	520
Clay, red	10	530
Clay, brown	10	540
Clay, buff	20	560
Clay, sandy	10	570
Sandstone	30	600
Sand, fine, and caliche	10	610
No record	10	620
Sand, fine, and red clay	10	630
No record	10	640
Sand, fine	60	700
Clay, sandy, and gravel	10	710
Sand, very fine, and gravel	10	720
Sand, very fine	20	740
Sand and fine gravel	10	750
Silt	10	760
Sand, very fine, and biotite	10	770
Sand, very fine, and fine gravel	20	790
Sand, very fine, and coarse gravel	10	800
Sand, very fine	90	890
Sand, medium	10	900
Sandstone, very fine grained	20	920
Sandstone and shale	10	930

(Continued on next page)

Table 3.--Sample logs of wells in lower Mesilla Valley, El Paso County, Texas, and Dona Ana County, New Mexico--Continued

	Thickness (feet)	Depth (feet)
Well Q-172--Continued		
Sandstone, very fine grained	20	950
Sand and clay	10	960
Sandstone, very fine grained	30	990
Sand, medium	50	1,040
Sandstone, fine	10	1,050
Sand, fine	10	1,060
Sand, medium	10	1,070
Gravel, small, sharp	10	1,080
Sand, medium	10	1,090
Shale and limestone	10	1,100
Limestone, hard	10	1,110
Limestone and shale	10	1,120
Limestone, dark-gray	10	1,130
Limestone, light-gray	10	1,140
Limestone and sandstone	10	1,150
Limestone	10	1,160
Shale, buff	10	1,170
Sandstone, hard, fine-grained	31	1,201

Well Q-173

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

Sand, medium to coarse, and some brown clay	10	10
Sand, medium to coarse, and gravel	10	20

(Continued on next page)

Table 3.--Sample logs of wells in lower Mesilla Valley, El Paso County, Texas, and Dona Ana County, New Mexico--Continued

	Thickness (feet)	Depth (feet)
Well Q-173--Continued		
Sand, medium	10	30
No record	90	120
Sand, medium to coarse, gravel, and some clay	10	130
Clay and some medium sand	10	140
Sand, medium to coarse, and clay	10	150
Sand, medium to very coarse, and clay	90	240
Clay, and medium to very coarse sand	10	250
Sand, medium to coarse, and clay	10	260
Sand, medium to very coarse, and clay	20	280
Sand, medium to coarse, and clay	10	290
Clay, and medium to very coarse sand	10	300
Sand, medium to very coarse, and clay	10	310
Clay, and medium to very coarse sand	20	330
Sand, medium to very coarse, clay, and some gravel	30	360
Sand, medium to very coarse, and clay	30	390
Clay and medium to very coarse sand	20	410
Sand, medium to very coarse, clay, and some gravel	10	420
Sand, medium to very coarse, some clay and gravel	10	430
Sand, medium to coarse, and some clay	10	440
Sand, medium to very coarse, clay, and gravel	10	450
Sand, medium to very coarse, some clay and gravel	10	460
Sand, medium to very coarse, and some clay	10	470
Sand, medium to very coarse, and some gravel	10	480
Sand, medium to coarse, clay, and some gravel	10	490

(Continued on next page)

Table 3.--Sample logs of wells in lower Mesilla Valley, El Paso County, Texas, and Dona Ana County, New Mexico--Continued

	Thickness (feet)	Depth (feet)
Well Q-173--Continued		
Sand, medium to very coarse, and clay	10	500
Clay and some sand	20	520
Clay, sand, and gravel	10	530
Clay and sand	10	540
Clay, sand, and gravel	40	580
Sand, medium to very coarse, clay, and some gravel	20	600
Sand, medium to very coarse, and clay	10	610
Sand, medium to very coarse, and some clay	20	630
Gravel, clay, and sand	20	650
Gravel, medium to very coarse sand, and clay	10	660
Sand, medium to coarse	10	670
Sand, medium to coarse, and some gravel	10	680
Sand, medium, and some gravel	10	690
Gravel, medium sand, and some clay	20	710
Gravel and medium to coarse sand	10	720
Sand, medium to coarse, and gravel	10	730
Sand, fine to medium, clean, well-sorted	50	780
Sand, gravel, and clay	10	790
Gravel, fine sand, and some clay	10	800
Sand, fine to very coarse, gravel, and some clay	10	810
Gravel, fine to medium sand, and clay	10	820
Sand, fine to coarse, gravel, and clay	10	830
Gravel, fine to coarse sand, and some clay	10	840
Sand, fine to very coarse	20	860

(Continued on next page)

Table 3.--Sample logs of wells in lower Mesilla Valley, El Paso County, Texas, and Dona Ana County, New Mexico--Continued

	Thickness (feet)	Depth (feet)
Well Q-173--Continued		
Sand, fine to coarse	10	870
Sand, fine to medium	10	880
Sand, fine to coarse, gravel, and some clay	10	890
Sand, fine to very coarse, and clay	10	900
Gravel, clay, and some sand	10	910
Gravel, clay, and some fine sand	40	950
Gravel, clay, and sand	10	960
Gravel, some clay, and sand	10	970
Gravel, fine sand, and clay	10	980
Gravel, fine to coarse sand, and some clay	20	1,000
Gravel, sand, and clay	10	1,010
Gravel and fine to medium sand	10	1,020
Sand, fine to very coarse	20	1,040
Sand, fine to very coarse, and some clay	10	1,050
Sand, fine to coarse	10	1,060
Sand, fine to very coarse	10	1,070
Sand, clean, fine to medium, angular limestone fragments, and some gravel	10	1,080
Limestone fragments, angular	20	1,100
Sand, fine to medium, some gravel, and limestone fragments	10	1,110
Limestone fragments, some sand, and clay	10	1,120
Limestone fragments and fine to medium sand	20	1,140
Limestone fragments, sand, and clay	10	1,150
Limestone fragments and fine to medium sand	10	1,160

(Continued on next page)

Table 3.--Sample logs of wells in lower Mesilla Valley, El Paso County, Texas, and Dona Ana County, New Mexico--Continued

	Thickness (feet)	Depth (feet)
Well Q-173--Continued		
Sand, fine to medium, and some limestone fragments------------	10	1,170
Sand, fine to medium, some limestone fragments, and clay------	10	1,180
Sand, fine to very coarse, and some limestone fragments-------	10	1,190
Sand, fine to very coarse, and some clay and limestone--------	10	1,200
Sand, fine to coarse, and some clay--------------------------	10	1,210
Sand, fine to coarse, gravel, and some limestone fragments----	10	1,220
Sand, clay, and gravel---------------------------------------	10	1,230
Sand, fine to coarse, and some clay and gravel---------------	10	1,240
Sand, gravel, and some clay----------------------------------	10	1,250
Sand, fine to medium, and some gravel------------------------	12	1,262

Well Q-174

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

	Thickness (feet)	Depth (feet)
Sand, fine---	20	20
Sand, coarse---	10	30
Sand, fine---	10	40
Sand, medium---	10	50
No record--	10	60
Sand and gravel--	10	70
Sand, medium---	50	120
Sand, coarse, and gravel-------------------------------------	10	130
Sand, coarse, and caliche------------------------------------	10	140
Sand and clay--	10	150
Gravel and sand--	30	180

(Continued on next page)

Table 3.--Sample logs of wells in lower Mesilla Valley, El Paso County, Texas, and Dona Ana County, New Mexico--Continued

	Thickness (feet)	Depth (feet)
Well Q-174--Continued		
Sand, fine	10	190
Gravel and sand	20	210
Sand, medium	10	220
Sand, fine	10	230
Shale and sand	10	240
Sand, medium	20	260
Sand and shale	10	270
Sand, medium	40	310
Sand, fine	70	380
Sand and caliche	10	390
Sand, fine	10	400
Clay and sand	10	410
Sand, medium	10	420
Sand, fine	40	460
Sand and caliche	10	470
Sandstone	10	480
Sand, fine	20	500
Sand and clay	10	510
Sand, fine	50	560
Sand and gravel	10	570
Sand and clay	10	580
Sand, medium	10	590
Sand and shale	10	600

(Continued on next page)

Table 3.--Sample logs of wells in lower Mesilla Valley, El Paso County, Texas, and Dona Ana County, New Mexico--Continued

	Thickness (feet)	Depth (feet)
Well Q-174--Continued		
Sand, coarse	10	610
Sand and gravel	10	620
Sand, fine	10	630
Sand, medium	10	640
Sand, fine, black	10	650
Sand, shale, and caliche	10	660
Sand, medium	10	670
Sand, shale, and caliche	10	680
Sand, medium	10	690
Shale and sand	10	700
Sand, medium	10	710
Sand and caliche	10	720
Sand, fine	10	730
Sand and caliche	20	750
Sand, medium, red	120	870
Sand and shale	10	880
Sand, medium	20	900
Sand, and some shale	10	910
Sand, medium, red	30	940
Sand, medium	40	980
Sand, black	20	1,000
Sand, medium, red	50	1,050
Sand and shale	10	1,060

(Continued on next page)

Table 3.--Sample logs of wells in lower Mesilla Valley, El Paso County, Texas, and Dona Ana County, New Mexico--Continued

	Thickness (feet)	Depth (feet)
Well Q-174--Continued		
Sand, medium	20	1,080
Sand, fine	30	1,110
Sand, coarse	10	1,120
Sand and caliche	20	1,140
Sand, medium	10	1,150

Well Q-176

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

Surface sand	10	10
Gravel, fine	20	30
Gravel and sand	30	60
Sand, fine	80	140
Sand, medium	10	150
Sand, coarse	30	180
Sand and gravel	10	190
Sand, coarse, and gravel	10	200
Gravel, very fine	10	210
Gravel, fine	10	220
Gravel, sand, and caliche	10	230
Gravel, coarse, and sand	10	240
Sand, medium, and caliche	40	280
Sand, medium	30	310
Sand, fine	30	340
Sand, medium	10	350

(Continued on next page)

Table 3.--Sample logs of wells in lower Mesilla Valley, El Paso County, Texas, and Dona Ana County, New Mexico--Continued

	Thickness (feet)	Depth (feet)
Well Q-176--Continued		
Sand, coarse, and caliche	10	360
Sand, fine	10	370
Sand, medium	30	400
Sandstone, medium-grained	10	410
Sand, medium	10	420
No record	10	430
Sand, medium	10	440
Boulders and sandstone	20	460
Clay and sand	10	470
Sandstone	20	490
Sand and red clay streaks	10	500
Sand, medium	10	510
Sandstone, medium-grained	20	530
Sand and red clay streaks	10	540
Sand, medium	20	560
Sand and gravel	10	570
Clay, sandy	10	580
Shale, calcareous	10	590
Shale and sand	10	600
Sand, medium to coarse	10	610
Sand, medium	10	620
Sand, caliche, and shale	10	630
Sand, red, and caliche	10	640
Sand, medium	10	650

(Continued on next page)

Table 3.--Sample logs of wells in lower Mesilla Valley, El Paso County, Texas, and Dona Ana County, New Mexico--Continued

	Thickness (feet)	Depth (feet)
Well Q-176--Continued		
Sand, fine	260	910
Sand, medium, red	20	930
Sand, fine	70	1,000
Sandstone	20	1,020
Clay	20	1,040
Limestone	32	1,072

Well Q-178

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

	Thickness (feet)	Depth (feet)
Soil and fine sand	10	10
Sand, fine, red	10	20
Sand, fine, tan and gray, and small gravel	30	50
Gravel, small, and tan and gray sandstone	10	60
Clay, tan and gray fine sand, and some gravel	10	70
Sand, medium to coarse, tan to gray, and coarse gravel	10	80
Sand, fine to medium, and gravel	24	104
Shale, soft, brown, and trace of mica	3	107
Sand, fine, gray, and gravel	15	122
Clay, soft, brown, and some gravel	12	134
Sand, fine to medium, shale, and caliche	84	218
Clay, soft, brown, and some medium sand	7	225
Sand, fine to medium, tan to gray	10	235
Sand, fine to medium, and brown clay	10	245
Sand, fine to medium, a little clay, and caliche stringers	10	255

(Continued on next page)

Table 3.--Sample logs of wells in lower Mesilla Valley, El Paso County, Texas, and Dona Ana County, New Mexico--Continued

	Thickness (feet)	Depth (feet)
Well Q-178--Continued		
Clay, medium-hard, brown, and some tan to gray fine sand------	10	265
Clay, brown, streaks of fine-grained sandstone, and some light-purple shale--	10	275
Sandstone, fine-grained, gray, and streaks of purple and green shale---	20	295
Clay, brown, and some gray fine sand------------------------	10	305
Clay, brown---	20	325
Sand, fine--	10	335
Sand, fine, and brown clay----------------------------------	10	345
Clay, gumbo, brown--	10	355
Clay, gumbo, and some gravel--------------------------------	10	365
Clay, gumbo, and fine sand----------------------------------	10	375
Sand, fine--	10	385
Sand, fine, gray to tan, and brown clay---------------------	20	405
Clay, gumbo, brown, and gray fine to medium sand-------------	30	435
Clay, gumbo, brown--	30	465
Sand, fine, and some clay-----------------------------------	30	495
Sand, fine to medium, gray to tan, some gravel and clay streaks	40	535
Clay, brown, and some gravel--------------------------------	10	545
Sand, fine to medium, gray to tan---------------------------	10	555
Sand, fine to medium, and brown clay------------------------	10	565
Clay, brown, and some gravel--------------------------------	10	575
Sand, fine to medium, small gravel, and clay----------------	20	595
Sand, fine, gray sandstone, and hard brown clay-------------	10	605

(Continued on next page)

Table 3.--Sample logs of wells in lower Mesilla Valley, El Paso County, Texas, and Dona Ana County, New Mexico--Continued

	Thickness (feet)	Depth (feet)
Well Q-178--Continued		
Clay, hard, brown, and some fine sand	30	635
Sandstone, fine-grained, and brown hard clay	10	645
Clay, hard, brown	10	655
Clay and gray to tan fine sand	20	675
Sand, fine, and brown clay streaks	30	705
Sand, fine, and small gravel	20	725
Sand, fine, and some thin clay layers	40	765
Sand, fine	20	785
Sand, fine, hard brown clay streaks	10	795
Sand, fine	90	885
Sand, fine, and trace of brown shale	10	895
Sand, fine, reddish-brown	90	985
Sand, fine, reddish-brown, and some soft clay	10	995
Sand, fine, and some gravel	10	1,005
Sand, fine, and clay streaks	10	1,015
Sand, fine, reddish-tan	60	1,075
Sand, fine, and brown shale streaks	50	1,125
Sand, fine, and gray fine-grained sandstone	10	1,135
Sand, fine, tan to gray	20	1,155
Sand, fine, and shale streaks	10	1,165
Shale, light-tan, gray to tan fine sand, and some gravel	10	1,175
Sand, fine, small gravel, and some light-tan shale streaks	10	1,185
Sand, fine, small gravel, and some tan shale streaks	60	1,245
Clay, black, gray fine sand, and some gravel	10	1,255

(Continued on next page)

Table 3.--Sample logs of wells in lower Mesilla Valley, El Paso County, Texas, and Dona Ana County, New Mexico--Continued

	Thickness (feet)	Depth (feet)
Well Q-178--Continued		
Clay, hard, brown, and black shale	16	1,271
Igneous rock, possibly latite or rhyolite with calcite in fractures (cored: 1,272 to 1,285 ft.)	114	1,385
Sand, medium, brown, and brown clay with igneous rock streaks	20	1,405
Shale, reddish-brown, and streaks of igneous rock	30	1,435
Sand, medium, tan to gray, and streaks of clay and igneous rock	50	1,485
Sand, fine, and tan clay	10	1,495
Clay, tan	10	1,505
Clay, gumbo, and streaks of igneous rock	110	1,615
Shale, gray, and streaks of igneous rock and gumbo clay	90	1,705

Table 4.--Water levels in wells in lower Mesilla Valley, El Paso County, Texas, and Dona Ana County, New Mexico
(In feet below land-surface datum)

Date	Water level	Date	Water level	Date	Water level
Well J-1					
Owner: Mrs. M. L. Somerville.					
June 16, 1952	27.1	Jan. 19, 1955	27.7	Jan. 9, 1958	30.5
Feb. 13, 1953	27.4	Jan. 16, 1956	29.1	Jan. 14, 1959	26.0
Nov. 8, 1954	28.0	Jan. 9, 1957	30.3		
Well J-2					
Owner: Jack Cox.					
June 16, 1952	15.2	June 6, 1955	16.7	Apr. 26, 1956	17.0
Feb. 13, 1953	15.2	Sept.27	17.6	June 19	17.3
Nov. 8, 1954	15.9	Jan. 16, 1956	16.7	Jan. 9, 1957	17.2
Jan. 19, 1955	15.4				
Well J-3					
Owner: Mrs. W. H. Haas.					
June 16, 1952	9.1	Jan. 17, 1956	12.3	Jan. 9, 1958	13.6
Feb. 13, 1953	9.7	Jan. 9, 1957	13.1	Jan. 14, 1959	7.8
Jan. 19, 1955	10.3				
Well K-1					
Owner: E. W. Moore.					
Feb. 13, 1953	10.0	Jan. 16, 1956	12.6	Jan. 9, 1958	12.7
Nov. 8, 1954	11.4	Jan. 9, 1957	13.9	Jan. 14, 1959	8.6
Jan. 19, 1955	10.7				

Table 4.--Water levels in wells in lower Mesilla Valley, El Paso County, Texas, and Dona Ana County, New Mexico--Continued

Date	Water level	Date	Water level	Date	Water level

Well K-3

Owner: Dairy Farm Co.

Jan. 18, 1952	9.8	Jan. 16, 1956	12.1	June 12, 1958	11.2
Feb. 12, 1953	17.8	June 19	14.5	Jan. 13, 1959	9.9
Jan. 19, 1955	11.3	Jan. 9, 1957	13.3		
June 6	17.4	Jan. 9, 1958	12.0		

Well K-4

Owner: -- Colquitt.

June 18, 1952	7.5	Nov. 8, 1954	8.8	Jan. 16, 1956	9.0
Feb. 12, 1953	10.4	Jan. 19, 1955	8.5	Jan. 9, 1957	9.9

Well K-7

Owner: Landers & Amos.

Feb. 10, 1953	29.5	Jan. 16, 1956	33.8	Jan. 9, 1958	33.4
Nov. 8, 1954	34.0	Jan. 9, 1957	34.5	Jan. 13, 1959	34.3

Well K-8

Owner: Landers & Amos.

Jan. 18, 1952	31.6	June 6, 1955	36.3	June 19, 1956	36.0
Feb. 10, 1953	32.0	Sept. 27	35.7	Jan. 9, 1957	31.7
Jan. 19, 1955	33.1	Jan. 16, 1956	32.2	Jan. 9, 1958	31.8
Apr. 25	35.8	Apr. 26	35.1	Jan. 13, 1959	31.8

Well K-10

Owner: Anthony Cemetery.

Feb. 10, 1953	28.6	Nov. 8, 1954	28.6	Jan. 19, 1955	28.3

(Continued on next page)

Table 4.--Water levels in wells in lower Mesilla Valley, El Paso County, Texas, and Dona Ana County, New Mexico--Continued

Well K-10--Continued

Date	Water level	Date	Water level	Date	Water level
June 6, 1955	30.6	June 19, 1956	30.7	Jan. 9, 1958	28.0
Jan. 16, 1956	28.2	Jan. 9, 1957	28.4	Jan. 13, 1959	28.1

Well P-2

Owner: C. D. Little.

Date	Water level	Date	Water level	Date	Water level
Nov. 13, 1953	10.9	Jan. 17, 1956	12.7	Jan. 9, 1958	13.9
Nov. 9, 1954	11.8	Jan. 9, 1957	14.6	Jan. 14, 1959	9.8
Jan. 19, 1955	11.5				

Well P-4

Owner: M. L. Thomas.

Date	Water level	Date	Water level	Date	Water level
Nov. 13, 1953	18.5	Apr. 25, 1955	19.4	Jan. 17, 1956	20.3
Nov. 9, 1954	19.6	June 6	20.0	Jan. 9, 1957	22.2
Jan. 19, 1955	18.8	Sept.27	21.3	Jan. 14, 1959	17.9

Well Q-1

Owner: Ralph Haas.

Date	Water level	Date	Water level	Date	Water level
June 16, 1952	9.6	Jan. 19, 1955	10.7	Jan. 9, 1958	13.3
Feb. 13, 1953	9.6	Jan. 16, 1956	14.0	Jan. 14, 1959	8.0
Nov. 8, 1954	11.4	Jan. 9, 1957	15.7		

Well Q-3

Owner: Mrs. Whip Robinson.

Date	Water level	Date	Water level	Date	Water level
June 12, 1952	13.7	Jan. 19, 1955	14.6	Jan. 9, 1958	16.9
Feb. 13, 1953	13.3	Jan. 16, 1956	17.3	Jan. 14, 1959	11.7
Nov. 9, 1954	15.3	Jan. 9, 1957	18.3		

Table 4.--Water levels in wells in lower Mesilla Valley, El Paso County, Texas, and Dona Ana County, New Mexico--Continued

Date	Water level	Date	Water level	Date	Water level

Well Q-9

Owner: T. S. White.

Feb. 13, 1953	13.2	Jan. 16, 1956	15.6	Jan. 9, 1958	15.0
Nov. 9, 1954	14.1	Jan. 9, 1957	17.0	Jan. 13, 1959	11.2
Jan. 19, 1955	14.0				

Well Q-10

Owner: E. Tellez.

Jan. 17, 1952	12.4	Jan. 16, 1956	15.2	June 12, 1958	12.2
Feb. 13, 1953	12.0	Jan. 9, 1957	16.4	Oct. 23	10.5
Nov. 9, 1954	13.6	Jan. 9, 1958	14.9	Jan. 13, 1959	11.7
Jan. 19, 1955	13.6				

Well Q-11

Owner: J. W. Edmunsen.

Feb. 12, 1953	11.2	Nov. 8, 1954	11.8	Jan. 9, 1957	12.4
Apr. 21	10.6	Jan. 19, 1955	11.1	Jan. 9, 1958	11.8
June 11	10.4	Jan. 16, 1956	12.0	Jan. 13, 1959	10.1
Jan. 8, 1954	10.5				

Well Q-13

Owner: M. Baca.

Nov. 8, 1954	4.2	Sept.27, 1955	4.7	Jan. 9, 1957	6.9
Jan. 19, 1955	5.1	Jan. 16, 1956	6.1	Jan. 9, 1958	5.9
Apr. 25	4.9	Apr. 26	3.3	Oct. 23	3.0
June 6	5.3	June 19	4.8	Jan. 13, 1959	4.6

Table 4.--Water levels in wells in lower Mesilla Valley, El Paso County, Texas, and Dona Ana County, New Mexico--Continued

Date	Water level	Date	Water level	Date	Water level

Well Q-16

Owner: C. C. Woodward.

Jan. 11, 1952	9.8	Jan. 20, 1955	10.6	Jan. 9, 1958	11.2
Feb. 12, 1953	11.0	Jan. 16, 1956	11.2	Jan. 15, 1959	10.1
Nov. 9, 1954	11.1				

Well Q-18

Owner: Mrs. Anna L. Andreas.

Jan. 10, 1952	22.9	Jan. 20, 1955	21.8	Jan. 9, 1958	23.9
Feb. 12, 1953	20.2	Jan. 16, 1956	22.7	June 12	24.4
Nov. 9, 1954	22.6	Jan. 10, 1957	23.8	Jan. 13, 1959	22.6

Well Q-27

Owner: U. S. Bureau of Prisons.

June 2, 1952	43.9	Jan. 20, 1955	44.4	Jan. 10, 1958	48.8
Feb. 10, 1953	44.2	Jan. 16, 1956	45.6		

Well Q-37

Owner: M. R. Hemley.

Aug. 28, 1951	16.3	Jan. 19, 1955	10.1	Nov. 1, 1957	10.8
Feb. 16, 1953	9.3	Jan. 17, 1956	11.8	Jan. 9, 1958	11.0
Nov. 9, 1954	15.9	Jan. 10, 1957	11.5	Jan. 13, 1959	9.2

Well Q-38

Owner: Gus Eminger.

Jan. 17, 1952	5.2	Jan. 19, 1955	8.5	Jan. 9, 1958	9.8
Feb. 16, 1953	7.6	Jan. 10, 1957	10.3	Jan. 13, 1959	7.3
Nov. 9, 1954	10.0				

Table 4.--Water levels in wells in lower Mesilla Valley, El Paso County, Texas, and Dona Ana County, New Mexico--Continued

Date	Water level	Date	Water level	Date	Water level

Well Q-39

Owner: W. C. Huber.

Jan. 17, 1952	8.8	Nov. 9, 1954	11.4	Jan. 10, 1957	14.7
Feb. 13, 1953	8.7	Jan. 19, 1955	11.1	Jan. 9, 1958	14.2
Jan. 8, 1954	8.6	Jan. 17, 1956	12.9	Jan. 14, 1959	7.3

Well Q-41

Owner: H. A. Sexton.

Jan. 17, 1952	10.6	June 6, 1955	14.8	Jan. 9, 1958	15.7
Feb. 13, 1953	10.4	Jan. 11, 1957	17.0	Jan. 13, 1959	9.1
Nov. 9, 1954	13.3				

Well Q-46

Owner: Caroline Hayes.

Feb. 13, 1953	12.9	Jan. 17, 1956	16.1	Jan. 9, 1958	17.6
Nov. 9, 1954	14.8	Jan. 9, 1957	17.7	Jan. 14, 1959	10.3
Jan. 19, 1955	13.0				

Well Q-47

Owner: Marvin Hayes.

Feb. 13, 1953	10.4	Jan. 17, 1956	15.1	Jan. 9, 1958	16.5
Nov. 9, 1954	13.6	Jan. 9, 1957	17.3	Jan. 14, 1959	9.1
Jan. 19, 1955	12.8				

Well Q-48

Owner: Beckley & Whittington.

Feb. 13, 1953	10.7	Jan. 19, 1955	13.4	Jan. 10, 1957	17.8
Nov. 9, 1954	13.7	Jan. 17, 1956	15.9	Jan. 9, 1958	17.5

Table 4.--Water levels in wells in lower Mesilla Valley, El Paso County, Texas, and Dona Ana County, New Mexico--Continued

Date	Water level	Date	Water level	Date	Water level

Well Q-50

Owner: -- Lamar.

Feb. 16, 1953	11.7	Jan. 17, 1956	13.7	Jan. 10, 1958	16.2
Nov. 10, 1954	12.7	Jan. 10, 1957	15.7	Jan. 13, 1959	11.6
Jan. 20, 1955	12.1				

Well Q-51

Owner: J. R. Alvarez.

Feb. 11, 1953	14.1	Jan. 20, 1955	14.0	Jan. 9, 1958	18.9
Nov. 9, 1954	14.5	Jan. 10, 1957	18.0	Jan. 13, 1959	13.1

Well Q-52

Owner: L. K. Thompson.

June 13, 1952	14.6	Jan. 20, 1955	15.6	Jan. 10, 1957	20.2
Feb. 18, 1953	14.1	Jan. 17, 1956	18.0	Jan. 13, 1959	13.4
Nov. 9, 1954	16.1				

Well Q-53

Owner: E. H. Crossett.

June 13, 1952	46.3	Sept.27, 1955	49.8	Jan. 10, 1957	48.4
Feb. 16, 1953	46.5	Jan. 17, 1956	47.3	Jan. 10, 1958	48.9
Jan. 20, 1955	45.3	June 19	49.7	Jan. 13, 1959	44.8
June 6	50.9				

Well Q-55

Owner: L. K. Thompson.

June 13, 1952	14.0	Feb. 18, 1953	12.2	Jan. 8, 1954	12.5

(Continued on next page)

Table 4.--Water levels in wells in lower Mesilla Valley, El Paso County, Texas, and Dona Ana County, New Mexico--Continued

Well Q-55--Continued

Date	Water level	Date	Water level	Date	Water level
Nov. 10, 1954	16.0	Jan. 17, 1956	18.5	Jan. 9, 1958	20.6
Jan. 20, 1955	15.1	Jan. 11, 1957	20.3	Jan. 13, 1959	13.1

Well Q-58

Owner: Mrs. J. F. Bennett.

Date	Water level	Date	Water level	Date	Water level
Feb. 18, 1953	12.2	Jan. 17, 1956	17.9	Jan. 9, 1958	19.0
Nov. 10, 1954	15.7	Jan. 11, 1957	19.0	June 12	17.2
Jan. 20, 1955	16.0	June 26	20.6	Jan. 13, 1959	11.3

Well Q-59

Owner: M. E. Garcia.

Date	Water level	Date	Water level	Date	Water level
June 13, 1952	14.5	June 6, 1955	18.5	June 19, 1956	21.5
Feb. 16, 1953	13.6	Sept.27	19.1	Jan. 10, 1957	20.0
Nov. 9, 1954	16.1	Jan. 17, 1956	17.8	Jan. 9, 1958	20.2
Jan. 20, 1955	15.6	Apr. 26	21.2	Jan. 13, 1959	12.8
Apr. 25	17.8				

Well Q-60

Owner: Louis H. Brandt

Date	Water level	Date	Water level	Date	Water level
Feb. 16, 1953	9.0	Jan. 17, 1956	13.5	Jan. 9, 1958	14.6
Nov. 9, 1954	12.1	Jan. 10, 1957	15.6	Oct. 17	7.5
Jan. 20, 1955	11.4	Nov. 1	14.2	Jan. 13, 1959	7.9

Well Q-65

Owner: M. R. Hemley.

Date	Water level	Date	Water level	Date	Water level
Aug. 28, 1951	6.8	Feb. 16, 1953	6.7	Nov. 10, 1954	7.0

(Continued on next page)

Table 4.--Water levels in wells in lower Mesilla Valley, El Paso County, Texas, and Dona Ana County, New Mexico--Continued

Date	Water level	Date	Water level	Date	Water level
		Well Q-65--Continued			
Jan. 20, 1955	6.8	Jan. 10, 1957	8.0	Oct. 17, 1958	5.9
Jan. 17, 1956	7.5	Jan. 9, 1958	7.8	Jan. 13, 1959	7.2
Aug. 17	7.3				

Well Q-68

Owner: E. and V. Holquin.

Apr. 28, 1951	61.4	Nov. 10, 1954	60.6	Jan. 10, 1957	63.1
Jan. 10, 1952	57.7	Jan. 20, 1955	60.1	Jan. 10, 1958	65.4
Feb. 12, 1953	58.1	Jan. 16, 1956	61.7	Jan. 13, 1959	68.5
Jan. 8, 1954	59.0				

Well Q-69

Owner: Donald Keily.

Feb. 12, 1953	77.0	June 6, 1955	80.0	June 19, 1956	83.5
Nov. 10, 1954	79.7	Sept.27	82.7	Jan. 10, 1957	81.7
Jan. 20, 1955	79.1	Jan. 16, 1956	80.1	Jan. 10, 1958	85.2
Apr. 25	80.0	Apr. 26	81.2	Jan. 13, 1959	88.1

Well Q-71

Owner: Ellison Lott.

Jan. 10, 1952	54.1	Nov. 10, 1954	62.7	Jan. 15, 1957	60.0
Feb. 12, 1953	54.5	Jan. 20, 1955	62.0	Jan. 10, 1958	61.8
Jan. 8, 1954	55.9	Jan. 16, 1956	63.0	Jan. 13, 1959	63.6

Table 4.--Water levels in wells in lower Mesilla Valley, El Paso County, Texas, and Dona Ana County, New Mexico--Continued

Well Q-82

Owner: City of El Paso.

Date	Water level	Date	Water level	Date	Water level
Apr. 18, 1952	5.6	June 26, 1952	6.3	June 3, 1955	8.4
Apr. 25	6.0	June 30	5.2	Jan. 13, 1956	9.8
May 5	6.1	July 8	5.5	Apr. 26	8.9
May 22	5.5	July 15	8.5	June 19	11.1
May 29	5.7	Feb. 16, 1953	6.9	Jan. 10, 1957	15.2
June 2	6.0	Nov. 10, 1954	8.1	Oct. 8	12.4
June 13	6.0	Jan. 20, 1955	7.3	Jan. 9, 1958	11.2
June 16	5.6	Apr. 25	8.3	Jan. 14, 1959	8.0

Well Q-83

Owner: City of El Paso.

Date	Water level	Date	Water level	Date	Water level
Apr. 18, 1952	5.5	July 8, 1952	5.2	Oct. 8, 1957	13.4
25	5.7	9	6.3	Jan. 9, 1958	12.4
May 5	5.8	10	6.2	Apr. 21	10.3
22	5.3	Feb. 16, 1953	6.5	Oct. 9	9.3
29	5.4	Nov. 10, 1954	7.6	16	8.9
June 2	5.7	Jan. 20, 1955	7.1	23	9.3
6	5.6	June 3	8.9	30	9.3
13	5.4	Jan. 13, 1956	11.0	Nov. 18	9.8
16	5.0	Jan. 25, 1957	22.3	Jan. 14, 1959	10.0
30	5.0				

Table 4.--Water levels in wells in lower Mesilla Valley, El Paso County, Texas, and Dona Ana County, New Mexico--Continued

Date	Water level	Date	Water level	Date	Water level

Well Q-84

Owner: City of El Paso.

Jan. 10, 1952	5.8	June 6, 1952	5.2	Nov. 10, 1954	6.3
Feb. 28	5.8	9	5.4	June 3, 1955	8.6
Apr. 18	5.0	13	5.2	Jan. 13, 1956	11.2
25	5.2	16	4.7	Jan. 25, 1957	22.9
May 5	5.3	26	4.4	Oct. 8	13.0
22	4.9	30	4.3	Jan. 9, 1958	12.4
29	4.9	July 8	4.7	Jan. 14, 1959	9.1
June 2	5.2	Feb. 16, 1953	6.1		

Well Q-85

Owner: City of El Paso.

Apr. 25, 1952	2.9	June 30, 1952	1.8	June 3, 1955	7.0
May 5	2.4	July 8	1.7	Jan. 13, 1956	9.5
22	2.4	9	2.5	Apr. 26	10.1
29	2.1	10	2.5	Jan. 28, 1957	19.6
June 2	2.3	11	2.8	Sept. 17	14.3
6	2.1	Feb. 16, 1953	2.7	Oct. 8	12.7
9	2.2	Nov. 10, 1954	4.4	Jan. 9, 1958	10.8
13	2.3	Jan. 20, 1955	3.7	Jan. 14, 1959	6.1
26	2.0				

Well Q-87

Owner: City of El Paso.

Feb. 28, 1952	3.5	Mar. 12, 1952	4.1	Apr. 18, 1952	3.1

(Continued on next page)

Table 4.--Water levels in wells in lower Mesilla Valley, El Paso County, Texas, and Dona Ana County, New Mexico--Continued

Date	Water level	Date	Water level	Date	Water level
Well Q-87--Continued					
Apr. 25, 1952	3.3	July 14, 1952	3.4	Jan. 20, 1955	5.6
May 1	3.7	15	6.4	Apr. 25	5.8
5	3.5	16	6.5	June 3	6.1
22	3.8	18	6.7	Jan. 13, 1956	9.7
29	3.3	29	7.4	Apr. 26	11.0
June 2	3.5	30	7.3	June 19	*35.9
6	3.4	31	7.4	Jan. 11, 1957	21.3
9	3.4	Sept.30	8.6	Jan. 10, 1958	11.1
13	3.6	Feb. 16, 1953	3.7	Apr. 21	9.2
16	3.5	Apr. 21	3.8	Oct. 9	5.3
26	3.5	June 11	5.5	16	5.1
30	3.0	30	6.5	23	4.9
July 8	3.2	Jan. 8, 1954	10.7	31	4.7
9	3.3	June 23	11.7	Nov. 18	5.0
10	3.4	Nov. 10	6.1		

* Nearby well being pumped

Well Q-88

Owner: City of El Paso.

Feb. 28, 1952	3.6	July 31, 1952	10.4	Feb. 16, 1953	3.8
May 29	3.6	Sept.30	11.7		

Well Q-89

Owner: City of El Paso.

May 29, 1952	3.1	June 2, 1952	3.2	June 6, 1952	3.2

(Continued on next page)

Table 4.--Water levels in wells in lower Mesilla Valley, El Paso County, Texas, and Dona Ana County, New Mexico--Continued

Date	Water level	Date	Water level	Date	Water level
		Well Q-89--Continued			
June 9, 1952	3.3	July 10, 1952	3.1	July 29, 1952	2.8
13	3.3	11	3.1	31	2.8
16	3.2	14	3.1	Feb. 16, 1953	2.7
26	2.8	15	3.0	Nov. 10, 1954	4.5
30	2.8	16	2.9	Jan. 20, 1955	3.8
July 8	3.1	18	2.9	June 3	2.6
9	3.1				

Well Q-90

Owner: City of El Paso.

Date	Water level	Date	Water level	Date	Water level
Apr. 18, 1952	5.5	June 13, 1952	5.7	Nov. 10, 1954	7.1
25	5.6	26	5.2	Jan. 20, 1955	7.5
May 5	5.6	30	5.3	June 3	8.8
22	5.6	July 8	5.4	Jan. 26, 1957	23.1
29	5.6	9	5.4	Sept. 17	20.6
June 2	5.7	10	5.4	Oct. 8	18.9
6	5.6	11	5.4	Jan. 9, 1958	15.3
9	5.7	Feb. 16, 1953	5.4	Jan. 14, 1959	8.3

Well Q-91

Owner: City of El Paso.

Date	Water level	Date	Water level	Date	Water level
Apr. 18, 1952	6.5	May 29, 1952	6.9	June 13, 1952	6.9
25	7.1	June 2	7.1	16	6.9
May 5	7.2	6	6.9	26	6.9
22	7.7	9	7.0	30	6.2

(Continued on next page)

Table 4.--Water levels in wells in lower Mesilla Valley, El Paso County, Texas, and Dona Ana County, New Mexico--Continued

Date	Water level	Date	Water level	Date	Water level
Well Q-91--Continued					
July 8, 1952	6.2	Jan. 13, 1956	13.3	Oct. 9, 1958	10.2
9	6.3	Jan. 10, 1957	24.1	16	10.2
10	6.3	Sept.17	22.8	23	10.1
11	6.4	Oct. 8	20.2	31	9.9
Feb. 16, 1953	6.6	Jan. 9, 1958	16.9	Nov. 18	10.2
Nov. 10, 1954	8.0	Apr. 21	15.2	Jan. 14, 1959	9.7
Jan. 20, 1955	8.1				

Well Q-92

Owner: Sam B. Gillette, Jr.

Date	Water level	Date	Water level	Date	Water level
Jan. 10, 1952	7.8	Jan. 20, 1955	10.8	Nov. 1, 1957	17.3
Oct. 3	9.8	Jan. 18, 1956	12.8	Jan. 9, 1958	15.4
Feb. 16, 1953	7.9	Jan. 15, 1957	21.6	Jan. 14, 1959	8.1

Well Q-93

Owner: I. T. Gillette.

Date	Water level	Date	Water level	Date	Water level
Jan. 10, 1952	9.2	Jan. 20, 1955	11.2	Jan. 10, 1958	17.2
Feb. 16, 1953	9.2	Jan. 15, 1957	18.7	Jan. 14, 1959	10.2
Nov. 10, 1954	12.0				

Well Q-94

Owner: I. T. Gillette.

Date	Water level	Date	Water level	Date	Water level
Feb. 18, 1953	9.0	Apr. 25, 1955	14.1	Jan. 18, 1956	13.4
Nov. 10, 1954	12.1	June 6	13.3	Apr. 26	15.9
Jan. 20, 1955	11.8	Sept.28	14.3	June 19	15.2

(Continued on next page)

Table 4.--Water levels in wells in lower Mesilla Valley, El Paso County, Texas, and Dona Ana County, New Mexico--Continued

Date	Water level	Date	Water level	Date	Water level
		Well Q-94--Continued			
Jan. 11, 1957	15.9	June 12, 1958	15.0	Jan. 22, 1959	11.4
Jan. 9, 1958	16.7				

Well Q-96

Owner: W. S. Wallace.

Feb. 18, 1953	16.0	Jan. 20, 1955	17.5	Jan. 9, 1958	22.8
Nov. 10, 1954	18.5	Jan. 11, 1957	22.6	Jan. 13, 1959	15.3

Well Q-97

Owner: Horton Miller.

June 13, 1952	13.3	Jan. 17, 1956	18.2	Jan. 9, 1958	20.3
Feb. 18, 1953	13.6	Jan. 11, 1957	20.5	Jan. 13, 1959	12.7
Jan. 20, 1955	16.2				

Well Q-98

Owner: H. Casad.

June 13, 1952	13.1	Jan. 20, 1955	15.1	Jan. 10, 1958	19.4
Feb. 18, 1953	12.6	Jan. 17, 1956	17.2	Jan. 13, 1959	13.3
Nov. 10, 1954	16.3	Jan. 11, 1957	19.5		

Well Q-100

Owner: F. Guerrero.

June 13, 1952	30.9	Jan. 20, 1955	32.1	Jan. 10, 1958	35.9
Feb. 18, 1953	29.9	Jan. 11, 1957	35.7	Jan. 13, 1959	31.8

Table 4.--Water levels in wells in lower Mesilla Valley, El Paso County, Texas, and Dona Ana County, New Mexico--Continued

Date	Water level	Date	Water level	Date	Water level

Well Q-102

Owner: B. L. Hall.

Date	Water level	Date	Water level	Date	Water level
June 13, 1952	12.5	Jan. 20, 1955	14.9	Jan. 10, 1958	18.6
Feb. 18, 1953	11.7	Jan. 17, 1956	16.7	Jan. 13, 1959	13.5
Nov. 10	15.9	Jan. 11, 1957	19.0		

Well Q-103

Owner: C. Deerman.

Date	Water level	Date	Water level	Date	Water level
June 13, 1952	12.3	Jan. 20, 1955	14.7	Jan. 10, 1958	18.2
Feb. 18, 1953	11.6	Jan. 17, 1956	16.4	June 12	17.0
Nov. 10, 1954	15.6	Jan. 11, 1957	18.5	Jan. 13, 1959	13.1

Well Q-105

Owner: J. Deerman, Jr.

Date	Water level	Date	Water level	Date	Water level
June 11, 1952	11.0	June 6, 1955	16.4	Jan. 11, 1957	16.5
Feb. 18, 1953	10.4	Sept.28	54.9	Jan. 10, 1958	16.2
Nov. 10, 1954	13.9	Jan. 18, 1956	14.6	Jan. 13, 1959	11.6

Well Q-106

Owner: C. H. Tallmon.

Date	Water level	Date	Water level	Date	Water level
Feb. 18, 1953	9.7	Jan. 20, 1955	12.1	Jan. 10, 1958	14.7
June 30	12.0	Jan. 18, 1956	13.2	Jan. 13, 1959	10.6
Nov. 10, 1954	12.9	Jan. 11, 1957	15.0		

Well Q-108

Owner: D. D. McFaul.

Date	Water level	Date	Water level	Date	Water level
June 11, 1952	9.7	Feb. 18, 1953	8.9	Nov. 10, 1954	13.0

(Continued on next page)

Table 4.--Water levels in wells in lower Mesilla Valley, El Paso County, Texas, and Dona Ana County, New Mexico--Continued

Date	Water level	Date	Water level	Date	Water level
Well Q-108--Continued					
Jan. 21, 1955	12.1	Jan. 11, 1957	14.6	Jan. 13, 1959	9.6
Jan. 18, 1956	12.9	Jan. 10, 1958	13.9		

Well Q-109

Owner: Mary Goggin.

June 11, 1952	10.7	Jan. 21, 1955	12.0	June 26, 1957	16.2
Feb. 19, 1953	10.3	Jan. 18, 1956	12.6	Jan. 10, 1958	13.3
Nov. 10, 1954	12.6	Jan. 11, 1957	13.9	Jan. 13, 1959	9.5

Well Q-111

Owner: C. M. Tallmon.

Mar. 26, 1952	13.7	Jan. 21, 1955	10.6	Jan. 10, 1958	12.1
Feb. 19, 1953	9.8	Jan. 18, 1956	11.9	Jan. 13, 1959	7.7
Nov. 11, 1954	11.3	Jan. 11, 1957	13.2		

Well Q-123

Owner: W. E. Jackson.

June 11, 1952	8.7	Jan. 21, 1955	8.9	Jan. 10, 1958	10.0
Feb. 18, 1953	8.7	Jan. 18, 1956	9.8	Jan. 13, 1959	6.8
Nov. 11, 1954	9.2	Jan. 11, 1957	11.5		

Well Q-129

Owner: I. Singh.

Mar. 26, 1952	7.5	Jan. 18, 1956	9.9	Oct. 30, 1958	6.3
Jan. 16, 1953	7.4	Jan. 11, 1957	10.7	Nov. 24	6.6
Nov. 11, 1954	8.5	Jan. 10, 1958	9.0	Jan. 13, 1959	7.0
Jan. 21, 1955	8.4	Oct. 23	6.0		

Table 4.--Water levels in wells in lower Mesilla Valley, El Paso County, Texas, and Dona Ana County, New Mexico--Continued

Date	Water level	Date	Water level	Date	Water level

Well Q-133

Owner: J. Brewington.

Date	Water level	Date	Water level	Date	Water level
Apr. 28, 1951	31.2	June 6, 1955	31.7	Jan. 11, 1957	32.8
Mar. 12, 1953	30.6	Sept.28	31.2	June 26	32.6
Nov. 11, 1954	31.1	Jan. 16, 1956	32.0	Jan. 10, 1958	32.7
Jan. 21, 1955	31.1	Apr. 26	31.4	June 12	30.1
Apr. 25	31.4	June 19	32.1		

Well Q-135

Owner: Barry Hagedon.

Date	Water level	Date	Water level	Date	Water level
Jan. 16, 1953	4.3	Jan. 18, 1956	6.2	Jan. 10, 1958	5.5
Nov. 11, 1954	5.2	Jan. 11, 1957	7.0	Jan. 13, 1959	3.7
Jan. 21, 1955	5.2				

Well Q-136

Owner: Martin & Davis.

Date	Water level	Date	Water level	Date	Water level
Apr. 28, 1951	5.5	Jan. 21, 1955	7.4	Jan. 10, 1958	8.0
Jan. 16, 1953	6.1	Jan. 18, 1956	8.9	Jan. 13, 1959	5.8
Nov. 11, 1954	7.3	Jan. 11, 1957	9.2		

Well Q-137

Owner: Erich Brandes.

Date	Water level	Date	Water level	Date	Water level
June 10, 1952	6.9	Jan. 21, 1955	8.2	Jan. 10, 1958	8.0
Jan. 16, 1953	7.4	Jan. 18, 1956	8.7	Jan. 13, 1959	6.3
Nov. 11, 1954	9.9	Jan. 14, 1957	9.2		

Table 4.--Water levels in wells in lower Mesilla Valley, El Paso County, Texas, and Dona Ana County, New Mexico--Continued

Date	Water level	Date	Water level	Date	Water level
		Well Q-139			
Owner: Ord Gary.					
Feb. 18, 1953	7.5	Jan. 21, 1955	10.7	Jan. 10, 1958	11.1
Jan. 8, 1954	7.9	June 6	15.7	Jan. 13, 1959	6.1
Nov. 11	15.7	Jan. 11, 1957	13.6		
		Well Q-141			
Owner: Cathcart & Mason.					
June 11, 1952	8.6	Jan. 21, 1955	9.4	Jan. 10, 1958	9.5
Feb. 19, 1953	7.3	Jan. 18, 1956	10.1	Jan. 14, 1959	6.7
Nov. 11, 1954	9.8	Jan. 11, 1957	11.2		
		Well Q-142			
Owner: Cathcart & Mason.					
June 11, 1952	7.4	Apr. 25, 1955	7.8	June 19, 1956	7.1
Feb. 19, 1953	7.3	June 6	7.8	Jan. 11, 1957	6.4
Nov. 11, 1954	7.3	Jan. 18, 1956	6.7	Jan. 10, 1958	5.2
Jan. 21, 1955	6.9	Apr. 26	6.9	Jan. 14, 1959	4.3
		Well Q-145			
Owner: W. Deerman.					
Apr. 28, 1951	7.6	Jan. 21, 1955	9.3	Jan. 10, 1958	7.7
Feb. 19, 1953	7.6	Jan. 18, 1956	8.4	June 12	7.7
Jan. 8, 1954	8.5	Jan. 14, 1957	8.4	Jan. 13, 1959	6.1
Nov. 11	9.6				

Table 4.--Water levels in wells in lower Mesilla Valley, El Paso County, Texas, and Dona Ana County, New Mexico--Continued

Date	Water level	Date	Water level	Date	Water level

Well Q-146

Owner: M. M. Friedmann.

Date	Water level	Date	Water level	Date	Water level
Jan. 16, 1953	7.5	Jan. 18, 1956	8.1	Jan. 10, 1958	6.4
Nov. 11, 1954	7.2	Jan. 14, 1957	7.2	Jan. 13, 1959	5.3
Jan. 21, 1955	6.8				

Well Q-148

Owner: Payne-Taylor.

Date	Water level	Date	Water level	Date	Water level
Apr. 28, 1951	8.2	Apr. 25, 1955	9.8	Jan. 14, 1957	9.2
Jan. 16, 1953	8.9	Sept.28	9.4	June 26	9.1
Nov. 11, 1954	9.6	Jan. 18, 1956	9.7	Jan. 10, 1958	9.4
Jan. 21, 1955	9.5				

Well Q-149

Owner: Payne-Taylor.

Date	Water level	Date	Water level	Date	Water level
Jan. 15, 1953	4.8	Jan. 18, 1956	6.5	Jan. 10, 1958	6.6
Nov. 12, 1954	5.6	Jan. 14, 1957	6.2	Jan. 13, 1959	4.6
Jan. 21, 1955	5.5				

Well Q-150

Owner: L. T. Cox.

Date	Water level	Date	Water level	Date	Water level
Mar. 18, 1952	8.3	Jan. 21, 1955	8.0	Jan. 10, 1958	8.3
Jan. 15, 1953	7.7	Jan. 18, 1956	9.1	Jan. 13, 1959	6.9
Nov. 12, 1954	8.2	Jan. 15, 1957	9.2		

Table 4.--Water levels in wells in lower Mesilla Valley, El Paso County, Texas, and Dona Ana County, New Mexico--Continued

Date	Water level	Date	Water level	Date	Water level

Well Q-153

Owner: I. Singh.

Jan. 16, 1953	7.3	Jan. 18, 1956	6.3	Jan. 10, 1958	6.8
Nov. 11, 1954	7.2	Jan. 14, 1957	7.2	Jan. 14, 1959	5.8
Jan. 21, 1955	7.1				

Well Q-154

Owner: J. H. Padgett.

Mar. 14, 1952	9.5	Jan. 8, 1954	8.5	Jan. 18, 1956	8.1
Jan. 16, 1953	8.7	Nov. 12	8.8		

Well Q-157

Owner: El Paso Country Club.

Jan. 15, 1953	10.4	Jan. 18, 1956	11.5	Jan. 10, 1958	10.5
Nov. 12, 1954	11.4	Jan. 14, 1957	10.9	Jan. 22, 1959	9.4
Jan. 21, 1955	11.1				

Well Q-164

Owner: L. G. Little.

Feb. 13, 1953	12.9	Jan. 19, 1955	13.7	Jan. 9, 1958	16.0
Jan. 8, 1954	11.2	Jan. 17, 1956	15.6	Jan. 14, 1959	10.0
Nov. 9	14.1	Jan. 9, 1957	17.5		

Well Q-165

Owner: City of El Paso.

Dec. 15, 1955	11.4	Sept. 17, 1957	14.9	Jan. 9, 1958	10.5
Jan. 13, 1956	7.1	Oct. 8	13.9	Jan. 14, 1959	4.9
Jan. 26, 1957	19.7				

Table 4.--Water levels in wells in lower Mesilla Valley, El Paso County, Texas, and Dona Ana County, New Mexico--Continued

Date	Water level	Date	Water level	Date	Water level

Well Q-166

Owner: City of El Paso.

Dec. 6, 1955	14.4	Jan. 9, 1958	13.5	Oct. 23, 1958	6.2
Jan. 13, 1956	10.7	Apr. 21	10.4	31	6.0
Apr. 26	10.9	Oct. 9	6.6	Nov. 18	6.3
Jan. 11, 1957	22.8	16	6.4	Jan. 14, 1959	6.3
Oct. 8	17.1				

Well Q-168

Owner: City of El Paso.

Nov. 23, 1955	15.5	Jan. 9, 1958	15.4	Oct. 23, 1958	6.9
Jan. 13, 1956	12.1	Apr. 21	13.0	30	6.8
Jan. 10, 1957	19.3	Oct. 9	6.7	Nov. 18	7.1
Sept.17	19.1	16	6.9	Jan. 14, 1959	7.4
Oct. 8	18.2				

Well Q-169

Owner: City of El Paso.

Dec. 19, 1955	16.2	Jan. 9, 1958	17.1	Oct. 23, 1958	8.5
Jan. 13, 1956	15.1	Apr. 21	14.0	30	8.5
Jan. 10, 1957	18.9	Oct. 8	8.3	Nov. 18	8.8
Sept.17	19.4	16	8.5	Jan. 14, 1959	8.7
Oct. 8	18.9				

Table 4.--Water levels in wells in lower Mesilla Valley, El Paso County, Texas, and Dona Ana County, New Mexico--Continued

Date	Water level	Date	Water level	Date	Water level

Well Q-170

Owner: City of El Paso.

Jan. 13, 1956	8.4	Oct. 8, 1957	11.8	Jan. 14, 1959	5.4
Jan. 28, 1957	22.0	Jan. 9, 1958	10.0		

Well Q-175

Owner: City of El Paso.

May 20, 1958	39.3	Aug. 28, 1958	18.9	Nov. 10, 1958	32.3
June 9	38.8	Sept. 8	14.6	24	37.1
17	37.7	19	15.3	Dec. 2	37.7
30	38.6	Oct. 2	9.4	12	38.0
July 25	40.1	16	8.9	22	38.5
Aug. 12	43.6	31	8.3	Jan. 9, 1959	39.2

Well Q-189

Owner: City of El Paso.

July 15, 1958	42.8	Oct. 2, 1958	16.5	Dec. 2, 1958	40.5
25	42.8	16	16.9	12	40.9
Aug. 28	25.9	31	16.4	22	41.2
Sept.19	22.6	Nov. 10	35.5	Jan. 9, 1959	41.8
28	22.3	24	40.1		

Well U-24

Owner: L. D. McComas.

June 10, 1952	7.8	Jan. 21, 1955	8.9	Jan. 10, 1958	8.4
Jan. 15, 1953	8.5	Jan. 18, 1956	9.4	Jan. 13, 1959	7.5
Nov. 12, 1954	9.1	Jan. 14, 1957	10.1		

Table 4.--Water levels in wells in lower Mesilla Valley, El Paso County, Texas, and Dona Ana County, New Mexico--Continued

Date	Water level	Date	Water level	Date	Water level

Well U-26

Owner: El Paso Electric Co.

Jan. 15, 1953	14.1	Dec. 31, 1956	16.4	Dec. 31, 1958	12.9
Jan. 23, 1956	16.5	Dec. 31, 1957	14.7		

Well U-35

Owner: El Paso Electric Co.

Jan. 15, 1953	39.5	June 6, 1955	54.8	Dec. 31, 1956	49.3
Nov. 12, 1954	49.8	Sept.28	50.2	Dec. 31, 1957	46.0
Jan. 21, 1955	47.2	Jan. 23, 1956	53.0	Dec. 31, 1958	47.4
Apr. 25	43.3				

Well U-38

Owner: El Paso Electric Co.

Nov. 12, 1954	63.5	Sept.28, 1955	63.9	June 19, 1956	74.6
Jan. 21, 1955	58.1	Nov. 7	64.5	Dec. 31	68.9
Apr. 25	58.3	Jan. 23, 1956	60.5	Dec. 31, 1957	54.6
June 6	65.9	Apr. 27	60.8	Dec. 31, 1958	63.0

Well U-54

Owner: El Paso Electric Co.

Jan. 15, 1953	39.3	June 26, 1956	40.9	June 16, 1958	41.5
Jan. 23, 1956	40.7	Jan. 15, 1957	41.4	Dec. 31	40.7

Table 5.--Analyses of water from wells in lower Mesilla Valley, El Paso County, Texas, and Dona Ana County, New Mexico

(Analyses given are in parts per million except specific conductance, pH, and percent sodium)

NOTE: Analyses of water from different depths in the same well are given for several wells.

Well	Owner	Depth of well (ft.)	Date of collection	Silica (SiO_2)	Iron (Fe)	Manganese (Mn)	Calcium (Ca)	Magnesium (Mg)	Sodium and potassium (Na + K)	Bicarbonate (HCO_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
K-3	Dairy Farms Co.	141	June 18, 1952	49	--	--	113	48	526	518	536	462	--	1.5	--	0.42	2,000	492	70	3,110	7.5
K-7	Landera & Amos	--	do	56	--	--	119	51	235	337	195	415	0.6	5.0	--	.39	1,240	506	50	2,200	7.5
K-12	--	--	June 30, 1953	--	--	--	--	--	--	243	183	392	--	--	--	--	--	388	--	1,970	8.1
P-1	C. D. Little	90	June 18, 1953	--	--	--	--	--	--	a155	188	108	--	--	--	--	--	160	--	984	8.3
P-1	do	--	June 26, 1956	--	--	--	--	--	--	142	--	118	--	--	--	--	--	160	--	1,040	8.3
P-6	Southern Pacific Lines	950	Apr. 22, 1936	--	--	--	20	9.0	247	407	180	72	--	.75	--	--	729	87	--	--	--
P-7	do	481	Jan. 22, 1959	22	3.7	--	15	6.2	252	352	194	72	1.4	.0	0.02	.39	714	63	89	1,130	8.2
Q-1	Ralph Haas	115	June 30, 1953	--	--	--	--	--	--	290	507	258	--	--	--	--	--	464	--	2,150	8.2
Q-1	do	--	June 26, 1956	50	--	--	172	29	266 7.4	314	503	250	.6	1.0	--	--	1,430	548	51	--	--
Q-9	T. S. White	132	June 30, 1953	38	--	--	72	17	132	261	207	82	--	.2	--	.18	682	250	53	1,060	7.7
Q-10	E. Tellez	93	June 26, 1956	50	--	--	102	30	302 7.4	449	389	190	1.2	.5	--	--	1,290	378	63	--	--
Q-17	--	100	Mar. 11, 1953	--	--	--	--	--	--	308	264	530	--	--	--	--	--	540	--	2,600	7.6
Q-18	Mrs. Anna Andreas	185	June 18, 1952	45	--	--	62	31	284	252	194	365	1.0	1.0	--	0.47	1,110	232	69	1,970	7.8
Q-19	C. P. Davis	136	Sept.16, 1948	50	--	--	80	41	240	332	175	308	--	2.2	--	--	1,060	368	59	1,810	--
Q-20	do	196	do	42	--	--	60	28	275	262	160	340	--	2.2	--	--	1,040	264	69	1,820	--
Q-23	do	104	do	38	--	--	74	36	396	364	259	442	--	2.8	--	--	1,430	332	72	2,400	--
Q-25	U. S. Geological Survey	y180-200	Sept. 2, 1953	31	2.6	0.00	42	20	236 29	154	160	315	1.4	.2	--	.18	918	187	70	1,600	7.8
Q-25	do	y355-410	Sept.18, 1953	28	.5	.00	42	19	316 28	232	184	384	1.0	1.2	0.06	.30	1,110	183	76	1,940	8.1
Q-25	do	y575-620	Oct. 1, 1953	29	3.1	.00	26	13	301 6.8	203	277	232	6.0	.2	.02	.55	992	118	84	1,660	7.9
Q-27	U. S. Bureau of Prisons	264	Mar. 17, 1952	38	--	--	38	12	227	162	219	190	--	13	--	.37	847	144	77	1,350	8.0
Q-28	do	252	Oct. 29, 1951	32	--	--	43	26	220	164	125	300	1.6	.5	--	--	839	214	69	1,480	7.7

See footnotes at end of table.

Well	Owner	Depth of well (ft.)	Date of collection	Silica (SiO_2)	Iron (Fe)	Manganese (Mn)	Calcium (Ca)	Magnesium (Mg)	Sodium and potassium (Na + K)	Bicarbonate (HCO_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
Q-31	D. & L. Holquin	190	June 18, 1952	35	--	--	42	17	279	164	220	295	1.8	1.5	--	.39	973	175	78	1,030	8.2
Q-32	Tom Donaldson	225	do	34	--	--	36	13	315	b175	229	322	2.4	.8	--	.52	1,040	144	83	1,090	8.4
Q-32	do	--	June 26, 1956	--	--	--	--	--	--	165	--	355	--	--	--	--	--	208	--	1,980	7.8
Q-36	Davis Greenwood	300	Feb. 12, 1953	34	--	--	17	6.2	143	114	119	115	--	.2	--	--	509	68	82	826	8.2
Q-37	M. R. Hemley	135	Mar. 13, 1953	--	--	--	--	--	--	222	215	145	--	--	--	--	--	104	--	1,250	8.1
Q-42	Davis Greenwood	122	June 30, 1953	33	--	--	86	19	118	229	198	110	--	0.2	--	--	688	293	47	1,070	7.8
Q-43	U. S. Geological Survey	y195-238	Nov. 12, 1953	22	0.04	0.00	21	3.8	110 2.3	120	112	69	0.3	.2	--	0.15	400	68	77	650	7.8
Q-43	do	y306-349	do	24	.21	--	16	2.7	99	106	96	55	.3	.0	--	--	356	51	81	563	7.6
Q-43	do	y435-478	Nov. 13, 1953	27	.04	--	20	2.8	104	128	109	48	.3	.2	--	--	374	62	79	587	7.7
Q-43	do	y562-605	do	36	.01	--	23	3.8	181	218	184	68	.6	.0	--	--	603	73	84	942	7.9
Q-43	do	y754-797	Nov. 14, 1953	20	.05	--	16	2.1	114	108	115	62	.5	.2	--	--	384	48	84	621	7.8
Q-43	do	y1,015-1,058	Nov. 16, 1954	32	.06	.00	18	1.5	90 23	108	87	51	.5	.0	.03	.14	338	51	78	516	7.7
Q-45	A. C. Riley	--	Feb. 16, 1953	34	--	--	108	22	105	291	226	80	--	1.2	--	--	769	360	39	1,120	7.5
Q-45	do	--	July 1956	--	--	--	--	--	--	224	--	110	--	--	--	--	--	384	--	1,320	8.0
Q-53	E. H. Crossett	146	June 26, 1956	37	--	--	36	9.8	222 4.4	212	230	130	--	3.0	--	.41	790	130	78	1,260	7.9
Q-61	Price's Dairy Farm	--	Feb. 16, 1953	34	--	--	66	18	293	282	337	208	--	1.0	--	--	1,100	238	73	1,730	7.8
Q-61	do	--	June 26, 1956	48	--	--	96	20	318 5.7	362	408	210	1.0	1.0	--	--	1,290	322	68	--	--
Q-63	U. S. Geological Survey	y257-300	Oct. 14, 1953	28	.03	.00	24	2.7	218 4.5	114	259	130	.8	.8	.07	.18	724	71	86	1,170	7.8
Q-63	do	y385-428	Oct. 15, 1953	31	0.01	0.00	22	3.1	175 4.1	112	202	108	0.5	0.2	0.06	0.21	601	68	84	968	7.7

See footnotes at end of table.

Well	Owner	Depth of well (ft.)	Date of collection	Silica (SiO_2)	Iron (Fe)	Manganese (Mn)	Calcium (Ca)	Magnesium (Mg)	Sodium and potassium (Na + K)	Bicarbonate (HCO_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
Q-63	U. S. Geological Survey	y532-575	Oct. 16, 1953	32	.23	0.00	13	1.7	96 3.3	99	104	47	.5	.2	.09	.12	360	40	83	[illegible]	7.5
Q-63	do	y715-758	Oct. 20, 1953	25	.60	--	14	1.1	96	108	93	43	.9	.0	--	--	354	39	84	739	7.7
Q-64	Emilio Chavez	160	June 30, 1953	--	--	--	--	--	--	267	320	282	--	--	--	--	--	298	--	1,900	8.1
Q-66	C. P. Heffenger	86	Mar. 13, 1953	42	--	--	60	14	268	146	345	220	--	1.2	--	--	1,020	207	74	1,840	8.2
Q-67	Baxter Carruth	131	Feb. 27, 1953	34	--	--	24	8.2	157	127	134	135	--	.0	--	--	558	94	78	918	8.2
Q-68	E. and V. Holquin	142	June 18, 1952	38	--	--	20	4.8	118	a98	106	101	.8	.0	--	.22	452	70	79	733	8.-
Q-68	do	142	July 1956	--	--	--	--	--	--	111	--	104	--	--	--	--	--	88	--	778	8.2
Q-71	Ellison Lott	190	Mar. 13, 1953	30	--	--	3.9	.3	80	c79	67	35	--	.0	--	--	263	11	94	395	8.9
Q-72	U. S. Geological Survey	y210-230	Aug. 28, 1953	15	.02	--	53	30	257	184	293	250	1.8	1.0	--	--	999	256	69	1,660	7.9
Q-72	do	y336-366	Aug. 17, 1953	6.3	.01	.00	35	18	244 13	186	238	205	2.0	2.0	.04	.13	863	162	75	[illegible]	7.8
Q-72	do	y404-434	Aug. 20, 1953	15	.02	--	60	29	207	203	213	228	2.2	1.0	--	--	859	268	63	1,460	8.0
Q-72	do	y619-649	Aug. 21, 1953	15	.03	.00	33	12	312 11	254	217	265	1.4	1.0	.02	.45	998	132	82	1,680	8.1
Q-73	do	y218-279	Aug. 31, 1953	11	.18	.01	60	30	236 12	216	269	232	2.6	1.0	.00	.20	983	273	64	1,590	7.8
Q-76	State of Texas	517	Nov. 12, 1952	19	--	--	101	64	202	251	271	318	--	0.2	--	--	1,100	515	46	1,810	8.0
Q-79	Ted White	160	June 30, 1953	24	--	--	5.4	.3	86	d79	75	42	--	.0	--	--	274	15	93	447	8.3
Q-81	L. D. Snell	35	July 31, 1952	37	--	--	14	3.2	136	117	134	74	1.4	1.5	--	--	459	48	86	748	8.2
eQ-82	City of El Paso	152	Apr. 1, 1952	--	--	--	--	--	--	f86	75	31	--	--	--	--	284	8	--	--	9.3
Q-82	do	152	July 8, 1952	43	--	--	4	.6	91	g88	80	36	1.4	.0	--	--	312	12	94	458	9.1
Q-82	do	152	Sept.30, 1952	43	--	--	20	3.1	137	h114	136	87	1.0	--	--	--	484	52	83	783	8.6
Q-82	do	152	Oct. 10, 1952	42	--	--	20	2.7	138	116	134	88	1.4	.0	--	--	483	61	83	825	8.5
Q-82	do	152	June 30, 1953	--	--	--	--	--	--	j127	140	92	--	--	--	--	--	73	--	531	8.5

See footnotes at end of table.

Table 5.--Analyses of water from wells in lower Mesilla Valley, El Paso County, Texas, and Dona Ana County, New Mexico--Continued

Well	Owner	Depth of well (ft.)	Date of collection	Silica (SiO_2)	Iron (Fe)	Manganese (Mn)	Calcium (Ca)	Magnesium (Mg)	Sodium and potassium (Na + K)	Bicarbonate (HCO_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
Q-82	City of El Paso	152	Aug. 9, 1953	--	--	--	--	--	--	j124	154	106	--	--	--	--	--	79	--	912	8.5
Q-82	do	152	Sept. 8, 1953	36	0.02	--	58	10	158	172	228	147	.8	.0	--	--	--	186	68	1,190	7.7
eQ-82	do	152	Dec. 15, 1953	--	.10	--	49	7.3	--	126	228	158	.1	--	--	--	719	152	--	--	8.3
Q-82	do	152	June 23, 1954	44	--	--	44	10	214	127	233	225	.9	.2	--	--	857	200	70	1,310	8.0
eQ-82	do	152	June 1955	--	--	--	39	13	264	137	260	243	1.0	--	--	--	935	227	--	--	8.5
Q-82	do	152	June 26, 1956	--	--	--	--	--	--	93	--	255	--	--	--	--	--	240	--	1,600	8.2
eQ-83	do	160	Mar. 27, 1952	--	--	--	--	--	--	k76	133	97	--	--	--	--	455	6	--	--	9.1
Q-83	do	160	July 11, 1952	45	--	--	4.1	.3	141	m80	120	84	2.6	.0	--	--	436	11	97	722	9.1
Q-83	do	160	Sept.30, 1952	43	--	--	7.4	1.0	169	n116	144	99	1.8	.0	--	--	515	22	94	860	8.8
Q-83	do	160	June 30, 1953	--	--	--	--	--	--	b135	151	100	--	--	--	--	--	36	--	900	8.4
Q-83	do	160	Sept. 8, 1953	--	--	--	--	--	--	122	155	94	--	--	--	--	--	27	--	851	8.9
eQ-83	do	160	Dec. 15, 1953	--	0.10	--	22	1.5	--	q120	222	113	1.4	--	--	--	614	61	--	--	8.6
Q-83	do	160	June 23, 1954	44	--	--	28	2.3	206	h126	214	140	1.6	0.0	--	--	698	80	85	1,100	8.4
Q-83	do	160	Oct. 26, 1955	--	--	--	--	--	--	j120	--	140	--	--	--	--	--	92	--	1,130	8.5
Q-83	do	160	May 29, 1956	--	--	--	--	--	--	117	--	148	--	--	--	--	--	112	--	1,200	8.2
Q-83	do	160	Mar. 26, 1957	--	.02	--	34	9	227	--	270	138	1.2	--	--	--	716	102	83	--	8.5
Q-84	do	r122	Aug. 21, 1951	--	--	--	--	--	--	a124	190	124	--	--	--	--	616	82	--	--	8.8
Q-84	do	110	July 11, 1952	40	--	--	21	3.5	164	j117	162	108	2.0	.0	--	--	593	67	84	922	8.7
Q-84	do	110	Sept.30, 1952	41	--	--	30	6.1	176	d131	182	129	1.8	.2	--	--	630	100	79	1,020	8.3
Q-84	do	110	June 30, 1953	--	--	--	--	--	--	139	180	140	--	--	--	--	--	95	--	1,060	8.2
Q-84	do	110	Sept. 8, 1953	--	--	--	--	--	--	j126	187	125	--	--	--	--	--	86	--	1,010	8.6
eQ-84	do	110	Dec. 15, 1953	--	.10	--	30	5.0	--	q120	232	133	1.8	--	--	--	663	97	--	--	8.5
Q-84	do	110	June 23, 1954	--	--	--	--	--	--	i116	--	135	--	--	--	--	--	78	--	1,030	8.4

See footnotes at end of table.

Well	Owner	Depth of well (ft.)	Date of collection	Silica (SiO_2)	Iron (Fe)	Manganese (Mn)	Calcium (Ca)	Magnesium (Mg)	Sodium and potassium (Na + K)	Bicarbonate (HCO_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
Q-84	City of El Paso	110	May 29, 1956	--	--	--	--	--	--	113	--	150	--	--	--	--	--	108	--	1,140	8.1
eQ-84	do	110	Mar. 26, 1957	--	.02	--	20	3	220	--	240	155	1.5	--	--	--	683	71	89	--	8.6
Q-85	do	160	May 1, 1952	42	--	--	42	5.7	159	112	151	160	--	.0	--	0.12	615	128	73	1,020	8.2
Q-85	do	160	July 29, 1952	42	.00	--	45	6.2	164	a114	155	168	1.2	.0	--	--	637	138	72	1,060	8.5
Q-85	do	160	Sept.30, 1952	--	--	--	--	--	--	a115	--	163	--	--	--	--	--	132	--	1,040	8.3
Q-85	do	160	June 30, 1953	--	--	--	--	--	--	121	134	122	--	--	--	--	--	100	--	902	8.2
Q-85	do	160	Sept. 8, 1953	--	--	--	--	--	--	b106	130	108	--	--	--	--	--	76	--	808	8.6
eQ-85	do	160	Dec. 12, 1953	--	0.10	--	20	2.4	--	g96	146	95	1.1	--	--	--	459	60	--	--	8.6
Q-85	do	160	June 23, 1954	41	--	--	18	2.0	135	h91	124	99	1.1	0.2	--	--	465	53	85	730	8.5
Q-85	do	160	May 29, 1956	--	--	--	--	--	--	109	--	138	--	--	--	--	--	94	--	961	8.0
Q-85	do	160	Mar. 26, 1957	--	.02	--	44	4	189	--	192	165	1.0	--	--	--	689	127	80	--	8.4
Q-86	U. S. Geological Survey	y183-207	Sept. 3, 1953	36	.02	0.00	34	6.0	258 3.8	92	207	268	1.4	.2	0.03	0.36	860	110	83	1,440	7.5
Q-86	do	y286-310	Sept. 4, 1953	34	.28	.00	15	2.3	113 2.2	125	98	63	1.3	.2	.11	.18	398	47	83	587	7.8
Q-86	do	y533-557	Sept. 5, 1953	42	.80	.00	22	.8	175 1.4	90	137	154	1.6	.0	.02	.21	609	58	86	896	7.8
Q-86	do	y673-697	Sept. 9, 1953	13	.02	.01	80	13	691 6.6	67	545	800	2.4	.2	.07	.32	2,180	253	85	3,720	7.2
Q-86	do	y731-755	Sept.10, 1953	19	.02	--	66	3.7	608	31	466	700	1.8	.2	--	--	1,880	180	88	3,190	6.8
eQ-90	City of El Paso	160	Apr. 10, 1952	--	--	--	37	58	--	128	206	102	--	--	--	--	583	116	--	--	7.7
Q-90	do	160	July 29, 1952	32	.00	--	44	8.2	165	160	213	105	.6	.5	--	--	654	144	71	1,070	8.2
Q-90	do	160	Sept.30, 1952	35	--	--	51	9.3	176	171	217	128	.6	.2	--	--	710	165	70	1,120	8.1
Q-90	do	160	June 30, 1953	--	--	--	--	--	--	175	212	138	--	--	--	--	--	172	--	1,160	8.1
Q-90	do	160	Sept. 8, 1953	36	0.02	--	58	10	185	172	228	147	0.8	0.0	--	--	759	186	68	1,190	7.7

See footnotes at end of table.

Well	Owner	Depth of well (ft.)	Date of collection	Silica (SiO_2)	Iron (Fe)	Manganese (Mn)	Calcium (Ca)	Magnesium (Mg)	Sodium and potassium (Na + K)	Bicarbonate (HCO_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
eQ-90	City of El Paso	160	Dec. 15, 1953	--	.10	--	64	11	--	173	272	158	.6	--	--	--	826	203	--	--	7.9
Q-90	do	160	June 23, 1954	38	--	--	66	12	212	180	262	180	.6	.2	--	--	868	214	68	1,390	7.9
Q-90	do	160	Oct. 26, 1955	--	--	--	--	--	--	188	--	210	--	--	--	--	--	226	--	1,460	8.0
Q-90	do	160	May 29, 1956	36	--	--	77	12	235	178	288	215	.7	1.7	--	--	963	242	68	1,530	7.8
eQ-90	do	160	Mar. 26, 1957	--	.08	--	80	11	189	--	330	110	.5	--	--	--	1,006	246	68	--	8.1
eQ-91	do	202	Apr. 16, 1952	--	--	--	16	6.0	--	a116	139	75	--	--	--	--	447	66	--	--	8.5
Q-91	do	202	July 15, 1952	34	--	--	12	1.6	95	a95	91	48	1.0	.0	--	--	346	37	85	526	8.5
Q-91	do	202	Sept.30, 1952	--	--	--	--	--	--	99	--	53	--	--	--	--	--	43	--	556	8.1
Q-91	do	202	Sept. 8, 1953	--	--	--	--	--	--	93	--	48	--	--	--	--	--	37	--	507	7.3
Q-91	do	202	Dec. 15, 1953	--	.10	--	12	1.5	--	90	104	46	.9	--	--	--	336	37	--	--	8.2
Q-91	do	202	June 23, 1954	--	--	--	--	--	--	95	--	50	--	--	--	--	--	38	--	505	8.2
Q-91	do	202	Oct. 26, 1955	--	--	--	--	--	--	w92	--	50	--	--	--	--	--	39	--	514	8.3
eQ-91	do	202	Mar. 26, 1957	--	.02	--	15	--	114	--	108	53	.8	--	--	--	346	42	88	--	8.4
Q-97	Horton Miller	136	May 29, 1956	41	--	--	95	16	342	371	477	172	1.4	.0	--	--	1,330	304	71	1,960	7.9
Q-101	B. L. Hall	178	June 16, 1953	48	--	--	24	21	255	383	175	144	--	2.0	--	0.42	857	146	79	1,420	7.8
Q-106	C. H. Tallmon	122	July 9, 1953	50	--	--	31	23	250 7.8	421	187	130	--	.2	--	.00	886	172	75	1,400	7.8
Q-106	do	122	July 6, 1956	--	--	--	--	--	--	s403	--	122	--	--	--	--	--	136	--	1,300	8.5
Q-107	H. C. Mandell	125	Mar. 26, 1952	57	--	--	24	29	337	466	240	192	--	0.0	--	0.66	1,110	179	80	1,760	8.0
Q-108	D. D. McFaul	162	July 1, 1953	--	--	--	--	--	--	s472	168	135	--	--	--	--	--	158	--	1,460	8.7
Q-119	O. C. Cole	72	Aug. 31, 1952	45	--	--	98	31	671	625	808	338	1.6	2.0	--	.78	2,300	372	80	3,430	7.6
Q-119	do	72	July 17, 1956	--	--	--	--	--	--	621	--	440	--	--	--	--	--	450	--	+,090	8.2
Q-122	C. L. Ezell	141	Mar. 30, 1951	44	--	--	56	9.2	328	325	345	190	--	.0	--	.26	1,130	178	80	1,730	8.1
Q-125	Vinton School	167	Jan. 11, 1952	27	0.10	--	102	25	235	124	256	351	2.0	.2	--	--	1,060	358	59	1,810	7.8

See footnotes at end of table.

Table 5.--Analyses of water from wells in lower Mesilla Valley, El Paso County, Texas, and Dona Ana County, New Mexico--Continued

Well	Owner	Depth of well (ft.)	Date of collection	Silica (SiO_2)	Iron (Fe)	Manganese (Mn)	Calcium (Ca)	Magnesium (Mg)	Sodium and potassium (Na + K)	Bicarbonate (HCO_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
Q-125	Vinton School	167	June 26, 1956	--	--	--	--	--	--	94	--	492	--	--	--	--	--	454	--	2,460	7.8
Q-127	U. S. Geological Survey	y110-130	Aug. 14, 1952	26	.00	0.01	56	37	220 14	177	325	208	1.8	3.0	0.02	.26	1,000	292	61	1,590	7.8
Q-127	do	y205-235	Aug. 9, 1953	23	.05	--	42	29	1,190	416	1,030	980	1.8	1.0	--	--	3,500	212	92	5,410	8.2
Q-127	do	y298-328	Aug. 10, 1953	49	.08	--	31	27	1,150 7.6	597	922	880	2.6	1.5	--	1.5	3,370	188	93	5,220	8.2
Q-127	do	y410-440	Aug. 13, 1953	32	.00	--	38	33	1,200	578	951	970	1.3	1.5	--	--	3,510	230	92	5,480	8.1
Q-127	do	y490-520	do	--	--	--	--	--	--	178	--	1,570	--	--	--	--	--	299	--	7,390	7.6
Q-130	I. Singh	128	Mar. 30, 1951	42	--	--	254	103	1,920	398	1,730	2,230	.7	--	--	1.7	6,470	1,060	80	9,470	7.8
eQ-131	Victor Hlavacek	62	Aug. 27, 1951	--	--	--	--	--	--	--	740	752	--	--	--	--	--	610	--	--	--
eQ-132	J. J. Farrell	80	do	--	--	--	--	--	--	--	388	303	--	--	--	--	--	442	--	--	--
Q-134	U. S. Geological Survey	y100-120	Nov. 9, 1953	18	0.01	0.22	70	34	349 10	126	454	355	1.8	4.5	0.03	0.34	1,360	314	70	2,200	7.3
Q-134	do	y194-238	Nov. 5, 1953	24	.00	--	69	48	1,310	182	1,150	1,320	1.8	.5	--	--	4,010	370	88	6,200	7.9
Q-134	do	y351-394	Nov. 6, 1953	19	.00	--	152	80	1,790	87	2,470	2,120	1.8	--	--	--	5,680	708	85	8,650	7.5
Q-135	Barry Hagedon	140	Mar. 26, 1952	52	--	--	21	13	447	448	335	232	--	.2	--	.09	1,320	106	90	2,080	7.8
Q-137	Erich Brandes	123	Mar. 30, 1951	46	--	--	70	34	435	520	457	268	.4	2.0	--	.71	1,570	314	75	2,360	8.0
Q-137	do	123	June 6, 1953	--	--	--	--	--	--	139	180	140	--	--	--	--	--	95	--	1,060	8.2
eQ-138	--	10	1922	--	--	--	--	--	--	--	--	--	--	--	--	--	1,004	--	--	--	--
eQ-138	--	260	1922	--	--	--	--	--	--	--	--	--	--	--	--	--	1,800	--	--	--	--
eQ-138	--	470	1922	--	--	--	--	--	--	--	--	--	--	--	--	--	3,740	--	--	--	--
eQ-138	--	1,007	1922	--	--	--	--	--	--	--	--	--	--	--	--	--	4,542	--	--	--	--
Q-139	Ord Gary	124	Mar. 30, 1951	46	--	--	93	45	455	487	499	358	--	.2	--	.60	1,740	417	70	2,630	8.0

See footnotes at end of table.

Well	Owner	Depth of well (ft.)	Date of collection	Silica (SiO_2)	Iron (Fe)	Manganese (Mn)	Calcium (Ca)	Magnesium (Mg)	Sodium and potassium (Na + K)	Bicarbonate (HCO_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
Q-141	Cathcart & Mason	148	June 9, 1953	72	--	--	45	47	577	1,120	427	138	1.0	.2	--	--	1,860	306	80	2,770	7.7
Q-143	C. H. Mason	87	July 9, 1953	50	--	--	22	8.3	209 6.0	291	191	74	--	.2	--	.14	725	89	82	1,080	7.9
tQ-144	R. A. Gardner	y156-168	Mar. 15, 1952	31	--	--	--	--	--	--	390	217	--	--	--	--	915	133	--	--	8.2
tQ-144	do	y468-478	Mar. 18, 1952	36	--	--	--	--	--	--	1,210	2,100	--	--	--	--	4,750	642	--	--	7.9
tQ-144	do	y679-689	Mar. 19, 1952	24	--	--	--	--	--	--	750	1,020	--	--	--	--	2,700	345	--	--	8.0
tQ-144	do	y858-868	Mar. 21, 1952	22	--	--	--	--	--	--	840	955	--	--	--	--	2,400	318	--	--	8.0
Q-145	W. Deerman	128	Mar. 30, 1951	45	--	--	94	59	933	808	939	610	0.6	1.0	--	1.2	3,080	477	81	4,510	7.7
Q-149	Payne-Taylor	235	June 19, 1953	34	--	--	156	10	580	117	529	750	--	.8	--	.4	2,120	430	74	3,400	7.7
Q-149	do	235	July 17, 1956	--	--	--	--	--	--	115	--	765	--	--	--	--	--	555	--	3,520	7.8
Q-152	L. T. Stock	92	Mar. 14, 1952	41	--	--	65	21	692	a383	607	580	--	.0	--	.8	2,190	248	86	3,460	8.3
Q-153	I. Singh	130	Mar. 26, 1952	51	--	--	41	37	1,120	458	955	940	--	.8	--	1.3	3,370	254	91	5,340	8.2
Q-154	J. H. Padgett	125	Mar. 30, 1951	47	--	--	34	9.6	371	a260	351	240	--	.5	--	.6	1,180	124	87	1,960	8.3
eQ-158	Westerner Motel	105	--	--	--	--	--	--	--	--	411	418	--	--	--	--	1,310	92	--	--	9.1
eQ-158	do	130	--	--	--	--	--	--	--	--	418	410	--	--	--	--	1,530	111	--	--	8.7
eQ-158	do	160	--	--	--	--	--	--	--	--	908	710	--	--	--	--	2,730	342	--	--	8.3
eQ-158	do	203	--	--	--	--	--	--	--	--	--	--	--	--	--	--	2,740	294	--	--	8.4
Q-160	Penn's Dairy	r382	Jan. 10, 1952	18	0.30	--	69	57	108	246	166	187	1.1	.2	--	--	782	406	37	1,340	6.6
Q-160	do	540	July 6, 1956	--	--	--	--	--	--	n256	--	112	--	--	--	--	--	305	--	1,160	8.3
eQ-163	Broadus & McGrath	425	June 8, 1949	--	--	--	--	--	--	--	285	53	--	--	--	--	628	352	--	--	7.1
eQ-165	City of El Paso	170	Aug. 22, 1955	--	0.02	--	27	8	290	211	240	167	1.2	--	--	--	859	101	--	--	8.3
eQ-165	do	170	Feb. 22, 1956	--	.02	--	28	8	281	203	240	180	.9	--	--	--	847	104	--	--	--
eQ-165	do	170	Apr. 5, 1956	--	.02	--	40	10	358	214	310	217	1.0	--	--	--	992	142	--	--	8.2

See footnotes at end of table.

Well	Owner	Depth of well (ft.)	Date of collection	Silica (SiO_2)	Iron (Fe)	Manganese (Mn)	Calcium (Ca)	Magnesium (Mg)	Sodium and potassium (Na + K)	Bicarbonate (HCO_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
Q-165	City of El Paso	170	May 29, 1956	38	--	--	58	13	315	214	324	260	.9	0.2	--	--	1,110	198	78	1,790	7.9
eQ-165	do	170	Aug. 24, 1956	--	.02	--	60	14	277	223	210	290	1.0	--	--	--	1,191	208	--	--	8.3
eQ-165	do	170	Mar. 26, 1957	--	.12	0.1	65	14	384	--	440	286	.9	--	--	--	1,267	220	83	--	8.0
eQ-166	do	194	June 10, 1955	--	--	--	28	5	--	135	200	130	--	--	--	--	704	91	--	--	8.0
eQ-166	do	194	Aug. 18, 1955	--	.02	--	67	12	222	163	240	221	1.0	--	--	--	902	248	--	--	8.3
Q-166	do	194	Oct. 26, 1955	39	.04	--	79	14	240	167	249	268	.5	.4	--	--	968	254	67	1,570	7.7
eQ-166	do	194	Dec. 9, 1955	--	.04	--	80	19	255	151	250	320	.6	--	--	--	1,066	280	--	--	7.8
eQ-166	do	194	Feb. 22, 1956	--	.02	--	85	19	258	157	245	330	.7	--	--	--	1,131	290	--	--	--
Q-166	do	194	May 29, 1956	39	--	--	94	16	272	172	282	322	.5	1.8	--	--	1,130	300	66	1,620	7.7
eQ-166	do	194	Oct. 1, 1956	--	.04	--	110	17	312	173	290	410	.6	--	--	--	1,291	344	--	--	8.2
eQ-167	do	156	Mar. 5, 1955	--	.01	--	54	13	--	201	275	167	.8	--	--	--	946	191	--	--	8.0
eQ-167	do	156	Aug. 18, 1955	--	0.02	--	71	17	294	290	350	200	0.8	--	--	--	1,133	248	--	--	8.2
Q-167	do	156	June 19, 1956	39	--	--	86	18	319 3.9	311	399	232	--	0.5	--	--	1,250	288	70	1,960	8.1
eQ-168	do	200	May 5, 1956	--	.15	--	64	14	--	239	260	100	.5	--	--	--	775	218	--	--	8.1
Q-168	do	200	May 29, 1956	40	--	--	74	16	189	248	274	121	.7	.0	--	--	837	250	62	--	7.3
eQ-168	do	200	Oct. 1, 1956	--	.07	--	73	15	118	121	210	128	.7	--	--	--	821	244	--	--	8.2
eQ-168	do	200	Mar. 29, 1957	--	.12	0.4	98	20	223	--	375	148	.5	--	--	--	--	326	66	--	8.2
eQ-169	do	200	Apr. 12, 1956	--	.02	--	49	--	120	196	160	75	1.0	--	--	--	546	172	--	--	7.8
Q-169	do	200	May 29, 1956	39	--	--	78	18	132	240	218	92	.7	.0	--	--	696	268	52	1,080	7.7
eQ-169	do	200	Mar. 29, 1957	--	.1	.3	62	12	131	--	210	82	.7	--	--	--	610	204	64	--	8.1
eQ-170	do	200	June 29, 1955	--	.02	--	52	9	--	250	180	167	1.0	--	--	--	809	166	--	--	8.5
Q-170	do	200	May 29, 1956	44	--	--	44	6.6	198	200	195	140	1.4	.0	--	--	727	137	76	--	8.0
eQ-170	do	200	Oct. 1, 1956	--	.05	--	55	8	213	201	190	188	1.7	--	--	--	820	170	--	--	8.4

See footnotes at end of table.

Table 5.--Analyses of water from wells in lower Mesilla Valley, El Paso County, Texas, and Dona Ana County, New Mexico--Continued

Well	Owner	Depth of well (ft.)	Date of collection	Silica (SiO_2)	Iron (Fe)	Manganese (Mn)	Calcium (Ca)	Magnesium (Mg)	Sodium and potassium (Na + K)	Bicarbonate (HCO_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
eQ-170	City of El Paso	200	Mar. 26, 1957	--	.06	.15	43	6	191	--	210	140	1.1	--	--	--	722	132	80	--	8.3
Q-172	do	y189-209	Oct. 1956	--	--	--	--	--	136 --	108	--	93	--	--	--	--	--	71	--	796	8.0
Q-172	do	y280-300	Oct. 1956	36	--	--	17	.8	121	104	119	70	.8	.0	--	--	427	46	85	638	8.3
Q-172	do	y369-389	Oct. 1956	--	--	--	--	--	114 --	100	--	62	--	--	--	--	--	45	85	609	8.0
Q-172	do	y470-493	Oct. 1956	36	.15	--	8.8	.0	80 2.2	82	73	39	1.0	.0	--	0.12	280	22	88	425	8.1
Q-172	do	y590-612	Oct. 1956	--	--	--	--	--	89 --	93	--	40	--	--	--	--	--	30	87	464	8.3
Q-172	do	y666-686	Oct. 1956	--	--	--	--	--	151 --	104	--	80	--	--	--	--	--	27	81	739	8.1
Q-172	do	y786-806	Oct. 1956	--	--	--	--	--	90 --	98	--	39	--	--	--	--	--	24	98	455	8.7
Q-172	do	y876-896	Oct. 1956	28	0.15	--	3.4	0.0	87 1.2	106	67	30	1.4	0.2	--	0.18	271	8	95	415	8.4
Q-172	do	y969-989	Oct. 1956	--	--	--	--	--	95 --	113	--	29	--	--	--	--	--	6	97	432	9.0
eQ-172	do	1,060	May 6, 1957	--	.02	--	2.4	--	--	--	90	37	1.4	--	--	--	283	6	--	--	8.4
eQ-172	do	1,060	Oct. 25, 1957	--	.02	0.1	5	0	--	--	92	39	1.3	--	--	--	292	10	--	--	9.2
eQ-173	do	y250-270	Nov. 17, 1956	--	--	--	14	2	126	--	118	50	.8	--	--	--	380	42	89	--	8.1
eQ-173	do	y370-390	Nov. 18, 1956	--	--	--	17	2	129	--	114	67	.7	--	--	--	354	52	87	--	8.1
eQ-173	do	y470-490	do	--	--	--	8	0	94	--	74	35	.7	--	--	--	281	19	92	--	8.3
eQ-173	do	y680-700	Nov. 21, 1956	--	--	--	22	4	144	--	152	81	.7	--	--	--	434	71	85	--	8.3

See footnotes at end of table.

Table 5.--Analyses of water from wells in lower Mesilla Valley, El Paso County, Texas, and Dona Ana County, New Mexico--Continued.

Well	Owner	Depth of well (ft.)	Date of collection	Silica (SiO_2)	Iron (Fe)	Manganese (Mn)	Calcium (Ca)	Magnesium (Mg)	Sodium and potassium (Na + K)	Bicarbonate (HCO_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
e9-173	City of El Paso	y758-778	Nov. 21, 1956	--	--	--	8	0	117	--	96	48	1.0	--	--	--	300	20	94	--	8.3
e9-173	do	y819-839	Nov. 22, 1956	--	--	--	6	0	127	--	98	50	1.0	--	--	--	314	14	95	--	8.3
e9-173	do	y910-930	Nov. 23, 1956	--	--	--	8	0	113	--	80	53	1.0	--	--	--	315	19	93	--	8.[illegible]
e9-173	do	y1,000-1,020	do	--	--	--	12	3	197	--	178	99	.8	--	--	--	540	43	93	--	8.[illegible]
e9-173	do	y1,090-1,110	Nov. 26, 1956	--	--	--	6	0	110	--	74	41	1.1	--	--	--	295	15	95	--	8.2
e9-173	do	1,090	June 20, 1957	--	0.02	0.1	2.4	--	--	--	80	35	1.0	--	--	--	271	6	--	--	8.3
e9-173	do	1,090	Oct. 25, 1957	--	.02	.1	6	0	--	--	84	38	1.0	--	--	--	261	112	--	--	[illegible].2
e9-173	do	1,090	July 15, 1958	30	.00	--	4.0	.3	80 0.9	74	69	38	1.2	0.0	--	0.08	257	11	93	--	8.5
e9-174	do	y278-298	Dec. 4, 1956	--	--	--	15	1	130	--	96	75	.7	--	--	--	403	42	89	--	8.[illegible]
e9-174	do	y359-379	Dec. 5, 1956	--	--	--	28	3	200	--	194	142	.6	--	--	--	612	82	87	--	8.[illegible]
e9-174	do	y448-468	Dec. 6, 1956	--	--	--	21	1	124	--	142	55	.7	--	--	--	456	57	85	--	8.1
e9-174	do	y568-588	Dec. 7, 1956	--	--	--	14	0	111	--	112	45	.6	--	--	--	340	35	89	--	8.3
e9-174	do	y644-664	do	--	--	--	15	0	105	--	90	44	.5	--	--	--	331	38	87	--	8.[illegible]
e9-174	do	y763-783	Dec. 8, 1956	--	--	--	6	0	94	--	70	39	.9	--	--	--	364	15	94	--	8.3
e9-174	do	y868-889	do	--	--	--	5	0	103	--	70	44	.9	--	--	--	256	13	95	--	8.1
e9-174	do	y960-980	Dec. 9, 1956	--	--	--	5	0	84	--	68	41	.7	--	--	--	269	12	94	--	8.[illegible]

See footnotes at end of table.

Well	Owner	Depth of well (ft.)	Date of collection	Silica (SiO_2)	Iron (Fe)	Manganese (Mn)	Calcium (Ca)	Magnesium (Mg)	Sodium and potassium (Na + K)	Bicarbonate (HCO_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
eQ-174	City of El Paso	y1,130-1,150	Dec. 11, 1956	--	--	--	3	0	108	--	68	39	.7	--	--	--	255	8	98	--	8.5
eQ-174	do	y1,234-1,277	July 15, 1957	--	.04	.1	18	--	--	--	112	68	1.6	--	--	--	723	46	--	--	8.5
eQ-174	do	1,150	Nov. 19, 1957	--	.02	.1	6	0	--	--	118	41	.9	--	--	--	250	16	--	--	8.8
eQ-174	do	1,150	July 15, 1958	28	.00	--	4.9	.5	78 .5	71	69	38	1.0	0	--	.14	256	14	92	408	--
eQ-175	do	y465-480	Dec. 15, 1956	--	--	--	11	2	159	--	140	65	.5	--	--	--	450	37	92	--	8.4
eQ-175	do	y630-650	Dec. 16, 1956	--	--	--	12	0	101	--	76	50	.7	--	--	--	294	30	89	--	8.2
eQ-175	do	y830-850	do	--	--	--	15	1	214	--	240	68	0.7	--	--	--	600	43	93	--	8.5
eQ-175	do	y965-990	Dec. 17, 1956	--	--	--	5	0	109	--	92	39	.8	--	--	--	285	12	96	--	8.6
eQ-178	do	149	--	--	--	0.1	8,784	5,215	--	--	2,700	5,240	.8	--	--	--	23,680	14,417	--	--	7.4
eQ-178	do	y233-258	--	--	--	.1	37	13	--	--	210	210	.6	--	--	--	912	148	--	--	8.1
eQ-178	do	y313-334	--	--	0.02	.1	27	1	--	--	164	137	.7	--	--	--	629	72	--	--	8.2
eQ-178	do	y426-440	--	--	--	.1	31	1	--	--	164	147	.7	--	--	--	697	82	--	--	8.1
eQ-178	do	y495-521	--	--	.02	.1	18	1	--	--	130	64	.6	--	--	--	444	50	--	--	8.4
eQ-178	do	y576-602	--	--	.06	.1	14	.9	--	--	124	48	.8	--	--	--	366	30	--	--	8.4
eQ-178	do	y675-701	--	--	--	.1	23	0	--	--	130	45	.6	--	--	--	376	56	--	--	8.4
eQ-178	do	y846-872	--	--	--	.1	80	1	--	--	350	63	.8	--	--	--	615	206	--	--	9.3

See footnotes at end of table.

Table 5.--Analyses of water from wells in lower Mesilla Valley, El Paso County, Texas, and Dona Ana County, New Mexico--Continued

Well	Owner	Depth of well (ft.)	Date of collection	Silica (SiO_2)	Iron (Fe)	Manganese (Mn)	Calcium (Ca)	Magnesium (Mg)	Sodium and potassium (Na + K)	Bicarbonate (HCO_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
eQ-178	City of El Paso	y967-993	--	--	--	.1	19	.2	--	--	105	43	.9	--	--	--	319	48	--	--	8.6
eQ-178	do	y1,057-1,083	--	--	.2	.1	20	0	--	--	120	49	.6	--	--	--	357	40	--	--	8.4
eQ-178	do	y1,194-1,218	--	--	1.4	.1	12	.5	--	--	205	90	.9	--	--	--	737	32	--	--	8.6
eQ-179	J. E. Mann	150	June 21, 1957	--	.02	.1	62	23	--	--	300	160	1.5	--	--	--	810	260	--	--	8.0
eQ-180	City of El Paso	550	Aug. 28, 1957	32	.04	.00	13	1.2	97 3.2	95	99	52	.3	0.0	0.2	0.12	345	38	84	[illegible]38	8.3
eQ-181	do	y80-90	Aug. 1957	--	0.02	0.01	13	3	--	--	168	64	0.7	--	--	--	481	46	--	--	8.1
eQ-181	do	y260-276	Aug. 1957	--	.02	.1	14	3	--	--	124	54	1.1	--	--	--	375	50	--	--	8.2
eQ-181	do	y395-421	Aug. 1957	--	.02	.1	19	6	--	--	168	62	1.1	--	--	--	473	70	--	--	8.1
eQ-181	do	y515-541	Aug. 1957	--	.02	.1	9	4	--	--	124	37	1.2	--	--	--	380	40	--	--	8.4
eQ-181	do	y605-631	Aug. 1957	--	.02	.1	9	6	--	--	336	36	1.2	--	--	--	880	48	--	--	8.3
eQ-181	do	y696-722	Aug. 1957	--	.02	.1	16	5	--	--	284	57	1.1	--	--	--	540	60	--	--	8.5
eQ-181	do	y787-813	Aug. 29, 1957	--	.02	.1	9	4	--	--	312	78	1.5	--	--	--	663	38	--	--	8.3
eQ-181	do	y907-933	do	--	.02	.1	14	5	--	--	208	221	1.8	--	--	--	952	56	--	--	8.4
eQ-181	do	y988-1,014	Aug. 30, 1957	--	.02	.1	62	7	--	--	600	683	1.9	--	--	--	2,057	182	--	--	8.2
Q-181	do	y528-1,013	Sept. 6, 1957	30	.25	.00	6.6	0.1	161 1.4	83	127	116	3.6	0.0	0.2	0.34	510	17	95	812	8.9
Q-182	do	202	Sept. 13, 1957	33	--	--	27	3.2	190 6.6	155	170	133	.5	.0	--	.23	640	80	82	1,050	8.0

See footnotes at end of table.

Well	Owner	Depth of well (ft.)	Date of collection	Silica (SiO_2)	Iron (Fe)	Manganese (Mn)	Calcium (Ca)	Magnesium (Mg)	Sodium and potassium (Na + K)	Bicarbonate (HCO_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
Q-186	McKee Construction Co.	204	July 11, 1958	36	--	--	66	39	163	182	221	210	1.8	.0	--	--	852	325	62	1,360	7.9
Q-187	Town of Anthony	277	Sept. 1954	--	.15	--	53	17	291	244	153	336	--	--	--	--	--	202	--	--	8.0
Q-188	do	287	Nov. 1954	--	.05	--	58	22	276	214	143	360	--	--	--	--	--	235	--	--	8.0
eQ-189	City of El Paso	y274-300	May 20, 1958	--	.02	--	12	3	--	--	88	50	.8	--	--	--	190	44	--	--	8.5
eQ-189	do	y487-513	do	--	.02	--	14	1	--	--	96	90	.9	--	--	--	267	41	--	--	8.4
eQ-189	do	y666-692	do	--	0.06	--	10	3	--	--	72	50	0.9	--	--	--	365	40	--	--	9.2
eQ-189	do	y847-873	do	--	.02	--	15	4	--	--	144	105	1.1	--	--	--	774	50	--	--	8.8
eQ-189	do	y937-963	May 22, 1958	--	.02	--	70	7	--	--	400	730	1.7	--	--	--	1,943	206	--	--	8.3
Q-189	do	900	Aug. 19, 1958	33	.03	0.00	4.8	.0	82 0.8	76	73	38	1.0	0.0	--	0.12	265	12	93	425	8.7
eQ-190	McKee Construction Co.	226	Feb. 20, 1958	--	70.02	--	83	25	--	--	216	217	1.7	--	--	--	901	310	--	--	7.9
eQ-191	do	224	do	--	.02	--	78	18	--	--	130	293	1.5	--	--	--	888	272	--	--	8.1
eU-1	White Water Works well 1	127	June 12, 1942	46	--	--	72	10	--	49	357	350	--	--	--	--	1,070	221	--	--	7.8
eU-2	White Water Works well 6	--	do	70	--	--	138	11	676	44	573	870	--	--	--	--	2,210	--	--	--	7.6
eU-4	White Water Works well 5	92	Dec. 10, 1953	--	.1	--	39	10	244	--	288	92	.5	--	--	--	948	139	--	--	7.3
eU-6	White Water Works test hole 5	127	Dec. 24, 1945	--	--	--	--	--	--	35	--	580	--	--	--	--	2,085	280	--	--	--
eU-7	White Water Works well 3	107	June 12, 1942	47	--	--	73	9	289	51	313	340	--	--	--	--	956	219	--	--	7.7
U-10	Paul Harvey	--	June 30, 1953	--	--	--	--	--	--	147	576	448	--	--	--	--	--	360	--	2,750	8.2

See footnotes at end of table.

Table 5.--Analyses of water from wells in lower Mesilla Valley, El Paso County, Texas, and Dona Ana County, New Mexico--Continued

Well	Owner	Depth of well (ft.)	Date of collection	Silica (SiO_2)	Iron (Fe)	Manganese (Mn)	Calcium (Ca)	Magnesium (Mg)	Sodium and potassium (Na + K)	Bicarbonate (HCO_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
U-12	Broadus & McGrath	1,690	June 9, 1953	20	--	--	46	32	119	311	99	98	4.8	.0	--	--	570	246	51	987	7.6
U-12	do	1,690	Feb. 4, 1953	18	3	--	80	--	93	323	105	131	5.6	.4	--	--	652	356	--	--	--
U-13	do	502	Oct. 10, 1953	22	0.02	0.01	26	26	142 7.5	318	111	60	2.8	2.6	0.01	0.44	579	168	63	942	8.1
U-15	Buena Vista Co-operative Water System	169	June 10, 1952	14	--	--	24	19	179	365	138	57	1.8	.2	--	--	638	138	74	1,020	7.9
tU-17	El Paso Electric Co.	y10-30	May 31, 1951	39	--	--	--	--	--	--	5,000	11,000	--	--	--	--	23,300	4,320	--	--	7.7
tU-17	do	y32-52	do	46	--	--	--	--	--	--	4,880	11,600	--	--	--	--	24,800	5,340	--	--	7.7
tU-21	do	20	May 29, 1951	33	--	--	--	--	--	--	710	400	--	--	--	--	2,900	502	--	--	8.0
tU-21	do	50	do	40	--	--	--	--	--	--	2,200	2,760	--	--	--	--	7,550	3,810	--	--	7.9
tU-21	do	y126-142	May 30, 1951	11	--	--	--	--	--	--	3,060	7,900	--	--	--	--	14,400	4,040	--	--	7.5
tU-26	do	y79-150	Jan. 11, 1952	31	--	--	--	--	--	--	390	230	--	--	--	--	1,030	254	--	--	8.1
tU-26	do	y168-188	Jan. 9, 1952	30	--	--	--	--	--	--	850	595	--	--	--	--	2,620	326	--	--	7.8
tU-26	do	y235-255	June 8, 1952	16	--	--	--	--	--	--	1,380	750	--	--	--	--	3,050	482	--	--	7.7
tU-28	American Smelting & Refining Co.	352	Aug. 1951	--	--	--	--	--	--	--	795	580	--	--	--	--	2,190	370	--	--	--
tU-28	do	384	Aug. 1951	--	--	--	--	--	--	--	927	610	--	--	--	--	2,420	--	--	--	--
tU-29	do	119	Aug. 1951	--	--	--	--	--	--	--	217	100	--	--	--	--	618	150	--	--	--
tU-29	do	144	Aug. 1951	--	--	--	--	--	--	--	353	210	--	--	--	--	958	170	--	--	--
tU-29	do	170	Aug. 1951	--	--	--	--	--	--	--	574	320	--	--	--	--	1,480	260	--	--	--
tU-29	do	230	Aug. 1951	--	--	--	--	--	--	--	955	460	--	--	--	--	2,330	390	--	--	--

See footnotes at end of table.

Well	Owner	Depth of well (ft.)	Date of collection	Silica (SiO_2)	Iron (Fe)	Manganese (Mn)	Calcium (Ca)	Magnesium (Mg)	Sodium and potassium (Na + K)	Bicarbonate (HCO_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
tU-31	American Smelting & Refining Co.	83	Aug. 1951	--	--	--	--	--	--	--	238	110	--	--	--	--	622	100	--	--	--
tU-32	El Paso Electric Co.	y98-122	July 23, 1951	30	--	--	--	--	--	--	320	121	--	--	--	--	683	160	--	--	8.3
tU-32	do	y122-136	do	32	--	--	--	--	--	--	310	133	--	--	--	--	683	148	--	--	8.3
tU-32	do	y140-161	do	34	--	--	--	--	--	--	430	198	--	--	--	--	908	188	--	--	8.2
tU-32	do	y218-242	do	34	--	--	--	--	--	--	850	418	--	--	--	--	1,640	390	--	--	8.2
tU-36	do	y102-122	July 9, 1951	23	--	--	--	--	--	--	165	62	--	--	--	--	368	68	--	--	9.0
tU-36	do	y142-162	July 10, 1951	21	--	--	--	--	--	--	230	74	--	--	--	--	420	46	--	--	8.6
tU-36	do	y162-182	do	20	--	--	--	--	--	--	267	160	--	--	--	--	750	88	--	--	8.4
tU-36	do	y196-212	July 11, 1951	33	--	--	--	--	--	--	370	321	--	--	--	--	1,430	174	--	--	8.3
tU-36	do	y212-231	July 12, 1951	35	--	--	--	--	--	--	975	500	--	--	--	--	1,880	330	--	--	8.1
U-37	do	370	May 29, 1956	36	--	--	55	2.4	347	60	512	225	1.4	0.5	--	--	1,210	148	84	1,870	7.8
tU-39	do	y46-52	June 6, 1951	34	--	--	--	--	--	--	250	62	--	--	--	--	700	89	--	--	8.3
tU-39	do	y74-82	June 26, 1951	29	--	--	--	--	--	--	180	28	--	--	--	--	460	49	--	--	8.5
tU-39	do	y82-92	June 27, 1951	28	--	--	--	--	--	--	130	37	--	--	--	--	430	58	--	--	8.2
tU-39	do	y92-102	June 28, 1951	27	--	--	--	--	--	--	280	87	--	--	--	--	670	63	--	--	8.5
tU-39	do	y102-112	do	28	--	--	--	--	--	--	240	94	--	--	--	--	670	63	--	--	8.3

See footnotes at end of table.

Table 5.--Analyses of water from wells in lower Mesilla Valley, El Paso County, Texas, and Dona Ana County, New Mexico--Continued

Well	Owner	Depth of well (ft.)	Date of collection	Silica (SiO_2)	Iron (Fe)	Manganese (Mn)	Calcium (Ca)	Magnesium (Mg)	Sodium and potassium (Na + K)	Bicarbonate (HCO_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
tU-39	El Paso Electric Co.	y162-192	June 29, 1951	16	--	--	--	--	--	--	600	469	--	--	--	--	2,130	302	--	--	8.1
tU-39	do	y205-257	June 30, 1951	23	--	--	--	--	--	--	440	474	--	--	--	--	2,090	326	--	--	8.0
tU-40	F. A. McKnight	80	June 4, 1951	32	--	--	40	3.4	340	a49	550	170	--	--	--	--	1,180	113	--	--	8.4
tU-41	L. D. McComas	72	do	34	--	--	56	5.1	238	139	380	122	--	--	--	--	--	161	--	--	8.1
tU-48	El Paso Electric Co.	y62-82	Aug. 20, 1951	33	--	--	--	--	--	--	220	45	--	--	--	--	428	112	--	--	8.1
tU-48	do	y82-100	do	29	--	--	--	--	--	--	380	53	--	--	--	--	662	146	--	--	8.1
tU-48	do	y105-122	Aug. 21, 1951	22	--	--	--	--	--	--	330	52	--	--	--	--	500	108	--	--	8.1
tU-48	do	y138-162	do	23	--	--	--	--	--	--	320	62	--	--	--	--	518	51	--	--	8.4
tU-48	do	y162-182	Aug. 22, 1951	23	--	--	--	--	--	--	520	133	--	--	--	--	923	91	--	--	8.4
tU-48	do	y182-200	do	22	--	--	--	--	--	--	620	188	--	--	--	--	1,120	109	--	--	8.1
tU-49	do	y60-80	Aug. 17, 1951	22	--	--	--	--	--	--	300	72	--	--	--	--	533	88	--	--	8.5
tU-49	do	y97-122	do	22	--	--	--	--	--	--	350	82	--	--	--	--	585	64	--	--	8.4
tU-49	do	y122-142	do	22	--	--	--	--	--	--	640	186	--	--	--	--	1,140	157	--	--	8.4
tU-51	do	y60-80	June 19, 1951	31	--	--	--	--	--	--	800	544	--	--	--	--	2,460	504	--	--	7.9
tU-51	do	y160-180	do	48	--	--	--	--	--	--	830	596	--	--	--	--	2,810	496	--	--	7.8
tU-53	do	y45-64	Jan. 24, 1951	26	--	--	--	--	--	--	270	132	--	--	--	--	775	166	--	--	8.1

See footnotes at end of table.

Well	Owner	Depth of well (ft.)	Date of collection	Silica (SiO_2)	Iron (Fe)	Manganese (Mn)	Calcium (Ca)	Magnesium (Mg)	Sodium and potassium (Na + K)	Bicarbonate (HCO_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
tU-53	El Paso Electric Co.	y150-170	June 23, 1950	12	--	--	--	--	--	--	1,780	724	--	--	--	--	3,400	568	--	--	7.6
tU-53	do	y220-240	June 23, 1951	14	--	--	--	--	--	--	1,650	750	--	--	--	--	3,500	608	--	--	7.8
tU-54	do	132	June 13, 1951	28	--	--	--	--	--	--	1,090	264	--	--	--	--	1,910	540	--	--	8.0
tU-54	do	142	do	24	--	--	--	--	--	--	910	334	--	--	--	--	1,680	394	--	--	7.3
tU-55	do	205	July 9, 1951	--	--	--	--	--	--	--	1,540	460	--	--	--	--	10,300	1,150	--	--	--
U-56	Southern Pacific Lines	200	Oct. 2, 1950	42	--	--	75	17	138	108	303	98	--	18	--	--	746	257	54	1,090	7.6
tU-57	American Smelting & Refining Co.	266	July 9, 1951	--	--	--	--	--	--	--	426	200	--	--	--	--	1,060	230	--	--	--
tU-58	do	163	July 2, 1951	--	--	--	--	--	--	--	537	730	--	--	--	--	--	440	--	--	--
U-59	Southwestern Portland Cement Co.	140	June 26, 1953	24	--	--	91	52	390	396	439	530	--	16	--	--	1,560	441	66	3,800	7.8
eU-63	El Paso Electric Co.	274	Aug. 24, 1956	--	0.02	--	82	47	217	239	200	215	0.5	--	--	--	910	396	--	--	8.2
tU-65	Erich Brandes	600	Sept.22, 1957	40	--	--	114	42	1,274	71	1,750	790	--	--	--	--	4,380	460	--	4,200	7.8

a - Includes carbonate as bicarbonate.
b - Includes the equivalent of 5 ppm carbonate (CO_3).
c - Includes the equivalent of 8 ppm carbonate (CO_3).
d - Includes the equivalent of 1 ppm carbonate (CO_3).
e - Analysis by city of El Paso.
f - Includes the equivalent of 30 ppm carbonate (CO_3).
g - Includes the equivalent of 13 ppm carbonate (CO_3).
h - Includes the equivalent of 3 ppm carbonate (CO_3).
i - Includes the equivalent of 4 ppm carbonate (CO_3).
j - Includes the equivalent of 6 ppm carbonate (CO_3).
k - Includes the equivalent of 26 ppm carbonate (CO_3).
m - Includes the equivalent of 14 ppm carbonate (CO_3).
n - Includes the equivalent of 7 ppm carbonate (CO_3).
p - Includes the equivalent of 12 ppm carbonate (CO_3).
q - Includes the equivalent of 10 ppm carbonate (CO_3).
r - Former depth. Deepened to 540 ft. in 1952.
s - Includes the equivalent of 23 ppm carbonate (CO_3).
t - Analysis by El Paso Electric Co.
v - Analysis by Texas State Dept. of Health.
w - Includes the equivalent of 2 ppm (CO_3).
x - Analysis by Curtis Laboratory.
y - Drill-stem test, depth interval sampled.