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REPORT 32

GROUND-WATER RESOURCES OF ATASCOSA AND FRIO COUNTIES, TEXAS

DECEMBER 1966

TEXAS WATER DEVELOPMENT BOARD

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GROUND-WATER RESOURCES OF ATASCOSA AND FRIO COUNTIES, TEXAS

By

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United States Geological Survey

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GROUND-WATER RESOURCES OF ATASCOSA AND FRIO COUNTIES, TEXAS

ABSTRACT

To evaluate the present and future ground-water resources of Atascosa and Frio Counties a comprehensive study of the area has been conducted by the U.S. Geological Survey and the Texas Water Development Board.

Atascosa County, an area of 1,206 square miles, and adjacent Frio County, an area of 1,116 square miles, are in the Gulf Coastal Plain of south Texas. Atascosa County lies south, and Frio County southwest, of the city of San Antonio.

The economy of both counties is based on diversified agriculture and on the production of oil and gas. Ground water, essential to the economy, meets 99.8 percent of the irrigation needs, and all of the municipal, industrial, and domestic requirements. Water used in the report area during 1964 amounted to 10,000 acre-feet of ground water for public supply, industrial, domestic, and livestock uses, plus 100,000 acre-feet of ground water and 201 acre-feet of surface water for irrigation.

The extensive development of irrigation, which began during the 1950-56 drought, has resulted in a significant increase in the use of ground water in Atascosa and Frio Counties. The ground-water discharge, which amounted to 17,000 acre-feet in 1930, increased to 25,000 acre-feet in 1945, 62,000 acre-feet in 1955, and 110,000 acre-feet in 1964.

Large quantities of fresh water are obtained from wells supplied from the Carrizo Sand, the principal aquifer in Atascosa and Frio Counties; four other less important aquifers yield smaller quantities of water. In 1964 the following quantities, in acre-feet, were obtained: Carrizo Sand, 103,000; Queen City Sand, 2,240; Edwards and associated limestones, 1,100; Wilcox Group, 840; and Sparta Sand, 220.

The Carrizo Sand has been the principal source of ground water in these two counties for more than 60 years. In 1964 the Carrizo supplied to 510 irrigation wells in the report area an approximate 97,000 acre-feet of water, or 88 percent of the water used for all purposes during the year. The large withdrawals of water during the past 14 years have, however, caused significant declines in the water levels of wells supplied from the Carrizo Sand. For example, the annual average of declines of water levels from 1961 to 1964 ranged from 5 feet per year in the northern part of the report area to 25 feet per year in the southwestern part of Frio County.

The ground-water budgets for the Carrizo Sand in Atascosa and Frio Counties for 1905-64 and 1961-64 are estimates of conditions in the aquifer during these periods. The sources of supply (recharge, dewatering of outcrop, and release from artesian storage) totalled 2,170,000 acre-feet from 1905 to 1964 and 374,000 acre-feet from 1961 to 1964--totals equivalent to the sources of depletion (withdrawals, subsurface outflow, and leakage to overlying formations).

The future development of the water resources in the Carrizo Sand in much of the report area is more dependent on the cost of pumping water than on the availability of water. During the period 1961-64, the pumpage was about four times the rate of recharge, and most of the water was taken from storage. The areas in which the water-level declines have been the least will, therefore, be the most promising for additional development.

The Edwards and associated limestones are available for development in only the extreme northern corner of Atascosa County. Large quantities of water can be developed from individual wells in them; however, the principal factor limiting the development is the great depth to the top of the Edwards and associated limestones (at least 2,000 feet).

The Wilcox Group, which immediately underlies the Carrizo Sand, is capable of yielding moderate supplies of water to wells in most of the report area. The water is fresh only in and near the outcrop area; the Wilcox contains slightly or moderately saline water in the remainder of the two counties.

The Reklaw Formation, immediately overlying the Carrizo Sand, is extremely fine grained; hence the construction of sand-free wells in the formation is difficult. The principal significance of the Reklaw, which contains large quantities of fresh water in storage, is that it will probably supply water to the underlying Carrizo Sand as the artesian pressures decline in the Carrizo.

Moderate quantities of water can be obtained from the Queen City Sand. The areas most favorable for development are those in which the greatest thicknesses of sand occur in the east-central, central, and southwestern parts of Atascosa County, and in the southeastern part of Frio County.

Fresh water is available in the Sparta Sand only in the outcrop area and a few miles downdip from the outcrop.

The other geologic formations in the two-county area can be expected to yield only small quantities of water, much of which is saline.

GROUND-WATER RESOURCES OF ATASCOSA AND FRIO COUNTIES, TEXAS

INTRODUCTION

Location and Extent of Area

Atascosa and Frio Counties are in the central part of southern Texas (Figure 1). Atascosa County is bordered by the following counties: on the northeast and east by Bexar, Wilson, and Karnes; on the southeast by Live Oak; on the south by McMullen; and on the west by Frio and Medina. Frio County is bordered by only four counties: on the north by Medina; on the east by Atascosa; on the south by La Salle; and on the west by Zavala. Jourdanton, the Atascosa County seat, is 38 miles south of San Antonio. Pearsall, the Frio County seat, is 52 miles southwest of San Antonio. The report area includes 2,322 square miles--of which Atascosa County comprises 1,206 and Frio County 1,116.

Purpose and Scope of Investigation

Through this cooperative investigation, begun in April 1963, the Texas Water Development Board and the U.S. Geological Survey proposed to determine and describe the ground-water resources of Atascosa and Frio Counties. The results of the investigation are presented in this report, which includes an analytical discussion of the occurrence and availability of ground water and a tabulation of basic data obtained during the project. The purpose of the report is to present information and data as a guide to the development of the available ground-water supplies.

The general scope of the investigation encompassed the collection, compilation, and analysis of data related to ground water in the project area. Likewise included were determinations of the locations and extent of the water-bearing formations, the chemical quality of the water they contain, the quantity of water being withdrawn and the effects of these withdrawals on the water levels, the hydraulic characteristics of the important water-bearing formations, and estimates of the quantities of ground water available for development. The technical terms in this report are defined in the section entitled "Definitions of Terms."

Methods of Investigation

The procedures on page 5 were followed in the investigation.

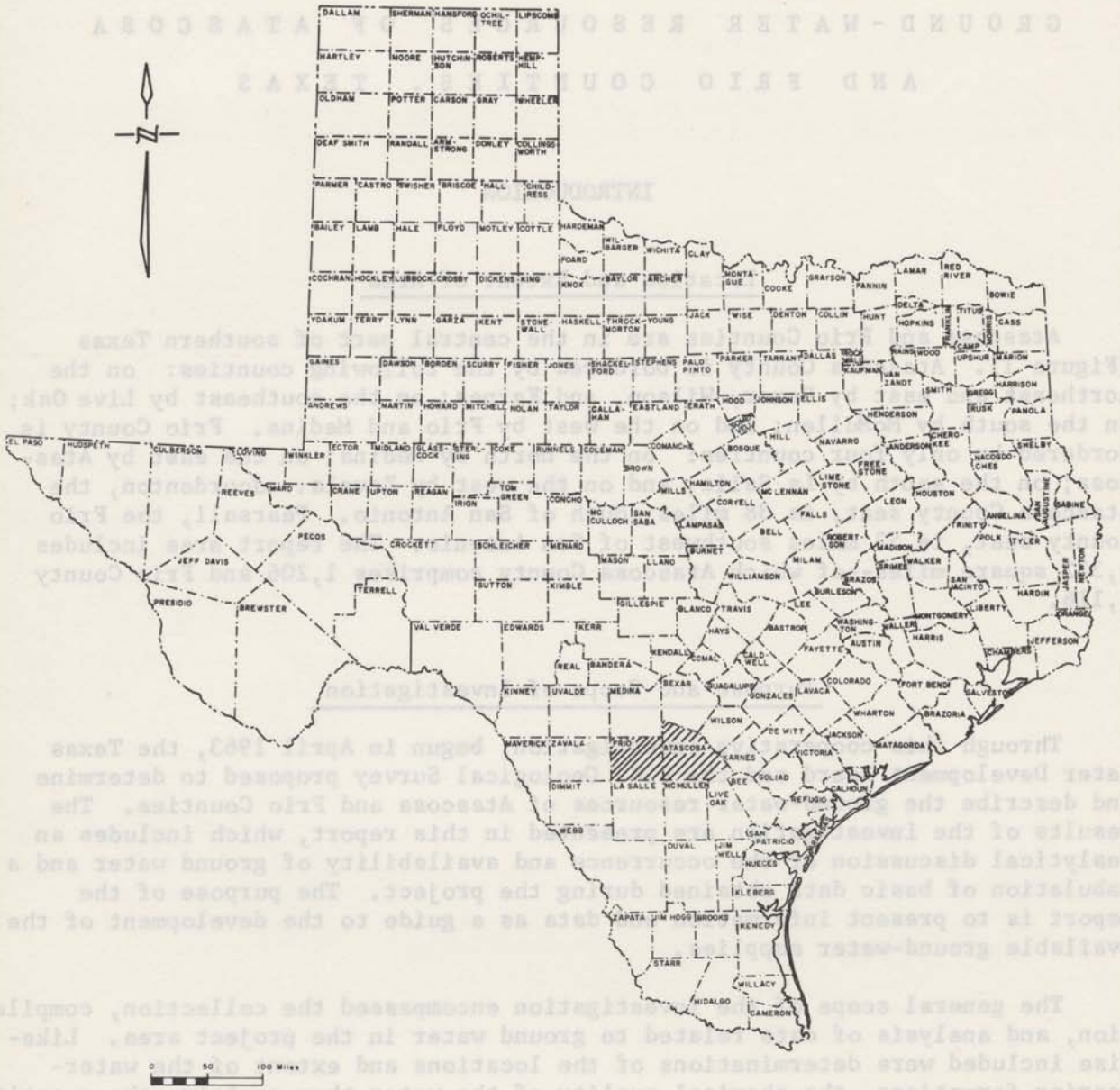

Figure 1

Map of Texas Showing Location of Atascosa and Frio Counties

U.S. Geological Survey in cooperation with the Texas Water Development Board

1. All public supply, irrigation, and industrial wells, plus a number of domestic and livestock wells (a total of 1,218 wells) were inventoried; among them were all the large-capacity wells supplied from the Carrizo Sand (for locations of the wells, see Figure 34).

2. The electric logs of 227 oil and gas tests were used for correlation and for a study of the water-bearing properties of the formations (for locations of these tests, see Figure 34).

3. The quantities of water used for public supply, irrigation, and industry were inventoried, and the quantity used for domestic and livestock purposes was estimated (Figures 15 and 16).

4. The results of 14 pumping tests were used to determine the hydraulic characteristics of the water-bearing sands (Table 2).

5. Water levels in wells were measured and available records of past fluctuations of water levels were compiled (Figures 17, 18, and 19).

6. Climatological and streamflow records were collected and compiled (Figures 2 to 6).

7. Analyses of samples of water collected during the present and previous investigations were used to determine the chemical quality of the water and to construct a water-quality map of the Carrizo Sand (Figure 24).

8. Maps showing the extent and thickness of sands containing fresh to slightly saline water in the Wilcox Group, Carrizo Sand, Reklaw Formation, and Queen City Sand were drawn from the electrical-log data and from the chemical analyses of water samples (Figures 27, 28, 31, and 32).

9. A map showing the altitude of the base of the fresh to slightly saline water was drawn from electrical-log data (Figure 26).

10. Maps showing the depths to the tops of the Carrizo Sand and Queen City Sand were drawn from electrical-log data (Figures 29 and 33).

11. Maps showing the altitudes of the tops of the Carrizo Sand, Queen City Sand, and Sparta Sand were drawn from electrical-log data (Figures 8, 9, and 10).

12. Five geologic sections were drawn from electrical logs (Figures 35 to 39).

13. Maps showing the altitude of the piezometric surface in the Carrizo Sand in 1929-30 (Figure 20) and in 1965 (Figure 21) were constructed from water-level measurements and altitudes of the wells (the altitudes had been obtained from topographic maps and altimeter measurements).

14. The hydrologic data were analyzed to determine the quantity and quality of ground water available for development.

Previous Investigations

Lonsdale (1935) described the geology of Atascosa and Frio Counties and discussed the 1900-1930 development of the ground-water resources. Lonsdale's report contains the records of 343 wells, and the chemical analyses of 45 water samples. Sundstrom and Follett (1950) discussed the 1930-45 development of the ground-water resources in Atascosa County. Their report includes the records of 301 wells, 75 of which were drilled between 1930 and 1945, and the chemical analyses of 73 water samples collected in 1944 and 1945. Among the public water supplies in southern Texas, inventoried by Broadhurst, Sundstrom, and Rowley (1950, p. 17-21, 53-55), were listed those of Campbellton, Christine, Coughran, Jourdanton, North Pleasanton, Pleasanton, and Poteet in Atascosa County and those of Dilley and Pearsall in Frio County.

A report by Moulder (1957) on the development of ground water from the Carrizo Sand and Wilcox Group in the southern Texas area included data on Atascosa and Frio Counties, as did a reconnaissance report on the ground-water resources of the Nueces River basin by Alexander, Myers, and Dale (1964). Records of water-level measurements in wells in Atascosa and Frio Counties from 1929 to 1954 were compiled by Swartz (1954), and those from 1955 to 1960 by Stearman (1960).

In two reports on regional geology (Deussen, 1924; and Sellards and others, 1932) the geologic formations in the report area were described.

Reports on ground-water resources of areas adjacent to Atascosa and Frio Counties include the following, by counties: Bexar (Arnow, 1959); Dimmit (Mason, 1960); Dimmit, Maverick, and Zavala (Turner and others, 1960); Karnes (Anders, 1960); La Salle and McMullen (Deussen and Dole, 1916, and Harris, 1965); Live Oak (Anders and Baker, 1961); Medina (Holt, 1959); Uvalde (Welder and Reeves, 1964); and Wilson (Anders, 1957). More recent reports on ground water in the San Antonio area, which includes the northernmost part of Atascosa County, are by Petitt and George (1956) and by Garza (1962a, 1962b, and 1964).

Economic Development

The economy of Atascosa and Frio Counties is based on agriculture and on production of oil and gas. In 1960 (U.S. Census data) the following populations were listed for the respective counties and their principal cities and towns: Atascosa County, 18,828--Pleasanton, 3,467; Poteet, 2,811; Jourdanton, 1,504; Charlotte, 1,465; North Pleasanton, 1,018; and Lytle, 798; Frio County, 10,112--Pearsall, 4,957; and Dilley, 2,118. All of the population is dependent on ground water for public supply and domestic use.

Agriculture was begun in Atascosa and Frio Counties more than 100 years ago when the area was a vast, open, cattle range. Beck, Hawker, and Ragsdale (1929, p. 4) wrote that, with the advent of barbed wire in the 1870's, large blocks of range land were fenced, improved breeds of beef cattle were gradually introduced, and small amounts of some feed crops were grown to augment the range forage for the more valuable livestock. Livestock production has continued to be a substantial source of agricultural income, and land under cultivation has increased to the present 210,000 acres in Atascosa County and

175,000 acres in Frio County. The principal crops are peanuts, cotton, and watermelons. Also important are grains, dairying, and diversified truck crops (including strawberries).

Irrigation from wells in Atascosa and Frio Counties began in the early 1900's, developed at a modest rate, accelerated during the drought of 1950-56, and has been continued at approximately the same pace (Figures 15 and 16). The number of acres irrigated from wells in Atascosa County increased from 23,200 in 1958 to 28,330 in 1964; and, in Frio County, from 24,200 in 1958 to 44,595 in 1964 (Gillett and Janca, 1965, p. 13, 16). In 1964, surface water was used to irrigate 175 acres in Atascosa County, but no use of surface water for irrigation was reported for Frio County (Gillett and Janca, 1965, p. 13).

The production of oil and gas is the principal industry in Atascosa and Frio Counties. The following data were tabulated from reports of individual oil and gas reservoirs (Railroad Commission of Texas, 1964, p. 46-57, 365-366). The production of oil during 1963 and the cumulative production to January 1, 1964, were, respectively, 2,914,851 and 61,040,379 barrels in Atascosa County, and 1,074,745 and 31,479,549 barrels in Frio County. The production of gas during 1964 reached 42,267,817 mcf (million cubic feet) in Atascosa County, and 7,180,132 mcf in Frio County. The quantity of hydrocarbon liquids produced with the gas during 1964 was 12,126 barrels in Atascosa County, and 992 barrels in Frio County. The Edwards Limestone, Carrizo Sand, Reklaw Formation, Queen City Sand, and Sparta Sand are among the oil and gas reservoirs in the report area; and they are also aquifers.

Physiography and Drainage

Atascosa and Frio Counties are in the West Gulf Coastal Plain (Fenneman, 1938, p. 100). The principal physiographic features of the report area are: the sandy, rolling to hilly belt across northern Atascosa County; the relatively flat, gravel-covered divide areas in north-central and northwestern Frio County and southwestern Atascosa County; and the gently rolling topography in almost all of the remainder of the report area. Flood plains and terraces occur as narrow belts along the major streams, except in northwestern Frio County where the belts are several miles wide. Altitudes (above sea level) range from about 200 feet, where the Atascosa River crosses the Atascosa-Live Oak County line, to about 800 feet in northern Atascosa County. In Frio County the highest altitude, also about 800 feet, is in the northern part.

All of Frio County and the southwestern part of Atascosa County are in the watershed of the Frio River. The remainder of Atascosa County, with the exception of a small area along the northern boundary, is in the watershed of the Atascosa River.

Because of their irregular flows, the Atascosa and Frio Rivers would not be dependable sources of water for irrigation in Atascosa and Frio Counties unless storage could be provided. In 1964, only 201 acre-feet of surface water was used to irrigate 175 acres in Atascosa County (Gillett and Janca, 1965, p. 13).

The Atascosa River drains an area of 1,171 square miles above the gaging station at Whitsett. Most of the drainage area is in Atascosa County. The

average annual discharge of the Atascosa at Whitsett for a 32-year period was 94,120 acre-feet; however, the discharge for the water year October 1962 to September 1963 was only 9,170 acre-feet, the minimum discharge during the 32-year period (U.S. Geological Survey, 1964, p. 375). The maximum discharge of record was 341,800 acre-feet in 1936 (Wells, 1960, p. 288).

The Frio River drains an area of 3,493 square miles above the gaging station near Derby. The average annual discharge of the Frio near Derby for a 48-year period was 94,120 acre-feet, and the discharge for the water year October 1962 to September 1963 was 3,150 acre-feet (U.S. Geological Survey, 1964, p. 373). The maximum discharge was 787,100 acre-feet in 1935 (Wells, 1960, p. 285), and the minimum discharge was 1,280 acre-feet in 1952 (Hendricks, 1964, p. 306). Additional records of discharge measurements at the two gaging stations are included in the "Surface Water Records of Texas" for 1961 and 1962 (U.S. Geological Survey, 1962, 1963).

Climate

The records of the U.S. Weather Bureau at Dilley, which date from 1910, provide the most complete climatological data for the report area. The average monthly data for precipitation, temperature, and evaporation from 1931 to 1960 are shown on Figure 2. During this period, the average annual precipitation was 22.63 inches. The average monthly precipitation was lowest during March and highest during May. The average annual temperature was 70.9°F; the average monthly temperature was lowest in January and highest in August. The average annual gross evaporation from U.S. Weather Bureau pan was 78.84 inches; the average monthly evaporation was lowest in December and highest in July. The growing season is about 286 days. The approximate dates for the last and first killing frosts are February 22 and December 5. Freezing weather generally is of short duration.

The variation of the annual precipitation in the two-county area is illustrated in Figures 3, 4, and 5. The precipitation at Dilley during 1931-64 (Figure 3) ranged from 7.22 inches in 1956 to 36.05 inches in 1958. A comparison of Figures 3, 4, and 5 shows the irregular areal distribution of precipitation in the report area; for example, during 1960 the annual totals were 30.25 inches at Dilley, 32.28 inches at Pearsall, and 35.44 inches at Poteet.

Thornthwaite (1952, p. 25-35) classified the climate in the conterminous United States by an index of moisture deficiency or surplus which was obtained from comparisons of the potential evapotranspiration with the precipitation. When precipitation is the same as potential evapotranspiration and water is available as needed, the climate is neither dry nor moist and is called subhumid. As the water surplus becomes larger with respect to the potential evaporation, the climate becomes more humid; and, conversely, as the water deficiency becomes larger, the climate becomes more arid. Most of the eastern half of Texas and part of the Texas Panhandle are in the subhumid belt. The line separating the moist subhumid belt in eastern Texas from the dry subhumid belt extends from Port Lavaca, which is 75 miles northeast of Corpus Christi, northward through Dallas. Atascosa and Frio Counties are in the semiarid belt, but are close to the boundary line of the dry subhumid belt (Thornthwaite, 1952, Figure 30) shown in Figure 6.

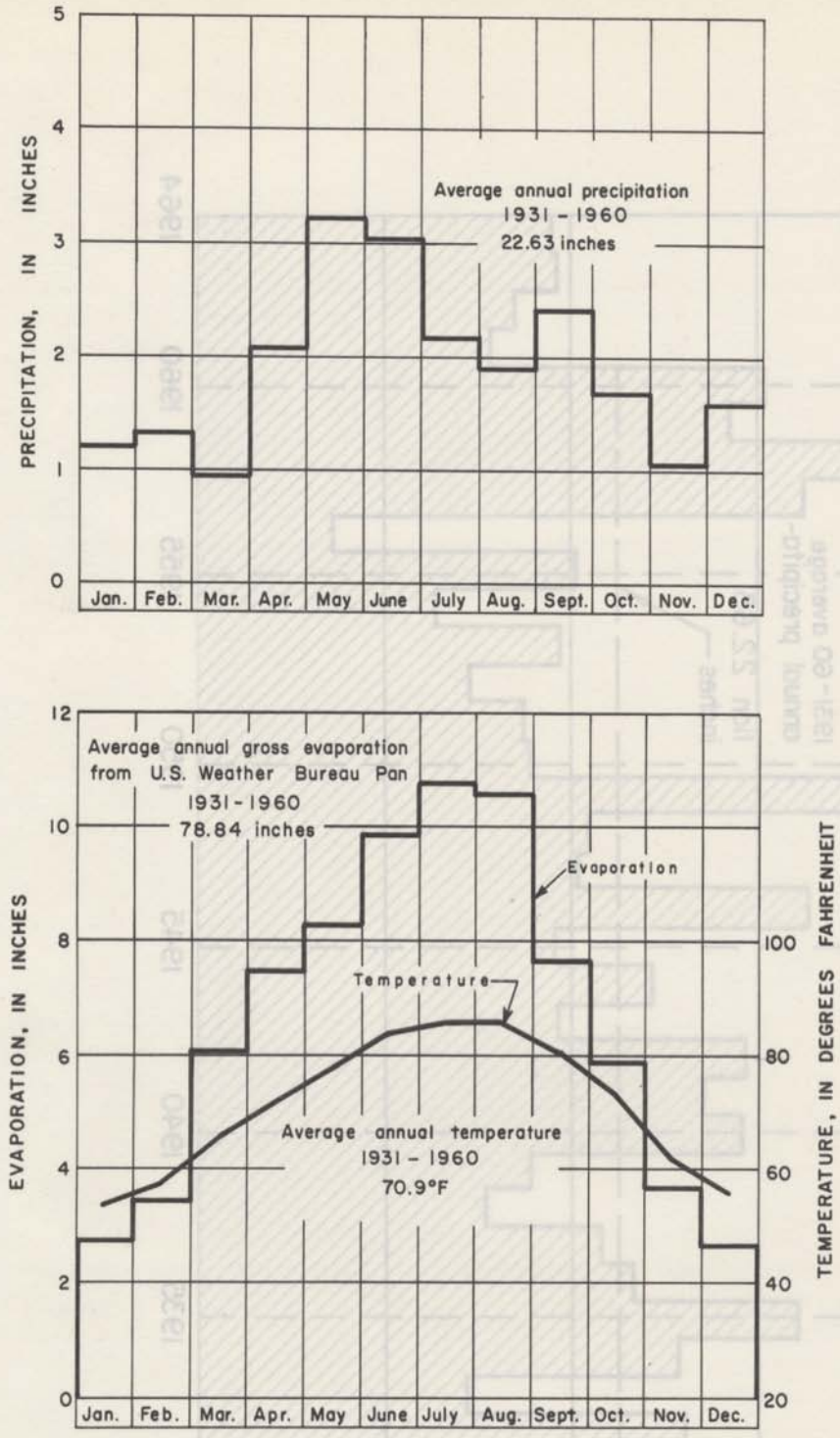

Figure 2

Monthly Precipitation, Evaporation, and Temperature at Dilley, 1931-60

U.S. Geological Survey in cooperation with the Texas Water Development Board

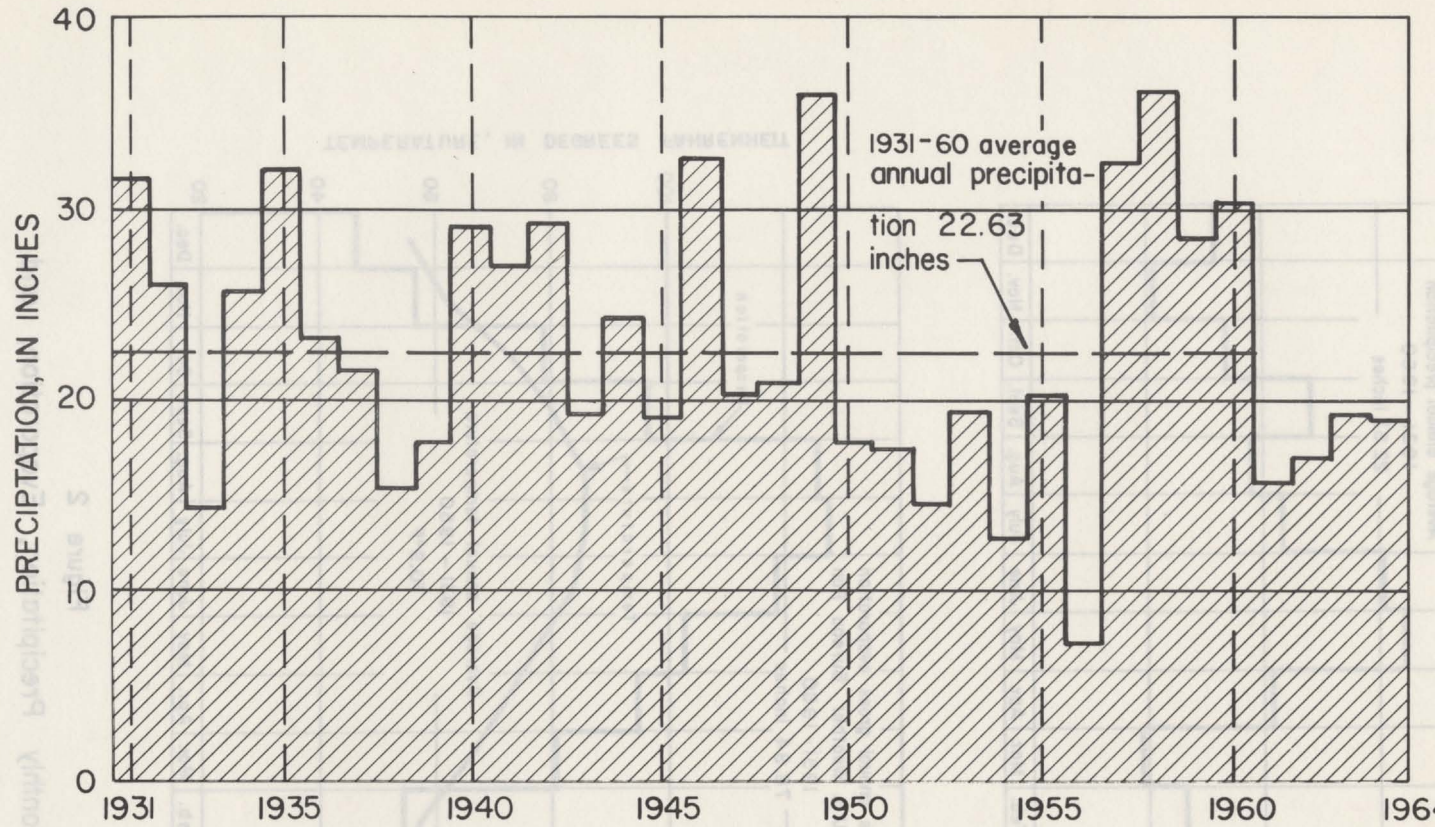

Figure 3

Annual Precipitation at Dilley, 1931-64

U. S. Geological Survey in cooperation with the Texas Water Development Board

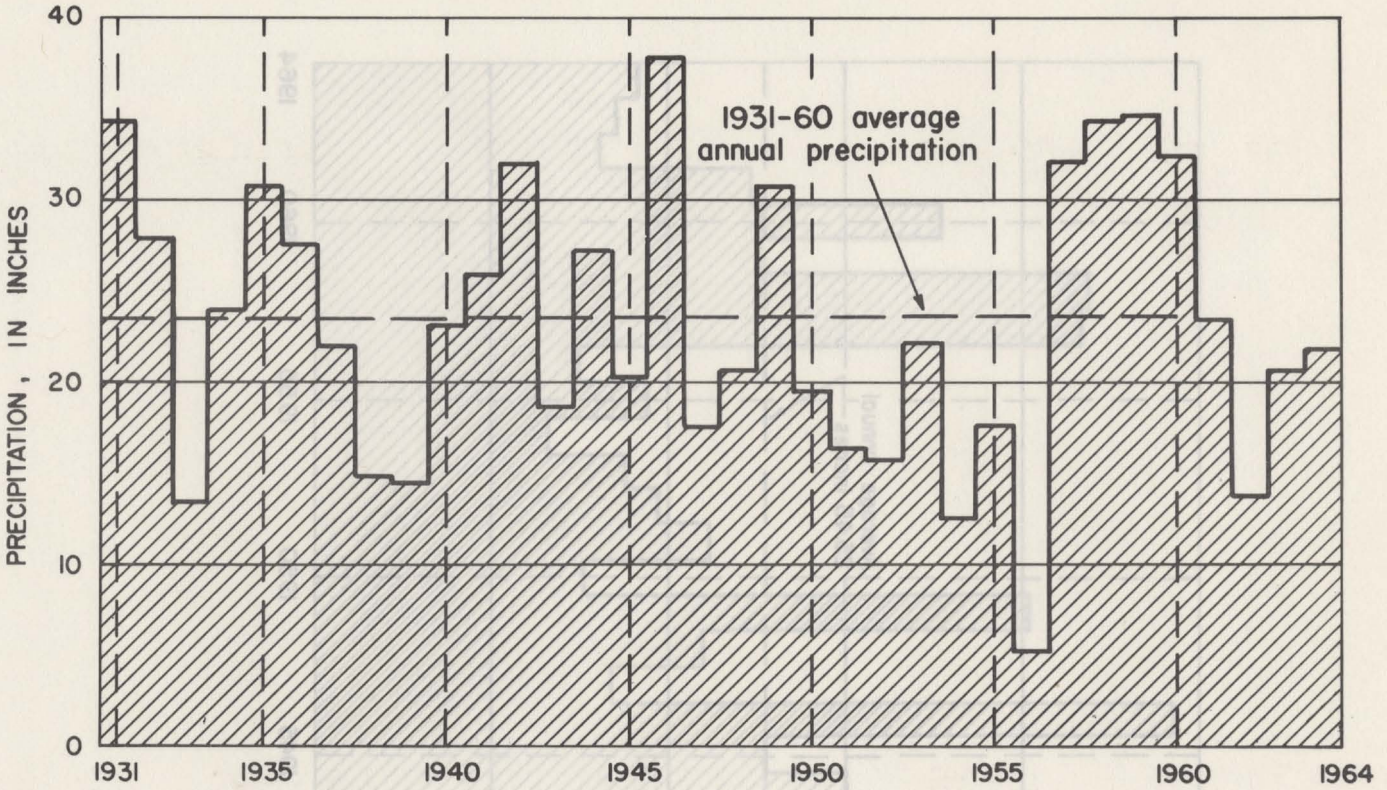

Figure 4

Annual Precipitation at Pearsall, 1931-64

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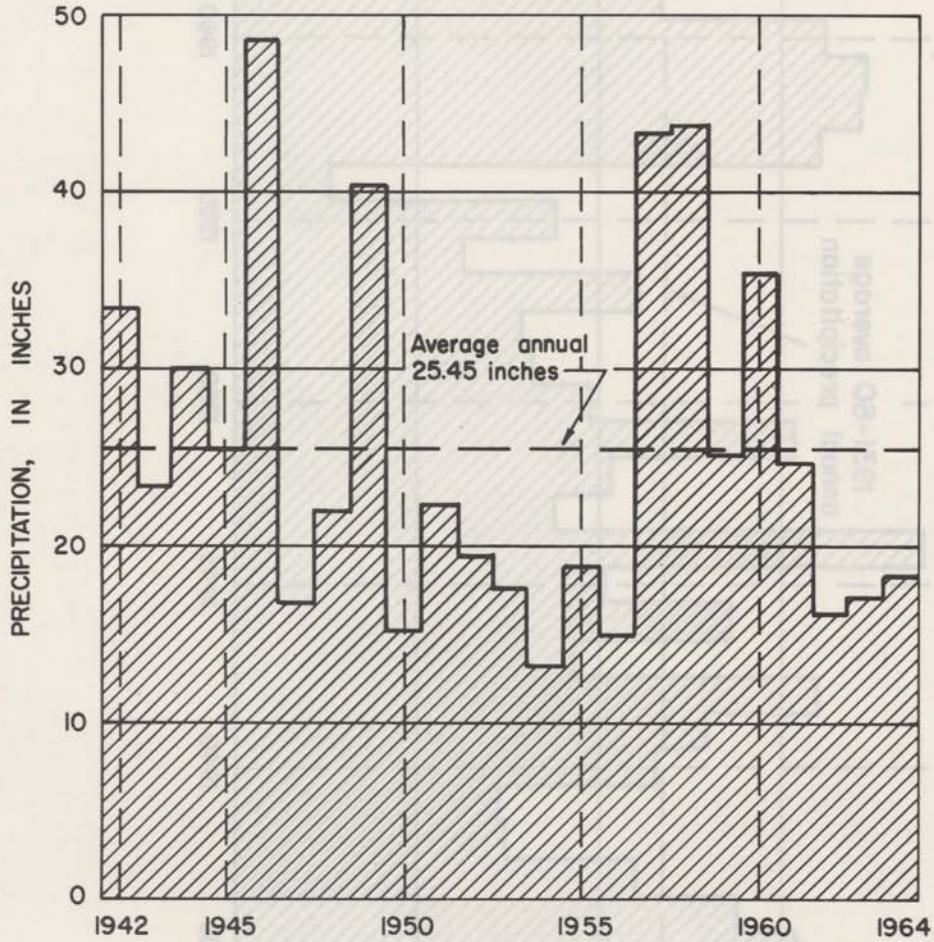

Figure 5

Annual Precipitation at Poteet, 1942-64

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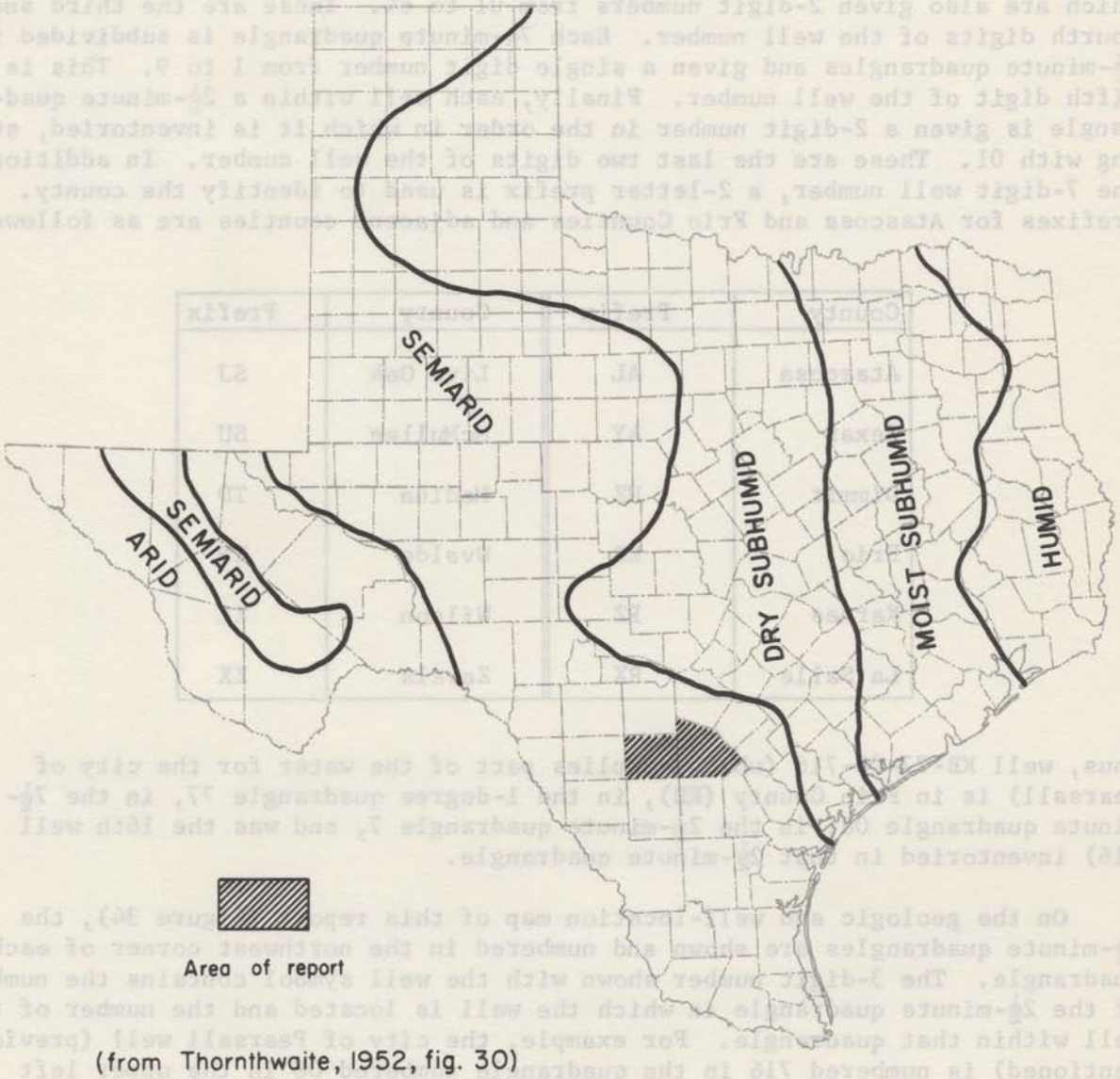

(from Thornthwaite, 1952, fig. 30)

Figure 6

Moisture Regions of Texas

U.S. Geological Survey in cooperation with the Texas Water Development Board

Well-Numbering System

The well-numbering system used in this report is one accepted by the Texas Water Development Board for use throughout the State and is based on latitude and longitude (Figure 7). Under this system, each 1-degree quadrangle in the State is given a number consisting of two digits; the report area includes parts of quadrangles 68, 69, 77, and 78. These are the first two digits appearing in the well number. Each 1-degree quadrangle is divided into 7½-minute quadrangles which are also given 2-digit numbers from 01 to 64. These are the third and fourth digits of the well number. Each 7½-minute quadrangle is subdivided into 2½-minute quadrangles and given a single digit number from 1 to 9. This is the fifth digit of the well number. Finally, each well within a 2½-minute quadrangle is given a 2-digit number in the order in which it is inventoried, starting with 01. These are the last two digits of the well number. In addition to the 7-digit well number, a 2-letter prefix is used to identify the county. The prefixes for Atascosa and Frio Counties and adjacent counties are as follows:

County	Prefix	County	Prefix
Atascosa	AL	Live Oak	SJ
Bexar	AY	McMullen	SU
Dimmit	HZ	Medina	TD
Frio	KB	Uvalde	YP
Karnes	PZ	Wilson	ZL
La Salle	RX	Zavala	ZX

Thus, well KB-77-08-716 (which supplies part of the water for the city of Pearsall) is in Frio County (KB), in the 1-degree quadrangle 77, in the 7½-minute quadrangle 08, in the 2½-minute quadrangle 7, and was the 16th well (16) inventoried in that 2½-minute quadrangle.

On the geologic and well-location map of this report (Figure 34), the 7½-minute quadrangles are shown and numbered in the northwest corner of each quadrangle. The 3-digit number shown with the well symbol contains the number of the 2½-minute quadrangle in which the well is located and the number of the well within that quadrangle. For example, the city of Pearsall well (previously mentioned) is numbered 716 in the quadrangle numbered 08 in the upper left corner.

Acknowledgments

The authors are indebted to the landowners in Atascosa and Frio Counties for supplying information about their water wells and for permitting access to their properties, to the well drillers for logs and other information on water wells, to the pump companies for information on pumps and development tests, to the Medina Electric Cooperative, Inc., and Central Power and Light

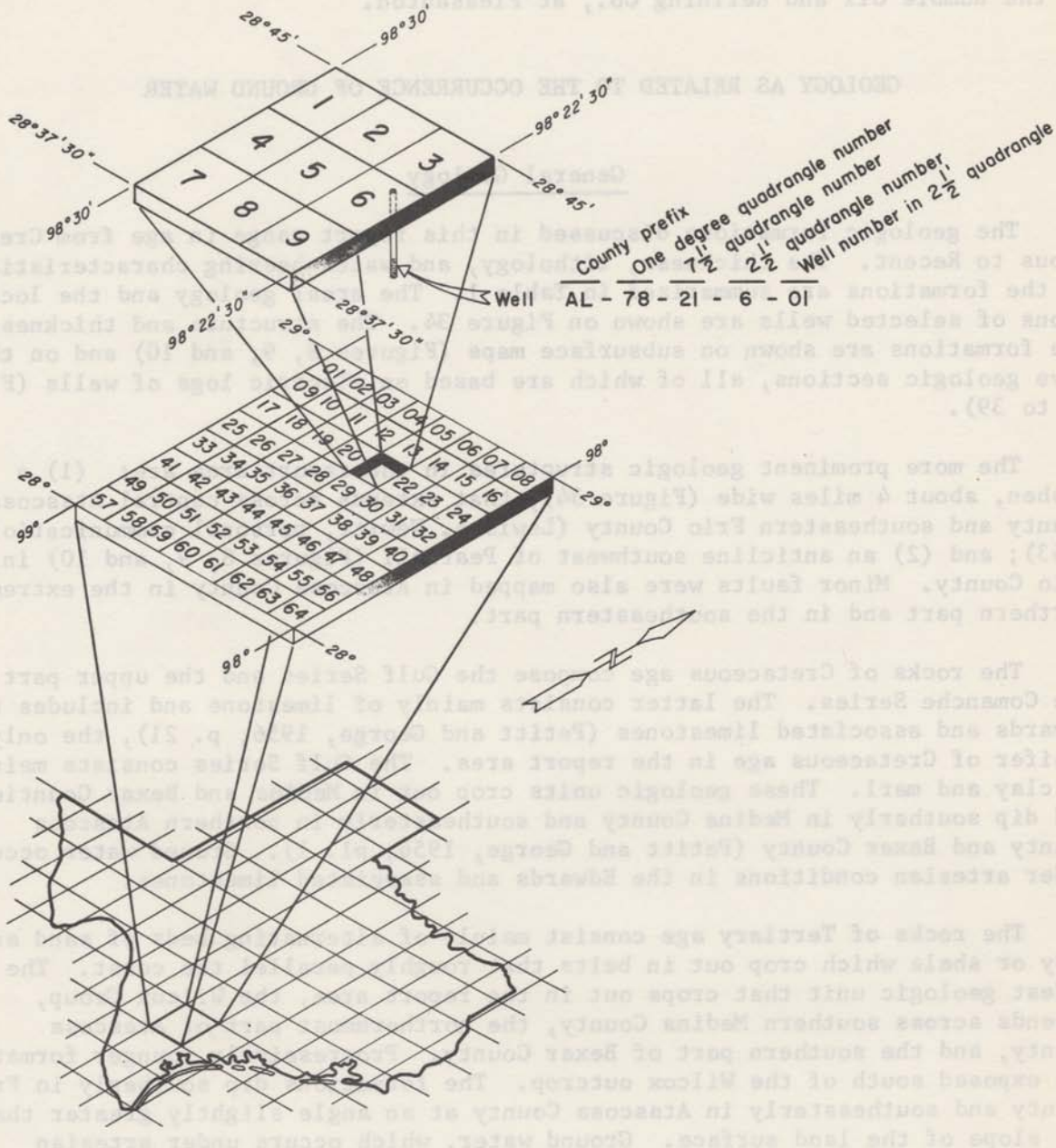

Figure 7

Well-Numbering System

U.S. Geological Survey in cooperation with the Texas Water Development Board

Co. for power data, and to the officials of the cities and towns and of the State and federal agencies, especially those of the Soil Conservation Service of the U.S. Department of Agriculture, and to the respective county agricultural agents. Considerable help was also received from D. Hoye Eargle, U.S. Geological Survey; from John G. Caran, consulting engineer; from Lewis A. Newitt and George Weatherston, consulting geologists; and from the officials of the Humble Oil and Refining Co., at Pleasanton.

GEOLOGY AS RELATED TO THE OCCURRENCE OF GROUND WATER

General Geology

The geologic formations discussed in this report range in age from Cretaceous to Recent. The thickness, lithology, and water-bearing characteristics of the formations are summarized in Table 1. The areal geology and the locations of selected wells are shown on Figure 34. The structure and thickness of the formations are shown on subsurface maps (Figures 8, 9, and 10) and on the five geologic sections, all of which are based on electric logs of wells (Figures 35 to 39).

The more prominent geologic structures in the report area are: (1) a graben, about 4 miles wide (Figure 34), that extends across central Atascosa County and southeastern Frio County (Lewis A. Newitt, personal communication, 1963); and (2) an anticline southwest of Pearsall (Figures 8, 9, and 10) in Frio County. Minor faults were also mapped in Atascosa County in the extreme northern part and in the southeastern part.

The rocks of Cretaceous age compose the Gulf Series and the upper part of the Comanche Series. The latter consists mainly of limestone and includes the Edwards and associated limestones (Petitt and George, 1956, p. 21), the only aquifer of Cretaceous age in the report area. The Gulf Series consists mainly of clay and marl. These geologic units crop out in Medina and Bexar Counties and dip southerly in Medina County and southeasterly in northern Atascosa County and Bexar County (Petitt and George, 1956, pl. 1). Ground water occurs under artesian conditions in the Edwards and associated limestones.

The rocks of Tertiary age consist mainly of alternating beds of sand and clay or shale which crop out in belts that roughly parallel the coast. The oldest geologic unit that crops out in the report area, the Wilcox Group, extends across southern Medina County, the northernmost part of Atascosa County, and the southern part of Bexar County. Progressively younger formations are exposed south of the Wilcox outcrop. The formations dip southerly in Frio County and southeasterly in Atascosa County at an angle slightly greater than the slope of the land surface. Ground water, which occurs under artesian conditions downdip in the Tertiary sands, occurs under water-table conditions in the outcrops of the Tertiary sands and in the alluvial deposits along the major streams.

Physical Characteristics and Water-Bearing Properties of the Geologic Formations

In the descriptions of the water-bearing properties of the formations, the yields of wells are described according to the following rating:

Description	Yield (gallons per minute)
Small	Less than 50
Moderate	50 to 500
Large	More than 500

In general, the chemical quality of the water is classified according to the dissolved-solids content (Winslow and Kister, 1956, p. 5):

Description	Dissolved-solids content (parts per million)
Fresh	Less than 1,000
Slightly saline	1,000 to 3,000
Moderately saline	3,000 to 10,000
Very saline	10,000 to 35,000
Brine	More than 35,000

Cretaceous System

Comanche Series

The rocks of Comanche age discussed in this report include not only the Comanche Peak and Edwards Limestones of the Fredericksburg Group but also the Georgetown Limestone, Grayson Shale, and Buda Limestone of the Washita Group (Table 1).

Edwards and Associated Limestones

The Comanche Peak, Edwards, and Georgetown Limestones compose the Edwards and associated limestones--the principal aquifer in the San Antonio area (Petitt and George, 1956, p. 21). These limestones have a total thickness of about 675 feet and crop out in the northern parts of Medina and Bexar Counties. The top of the Georgetown Limestone in northern Atascosa County and adjacent areas dips southeasterly at 200 feet per mile (Petitt and George, 1956, pl. 1).

Table 1.--Geologic formations and their water-bearing properties, Atascosa and Frio Counties

System	Series	Group	Geologic unit	Approximate thickness (feet)	Character of rocks	Water-bearing properties
Quaternary	Recent and Pleistocene		Alluvium	35- 50	Terrace and flood-plain deposits of silt, sand, and gravel.	Yields small quantities of fresh water to wells.
Tertiary(?)	Pliocene(?)		Uvalde Gravel	20	Gravel and cobbles with some sand and caliche.	Caps some divide areas. Not know to yield water to wells in report area.
Tertiary	Miocene(?)		Catahoula Tuff	10	Calcareous tuff, bentonitic clay, conglomerate, and sand.	Caps small areas on divides in eastern Atascosa County. Not known to yield water to wells in report area.
	Eocene	Jackson		1,000	Clay, sand, silt, bentonitic clay, and lignite.	Yields small quantities of slightly to moderately saline water to wells.
		Claiborne	Yegua Formation	720-1,130	Gypsiferous clay, sand, and thin beds of lignite.	Yields small quantities of slightly to moderately saline water to wells in outcrop area.
			Cook Mountain Formation	410- 560	Clay and shale with a few sandstone and limestone lenses and minor amounts of glauconite and gypsum.	Yields small quantities of slightly saline water to wells in outcrop area.
			Sparta Sand	110- 160	Sand with clay beds in lower part.	Yields small to moderate quantities of fresh to moderately saline water to wells.
			Weches Greensand	90- 170	Shale; contains glauconite and thin beds of sand.	Not known to yield water to wells in Atascosa and Frio Counties.
			Queen City Sand	580-1,100	Sand and shale.	Yields small to moderate quantities of fresh water to shallow wells in central Frio County, and moderate to large quantities of fresh water to wells in central Atascosa County.
			Reklaw Formation	250- 450	Sand and shale.	Yields small to moderate quantities of fresh water to wells in central Atascosa County.
			Carrizo Sand	320-1,290	Sand with minor amounts of shale and lignite.	Principal aquifer in Atascosa and Frio Counties. Yields large quantities of fresh water to several hundred wells.
		Wilcox		410-1,820	Clay, shale, lenticular beds of sand, and discontinuous beds of lignite. The shale and clay generally contain gypsum.	Yields small to moderate quantities of fresh water to a few wells in the northern part of the report area.
	Paleocene	Midway		440- 460	Sandy clay.	Not known to yield water to wells in Atascosa and Frio Counties.

(Continued on next page)

Table 1.--Geologic formations and their water-bearing properties, Atascosa and Frio Counties--Continued

System	Series	Group	Geologic unit	Approximate thickness (feet)	Character of rocks	Water-bearing properties
Cretaceous	Gulf	Navarro		500- 610	Clay and marl.	Not known to yield water to wells in Atascosa and Frio Counties.
			Taylor Marl	450- 500	Marl and calcareous clay.	Do.
			Anacacho Limestone	230- 480	Marly chalk.	Do.
			Austin Chalk	210	Chalk, marl, and limestone.	Do.
			Eagle Ford Shale	20	Calcareous and sandy shale and some argillaceous limestone.	Do.
	Comanche	Washita	Buda Limestone	75	Dense, hard limestone.	Do.
			Grayson Shale	60	Blue clay.	Do.
			Georgetown Limestone	35	Hard, massive limestone and argillaceous limestone.	The aquifer in the Edwards and associated limestones yields small to moderate quantities of fresh to slightly saline water to a few wells in northern Atascosa County.
		Fredericksburg	Edwards Limestone	600	Hard, massive limestone and dolomite, some thin-bedded limestone and marly limestone. Porous zones and cavities.	
			Comanche Peak Limestone	40	Massive limestone and marl.	

Water is obtained from interconnected solutional cavities and porous zones; it is under artesian pressure in the report area.

The Edwards and associated limestones yield large quantities of fresh water to the city well at Lytle and to four irrigation wells east of Lytle. They are the subject of continuing hydrologic studies in the San Antonio area and are thoroughly discussed in reports by Petitt and George (1956) and by Garza (1962a, 1962b, and 1964).

Grayson Shale and Buda Limestone

The Grayson Shale (formerly the Del Rio Clay) is about 60 feet thick and consists chiefly of blue clay. The Buda Limestone is 75 feet thick and consists of dense hard limestone. Both formations crop out in the northern parts of Medina and Bexar Counties, and are not known to yield water to wells in Atascosa and Frio Counties.

Gulf Series

The Gulf Series in the report area includes the Eagle Ford Shale, Austin Chalk, Anacacho Limestone, Taylor Marl, and the Navarro Group. These geologic units are composed of clay, marl, chalk, and limestone, and have a maximum total thickness of about 1,820 feet. They crop out in the central parts of Medina and Bexar Counties, and are not known to yield water to wells in Atascosa and Frio Counties.

Tertiary System

Paleocene Series

Midway Group

The Midway Group crops out in the southern parts of Medina and Bexar Counties. It is composed chiefly of sandy clay and ranges from 440 to 460 feet in thickness. The Midway is not known to yield water to wells in Atascosa and Frio Counties.

Eocene Series

Wilcox Group

The Wilcox Group crops out in a belt from 3 to 10 miles wide in southern Medina County, the northernmost part of Atascosa County, and southern Bexar County. The Wilcox is composed of clay, shale, lenticular beds of sand, and discontinuous beds of lignite. The shale and clay generally contain gypsum. In thickness, the Wilcox ranges from 410 to 1,820 feet. This unit yields small

to moderate quantities of fresh water to a few wells in the northern part of the report area. The electric logs indicate that the water in the Wilcox is fresh in areas within a few miles of the outcrop and slightly saline in most of the remainder of the report area.

Claiborne Group

The Claiborne Group includes the Carrizo Sand, Reklaw Formation, Queen City Sand, Weches Greensand, Sparta Sand, Cook Mountain Formation, and Yegua Formation. The Carrizo Sand is the most important aquifer in the report area; the Reklaw Formation, Queen City Sand, and Sparta Sand are aquifers of lesser importance. The Cook Mountain and Yegua Formations yield only small quantities of water.

When Lonsdale's (1935, p. 12) report was written, the only commercial production of oil was in a small area in northern Atascosa County, and no electrical logs of oil tests had been made in the report area. Since 1935 a large amount of petroleum exploration has been completed in Atascosa and Frio Counties, and electrical-logging techniques have been developed. Therefore electrical logs are now available for test wells in most of the area. As already mentioned (in the report section on "Methods of Investigation"), data from 227 electrical logs of oil and gas test wells were used to compile the geologic sections and subsurface maps. The geologic formations were correlated on the electrical logs based on work by Anders (1957) in Wilson County. From this point the correlation was extended southwestwardly across Atascosa County, and then westwardly across Frio County. In this correlation the Mount Selman Formation (Lonsdale, 1935, p. 28-35) was abandoned as a stratigraphic unit; and rocks in the Mount Selman were divided into the Reklaw Formation, Queen City Sand, and Weches Greensand (Shafer, 1965, p. 12). Similarly, the Cook Mountain Formation (Lonsdale, 1935, p. 35-41) was divided into the Sparta Sand and the Cook Mountain Formation of the present classification.

Carrizo Sand.--The Carrizo Sand overlies the Wilcox Group unconformably and crops out in a belt from 3 to 7 miles wide south of the outcrop of the Wilcox Group. The Carrizo outcrop is the belt of rolling to hilly topography that extends across northern Frio, southern Medina, and northern Atascosa Counties.

The Carrizo consists almost entirely of sand and contains minor amounts of shale or clay and lignite. The sand is dominantly cross-bedded, and locally includes crystals of pyrite. The beds of shale or clay are lenticular and relatively thin throughout most of the report area; but, in southeastern Frio County and southern Atascosa County, the electrical logs show shaly zones more than 50 feet thick. Lenticular beds of lignite have been reported in wells close to the outcrop (Lonsdale, 1935, p. 26).

The thickness of the Carrizo ranges from about 320 feet near the outcrop in Frio County to about 1,290 feet in southern Atascosa County. Part of the variation of thickness is due to the unconformable relationship with the underlying Wilcox Group.

The approximate altitude of the top of the Carrizo Sand is shown by Figure 8. In Atascosa County, the dip of the Carrizo is southeasterly and ranges from 100 to 130 feet per mile. In Frio County, the dip is southerly at about 100

feet per mile in the northern part of the county, northwesterly at about 200 feet per mile along the northwestern flank of the anticline in the west-central part of the county, and southeasterly at 50 to 100 feet per mile in the southern part of the county. The depth to the top of the Carrizo Sand (Figure 29) increases in the direction of dip.

The Carrizo Sand yields large quantities of fresh water to several hundred wells in the report area.

Reklaw Formation.--The Reklaw Formation conformably overlies the Carrizo Sand and crops out in a belt 1½ to 4 miles wide south of the outcrop of the Carrizo Sand (Figure 34). The Reklaw consists chiefly of fine sand and shale; glauconite was reported in well cuttings of the sand in La Salle and McMullen Counties (Harris, 1965, p. 29). The thickness of the Reklaw ranges from 250 to 450 feet, but the average thickness is about 400 feet in most of the report area. Electrical logs show that in the southeastern part of Atascosa County the formation is composed of shale; in the western half of the county, sand comprises as much as half of the formation; and, in places in Frio County, sand comprises almost all of the formation.

The Reklaw supplies small to moderate quantities of fresh water to wells in the central part of Atascosa County.

Queen City Sand.--The Queen City Sand conformably overlies the Reklaw Formation and crops out in a belt from 6 to 12 miles wide south or southeast of the Reklaw outcrop (Figure 34). The Queen City consists mainly of sand and shale. The thickness of the Queen City Sand in the report area ranges from 580 to 1,100 feet.

Figure 9 shows the altitude of the top of the Queen City Sand. The dip in Frio County is southerly at about 50 feet per mile; in Atascosa County, it is southeasterly at rates ranging from less than 100 feet per mile to about 150 feet per mile. The depth to the top of the Queen City (Figure 33) increases in the direction of dip.

The Queen City Sand supplies small to moderate quantities of fresh water to shallow wells in central Frio County, and moderate to large quantities of fresh water to wells in central Atascosa County.

Weches Greensand.--The Weches Greensand conformably overlies the Queen City Sand and crops out in a belt less than 1 to about 4 miles wide south or southeast of the Queen City outcrop (Figure 34). The Weches, which consists principally of glauconitic shale and sand, is mostly shale in Atascosa County and mostly thin beds of sand in Frio County. The thickness of the formation ranges from 90 to 170 feet, and averages about 150 feet in most of the report area.

The Weches Greensand is not known to yield water to wells in the report area.

Sparta Sand.--The Sparta Sand conformably overlies the Weches and crops out in a belt less than half a mile to more than 4 miles wide south or

southeast of the Weches outcrop (Figure 34). The Sparta consists of sand and clay. Most of the sand is in the upper two-thirds of the formation; the lower one-third is mostly clay. This distribution of sand and clay results in a distinctive pattern of the natural potential and resistivity measurements on many of the electrical logs. The thickness of the Sparta ranges from 110 to 160 feet; the average thickness is about 150 feet in most of the report area. In Figure 10 is shown the altitude of the top of the Sparta Sand. In Atascosa County the dip of the Sparta is southeasterly at about 100 feet per mile, except in the southeastern part of the county where it is more than 150 feet per mile; in most of Frio County, the dip is southerly at about 30 feet per mile.

The Sparta yields small to moderate quantities of fresh to moderately saline water to wells in and near the outcrop.

Cook Mountain Formation.--The Cook Mountain Formation overlies the Sparta Sand and crops out in a belt 3 to 10 miles wide south or southeast of the Sparta outcrop (Figure 34) in Atascosa County. In Frio County the Cook Mountain crops out in a large area in the southern third of the county. The Cook Mountain consists of clay and shale containing a few sandstone and limestone lenses and minor amounts of glauconite and gypsum. The thickness of the Cook Mountain ranges from 410 to 560 feet.

The Cook Mountain yields small quantities of slightly saline water to wells in the outcrop area.

Yegua Formation.--The Yegua Formation, the youngest in the Claiborne Group, overlies the Cook Mountain Formation and crops out in a belt 7 to 13 miles wide southeast of the Cook Mountain outcrop. The outcrop extends from the southeastern corner of Frio County to the east-central part of Atascosa County. The Yegua consists of clay that contains gypsum, sand, and thin beds of lignite. The thickness of the Yegua ranges from 720 to 1,130 feet.

The Yegua yields only small quantities of slightly to moderately saline water to wells in the outcrop area.

Jackson Group

The Jackson Group, the youngest group of Eocene age, conformably overlies the Yegua Formation and crops out in Atascosa County in a belt about 12 miles wide southeast of the Yegua outcrop. The unit is not present in Frio County. The upper part of the Jackson consists of tuffaceous sand, bentonitic clay, and a small amount of lignite; the lower part consists of clay (some of which is bentonitic or sandy or silty), thin sand beds, and a small amount of lignite.

The Jackson Group is about 1,000 feet thick and yields only small quantities of slightly to moderately saline water to wells.

Miocene(?) Series

Catahoula Tuff

The Catahoula Tuff unconformably overlies the Jackson Group and crops out in three small areas on divides near the eastern corner of Atascosa County (Eargle, Brown, and Moxham, 1961; and Eargle and Moxham, 1961). The Catahoula, which is about 10 feet thick in Atascosa County, is composed of calcareous tuff, bentonitic clay, conglomerate, and sand. The total area of the three outcrops is only about 1 square mile. The Catahoula Tuff is not an aquifer in the report area.

Tertiary(?) System

Pliocene(?) Series

Uvalde Gravel

The Uvalde Gravel is composed mostly of gravel and cobbles with some sand and caliche. The Uvalde caps the high interstream areas in north-central and northwestern Frio County and southwestern Atascosa County (Deussen, 1924, pl. 8). The maximum thickness of the Uvalde is probably not more than 20 feet. Because of its topographic position, it is not a source of ground water in the report area. (The Uvalde Gravel is not shown on Figure 34, the geologic map.)

Quaternary System

Pleistocene and Recent Series

Alluvium

Flood-plain and stream-terrace deposits occur as belts along the major streams. Although the belts are narrow in most of the report area, they are several miles wide in northwestern Frio County. In the valley of the Frio River in the northwestern corner of Frio County, a stream terrace about 5 miles wide is the site of an extensive irrigation development; however, the wells are supplied from the underlying Carrizo Sand. This stream terrace is as much as 35 feet thick and is composed of silt with minor amounts of sand and gravel (Lonsdale, 1935, p. 47).

In the valley of the Atascosa River, the flood-plain and stream-terrace deposits are composed almost entirely of sand; they are as much as 50 feet thick in the eastern part of Atascosa County. Because of their narrow widths, these deposits are not an important source of ground water.

The alluvial deposits yield small quantities of fresh water to wells. (The stream-terrace and flood-plain deposits are not shown on Figure 34, the geologic map.)

EXPLANATION

-320

Well used for control
Number indicates approximate altitude of top of Sparta Sand

—300—

Structure contour
Shows approximate altitude of top of Sparta Sand
Contour interval 100 feet
Datum is mean sea level

Ts

Outcrop of Sparta Sand

U/D

Fault, dashed where approximate
(Relative movement: D, down; U, up)

N

0 2 4 6 8 10 Miles

Figure 10

Approximate Altitude of the Top of the Sparta Sand

U. S. Geological Survey in cooperation with the Texas Water Development Board

Base compiled from county maps of the Texas State Highway Department

EXPLANATION

-370 — Well used for control. Number indicates approximate altitude of top of Queen City Sand

-200 — Structure contour. Shows approximate altitude of top of Queen City Sand. Contour interval 200 feet. Datum is mean sea level

Tqc — Outcrop of Queen City Sand

D / U — Fault, dashed where approximate (Relative movement: D, down; U, up)

N

0 2 4 6 8 10 Miles

Figure 9

Approximate Altitude of the Top of the Queen City Sand

U. S. Geological Survey in cooperation with the Texas Water Development Board

Base compiled from county maps of the Texas State Highway Department

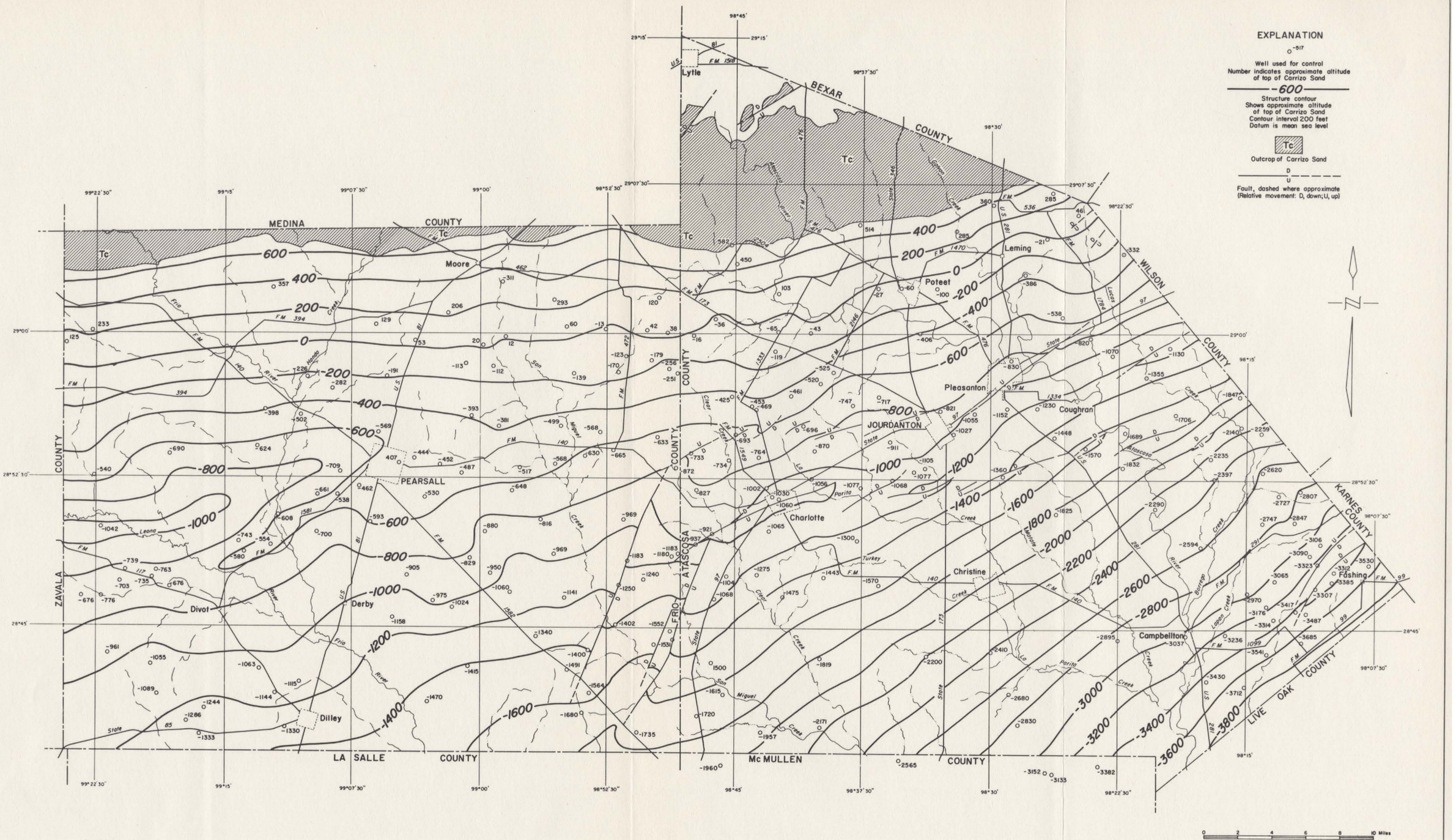

Figure 8

Approximate Altitude of the Top of the Carrizo Sand

U. S. Geological Survey in cooperation with the Texas Water Development Board

Base compiled from county maps of the Texas State Highway Department

GROUND-WATER HYDROLOGY

The general principles of ground-water hydrology as they apply to the study area are discussed in the following report sections. For additional technical information on these and other hydrologic principles, the reader is referred to: Meinzer (1923a, 1923b), Meinzer and others (1942), Todd (1959), Tolman (1937), and Wisler and Brater (1959); and, for non-technical discussions, to: Leopold and Langbein (1960), and Baldwin and McGuinness (1963).

Hydrologic Cycle

Ground water is an integral part of the hydrologic cycle (Figure 11)--the complete cycle of phenomena through which water passes, commencing as atmospheric water vapor, passing into liquid or solid form as precipitation, thence moving along or into the ground, and finally returning to the form of atmospheric water vapor by means of evaporation and transpiration. Leopold and Langbein (1960, p. 3) have defined the hydrologic cycle as the exchange of water between earth and atmosphere.

Source and Occurrence of Ground Water

The source of ground water in Atascosa and Frio Counties is precipitation on their land surface and on adjoining areas to the north. Most of the water from precipitation is evaporated at the land surface, transpired by plants, or retained by capillary forces in the soil; only a small part migrates downward by gravity through the zone of aeration, or essentially dry sediments, until it reaches the zone of saturation where the rocks are saturated with water. The upper surface of the zone of saturation is the water table. In the zone of saturation, water is contained in the interstices or pore spaces between the rock particles, such as sand grains and gravel. In the report area, sand is the dominant type of sediment composing the aquifers.

Water-bearing rock units, or aquifers, are of two types--water table, or unconfined aquifers; and artesian, or confined aquifers. Unconfined water occurs where the upper surface of the zone of saturation is under atmospheric pressure only and the water is free to rise or fall in response to the changes in the volume of water in storage. In and around Atascosa and Frio Counties, water-table conditions occur in the outcrops of the Tertiary sands and in the alluvial deposits along the major streams. A well penetrating an aquifer under water-table conditions becomes filled with water to the level of the water table.

Confined water occurs where an aquifer is overlain by sediments of lower permeability that confine the water under a pressure greater than atmospheric. Such artesian conditions occur downdip from the outcrops of the Tertiary aquifers in the report area. A well penetrating sands under artesian pressure becomes filled with water to a level above the top of the aquifer, and if the pressure head is large enough to cause the water in the well to rise to an altitude greater than that of the land surface, the well will flow. Seventy-four flowing wells were inventoried in Atascosa County, but no wells are known to flow in Frio County. The level or surface to which water will rise in

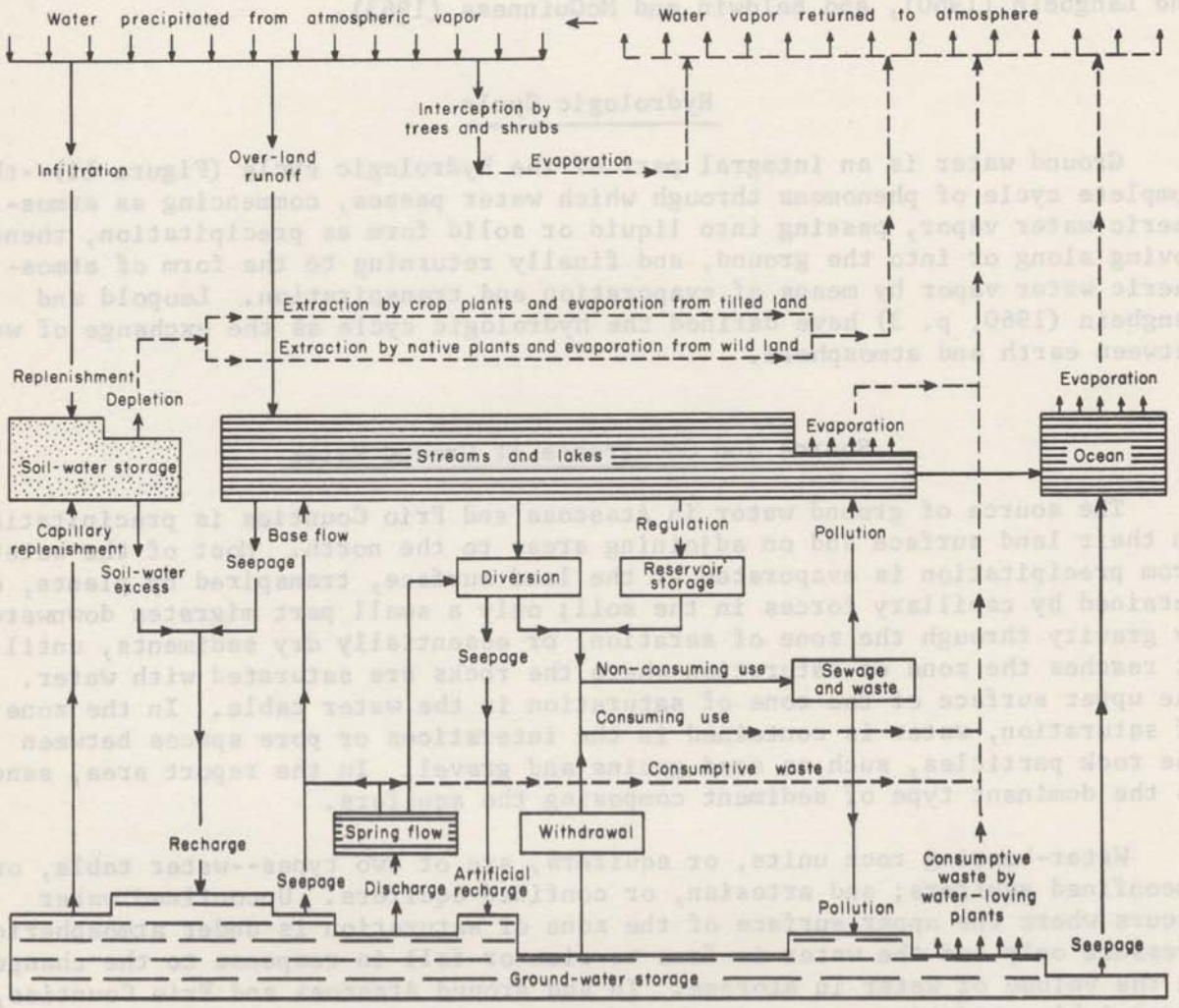

Figure 11

Hydrologic Cycle

U.S. Geological Survey in cooperation with the Texas Water Development Board

artesian wells is called the piezometric surface. Although the terms water table and piezometric surface are synonymous in the outcrop areas, the term piezometric surface as used in this report is applicable only in artesian areas.

Recharge, Movement, and Discharge of Ground Water

Recharge Conditions

Aquifers may be recharged by either natural or artificial processes. Natural recharge results from the infiltration of precipitation, either where it falls or from runoff en route to a watercourse or from the eventual infiltration of water from streams and lakes. Any subsequent transfer of water from one aquifer to another is not a primary source of recharge but only an incident of underground water movement. Artificial-recharge processes include infiltration of irrigation water, of industrial waste water, and of sewage. Improperly treated waste water and sewage may contaminate the supply of fresh ground water, especially at shallow depths.

Among the many factors which govern the rate of natural recharge, the most important are the type of soil, the duration and intensity of rainfall, the slope of the land surface, and the presence or absence of a cover of vegetation. In general, the greater the precipitation on the outcrop area of an aquifer, the greater the recharge; but the duration and intensity of rainfall are also factors of considerable significance: A given amount of rainfall during a short period usually results in less recharge than the same amount of rainfall during a longer period. Also, the rates of recharge can be greater during the winter months when plant growth is at a minimum and evaporation rates are low.

The sandy soil and generally poor cover of vegetation on the outcrop of the Carrizo Sand are favorable to recharge. The estimated recharge to the Carrizo Sand in Atascosa County, from the beginning of irrigation development in 1905 to 1964, was 770,000 acre-feet (an average of about 13,000 acre-feet per year). During the same period, the estimated recharge to the Carrizo Sand in Frio County was 600,000 acre-feet (an average of about 10,000 acre-feet per year). These recharge rates are equivalent to the infiltration of an average of 1.8 inches of precipitation per year on 153,600 acres of outcrop area. The estimates of recharge are based on the velocities of movement of the ground water as calculated from carbon-14 age determinations of the water and from velocities determined from hydraulic gradient, permeability, and porosity data (Figure 13).

Because the available data are insufficient, the recharge rates of the other aquifers in the report area cannot be definitely estimated. However, recharge conditions of these aquifers generally are less favorable than those of the Carrizo; hence the rates of the former are probably considerably less than the rate of 1.8 inches of precipitation per year for the latter.

Direction of Movement

Ground water in the two counties moves slowly through the aquifers from areas of recharge to areas of discharge, gravity being the motivating force in this action. The movement is downward from the recharge areas to the zone of

saturation; thereafter the water moves slowly in the general direction of the dip of the aquifers--southwardly in Frio County, and southeastwardly in Atascosa County. Exceptions to the natural downdip movement of water in the zone of saturation are in the areas where large quantities of water are withdrawn from an aquifer. In these areas, water moves from all directions to the centers of heavy withdrawal. In Figures 20 and 21 are shown the altitudes of water levels in wells in the Carrizo Sand in 1929-30 and 1965. The direction of movement of the water is at right angles to the contours in the direction of decreasing altitude.

Age and Rates of Movement of Water in the Carrizo Sand in Atascosa County

Determining the age of water samples from representative wells supplied from the Carrizo Sand in Atascosa County and in adjacent parts of La Salle, McMullen, and Live Oak Counties was a special research project of the Radiocarbon Dating Laboratory of The University of Texas. In Figure 12, coutours showing the age of the water are based on age determinations made by F. J. Pearson, Jr. (1966, fig. 10), of that laboratory. The width of the contours represents the range of error expected from the determinations. As also illustrated in Figure 12, the age of the water in the Carrizo Sand is more than 25,000 years in the southern part of Atascosa County and increases with depth in a southeasterly direction. The ages were determined from the measurements of the C^{14} content of the dissolved bicarbonate in the water. The correction factors used in these measurements were described by Ingerson and Pearson (1964), and by Pearson (1966), and were based on measurements made by Irving Friedman, Branch of Isotope Geology, U.S. Geological Survey.

The age of a well-water sample represents the length of time required for the water to move from the outcrop of the Carrizo Sand to the well. The average water velocities were computed by dividing the time interval into the flow distance measured at right angles to the lines of equal age. Water velocities along a northwest-southeast line in eastern Atascosa County are shown by two curves in Figure 13. Velocities obtained from C^{14} ages of the samples are represented by one of the curves, and velocities computed from conventional hydrologic data by means of Darcy's equation are represented by the other. The range in error of the C^{14} determinations is shown by error band widths on the C^{14} curve. The rates based on C^{14} determinations decrease from about 8 feet per year, 10 miles downdip from the outcrop, to about 5.5 feet per year in the belt from 18 to 31 miles downdip from the outcrop.

Pearson (1966, p. 68) noted that, "The hydrologic rates fall within the range of the C^{14} rates except in the deeper portions of the aquifer. Here, however, the C^{14} contents of the water samples were so small that slight contamination during sampling of the C^{14} measuring process would have had a large effect on the calculated ages, giving an apparently high flow rate. Thus the disagreement may be due to difficulties with the sample collection procedure rather than to a basic error in the method. It is equally likely, though, that the error, if any, is in the hydrologic rather than the C^{14} rates."

Rates obtained from the conventional hydrologic methods and from the C^{14} dating technique are in general agreement.

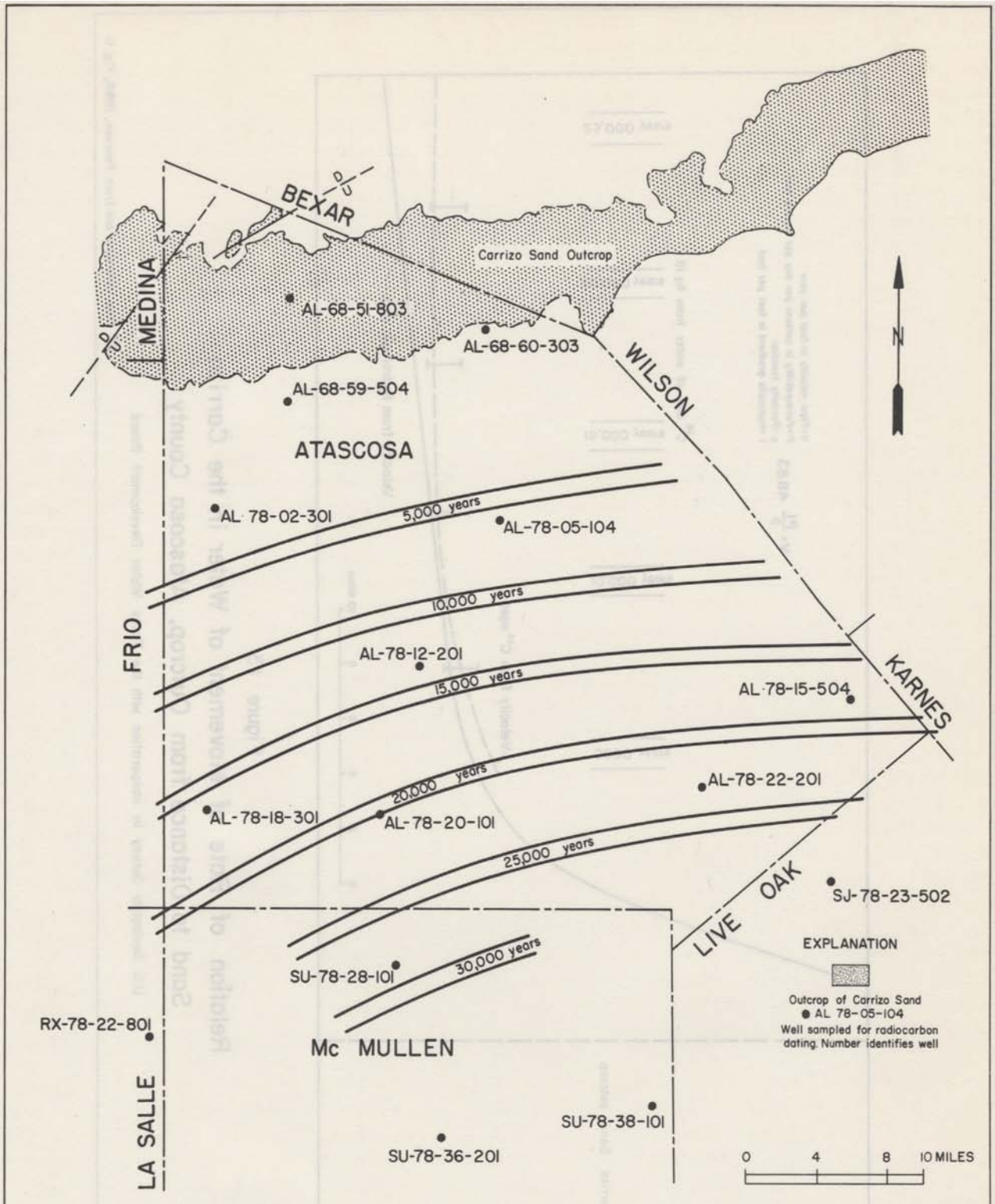

Figure 12

Age of Water in the Carrizo Sand, Atascosa County

U. S. Geological Survey in cooperation with the Texas Water Development Board

After Pearson, 1966, Fig. 10

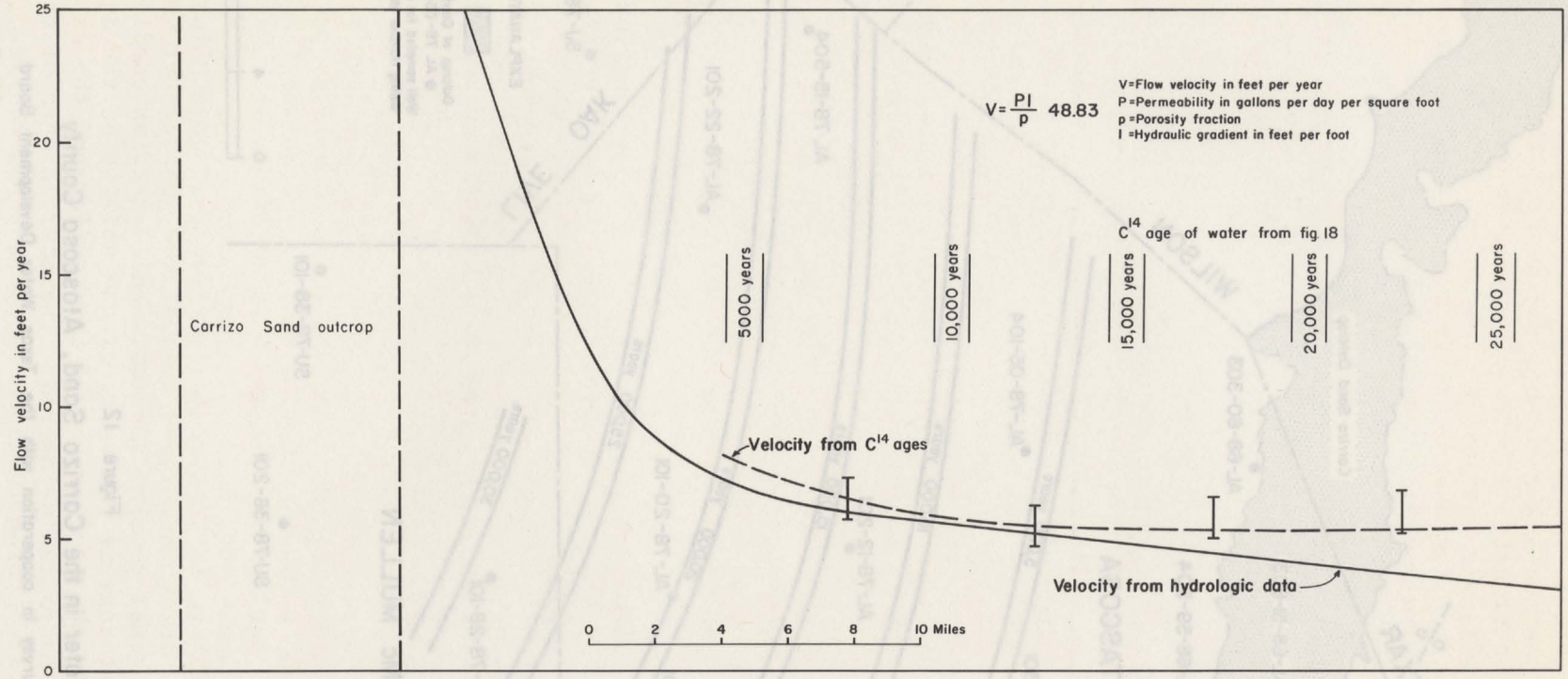

Figure 13

Relation of Rate of Movement of Water in the Carrizo Sand to Distance from Outcrop, Atascosa County

U.S. Geological Survey in cooperation with the Texas Water Development Board

C^{14} flow velocities are from Pearson, 1966, Fig. 11

Discharge Conditions

The water in the aquifers in the report area is discharged both naturally and artificially. Except where heavily pumped, the deep aquifers (such as the Carrizo Sand) are under greater artesian pressure than the overlying aquifers (such as the Queen City Sand). In response to the differences in pressure, water is discharged upward from the deep aquifers through the less permeable confining beds to the overlying aquifers, and ultimately to the land surface where the water is consumed by evaporation and transpiration (Winslow, Doyel, and Wood, 1957, p. 387). The only apparent natural discharge is the water evaporated from the soil or transpired by plants; no perennial springs were reported in Atascosa and Frio Counties. The artificial discharge of ground water is from flowing or pumped wells. (See report section on the "Development of Ground water.")

Hydraulic Characteristics of the Aquifers

When water is discharged from an aquifer through a well, a hydraulic gradient in the water table or piezometric surface is established toward the well. When a well is pumped or allowed to flow, the level of the water table or piezometric surface is lowered; the difference between the discharging level and the static level (water level before pumping or before start of flow) is the drawdown. The water table or piezometric surface surrounding a discharging well assumes more or less the shape of an inverted cone which is called the cone of depression.

The rate at which water is transmitted by an aquifer depends on the ability of the aquifer to transmit water and on the hydraulic gradient. The amount of water released from storage depends chiefly on the compressibility of the sands and their associated clays, and upon the expansion of the water as the artesian pressure is lowered.

Formulas have been developed to show the relationship of the yield of a well, the shape and extent of the cone of depression, and the properties of the aquifer--the specific yield, porosity, permeability or transmissibility, and storage coefficient. The specific yield is the ratio (expressed as a percentage) of the volume of water a saturated rock will yield by gravity to its own volume. Porosity is the ratio (in percent) of the aggregate volume of pore space in a rock to its total volume. The permeability of an aquifer is the capacity for transmitting water under pressure and is measured by the coefficient of permeability--the rate of flow in gallons per day through a cross-sectional area of 1 square foot under a hydraulic gradient of 1 foot per foot (100 percent). The coefficient of transmissibility is the rate of flow in gallons per day through a vertical strip of the aquifer 1 foot wide and extending the full saturated thickness of the aquifer under a hydraulic gradient of 100 percent.

The coefficient of storage is the volume of water that an aquifer releases from or takes into storage per unit surface area of the aquifer per unit change in the component of head normal to that surface. When artesian conditions prevail, the coefficient of storage is a measure of the ability of the aquifer to yield water from storage by the compression of the aquifer and the expansion of the water as the artesian pressure is lowered. The coefficients of storage in artesian aquifers are small compared to those in water-table aquifers;

consequently, when an artesian well starts discharging, a cone of depression is developed through a wide area in a short time. Where water-table conditions prevail, the coefficient of storage is a measure of the ability of the aquifer to yield water from storage by gravity drainage of the aquifer; consequently, the cone of depression extends through a relatively small area. Under water-table conditions, the volume of water attributable to expansion is usually such a negligible part of the total volume of water released from the aquifer that the coefficient of storage is considered the same as the specific yield.

Formulas based on the hydraulic characteristics of an aquifer indicate that within limits the discharge from a well varies directly with the drawdown--that is, doubling the drawdown will nearly double the amount of discharge. The discharge per unit of drawdown (gallons per minute per foot), or specific capacity, is of value in estimating the probable yield of a well and the required pump setting.

The yield of a well is usually measured in gallons per minute or gallons per hour. Yield depends on the ability of the aquifer to transmit water, the thickness of the water-bearing material, the construction of the well, the size and efficiency of the pump, and the allowable drawdown.

Aquifer tests have been made in 14 wells in Atascosa and Frio Counties to determine the ability of the Carrizo Sand and Queen City Sand to transmit water. The results of these tests are given in Table 2. Data from the aquifer tests were analyzed by using the Theis non-equilibrium method, as modified by Cooper and Jacob (1946, p. 526-534), and the Theis recovery method (Wenzel, 1942, p. 94-97). The average coefficients of transmissibility determined from tests of 12 wells tapping the Carrizo Sand ranged from 36,000 gpd (gallons per day) per foot at Dilley to 150,000 gpd per foot near Poteet. An average transmissibility of 12,000 gpd per foot was computed from tests of two wells tapping the Queen City Sand at Pleasanton. The transmissibility of the Sparta Sand was not determined; however, tests of three wells that tap the Sparta in La Salle County showed transmissibilities of 1,100, 1,500, and 3,500 gpd per foot (Harris, 1965, table 2).

The field permeability coefficients in Table 2 were computed by dividing the transmissibility coefficients by the estimated thicknesses of sands supplying water to the wells. The sand thicknesses were obtained from study of the electrical logs of wells. The field permeability coefficients of the Carrizo Sand ranged from 80 gpd per square foot at Campbellton to 375 gpd per square foot near Poteet. The permeability of the lower section of the Queen City Sand at Pleasanton is about 60 gpd per square foot. The storage coefficients obtained from tests of wells tapping the Carrizo Sand near Campbellton and Poteet were 0.00009 and 0.0005, respectively. The storage coefficient obtained from tests of wells tapping the Queen City Sand at Pleasanton was 0.0001.

In Table 3 are shown the specific capacities of 40 wells that tap the Carrizo Sand in Atascosa and Frio Counties. The values were obtained from records of pump companies. The duration of the tests is not known; therefore, the values should be considered as approximate. The specific capacities ranged from 5.3 to 80 gpm (gallons per minute) per foot of drawdown. In general, those wells having the largest amount of screened, slotted, or perforated intervals have the largest specific capacity. Also, specific capacities of wells decrease in the downdip direction corresponding to the decrease in transmissibility, permeability, and the storage coefficients.

Table 2.--Coefficients of transmissibility, permeability, and storage determined from pumping tests of selected wells that tap the Carrizo Sand and Queen City Sand in Atascosa and Frio Counties

Well	Depth of well (ft)	Date test began	Length of test (hrs)		Coefficient of transmissibility (gpd per ft)			Coefficient of storage	Coefficient of permeability (gpd per sq ft)	Estimated thickness of sand contributing water to well (ft)
			Recovery	Interference	Recovery	Interference	Average			
Carrizo Sand										
AL-68-60-904	1,037	June 14, 1951	16	--	176,000	--				
68-60-905	1,013	do	16	48	156,600	130,900				
68-60-603	909	do	18	48	154,300	135,600	150,000	0.0005	375	400
68-60-604	1,000	do	--	48	---	174,500				
78-04-207	1,109	do	1-1/2	--	148,000	--				
78-04-803	1,960	Apr. 8, 1964	2-1/2	3-1/2	70,960	69,500	70,000	--	170	420
78-14-801	3,992	June 27, 1951	12	--	40,000	--				
78-14-802	3,663	Mar. 26, 1951	12	48	37,100	36,400	40,000	0.00009	80	500
78-22-202	4,132	do	12	48	40,000	37,100				
KB-77-07-501	1,300	May 9, 1956	1/2	--	70,000	--	70,000	--	155	450
77-08-715	1,434	Sept. 28, 1957	1-2	2-1/2	53,500	65,700	60,000	--	120	490
77-23-803	2,082	Sept. 27, 1962	1-2	1-7/12	40,400	31,200	36,000	--	100	350
Queen City Sand										
AL-78-05-103	815	Mar. 12, 1954	1	3-1/2	8,950	13,780	12,000	0.0001	60	200
78-05-105	814	do	1/2	--	14,300	--				

Table 3.--Approximate specific capacities of selected wells that tap the Carrizo Sand in Atascosa and Frio Counties

Well	Depth of well (ft)	Length of well open to aquifer (ft)	Discharge (gpm)	Specific capacity (gpm per ft)
		Atascosa County		
AL-68-60-105	440	--	1,202	63
68-60-206	350	135	1,899	68
68-60-518	1,400	300	2,157	26
68-60-839	1,500	300	2,157	41
68-61-207	805	237	1,990	59
68-61-302	815	175	1,840	37
68-62-405	1,531	250	1,408	50
78-02-504	1,340	210	1,902	19
78-02-904	1,500	261	1,400	52
78-03-603	1,605	300	1,258	28
78-04-201	1,575	--	2,050	46
78-04-803	1,960	135	2,032	31
78-10-303	1,770	--	1,293	19
78-11-501	2,160	300	1,000	7.4
78-11-603	2,500	--	870	10
78-12-701	2,300	--	880	6.1
78-18-301	2,400	250	1,421	13
78-22-202	4,132	299	2,000	5.3
		Frio County		
KB-68-57-101	237	100	1,505	65
68-57-407	390	167	1,613	44
68-57-613	280	160	1,416	42
68-58-403	300	100	1,700	46
69-61-906	338	208	1,960	78
69-63-801	638	298	1,256	31
69-64-406	345	210	1,512	69
77-07-901	1,614	305	1,828	23
77-08-404	1,408	292	2,011	39
77-14-803	1,653	250	1,854	23
77-15-803	1,685	278	1,591	30
77-16-407	1,870	300	1,512	30
77-16-705	1,870	350	1,828	28
77-22-302	1,681	250	1,729	31
77-23-803	1,930	272	1,140	13
77-24-102	2,000	300	1,598	33
77-24-302	2,167	300	1,025	20
78-01-205	900	230	1,457	27
78-01-801	1,413	228	2,010	31
78-09-104	1,501	240	1,416	27
78-09-305	1,678	250	1,865	18
78-09-504	1,804	250	975	16

The coefficients of transmissibility and storage may be used to predict future drawdown of water levels caused by pumping. Figure 14 shows the theoretical relation between drawdown or decline of water level and the distance from the center of pumping for different coefficients of transmissibility and storage. The calculations of drawdown are based on a withdrawal of 1 mgd (million gallons per day) for 1 year and coefficients of storage and transmissibility as shown. The figure shows that the amount of drawdown will increase with the decrease in the value of the coefficient of transmissibility. For example, if the coefficients of transmissibility and storage are 200,000 gpd per foot and 0.0005, respectively, the drawdown or decline in the water level would be about 3 feet at a distance of 1 mile from a well or group of wells discharging 1 mgd for 1 year. If the coefficients of transmissibility and storage are 5,000 gpd per foot and 0.0001, respectively, the same pumping rate for the same time would cause 84 feet of decline at the same distance.

Pumping from wells drilled close together may create cones of depression that intersect, thereby causing additional lowering of the piezometric surface or water table. The intersection of cones of depression, or interference between wells, will result in lower pumping levels (and increased pumping costs) and may cause serious declines in yields of the wells. If the pumping level is lowered below the top of the well screen, that part of the aquifer will become dewatered, and the yield of the well will decrease in proportion to the reduction in thickness of the saturated part of the aquifer. The proper spacing of wells to minimize interference can be determined from the aquifer-test data.

Development of Ground Water

In 1964, about 99 mgd (or about 110,000 acre-feet) of ground water was used in Atascosa and Frio Counties. The respective quantities of ground water utilized for public supply, industry, irrigation, and for domestic and livestock needs in 1964 are itemized in Table 4.

The use of ground water from the principal aquifers in the study area in 1964 is given in Table 5. (Withdrawals from the less important aquifers that supply domestic and livestock needs are not included in this table but are in the estimates in Table 4.) As shown in Table 5, by far the largest amount of ground water used was from the Carrizo Sand.

In Figures 15 and 16 is shown not only the use of ground water from the Carrizo Sand in the report area during the 1920-64 period, but also the considerable increase in amounts used during the 1950-56 drought and the steadily rising water usage after 1956. (Data are available for only a few years during the 1920-64 period; the other points on the curves are estimated.) Most of the additional water has been used for irrigation. As the use of water increased, a corresponding decrease occurred in the quantity of water released from uncontrolled flowing wells--mainly because of the declines of artesian pressure.

After the drought the quantity of water exported from Atascosa County by the Lower Nueces River Water Supply District substantially decreased (Figure 15). In emergencies, this water was used to augment the public supply for the city of Corpus Christi.

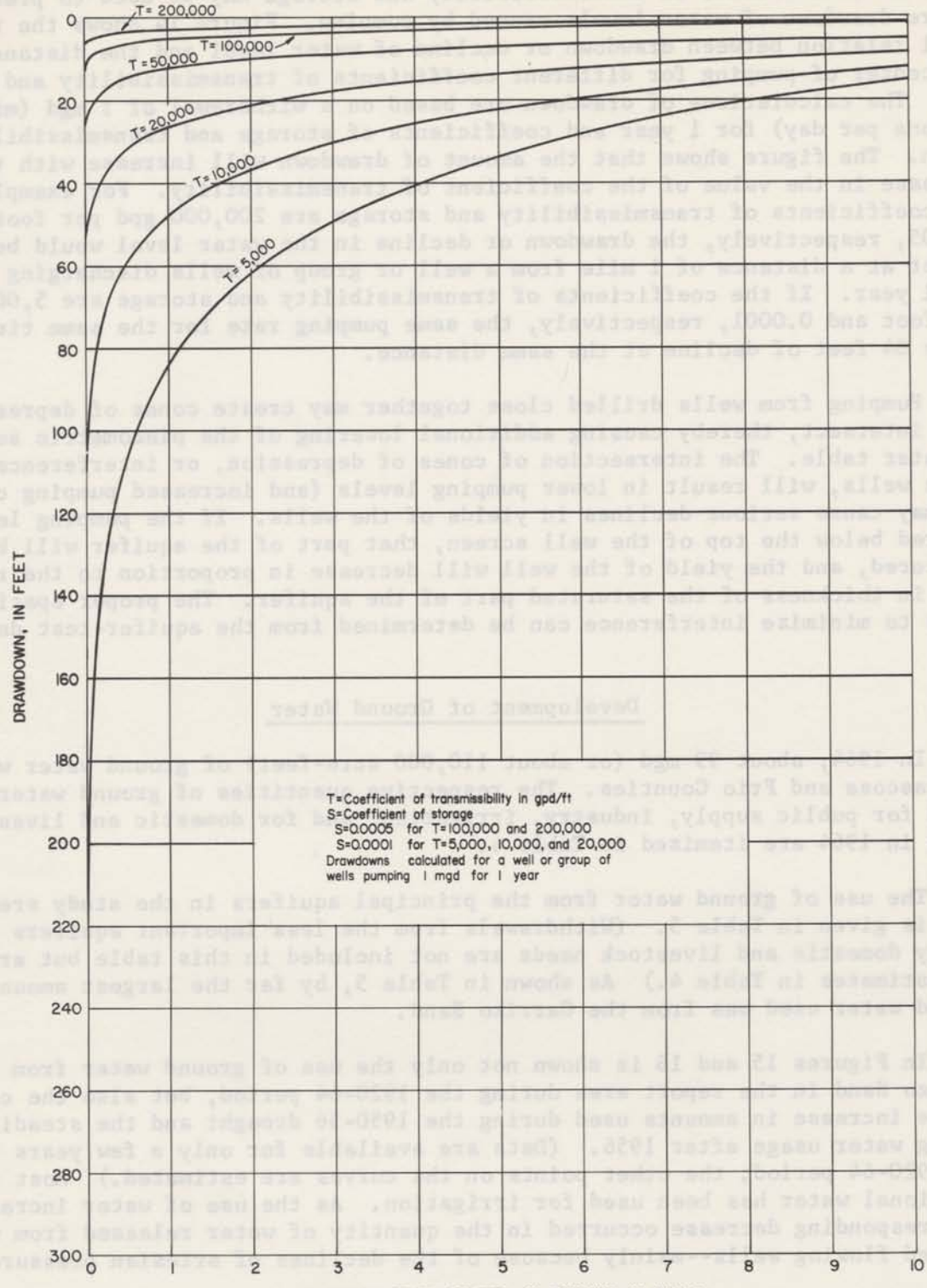

Figure 14

Relation of Drawdown to Transmissibility and Distance in an Infinite Aquifer

U. S. Geological Survey in cooperation with the Texas Water Development Board

Table 4.--Use of ground water in Atascosa and Frio Counties, 1964

Use	Atascosa County		Frio County		Total*	
	(mgd)	(acre-feet)	(mgd)	(acre-feet)	(mgd)	(acre-feet)
Public supply	1.78	2,000	1.16	1,300	2.9	3,300
Industrial	3.48	3,900	.76	852	4.3	4,800
Irrigation	38.62	43,300	50.22	56,300	89	100,000
Domestic and livestock	1.70	1,900	.98	1,100	2.7	3,000
Total*	46	51,000	53	60,000	99	110,000

* Figures are approximate because some of the pumpage is estimated. Totals are rounded to two significant figures. In addition to the amounts shown in the table, approximately 1,100 acre-feet (0.98 mgd) was lost from uncontrolled flowing wells. Also, 115 acre-feet (0.10 mgd) was discharged into the Atascosa River near Campbellton by Lower Nueces River Water Supply District wells. This water, designated as "exported" in Figure 15, was used downstream by ranches and by the cities of Three Rivers and Corpus Christi.

Table 5.--Use of ground water from the principal aquifers in Atascosa and Frio Counties, 1964

Geologic source	Public supply		Industry		Irrigation		Total*	
	(mgd)	(acre-feet)	(mgd)	(acre-feet)	(mgd)	(acre-feet)	(mgd)	(acre-feet)
Atascosa County								
Carrizo Sand	0.83	933	2.68	3,000	36.93	41,400	40	45,000
Queen City Sand	.82	918	--	--	.64	720	1.4	1,600
Edwards and associated limestones	.12	134	--	--	.98	1,100	.98	1,100
Wilcox Group	--	--	.75	840	--	--	.75	840
Sparta Sand	--	--	.054	60	.09	100	.14	160
Frio County								
Carrizo Sand	1.13	1,270	.76	848	49.60	55,600	52	58,000
Queen City Sand	--	--	--	--	.57	640	.57	640
Sparta Sand	--	--	--	--	.054	60	.054	60

* Figures are approximate because some of the pumpage is estimated. Totals are rounded to two significant figures. The table does not include the pumpage from the less important water-bearing formations, most of which was for domestic and livestock use.

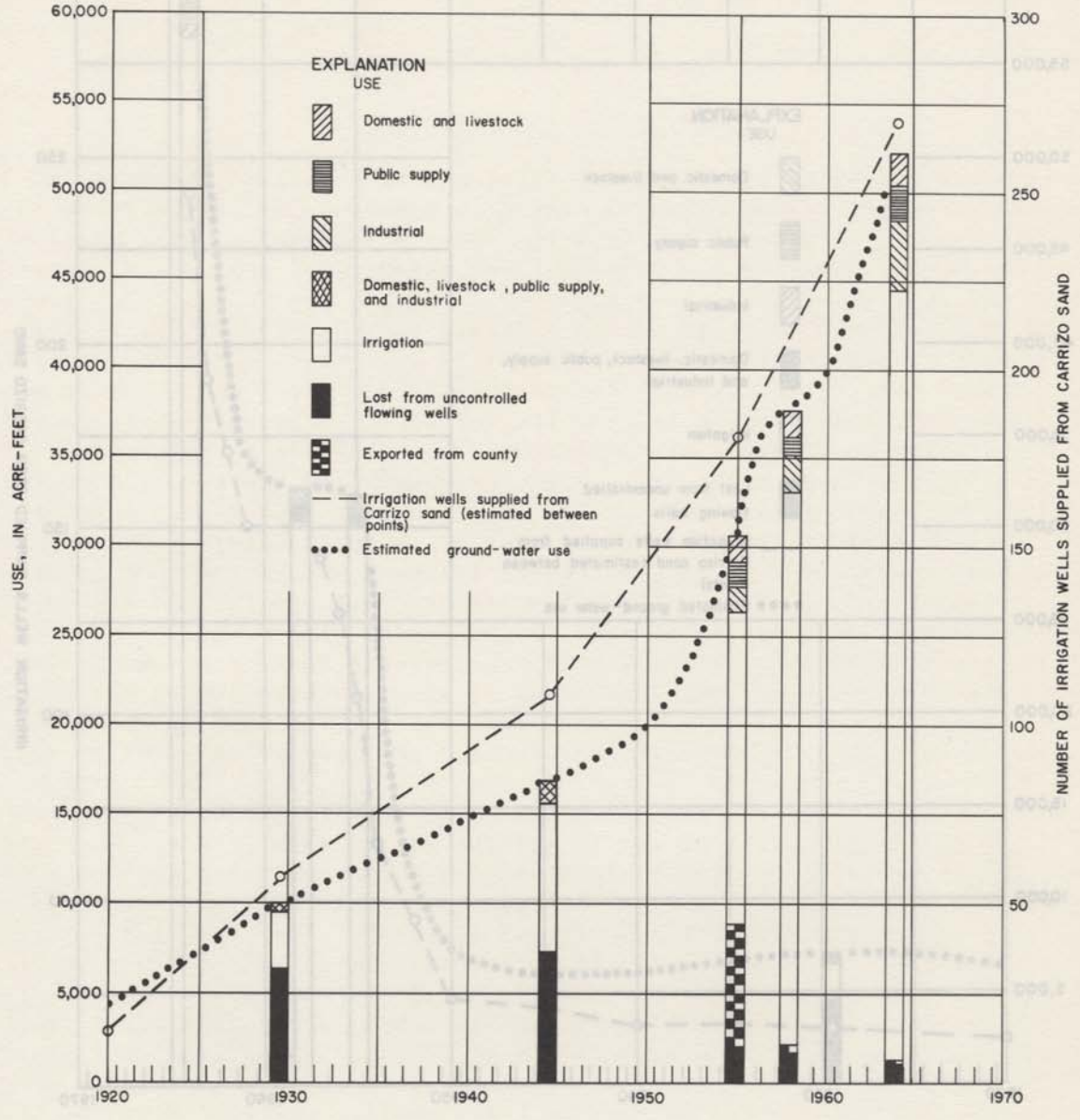

Figure 15

Ground-Water Use and Number of Irrigation Wells Supplied from the Carrizo Sand in Atascosa County, 1920-64

U.S. Geological Survey in cooperation with the Texas Water Development Board

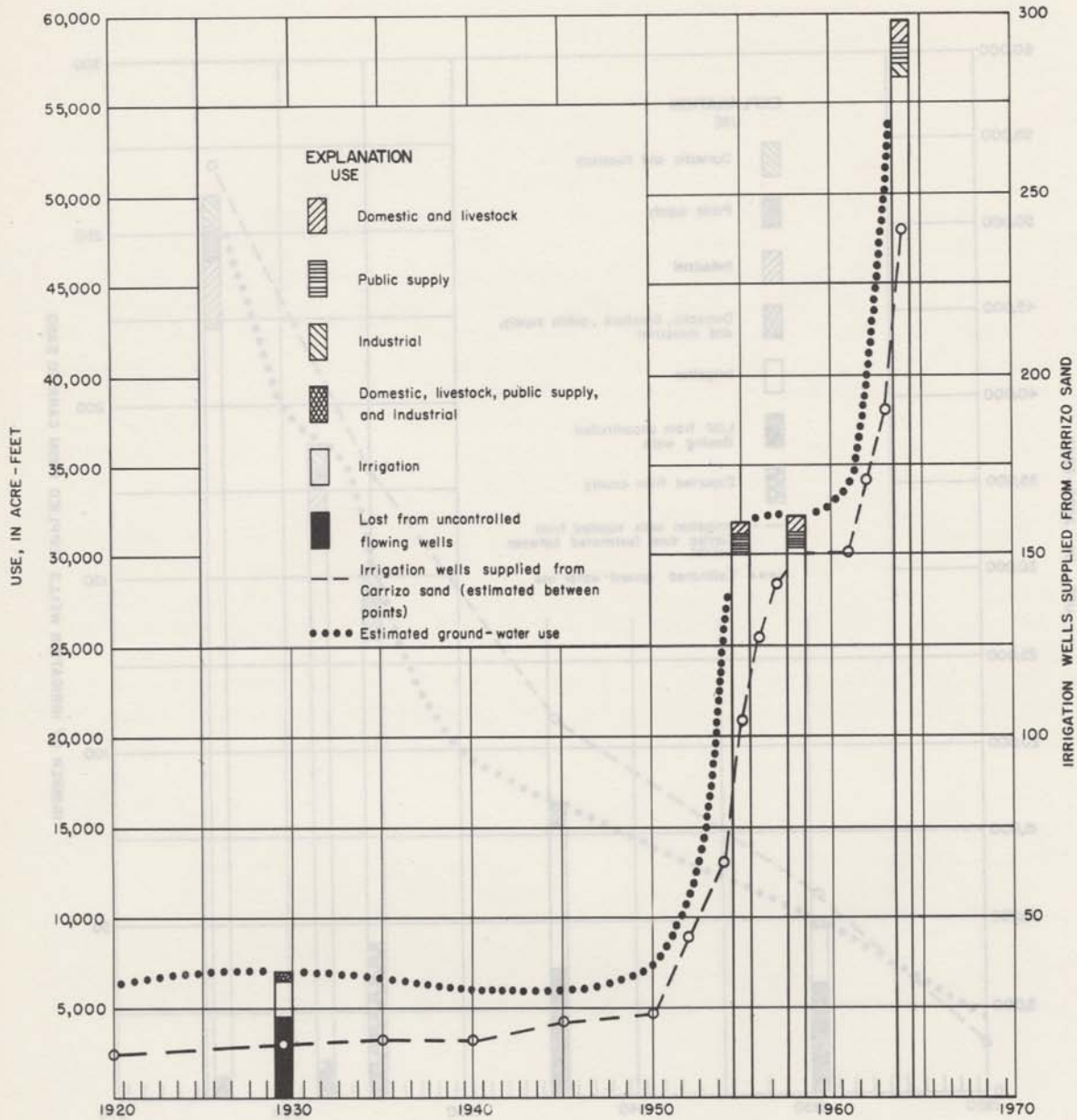

Figure 16

Ground-Water Use and Number of Irrigation Wells Supplied from the Carrizo Sand in Frio County, 1920-64

U. S. Geological Survey in cooperation with the Texas Water Development Board

Public Supply

All water used for public supply in Atascosa and Frio Counties is obtained from wells. The pumpage for public supply in 1964 averaged 2.9 mgd (3,300 acre-feet), 3 percent of the ground water used for all purposes.

The city of Pearsall used an average of 0.849 mgd (951 acre-feet) in 1964. The water was obtained from the Carrizo Sand via four wells (KB-77-08-713 to 716) that ranged in depth from 1,302 to 1,572 feet. The wells were pumped at rates ranging from 640 to 1,100 gpm. The temperature of the water from well KB-77-08-713 was 93.5°F.

The city of Dilley used an average of 0.306 mgd (343 acre-feet) in 1964. The first water supply for the city was obtained from well KB-77-23-801, drilled in 1924. This well, which was 2,010 feet deep and tapped the Carrizo Sand, was pumped at the rate of 240 gpm. The temperature of the water was 101°F. The second well (KB-77-23-802) was drilled in 1952 to the depth of 523 feet, but the casing was slotted from 255 to 330 feet opposite the Sparta Sand. This well was pumped at the rate of 500 gpm. The third well (KB-77-23-803) was drilled in 1956 to the depth of 2,082 feet. This well, which is supplied from the Carrizo Sand and pumped at the rate of 800 gpm, is the principal source of water. Well KB-77-23-801 was plugged in 1962, and well KB-77-23-802 is used occasionally as a supplemental supply.

The city of Pleasanton used an average of 0.813 mgd (911 acre-feet) in 1963. Most of the water is obtained from four wells (A1-78-05-105 to 108) that are supplied from the Queen City Sand. These wells range in depth from 790 to 814 feet and are pumped at rates ranging from 237 to 500 gpm. Well A1-78-05-104, which is 1,700 feet deep and supplied from the Carrizo Sand, is used occasionally as a supplemental supply. In the Pleasanton area, the temperature of the water from wells supplied by the Queen City Sand is about 82°F and from those supplied by the Carrizo Sand is about 92°F.

The city of Poteet used an average of 0.273 mgd (306 acre-feet) in 1964. The water is obtained from the Carrizo Sand via two wells: A1-68-60-702, which is 946 feet deep; and AL-68-60-810, which is 860 feet deep.

The city of Jourdanton used an average of 0.270 mgd (303 acre-feet) in 1964. The water is obtained from two wells supplied from the Carrizo Sand. Well A1-78-04-502 is 1,635 feet deep and is pumped at the rate of 150 gpm. Well A1-78-04-803 is 1,960 feet deep and is pumped at the rate of 725 gpm. The temperature of the water from the deeper well is 98°F.

The city of Charlotte used an average of 0.277 mgd (310 acre-feet) in 1964. The water is obtained from two wells supplied from the Carrizo Sand. Well A1-78-11-101 is 1,869 feet deep and is pumped at the rate of 1,200 gpm. Well A1-78-11-201 is 1,692 feet deep and is pumped at the rate of 500 gpm.

The city of Lytle used an average of 0.121 mgd (136 acre-feet) in 1964. The water is obtained from well A1-68-50-201, which is supplied from the Edwards and associated limestones. The well is 2,379 feet deep and is pumped at the rate of 350 gpm. The temperature of the water is 100°F.

The city of Campbellton used an average of 0.031 mgd (35.0 acre-feet) in 1964. The water is obtained from well A1-78-22-202, which is supplied from the Carrizo Sand. The well is 4,132 feet deep. When the well was drilled in 1951, the flow was 1,175 gpm, and the pressure head was 189 feet above the land surface. The temperature of the water is 142°F.

The city of Christine used an average of 0.019 mgd (21.5 acre-feet) in 1964. The water is obtained from well A1-78-13-702, which is 1,717 feet deep. The well is supplied from the Queen City Sand, and the artesian pressure is used to distribute the water.

The community of Coughran used an average of 0.0027 mgd (3.07 acre-feet) in 1964. The water is obtained from well A1-78-05-603, which is 885 feet deep. The well is supplied from the Queen City Sand and the artesian pressure is used to distribute the water. The temperature of the water is 84°F.

Industry

In 1964, industries in Atascosa and Frio Counties used an estimated 4.3 mgd (4,800 acre-feet) of ground water, or about 4 percent of the total amount withdrawn for all purposes. On the average, 0.8 mgd was used by an electrical power generating plant, 3.1 mgd by the petroleum industry (mainly to repressure oil reservoirs), and 0.4 mgd for washing sand (for construction purposes).

Irrigation

In 1964, irrigation in Atascosa and Frio Counties required an estimated 100,000 acre-feet (89 mgd) of ground water, or about 90 percent of the total used for all purposes. During that year approximately 97,000 acre-feet of water was pumped from the Carrizo Sand as the principal source of ground water for irrigation use. The number of irrigation wells supplied from the Carrizo Sand from 1920 to 1964 is shown on Figures 15 and 16. In Atascosa County, the number increased from 14 in 1920 to 270 in 1964; in Frio County, the number increased from 12 in 1920 to 240 in 1964.

Sundstrom and Follett (1950, p. 109-110 and 114-115) gave the following description of the development of irrigation in Atascosa County:

> "The production of ground crops in the Poteet area of northern Atascosa County, especially vegetables and strawberries, by means of irrigation from wells in the Carrizo Sand...started about 1904. It is believed that in the early days of this development all the wells flowed. Later many of them were equipped with pumps. The first irrigation well, a flowing well, was drilled at Poteet in 1904 before the advent of the railroad. By 1910, 10 flowing wells were in use, of which several were used for irrigation, and thereafter several were drilled each year until World War I, when the development was stopped on account of the high cost of drilling the wells and providing them with equipment where this was needed. After the war the development was resumed.

"In 1929-30, 57 wells in the Carrizo Sand were used for irrigation, of which 41 had a flow; a total of 1,350 acres was irrigated from them, and about 3,200 acre-feet of water (2.4 acre-feet per acre) was used. This is the equivalent of about 2.9 million gallons of water a day through the year.

"As shown by the Lonsdale report...[1935, pl. 1], most of the irrigation in 1929-30 was in the northern part of the county near Poteet and was restricted generally to the lower lands in the Atascosa River valley, only a few wells being on higher land at some distance from the stream. Most of the irrigation wells were within 5 miles of Poteet.

"In 1945, 108 wells in the Carrizo Sand were used for irrigation in Atascosa County, of which 51 were flowing wells; a total of about 3,544 acres was irrigated, and 7,900 acre-feet of water (2.2 acre-feet per acre) was used. This represents an average of about 7 million gallons of water a day throughout the year. Of the total number of wells in use, 98 were within a territory which still may be designated as the Poteet area although its former boundaries have expanded in all directions, the wells farthest west now being about 10 miles from the town and those farthest east about 5 miles from the town...Of the total number of acres under irrigation about 2,800 acres are in the Poteet area.

"Water from the Mount Selman Formation [Queen City Sand] is used to some extent for irrigation in a few scattered areas 4 to 7 miles east of Pleasanton. In 1929-30, nine irrigation wells were reported as drawing from this formation. Since 1930 nine new wells have been drilled but several of the earlier wells have been abandoned. In 1945, 13 Mount Selman wells were being used for irrigation, and...less than 400 acres were irrigated from them."

Moulder (1957, p. 10) reported 181 irrigation wells supplied from the Carrizo Sand in Atascosa County, and 13,800 acres under irrigation. In 1955, these wells provided 16,700 acre-feet of water (1.21 acre-feet per acre).

In Atascosa County in 1958, 201 irrigation wells supplied 30,915 acre-feet of water to 23,200 acres, or 1.33 acre-feet per acre; and in 1964, 253 wells supplied 43,278 acre-feet of water to 28,330 acres, or 1.53 acre-feet per acre (Gillett and Janca, 1965, p. 13). In 1964, about 27,000 acres was irrigated with water supplied from the Carrizo Sand, and about 1,330 acres was irrigated with water from the Edwards and associated limestones, the Queen City Sand, and the Sparta Sand.

The following descriptions of the development of irrigation in Frio County from 1905-30 are drawn from those in a report by Lonsdale (1935, p. 48-51 and 62-63). The first irrigation well supplied from the Carrizo Sand (well KB-77-15-303) was drilled in 1905 and flowed until 1915. In 1930, 15 irrigation wells were supplied by the Carrizo Sand in Frio County, and an estimated 2,100 acre-feet of water was used to irrigate 735 acres (2.8 acre-feet per acre).

The first irrigation well in Frio County was a shallow well drilled 1 mile north of Pearsall in 1902. This well demonstrated that the Queen City Sand in the area north of Pearsall could yield sufficient water for the irrigation of small tracts of land. In 1930 this area had 50 irrigation wells whose depths ranged from 100 to 200 feet and whose irrigated acres ranged from 3 to 30 per well. However, less than one-third of these wells were in use in 1930.

In 1930, 40 irrigation wells were supplied from the Sparta Sand in the vicinity of Dilley. The first well was drilled in 1927. These wells ranged in depth from 204 to 510 feet and supplied sufficient water for the irrigation of tracts of 35 acres or more. However, comparatively little land in the Dilley area was irrigated in 1930.

Moulder (1957, p. 10) reported 112 irrigation wells supplied from the Carrizo Sand in Frio County in 1955, and 15,400 acres under irrigation. These wells supplied 29,300 acre-feet of water (1.90 acre-feet per acre).

In 1958, 135 irrigation wells supplied 30,373 acre-feet of water to 24,200 acres, or 1.25 acre-feet per acre, in Frio County; and in 1964, 240 wells supplied 56,300 acre-feet of water to 44,595 acres, or 1.26 acre-feet per acre. In 1964, about 44,000 acres in Frio County was irrigated with water from wells supplied from the Carrizo Sand, and about 595 acres was irrigated with water from the Queen City or Sparta Sands.

Domestic and Livestock Needs

The estimate of 2.7 mgd (3,000 acre-feet) of ground water used in 1964 for domestic and livestock needs in Atascosa and Frio Counties was based on agricultural and population census data and on the per capita water requirements.

Changes in Water Levels

The changes of water levels in observation wells in the Carrizo Sand in Atascosa and Frio Counties are illustrated in this report by hydrographs showing fluctuations of water levels in wells, a map of annual average declines of water levels, two maps of the piezometric surface, and a cross section showing piezometric gradients.

Figures 17 and 18 are hydrographs of measurements in seven wells that tap the Carrizo Sand. The hydrographs of four wells (Figure 17) show declines of water level from 1950-56 and from 1961-65. The smaller declines are in well KB-69-62-501 which is in the outcrop of the Carrizo. Hydrographs of three other wells having shorter periods of record (Figure 18) also show declines of water level from 1961-65. The seasonal fluctuations of water levels caused by pumping for irrigation are indicated on the hydrographs of wells AL-68-60-502 and KB-77-06-301.

The annual average of the declines of water levels from the winter of 1960-61 to the winter of 1964-65 (Figure 19) ranged from less than 5 feet in the northern part of the report area to about 25 feet in the southwestern part of Frio County. The smaller rates of decline represent the removal of water from storage in the water-table part of the Carrizo, and the larger rates result from the lowering of pressure in the artesian part of the aquifer.

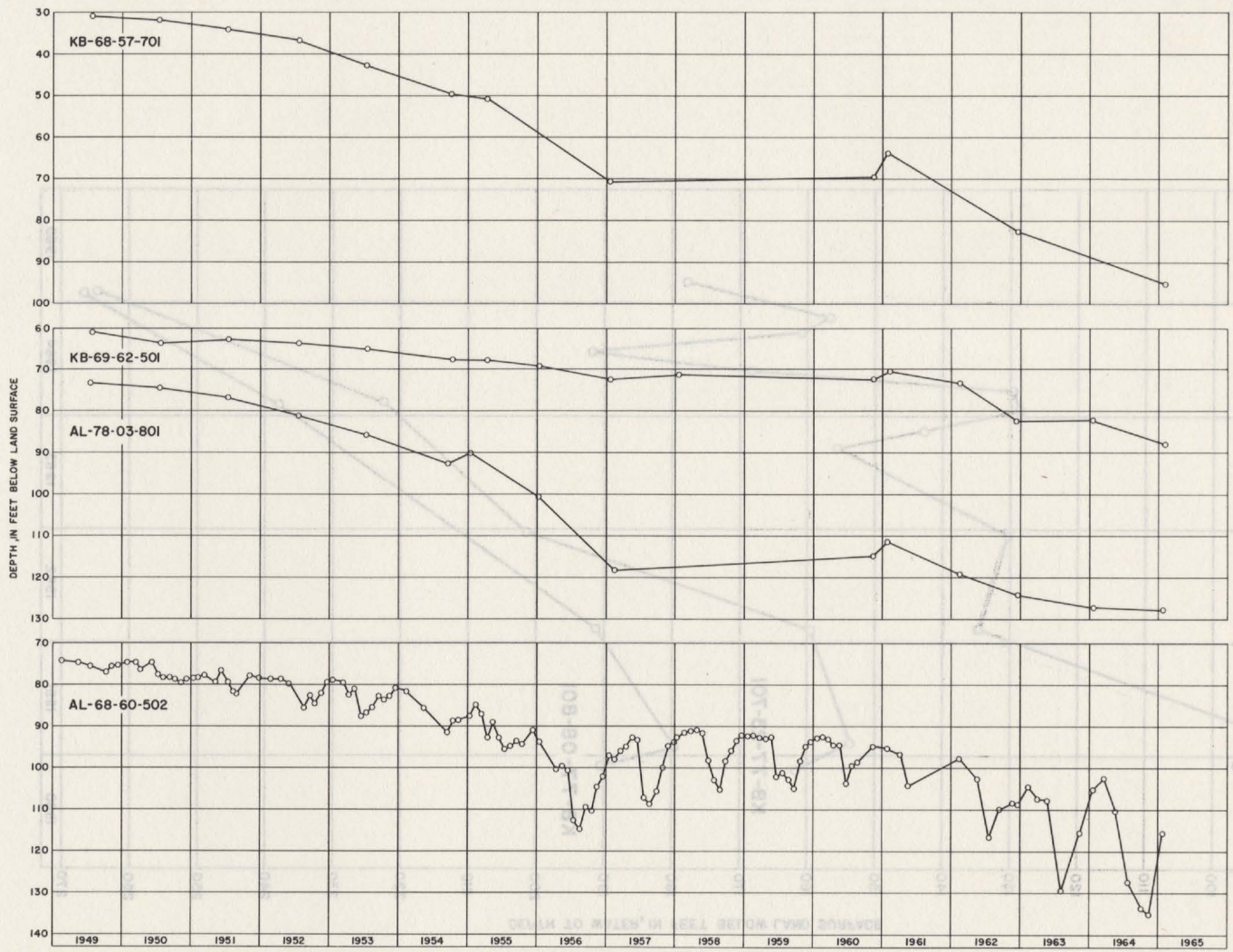

Figure 17

Water Levels in Wells Tapping the Carrizo Sand in Atascosa and Frio Counties

U.S. Geological Survey in cooperation with the Texas Water Development Board

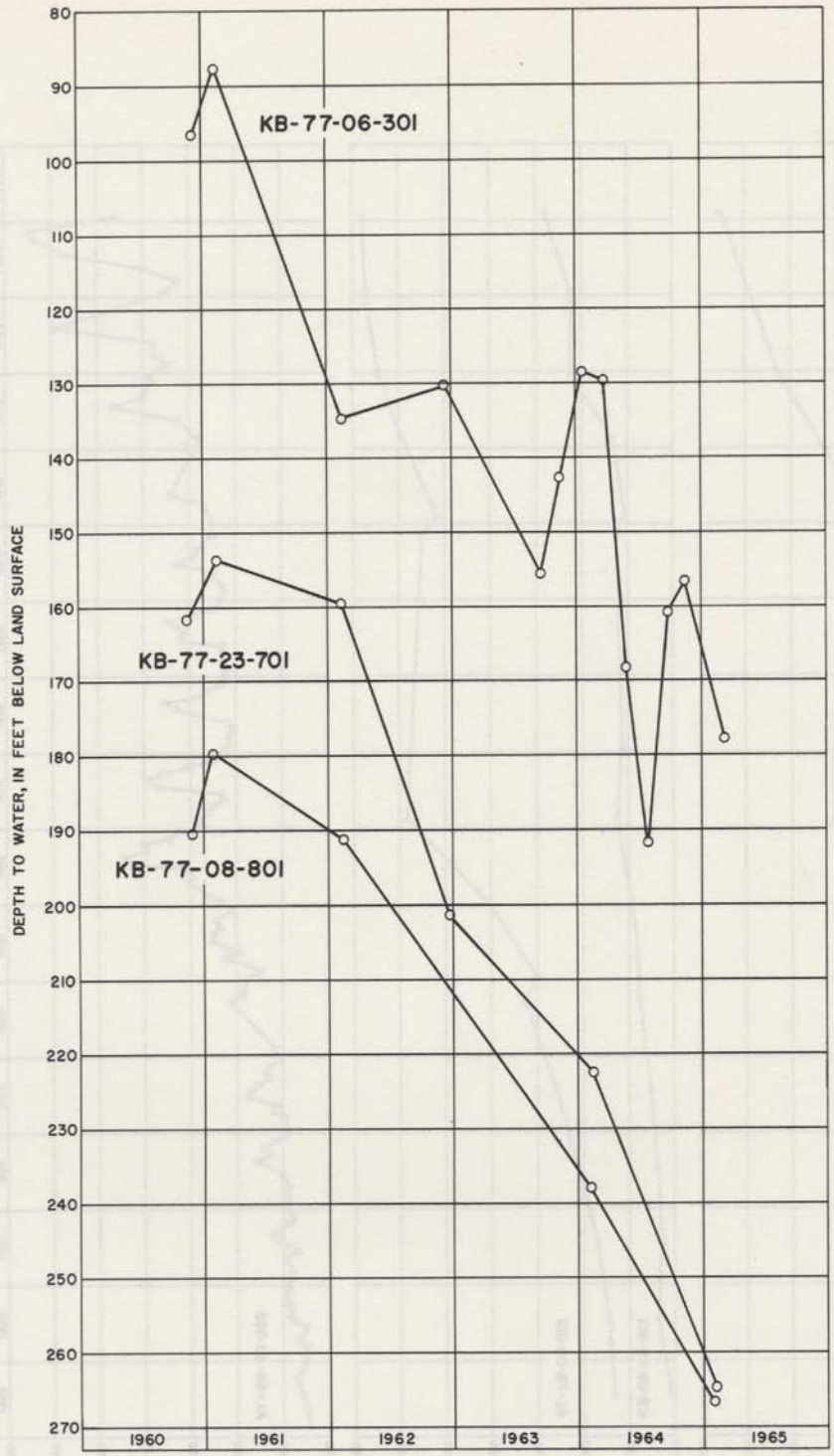

Figure 18

Water Levels in Wells Tapping the Carrizo Sand in Frio County

U.S. Geological Survey in cooperation with the Texas Water Development Board

On the map of the altitude of the piezometric surface in 1929-30 (Figure 20) are shown the conditions near the beginning of the extensive development of the water resources of the Carrizo Sand, and on the map for the spring of 1965 (Figure 21) are shown the results of development to the present. The main feature of the 1929-30 map (Figure 20) is the depression of the surface in the Poteet area, the principal center of irrigation at that time. A similar depression in the 1965 surface was caused by discharge of well A1-78-22-202 which supplies the city of Campbellton.

Figure 22 is a sectional view of the altitudes of the 1900 (estimated), the 1929-30, and the 1965 piezometric surfaces in Atascosa County. The section line extends from the outcrop of the Carrizo Sand southeasterly through the Poteet, Pleasanton, and Campbellton areas to the Atascosa-Live Oak County line. In general, the largest declines in water levels have occurred in those areas most distant from the outcrop area. The declines in water levels from the 1929-30 period to 1965 range from less than 5 feet to 40 feet in the outcrop area and from 40 to 110 feet in the area downdip from the outcrop.

Construction of Wells

Almost all the water wells in Atascosa and Frio Counties are drilled wells. The few exceptions are shallow dug wells. The casings in the drilled wells generally range in diameter from 4 to 14 inches, but a few casings as large as 18 inches have been used. Casings from 4 to 6 inches in diameter are commonly used in wells drilled for domestic or livestock supplies; the larger casings, 8 to 14 inches, are necessary to accommodate the deep-well turbine pumps that supply larger quantities of water for irrigation, public supply, and industrial needs. Large-diameter casing is installed to the bottoms of many wells in the northern part of the report area and in a few wells elsewhere. Generally in the deeper wells, large-diameter casing is set in the upper part of the well and the size is reduced in the lower part. In most of the wells, slotted casings are installed opposite the water-bearing sands; but in a few wells, screens are used for this purpose. As much as 300 feet of slotted casing has been installed in many of the irrigation wells in the Carrizo Sand. A number of the irrigation wells in the northern part of the report area are gravel packed, but this method is not universally used. A few of the unsuccessful oil test wells have been plugged back to the base of the Carrizo Sand and completed as water wells by gun-perforating the casing opposite the Carrizo Sand.

QUALITY OF GROUND WATER

The chemical constituents of ground water originate principally from the soil and rocks through which the water has moved; most of the differences in the chemical character of the water in the report area reflect the differences in the mineral content of the geologic formations that have been in contact with the water. Generally, the chemical content of ground water increases with depth. The temperature of ground water near the land surface is generally about the same as the mean air temperature of the region and increases with depth. The chemical analyses of water from 195 selected wells in the report area are given in Table 9, and the temperatures of the water samples are given in Table 8.

The source and significance of dissolved-mineral constituents and properties of water are summarized in Table 6 (from Doll and others, 1963, p. 39-43). The dissolved-mineral constituents are listed in the same sequence as in Table 9, the tabulation of the chemical analyses of water from selected wells in the report area. Concentrations of dissolved-mineral constituents are commonly expressed in: (1) parts per million (ppm), an expression of concentration by weight, and (2) equivalents per million (epm), the concentration of an ion in parts per million divided by the combining weight of the ion. General discussions of the quality of ground water are included in "A Primer on Water Quality," by Swenson and Baldwin (1965), and in the "Study and Interpretation of the Chemical Characteristics of Natural Water," by Hem (1959).

Relationship of Quality of Water to Use

The major factors that determine the suitability of a water supply are the limitations imposed by the comtemplated use of the water. Among the various criteria established for water quality are: bacterial content; physical characteristics, such as temperature, odor, color, and turbidity; and chemical constituents. Usually, the bacterial content and the undesirable physical properties can be alleviated economically, but the removal of undesirable chemical constituents can be difficult and expensive.

Public Supply and Domestic Uses

The U.S. Public Health Service (1962) has established and periodically revises standards of drinking water to be used on common carriers engaged in interstate commerce. The standards are designed to protect the traveling public and may be used to evaluate domestic and public water supplies. According to the standards, chemical constituents should not be present in a public water supply in excess of the listed concentrations shown in the following table, except where other more suitable supplies are not available. Below is a partial list of the standards adopted by the U.S. Public Health Service (1962, p. 7-8), including those constituents in the analyses from the two-county area:

Substance	Concentration (ppm)
Chloride (Cl)	250
Fluoride (F)	*
Iron (Fe)	0.3
Nitrate (NO_3)	45
Sulfate (SO_4)	250
Dissolved solids	500

*When fluoride is naturally present in drinking water, the concentration should not average more than the appropriate upper limit shown in the table on page 59.

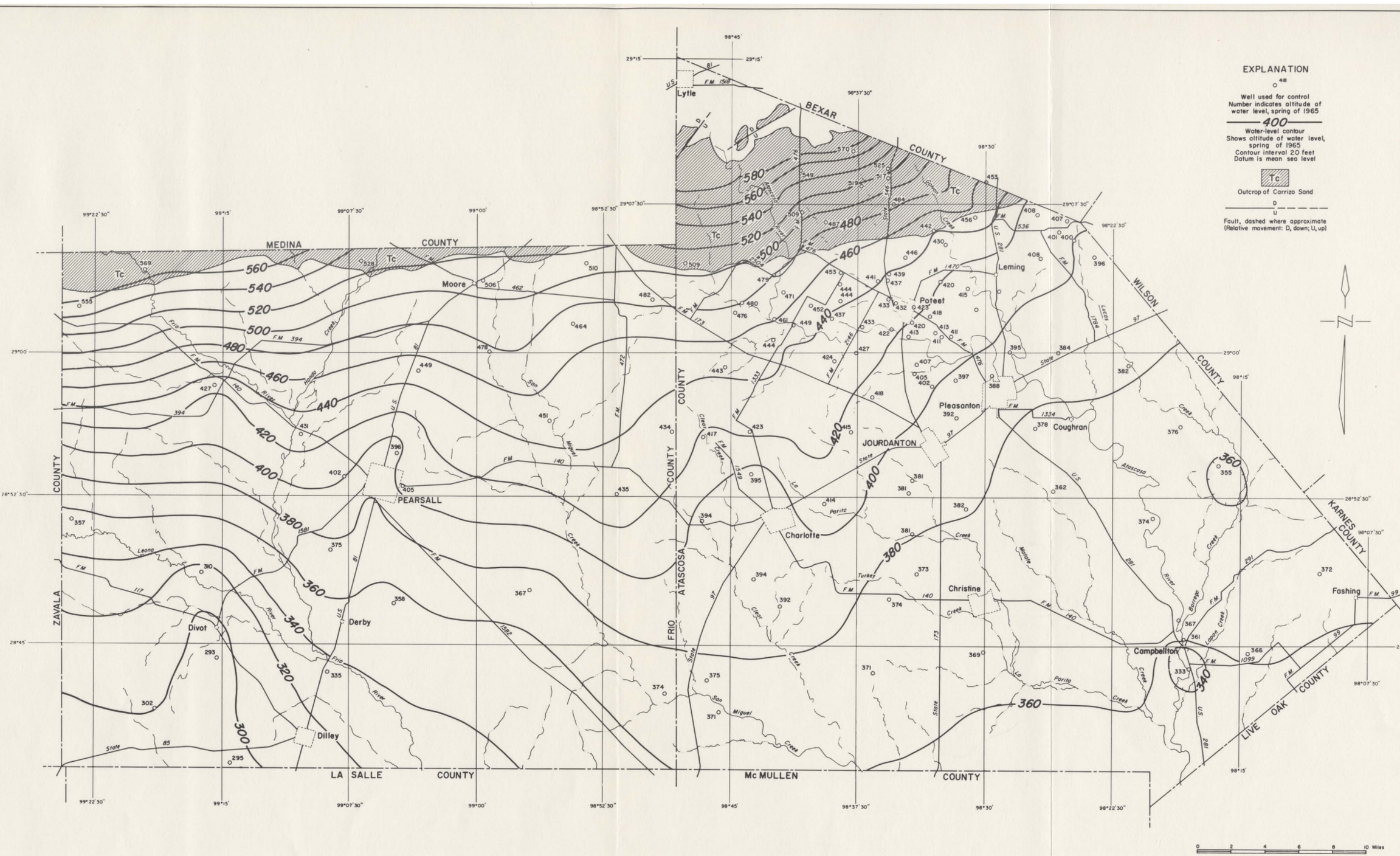

Figure 21

Altitude of Water Levels in Wells in the Carrizo Sand, Spring of 1965

U. S. Geological Survey in cooperation with the Texas Water Development Board

Base compiled from county maps of the Texas State Highway Department

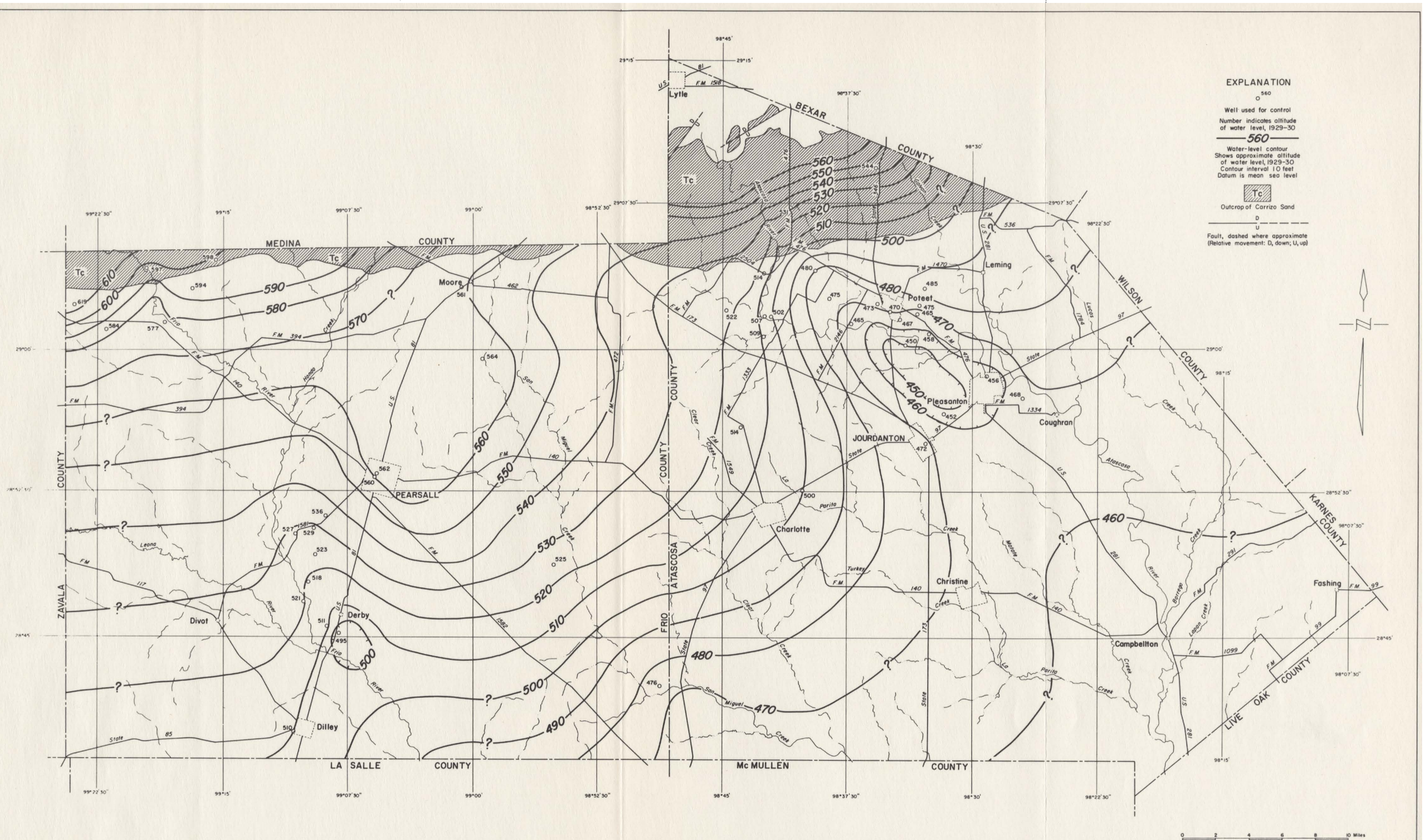

Figure 20

Approximate Altitude of Water Levels in Wells in the Carrizo Sand, 1929-30

U. S. Geological Survey in cooperation with the Texas Water Development Board

Base compiled from county maps of the Texas State Highway Department

EXPLANATION

(8)
Well used for control
Number indicates average annual decline of water level, 1961-65, parenthesis indicates approximate decline

10
Water-level-decline contour
Shows approximate average annual decline of water level from 1961 to 1965
Contour interval 5 feet

Tc
Outcrop of Carrizo Sand

D / U
Fault, dashed where approximate
(Relative movement: D, down; U, up)

BEXAR COUNTY
MEDINA COUNTY
WILSON COUNTY
KARNES COUNTY
LIVE OAK COUNTY
McMULLEN COUNTY
LA SALLE COUNTY
ATASCOSA COUNTY
FRIO COUNTY
ZAVALA COUNTY
Lytle
Moore
Poteet
Leming
Pleasanton
Coughran
JOURDANTON
Charlotte
Christine
Fashing
Campbellton
PEARSALL
Derby
Divot
Dilley

Figure 19

Average Annual Declines of Water Levels in Wells in the Carrizo Sand, 1961-65

U. S Geological Survey in cooperation with the Texas Water Development Board

Base compiled from county maps of the Texas State Highway Department

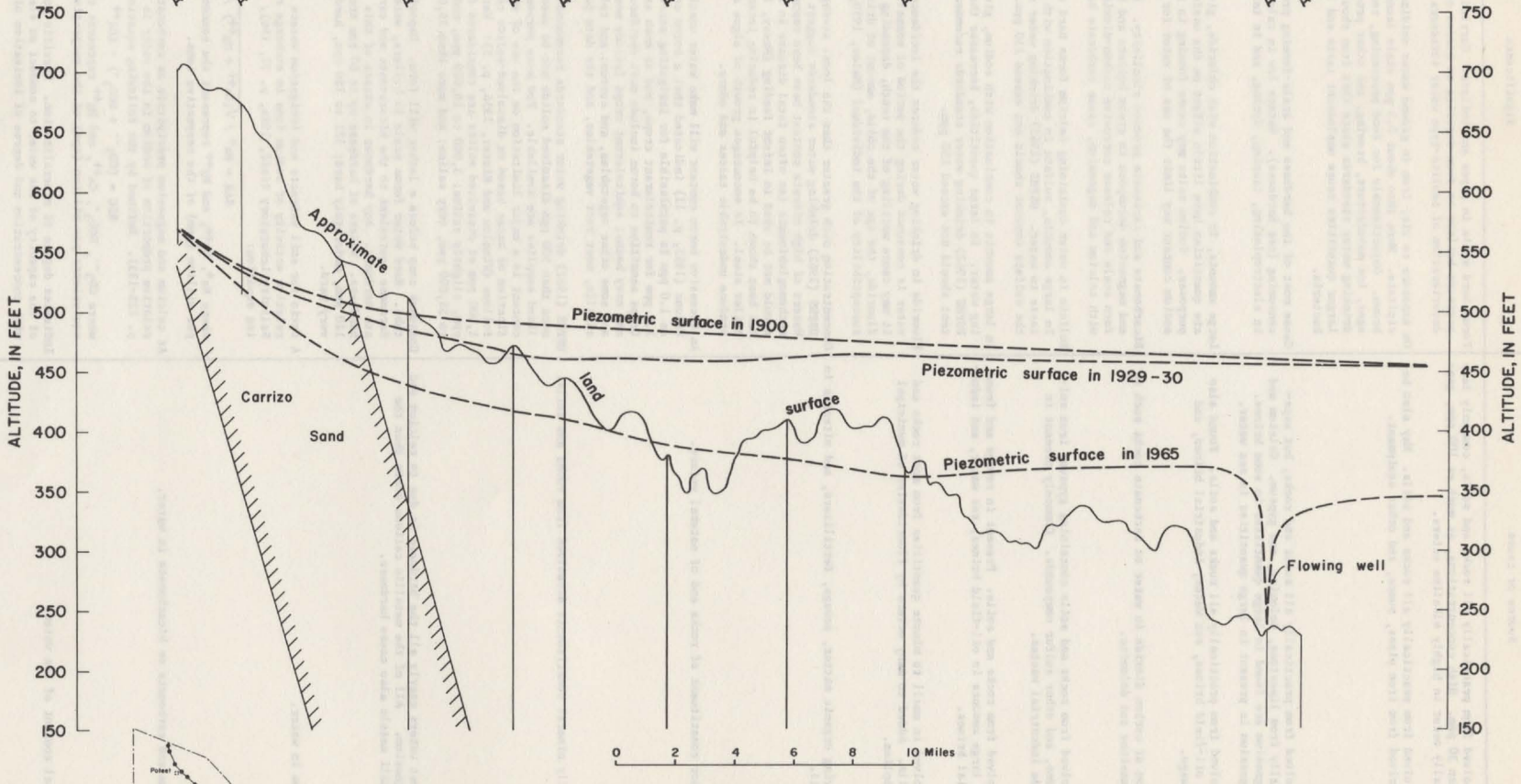

Figure 22

Profiles of Piezometric Surface, Carrizo Sand, Atascosa County, in 1900, 1929-30, and 1965

U.S. Geological Survey in cooperation with the Texas Water Development Board

Table 6.--Source and significance of dissolved-mineral constituents and properties of water
(from Doll and others, 1963, p. 39-43)

Constituent or property	Source or cause	Significance
Silica (SiO_2)	Dissolved from practically all rocks and soils, commonly less than 30 ppm. High concentrations, as much as 100 ppm, generally occur in highly alkaline waters.	Forms hard scale in pipes and boilers. Carried over in steam of high-pressure boilers to form deposits on blades of turbines. Inhibits deterioration of zeolite-type water softeners.
Iron (Fe)	Dissolved from practically all rocks and soils. May also be derived from iron pipes, pumps, and other equipment.	On exposure to air, iron in ground water oxidizes to reddish-brown precipitate. More than about 0.3 ppm stain laundry and utensils reddish-brown. Objectionable for food processing, textile processing, beverages, ice manufacture, brewing, and other processes. USPHS (1962) drinking water standards state that iron should not exceed 0.3 ppm. Larger quantities cause unpleasant taste and favor growth of iron bacteria.
Calcium (Ca) and Magnesium (Mg)	Dissolved from practically all soils and rocks, but especially from limestone, dolomite, and gypsum. Calcium and magnesium are found in large quantities in some brines. Magnesium is present in large quantities in sea water.	Cause most of the hardness and scale-forming properties of water; soap consuming (see hardness). Waters low in calcium and magnesium desired in electroplating, tanning, dyeing, and in textile manufacturing.
Sodium (Na) and Potassium (K)	Dissolved from practically all rocks and soils. Found also in oil-field brines, sea water, industrial brines, and sewage.	Large amounts, in combination with chloride, give a salty taste. Moderate quantities have little effect on the usefulness of water for most purposes. Sodium salts may cause foaming in steam boilers and a high sodium content may limit the use of water for irrigation.
Bicarbonate (HCO_3) and Carbonate (CO_3)	Action of carbon dioxide in water on carbonate rocks such as limestone and dolomite.	Bicarbonate and carbonate produce alkalinity. Bicarbonates of calcium and magnesium decompose in steam boilers and hot water facilities to form scale and release corrosive carbon-dioxide gas. In combination with calcium and magnesium, cause carbonate hardness.
Sulfate (SO_4)	Dissolved from rocks and soils containing gypsum, iron sulfides, and other sulfur compounds. Commonly present in some industrial wastes.	Sulfate in water containing calcium forms hard scale in steam boilers. In large amounts, sulfate in combination with other ions gives bitter taste to water. USPHS (1962) drinking water standards recommend that the sulfate content should not exceed 250 ppm.
Chloride (Cl)	Dissolved from rocks and soils. Present in sewage and found in large amounts in oil-field brines, sea water, and industrial brines.	In large amounts in combination with sodium, gives salty taste to drinking water. In large quantities, increases the corrosiveness of water. USPHS (1962) drinking water standards recommend that the chloride content should not exceed 250 ppm.
Fluoride (F)	Dissolved in small to minute quantities from most rocks and soils. Added to many waters by fluoridation of municipal supplies.	Fluoride in drinking water reduces the incidence of tooth decay when the water is consumed during the period of enamel calcification. However, it may cause mottling of the teeth, depending on the concentration of fluoride, the age of the child, amount of drinking water consumed, and susceptibility of the individual (Maier, 1950, p. 1120-1132).
Nitrate (NO_3)	Decaying organic matter, sewage, fertilizers, and nitrates in soil.	Concentration much greater than the local average may suggest pollution. USPHS (1962) drinking water standards suggest a limit of 45 ppm. Waters of high nitrate content have been reported to be the cause of methemoglobinemia (an often fatal disease in infants) and therefore should not be used in infant feeding (Maxcy, 1950, p. 271). Nitrate has been shown to be helpful in reducing inter-crystalline cracking of boiler steel. It encourages growth of algae and other organisms which produce undesirable tastes and odors.
Boron (B)	A minor constituent of rocks and of natural waters.	An excessive boron content will make water unsuitable for irrigation. Wilcox (1955, p. 11) indicated that a boron concentration of as much as 1.0 ppm is permissible for irrigating sensitive crops, as much as 2.0 ppm for semitolerant crops, and as much as 3.0 for tolerant crops. Crops sensitive to boron include most deciduous fruit and nut trees and navy beans; semitolerant crops include most small grains, potatoes and some other vegetables, and cotton; and tolerant crops include alfalfa, most root vegetables, and the date palm.
Dissolved solids	Chiefly mineral constituents dissolved from rocks and soils.	USPHS (1962) drinking water standards recommend that waters containing more than 500 ppm dissolved solids not be used if other less mineralized supplies are available. For many purposes the dissolved-solids content is a major limitation on the use of water. A general classification of water based on dissolved-solids content, in ppm, is as follows (Winslow and Kister, 1956, p. 5): Waters containing less than 1,000 ppm of dissolved solids are considered fresh; 1,000 to 3,000 ppm, slightly saline; 3,000 to 10,000 ppm, moderately saline; 10,000 to 35,000 ppm, very saline; and more than 35,000 ppm, brine.
Hardness as $CaCO_3$	In most waters nearly all the hardness is due to calcium and magnesium. All of the metallic cations other than the alkali metals also cause hardness.	Consumes soap before a lather will form. Deposits soap curd on bathtubs. Hard water forms scale in boilers, water heaters, and pipes. Hardness equivalent to the bicarbonate and carbonate is called carbonate hardness. Any hardness in excess of this is called non-carbonate hardness. Waters of hardness up to 60 ppm are considered soft; 61 to 120 ppm, moderately hard; 121 to 180 ppm, hard; more than 180 ppm, very hard.
Sodium-adsorption ratio (SAR)	Sodium in water.	A ratio for soil extracts and irrigation waters used to express the relative activity of sodium ions in exchange reactions with soil (U.S. Salinity Laboratory Staff, 1954, p. 72, 156). Defined by the following equation: $SAR = Na^+ / \sqrt{(Ca^{++} + Mg^{++})}\ /2$ where Na^+, Ca^{++}, and Mg^{++} represent the concentrations in equivalents per million (epm) of the respective ions.
Residual sodium carbonate (RSC)	Sodium and carbonate or bicarbonate in water.	As calcium and magnesium precipitate as carbonates in the soil, the relative proportion of sodium in the water is increased (Eaton, 1950, p. 123-133). Defined by the following equation: $RSC = (CO_3^{--} + HCO_3^-) - (Ca^{++} - Mg^{++})$ where CO_3^{--}, HCO_3^-, Ca^{++}, and Mg^{++} represent the concentrations in equivalents per million (epm) of the respective ions.
Specific conductance (micromhos at 25°C)	Mineral content of the water.	Indicates degree of mineralization. Specific conductance is a measure of the capacity of the water to conduct an electric current. Varies with concentration and degree of ionization of the constituents.
Hydrogen ion concentration (pH)	Acids, acid-generating salts, and free carbon dioxide lower the pH. Carbonates, bicarbonates, hydroxides, and phosphates, silicates, and borates raise the pH.	A pH of 7.0 indicates neutrality of a solution. Values higher than 7.0 denote increasing alkalinity; values lower than 7.0 indicate increasing acidity. pH is a measure of the activity of the hydrogen ions. Corrosiveness of water generally increases with decreasing pH. However, excessively alkaline waters may also attack metals.

Annual average of maximum daily air temperatures (°F) (obtained from a minimum of 5 years)	Recommended control limits of fluoride concentrations (ppm)		
	Lower	Optimum	Upper
50.0 - 53.7	0.9	1.2	1.7
53.8 - 58.3	.8	1.1	1.5
58.4 - 63.8	.8	1.0	1.3
63.9 - 70.6	.7	.9	1.2
70.7 - 79.2	.7	.8	1.0
79.3 - 90.5	.6	.7	.8

For the 5-year period 1960-64, the annual average of the maximum daily air temperatures at Dilley ranged from 80.7 to 85.5°F, and averaged 83.2°F; for the same period at Poteet the range was from 79.6 to 83.0°F, and the average was 81.5°F. Consequently, the recommended control limits of fluoride concentrations in the report area range from 0.6 to 0.8 ppm.

Industrial Use

Water used for industry may be placed in three categories--process water, cooling water, and boiler water. Process water is the term used for the water incorporated into or in contact with the manufactured products. The quality requirements for this use may include physical and biological factors in addition to chemical factors. Water for cooling and boiler uses should be noncorrosive and relatively free of scale-forming constituents. In boiler water the presence of silica is undesirable because it forms a hard scale or encrustation, the scale-forming tendency increasing with the pressure in the boiler. The following table shows the maximum suggested concentrations of silica for water used in boilers (Moore, 1940, p. 263):

Concentration of silica (ppm)	Boiler pressure (pounds per square inch)
40	Less than 150
20	150 to 250
5	251 to 400
1	More than 400

Irrigation Use

Several factors other than the chemical quality are involved in determining the suitability of water for irrigation purposes. The type of soil, adequacy

of drainage, crops grown, climatic conditions, and quality of water used--all have important bearing on the continued productivity of irrigated land.

For judging the quality of a water for irrigation a classification, now commonly used, was proposed in 1954 by the U.S. Salinity Laboratory Staff (1954, p. 69-82). The classification is based on the salinity hazard as measured by the electrical conductivity of the water and the sodium hazard as measured by the SAR (sodium-adsorption ratio). The relative importance of the dissolved constituents in irrigation water is dependent upon the degree to which they accumulate in the soil--more of the mineral content of the water will accumulate in tight soils than in more permeable soils under similar conditions. Sodium can be a significant factor in evaluating the quality of irrigation water because water with a high SAR will cause the soil structure to break down by deflocculating the colloidal soil particles. Consequently, the soil can become plastic, thereby causing poor aeration and low water availability. This possibility is especially true of fine-textured soils. Wilcox (1955, p. 15) stated that the system of classification of irrigation waters proposed by the Laboratory Staff "...is not directly applicable to supplemental waters used in areas of relatively high rainfall." Wilcox (1955, p. 16) indicated that generally water may be used safely for supplemental irrigation if its conductivity is less than 2,250 micromhos per centimeter at 25°C and its SAR is less than 14. The SAR value and the conductivity of samples from selected wells tapping the Carrizo Sand are shown in Figure 23.

Another factor in assessing the quality of water for irrigation is the RSC (residual sodium carbonate) in the water. Excessive RSC will cause the water to be alkaline, and the organic material in the soil will tend to dissolve. The soil may become a grayish black and the land areas affected are referred to as "black alkali." Wilcox (1955, p. 11) states that laboratory and field studies have resulted in the conclusion that water containing more than 2.5 epm RSC is not suitable for irrigation. Water containing from 1.25 to 2.5 epm is marginal, and water containing less than 1.25 epm RSC probably is safe. However, the successful use of marginal water for irrigation might be made possible by proper irrigation practices and use of soil amendments. Furthermore, the degree of leaching will modify the permissible limit to some extent (Wilcox, Blair, and Bower, 1954, p. 265).

Edwards and Associated Limestones

Only five wells are supplied from the Edwards and associated limestones in the report area: the city of Lytle well (AL-68-50-201), which is 2,379 feet deep; and four irrigation wells east of Lytle (AL-68-50-301, AL-68-50-302, AL-68-50-303, and AL-68-51-101), which are 2,507, 2,498, 2,428, and 2,656 feet deep, respectively. The water from the Lytle city well, although very hard, meets all the U.S. Public Health Service requirements. The water from the other four wells is suitable for irrigation. The Edwards and associated limestones contains fresh water in only the extreme northern part of Atascosa County. The water is saline south of a line running east-northeast across the county near well AL-68-50-301.

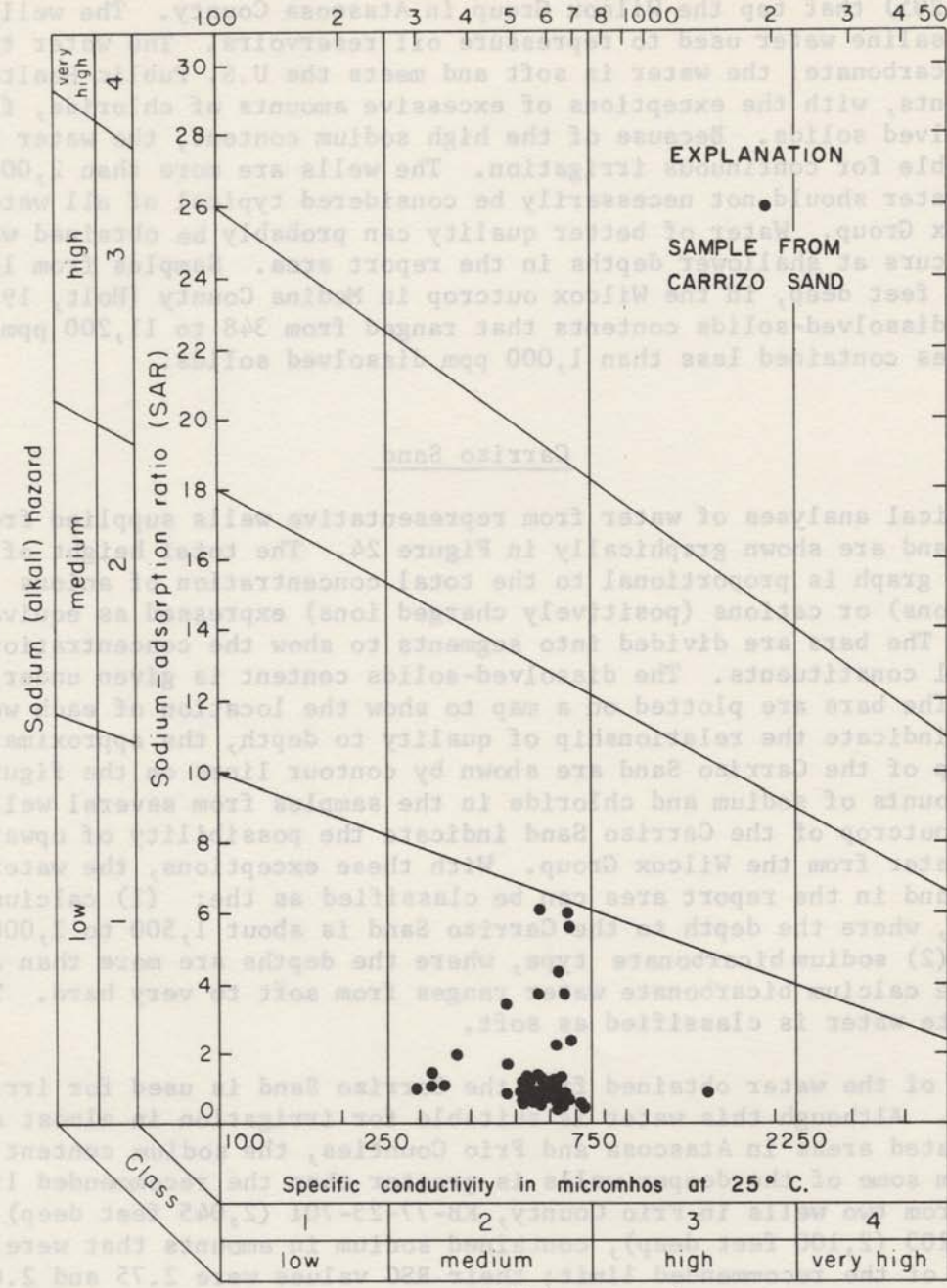

Figure 23

Diagram for the Classification of Irrigation Waters

U.S. Geological Survey in cooperation with the Texas Water Development Board

Wilcox Group

Samples were collected from three wells (AL-78-03-504, AL-78-10-602, and AL-78-11-205) that tap the Wilcox Group in Atascosa County. The wells produce slightly saline water used to repressure oil reservoirs. The water type is sodium bicarbonate; the water is soft and meets the U.S. Public Health Service requirements, with the exceptions of excessive amounts of chloride, fluoride, and dissolved solids. Because of the high sodium content, the water is probably not suitable for continuous irrigation. The wells are more than 2,000 feet deep, and the water should not necessarily be considered typical of all water from the Wilcox Group. Water of better quality can probably be obtained where the Wilcox occurs at shallower depths in the report area. Samples from 17 wells, 20 to 615 feet deep, in the Wilcox outcrop in Medina County (Holt, 1959, p. 208-209) had dissolved-solids contents that ranged from 348 to 11,200 ppm. Seven of the samples contained less than 1,000 ppm dissolved solids.

Carrizo Sand

Chemical analyses of water from representative wells supplied from the Carrizo Sand are shown graphically in Figure 24. The total height of each vertical bar graph is proportional to the total concentration of anions (negatively charged ions) or cations (positively charged ions) expressed as equivalents per million. The bars are divided into segments to show the concentration of the individual constituents. The dissolved-solids content is given under the bar graphs. The bars are plotted on a map to show the location of each well. In order to indicate the relationship of quality to depth, the approximate depths to the top of the Carrizo Sand are shown by contour lines on the figure. The larger amounts of sodium and chloride in the samples from several wells in and near the outcrop of the Carrizo Sand indicate the possibility of upward movement of water from the Wilcox Group. With these exceptions, the water in the Carrizo Sand in the report area can be classified as the: (1) calcium bicarbonate type, where the depth to the Carrizo Sand is about 1,500 to 2,000 feet or less; or (2) sodium bicarbonate type, where the depths are more than about 2,000 feet. The calcium bicarbonate water ranges from soft to very hard. The sodium bicarbonate water is classified as soft.

Most of the water obtained from the Carrizo Sand is used for irrigation (Table 5). Although this water is suitable for irrigation in almost all of the irrigated areas in Atascosa and Frio Counties, the sodium content of the water from some of the deeper wells is greater than the recommended limit. Samples from two wells in Frio County, KB-77-23-701 (2,045 feet deep) and KB-77-24-203 (2,100 feet deep), contained sodium in amounts that were slightly in excess of the recommended limit; their RSC values were 2.75 and 2.68 epm, respectively. The sample collected in 1956 from well KB-78-18-501, also in Frio County, contained an excessive amount of sodium; the SAR value was 22 and the RSC was 5.80 epm. This well (2,114 feet deep) was drilled in 1917 and was used for irrigation for a number of years. The excessive amount of sodium in the 1956 sample probably was due to a casing leak that allowed water to enter from an overlying saline-water-bearing formation. In Atascosa County, samples collected from nine wells which were more than 2,500 feet deep contained excessive amounts of sodium. The depths of the wells ranged from 2,507 to 4,800 feet, the SAR values ranged from 3.8 to 43, and the RSC ranged from 2.67 to 10.0 epm.

EXPLANATION

- Sampled well
- Sodium(Na) and Potassium(K)
- Calcium(Ca) and Magnesium(Mg)
- Chloride(Cl), Fluoride(F), and Nitrate(NO_3)
- Sulfate(SO_4)
- Carbonate(CO_3) and Bicarbonate(HCO_3)

Concentration of ions in Equivalents per million (epm)

334 – Dissolved solids in parts per million (ppm) (Analysis in ppm in Table 9)

1000 — Line showing approximate depth to the top of Carrizo Sand Contour interval 1000 feet

Tc — Outcrop of Carrizo Sand

D / U — Fault, dashed where approximate (Relative movement: D, down; U, up)

Figure 24

Quality of Water in the Carrizo Sand

U. S. Geological Survey in cooperation with the Texas Water Development Board

Base compiled from county maps of the Texas State Highway Department

Conductivity and SAR values for 29 wells in Atascosa County and for 19 wells in Frio County are plotted on a diagram used for the classification of irrigation waters (Figure 23). These wells are all less than 3,200 feet deep and, with one exception, are classified as having low sodium hazard and medium salinity hazard. Six other wells in Atascosa County are from 4,100 to 4,800 feet in depth but had SAR values ranging from 32 to 43, and specific conductances ranging from 969 to 1,370 micromhos per centimeter.

As shown in Table 5, more than half of the water used for public supplies in Atascosa and Frio Counties is obtained from the Carrizo Sand. All the samples from wells used for public supply met the U.S. Public Health Service standards, except in iron content which, in most samples, exceeded 0.3 ppm. The water was soft at Campbellton, moderately hard at Dilley and Poteet, and very hard at Pearsall, Jourdanton, and Charlotte.

Reklaw Formation

Data from chemical analyses of a few water samples and from a number of electrical logs indicate that the sands in the Reklaw contain fresh water to depths as great as 1,000 feet in much of the report area. However, relatively little development of the water resources in the Reklaw has been accomplished, because the texture of the sand is generally so fine that completion of a sand-free well is difficult. The dissolved-solids content of samples collected from four wells, 115 to 208 feet deep, ranged from 329 to 482 ppm, respectively. The sample from well KB-77-07-102, 700 feet deep, contained 607 ppm dissolved solids; and the sample from well AL-78-04-402, 1,040 feet deep, contained 442 ppm dissolved solids. The SAR and RSC values of all the samples indicate that the water is suitable for irrigation.

Queen City Sand

The sand beds in the lower part of the Queen City Sand are thicker (Figures 36, 37, and 38) and yield water of better quality than do the sands in the upper part. The downdip limit of fresh water (Figure 32) was based both on the analyses of water samples from wells supplied from the deeper sands and on electrical logs.

Samples were collected in the area south of Pearsall from five wells, 200 to 285 feet deep, that are supplied from the sands in the upper part of the Queen City. The dissolved-solids content of one sample was 662 ppm, and the others ranged from 1,568 to 1,891 ppm. All samples were classified as very hard. The sulfate content ranged from 79 to 676 ppm, and the chloride from 148 to 460 ppm. The SAR values ranged from 2.9 to 15, and RSC values were 0.00.

Nine samples were collected in Atascosa County from wells that are supplied from the sands in the lower part of the Queen City. The depths of these wells ranged from 455 to 2,185 feet. The SAR values for these samples ranged from 9.4 to 68, and the RSC values ranged from 3.16 to 12.4 epm.

With the exception of wells in the outcrop area and a few tapping sands in the upper part of the formation, the wells supplied from the Queen City Sand yield soft water of the sodium bicarbonate type. Because of its softness, this

water is more suitable for domestic and public supply uses but less suitable for irrigation than that from the underlying Carrizo Sand.

Sparta Sand

The chemical analyses of water from wells supplied by the Sparta Sand indicate that fresh water is available only in the outcrop area and for a few miles downdip, and also that water suitable for irrigation probably can be obtained in certain areas from wells less than 500 feet deep.

Water from the city of Dilley well 2 (KB-77-23-802, 340 feet deep) meets all the U.S. Public Health Service standards except in iron content, which is 0.6 ppm. In the vicinity of Divot the water in three wells (KB-77-14-801, 901, and 902), from 173 to 210 feet deep, ranges from slightly to moderately saline. Water from wells AL-78-04-906 and AL-78-12-205, 333 and 459 feet deep, respectively, is slightly saline but suitable for irrigation. Water from wells AL-78-13-701 and AL-78-18-201, 956 and 480 feet deep, respectively, is also slightly saline but is not suitable for irrigation because of its high sodium content.

Other Formations

The Cook Mountain Formation yields small quantities of slightly saline water to wells. In the vicinity of Dilley, samples from three wells (KB-77-23-601, 805, and 902) from 110 to 370 feet deep contained, respectively, 386, 650, and 730 ppm of sulfate, and 385, 325, and 350 ppm chloride. The sample from well KB-78-17-301, which is 193 feet deep, contained 355 ppm sulfate and 330 ppm chloride; and the sample from well AL-78-14-102 contained 163 ppm sulfate and 850 ppm chloride.

Lonsdale (1935, p. 42) wrote that most of the water from the Yegua Formation is too highly mineralized to be suitable for domestic, livestock, and irrigation uses, although a few wells supply water that can be used. Samples were collected from two wells that tap the Yegua Formation: AL-78-13-202, which is 148 feet deep; and AL-78-13-502, which is 285 feet deep. The sample from well AL-78-13-202 contained 2,000 ppm sulfate and 720 ppm chloride. The sample from well AL-78-13-502 contained 2,000 ppm sulfate and 1,580 ppm chloride.

According to Lonsdale (1935, p. 46), some of the water from the sandstone in the lower part of the Jackson Group is suitable for use, but water from the upper part of the Jackson is generally highly mineralized and unsuitable for use. Well AL-78-15-804, 765 feet deep, is supplied from the sandstone in the lower part of the Jackson. The sample from this well contained 740 ppm chloride and 20 ppm sulfate. Wells AL-78-15-601 and AL-78-23-201, 185 and 175 feet deep, respectively, are supplied from the upper part of the Jackson. The sample from well AL-78-15-601 contained 4,660 ppm dissolved solids, 1,840 ppm sulfate, and 1,020 ppm chloride. The sample from well AL-78-23-201 contained 3,080 ppm dissolved solids, 1,220 ppm sulfate, and 600 ppm chloride.

No samples were collected from wells supplied from the alluvial deposits.

Temperature of Ground Water

The temperature of ground water near the land surface generally is about the same as the mean air temperature, which is approximately 71°F at Dilley. The increase of water temperature with depth in the Carrizo Sand in Atascosa and Frio Counties is shown by Figure 25. The temperature ranges from about 73°F at 200 feet to 147°F at 4,200 feet. The temperature gradient ranges from 1.1°F per 100 feet in the shallower wells to 2.3°F per 100 feet in the deeper wells; the average is 1.7°F per 100 feet.

Protection of Ground Water

A potential source of ground-water contamination in Atascosa and Frio Counties exists in the movement of brines from the underlying salt-water-bearing formations through improperly cased oil wells or improperly plugged oil tests. In recent years, the Texas Water Development Board has made recommendations to the oil operators of the depths to which water-bearing formations are to be protected; and the Oil and Gas Division of the Railroad Commission of Texas is responsible for the protection of the water-bearing formations. With the exceptions of the Crown East (Navarro), Pearsall (Austin Chalk), and Somerset fields, the surface-casing requirements for all the oil fields, mentioned in the April 1965 field rules of the Railroad Commission, are adequate to protect the fresh water in Atascosa and Frio Counties. The water sands should be protected from the surface to the following depths: about 3,000 feet in parts of the Crown East (Navarro) field, about 2,700 feet in the Pearsall (Austin Chalk) field, and about 800 feet in the Somerset field. Figure 26 shows the approximate altitude of the base of the fresh to slightly saline water in the Tertiary aquifers in the report area. This water-quality base is at the contact of the Wilcox and Midway Groups in most of Atascosa and Frio Counties, except at the southeastern part of the report area where it is at or near the base of the Carrizo Sand. In the extreme northern part of Atascosa County, the base of fresh to slightly saline water is at or near the base of the Edwards and associated limestones.

Another potential source of contamination is the infiltration of oil-field brine from disposal pits on the outcrop of the aquifer. The Texas Water Commission and Texas Water Pollution Control Board (1963, p. 1-24 and 71-79) published a statistical analysis of data on oil-field-brine production and disposal in Texas for the year 1961. The data are from an inventory conducted by the Texas Railroad Commission. From a tabulation of these data, 6,581,846 barrels (848.35 acre-feet, or 276.44 million gallons) of brine was produced in 1961 from the oil and gas reservoirs in the report area. Of this amount, disposal of 1,561,371 barrels (201.25 acre-feet, or 65.58 million gallons--23.7 percent of the total) was by means of injection wells; and disposal of 5,020,475 barrels (647.10 acre-feet, or 210.86 million gallons--76.3 percent of the total) was by means of pits. Of the water thus relegated to pits, 2,199,219 barrels (283.46 acre-feet, or 92.37 million gallons--33.4 percent of the total quantity of water produced in 1961) was fresh water from oil reservoirs in the Carrizo Sand and other fresh-water aquifers. Many of the pits are on shale outcrops where they would be less likely to be harmful to ground-water supplies.

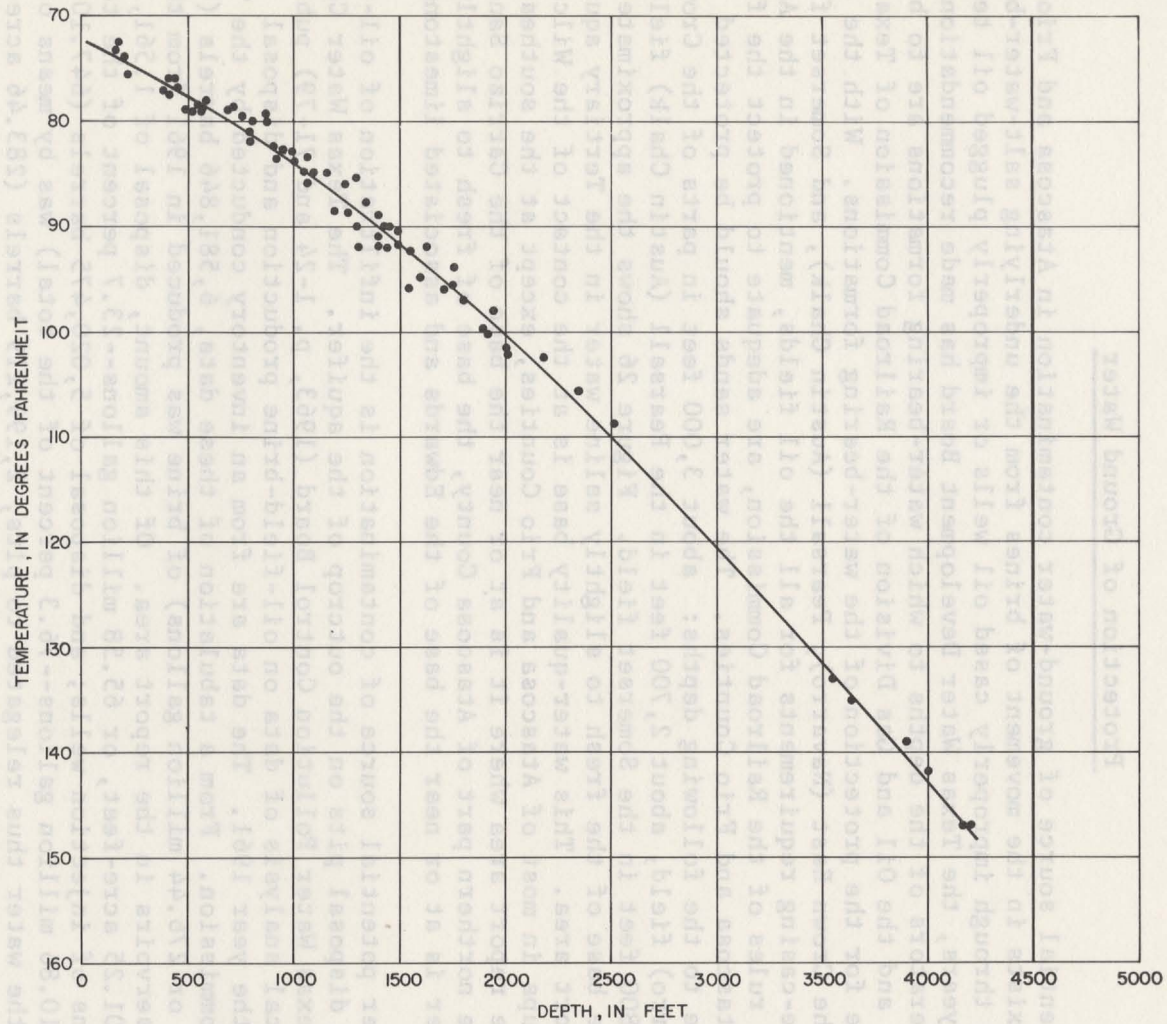

Figure 25

Temperature Gradient in the Carrizo Sand, Atascosa and Frio Counties

U.S. Geological Survey in cooperation with the Texas Water Development Board

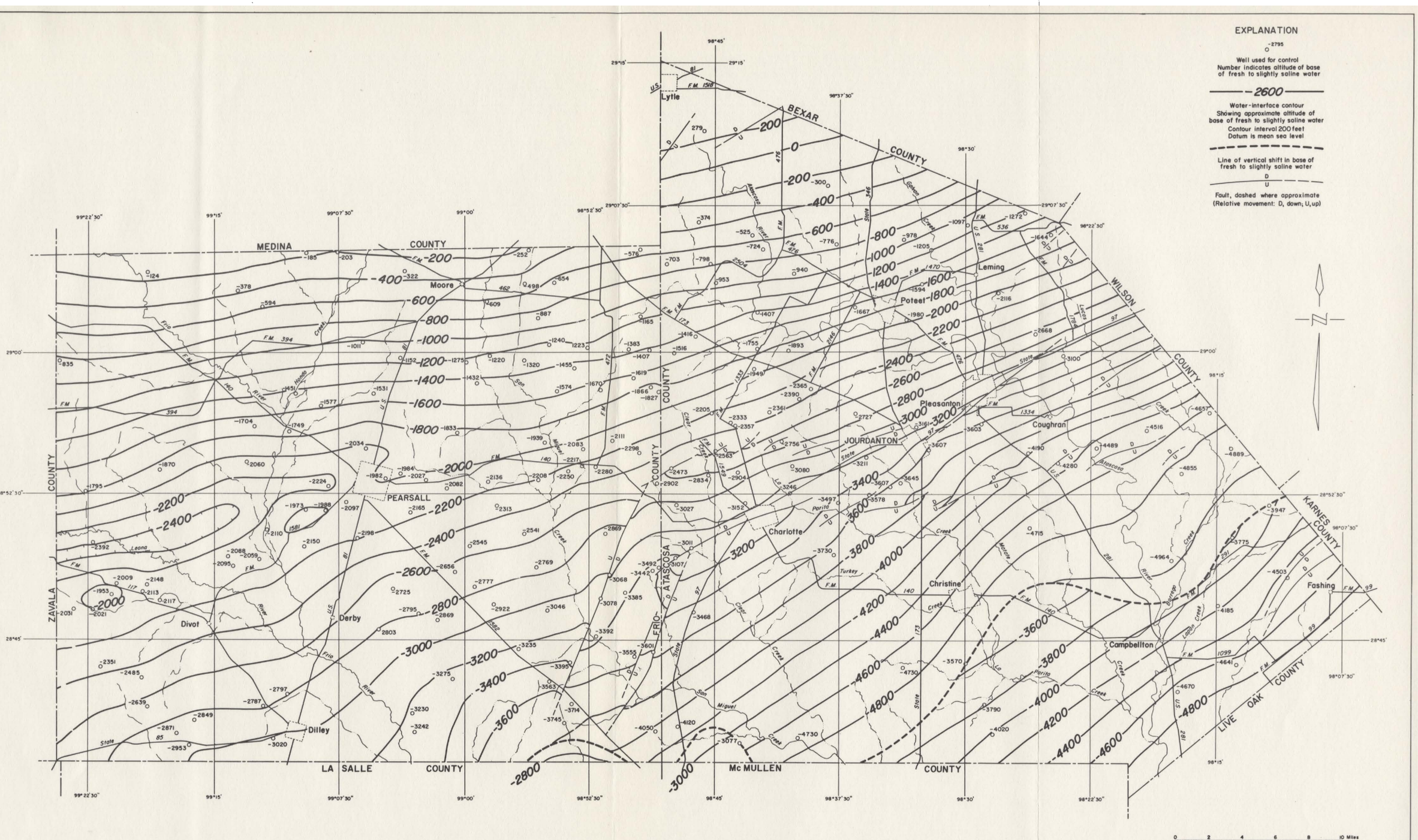

Figure 26

Approximate Altitude of the Base of Fresh to Slightly Saline Water in the Tertiary Aquifers

U.S. Geological Survey in cooperation with the Texas Water Development Board

Base compiled from county maps of the Texas State Highway Department

AVAILABILITY OF GROUND WATER FOR FUTURE DEVELOPMENT

The availability of water for future development from the aquifers in Atascosa and Frio Counties is dependent on several hydrologic and economic factors. Among the hydrologic factors, the more important are the ability of the aquifers to transmit water, the amount of water in storage, the rate of recharge to the aquifers, and the quality of the water. Economic factors include the cost of wells, which is an important factor in some areas because of the great depth to the tops of the aquifers; and the increased cost of pumping as water levels declined. The hydrologic and (or) economic aspects of ground-water development for the respective geologic units within the study area are summarized and evaluated in this concluding section of the report.

Edwards and Associated Limestones

The present development of the water resources of the Edwards and associated limestones in the report area (as mentioned in the section on "Quality of Ground Water") consists of five wells drilled in 1955 and 1956--the city of Lytle well and four irrigation wells east of Lytle. The depths of the wells range from 2,379 to 2,656 feet, and the reported yields of the irrigation wells range from 1,000 to 2,000 gpm. The cost of drilling to more than 2,000 feet is probably the factor that has limited to five wells the development of the ground-water resources of the Edwards and associated limestones in Atascosa County, although additional water could be obtained. Another factor is the presence of the quality-of-water transition zone in the eastern part of the area of present development (Garza, 1962a, pl. 3). In this transition zone, changes occur in the chemical quality of the water. Garza (1962a, p. 38) wrote that a study of analyses of samples taken periodically since 1955 show that the dissolved-solids content of the water in parts of the aquifer changes in response to changes in the artesian head--that is, as the artesian pressure increases, the dissolved-solids content of water from wells in the transition zone generally decreases, but little or no net change occurs in the dissolved-solids content in wells in the good quality and poor quality zones. The analyses of samples taken periodically from the city of Lytle well (AL-68-50-201) show no significant changes in the good quality of the water from 1955 to 1963 (Garza, 1962b, 1964).

Wilcox Group

The thickness of the sand containing fresh to slightly saline water in the Wilcox Group is shown on Figure 27. The maximum thickness of sand is 600 feet in Atascosa County, and 800 feet in Frio County. Data from the electric logs of oil tests indicate most of this water is slightly saline.

Within these counties the development of the water potential of the Wilcox has been limited to several wells in the outcrop area and to seven wells down-dip from the outcrop. The former are used occasionally for irrigation, and the latter are used in repressuring oil reservoirs. The yields of the irrigation wells range from 100 to 250 gpm. Well AL-68-51-501 is 400 feet deep, yields 125 gpm, and is used occasionally to irrigate 15 acres. The city of Devine well J-7-22 in Medina County (Holt, 1959, p. 143) is 613 feet deep and the yield

was 310 gpm of fresh water in 1952. The yields of the seven wells that supply slightly saline water for repressuring purposes average about 250 gpm, but the individual potentials may be as great as 500 gpm.

With the exception of the southeastern part of Atascosa County moderate yields (50 to 500 gpm) can probably be obtained from the Wilcox. The largest yields should be expected in the areas of greatest sand thickness (Figure 27). The water quality is fresh to slightly saline in and near the outcrop, and slightly saline in most of the remainder of the area.

Carrizo Sand

The thickness of sand containing fresh water in the Carrizo Sand is shown on Figure 28. According to chemical analyses, all the samples collected from representative wells supplied by the Carrizo Sand contained less than 1,000 ppm dissolved solids (fresh water). The maximum thickness of sand is 700 feet in central Frio County and 900 feet in the central and southeastern parts of Atascosa County. The depth to the top of the Carrizo Sand is shown on Figure 29; the maximum depth is about 2,200 feet in the southeastern corner of Frio County and about 4,200 feet in the southeastern part of Atascosa County.

The ground-water budgets for the Carrizo Sand in Atascosa and Frio Counties, from the beginning of development in 1905 to 1964 and from 1961 to 1964, are estimates of conditions in the aquifer during these periods (Table 7). The data for the budgets are from aquifer tests, measurements of water levels, and other hydrologic information. The sources of supply are recharge, dewatering of the outcrop, and water released from artesian storage by the decline of artesian pressure. The items of depletion include discharge of water from pumped or flowing wells, subsurface outflow (the water that moves through the Carrizo Sand from Frio to La Salle County and from Atascosa to McMullen and Live Oak Counties), and natural leakage from the Carrizo Sand to the overlying formations. The water budget for Atascosa County from 1905 to 1964 is shown graphically by a cross section (Figure 30).

Most of the total discharge for 1905-64 and 1961-64 was supplied from recharge and from water in storage in the outcrop area, as shown by Table 7.

Additional development of the ground-water resources of the Carrizo Sand will result in further lowering of water levels. However, withdrawals can be increased with the least decline of water levels in and near the outcrop of the Carrizo Sand--the area in which the transmissibility of the aquifer is greatest.

In the report area, the rate of recharge during the 1961-64 period was approximately one-fourth the rate of pumpage. Therefore, if the availability of ground water for future development is estimated on the basis of quantity of recharge, no additional water is available for development. This estimate, however, completely ignores the large quantity of water in storage; the ground-water budget indicates that most of the amount pumped has been taken from storage, and much more water remains available. Consequently, additional water development will be principally a matter of the economics of pumping. Larger quantities of water can be developed, but the water levels will continue to decline and pumping costs will increase. On this basis, then, the areas most

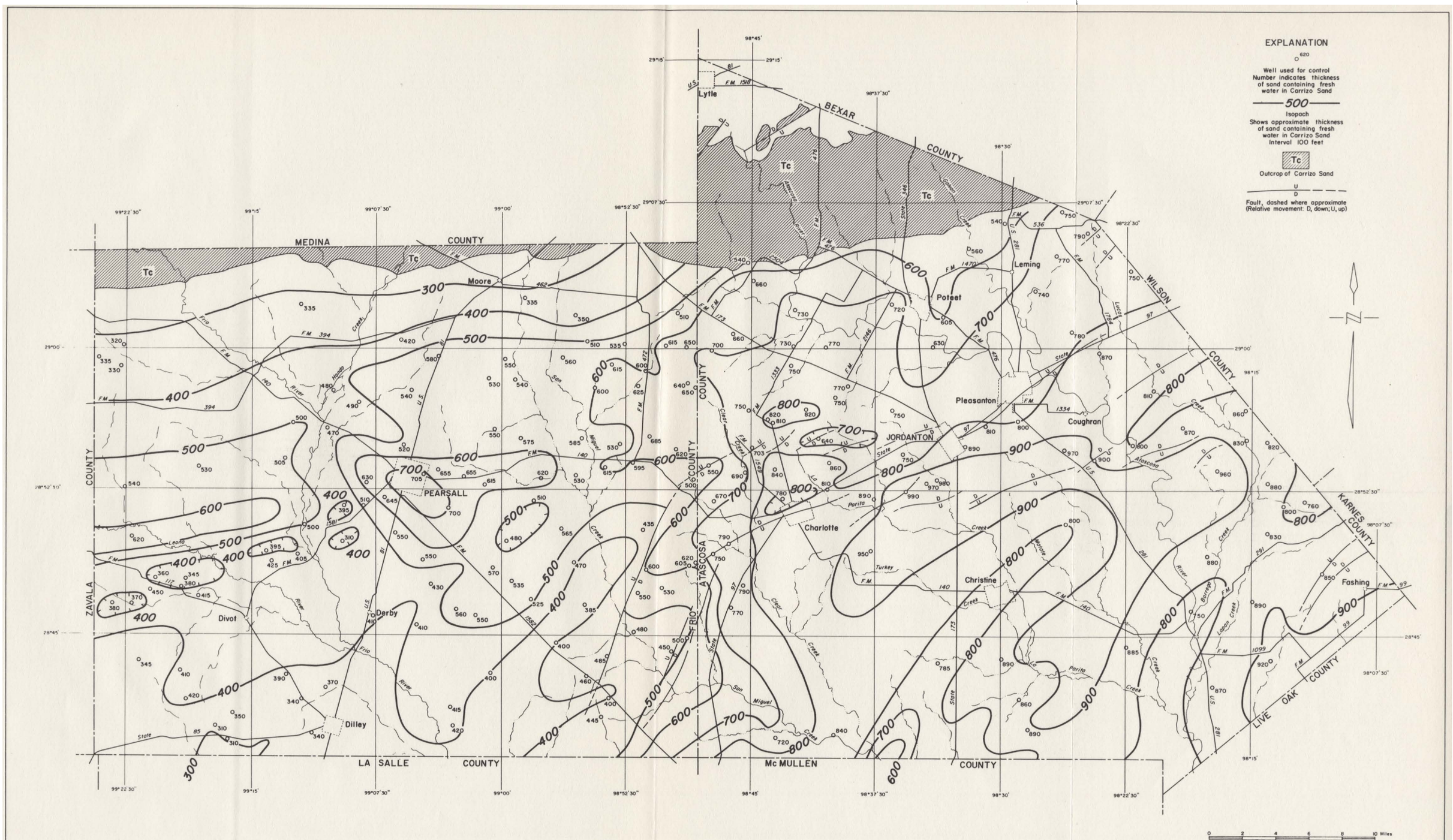

Figure 28

Approximate Thickness of Sand Containing Fresh Water in the Carrizo Sand

U. S. Geological Survey in cooperation with the Texas Water Development Board

Base compiled from county maps of the Texas State Highway Department

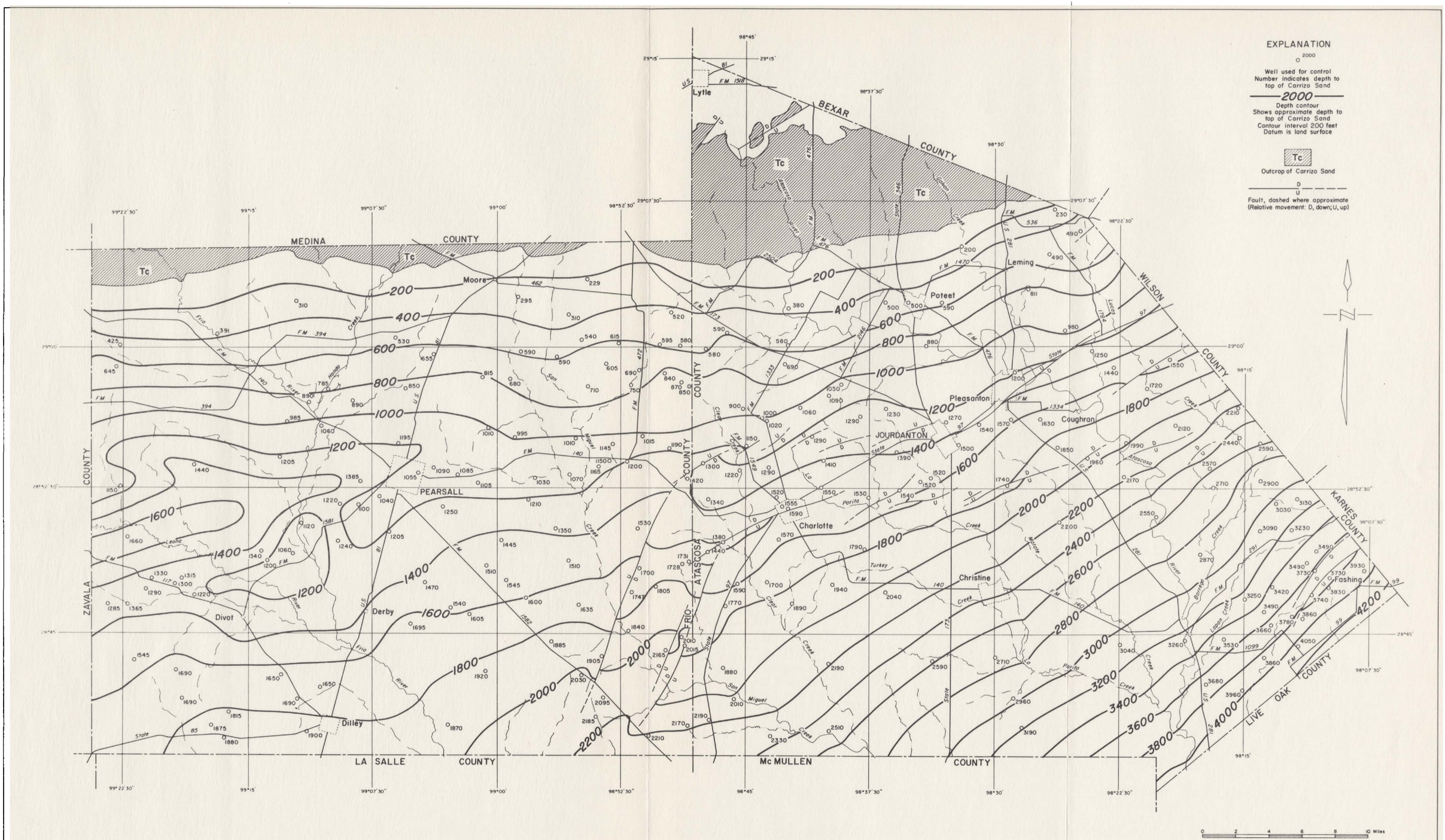

Figure 29

Approximate Depth to the Top of the Carrizo Sand

U.S. Geological Survey in cooperation with the Texas Water Development Board

Base compiled from county maps of the Texas State Highway Department

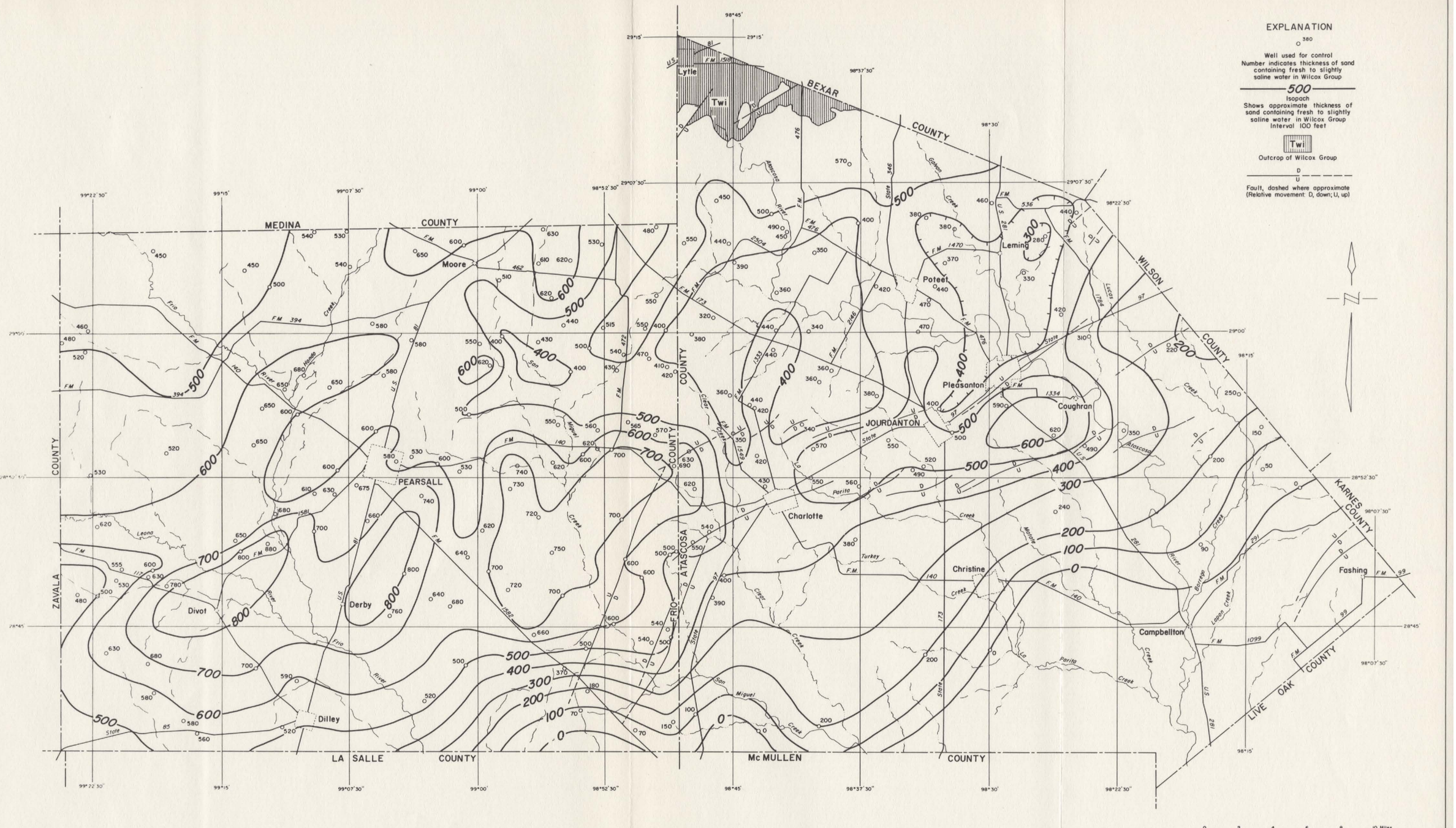

Figure 27

Approximate Thickness of Sand Containing Fresh to Slightly Saline Water in the Wilcox Group

U.S. Geological Survey in cooperation with the Texas Water Development Board

Base compiled from county maps of the Texas State Highway Department

Table 7.--Ground-water budgets for the Carrizo Sand in Atascosa and Frio Counties (acre-feet)

Factors evaluated	1905-64		1961-64		Average Annual, 1961-64	
	Atascosa County	Frio County	Atascosa County	Frio County	Atascosa County	Frio County
Items of supply						
Recharge	770,000	600,000	50,000	40,000	12,500	10,000
Dewatering of outcrop	485,000	270,000	134,000	130,000	33,500	32,500
Released from artesian storage	15,000	30,000	5,000	15,000	1,250	3,750
Total	1,270,000	900,000	189,000	185,000	47,250	46,250
Items of depletion						
Discharge (at surface)	850,000	630,000	180,000	180,000	45,000	45,000
Subsurface outflow	270,000	150,000	7,500	4,000	1,875	1,000
Leakage to overlying formations	150,000	120,000	1,500	1,000	375	250
Total	1,270,000	900,000	189,000	185,000	47,250	46,250

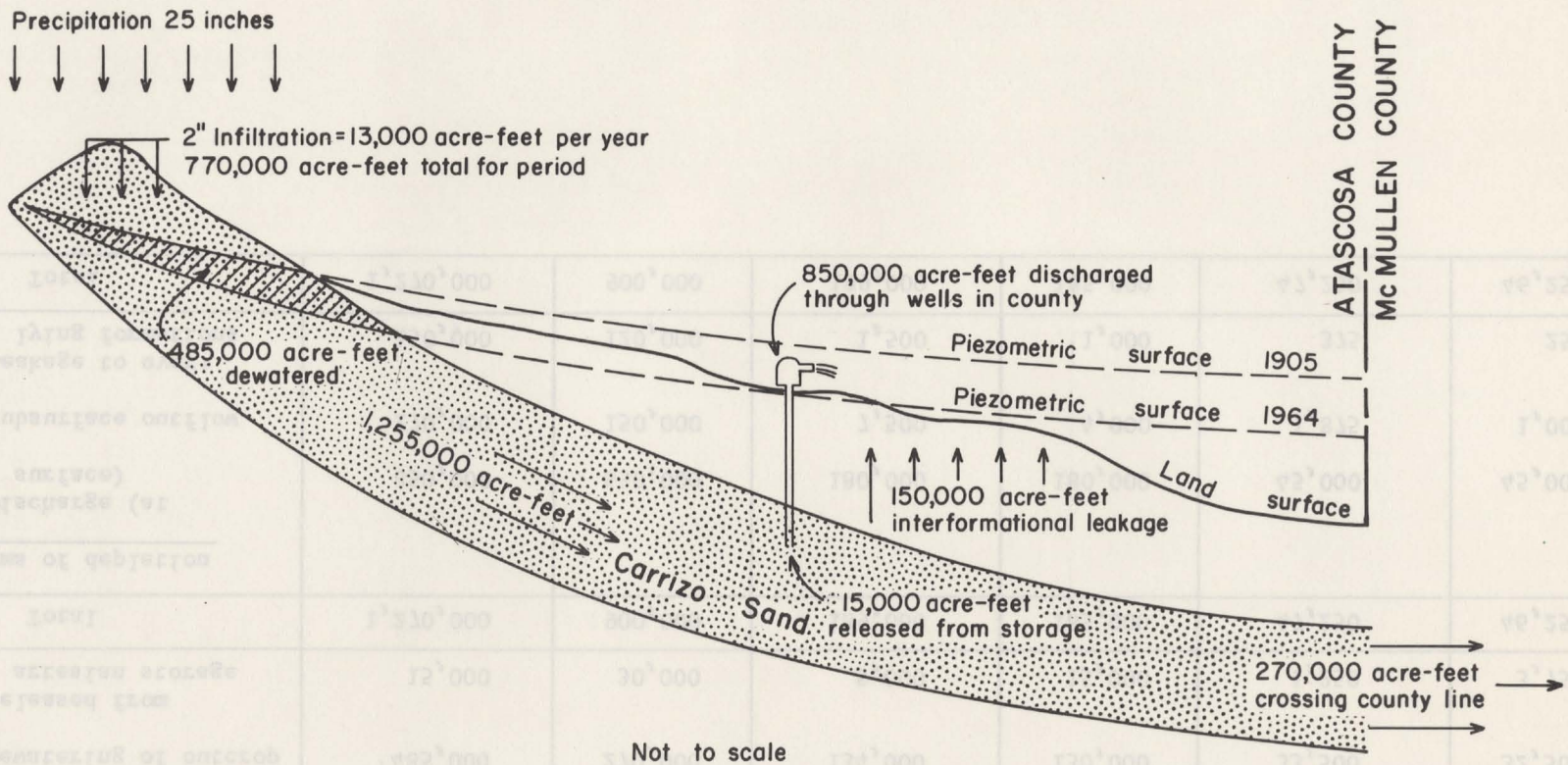

Figure 30

Ground-Water Budget of the Carrizo Sand in Atascosa County, 1905-64

U.S. Geological Survey in cooperation with the Texas Water Development Board

favorable for additional development are those in which the water-level declines have been the least. In any event, the fact should be recognized that the development at the present scale is considerably in excess of the rate of replenishment. In effect, the water is being mined.

Reklaw Formation

The thickness of sand containing fresh to slightly saline water in the Reklaw Formation is shown on Figure 31. In general, the thickness ranges in Frio County from 200 to 300 feet in the western part, but from 300 to 400 feet in the eastern part; and in Atascosa County, from 100 to 300 feet in the west-central part, but from 100 to 200 feet in the north-central part. The Reklaw Formation is about 400 feet thick in the report area; consequently, the depth to the top of the Reklaw at any locality will be about 400 feet less than the depth to the top of the Carrizo Sand (Figure 29).

Relatively little development of the water resources in the Reklaw Formation has taken place because, as mentioned previously, the texture of the sand is generally so fine that completing a sand-free well in the formation is difficult. Consequently, the wells are drilled into the underlying Carrizo Sand.

The Reklaw probably would yield as much as 500 gpm to properly constructed wells in most of the report area where sand thickness is greater than 200 feet in the northwestern part of Atascosa County and most of Frio County (Figure 31). Except in the southeastern part of Atascosa County, where the formation is predominantly shale, the Reklaw probably will supply water to the underlying Carrizo Sand as artesian pressures in the Carrizo continue to decline.

Queen City Sand

The thickness of sand containing fresh to slightly saline water in the Queen City Sand is shown on Figure 32. The maximum thickness is 500 feet in the eastern and southwestern parts of Atascosa County and in the southeastern part of Frio County. The depth to the top of the formation is shown on Figure 33. The thicker and more productive water sand generally is in the lower part of the formation. The depth to the top of the lower sand is, in general, several hundred feet more than the depth to the top of the formation at any given locality.

In the east-central, central, and southwestern parts of Atascosa County and the southeastern part of Frio County, the Queen City contains a large quantity of water that is suitable for public supply and domestic uses, but the high sodium content makes the water less suitable for irrigation. The groundwater potential of the Queen City Sand cannot be evaluated fully because the relevant data are insufficient. However, moderate yields (50 to 500 gpm) probably can be obtained in the areas of relatively thick sand.

Sparta Sand

The chemical analyses of water from wells supplied by the Sparta Sand indicate that fresh water is available only in the outcrop area and for a few

miles downdip. The better areas of potential development are in the vicinity of Dilley in southwestern Frio County and in the area a few miles downdip from the outcrop in Atascosa County.

Because available data are insufficient, the ground-water potential of the Sparta Sand cannot be evaluated. The largest yield from a well supplied by the Sparta is 500 gpm from the city of Dilley well KB-77-23-802, which is 340 feet deep. The only known irrigation wells in use are KB-77-23-504, which is 360 feet deep and yields 450 gpm, and AL-78-11-702, which is 412 feet deep and yields 200 gpm.

Other Formations

The geologic formations younger than the Sparta Sand (Table 1) yield only small quantities of water to domestic and livestock wells in Atascosa and Frio Counties. With a few exceptions, the quality of the water from these wells ranges from slightly to moderately saline and is not suitable for public supply, industry, or irrigation. Because data are not available, quantitative appraisals of the ground-water potentials of these units cannot be made. Very little additional development is anticipated, however, because of the low yields of wells and the generally undesirable chemical quality of the water.

EXPLANATION

340
Well used for control
Number indicates thickness of sand containing fresh to slightly saline water in Reklaw Formation

300
Isopach
Shows approximate thickness of sand containing fresh to slightly saline water in Reklaw Formation
Interval 100 feet

Tr
Outcrop of Reklaw Formation

D
U
Fault, dashed where approximate
(Relative movement: D, down; U, up)

N

0 2 4 6 8 10 Miles

Figure 31

Approximate Thickness of Sand Containing Fresh to Slightly Saline Water in the Reklaw Formation

U.S. Geological Survey in cooperation with the Texas Water Development Board

Base compiled from county maps of the Texas State Highway Department

EXPLANATION

330
Well used for control
Number indicates thickness of sand containing fresh to slightly saline water in the Queen City Sand

300
Isopach
Shows approximate thickness of sand containing fresh to slightly saline water in the Queen City Sand
Interval 100 feet

Line showing approximate downdip extent of fresh water in the Queen City Sand

Tqc
Outcrop of Queen City Sand

D / U
Fault, dashed where approximate
(Relative movement: D, down; U, up)

Figure 32

Approximate Thickness of Sand Containing Fresh to Slightly Saline Water in the Queen City Sand

U. S. Geological Survey in cooperation with the Texas Water Development Board

Base compiled from county maps of the Texas State Highway Department

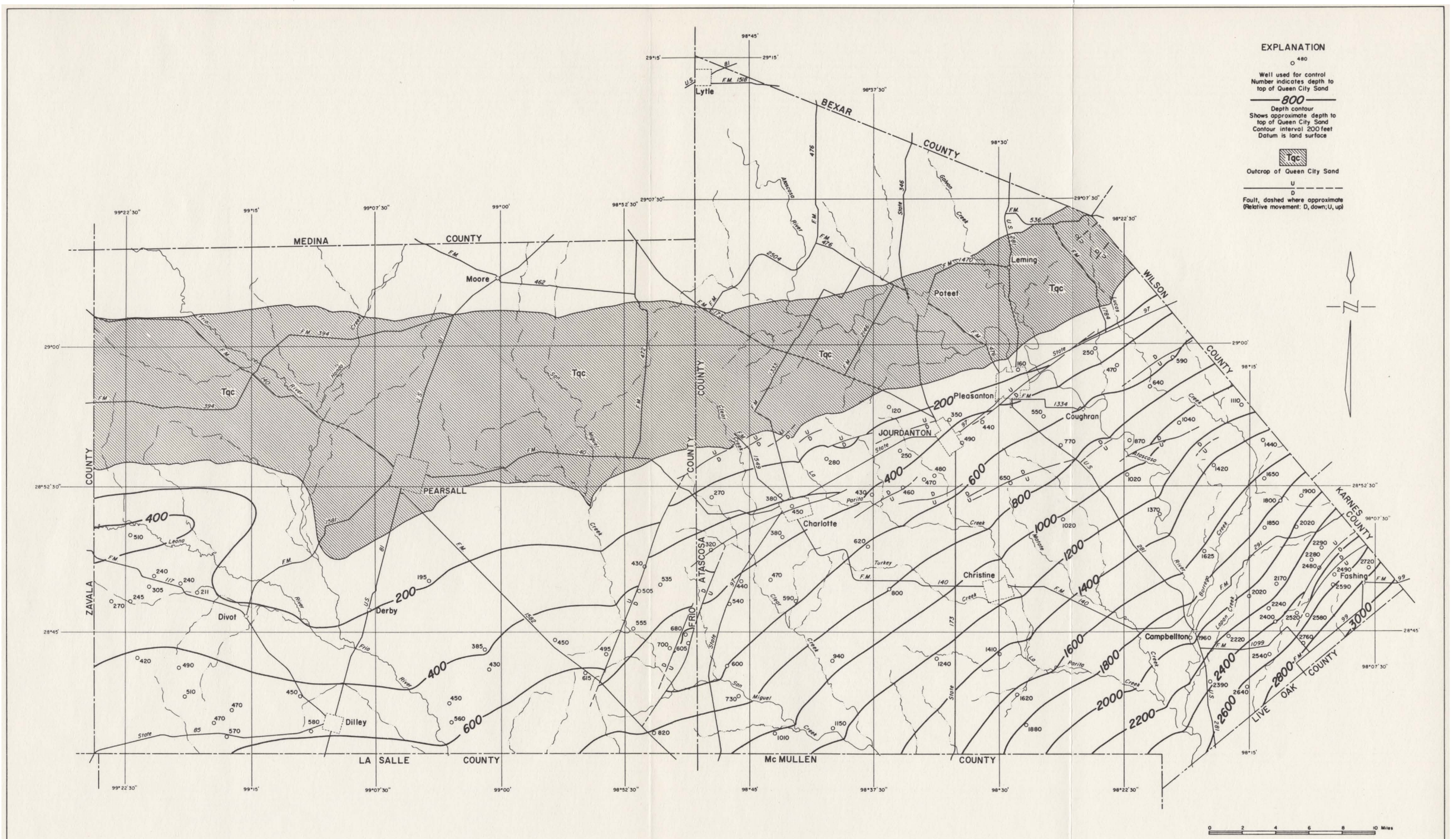

Figure 33

Approximate Depth to the Top of the Queen City Sand

U. S. Geological Survey in cooperation with the Texas Water Development Board

Base compiled from county maps of the Texas State Highway Department

DEFINITIONS OF TERMS

Many of the following definitions are based on the work of Meinzer (1923b), American Geological Institute (1960), Langbein and Iseri (1960), and Ferris and others (1962).

Acre-foot.--The volume of water required to cover 1 acre to a depth of 1 foot (43,560 cubic feet), or 325,851 gallons. The term is commonly used in measuring volume of water in storage in an aquifer, in a surface reservoir, or volume used.

Alluvial deposits.--See alluvium.

Alluvium.--Sediments deposited by streams; includes flood-plain deposits and stream-terrace deposits. Also called alluvial deposits.

Anticline.--A fold in rocks that is convex upward.

Aquifer.--A formation, group of formations, or part of a formation that is water bearing.

Aquifer test, pumping test.--The test consists of the measurement at specific intervals of the discharge and water level of the well being pumped and the water levels in nearby observation wells. Formulas have been developed to show the relationship of the yield of a well, the shape and extent of the cone of depression, and the properties of the aquifer (such as the specific yield, porosity, and coefficients of permeability, transmissibility, and storage).

Aquifer test, recovery test.--The test consists of the measurement at specific intervals of the water level in the previously pumped well and the observation wells. (See definition: "Aquifer test, pumping test.") Measurements are begun shortly after the pump is stopped and are continued until the water levels rise to (or recover) their positions previous to the start of the test.

Artesian aquifer, confined aquifer.--Artesian (confined) water occurs where an aquifer is overlain by rock of lower permeability (for example, clay) that confines the water under pressure greater than atmospheric. The water level in an artesian well will rise above the top of the aquifer. The well may or may not flow.

Artesian well.--One in which the water level rises above the top of the aquifer, whether or not the water flows at the land surface.

Base flow of a stream.--Fair-weather flow in a stream supplied by ground-water discharge.

Cone of depression.--Depression of the water table or piezometric surface surrounding a discharging well; more or less the shape of an inverted cone.

Confining bed.--A bed which, because of its position and its impermeability or low permeability relative to that of the aquifer, keeps the water in the aquifer under artesian pressure.

Contact.--The place or surface where two different kinds of rock or geologic units come together, shown on both maps and cross sections (such as the Carrizo Sand-Wilcox Group contact on Figures 34 to 39).

Dip of rocks.--The angle or amount of slope at which a bed is inclined from the horizontal; direction is also expressed (for example, 1 degree, southeast; or 90 feet per mile, southeast).

Drawdown.--The lowering of the water table or piezometric surface caused by pumping (or artesian flow). In most instances, drawdown is the difference, in feet, between the static level and the pumping level.

Electrical log.--A graph log showing the relation of the electrical properties of the rocks and their fluid contents when penetrated in a well. The electrical properties are natural potentials, and resistivities to induced electrical currents, some of which are modified by the presence of the drilling mud.

Equivalents per million (epm).--An expression of the concentration of chemical substances in terms of the reacting values of electrically charged particles, or ions, in solution. One epm of a positively charged ion (such as Na^+) will react with 1 epm of a negatively charged ion (such as Cl^-):

$$\text{epm} = \frac{\text{concentration of an ion in parts per million}}{\text{combining weight of the ion}}$$

Evapotranspiration.--Water withdrawn by evaporation from a land area, a water surface, moist soil, or the water table, and the water consumed by transpiration of plants.

Fault.--A fracture or fracture zone along which has occurred displacement of the two sides relative to one another and parallel to the fracture.

Flood plain.--The lowland that borders a stream; usually dry but subject to flooding.

Formation.--A body of rock that is sufficiently homogeneous or distinctive to be regarded as a mappable unit; usually named for a locality where the formation is typical (examples: Carrizo Sand and Queen City Sand).

Fresh water.--Water containing less than 1,000 ppm (parts per million) dissolved solids (Winslow and Kister, 1956, p. 5). For dissolved solids, see Table 6.

Gallons per day (gpd).

Gallons per hour (gph).

Gallons per minute (gpm).

Greensand.--A mixture of granular (sand size) iron silicate mineral of the glauconite group with varying proportions of quartz sand and clay (Eckel, 1938, p. 1).

Ground water.--Water in the ground that is in the zone of saturation from which wells, springs, and seeps are supplied.

Head.--Artesian pressure measured at the land surface reported in pounds per square inch or feet of water.

Hydraulic gradient.--The slope of the water table or piezometric surface, usually given in feet per mile.

Hydrologic cycle.--The complete cycle of phenomena through which water passes (Figure 11), commencing as atmospheric water vapor, passing into liquid or solid form as precipitation, thence along or into the ground, and finally again returning to the form of atmospheric water vapor by means of evaporation and transpiration.

Irrigation, supplemental.--The use of ground or surface water for irrigation in humid regions as a supplement to rainfall during periods of drought. Not a primary source of moisture as in arid and semiarid regions.

Lignite.--A brownish-black coal in which the alteration of vegetal material has proceeded further than in peat but not as far as in subbituminous coal.

Lithology.--The description of rocks, usually from observation of hand specimen or outcrop.

Marl.--A calcareous clay.

Million(s) gallons per day (mgd).--One mgd equals 3.068883 acre-feet per day or 1,120.91 acre-feet per year.

Mineral.--Any chemical element or compound occurring naturally as a product of inorganic processes.

Outcrop.--That part of a rock layer which appears at the land surface. On an areal geologic map a formation or other stratigraphic unit is shown as an area of outcrop where exposed and where covered by alluvial deposits (contacts below the alluvial deposits are shown on map by dotted lines).

Parts per million (ppm - weight).--One part per million represents 1 milligram of solute in 1 kilogram of solution. As commonly measured and used, parts per million is numerically equivalent to milligrams of a substance per liter of water.

Permeability of an aquifer.--The capacity of an aquifer for transmitting water under pressure.

Piezometric surface.--An imaginary surface that everywhere coincides with the static level of the water in the aquifer. The surface to which the water from a given aquifer will rise under its full head.

Porosity.--The ratio of the aggregate volume of interstices (openings) in a rock or soil to its total volume, usually stated as a percentage.

Pyrite.--Iron pyrites (Fool's gold). A common mineral of a pale brass-yellow color and metallic luster; chemically, iron disulfide (FeS_2).

Recharge of ground water.--The process by which water is absorbed and is added to the zone of saturation. Also used to designate the quantity of water that is added to the zone of saturation, usually given in acre-feet per year or in million gallons per day.

Recharge, rejected.--The natural discharge of ground water in the recharge area of an aquifer by springs, seeps, and evapotranspiration, which occurs when the rate of recharge exceeds the rate of transmission in the aquifer.

Resistivity (electrical log).--The resistance of the rocks and their fluid contents penetrated in a well to induced electrical currents. Permeable rocks containing fresh water have high resistivities.

Salinity of water.--From a general classification of water based on dissolved-solids content by Winslow and Kister (1956, p. 5): slightly saline water, 1,000 to 3,000 ppm; moderately saline water, 3,000 to 10,000 ppm; very saline water, 10,000 to 35,000 ppm; and brine, more than 35,000 ppm. For dissolved solids, see Table 6.

Specific capacity.--The rate of yield of a well per unit of drawdown, usually expressed as gallons per minute per foot of drawdown. If the yield is 250 gpm and the drawdown is 10 feet, the specific capacity is 25 gpm/ft.

Specific yield.--The quantity of water that an aquifer will yield by gravity if it is first saturated and then allowed to drain; the ratio expressed in percentage of the volume of water drained to volume of the aquifer that is drained.

Storage.--The volume of water in an aquifer, usually given in acre-feet.

Storage, coefficient of.--The volume of water that an aquifer releases from or takes into storage per unit surface area of the aquifer per unit change in the component of head normal to that surface. Storage coefficients of artesian aquifers may range from about 0.00001 to 0.001; those of water-table aquifers may range from about 0.05 to 0.30.

Stream-gaging station.--A gaging station where a record of discharge (flow) of a stream is obtained.

Stream terrace.--A level and rather narrow plain in a valley at some height above the flood plain composed of alluvial deposits that represent a former flood plain of the stream.

Structural feature, geologic.--The result of the deformation or dislocation (such as faulting) of the rocks in the earth's crust.

Surface water.--Water on the surface of the earth.

Transmissibility, coefficient of.--The rate of flow of water in gallons per day through a vertical strip of the aquifer 1 foot wide extending through the vertical thickness of the aquifer at a hydraulic gradient of 1 foot per foot and at the prevailing temperature of the water. The coefficient of transmissibility from a pumping test is reported for the part of the aquifer tapped by the well.

Transmission capacity of an aquifer.--The quantity of water that can be transmitted through a given width of an aquifer at a given hydraulic gradient, usually expressed in acre-feet per year or million gallons per day.

Transpiration.--The process by which water vapor escapes from a living plant, principally from the leaves, and enters the atmosphere.

Water level.--Depth to water, in feet below the land surface, where the water occurs under water-table conditions (or depth to the top of the zone of saturation). Under artesian conditions the water level is a measure of the pressure on the aquifer, and the water level may be at, below, or above the land surface.

Water level, pumping.--The water level, during pumping, measured in feet below the land surface.

Water level, static.--The water level in an unpumped or nonflowing well measured in feet above or below the land-surface or sea-level datum.

Water table.--The upper surface of a zone of saturation except where that surface is formed by an impermeable body of rock.

Water-table aquifer (unconfined aquifer).--An aquifer in which the water is unconfined; the upper surface of the zone of saturation is under atmospheric pressure only and the water is free to rise or fall in response to the changes in the volume of water in storage. A well penetrating an aquifer under water-table conditions becomes filled with water to the level of the water table.

Yield of a well.--The rate of discharge, commonly expressed as gallons per minute, gallons per day, or gallons per hour. In this report, yields are classified as: small, less than 50 gpm; moderate, 50 to 500 gpm; and large, more than 500 gpm.

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Table 8.--Records of wells in Atascosa, Frio, and adjacent counties

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: A, airlift; C, cylinder; Cf, centrifugal; E, electric; G, gasoline, butane, or Diesel engine; H, hand; J, jet; N, none; Ng, natural gas; T, turbine; W, windmill. Number indicates horsepower.
Use of water : D, domestic; Ind, industrial; Irr, irrigation; N, none; P, public supply; S, stock.
Water-bearing unit : Qal, Quaternary alluvium; Kea, Edwards and associated limestones; Tc, Carrizo Sand; Tcm, Cook Mountain Formation; Tj, Jackson Group; Tqc, Queen City Sand; Tr, Reklaw Formation; Ts, Sparta Sand; Twi, Wilcox Group; Ty, Yegua Formation.

Well	Owner	Driller	Date completed	Depth of well (ft)	Diameter of well (in.)	Water-bearing unit	Altitude of land-surface (ft)	Water level: Below land surface datum (ft)	Water level: Date of measurement	Method of lift	Use of water	Remarks
						Atascosa County						
*AL-68-50-201	City of Lytle	J. R. Johnson	1955	2,379	10, 8	Kea	704	87.6 46.2	Jan. 12, 1957 June 15, 1965	T,E 40	P	Casing: 10-in. to 306 ft, 8-in. from 306 to 2,304 ft. Open hole from 2,304 to 2,379 ft. Temp. 90°F.
* 301	C. W. Mask	--	1956	2,507	10, 8	Kea	--	--	--	T,G	S, Irr	Cased to 2,200 ft. Open hole from 2,200 to 2,507 ft. Temp. 91°F.
* 302	Touchstone Estate	--	1956	2,498	12, 8	Kea	--	85	Jan. 1956	T,E, 125	Irr	Casing: 12-in. to 316 ft, 8-in. from 316 to 2,041 ft. Open hole from 2,041 to 2,498 ft. Development test Peerless Equipment Co., 1956: 1,452 gpm at 228 ft pumping level. 210 ft of 8-in. column pipe. Temp. 104°F.
* 303	Gidley Estate	--	1955	2,428	12	Kea	--	--	--	T,E, 100	Irr	Cased to 1,895 ft. Open hole from 1,895 to 2,428 ft. Temp. 81°F. Reported discharge 2,000 gpm, July 1955.
601	George Coates well 1	Gilcrease Oil Co.	1955	2,495	--	--	662	--	--	--	--	Oil test.1/
51-101	Gidley-Bush	--	1956	2,656	--	Kea	--	--	--	T,E, 100	Irr	Irrigated 220 acres in 1965. Flowed until Apr. 1964. 180 ft of 8-in. column pipe. Temp. 93°F.
501	Gregorio Alcorta	--	--	400	6	Twi	760	78.3	Apr. 20, 1965	T,E, 5	Irr	Supplied water for steam engines in oil field. Irrigated 15 acres in 1964-65.
601	--	--	--	177	7	Tc	760	167.6 169.5	June 27, 1951 May 12, 1960	N	N	Well 130 in Texas Board Water Engineers Bull. 5416.
602	Frank Maske	--	1900	142	6,4	Tc	700	130.0	Apr. 20, 1965	C,W	D,S	Texas Water Development Board observation well.
801	W. J. Adcock	W. J. Adcock	--	140	--	Tc	673	125.7 124.6	June 27, 1951 Jan. 28, 1965	C,W	S	Do.
802	C. E. Dillon	--	--	136	4	Tc	637	108.0 123.8 125.5	1909 Dec. 12, 1955 May 18, 1961	C,W	D,S	Well 160 in Water-Supply Paper 1079-C.
* 803	M. W. Parchman	--	1955	166	4	Tc	670	139.9	Apr. 20, 1965	C,E, 1	D,S	

See footnotes at end of table.

Table 8.--Records of wells in Atascosa, Frio, and adjacent counties--Continued

Atascosa County

Well	Owner	Driller	Date completed	Depth of well (ft)	Diameter of well (in.)	Water-bearing unit	Altitude of land-surface (ft)	Water level		Method of lift	Use of water	Remarks
								Below land surface datum (ft)	Date of measurement			
AL-68-51-901	W. J. Adcock	W. J. Adcock	1964	343	12	Tc	670	139.9	Apr. 20, 1965	C,E, 1	D,S	Cased to 343 ft. Perforated from 195 to 338 ft, gravel-packed. Reported discharge 800 gpm, May 18, 1965. 200 ft of 6-in. column pipe. Irrigated 66 acres in 1965.
902	Chas. Simmang Heirs well 1	CAFRE Research	1951	2,009	--	--	650	--	--	--	--	Oil test.[1]
* 52-401	J. D. Harrison	Burkett Drilling Co.	1939	203	12, 10	Tc	--	147	1949	N	N	Abandoned. Well 1 in Water-Supply Paper 1079-C. Formerly used to wash sand for glass making. Temp. 74°F.
402	do	T. Bryan	1942	700	10,7, 5	Twi	--	162.7	May 31, 1944	N	N	Abandoned. Well 2 in Water-Supply Paper 1079-C. Formerly used to wash sand for glass making.
403	do	Burkett Drilling Co.	1947	205	8	Tc	--	137	1947	N	N	Abandoned.
404	do	do	1949	198	10	Tc	--	147	1949	--	D	
* 701	C. R. Owens	--	1926	175	6	Tc	685	140 143.7 160.0	1930 Nov. 14, 1960 Jan. 28, 1965	T,E	D,S	Well 166 in Water-Supply Paper 1079-C. Texas Water Development Board observation well. Temp. 73°F.
702	Schuetting Bros.	W. Adcock	1901	25	36	Qal	--	17.7 6.4	June 27, 1961 May 18, 1961	N	N	Dug well. Unused.
703	do	--	--	24	36	Qal	--	22.7	Sept.26, 1951	N	N	Do.
704	do	Burkett Drilling Co.	1942	174	4	Tc	622	123 129.1 138.5	1942 June 9, 1955 Apr. 21, 1965	C,W	S	Cased to 167 ft. Slotted from 149 to 167 ft.
705	C. R. Owens	--	1938	169	6	Tc	--	140 138.9 147.6	1930 May 31, 1944 Dec. 12, 1955	N	N	Abandoned. Well 4 in Water-Supply Paper 1079-C.
706	do	--	1942	169	6	Tc	--	--	--	T,E	D,S	Cased to 169 ft. Perforated from 149 to 169 ft. Well 3 in Water-Supply Paper 1079-C. Temp. 73°F.
707	-- Appell	--	--	160	4	Tc	675	151.3 155.6	Dec. 12, 1955 Apr. 20, 1965	N	N	Abandoned.
708	J. D. Harrison	Burkett Drilling Co.	1949	205	10	Tc	--	150	1949	N	N	Do.
709	do	O. L. Boone	1949	315	10	Tc	670	153.1	Apr. 20, 1965	N	N	Cased to 315 ft. Slotted from 155 to 315 ft. Gravel-packed. Unused since 1961.
710	do	do	1961	315	12	Tc	--	156	Apr. 1965	T,E	Ind	Supplies water for sand washing plant. Reported to discharge 500 gpm, slotted from 155 to 315 ft. Gravel-packed. Replaced well A1-68-52-709.

See footnotes at end of table.

Table 8.--Records of wells in Atascosa, Frio, and adjacent counties--Continued

Atascosa County

Well	Owner	Driller	Date completed	Depth of well (ft)	Diameter of well (in.)	Water-bearing unit	Altitude of land-surface (ft)	Water level		Method of lift	Use of water	Remarks
								Below land surface datum (ft)	Date of measurement			
AL-68-52-901	G. Weynand	--	--	--	--	Tc	--	94.0 106.7	June 28, 1951 Nov. 14, 1960	C,W	D,S	Texas Water Development Board observation well.
53-702	Edwin Espey	O. L. Boone	1957	243	12	Tc	--	100	Oct. 1963	T,G	Ind	Supplies water for sand washing plant. 120 ft of 8-in. column pipe.
58-202	George Thompson	E. H. Cannon	1965	450	12	Tc	--	--	-- --	--	Irr	Cased to 450 ft. Slotted from 250 to 450 ft. Gravel-packed.
301	F. F. Jones, well 1	Ray Clark	1948	3,335	--	--	636	--	--	--	--	Oil test.[1]
510	Sharp Whitley well 1	Luling Oil & Gas Co.	1949	2,656	--	--	577	--	--	--	--	Do.
511	Sharp Whitley	--	1940	500	--	Tc	580	71.1	Apr. 21, 1965	N	N	Supplied water for drilling oil test. Texas Water Development Board observation well.
601	T. A. Crawford well 1	Sutton Drilling Co.	1956	2,501	--	--	582	---	--	--	--	Oil test.[1]
901	C. D. Johnson well 1	Sun Oil Co.	1954	3,551	--	--	555	---	--	--	--	Do.
59-101	Nellie Smith well 1	J. G. McCabe & Pegg Bros.	---	3,542	--	--	595	---	--	--	--	Do.
201	F. Redendo	--	--	170	7	Tc	660	141.4 151.3	June 27, 1951 Mar. 23, 1965	C,W	D,S	
* 202	G. W. Beachman	--	--	125	4	Tc	636	105	1930	C,G	D,S	Well 161 in Water-Supply Paper 1079-C.
203	Leonor Galindo well 1	J. G. McCabe & Pegg Bros.	1949	2,950	--	--	540	--	--	--	--	Oil test.[1]
204	Leonor Galindo well 2	J. G. McCabe & Pegg Bros	1948	2,341	--	--	556	--	--	--	--	Oil test.[1]
205	F. Redendo	--	1963	365	5	Tc	660	--	--	T,E	Irr	Reported irrigated 5 acres of strawberries in 1964-65.
301	T. P. Alcorta	O. L. Boone	1963	340	8	Tc	--	57	1963	T,E, 10	Irr	Reported irrigated 12 acres in 1965. Gravel-packed.
302	John C. Lott	do	1954	350	8,6	Tc	--	120	Oct. 1963	T,G	Irr	Casing: 8-in. to 200 ft, 6-in. from 200 to 350 ft. Slotted from 275 to 350 ft. Irrigated 269 acres from 2 wells in 1964-65.
303	Millard Eichman	do	1964	360	10	Tc	587	110 99.8	Apr. 1964 Mar. 23, 1965	T,G, 80	Irr	Cased to 360 ft. Slotted from 200-300 ft. Gravel-packed. Development test, Calhoun Equipment Co., 1964: 918 gpm at 175 ft pumping level, 1,136 gpm at 182 ft. Texas Water Development Board observation well.

See footnotes at end of table.

Table 8.--Records of wells in Atascosa, Frio, and adjacent counties--Continued

Atascosa County

Well	Owner	Driller	Date completed	Depth of well (ft)	Diameter of well (in.)	Water-bearing unit	Altitude of land-surface (ft)	Water level		Method of lift	Use of water	Remarks
								Below land surface datum (ft)	Date of measurement			
AL-68-59-304	Delbert Eichman	O. L. Boone	1964	360	12	Tc	--	123	Apr. 1964	T,G, 160	Irr	Cased to 360 ft. Slotted from 200 to 360 ft. Irrigated 110 acres of peanuts in 1964-65. Development test Calhoun Equipment Co., 1964: 1,222 gpm at 180 ft pumping level, 1,482 gpm at 190 ft.
305	E. C. Rogers Estate well 1	Frank Frahnhoefer	1947	2,606	--	--	514	--	--	--	--	Oil test.[1]
306	-- Phillips	O. L. Boone	1965	360	12	Tc	--	116	Apr. 1965	T,G	Irr	Cased to 360 ft. Slotted from 203 to 306 ft. Irrigated 113 acres in 1965.
* 401	L. C. Heberer	T. Byram	1927	380	6	Tc	517	+12 + 7.2 24.1	1930 June 2, 1944 Mar. 23, 1965	C,W	S	Well 163 in Water-Supply Paper 1079-C.
402	Ike Cowley, well 1	Sullivan & Garrett	1948	2,669	--	--	537	--	--	--	--	Oil test.[1]
501	H. E. Whittet	J. Stewart	1960	290	5, 4	Tc	548	57.0 69.0	Nov. 14, 1960 Jan. 28, 1965	C,W	D,S	Cased to 290 ft. Slotted from 245 to 290 ft. Cemented from surface to 240 ft. Texas Water Development Board observation well.
502	do	do	1910	280	6,4	Tc	547	25 34 39.0 50.3	1910 1929 Aug. 11, 1945 Nov. 14, 1960	N	N	Abandoned. Well 165 in Water-Supply Paper 1079-C.
503	Rossville Community House	--	--	75	--	Tc	--	56.2	July 19, 1949	J,E	D	
* 504	Alex Ross	E. E. Swierc	1955	411	8	Tc	--	60	1963	T,G, 50	D,S, Irr	Cased to 411 ft. Perforated from 371 to 411 ft. Reported discharge 300 gpm.
505	-- Finch, well 1	Amerada Petroleum Co.	1958	2,804	--	--	552	--	--	--	--	Oil test.[1]
506	W. W. Westbrook	E. E. Swierc	1955	400	10	Tc	455	84.1	Apr. 20, 1965	T,E, 20	D,S, Irr	Cased to 400 ft. Reported irrigated 50 acres in 1955-64. Perforated from 360 to 400 ft.
507	-- Brezeale	--	1956	350	10	Tc	--	--	--	T,G	N	Unused in 1964-65.
601	Roy Urban	Boone & Ormand	1938	318	8,6	Tc	505	28.3 47.4	June 1, 1944 Jan. 14, 1958	T,E, 5	Irr	Well 17 in Water-Supply Paper 1079-C.
602	J. M. Rogers	O. L. Boone	1951	195	10,8	Tc	--	29.0	June 27, 1951	T,G	Irr	Casing: 10-in. to 100 ft, 8-in. from 100 to 195 ft. 90 ft of 6-in. column pipe. Reported discharge 650 gpm.
* 603	L. C. Scott	Burkett Drilling Co.	1934	460	8,6	Tc	--	70	Apr. 1956	T,G, 30	Irr	Cased to 460 ft. Perforated from 380 to 460 ft. Reported discharge 400 gpm.

See footnotes at end of table.

Table 8.--Records of wells in Atascosa, Frio, and adjacent counties--Continued

Atascosa County

Well	Owner	Driller	Date completed	Depth of well (ft)	Diameter of well (in.)	Water-bearing unit	Altitude of land-surface (ft)	Water level		Method of lift	Use of water	Remarks
								Below land surface datum (ft)	Date of measurement			
AL-68-59-604	Mrs. Clara Mann	Ervin Preston	1952	350	6	Tc	--	80	Oct. 1963	T,G, 50	Irr	Cased to 350 ft. Irrigated 20 acres in 1964. 120 ft of 4-in. column pipe.
605	S. E. Knowlton	--	1954	370	10,8	Tc	--	--	--	T,E, 25	N	Unused in 1964-65.
606	M. Cantu	--	--	300	10,8	Tc	--	80	1964	T,G	Irr	Irrigated 40 acres of vegetables in 1955 and 1964.
607	Mrs. L. Brooks	-- Oliver	1954	247	8,6	Tc	515	62.0	Apr. 13, 1965	T,E	D,S	Reported irrigated 10 acres in 1955. Not used in 1964. Pump set at 126 ft.
608	O. Martinez	-- Favors	1958	250	10,8	Tc	--	60	1964	T,E, 25	Irr	Irrigated 50 acres in 1964.
609	B. O. Montgomery	--	1945	300	6,4	Tc	497	53.7	Apr. 13, 1965	T,E, 3	D,S	Casing: 6-in. to 63 ft, 4-in. from 63 to 300 ft. Used for irrigation from 1945 to 1960.
610	Chas. Lott	--	--	300	8	Tr	--	--	--	T,G	N	Reported irrigated 30 acres in 1955. Not used in 1964-65.
611	Felix Mikolajczwk	--	1926	350	8	Tr	--	15.4 60	May 30, 1944 1964	T,G	Irr	Irrigated 50 acres of vegetables in 1965. Well 189 in Water-Supply Paper 1079-C. Temp. 77°F.
* 612	Kenneth Hoffman	--	--	380	8	Tr	--	65	1964	T,E, 10	Irr	Irrigated 20 acres of vegetables in 1965. Well 190 in Water-Supply Paper 1079-C. Temp. 77°F.
613	J. A. Browning	--	1954	250	8,6	Tc	--	--	--	T,E	D,S	Reported to have irrigated 15 acres in 1955. Not used for irrigation in 1964-65.
614	Kenneth Hoffman	O. L. Boone	1962	455	10,7	Tc	--	60	1964	T,E, 30	Irr	Casing: 10-in. to 240 ft, 7-in. from 240 to 455 ft. Slotted from 400 to 455 ft. Irrigated 80 acres in 1964.
* 615	L. S. Martinez	T. Byram	1927	560	6,5	Tc	535	55.5	Mar. 5, 1930	T,E, 20	Irr, D,S	Casing: 6-in. to 275 ft, 5-in. from 275 to 560 ft. Irrigated 10 acres of vegetables in 1965. Well 185 in Water-Supply Paper 1079-C.
616	John F. Hearn	Boone & Ormand	1938	281	8,6	Tc	--	72.2	Mar. 23, 1965	T,E	Irr, D,S	Casing: 8-in. to 40 ft, 6-in. from 40 to 281 ft. Well 16 in Water-Supply Paper 1079-C.
617	John C. Lott	E. Preston	1956	380	8	Tc	--	--	--	T,G	Irr	Cased to 380 ft. Slotted from 305 to 380 ft. Reported discharge 500 gpm. 180 ft of 5-in. column pipe.
618	Kenneth Hoffman	Burkett Drilling Co.	1926	480	8,6	Tc	--	26	1944	T,E, 15	Irr, D,S	Cased to 480 ft. Perforated from 400 to 480 ft. Irrigated 35 acres of vegetables in 1965. Well 22 in Water-Supply Paper 1079-C.
* 619	N. Berrones	Boone & Ormand	1941	270	6,4	Tr	--	12	May 1944	T,E, 5	Irr, D,S	Cased to 270 ft. Irrigated 3½ acres of strawberries in 1965. Well 23 in Water-Supply Paper 1079-C. Temp. 77°F.

See footnotes at end of table.

Table 8.--Records of wells in Atascosa, Frio, and adjacent counties--Continued

Atascosa County

Well	Owner	Driller	Date completed	Depth of well (ft)	Diameter of well (in.)	Water-bearing unit	Altitude of land-surface (ft)	Water level		Method of lift	Use of water	Remarks
								Below land surface datum (ft)	Date of measurement			
*AL-68-59-620	A. E. Tutschke	Boone & Ormand	1940	521	8,6	Tc	--	10.5	May 30, 1944	J,E,	D,S	Casing: 8-in. to 313 ft, 6-in, from 313 to 521 ft. Slotted from 421 to 521 ft. Reported used for irrigation from 1940 to 1950. Well 34 in Water-Supply Paper 1079-C. Temp. 79°F.
621	Kenneth Hoffman	--	1915	714	6	Tc	485	41.1	Apr. 14, 1965	N	N	Texas Water Development Board observation well. Well 192 in Water-Supply Paper 1079-C.
622	Steve Zigmond	E. E. Swierc	1959	472	8	Tc	--	--	--	T,G	N	Reported used for irrigation until 1963.
623	A. B. Carstens	O. L. Boone	1965	360	10	Tc	--	--	--	T,E, 25	Irr	Cased to 360 ft. Slotted from 245 to 360 ft.
701	J. S. Thompson	T. Byram	1926	420	6	Tc	505	+17 + 6.2 28.7	1929 June 2, 1944 Mar. 23, 1965	C,W	S	Reported flowed until 1955. Well 164 in Water-Supply Paper 1079-C.
702	J. N. Escalera	--	1930	630	6,5	Tc	--	--	--	N	N	Reported used for irrigation from 1930 to 1955. Well 175 in Water-Supply Paper 1079-C.
703	do	Boone & Ormand	1940	600	8,6	Tc	--	---	--	T,G	Irr, D,S	Casing: 8-in. to 240 ft, 6-in. from 240 to 600 ft. Well 25 in Water-Supply Paper 1079-C. Irrigated 60 acres in 1964-65.
* 801	Norma Byram	T. Byram	1928	640	6	Tc	502	+ 5.0 + 0.24 41.1	1929 July 18, 1949 Mar. 23, 1965	J,E, C,W	D,S	Reported flowed until 1949. Well 177 in Water-Supply Paper 1079-C.
* 802	J. Cumpian	E. Faries	1927	578	6,4	Tc	491	+18.0 + 2.0 46.9	1929 May 23, 1944 Apr. 16, 1965	C,H	D,S	Used for irrigation until 1945. Texas Water Development Board observation well. Well 179 in Water-Supply Paper 1079-C.
803	T. C. Byram, well 1	Inca Drilling Co.	1958	3,661	--	--	516	--	--	--	--	Oil test.[1]
804	Adolph Cumpian	O. L. Boone	1964	740	12,8	Tc	496	68 50.8	June 1964 Apr. 16, 1965	T,E, 25	Irr	Casing: 12-in. to 414 ft, 8-in. from 414 to 740 ft. Slotted from 543 to 700 ft. Slotted from 543 to 700 ft. Irrigated 50 acres of grass in 1964-65. Development test, 1964, Stewart and Stevenson Services, Inc.: 1,020 gpm at 105 ft pumping level, 1,315 gpm at 128 ft, and 1,595 gpm at 158 ft.
805	do	L. & J. Swierc	1962	277	7	Tr	--	42	1964	J,E	D,S	Cased to 277 ft. Perforated from 235 to 277 ft.
806	M. L. Bailey	--	1956	600	10,8	Tc	--	--	--	T,E	Irr	Reported irrigated 50 acres in 1964.
807	Pete Pawelek	E. Preston	--	1,100	6,5	Tc	485	90	Jan. 1962	T,E, 25	Irr	Oil test; converted to water well. Casing: 6-in. to 90 ft, 5-in. from 90 to 1,100 ft. Irrigated 40 acres in 1965.

See footnotes at end of table.

Table 8.--Records of wells in Atascosa, Frio, and adjacent counties--Continued

Atascosa County

Well	Owner	Driller	Date completed	Depth of well (ft)	Diameter of well (in.)	Water-bearing unit	Altitude of land-surface (ft)	Water level		Method of lift	Use of water	Remarks
								Below land surface datum (ft)	Date of measurement			
*AL-68-59-808	Salome C. Martinez & W. W. Newman	-- Burke	1930	500	8	Tc	--	--	--	T,G	Irr, D,S	Cased to 500 ft. Irrigated 15 acres of vegetables and strawberries in 1964. Temp. 78°F.
809	J. S. Bender	O. L. Boone	1962	550	10,8	Tc	--	--	--	T,G	Irr, D,S	Casing: 10-in. to 300 ft, 8-in. from 300 to 550 ft. Irrigated 70 acres in 1964.
810	do	Boone & Ormand	--	550	10,8	Tc	--	--	--	N	N	Unused since 1962.
811	E. Byram	--	1945	345	4	Tc	457	7.7	Apr. 21, 1965	C,E	S	Flowed 8 gpm, Aug. 8, 1945. Stopped flowing in 1963. Temp. 76°F.
812	T. Byram	T. Byram	1927	620	8,6	Tc, Tr	493	42.4	do	T,E	D,S	Cased to 620 ft. Well 181 in Water-Supply Paper 1079-C.
813	Don Middleton	do	1927	680	6,4	Tc	--	25	Jan. 1956	T,E	Irr, S	Development test, 1956, Peerless Equipment Co.: 405 gpm at 103 ft pumping level.
* 814	do	--	1935	560	8,6	Tc	--	22 44	1935 1956	N	N	Unused since 1959. Well 24 in Water-Supply Paper 1079-C. Temp. 79°F. Development test, 1956, Peerless Equipment Co.: 454 gpm at 185 ft pumping level.
815	do	Ted Persley	1955	700	10,8	Tc	--	65	Sept. 1956	T,E, 25	Irr, D,S	Casing: 10-in. to 350 ft, 8-in. from 350 to 700 ft. Development test, 1956, Peerless Equipment Co.: 846 gpm at 90 ft pumping level, 1,100 gpm at 100 ft, and 1,237 gpm at 110 ft.
816	W. G. Graf, well 1	Beard & Turnbull	--	4,231	--	--	486	--	--	--	--	Oil test.
817	Ed Hernandez	Boone & Ormand	1948	420	8,7	Tc	512	60.3	Apr. 21, 1965	T,E	Irr	Casing: 8-in. to 92 ft, 7-in. from 92 to 920 ft. Slotted from 360 to 420 ft. Irrigated 20 acres of vegetables in 1964-65.
818	J. S. Bender	T. Byram	1926	468	8	Tc	--	--	--	T,G	N	Unused in 1964-65; may be used in the future. Well 183 in Water-Supply Paper 1079-C.
901	C. E. Simmons	Burkett Drilling Co.	1940	428	8,6	Tc	--	18.0 48.3	July 19, 1940 Jan. 14, 1958	T,E, 10	Irr, D,S	Cased to 428 ft. Slotted from 388 to 428 ft. Well 337 in Water-Supply Paper 1079-C.
902	F. Holberg	--	1914	600	8,6	Tc	--	+ 3 10.3 28.1	1929 Apr. 18, 1946 Jan. 14, 1955	N	N	Abandoned in 1956. Well 196 in Water-Supply Paper 1079-C.
* 903	W. F. Locke	--	1914	600	6	Tc	--	+23 + 7.3	1929 Apr. 18, 1956	N	N	Abandoned. Flowed 135 gpm, May 22, 1944. Well 197 in Water-Supply Paper 1079-C. Temp. 78°F.
* 904	Felix Mikolajczwk	--	1926	715	8,6	Tc	--	5 64	1929 1964	T,G, 15	Irr	Irrigated 100 acres in 1964. Well 195 in Water-Supply Paper 1079-C. Temp. 78°F.

See footnotes at end of table.

Table 8.--Records of wells in Atascosa, Frio, and adjacent counties--Continued

Atascosa County

Well	Owner	Driller	Date completed	Depth of well (ft)	Diameter of well (in.)	Water-bearing unit	Altitude of land-surface (ft)	Water level		Method of lift	Use of water	Remarks
								Below land surface datum (ft)	Date of measurement			
AL-68-59-905	Antonio Sanchez	Burkett Drilling Co.	1940	680	8,6	Tc	--	--	--	T,E, 7½	Irr, D,S	Casing: 8-in. to 340 ft, 6-in. from 340 to 680 ft. Slotted from 580 to 680 ft. Irrigated 100 acres from two wells (AL-68-59-905 and AL-68-59-907) in 1964-65. Temp. 78°F.
906	Gorman Ranch	Gorman Drilling Co.	1962	1,320	13,9	Tc	490	62.5	Apr. 12, 1965	T,G, 150	Irr	Casing: 13-in. to 570 ft, 9-in. from 570 to 1,320 ft. Slotted from 1,020 to 1,320 ft.
907	Antonio Sanchez	Stewart Drilling Co.	1964	420	8	Tr	--	69	Sept. 1964	T,E, 15	Irr	Cased to 420 ft. Slotted from 380 to 420 ft. Development test, 1964: 610 gpm at 100 ft pumping level, 862 gpm at 140 ft, and 898 gpm at 200 ft.
908	Clifton Burd	Burkett Drilling Co.	1939	630	10	Tc	--	+19.5	May 22, 1944	T,G	Irr	Well 27 in Water-Supply Paper 1079-C. Temp. 80°F.
909	Fred Hohberg	do	1935	465	8	Tc, Tr	470	32.7	Apr. 14, 1965	T,E	S	Reported flowed 75 gpm in 1944. Used for stock only. Well 31 in Water-Supply Paper 1079-C.
* 910	C. L. Vickers	--	1930	630	4	Tc	--	+15.3 22.4	May 30, 1944 Apr. 14, 1965	T,E	D,S	Flowed 200 gpm, May 30, 1944. Reported has not flowed since 1955. Well 36 in Water-Supply Paper 1079-C.
911	W. F. Locke	Burkett Drilling Co.	--	498	8,6	Tc, Tr	--	+18.5	May 22, 1944	T,E	Irr	Flowed 405 gpm, May 22, 1944. Well 28 in Water-Supply Paper 1079-C. Temp. 79°F.
912	Do	do	1938	475	8,6	Tc, Tr	--	7.5	May 22, 1944	T,G	Irr	Flowed 322 gpm, May 22, 1944. Well 29 in Water-Supply Paper 1079-C. Temp. 78°F.
913	V. L. Sanderford	-- Favors	1961	1,000	10, 7	Tc	--	40	Oct. 1961	T,E, 30	Irr, D,S	Casing: 10-in. to 400 ft, 7-in. from 400 to 1,000 ft. Slotted from 800 to 1,000 ft. Irrigated 450 acres from 3 wells (AL-68-59-913, 68-59-914, and 78-03-303). Development test, 1961, Stewart and Stevenson Services, Inc.: 487 gpm at 61 ft pumping level, 747 gpm at 83 ft, and 862 gpm at 95 ft.
914	V. L. Sanderford well 2	L & J. Swierc	1964	996	10,7	Tc	--	12	Jan. 1964	T,E	Irr	Casing: 10-in. to 346 ft, 7-in. from 346 to 996 ft. Perforated from 792 to 996 ft. Development test, 1964, Stewart & Stevenson Services, Inc.: 900 gpm at 68 ft pumping level, 977 gpm at 70 ft, and 1,114 gpm at 77 ft. 100 ft of 6-in. column pipe.
915	S. C. Zigmond	Burkett Drilling Co.	1926	560	6	Tc	--	8	May 1944	T,E, 10	Irr, D,S	Irrigated 60 acres of vegetables and strawberries in 1964-65. Well 35 in Water-Supply Paper 1079-C. Temp. 78°F.
916	R. Barrows	do	--	--	--	Tc (?)	--	+	May 22, 1944	T,E, 3	Irr	Flowed 97½ gpm, May 22, 1944. Well 26 in Water-Supply Paper 1079-C. Temp. 80°F.

See footnotes at end of table.

Table 8.--Records of wells in Atascosa, Frio, and adjacent counties--Continued

Atascosa County

Well	Owner	Driller	Date completed	Depth of well (ft)	Diameter of well (in.)	Water-bearing unit	Altitude of land-surface (ft)	Water level		Method of lift	Use of water	Remarks
								Below land surface datum (ft)	Date of measurement			
AL-68-60-101	Guy A. Bryant	--	--	120	4	Tc	572	90 117.1 124.5	1929 Dec. 20, 1962 May 13, 1965	J,E	D	Texas Water Development Board observation well. Well 168 in Water-Supply Paper 1079C.
* 102	H. Koehler	D. Pegg	1931	450	10,6	Tc	--	50 65.8	1929 July 15, 1953	T,G	Irr	Casing: 10-in. to 100 ft, 6-in. from 100 to 450 ft. Perforated from 410 to 450 ft. Temp. 76°F.
103	Guy A. Bryant	O. L. Boone	1955	345	10,8	Tc	--	--	--	T,G	Irr	Casing: 10-in. to 217 ft, 8-in. from 217 to 345 ft. Irrigated 40 acres of peanuts and 10 acres of pasture in 1964-65.
104	John Popham	--	1955	360	6	Tc	--	40	Oct. 1963	T,E, 15	D,S, Irr	Irrigated 14 acres of pasture in 1964-65.
105	John Faggard	-- Favors	1961	440	10	Tc	--	59 90	Aug. 1961 Oct. 1963	T,E, 40	Irr	Reported irrigated 100 acres of pasture and feed in 1964-65. Development test, 1961: 785 gpm at 70 ft pumping level, 1,069 gpm at 75 ft, and 1,202 gpm at 78 ft.
106	A. V. Stephens	M. E. Higdon	1956	362	8	Tc	--	95	Oct. 1963	T,G 60	D,S, Irr	Cased to 362 ft. Slotted from 270 to 362 ft. Reported discharge 650 gpm.
107	do	Sutton Drilling Co.	1963	350	10	Tc	--	120	Sept. 1963	T,G, 60	Irr	Cased to 350 ft. Slotted from 215 to 350 ft. Gravel-packed. Reported irrigated 175 acres from wells AL-68-60-106 and AL-68-60-107. Development test, 1963, Calhoun Equipment Co.: 1,126 gpm at 160 ft pumping level.
108	Preston M. Thomas	--	1955	150	10	Tc	--	--	--	T,G	Irr	Formerly used to wash sand from Palo Alto Creek. Irrigated 17 acres of peanuts in 1964-65.
109	H. P. Cooper	R. L. Johnson	1933	500	12	Tc	--	--	--	T,G	D,S, Irr	Cased to 450 ft. Well 7 in Water-Supply Paper 1079-C
201	-- Fonski	--	1913?	64	36	Tc	--	62.0 60.2	Jan. 21, 1958 May 18, 1961	C,W	S	Dug well. Well 125 in Water-Supply Paper 1079-C
202	C. C. Shotts	--	1881	84	36	Tc	--	80.7 82.9 84	June 27, 1951 Mar. 15, 1955 1956	N	N	Dug well. Reported depth 55 ft in 1881. Later deepened to 84 ft. Well 124 in Water-Supply Paper 1079-C.
203	Jerry Kosub	L. & J. Swierc	1964	459	8	Tc	--	65	Oct. 1964	T,G	Irr	Cased to 459 ft. Perforated from 306 to 459 ft. Irrigated 37 acres of peanuts in 1964-65. Reported discharge 500 gpm. 120 ft of 6-in. column pipe.
204	C. C. Shotts	Adcock Pipe & Supply Co.	1962	319	10	Tc	523	70 81.0	May 1962 Mar. 24, 1965	T,G	Irr	Cased to 319 ft. Slotted from 154 to 319 ft. Packed with 25 yards of gravel. Irrigated 127 acres of Coastal Bermuda grass and 45 acres of peanuts in 1964-65. Development test, 1962, Adcock Pipe & Supply Co.: 1,450 gpm at 103 ft pumping level.

See footnotes at end of table.

Table 8.--Records of wells in Atascosa, Frio, and adjacent counties--Continued

Atascosa County

Well	Owner	Driller	Date completed	Depth of well (ft)	Diameter of well (in.)	Water-bearing unit	Altitude of land-surface (ft)	Water level		Method of lift	Use of water	Remarks
								Below land surface datum (ft)	Date of measurement			
AL-68-60-205	Mary Stanush, well 1	Herman Brown, et al	1949	4,020	--	--	542	--	--	--	--	Oil test.[1]
206	-- Frost	O. L. Boone	1964	350	12	Tc	--	160	Sept. 1964	T,G	Irr	Cased to 350 ft. Slotted from 215 to 350 ft. Gravel packed. Irrigated 128 acres of peanuts in 1965. Development test, 1964, Calhoun Equipment Co.: 1,423 gpm at 180 ft pumping level, 1,651 gpm at 180 ft pumping level, 1,651 gpm at 185 ft, and 1,899 gpm at 188 ft.
301	G. Weynand	--	--	120	5	Tc	--	81.8 99.0	June 5, 1944 Nov. 23, 1959	C,E	S	Well 72 in Water-Supply Paper 1079-C.
302	R. L. Bruce	--	1925	104	4	Tc	553	69 29.8	1929 Apr. 19, 1946	N	N	Abandoned in 1949. Well 169 in Water-Supply Paper 676.
* 303	do	--	1948	145	5	Tc	555	78.2 99.2	July 19, 1949 Mar. 24, 1965	C,W	D,S	Texas Water Development Board observation well.
304	C. O. Bruce	Boone & Ormand	1953	395	10,8	Tc	--	70	Apr. 1956	T,G, 95	Irr	Casing: 10-in. to 200 ft, 8-in. from 200 to 395 ft. Slotted from 275 to 395 ft.
305	do	do	1955	378	12	Tc	--	---	--	T,G, 95	Irr	Cased to 378 ft. Reported discharge 1,400 gpm.
306	Lawrence Katesmorak well 1	Eugene W. Gill	1947	4,166	--	--	485	--	--	--	--	Oil test.[1]
307	-- Tardy	O. L. Boone	1948	365	6	Tc	510	79.7	Apr. 7, 1965	T,G	Irr	
401	Erwin Preston	--	--	666	10	Tc	525	32 45.3 55.2 83.5	1929 Aug. 7, 1945 Jan. 14, 1955 Jan. 28, 1965	N	N	Measured bi-monthly by Texas Water Development Board. Well 187 in Water-Supply Paper 1079-C.
402	C. H. Bracewell	--	1911	1,000	6	Tc	498	27 57.6	1929 Jan. 14, 1958	T,E	S	Well 299 in Water-Supply Paper 676.
403	Braxton Newmann	L. & J. Swierc	1964	771	10,7	Tc	485	75 51.8	Oct. 1964 Apr. 13, 1965	T,E, ⅄	Irr	Casing: 10-in to 306 ft, 7-in. from 306 to 771 ft. Perforated from 560 to 771 ft. Cemented from surface to 560 ft. Development test, 1964, Stewart & Stevenson Services In.: 800 gpm at 94 ft pumping level, 1,150 gpm at 110 ft, and 1,482 gpm at 127 ft.
404	Erwin Preston	J. Wolfe	---	5525	4	Tc	515	12 32.1	1929 July 12, 1950	C,W	D,S	Well 188 in Water-Supply Paper 676.
405	W. C. Akers	--	1929	550	8	Tc	503	65.8	Apr. 13, 1965	J,E	D,S	Well 13 in Water-Supply Paper 1079-C.
406	T. J. Haar	--	--	--	8	Tc	--	+ 6 18.4	1929 Apr. 17, 1946	N	N	Abandoned; replaced by Well AL-68-60-412. Well 215 in Water-Supply Paper 676.

See footnotes at end of table.

Table 8.--Records of wells in Atascosa, Frio, and adjacent counties--Continued

Atascosa County

Well	Owner	Driller	Date completed	Depth of well (ft)	Diameter of well (in.)	Water-bearing unit	Altitude of land-surface (ft)	Water level		Method of lift	Use of water	Remarks
								Below land surface datum (ft)	Date of measurement			
AL-68-60-407	Roy Martinez	Burkett Drilling Co	1939	540	10,6	Tc	--	32	1939	T,E	N	Unused since 1964. Well 14 in Water-Supply Paper 1079-C. Temp. 78°F.
408	do	O. L. Boone	1958	600	10,6	Tc	--	60	Oct. 1963	T,E, 25	Irr	Cased to 600 ft. Irrigated 50 acres of nursery, stock, and vegetables in 1964-65.
409	-- Wright	-- Compton	--	550	48,6	Tc	--	36	Aug. 1945	T,E, 10	N	Dug well, 48-in. diameter, to 24 ft; drilled well, 6-in. casing, from 24 to 550 ft. Unused irrigation well.
410	Pines Motel	G. Gilland	1926	1,040	8,6	Tc	505	37	1942	T,E	D	Perforated from 985 to 1,040 ft. Well 202 in Water-Supply Paper 1079-C.
* 411	J. M. Chittim Estate	--	1904	850	6	Tc	--	--	--	N	N	Abandoned. Well 206 in Water-Supply Paper 676. Temp. 80°F.
412	T. J. Haar	--	1950	700	8,6	Tc	478	45.9	Apr. 7, 1965	T,E, 7½	Irr	Irrigated 15 acres in 1965.
413	Rudolph Strumberg	--	1957	270	6	Tc	--	--	--	T,G	Irr	Irrigated 8 acres of feed in 1964-65. Replaced well 8 in Water-Supply Paper 1079-C.
* 414	do	-- Craven	1931	265	6	Tc	--	--	--	T,G	Irr	Well 9 in Water-Supply Paper 1079-C. Temp. 75°F.
415	J. Mann	O. L. Boone	1964	290	--	Tc	--	--	--	T,E, 10	D,Irr	Replaced well 186 in Water-Supply Paper 1079-C.
416	C. R. Brooks	-- Craven	1934	550	4	Tc	515	76.0	Apr. 13, 1965	T,E	D,S	Well 10 in Water-Supply Paper 1079-C.
501	Ben Sanchez	G. Gilland	1926	600	6	Tc	--	+ 5 12.3	1929 July 22, 1953	T,E, 5	D,S, Irr	Irrigated 10 acres of vegetables in 1964-65. Well 203 in Water-Supply Paper 1079-C.
502	E. T. Page	Guy Preston	1947	735	10,6	Tc	536	74.6 92.7 115.6	Jan. 30, 1950 Jan. 25, 1960 Jan. 28, 1965	T,E, 7½	D,S	Texas Water Development Board observation well.
503	-- Gasch	G. Gilland	1926	881	4	Tc	--	+28 + 9	1929 1943	N	N	Flowed 225 gpm, May 24, 1944. Well 205 in Water-Supply Paper 1079-C. Temp. 79°F.
504	S. Hughes	T. Byram	1928	720	6	Tc	--	+ 1 9	1929 June 1944	T,E, 3/4	D,S	Well 211 in Water-Supply Paper 1079-C.
505	E. T. Page	--	--	850	6	Tc	490	5 23.6	1929 Sept. 28,1948	C,W	S	Used for irrigation until 1934. Well 213 in Water-Supply Paper 676.
506	Rodriguez & Diaz	--	1961	600	6	Tc	--	91	Mar. 1962	T,G, 30	D,S, Irr	Development test, 1962, Peerless Equipment Co.: 508 gpm at 115 ft pumping level, 602 gpm at 120 ft, and 704 gpm at 126 ft.
507	A. Sutton	--	1934	900	5	Tc	--	--	--	Cf,E, 7½	N	Irrigated 35 acres in 1955. Unused in 1964-65.

See footnotes at end of table.

Table 8.--Records of wells in Atascosa, Frio, and adjacent counties--Continued

Atascosa County

Well	Owner	Driller	Date completed	Depth of well (ft)	Diameter of well (in.)	Water-bearing unit	Altitude of land-surface (ft)	Water level		Method of lift	Use of water	Remarks
								Below land surface datum (ft)	Date of measurement			
AL-68-60-508	L. Killebrew	--	1911	960	8,6	Tc	--	65	Oct. 1964	T,E, 10	Irr	Irrigated 25 acres in 1964-65. Casing: 8-in. to 90 ft, 6-in. from 90 to 960 ft.
509	-- Kuykendall	--	1953	450	6	Tc	--	--	--	T,G, 30	S, Irr	Irrigated 14 acres of peanuts in 1964-65.
510	D. N. Jacob	O. L. Boone	1963	494	12	Tc	522	88 76.1	Dec. 1963 Mar. 24, 1965	T,G, 75	Irr	Cased to 494 ft. Slotted from 294 to 494 ft. Gravel-packed. Irrigated 25 acres of peanuts and 80 acres of Coastal Bermuda grass in 1964-65. Development test, 1963, Peerless Equipment Co.: 1,027 gpm at 105 ft pumping level, 1,222 gpm at 110 ft, and 2,032 gpm at 129 ft.
511	R. D. Templeton	E. E. Swierc	1963	560	6	Tc	--	86	June 1963	T,G, 40	D,S, Irr	Development test, 1963, Peerless Equipment Co.: 886 gpm at 120 ft pumping level, 900 gpm at 180 ft. 130 ft of 6-in. column pipe.
512	Wayne Russell	O. L. Boone	1958	700	8	Tc	--	80	Oct. 1963	T,G	S, Irr	Cased to 700 ft. Reported discharge 500 gpm.
513	Allie Miller	E. Preston	1952	605	8	Tc	--	79	Oct. 1963	T,G	Irr	Cased to 605 ft. Reported discharge 250 gpm.
514	Martin Dreiss	--	1926	918	6	Tc	--	--	--	T,E, 7½	D,S, Irr	Irrigated 35 acres in 1964-65. Well 204 in Water-Supply Paper 1079-C. Temp. 78°F.
515	-- Kinchen	--	1926	--	--	Tc	--	--	--	N	N	Abandoned. Well 237 in Water-Supply Paper 107 1079-C.
516	E. T. Page, well 1	Gorman Drilling Co.	1956	750	10	Tc	--	68	1956	T,G, 40	Irr	Oil test; converted to water well. Drilled to 3,566 ft, plugged back to 750 ft. Perforated from 690 to 750 ft. Development test, Peerless Equipment Co.: 1,000 gpm at 106 ft pumping level, 1,400 gpm at 110 ft.
517	Gorman Ranch	Gorman Drilling Co.	1964	1,300	13,9	Tc	--	51	Feb. 1964	T,G	Irr	Cased to 1,300 ft. Slotted from 1,100 to 1,300 ft. 180 ft of 8-in. column pipe. Development test, 1964, Peerless Equipment Co.: 1,580 gpm at 140 ft pumping level.
518	do	do	1961	1,400	13,9	Tc	--	52	Apr. 1961	T,G	Irr	Cased to 1,400 ft. Slotted from 1,100 to 1,400 ft. Development test, 1961, Peerless Equipment Co.: 1,027 gpm at 74 ft pumping level, 1,512 gpm at 93 ft, and 2,157 gpm at 135 ft.
519	L. H. Montes	--	--	750	8,6	Tc	--	--	--	T,E	D,Irr	Cased to 750 ft. Irrigated 5 acres of strawberries in 1964-65.
601	Joe Jasik	J. Wolfe	1935	1,009	8,6	Tc	--	2	Aug. 1945	T,E, 30	Irr	Cased to 1,009 ft. Irrigated 100 acres in 1964-65. Well 70 in Water-Supply Paper 1079-C. Temp. 82°F.

See footnotes at end of table.

Table 8.--Records of wells in Atascosa, Frio, and adjacent counties--Continued

Atascosa County

Well	Owner	Driller	Date completed	Depth of well (ft)	Diameter of well (in.)	Water-bearing unit	Altitude of land-surface (ft)	Water level		Method of lift	Use of water	Remarks
								Below land surface datum (ft)	Date of measurement			
AL-68-60-602	E. G. Rakowitz	O. L. Boone	1956	918	10,8	Tc	--	60	Oct. 1963	T,E, 40	D,Irr	Casing: 10-in. to 300 ft, 8-in. from 300 ft to 918 ft. Slotted from 880 to 918 ft. Irrigated 175 acres of vegetables and feed in 1964-65.
603	E. L. Rakowitz	do	1950	909	10,7	Tc	475	60.1	Apr. 7, 1965	T,Ng	Irr	Casing: 10-in. to 180 ft, 7-in. from 180 to 909 ft. Slotted from 769 to 909 ft. Irrigated 50 to 60 acres of feed in 1964-65.
604	E. G. Rakowitz	J. Wolfe	1932	1,000	6	Tc	--	10	May 1944	N	N	Abandoned in 1955. Replaced by Well AL-68-60-602. Well 69 in Water-Supply Paper 1079-C.
605	Anton Perlicke	O. L. Boone	1953	650	10,7	Tc	--	--	--	T,G, 48	Irr	Irrigated 15 acres of vegetables in 1964.
606	Gorman Ranch	Gorman Drilling Co.	1961	1,500	13,9	Tc	--	35	Apr. 1964	T,Ng	Irr	Cased to 1,500 ft. Slotted from 1,200 to 1,500 ft. 140 ft of 8-in. column pipe. Development test, 1961: 1,027 gpm at 87 ft pumping level, 1,350 gpm at 92 ft, and 1,580 gpm at 108 ft. Flow of 150 gpm after test was completed.
701	Harry Schroeter	--	1937	600	6,2	Tc	--	6.0 14.9	Sept.28, 1948 July 15, 1953	N	N	Abandoned. Well 39 in Water-Supply Paper 1079-C.
702	City of Poteet	McKinley Drilling Co.	1956	946	12,10	Tc	--	--	--	T,E, 40	P	Casing: 12-in. to 500 ft, 10-in. from 500 to 946 ft. Slotted from 746 to 946 ft. Development test, 1956, SAMSCO Co.: 1,000 gpm at 65 ft pumping level, 1,300 gpm at 100 ft.
703	Louis Hooge	-- Favors	1958	350	8	Tr	--	--	--	N	N	Cased to 350 ft. Slotted from 250 to 350 ft. Gravel-packed. Standby irrigation well. Unused in 1964-65.
704	R. Jenschke	G. P. Rainey	1911	1,000	8	Tc	--	--	--	T,G	N	Unused, replaced by well AL-68-60-711. Well 198 in Water-Supply Paper 1079-C. Temp. 79°F.
705	Harry Schroeter	Boone & Ormand	1936	700	6	Tc	--	--	--	Cf,G	S§	Cased to 700 ft. Flowed 130 gpm in May 23, 1944 Used for stock only. Temp. 79°F.
706	J. Wilborn	do	--	642	6,4	Tc	450	16.8	Apr. 8, 1965	J,E	D	Flowed 125 gpm in 1944. Well 201 in Water-Supply Paper 1079-C. Temp. 79°F.
707	do	do	1936	700	8	Tc	--	--	--	T,E, 15	Irr	
708	Fred Morgan	--	1952	840	8	Tc	435	13.2	Apr. 12, 1965	N	N	Abandoned.
709	M. E. Franklin	O. L. Boone	1956	845	10,7	Tc	--	--	--	T,E, 40	Irr	Cased to 845 ft. Irrigated 60 acres of peanuts, 15 acres of cotton, and 15 acres of corn in 1965.
710	J. V. Gates	--	--	--	6	Tc	--	--	--	T,E	D,S	Reported flowed 150 gpm in 1944. Well 41 in Water-Supply Paper 1079-C. Temp. 81°F.

See footnotes at end of table.

Table 8.--Records of wells in Atascosa, Frio, and adjacent counties--Continued

Atascosa County

Well	Owner	Driller	Date completed	Depth of well (ft)	Diameter of well (in.)	Water-bearing unit	Altitude of land-surface (ft)	Water level		Method of lift	Use of water	Remarks
								Below land surface datum (ft)	Date of measurement			
AL-68-60-711	R. Jenschke	E. E. Swierc	1956	808	10,7	Tc	--	--	--	T,G	Irr	Cased to 808 ft. Irrigated 28 acres of peanuts and 45 acres of pasture in 1964-65. Replaced Well AL-68-60-704.
712	Eulogid Cabrera	Boone & Ormand	--	775	6	Tc	--	---	--	T,G	Irr	Cased to 775 ft. Irrigated 40 acres of vegetables in 1965. Flowed 256 gpm on May 23, 1944. Well 42 in Water-Supply Paper 1079-C.
713	W. W. Collums	--	--	--	6	Tc	--	39.7	May 29, 1944	T,G	D,S, Irr	Supplies water for dairy. Old well. Well 37 in Water-Supply Paper 1079-C.
714	Gorman Ranch	Gorman Drilling Co.	1962	1,259	13,9	Tc	--	23	Feb. 1964	T,G, 150	Irr	Casing: 13-in. to 720 ft, 9-in. from 720 to 1,259 ft. Slotted from 971 to 1,259 ft. Development test, 1964, Peerless Equipment Co.: 1,104 gpm at 64 ft pumping level, 1,513 gpm at 78 ft, and 1,818 gpm at 108 ft.
715	R. G. Burris	Boone & Ormand	1935	764	8,6	Tc	--	20	1942	T,E, 2	D,S	Casing: 8-in. to 84 ft, 6-in. from 84 to 744 ft Reported used for irrigation until 1962. Well 43 in Water-Supply Paper 1079-C.
716	Louis Hooge	D. Pegg	1938	850	10,6	Tc	--	10.2	May 9, 1944	T,E, 15	Irr	Irrigated 50 acres in 1964-65. Well 44 in Water-Supply Paper 1079-C.
717	Fred Morgan	--	1954	800	8	Tc	412	10	Apr. 1965	Flows, T,E	D	Used for irrigation until 1963. Supplied water for Country Club swimming pool.
718	J. W. Wim well 1	Daubert, Dolch, & Coates	1956	3,450	--	--	463	--	--	--	--	Oil test.
719	L. Hooge	-- Favors	1958	950	10,7	Tc	--	--	--	T,E, 30	Irr	Cased to 950 ft. Reported discharge 700 gpm. Irrigates 100 acres of strawberries.
720	Mrs. W. H. Slimm	--	--	--	6,4	Tc(?)	501	28 34.8 48.6	1929 Sept.28, 1948 Jan. 14, 1958	N	N	Abandoned. Well 209 in Water-Supply Paper 1079 1079-C.
721	do	--	--	--	6	Tc(?)	495	61.8	Apr. 13, 1965	T,E	N	Abandoned. Well 207 in Water-Supply Paper 1079-C.
722	do	Boone & Ormand	1943	807	8,6	Tc	--	--	--	N	N	Abandoned. Well 46 in Water-Supply Paper 1079-C.
723	Harry Schroeter	E. E. Swierc	1954	717	8,6	Tc	--	--	--	T,G, 20	Irr	Casing: 8-in. to 100 ft, 6-in. from 100 to 717 ft. Perforated from 657 to 717 ft. Reported discharge 400 gpm. Irrigated 70 acres in 1964-65.
* 724	J. R. Shearer	--	1940	540	8	Tc	470	+ 0.4 29.1	May 29, 1944 Apr. 13, 1965	T,G	D,S Irr	Well 38 in Water-Supply Paper 1079-C. Temp. 78°F.

See footnotes at end of table.

Table 8.--Records of wells in Atascosa, Frio, and adjacent counties--Continued

Atascosa County

Well	Owner	Driller	Date completed	Depth of well (ft)	Diameter of well (in.)	Water-bearing unit	Altitude of land-surface (ft)	Water level		Method of lift	Use of water	Remarks
								Below land surface datum (ft)	Date of measurement			
*AL-68-60-801	R. B. Fischer	D. Pegg	1936	1,090	15,8	Tc	--	+ 4. 17.6	Sept. 1937 Jan. 14, 1958	Cf,G	D,S	Well 62 in Water-Supply Paper 1079-C. Temp. 85°F.
* 802	do	G. Gilland	1925	1,010	6	Tc	445	+28 + 4.6 15.5 33.5	1925 May 8, 1949 June 22, 1954 Apr. 5, 1965	C,W	N	Cased to 850 ft. Well 61 in Water-Supply Paper 1079-C.
* 803	City of Poteet well 4	Alamo Machine Co.	1964	956	12,10	Tc	--	15	1964	T,E, 60	P	Cased to 956 ft. Screen from 724 to 956 ft. Temp. 83°F.
804	F. O. Webb	H. T. Mumme	1914	840	4	Tc	--	+ 9 4.2 4.9	1929 May 24, 1944 Apr. 18, 1946	--	--	Abandoned. Well 224 in Water-Supply Papers 676 and 1079-C.
805	J. H. Hildreth	--	1911	--	6	--	452	+15 3.8 36.5	1929 Sept.28, 1948 Apr. 8, 1965	T,E, 5	Irr	Irrigated 5 acres in 1965. Well 226 in Water-Supply Papers 676 and 1079-C.
806	Gorman Ranch	--	--	--	8	--	490	24 42.1	1929 July 21, 1952	N	N	Abandoned. Well 214 in Water-Supply Papers 676 and 1079-C.
807	do	--	--	1,000	6,4	Tc	--	+ 6	1929	N	N	Abandoned. Well 230 in Water-Supply Papers 676 and 1079-C.
808	E. H. Shearer	--	--	1,001	4	Tc	--	+50 +32.5	May 1929 May 12, 1944	T,E, 1	D,S	Flowed 190 gpm on May 12, 1944. Well 234 in Water-Supply Papers 676 and 1079-C.
* 809	City of Poteet well 1	J. Wolfe	1928	835	6	Tc	490	+30 +14.0	1929 Apr. 25, 1944	N	N	Abandoned. Well 218 in Water-Supply Papers 676 and 1079-C.
810	City of Poteet well 3	O. L. Boone	1949	860	8,6	Tc	--	--	--	T,E, 25	P	Casing: 8-in. to 90 ft, 6-in. from 90 to 860 ft.
811	C. McCarthy	--	--	1,028	5	Tc	440	9.7 22	Apr. 25, 1944 Apr. 1965	N	N	Abandoned. Well 49 in Water-Supply Paper 1079-C. Temp. 82°F.
812	do	E. E. Swierc	1955	970	8,7	Tc	--	--	--	T,G	Irr	Casing: 8-in. to 250 ft, 7-in. from 250 to 970 ft. Perforated from 890 to 970 ft. Irrigated 10 acres in 1965.
813	W. T. Granada	R. L. Boone	1957	1,020	8,6	Tc	--	--	--	T,E, 30	Irr	Casing: 8-in. to 200 ft, 6-in. from 200 to 1,020 ft. Slotted from 920 to 1,020 ft. Irrigated 100 acres in 1965.
814	do	--	1929	990	6,4	Tc	--	--	--	T,E	D	Well 235 in Water-Supply Paper 1079-C.
815	A. F. Aigner	-- Dingman	1934	1,070	6	Tc	--	--	--	T,E	Irr, D,S	Well 60 in Water-Supply Paper 1079-C.
816	R. Podevyn	--	1934	340	8,4	Tc	--	--	--	T,E, 20	Irr	Irrigates 160 acres from Wells AL-68-60-816 and AL-68-60-828.

See footnotes at end of table.

Table 8.--Records of wells in Atascosa, Frio, and adjacent counties--Continued

Atascosa County

Well	Owner	Driller	Date completed	Depth of well (ft)	Diameter of well (in.)	Water-bearing unit	Altitude of land-surface (ft)	Water level		Method of lift	Use of water	Remarks
								Below land surface datum (ft)	Date of measurement			
AL-68-60-817	Maurice Dauwe	--	1930	1,245	10,6	Tc	--	--	--	T,G	Irr	Irrigates 50 acres. 100 ft of 6-in. column pipe.
818	Edgar Shearer	O. L. Boone	1952	1,120	10,7	Tc	--	--	--	T,E, 25	Irr	Casing: 10-in. to 200 ft, 7-in. from 200 to 1,120 ft. Slotted from 850 to 1,120 ft. 90 ft of 6-in. column pipe. Reported irrigates 100 acres.
819	Pancho Briones	--	1943	1,000	8	Tc	--	17.0	May 12, 1944	T,E, 20	Irr	Cased to 1,000 ft. 70 ft of 4-in. column pipe. Irrigates 80 acres.
820	Orta Bros.	O. L. Boone	1951	1,200	8	Tc	--	--	--	T,E, 20	Irr	Cased to 1,200 ft. 90 ft. of 4-in. column pipe. Irrigates 45 acres.
* 821	J. M. Chittam Estate	H. T. Mumme	1917	840	6	Tc	--	+20	1929	N	N	Abandoned. Well 216 in Water-Supply Papers 676 and 1079-C.
822	Garcia Bros.	-- Preston	1954	950	6	Tc	430	17.5	Apr. 5, 1965	T,E	Irr	Cased to 950 ft. Irrigates 20 acres.
* 823	J. M. Chittam Estate	H. T. Mumme	1909	840	4	Tc	--	+20	1929	N	N	Abandoned. Well 220 in Water-Supply Papers 676 and 1079-C.
824	R. E. Payne	--	1925	--	6	--	--	+ 7 14	1929 Aug. 1962	T,E,	D,S	Well 227 in Water-Supply Papers 676 and 1079-C.
825	James Long	G. Gilland	1926	--	6	--	413	+29.5 0.4	May 24, 1944 Apr. 5, 1965	J,E	D,S	Well 228 in Water-Supply Papers 676 and 1079-C.
826	Garcia Bros.	--	1923	950	6	Tc	490	25.9	Apr. 5, 1965	T,E	Irr	Irrigates 10 acres. Well 52 in Water-Supply Paper 1079-C.
827	Alfred Garcia	--	1927	927	4	Tc	--	--	--	J,E, 10	D,S	Well 223 in Water-Supply Paper 676.
828	R. Poderyn	O. L. Boone	1928	850	10,5	Tc	465	41.9	Apr. 8, 1965	T,G	Irr	Casing: 10-in. to 96 ft, 5-in. from 96 to 765 ft. Well 48 in Water-Supply Paper 1079-C.
829	E. H. Shearer	--	--	1,000	6	Tc	--	+36.0	May 12, 1944	T,E	Irr	Well 53 in Water-Supply Paper 1079-C.
830	N. Kaufman	Frank Cook	1935	1,000	6	Tc	--	--	--	T,E, 5	Irr, D,S	Irrigates 20 acres. 80 ft of 4-in. column pipe. Well 58 in Water-Supply Paper 1079-C. Temp. 86°F.
831	do	--	1939	1,080	6	Tc	--	+15.5	May 12, 1944	T,E, 7½	Irr	Well 59 in Water-Supply Paper 1079-C.
832	H. A. Jaroszewski	--	1936	700	4	Tc	--	--	--	C,E, 1½	D	Well 67 in Water-Supply Paper 1079-C.
833	J. H. McCraw	E. E. Swierc	1954	920	8,6	Tc	437	31.4	Apr. 8, 1965	T,E, 20	Irr	Casing: 8-in. to 200 ft, 6-in. from 200 to 920 ft.

See footnotes at end of table.

Table 8.--Records of wells in Atascosa, Frio, and adjacent counties--Continued

Atascosa County

Well	Owner	Driller	Date completed	Depth of well (ft)	Diameter of well (in.)	Water-bearing unit	Altitude of land-surface (ft)	Water level		Method of lift	Use of water	Remarks
								Below land surface datum (ft)	Date of measurement			
AL-68-60-834	Gorman Ranch	--	1938	950	6	Tc	429	14.9	Apr. 5, 1965	T,E, 2	S	Well 51 in Water-Supply Paper 1079-C.
835	do	--	--	934	8	Tc	--	--	--	N	N	Abandoned. Well 231 in Water-Supply Paper 676. Temp. 83°F.
836	do	I. U. Bettison	1912	1,245	8,6	Tc	--	--	--	T,E, 5	Irr	Cased to 840 ft. Well 232 in Water-Supply Paper 676.
837	do	--	--	840	6	Tc	470	52.8	Apr. 7, 1965	T,E	Irr, D,S	Irrigates 50 acres. Well 229 in Water-Supply Paper 676.
838	do	Gorman Drilling Co.	1955	1,300	10,8	Tc	491	--	--	T,E, 100	Irr	Casing: 10-in. to 719 ft, 8-in. from 719 to 1,300 ft. Oil test, converted to water well.
839	do	do	1961	1,500	13,9	Tc	--	43 55	June 1961 Aug. 1964	T,Ng	Irr	Cased to 1,500 ft. Slotted from 1,200 to 1,500 ft. Development test, 1961, Peerless Equipment Co.: 1,027 gpm at 61 ft pumping level, 1,622 gpm at 76 ft, and 2,157 gpm at 96 ft.
840	do	do	1961	1,500	13,9	Tc	--	47 35	Apr. 1961 Aug. 1964	T,Ng	Irr	Cased to 1,500 ft. 140 ft of 8-in. column pipe. Development test, 1961, Peerless Equipment Co.: 1,027 gpm at 68 ft pumping level, 1,512 gpm at 78 ft, and 2,297 gpm at 100 ft.
841	do	do	1956	1,300	10,8	Tc	--	--	--	T,E, 100	Irr	Casing: 10-in. to 811 ft, 8-in. from 811 to 1,300 ft. Slotted from 822 to 1,300 ft. Oil test; converted to water well.
842	do	do	1961	1,500	13,9	Tc	--	+ 3.3	Apr. 1961 Apr. 5, 1965	Flows, T,G	Irr	Cased to 1,500 ft. Flowed 250 gpm after test, small flow now. Development test, 1961, Peerless Equipment Co.: 1,027 gpm at 25 ft pumping level, 1,623 gpm at 45 ft, and 2,518 gpm at 80 ft.
843	do	do	1953	1,645	10,7	Tc	463	--	--	T,E, 60	Irr	Oil test; converted to water well. Drilled to 5,655 ft, plugged back to 1,645 ft. Cased to 1,645 ft. Perforated from 1,080 to 1,645 ft.
844	J. C. Lott	-- Favors	1962	990	6,4	Tc	--	--	--	T,G	Irr	Casing: 6-in. to 400 ft, 4-in. from 400 to 990 ft. Reported discharge 300 gpm. Irrigates 15 acres.
901	H. A. Jaroszewski	--	1932	850	6	--	480	55.1 57.6	July 21, 1952 Apr. 6, 1965	T,E, 3	N	Well 68 in Water-Supply Paper 1079-C.
902	Henry Shearer	O. L. Boone	1930	909	4	Tc	--	+15 2.3 3.1	1929 Sept.28, 1948 July 11, 1950	N	N	Abandoned. Well 342 in Water-Supply Paper 1079-C.
903	Cyril Hooge	-- Dingman	1932	1,200	6	Tc	--	24	Apr. 1956	N	N	Abandoned.

See footnotes at end of table.

Table 8.--Records of wells in Atascosa, Frio, and adjacent counties--Continued

Atascosa County

Well	Owner	Driller	Date completed	Depth of well (ft)	Diameter of well (in.)	Water-bearing unit	Altitude of land-surface (ft)	Water level		Method of lift	Use of water	Remarks
								Below land surface datum (ft)	Date of measurement			
AL-68-60-904	M. H. Shearer	Ormand & Boone	1950	1,037	10,7, 5	Tc	--	--	--	N	N	Abandoned. Casing: 10-in. to 168 ft, 7-in. from 168 to 910 ft, and 5-in. from 910 to 1,037 ft. Slotted from 910 to 1,037 ft.
905	Earl McKinney	D. C. Pegg	1932	1,013	10,8, 5	Tc	--	10	1945	T,G	Irr	Casing: 10-in. to 100 ft, 8-in. from 100 to 900 ft, and 5-in. from 900 to 1,013 ft. Slotted from 900 to 1,013 ft.
906	J. J. Rodriguez	Ormand & Boone	1934	1,084	6	Tc	--	--	--	C,H	D,S	Temp. 84°F.
907	Ben Rakowitz	Ormand & Boone	1934	1,070	6	Tc	--	--	--	T,G	S	Cased to 700 ft. 50 ft of 4-in. column pipe.
908	Ben Parker	--	--	1,000	6	Tc	--	--	--	N	N	Abandoned.
909	I. Rakowitz	--	1925	1,051	6	Tc	450	31.1	Apr. 6, 1965	C,G	S	Casing: 6-in. to 700 ft. Open hole from 700 to 1,051 ft.
910	Chas. Rakowitz	O. L. Boone	1954	922	10,8	Tc	--	--	--	T,G	Irr	Irrigates 50 acres.
911	M. H. Shearer	do	1964	1,100	12,8	Tc	--	40.1	Apr. 9, 1965	T,G, 42	Irr	Casing: 12-in. to 570 ft, 8-in. from 570 to 1,100 ft. Slotted from 800 to 1,100 ft. 160 ft of 6-in. column pipe. Irrigates 200 acres.
912	Cyril Hooge	do	1962	1,200	12,7	Tc	--	35.4	Apr. 5, 1965	T,E, 30	Irr	Casing: 12-in. to 145 ft, 7-in. from 145 to 1,200 ft. Slotted from 1,000 to 1,200 ft. 145 ft of 10-in. column pipe. Irrigates 100 acres.
913	I. Rakowitz	--	1932	1,160	6	Tc	--	+ 5 33.6	May 1944 Apr. 6, 1965	C,E	S	Cased to 1,160 ft. Slotted from 1,010 to 1,160 ft. Temp. 85°F.
914	O. B. Schnitz	--	--	--	6	--	--	.0	Apr. 22, 1965	Flows, J,E	Irr	Flows during winter. Irrigates 60 acres.
61-101	-- Ward, Well 1	Geo. K. Mery	1959	2,000	--	--	493	--	--	--	--	Oil test.[1]
102	Edwin Espey	O. L. Boone	1959	300	12	Tc	--	100	Oct. 1963	T,G	Irr	Cased to 300 ft.
103	do	Jim Higden	1935	120	10	Tc	--	100	Oct. 1963	T,E, 20	D	Cased to 120 ft.
104	Pablo Paez	--	1940	216	4	--	475	44.8	June 6, 1965	C,W	D,S	Cased to 216 ft. Slotted from 196 to 216 ft.
201	Charles Jasik	--	1952	650	10,7	Tc	--	56	Apr. 1956	T,G, 40	Irr	Casing: 10-in. to 200 ft, 7-in. from 200 to 650 ft.
202	do	O. L. Boone	1953	552	10	Tc	--	--	--	T,G	Irr	Cased to 552 ft. Slotted from 402 to 552 ft.
203	E. J. Korus	do	1956	610	10,	Tc	519	90 110.7	1956 Apr. 23, 1965	T,E	Irr	Cased to 610 ft. Slotted from 460 to 610 ft. 150 ft. 150 ft of 6-in. column pipe. Irrigates 45 acres.

See footnotes at end of table.

Table 8.--Records of wells in Atascosa, Frio, and adjacent counties--Continued

Atascosa County

Well	Owner	Driller	Date completed	Depth of well (ft)	Diameter of well (in.)	Water-bearing unit	Altitude of land-surface (ft)	Water level		Method of lift	Use of water	Remarks
								Below land surface datum (ft)	Date of measurement			
AL-68-61-204	Edwin Jasik	E. E. Swierc	1957	950	10,7	Tc	--	85	Oct. 1963	T,E, 40	Irr	Casing: 10-in. to 275 ft, 7-in. from 275 to 950 ft. 180 ft of 6-in. column pipe. Irrigates 205 acres.
205	A. J. Palmer Estate	do	1956	935	10,7	Tc	--	95	Oct. 1963	T,G, 40	Irr	Casing: 10-in. to 275 ft, 7-in. from 275 to 935 ft. 190 ft of 6-in. column pipe.
206	Tony Divin	O. L. Boone	1955	200	8	Tr	--	--	--	N	N	Abandoned.
207	do	do	1964	805	12	Tc	517	116	Mar. 1964	T,E, 50	Irr	Cased to 805 ft. Slotted from 568 to 805 ft. Irrigates 300 acres. 190 ft of 8-in. column pipe. Gravel-packed. Development test, 1964, Stewart & Stevenson Services Inc.: 920 gpm at 136 ft pumping level, 1,535 gpm at 142 ft, and 1,990 gpm at 150 ft.
208	A. Jasik, well 1	Arkansas Fuel Oil Co.	1947	4,316	--	--	518	--	--	--	--	Oil test.[1]
* 209	Wallace Adamitz	O. L. Boone	1955	810	10,7	Tc	519	111.7	Apr. 23, 1965	N	N	Abandoned.
210	do	do	1964	505	12	Tc	--	126	Dec. 1964	T,E, 50	Irr	Cased to 505 ft. Slotted from 348 to 505 ft. Irrigates 160 acres. 1,200 gpm at 150 ft pumping level. 180 ft of 8-in. column pipe.
301	Santiago Lopez	do	1954	940	10,7	Tc	--	--	--	T,E, 25	Irr	Casing: 10-in. to 300 ft, 7-in. from 300 to 940 ft. Irrigates 70 acres. 100 ft of 6-in. column pipe.
302	A. J. Palmer Estate	do	1965	815	12	Tc	--	80	Jan. 1965	T,G, 150	Irr	Cased to 815 ft. Slotted from 640 to 815 ft. Irrigates 500 acres. 180 ft of 8-in. column pipe. Development test, 1965, Stewart & Stevenson Services, Inc.: 1,000 gpm at 105 ft pumping level, 1,840 gpm at 130 ft, and 2,250 gpm at 140 ft.
303	L. B. Palmer well 1	Shelby, Walker, & McFarland	1954	4,444	--	--	566	--	--	--	--	Oil test.[1]
* 401	Mrs. Oscar Persyn	O. L. Boone	1957	964	10,7	Tc	450	32.1 35.9 44.9	Sept.27, 1960 Dec. 20, 1962 Jan. 28, 1965	T,G	Irr	Cased to 964 ft. Slotted from 770 to 964 ft. Cemented from surface to 770 ft. Texas Water Development Board observation well.
* 402	R. E. Murray	W. R. Cavender	1942	320	6	Tqc	--	45.4	Sept.23, 1954	N	N	Abandoned. Well 73 in Water-Supply Paper 1079-C.
403	do	Ormand & Boone	1954	925	10,8	Tc	--	36.0 48.4	Jan. 14, 1955 Apr. 23, 1965	T,E, 30	Irr	Casing: 10-in. to 200 ft, 8-in. from 200 to 925 ft. Slotted from 825 to 925 ft. 100 ft of 6-in. column pipe. Irrigates 280 acres.

See footnotes at end of table.

Table 8.--Records of wells in Atascosa, Frio, and adjacent counties--Continued

Atascosa County

Well	Owner	Driller	Date completed	Depth of well (ft)	Diameter of well (in.)	Water-bearing unit	Altitude of land-surface (ft)	Water level		Method of lift	Use of water	Remarks
								Below land surface datum (ft)	Date of measurement			
AL-68-61-404	R. E. Murray	Ormand & Boone	1955	940	10,7	Tc	457	15	Apr. 1956	T,E, 30	Irr	Casing: 10-in. to 200 ft, 7-in. from 200 to 940 ft. Slotted from 760 to 940 ft. Reported discharge 700 gpm.
405	do	--	1949	380	6	Tqc	--	48.3	Jan. 9, 1956	T,E	D,S	Cased to 380 ft. Slotted from 280 to 380 ft. Supplies water for dairy.
* 406	do	--	--	66	5	Tqc	--	--	--	N	N	Abandoned.
407	Geo. Jaggy	Guy Preston	--	930	6,3	Tc	--	50	Aug. 1964	T,E,	Irr	Cased to 930 ft. Irrigates 20 acres. 60 ft of 4-in. column pipe.
408	Maud Schneider	E. E. Swierc	1957	410	10	Tqc	--	80	Oct. 1963	T,G, 50	Irr	Cased to 410 ft. Irrigates 130 acres. 160 ft of 6-in. column pipe.
409	-- Franklin	--	--	900	10,8	Tc	--	--	--	T,E	N	Unused irrigation well.
* 410	Oscar Persyn	-- Hickman	1939	1,100	8,5	Tc	--	--	--	Cf,G	D,S	Cased to 1,100 ft. Temp. 83°F.
411	Isabel Huizar well 1	Wilcox Oil Co.	1950	5,207	--	--	405	--	--	--	--	Oil test.1/
501	E. S. Hurd	Shelby, Walker, & McFarland Corp.	1955	860	10,8	--	471	40 63.4 60.7	1955 Apr. 23, 1965 May 13, 1965	T,G	Irr	Casing: 10-in. to 100 ft, 8-in. from 100 to 425 ft, and 7-in. from 425 to 860 ft. Oil test; converted to water well. Slotted from 325 to 425 ft and from 750 to 860 ft. Irrigates 80 acres.
502	Paul Schneider	E. E. Swierc	1954	921	10,8	Tc	--	--	--	T,G	Irr	Casing: 10-in. to 200 ft, 8-in. from 200 to 921 ft. Irrigates 93 acres.
* 601	Steve Ridgeway	O. L. Boone	1955	1,057	10,7	Tc	--	50.5	June 7, 1955	T,E, 40	Irr	Casing: 10-in. to 300 ft, 7-in. from 300 to 1,057 ft. Slotted from 912 to 1,057 ft. Irrigates 200 acres. 130 ft of 6-in. column pipe. Temp. 85°F.
602	do	Thomas May	1965	1,200	12	Tc	--	78.8	May 13, 1965	T,G, 100	Irr	Cased to 1,200 ft. Gravel-packed. 180 ft of 10-in. column pipe. Reported discharge 2,100 gpm. Texas Water Development Board observation well.
701	Russell Burmeister	O. L. Boone	1955	1,212	10,7	Tc	420	--	--	T,G, 35	Irr	Casing: 10-in. to 212 ft, 7-in. from 212 to 1,212 ft.
702	Joe J. Montez	do	1953	900	6	Tc	438	--	--	T,E, 7½	Irr	Cased to 900 ft. Irrigates 30 acres.
703	Russell Burmeister	Ormand & Boone	1950	1,137	4	Tc	--	+	Apr. 1965	Flows, J,E	D,S	Cased to 1,137 ft. Flows except in summer. Supplies water for dairy.
* 704	Dorothy Quillian	--	1950	274	--	Tqc	--	--	--	--	D	

See footnotes at end of table.

Table 8.--Records of wells in Atascosa, Frio, and adjacent counties--Continued

Atascosa County

Well	Owner	Driller	Date completed	Depth of well (ft)	Diameter of well (in.)	Water-bearing unit	Altitude of land-surface (ft)	Water level		Method of lift	Use of water	Remarks
								Below land surface datum (ft)	Date of measurement			
AL-68-61-705	E. R. Breaker	--	--	1,280	6	Tc	410	14.8	Apr. 22, 1965	T,E, 5	Irr	Cased to 1,280 ft.
801	Mrs. N. L. Renshaw	H. H. Howell	1945	1,320	6	Tc	--	--	--	T,G	Irr	Oil Test; converted to water well. Irrigates 100 acres.[1]
802	DeWitt Perry	O. L. Boone	1954	1,320	6	Tc	438	24	July 1964	T,E	D,S, Irr	Cased to 1,320 ft. Slotted from 1,120 to 1,320 ft. Supplies water for dairy. Irrigates 200 acres.
803	Albert Rakowitz	do	1952	1,435	10,7	Tc	--	43	Apr. 1956	T,E, 30	Irr	Casing: 10-in. to 300 ft, 7-in. from 300 to 1,435 ft. Slotted from 1,235 to 1,435 ft. 130 ft of 6-in. column pipe. Irrigates 150 acres.
804	Carl Calhoun	do	1949	1,400	4	Tc	418	33.7	Apr. 22, 1965	T,E, 5	D,S	Cased to 1,400 ft. 80 ft of 2½-in. column pipe.
901	C. W. Baker	do	1963	1,505	10,7	Tc	473	90	Oct. 1963	T,E, 40	Irr	Casing: 10-in. to 404 ft, 7-in. from 404 to 1,505 ft. 160 ft of 8-in. column pipe. Development test, 1963, Peerless Equipment Co.: 1,000 gpm at 170 ft pumping level, 602 gpm at 135 ft.
902	Lamar Foster	do	1955	1,700	10,6	Tc	463	--	--	T,E, 30	Irr, D,S	150 ft of 6-in. column pipe.
903	H. Wharton	--	--	1,800	8	Tc	417	--	--	T,E, 2	D,S	
904	Weldon Dunaway	McKinley Drilling	1954	1,650	10,8	Tc	458	--	--	T,E, 30	Irr	Irrigated 100 acres in 1955.
905	Ned Royal	O. L. Boone	1965	1,413	10,7	Tc	--	92.3	Apr. 26, 1965	N	Irr	Casing: 10-in. to 515 ft, 7-in. from 515 to 1,413 ft. Slotted from 1,200 to 1,413 ft.
906	do	do	1956	1,400	10,7	Tc	--	--	--	N	N	Abandoned. Cased to 1,400 ft. Slotted from 1,240 to 1,400 ft.
62-403	Fairview Farms	McKinley Drilling Co.	1959	1,381	16,12	Tc	--	--	--	T,G	N	Casing: 16-in. to 302 ft, 12-in. from 302 to 1,318 ft. Unused irrigation well.
405	-- Hearn	E. H. Cannon	1965	1,531	12,10	Tc	492	114 107.8	Jan. 1965 Apr. 23, 1965	T,G, 125	Irr	Casing: 12-in. to 513 ft, 10-in. from 513 to 1,531 ft. Slotted from 1,281 to 1,531 ft. 200 ft of 8-in. column pipe. Development test, 1965, Peerless Equipment Co.: 1,001 gpm at 131 ft pumping level, 2,010 gpm at 173 ft. Irrigates 200 acres. Texas Water Development Board observation well.
701	H. L. Eicherberger	McKinley Drilling Co.	1963	1,614	12,8	Tc	--	58	July 1963	T,G	Irr	Casing: 12-in. to 400 ft, 8-in. from 400 to 1,612 ft. Slotted from 1,312 to 1,612 ft. Irrigates 160 acres.

See footnotes at end of table.

Table 8.--Records of wells in Atascosa, Frio, and adjacent counties--Countinued

Atascosa County

Well	Owner	Driller	Date completed	Depth of well (ft)	Diameter of well (in.)	Water-bearing unit	Altitude of land-surface (ft)	Water level		Method of lift	Use of water	Remarks
								Below land surface datum (ft)	Date of measurement			
*AL-68-62-702	C. A. Moehrig	--	--	455	4	Tqc	--	82	1936	T,E	D,S	
* 78-02-301	T. B. Mallard	McKinley Drilling Co.	1963	1,205	12,8	Tc	--	150	Nov. 1963	T,E, 100	Irr	Casing: 12-in. to 550 ft, 8-in. from 550 to 1,200 ft. Slotted from 900 to 1,200 ft. Irrigates 210 acres.
302	Theo. Rogers, Well 1	Hydro-Carbons Co.	1948	3,210	--	--	565	--	--	--	--	Oil test.[1]
303	Tony Nixon	D. Downing	1964	1,200	12	Tc	592	148.6	Apr. 21, 1965	T,G, 200	Irr	Cased to 1,200 ft. Slotted from 900 to 1,200 ft. Irrigates 173 acres. Texas Water Development Board observation well.
504	Adolph Cumpian	T. Carrol	1964	1,340	12,8	Tc	--	105	Mar. 1964	T,G, 75	Irr	Cased to 1,340 ft. Slotted from 1,130 to 1,340 ft. Development test, 1964, Peerless Equipment Co.: 708 gpm at 129 ft pumping level, 1,902 gpm at 207 ft. Irrigates 140 acres.
505	Marvin & Eldon W. Brauchle	McKinley Drilling Co.	1964	1,320	12	Tc	510	93.0	Apr. 16, 1965	T,G, 150	Irr	Cased to 1,300 ft. Slotted from 1,050 to 1,300 ft. Open hole from 1,300 to 1,320 ft. Development test, 1964, Stewart & Stevenson Services, Inc.: 1,100 gpm at 96 ft pumping level, 2,150 gpm at 108 ft. Irrigates 116 acres.
601	A. W. Dismuke well 1	Rodney DeLange, et al.	1955	4,172	--	---	562	--	--	--	--	Oil test.[1]
602	Joe Cumpian	T. Carroll	1964	1,360	12,8	Tc	--	--	--	T,E, 75	Irr	Casing: 12-in. to 500 ft, 8-in. from 500 to 1,360 ft. 200 Ft of 8-in. column pipe. Irrigates 250 acres.
603	G. Tullas, well 1	McKinley Drilling Co.	1956	1,237	12,8	Tc	--	68.8	Apr. 16, 1965	T,G, 60	Irr	Casing: 12-in. to 404 ft, 8-in. from 404 to 1,237 ft. Slotted from 974 to 1,237 ft. 150 ft of 8-in. column pipe. Irrigates 100 acres.
604	Joe Cumpian	E. E. Swierc	1954	1,300	7,5	Tc	--	103.5	do	T,E	D,S	Reported used for irrigation until 1964. Texas Water Development Board observation well.
805	Victor W. Marsch well 1	Carr & Haring	1951	4,611	--	--	568	--	--	--	--	Oil test.[1]
901	S. Brauchle well 1	Ormand & Boone	1950	1,280	8,5	Tc	--	10	1955	T,E	D,S	Cased to 1,280 ft. Reported used for irrigation until 1964.
902	S. Brauchle well 2	do	1954	1,500	10,8	Tc	--	100	Nov. 1963	T,E, 100	Irr	Casing: 10-in. to 300 ft, 8-in. from 300 to 1,500 ft. 300 ft of 3-in. column pipe. Irrigates 93 acres.
903	S. Brauchle well 3	--	1956	1,400	12,8	Tc	--	--	--	T,E, 75	Irr	Cased to 1,400 ft. 200 ft of 8-in. column pipe. Irrigates 93 acres. Reported discharge 1,200 gpm.

See footnotes at end of table.

Table 8.--Records of wells in Atascosa, Frio, and adjacent counties--Continued

Atascosa County

Well	Owner	Driller	Date completed	Depth of well (ft)	Diameter of well (in.)	Water-bearing unit	Altitude of land-surface (ft)	Water level		Method of lift	Use of water	Remarks
								Below land surface datum (ft)	Date of measurement			
AL-78-02-904	S. Brauchle, well 6	McKinley Drilling Co.	1964	1,500	12	Tc	--	97	Dec. 1964	T,G, 150	Irr	Cased to 1,500 ft. 240 ft of 8-in. column pipe. Irrigates 140 acres. Development test, 1964 Stewart & Stevenson Services, Inc.: 1,140 gpm at 118 ft pumping level, 1,400 gpm at 124 ft.
905	Victor Holquine	--	--	1,600	--	Tc	---	--	--	T,G	Irr	
906	E. T. Pruitt well D-1	Humble Oil & Refining Co.	1951	4,983	--	--	486	--	--	--	--	Oil test.[1]
03-101	Lois Eisenhauer well 1	Kirkwood & Morgan	1948	3,500	--	--	522	--	--	--	--	Oil test.
201	Raymond Martinez	E. E. Swierc	1957	850	--	Tc	--	110	1963	T,E, 20	Irr	Cased to 850 ft. Irrigates 5 acres. Reported discharge 650 gpm.
301	R. W. Brite, well 1	A. J. Kuenstler	1955§	4,256	--	--	525	--	--	--	--	Oil test.[1]
302	U. R. Reitzer	E. E. Swierc	1950	1,055	8,6	Tc	--	59.8	Apr. 14, 1965	N	N	Casing: 8-in. to 180 ft, 6-in. from 180 to 1,055 ft.
303	U. R. Reitzer well 2	L. & J. Swierc	1963	994	10,7	Tc	--	42	1963	T,G	Irr	Casing: 10-in. to 300 ft, 7-in. from 300 to 994 ft. 160 ft of 6-in. column pipe. Irrigates 130 acres.
304	Antonio Espinosa	George Favor	1963	987	10,7	Tc	--	81	1963	T,G	Irr	Casing: 10-in. to 250 ft, 7-in. from 250 to 987 ft.
305	-- Walton, well 1	Morgan Minerals	1955	4,304	--	--	530	---	--	--	---	Oil test.[1]
306	-- Sanderford well 3	L. & J. Swierc	1965	1,111	10,7	Tc	--	65	Jan. 1965	T,E, 30	Irr	Casing: 10-in. to 403 ft, 7-in. from 403 to 1,111 ft. Perforated from 913 to 1,111 ft. Development test, 1965, Stewart & Stevenson Services, Inc.: 600 gpm at 80 ft pumping level, 900 gpm at 98 ft. 120 ft of 6-in. column pipe.
307	U. R. Reitzer well 3	do	1964	1,170	10,7	Tc	--	90	1965	T,G	Irr	Casing: 10-in. to 505 ft, 7-in. from 505 to 1,170 ft. Slotted from 980 to 1,170 ft. 180 ft of 6-in. column pipe.
* 401	L. B. Wier	--	1908	1,207	5,3	Tc	--	38 74.5 114.8 128.8	1908 July 12, 1950 Nov. 15, 1960 Apr. 15, 1965	C,E	D,S	Texas Water Development Board observation well.
402	-- Wilson, well 3	Rodney DeLange	1955	4,309	--	--	547	--	--	--	--	Oil test.[1]
403	J. A. Wilson, well 1	McKinley Drilling Co.	1956	1,304	10,8	Tc	--	--	--	T,Ng	Irr, D,S	Casing: 10-in. to 400 ft, 8-in. from 400 to 1,304 ft. Slotted from 1,004 to 1,304 ft. Irrigates 50 acres.

See footnotes at end of table.

Table 8.--Records of wells in Atascosa, Frio, and adjacent counties--Continued

Atascosa County

Well	Owner	Driller	Date completed	Depth of well (ft)	Diameter of well (in.)	Water-bearing unit	Altitude of land-surface (ft)	Water level		Method of lift	Use of water	Remarks
								Below land surface datum (ft)	Date of measurement			
AL-78-03-404	Luke Wier	McKinley Drilling Co.	1956	1,302	10,8	Tc	--	120	1964	T,E, 150	Irr	Casing: 10-in. to 400 ft, 8-in. from 400 to 1,302 ft.
405	John Wilson, Jr. well 2	do	1961	1,400	12,5	Tc	--	150	July 1961	T,G, 150	Irr	Casing: 12-in. to 400 ft, 5-in. from 400 to 1,400 ft. Slotted from 1,150 to 1,400 ft. Development test, 1961, Stewart & Stevenson Services, Inc.: 400 gpm at 156 ft pumping level, 1,300 gpm at 200 ft.
406	J. A. Wilson, well 1	O. N. Neatherly, Jr.	1954	4,352	--	--	548	--	--	--	--	Oil test.[1]
407	J. W. Smelley	Ormand & Boone	1953	1,350	10,8	Tc	--	--	--	T,Ng	Irr	Casing: 10-in. to 400 ft, 8-in. from 400 to 1,350 ft. Slotted from 1,150 to 1,350 ft. 240 ft of 6-in. column pipe. Irrigates 200 acres.
* 408	Rodney DeLange	H & J Drilling Co.	--	1,750	8,7	Tc	--	--	--	T,E, 15	Ind	Water used to repressure oil field. Temp. 94°F.
* 409	Lone Star Producing Co.	McKinley Drilling Co.	1964	1,940	10,8	Tc, Twi	--	100	1964	T,E	Ind	Water used to repressure oil field. Casing: 10-in. to 400 ft, 8-in. from 400 to 1,940 ft. Perforated from 1,685 to 1,878 ft and from 1,907 to 1,940 ft.
501	Cyril Dalkowitz well 7	Drilling & Explor Exploration Co.	1955	4,317	--	--	560	--	--	--	--	Oil test.[1]
502	S. G. Dalkowitz	McKinley Drilling Co.	1951	1,250	12,8	Tc	--	100	1964	T,G, 225	Irr	Casing: 12-in. to 300 ft, 8-in. from 300 to 1,250 ft. Irrigates 225 acres.
503	do	--	1956	1,300	12,8	Tc	--	--	--	T,G	N	
* 504	Humble Oil & Refining Co.	--	--	2,624	--	Twi	---	--	--	--	Ind	Casing perforated from 2,233 to 2,243, 2,390 to 2,400, 2,477 to 2,487, and 2,614 to 2,624 ft. Water used to repressure oil field.
505	Lone Star Producing Co.	McKinley Drilling Co.	1964	1,800	7	Tc (lower)	--	--	--	--	Ind	Cased to 1,800 ft. Slotted from 1,610 to 1,800 ft. Cemented from 1,590 ft to surface.
506	Coward well 1-A	Lone Star Producing Co.	1957	4,814	--	--	590	--	--	--	--	Oil test.
507	B. Trevino	J. N. Carroll	1964	1,482	12,8	Tc	--	--	--	T,G	Irr	Cased to 1,482 ft. 260 ft of 8-in. column pipe. Irrigates 80 acres. Development test, 1964, Stewart & Stevenson Services, Inc.: 910 gpm at 170 ft pumping level, 1,980 gpm at 230 ft. Irrigates 80 acres.

See footnotes at end of table.

Table 8.--Records of wells in Atascosa, Frio, and adjacent counties--Continued

Atascosa County

Well	Owner	Driller	Date completed	Depth of well (ft)	Diameter of well (in.)	Water-bearing unit	Altitude of land-surface (ft)	Water level		Method of lift	Use of water	Remarks
								Below land surface datum (ft)	Date of measurement			
AL-78-03-508	Milton Davis	McKinley Drilling Co.	1957	1,690	12,10	Tc	--	171.8	Apr. 15, 1965	T,E, 150	Irr	Casing: 12-in. to 500 ft, 10-in. from 500 to 1,690 ft. Slotted from 1,415 to 1,690 ft. 250 ft of 8-in. column pipe. Irrigates 220 acres. Development test, 1957, Peerless Equipment Co.: 1,027 gpm at 200 ft pumping level, 1,421 gpm at 220 ft.
601	Edgar Muellar	E. E. Swierc	1953	1,650	8,6	Tc	--	128.1	May 13, 1965	N	N	Casing: 8-in. to 212 ft, 6-in. from 212 to 1,650 ft. Slotted from 1,470 to 1,650 ft.
602	do	do	1965	1,700	10,6	Tc	--	--	--	T,G, 50	Irr	Casing: 10-in. to 600 ft, 6-in. from 600 1,700 ft. Slotted from 1,470 to 1,700 ft. Replaced Well AL-78-03-601.
603	Bog Hindes	McKinley Drilling Co.	1956	1,605	12,8	Tc	--	156.6	Apr. 15, 1965	T,E, 75	Irr	Casing: 12-in. to 401 ft, 8-in. from 401 to 1,605 ft. Slotted from 1,305 to 1,605 ft. 220 ft of 8-in. column pipe. Irrigates 115 acres. Development test, 1956, Peerless Equipment Co.: 1,000 gpm at 190 ft pumping level, 1,258 gpm at 200 ft.
604	M. L. Franzen well 1	Martin, Shelly, & Thomas	1951	1,510	--	--	543	--	--	--	--	Oil test.
605	Milton Davis	-- Collins	1963	1,700	12,10	Tc	--	125	1965	T,G	Irr	Casing: 12-in. to 550 ft, 10-in. from 550 to 1,700 ft. Slotted from 1,300 to 1,700 ft. 270 ft of 8-in. column pipe. Irrigates 200 acres.
606	Frank Geyer	O. L. Boone	1957	1,609	12,8	Tc	--	--	--	T,E, 125	Irr	Casing: 12-in. to 400 ft, 8-in. from 400 to 1,609 ft. Slotted from 1,409 to 1,609 ft. 260 ft of 8-in. column pipe. Irrigates 225 acres.
701	T. Davies well 1	Dillard & Waltermire	1948	5,047	--	--	530	--	--	--	--	Oil test.
702	-- Dubose	E. E. Swierc	1955	1,275	10,7	Tc	--	58	1955	T,G, 40	Irr	Cased to 1,275 ft. Slotted from 1,105 to 1,275 ft. 196 ft of 8-in. column pipe. Irrigates 200 acres.
703	do	--	--	1,200	10	Tc	490	--	--	N	N	Oil test; converted to water well. Unused.1/
704	Brauchle Bros.	O. L. Boone	1961	1,600	12,8	Tc	--	100	1963	T,E, 75	Irr	Casing: 12-in. to 500 ft, 8-in. from 500 to 1,600 ft. Slotted from 1,450 to 1,600 ft. 240 ft of 8-in. column pipe. Irrigates 120 acres.
705	Haskins Estate	McKinley Drilling Co.	1963	1,710	12	Tc	562	167	Dec. 1963	T,G, 150	Irr	Cased to 1,710 ft. Slotted from 1,459 to 1,710 ft. Development test, 1963, Stewart & Stevenson Services, Inc.: 1,960 gpm at 210 ft pumping level.
706	W. W. Marsh	Humble Oil & Refining Co.	1956	1,700	10	Tc	--	90	1963	T,Ng,	Irr	Cased to 1,700 ft. Irrigates 165 acres.

See footnotes at end of table.

Table 8.--Records of wells in Atascosa, Frio, and adjacent counties--Continued

Atascosa County

Well	Owner	Driller	Date completed	Depth of well (ft)	Diameter of well (in.)	Water-bearing unit	Altitude of land-surface (ft)	Water level		Method of lift	Use of water	Remarks
								Below land surface datum (ft)	Date of measurement			
AL-78-03-707	F. Geyer	O. L. Boone	1963	1,570	12,8	Tc	--	143	1963	T,E, 125	Irr	Cased to 1,570 ft. Slotted from 1,320 to 1,570 ft.
708	W. W. Marsh	do	1956	1,690	10,7	Tc	--	150	1963	T,G, 65	Irr	Cased to 1,690 ft. Irrigates 240 acres.
709	do	McKinley Drilling Co.	1959	1,670	12,10	Tc	--	--	--	T,G, 250	Irr	Casing: 12-in. to 400 ft, 10-in. from 400 to 1,670 ft. Slotted from 1,420 to 1,670 ft. Irrigates 212 acres.
801	Fred Franks	--	1928	1,692	7,4	Tc	512	79.3	Nov. 12, 1960	N	N	Well 246 in Water-Supply Paper 1079-C.
802	J. F. Chupick well 1	Alaska Steamship Co. & Newman Bros.	1954	5,264	--	--	543	--	--	--	--	Oil test.1/
803	Dick Prassal	McKinley Drilling Co.	1955	1,625	12,8	Tc	--	145	1956	T,G, 90	Irr	Casing: 12-in. to 300 ft, 8-in. from 300 to 1,625 ft. Slotted from 1,375 to 1,625 ft. 220 ft of 8-in. column pipe. Irrigates 200 acres.
804	Humble Oil & Refining Co.	--	--	3,100	--	Twi	--	--	--	T,E, 5	Ind	Water is used to repressure oil field.
805	Dick Prassal	McKinley Drilling Co.	1955	1,682	12,8	Tc	--	75	1963	T,G	Irr	Casing: 12-in. to 305 ft, 8-in from 305 to 1,682 ft. Slotted from 1,432 to 1,682 ft. Reported discharge 800 gpm.
806	Edward Matocha well 1	Humble Oil & Refining Co.	1946	7,249	--	--	493	--	--	--	--	Oil test.
901	Ben Harlin	E. E. Swierc	1956	1,826	10,8	Tc	--	--	--	T,G	Irr	Casing: 10-in. to 300 ft, 8-in. from 300 to 1,826 ft. Slotted from 1,626 to 1,826 ft. 200 ft of 6-in. column pipe. Irrigates 190 acres.
04-101	Ed Adams	Armstrong & Harn	1955	1,400	6	Tc	--	60	1963	T,E	Irr, D,S	Cased to 853 ft. Slotted from 700 to 853 ft.
102	Wesley Clark	O. L. Boone	1955	1,180	10,7	Tc	--	46.4	Oct. 8, 1963	T,G	Irr	Casing: 10-in. to 200 ft, 7-in. from 200 to 980 ft.
* 103	Edwin Brooks	E. H. Cannon	1963	1,565	10	Tc	--	135 84.6	Mar. 1963 Apr. 15, 1965	T,E, 40	Irr	Development test, 1963, Calhoun Equipment Co.: 655 gpm at 157 ft pumping level, 874 gpm at 165 ft.
104	L. E. Molak	L. & J. Swierc	1963	1,038	10	Tc	--	40	1964	T,E, 30	Irr	Cased to 1,038 ft. Perforated from 840 to 1,038 ft. 120 ft of 6-in. column pipe. Irrigates 60 acres.
105	A. I. Robertson	L. & J. Swierc	1962	515	10,8	Twi	--	--	--	T,E, 40	Irr	Cased to 515 ft. Irrigates 50 acres.
106	Horace Gunn	do	1962	306	7	Twi	--	80	1962	T,E	S	

See footnotes at end of table.

Table 8.--Records of wells in Atascosa, Frio, and adjacent counties--Continued

Atascosa County

Well	Owner	Driller	Date completed	Depth of well (ft)	Diameter of well (in.)	Water-bearing unit	Altitude of land-surface (ft)	Water level		Method of lift	Use of water	Remarks
								Below land surface datum (ft)	Date of measurement			
AL-78-04-201	Gorman Ranch	Gorman Drilling Co.	1961	1,575	14,10	Tc	417	9.9	Apr. 5, 1965	T,G	Irr	Casing: 14-in. to 800 ft, 10-in. from 800 to 1,575 ft. Development test, 1961, Peerless Equipment Co.: 1,027 gpm at 53 ft pumping level, 2,050 gpm at 85 ft.
202	Howard Lowe	L. & J. Swierc	1964	1,236	10,8	Tc	--	60	1964	T,E, 30	Irr	Cased to 1,236 ft. Perforated from 1,200 to 1,236 ft. Irrigates 75 acres.
203	Gorman Ranch	Gorman Drilling Co.	1964	1,800	13,9	Tc	405	.4	Apr. 5, 1965	T,G,	Irr	Cased to 1,800 ft. Slotted from 1,600 to 1,800 ft. 180 ft of 8-in. column pipe.
* 204	M. Thomas	M. Thierry	1944	1,454	6	Tc	440	37.6	Apr. 15, 1965	N	N	Well 54 in Water-Supply Paper 1079-C. Texas Water Development Board observation well. Temp. 90°F.
* 205	Simon Rodriguez	Boone & Ormand	--	1,405	6,4	Tc	--	13.4	May 9, 1944	T,G	D,S	Well 55 in Water-Supply Paper 1079-C. Used for irrigation until 1958. Temp. 89°F.
* 206	Mitch Thomas	--	--	1,400	8,3	Tc	--	--	--	T,E, 10	D,S, Irr	Well 56 in Water-Supply Paper 1079-C.
207	Lone Star Brewery	E. E. Swierc	1951	1,109	6	Tc	--	+	1965	Flows	D	Flowed 900 gpm on June 14, 1951.
* 301	Travis Mansfield	--	--	1,500	8	Tc	430	33.1	Apr. 15, 1965	T,E	Irr	Irrigates 20 acres.
302	A. C. Woessner	Boone & Ormand	1948	360	6,4	Twi	--	55	1963	J,E	D	Cased to 360 ft.
303	Fred Halpin	do	1955	1,400	10,7	Tc	--	30	1963	T,E, 75	Irr	Casing: 10-in. to 400 ft, 7-in. from 400 to 1,400 ft. Slotted from 1,300 to 1,400 ft. Irrigates 140 acres.
304	Mitch Thomas	H. J. Chavanne	1958	1,500	10,7	Tc	--	--	--	T,E, 40	S, Irr	Oil test; converted to water well. Irrigates 150 acres.
305	Pete Pawelek	O. L. Boone	1960	1,154	12,8	Tc	--	+	1965	Flows	Irr	Casing: 12-in. to 200 ft, 8-in. from 200 to 1,154 ft. Irrigates 20 acres.
306	Fred Halpin	do	1963	630	10,7	Twi	--	50	1964	T,E, 30	Irr	Casing: 10-in. to 200 ft, 7-in. from 200 to 630 ft. Irrigates 90 acres. Reported discharge 850 gpm.
401	B. R. Brooks	E. E. Swierc	1956	1,590	10,7	Tc	--	--	--	T,G	Irr	Casing: 10-in. to 300 ft, 7-in. from 300 to 1,590 ft. 190 ft of 6-in. column pipe. Irrigates 150 acres.
* 402	-- Furgeson	I. V. Bettison	--	1,040	8,6	Tr	--	--	--	C,W	D,S	Well 248 in Water-Supply Paper 676.
403	Moos & Hitzfelder well 1	Kirkwood & Morgan	1957	3,472	--	--	513	--	--	--	--	Oil test.
501	P. J. Modden, well 1	do	1956	4,499	--	--	452	--	--	--	--	Do.

See footnotes at end of table.

Table 8.--Records of wells in Atascosa, Frio, and adjacent counties--Continued

Atascosa County

Well	Owner	Driller	Date completed	Depth of well (ft)	Diameter of well (in.)	Water-bearing unit	Altitude of land-surface (ft)	Water level		Method of lift	Use of water	Remarks
								Below land surface datum (ft)	Date of measurement			
*AL-78-04-502	City of Jourdanton	Layne-Texas Co.	1930	1,635	10,6	Tc	475	68	Apr. 1956	T,E, 50	P	Cased to 1,635 ft. Screen from 1,604 to 1,635 ft.
503	do	--	--	1,150	10	Tqc	--	--	--	T,E, 20	P	Used as standby well.
504	Claude Kaiser	Boone & Ormand	1955	1,800	10,7	Tc	--	--	--	T,E, 40	Irr	Casing: 10-in. to 289 ft, 7-in. from 289 to 1,800 ft. Slotted from 1,600 to 1,800 ft.
601	Atascosa Livestock Sales Yard	C. S. Young	1919	1,428	6	Tqc	--	10 48.5	1929 Jan. 15, 1958	T,E	S	Well 251 in Water-Supply Paper 1079-C.
* 602	Geo. Weatherston	--	1926	1,505	6	Tc	402	+55 +29 10	1929 June 1944 1965	T,E	Irr, D,S	Cased to 1,505 ft. Irrigates 75 acres. Flowed until 1958. Well 249 in Water-Supply Paper 1079-C. Temp. 92°F.
603	Fred Frank well 1	Security Drilling Co.	1955	4,667	--	--	--	--	--	--	--	Oil test.[1]
604	Fred Frank	--	1956	1,600	10,5	Tc	--	--	--	T,E	D,S	Casing: 10-in. to 430 ft, 5-in. from 430 to 1,600 ft.
* 605	Fred Krause	-- Schwartz	1938	701	6,4	Tqc	--	--	--	C,E	D,S	Cased to 701 ft. Well 78 in Water-Supply Paper 1079-C.
701	Humble Oil & Refining Co.	Carl Vickers	1950	1,950	5	Tc	--	--	--	T,E, 20	Ind	Cased to 1,950 ft. Slotted from 1,834 to 1,950 ft. Supplies water for Jourdanton Gas Plant.
702	do	do	1950	1,944	5	Tc	--	--	--	T,E, 20	Ind	Cased to 1,944 ft. Slotted from 1,829 to 1,944 ft. Supplies water for Jourdanton Gas Plant.
* 703	Bertha Winkler	E. E. Swierc	1957	1,900	10,8	Tc	--	70	1963	T,E, 30	Irr	Casing: 10-in. to 300 ft, 8-in. from 300 to 1,900 ft. 160 ft of 6-in. column pipe. Irrigates 153 acres.
704	Burt McDonald	Glen Keeney	1963	2,010	8,6	Tc	--	--	--	T,E, 40	Irr	Casing: 8-in. to 250 ft, 6-in. from 250 to 2,010 ft.
705	L. D. Brown, well 1	Parker & Anderson	1955	5,394	--	--	481	--	--	--	--	Oil test.
801	Pete Schorsch	O. L. Boone	--	1,920	4	Tc	--	--	--	T,E	D,S	Reported used for irrigation until 1956.
802	Dewey Tyler	Keeney Well Service	1963	1,800	10	Tc	--	--	--	T,G	Irr	Cased to 1,800 ft. Slotted from 1,600 to 1,800 ft. 120 ft of 8-in. column pipe.
* 803	City of Jourdanton	McKinley Drilling Co.	1957	1,960	12, 10,8	Tc	480	55 74.9	Apr. 1957 Apr. 28, 1965	T,E, 25	P	Casing: 12-in. to 395 ft, 10-in. from 395 to 1,825 ft, and 8-in. from 1,825 to 1,960 ft. Slotted from 1,825 to 1,960 ft. Development test, 1957, Peerless Equipment Co.: 600 gpm at 69 ft pumping level, 1,222 gpm at 96 ft, and 2,032 gpm at 120 ft. Temp. 98°F.

See footnotes at end of table.

Table 8.--Records of wells in Atascosa, Frio, and adjacent counties--Continued

Atascosa County

Well	Owner	Driller	Date completed	Depth of well (ft)	Diameter of well (in.)	Water-bearing unit	Altitude of land-surface (ft)	Water level		Method of lift	Use of water	Remarks
								Below land surface datum (ft)	Date of measurement			
AL-78-04-804	John T. Pesek	McKinley Drilling Co.	1955	2,017	8,7	Tc	425	43.9	Apr. 26, 1965	T,Ng	Irr	Casing: 8-in. to 300 ft, 7-in. from 300 to 2,017 ft. Irrigates 90 acres.
805	Henry Schorsch, Jr.	do	1954	2,173	10,8	Tc	445	63.7	Apr. 27, 1965	T,E, 50	Irr	Casing: 10-in. to 1,778 ft, 8-in. from 1,778 to 2,173 ft. Slotted from 1,800 to 2,173 ft. 120 ft of 8-in. column pipe. Irrigates 80 acres.
806	A. N. Moursund well 1	Humble Oil & Refining Co.	1946	7,375	--	--	415	--	--	--	--	Oil test.[1/]
807	Henry Schorsch, well 1	do	1945	7,405	--	--	442	--	--	--	--	Do.
808	Henry Schorsch, Jr.	McKinley Drilling Co.	1964	1,948	10,7	Tc	--	80	1964	T,G	Irr	Casing: 10-in. to 512 ft, 7-in. from 512 to 1,948 ft. Slotted from 1,613 to 1,948 ft. 175 ft of 6-in. column pipe. Reported discharge 900 gpm. Irrigates 100 acres.
809	A. N. Moursand	Humble Oil & Refining Co.	1946	2,131	--	Tc	--	--	--	N	N	Formerly used for oil well drilling supply.
810	Humble Oil & Refining Co.	Ormand & Boone	1950	1,950	--	Tc	--	--	--	T,E, 20	Ind	Casing slotted from 1,849 to 1,950 ft.
811	do	do	1950	1,950	--	Tc	--	--	--	T,E, 20	Ind	Do.
812	Pete Schorsch	McKinley Drilling Co.	1964	2,164	10,8	Tc	--	--	--	T,Ng	Irr	Casing: 10-in. to 410 ft, 8-in. from 410 to 2,150 ft. 125 ft of 6-in. column pipe. Irrigates 180 acres.
813	Mrs. J. J. Netarchus	E. E. Swierc	--	1,921	8,7	Tc	--	80	1964	T,Ng	Irr	Casing: 8-in. to 300 ft, 7-in. from 300 to 1,921 ft. Slotted from 1,600 to 1,921 ft. Irrigates 85 acres.
* 901	Humble Oil & Refining Co.	--	1946	2,350	7	Tc	--	--	--	T,E, 5	D,Ind	Cased to 2,053 ft. Supplies water for 3 houses and well drilling rigs.
902	C. W. Franks	E. E. Swierc	1961	372	5	Ts	--	70	1963	T,E	D,S	Cased to 372 ft. 100 ft of column pipe.
903	Mrs. Bill Tope	O. L. Boone	1940	150	4	Tcm	--	120	1963	C,E	S	Cased to 150 ft.
904	Wayne Walton	E. E. Swierc	1944	700	4	Tqc	--	80	1963	T,E	D,S	Cased to 700 ft.
905	Charles Ulcak	Doug Downing	1958	1,900	10,7	Tc	--	44	1958	T,G	Irr, D,S	Casing: 10-in. to 300 ft, 7-in. from 300 to 1,600 ft. Reported discharge 700 gpm. Temp. 90°F.
* 906	Frank Vyvlecka	L. & J. Swierc	1962	333	4	Ts	--	--	--	C,E	D,S	Cased to 333 ft. Slotted from 312 to 333 ft.
907	Humble Oil & Refining Co.	Ormand & Boone	--	1,217	--	Tqc	--	--	--	N	N	Abandoned.

See footnotes at end of table.

Table 8.--Records of wells in Atascosa, Frio, and adjacent counties--Continued

Atascosa County

Well	Owner	Driller	Date completed	Depth of well (ft)	Diameter of well (in.)	Water-bearing unit	Altitude of land-surface (ft)	Water level		Method of lift	Use of water	Remarks
								Below land surface datum (ft)	Date of measurement			
*AL-78-04-908	Joe Vyvlecka well 4	R. A. R. Special	1956	5,005	--	--	475	--	--	--	--	Oil test.
* 05-101	City of Pleasanton	--	1928	1,550	8	Tc	360	+	Apr. 1965	Flows	P,Ind	Former railroad well, now supplies water for ice plant. Temp. 92°F.
102	do	--	--	1,552	6	Tc	360	+96 +71	1929 June 1944	N	N	Former railroad well. Well 244 in Water-Supply Paper 1079-C. Abandoned.
* 103	City of Pleasanton well 1	--	--	815	6,4	Tqc	--	--	--	N	N	Abandoned. Well 262-A in Water-Supply Paper 1079-C. Temp. 82°F.
* 104	City of Pleasanton well 4	--	1954	1,700	10	Tc	--	+	Apr. 1965	Flows T,E,20	P	Used as standby well.
105	City of Pleasanton well 2	Ormand & Boone	1954	814	10	Tqc	--	74	July 1963	T,E, 20	P	Casing: 10-in. to 202 ft, 8-in. from 202 to 814 ft. Slotted from 640 to 800 ft. 140 ft of 4-in. column pipe. Pumping test by Central Power & Light Co., July 1963: 237 gpm at 90 ft pumping level.
106	City of Pleasanton well 3	O. L. Boone	1957	800	10	Tqc	--	79	July 1963	T,E, 20	P	Cased to 800 ft. Slotted from 640 to 800 ft. 170 ft of 6-in. column pipe. Pumping test by Central Power & Light Co., July 1963: 290 gpm at 109 ft pumping level.
107	City of Pleasanton well 5	do	1959	810	10	Tqc	--	89	July 1963	T,E, 30	P	Cased to 810 ft. Slotted from 641 to 810 ft. 300 ft of 6-in. column pipe. Pumping test by Central Power & Light Co., July 1963: 348 gpm at 127 ft pumping level.
* 108	City of Pleasanton well 6	McKinley Drilling Co.	1962	790	10	Tqc	--	42	July 1963	T,E, 40	P	Cased to 790 ft. Slotted from 610 to 790 ft. 300 ft of 6-in. column pipe. Pumping test by Central Power & Light Co., July 1963: 499 gpm at 65 ft pumping level.
109	City of Pleasanton	do	1950	1,688	10,8	Tc	370	--	--	Flows	N	Cased to 1,688 ft. Reported flow in 1950, 800 gpm. Abandoned. Former municipal supply for North Pleasanton.
110	D. B. Lee	--	--	1,300	6,5	Tc	--	+	Apr. 1965	T,E, Flows	D,S	Cased to 1,300 ft.
111	-- Brown	Ormand & Boone	1944	1,180	4	Tc	--	+38.5 +	Aug. 13, 1945 Apr. 1965	Flows, C,E	D,S	Cased to 1,180 ft. Slotted from 1,100 to 1,180 ft. Temp. 89°F.
112	R. E. Berry	O. L. Boone	--	1,200	8	Tc	--	--	--	T,C	Irr	Reported irrigated 100 acres in 1955.
113	-- McKay	Ormand & Boone	1940	1,200	4	Tc	--	+	Apr. 1965	Flows, C,E	D,S	Cased to 1,200 ft. Slotted from 1,170 to 1,200 ft. No irrigation since 1962. Reported irrigated 10 acres in 1955.

See footnotes at end of table.

Table 8.--Records of wells in Atascosa, Frio, and adjacent--Continued

Atascosa County

Well	Owner	Driller	Date completed	Depth of well (ft)	Diameter of well (in.)	Water-bearing unit	Altitude of land-surface (ft)	Water level		Method of lift	Use of water	Remarks
								Below land surface datum (ft)	Date of measurement			
AL-78-05-114	Pat Smith	Ormand & Boone	1955	1,275	10,7	Tc	--	+	Apr. 1965	Flows,	Irr	Casing: 10-in. to 300 ft, 7-in. from 300 to 1,275 ft. Slotted from 1,200 to 1,275 ft. Irrigates 40 acres.
* 115	Joe Amacker	--	1906	208	4	Tqc	--	11.7	Apr. 22, 1965	N	N	Well 243 in Water-Supply Paper 676. Temp. 81°F.
* 116	do	Tom Draper	1932	1,200	4	Tc	380	+40.0 + 8.0	June 5, 1944 Apr. 22, 1965	Flows, C,E	D,S	Well 76 in Water-Supply Paper 1079-C. Texas Water Development Board observation well.
* 117	E. R. Breaker	-- Evans, et al.	1911	1,925	6,4	Tc	412	+80	1929	N	N	Abandoned. Well 241 in Water-Supply Paper 676. Temp. 80°F.
118	Roy Nowell	O. L. Boone	1956	1,200	8	Tc	--	--	--	Flows, T,E, 15	Irr	Cased to 1,200 ft. Irrigates 27 acres.
119	-- York	do	1957	1,100	4,2	Tc	--	+	Apr. 1965	Flows, T,E	D,S	Flows during the winter and spring, but the water level declines about 30 ft during the summer.
201	G. E. Scogin	--	1918	1,429	10	Tc	--	+ 2 6.6 12.6 16.4	1929 July 11, 1950 Sept.27, 1960 Jan. 24, 1964	T,E, 15	Irr	Texas Water Development Board observation well.
202	Guy S. Combs Estate	--	--	--	6	Tqc	--	20.3 27.2	May 10, 1944 Jan. 14, 1955	C,H	D,S	Reported to have flowed until 1934.
203	C. Hierholzer	E. E. Swierc	1955	1,500	12	Tc	--	--	--	T,E	Irr	Cased to 1,500 ft. Reported discharge 800 gpm.
204	M. J. Brauchle Estate	O. L. Boone	1949	1,190	7	Tc	380	2.2	Apr. 22, 1965	T,E, 30	Irr	Cased to 1,190 ft. Irrigates 75 acres.
205	-- Duncan	B. T. Spradley	1909	482	5,4	Tqc	--	+ .4	May 10, 1944	J,G	S	Cased to 482 ft. Well 254 in Water-Supply Paper 676.
206	C. D. Hammons	--	--	400	--	Tqc	--	--	--	Flows	N	Abandoned. Well 87 in Water-Supply Paper 1079-C.
* 207	J. E. Crockett, Jr.	--	--	700	6	Tqc	--	+	Mar. 1965	Flows	Irr, D,S	Well 90 in Water-Supply Paper 1079-C.
* 208	do	--	--	700	6	Tqc	--	+	Mar. 1965	Flows	N	Abandoned. Well 89 in Water-Supply Paper 1079-C. Temp. 77°F.
* 209	A. H. Cockrell	Ormand & Boone	1937	600	6	Tqc	--	+	Mar. 1965	Flows	D,S	Well 88 in Water-Supply Paper 1079-C. Temp. 78°F.
210	Rips Ranch	O. L. Boone	1956	1,800	10,7	Tc	--	+	Apr. 1965	Flows	Irr	Cased to 1,800 ft. Irrigates 50 acres.
211	R. E. Mann	do	1963	1,900	10,8	Tc	--	+	1965	Flows	Irr	Casing: 10-in. to 150 ft, 8-in. from 150 to 1,900 ft. Irrigates 54 acres. Flows 160 gpm on Apr. 20, 1965.

See footnotes at end of table.

Table 8.--Records of wells in Atascosa, Frio, and adjacent counties--Continued

Atascosa County

Well	Owner	Driller	Date completed	Depth of well (ft)	Diameter of well (in.)	Water-bearing unit	Altitude of land-surface (ft)	Water level		Method of lift	Use of water	Remarks
								Below land surface datum (ft)	Date of measurement			
AL-78-05-301	L. J. Wiseman well 1	Jergins of Texas, Ltd.	1955	4,527	--	--	435	--	--	--	--	Oil test.[1]
302	E. H. Marek	--	--	1,200	6	Tqc	--	17.5 17.5	May 10, 1944 July 10, 1957	J,G	D,S	Well 94 in Water-Supply Paper 1079-C.
* 303	J. A. Coughran	George Brown	1912	600	4	Tqc	--	20.3 16.4	May 20, 1944 Mar. 22, 1965	C,E	D,S	Well 100 in Water-Supply Paper 1079-C. Temp. 79°F.
304	Fairview Farms	McKinley Drilling Co.	1958	1,930	16,13, 12	Tc	380	--	--	T,G	Irr	Casing: 16-in. to 300 ft, 13-in. from 300 to 500 ft, and 12-in. from 500 to 1,930 ft. Slotted from 1,600 to 1,930 ft.
305	Henshaw Bros.	--	1963	1,900	10	Tc	--	--	--	Flows, T,E, 50	Irr	Cased to 1,900 ft. Reported to flow during the winter.
* 306	L. D. Brown	W. Brown	--	1,050	6,4	Tqc	--	+ 2.5 9.5	May 10, 1944 Apr. 30, 1965	T,E	D,S, Irr	Well 255 in Water-Supply Paper 1079-C. Texas Water Development Board observation well. Irrigates 20 acres.
* 307	Oscar Kreitz	do	1929	900	6	Tqc	--	+ 9.9	May 10, 1944	J,E	D,S	Well 95 in Water-Supply Paper 1079-C.
* 308	Fairview Farms	--	1938	1,900	6	Tc	410	+53.0	do	C,G	S	Well 101 in Water-Supply Paper 1079-C. Flowed until 1963. Temp. 93°F.
* 309	Mrs. Ola Richardson	--	--	1,100	6	Tqc	--	--	--	C,G	Irr, D,S	Well 93 in Water-Supply Paper 1079-C. Temp. 85°F.
310	E. L. Perry	--	--	925	4	Tqc	--	+ 4.0	May 10, 1944	Cf,E	D,S	Well 92 in Water-Supply Paper 1079-C. Flowed until 1963. Was used for irrigation.
401	Nell Sutton, well 1	Taylor & Brown	1955	7,435	--	--	418	--	--	--	--	Oil test.[1]
402	E. R. Raines	Keeney Well Service	1963	400	7	Tqc	--	20	1963	T,E	Irr	Cased to 308 ft. Slotted from 228 to 308 ft. Open hole from 308 to 400 ft.
403	Fred Yerkes	Armstrong & Horn	--	1,953	7	Tc	438	20	1963	T,E, 7½	S,Irr	Cased to 1,953 ft. Irrigates 20 acres.
404	Milton Hurley	Ormand & Boone	1949	776	8,6	Tqc	--	96	1963	J,E	D,S	Casing: 8-in. to 120 ft, 6-in. from 120 to 776 ft.
* 405	Joe K. Williams	Tom Draper	1930	1,750	5,3	Tc	--	+41.0 3	May 9, 1944 1965	C,E	D,S	Cased to 1,750 ft. Well 86 in Water-Supply Paper 1079-C. Flowed 151 gpm, May 9, 1944. Used for irrigation until 1955. Temp. 95°F.
406	Earl Williams Estate	Ormand & Boone	1946	1,700	8,5	Tc	--	20	1965	T,Ng	Irr	Cased to 1,700 ft. 100 ft of 6-in. column pipe. Irrigates 40 acres. Flowed until summer of 1962.

See footnotes at end of table.

Table 8.--Records of wells in Atascosa, Frio, and adjacent counties--Continued

Atascosa County

Well	Owner	Driller	Date completed	Depth of well (ft)	Diameter of well (in.)	Water-bearing unit	Altitude of land-surface (ft)	Water level		Method of lift	Use of water	Remarks
								Below land surface datum (ft)	Date of measurement			
*AL-78-05-501	S. L. Batchelor	Ormand & Boone	1941	1,943	6,4	Tc	--	+38 20.2 32.3	May 1944 Dec. 20, 1962 Jan. 28, 1965	T,E	D,S	Cased to 1,940 ft. Slotted from 1,837 to 1,940 ft. Used for irrigation until 1953. Texas Water Development Board observation well. Temp. 87°F.
* 502	Rips Ranch	-- Cunningham	1927	1,722	6	Tc	370	+98 +	1927 Apr. 1965	Flows, T,E	D,S	Cased to 1,722 ft. Flowed 650 gpm in 1927, 10 gpm in April 1965. Well 300 in Water-Supply Paper 1079-C. Temp. 96°F.
503	Joe K. Williams	H. & J. Drilling Co.	1955	2,059	10,7	Tc	400	--	--	T,G	Irr	Oil test; converted to water well. Casing: 10-in. to 250 ft, 7-in. from 250 to 2,059 ft. Reported discharge 350 gpm. Irrigates 49 acres.
* 601	-- Dubose	--	--	903	--	Tqc	--	+27.3 +	May 10, 1944 Apr. 1965	Flows	S,Irr	Well 257 in Water-Supply Paper 1079-C. Flowed 96 gpm, May 10, 1944. Temp. 85°F.
602	do	--	--	927	4	Tqc	--	+23.0 +	May 10, 1944 Apr. 1965	Flows	D,S	Well 256 in Water-Supply Paper 1079-C. Flowed 81 gpm, May 10, 1944. Temp. 84°F.
* 603	Henshaw Bros.	--	1915	885	6	Tqc	--	+23.5 +	May 9, 1944 Apr. 1965	Flows	P	Supplies water for 5 houses. Temp. 84°F.
* 604	C. L. Downey	--	1940	1,000	6	Tqc	--	+16.0 +	May 18, 1944 Apr. 1965	Flows	D,S	Cased to 979 ft. Perforated from 919 to 979 ft, open hole from 979 to 1,000 ft. Flowed 24 gpm, May 18, 1944. Well 84 in Water-Supply Paper 1079-C. Temp. 86°F.
605	-- Sanderson	McKinley Drilling Co.	1965	2,120	12,8	Tc	360	+	Mar. 1965	Flows	Irr	Casing: 12-in. to 409 ft, 8-in. from 409 to 2,120 ft. Slotted from 1,870 to 2,120 ft. Cemented from 1,790 ft to surface. Reported flow, 400 gpm, March 1965.
* 606	M. S. Coughran	Geo. Brown	1928	700	4	Tqc	--	+	June 1965	Flows	D,S	Well 97 in Water-Supply Paper 1079-C.
701	Geo. Jasek	--	1930	230	6	Tcm	--	78.8	Nov. 3, 1963	C,W	S	
* 702	Humble Oil & Refining Co.	A. H. Masiran	1942	640	7	Ts	--	20	1942	J,G	Ind	Cased to 638 ft. Oil field supply well. Well 82 in Water-Supply Paper 1079-C.
* 703	M. L. Thompson	Paul Draper	1935	1,500	5	Tqc	--	--	--	N	D,S	Flowed 30 gpm 5 ft above ground level May 18, 1944.
704	Kate Richter well 1	Martin, Shelley, & Thomas	1951	1,903	--	--	383	--	--	--	--	Oil test.1/
* 801	R. D. Quillian	Humble Oil & Refining Co.	1939	2,060	4	Tc	--	+13.8 20	May 18, 1944 1964	N	N	Cased to 2,060 ft. Slotted from 2,020 to 2,060 ft. Well 83 in Water-Supply Paper 1079-C. Abandoned.
* 802	do	do	1945	2,993	9	Tc	--	20	1964	T,E, 10	Irr	Cased to 2,420 ft. Slotted from 2,300 to 2,420 ft. Measured discharge 345 gpm, Apr. 30, 1965. Temp. 103°F.

See footnotes at end of table.

Table 8.--Records of wells in Atascosa, Frio, and adjacent counties--Continued

Atascosa County

Well	Owner	Driller	Date completed	Depth of well (ft)	Diameter of well (in.)	Water-bearing unit	Altitude of land-surface (ft)	Water level		Method of lift	Use of water	Remarks
								Below land surface datum (ft)	Date of measurement			
AL-78-05-803	Raymond Difee	O. L. Boone	1953	2,100	10,8	Tc	370	8.3	Apr. 30, 1965	N	N	Abandoned. Texas Water Development Board observation well.
804	do	McKinley Drilling Co.	1964	2,414	12,8	Tc	--	--	--	T,E, 60	Irr	Casing: 12-in. to 400 ft, 8-in. from 400 to 2,414 ft. Slotted from 2,214 to 2,414 ft. 150 ft of 8-in. column pipe. Irrigates 100 acres.
805	Joseph Courand well B-1	Humble Oil & Refining Co.	1946	7,738	--	--	402	--	--	--	--	Oil test.[1]
901	Butts & Sawyer well 1	Masbacher & Mendell	1956	7,489	--	--	400	--	--	--	--	Do.
* 902	R. W. Dorsey	Ormand & Boone	1948	1,159	--	Tqc	--	+	1964	Flows	N	
06-101	D. D. Heinen well 1	Shell Oil Co., Inc.	1959	5,507	--	--	366	--	--	--	--	Oil test.[1]
102	D. D. Heinen	--	1934	1,495	8	Tc	400	18.2	Apr. 26, 1965	T,E, 15	Irr	Cased to 1,495 ft. Flowed until 1957. 70 ft of 6-in. column pipe. Irrigates 32 acres.
103	Fairview Farms	McKinley Drilling Co.	1958	2,015	10	Tc	--	--	--	T,G	Irr	Cased to 2,015 ft. Slotted from 1,600 to 1,900 ft.
* 201	Edwin Seay	Mike Thierry	1950	2,165	10,6	Tc	--	--	--	T,G, 40	Irr	Casing: 10-in. to 75 ft, 6-in. from 75 to 2,165 ft. Slotted from 2,035 to 2,165 ft. 50 ft of 6-in. column pipe. Flowed 240 gpm, October 1950. Irrigates 250 acres.
202	do	do	1954	2,220	8	Tc	--	+	1965	Flows, T,E, 20	S,Irr	Cased to 2,220 ft. Slotted from 1,980 to 2,220 ft. 80 ft of 6-in. column pipe.
203	R. E. Meyer	W. Brown	--	1,157	6	Tqc	--	+ 7.1 2.0	May 10, 1944 Apr. 26, 1965	T,E, 15	D,S, Irr	Irrigates 50 acres. Well 259 in Water-Supply Paper 1079-C.
204	J. B. Temple well 1	Thomas Bros. & Gilcrease Oil Co.	1953	1,699	--	--	422	--	--	--	--	Oil test.
* 401	M. F. Flores	Ormand & Boone	1943	2,010	6,4,2	Tc	365	62.5	May 10, 1944	Cf,E, 1½	D,S	Casing: 6-in. to 70 ft, 4-in. from 70 to 1,060 ft, and 2-in. from 1,060 to 2,010 ft. Slotted from 1,930 to 2,010 ft. Temp. 102°F.
402	J. E. Allen	O. L. Boone	1962	704	6	Ts	--	+	1965	Flows	S	Cased to 704 ft.
* 403	Ralph Coughran	Geo. Brown	1908	550	4	Ts	--	+	1965	Flows	D,S	Well 99 in Water-Supply Paper 1079-C. Temp. 83°F.
501	Sarah E. Ferry well 1	Lone Star Producing Co.	1950	8,280	--	--	419	--	--	--	--	Oil test.[1]

See footnotes at end of table.

Table 8.--Records of wells in Atascosa, Frio, and adjacent counties--Continued

Atascosa County

Well	Owner	Driller	Date completed	Depth of well (ft)	Diameter of well (in.)	Water-bearing unit	Altitude of land-surface (ft)	Water level		Method of lift	Use of water	Remarks
								Below land surface datum (ft)	Date of measurement			
AL-78-06-502	J. E. Kruse	McKinley Drilling Co.	1956	2,310	10	Tc	--	13	1964	T,G, 40	Irr	Casing: 10-in. to 298 ft, 8-in. from 298 to 2,310 ft. Slotted from 2,010 to 2,310 ft. 60 ft of 8-in. column pipe. Irrigates 90 acres.
503	G. Keeney	Keeney Well Service	1960	2,600	8	Tc	392	16.9	June 23, 1965	T,E, 30	Irr	Cased to 2,600 ft. Slotted from 2,100 to 2,600 ft. 150 ft of 6-in. column pipe. Oil test; converted to water well. Original depth 8,421 ft, plugged back to 2,600 ft in 1964. Irrigates 135 acres.
* 603	-- Billimac	--	1934	--	6	Tqc	--	+	June 1964	Flows	S	Flowed 60 gpm, May 16, 1944. Well 103 in Water-Supply Paper 1079-C.
604	-- Harris, well 1	Farenthold, Pitcarin & Minton	1956	5,364	--	--	364	--	--	--	--	Oil test.[1]
605	Chas. H. Brown well 1	Rowan, Hope & Gill	1952	5,321	--	--	303	--	--	--	--	Do.
701	Nellie Gordon & C. G. Dinsmore well 1	Humble Oil & Refining Co.	1947	8,120	--	--	311	--	--	--	--	Do.
702	E. Korus	--	--	4,000	10	Tc	--	+	1964	Flows	D,Irr	Irrigates 75 acres.
703	M. G. Dinsmore well 1	Pan-Tex Corp.	1951	5,968	--	--	348	--	--	--	--	Oil test.[1]
* 801	E. A. Kinsel	--	1937	1,300	4	Tqc	--	+ 1.0	May 16, 1944	C,W	S	Well 106 in Water-Supply Paper 1079-C. Temp. 85°F.
802	-- Kuykendall	--	1962	3,900	9	Tc	--	+	1965	Flows	S,Irr	Oil test; converted to water well. Cased to 3,900 ft. Slotted from 2,600 to 3,900 ft. Temp. 110°F.
803	R. J. Sechrist	Plymouth Oil Co.	1950	4,700	10	Tc	--	+	1964	Flows, T,G	Irr	Cased to 4,700 ft. Irrigates 65 acres.
* 901	-- Kuykendall	McKinley Drilling Co.	1955	3,195	10,8	Tc	355	+	1965	Flows	D,Irr	Casing: 10-in. to 288 ft, 8-in. from 288 to 3,195 ft. Reported flow, 350 gpm, June 1965. Slotted from 2,595 to 3,195 ft. Temp. 115°F.
902	-- Nieschwitz	do	1963	3,380	12,8	Tc	340	14.6	June 24, 1965	Flows, T,G	Irr	Casing: 12-in. to 301 ft, 8-in. from 301 to 3,380 ft. Slotted from 3,129 to 3,380 ft. Cemented from 3,030 ft to surface.
* 903	-- Kuykendall	Quintant Petroleum Corp.	1962	3,500	10	Tc	336	+	1965	Flows	Irr	Oil test; converted to water well. Slotted from 2,900 to 3,500 ft. Top of Carrizo Sand at 2,580 ft.[1]
904	E. A. Kinsel, well 1	Magnolia Petroleum Co.	1946	2,754	--	--	315	--	--	--	--	Oil test.[1]
905	Sarah Ferry Estate	--	--	3,300	10,8	Tc	--	+	1964	Flows	S	Cased to 3,300 ft.

See footnotes at end of table.

Table 8.--Records of wells in Atascosa, Frio, and adjacent counties--Continued

Atascosa County

Well	Owner	Driller	Date completed	Depth of well (ft)	Diameter of well (in.)	Water-bearing unit	Altitude of land-surface (ft)	Water level		Method of lift	Use of water	Remarks
								Below land surface datum (ft)	Date of measurement			
AL-78-06-906	Guy Smith	J. E. Hillier	1948	3,035	7,5	Tc	--	+	1965	Flows	D,S, Irr	Casing: 7-in. to 400 ft, 5-in. from 400 to 3,035 ft. Irrigates 70 acres.
07-701	-- Nieschwitz	--	--	--	4	--	--	--	--	Flows	S	Well 104 in Water-Supply Paper 1079-C.
702	Guy Smith well 1	Monterey Exploration Co.	1953	6,064	--	--	280	--	--	--	--	Oil test.[y]
703	-- Friesenhahn well 1	Newman Bros., et al	1946	5,738	--	--	331	--	--	--	--	Do.
10-301	Sesario Tijerina well 1	The Texas Co.	1956	5,082	--	--	512	--	--	--	--	Do.
302	Mrs. B. K. Nixon	Humble Oil & Refining Co.	1945	1,550	9	Tc	--	--	--	T,Ng	Irr	Oil test; converted to water well. Cased to 1,550 ft. Irrigates 80 acres.
303	N. H. Nixon	E. H. Cannon	1963	1,770	12,10	Tc	--	87 81.3	July 1963 Apr. 29, 1965	T,E, 75	Irr	Cased to 1,770 ft. 240 ft of 6-in. column pipe. Development test by Peerless Equipment Co., July 1963: 598 gpm at 108 ft pumping level, 1,293 gpm at 155 ft.
304	Humble Oil & Refining Co.	Patterson Drilling Co.	1961	3,500	--	Twi	--	+	1961	Flows, T,E, 10	Ind	Oil field repressure well. 70 ft of 5-in. column pipe. Development test, 1961, Peerless Equipment Co.: 203 gpm flow, 566 gpm at 70 ft pumping level.
305	do	do	1961	3,500	--	Twi	--	+32	Jan. 1961	Flows, T,E, 10	Ind	Slotted from 3,179 to 3,500 ft. 70 ft of 5-in. column pipe. Development test, 1961: 144 gpm flow, 557 gpm at 98 ft pumping level.
601	B. K. Nixon well B-1	Humble Oil & Refining Co.	1948	5,285	--	--	501	--	--	--	--	Oil test.[y]
* 602	The Texas Co.	--	1960	3,710	--	Twi	--	+	1964	Flows	Ind	Oil field repressure well.
603	D. D. Vickers	Byers & Dunwitty	1954	1,840	9,7	Tc	--	84	1964	T,G	Irr	Casing: 9-in. to 200 ft, 7-in. from 200 to 1,840 ft. Oil test; converted to water well. 160 ft of 6-in. column pipe. Irrigates 200 acres.
604	M. M. Davis, well 1	Arnold Well Service	1955	5,449	--	--	428	--	--	--	--	Oil test.[y]
605	Marrs McLean	Kirkwood & Morgan	1947	5,237	--	--	459	--	--	--	--	Do.
901	Milton Davis, well 1	Milam Drilling Co.	1951	6,002	--	--	502	--	--	--	--	Oil test.[y]
* 11-101	Atascosa County Water Control & Improvement District No. 1	Boone & Thierry	1957	1,869	10,8	Tc	--	133	Apr. 1965	T,E,	P	Casing: 10-in. to 510 ft, 8-in. from 510 to 1,869 ft. Slotted from 1,703 to 1,869 ft. 260 ft of column pipe. Reported discharge 1,200 gpm.[y]

See footnotes at end of table.

Table 8.--Records of wells in Atascosa, Frio, and adjacent counties--Continued

Atascosa County

Well	Owner	Driller	Date completed	Depth of well (ft)	Diameter of well (in.)	Water-bearing unit	Altitude of land-surface (ft)	Water level		Method of lift	Use of water	Remarks
								Below land surface datum (ft)	Date of measurement			
AL-78-11-102	G. L. Tullos well 1	Armstrong, Horn & Andrews	1954	5,282	--	--	528	--	--	--	--	Oil test.[1]
103	The Texas Co.	--	1961	2,800	10,7	Twi	--	15	1963	T,E, 5	Ind	Cased to 2,800 ft.
104	Humble Oil & Refining Co.	--	1951	1,715	--	Tc	--	--	--	C,E, 5	N	Slotted from 1,541 to 1,687 ft. Unused.
105	do	--	--	1,520	9	Tc	450	+44.3	May 11, 1944	T,E, 3	S,Ind	Cased to 1,520 ft. Oil test; converted to water well. Perforated from 1,470 to 1,520 ft. Well 117 in Water-Supply Paper 1079-C. Flowed 198 gpm, May 11, 1944.
106	The Texas Co.	O. L. Boone	1948	1,576	--	Tc	--	--	--	J,E	Ind	Perforated from 1,513 to 1,576 ft.
201	Atascosa County Water Control & Improvement District No. 1	J. R. Johnson	1949	1,692	10,8	Tc	--	140	1962	T,E, 50	P	Casing: 10-in. to 200 ft, 8-in from 200 to 1,692 ft. Slotted from 1,520 to 1,692 ft. 240 ft of 6-in. column pipe.[1]
202	Marcelino Orpeza	E. E. Swierc	1956	1,730	10,7	Tc	--	60	1964	T,G	Irr	Casing: 10-in. to 300 ft, 7-in. from 300 to 1,730 ft. Irrigates 80 acres.
203	E. Lujon	Humble Oil & Refining Co.	--	2,600	10	--	--	--	--	T,Ng, 50	Irr	Oil test; converted to water well. Irrigates 40 acres.
204	Humble Oil & Refining Co.	Ormand & Boone	--	325	--	Ts	--	--	--	J,Ng	N	Former oil well drilling rig. Unused.
* 205	do	--	1961	3,575	--	Twi	--	52	Mar. 1961	T,Ng, 10	Ind	Oil field repressure well. Development test, 1961: 176 gpm at 85 ft pumping level, 381 gpm at 130 ft.
* 301	C. T. Miers	Humble Oil & Refining Co.	1951	2,122	9	Tc	--	90.5	Apr. 28, 1965	T,G, 30	Irr	Irrigates 100 acres. Texas Water Development Board observation well. Oil test; converted to water well. Perforated from 1,900 to 2,100 ft.
302	J. L. Dornak	--	1956	1,900	9	Tc	--	35	1964	T,Ng	Irr	Oil test; converted to water well. 150 ft of 6-in. column pipe. Irrigates 70 acres.
303	John Shook	--	1955	2,500	10	Tc	--	35	1964	T,G	Irr	Cased to 2,500 ft. Oil test; converted to water well. Slotted from 1,900 to 2,500 ft. Irrigates 40 acres.
304	S.P.J.S.T. Lodge well 1	Humble Oil & Refining Co.	1946	7,390	--	--	453	--	--	--	--	Oil test.[1]
305	R. B. Whipple	--	1928	842	--	Tqc	--	73.8	Apr. 28, 1965	C,G	S	Well 116 in Water-Supply Paper 1079-C.
401	R. B. Daughtry	McKinley Drilling Co.	1956	2,200	10	Tc	507	--	--	T,E, 100	D,S, Irr	Oil test; converted to water well. 200 ft of 8-in. column pipe. Irrigates 183 acres.

See footnotes at end of table.

Table 8.--Records of wells in Atascosa, Frio, and adjacent counties--Continued

Atascosa County

Well	Owner	Driller	Date completed	Depth of well (ft)	Diameter of well (in.)	Water-bearing unit	Altitude of land-surface (ft)	Water level		Method of lift	Use of water	Remarks
								Below land surface datum (ft)	Date of measurement			
AL-78-11-402	M. M. Davis	--	1956	2,300	10,8	Tc	428	50	1963	T,G	Irr	Cased to 2,300 ft.
403	Humble Oil & Refining Co.	--	--	3,600	--	Twi	--	+92	Aug. 1964	Flows	Ind	Oil test; converted to water well. Oil field repressure well.
404	Bob Hindes	McKinley Drilling Co.	1964	2,047	12	Tc	499	105.5	Apr. 29, 1965	T,G, 218	Irr	Cased to 2,047 ft. Slotted from 1,747 to 2,047 ft. Texas Water Development Board observation well.
501	M. J. Brauchle Estate	do	1958	2,160	10,7	Tc	--	80	Feb. 1958	T,E, 30	Irr	Casing: 10-in. to 350 ft, 7-in. from 350 to 2,160 ft. Development test, 1958, Peerless Equipment Co.: 692 gpm at 153 ft pumping level, 1,000 gpm at 215 ft.
601	G. A. Schroeder well 1	F. V. McCright	1964	2,024	--	--	502	--	--	--	--	Oil test.[1]
602	Esther H. Klingeman well 1	General Crude Oil Co.	1955	6,314	--	--	493	--	--	---	--	Do.
603	do	do	1955	2,500	--	Tc	--	60	Apr. 1958	T,G	Irr	Cased to 2,500 ft. 150 ft of 6-in. column pipe. Development test, 1955, Peerless Equipment Co.: 547 gpm at 110 ft pumping level, 870 gpm at 145 ft.
701	Matt Davis, Jr.	--	1900	304	5	Ts	--	+15 18.9	1930 Apr. 29, 1965	C,W	D,S	Cased to 304 ft. Well 291 in Water-Supply Paper 1079-C.
702	Kuykendall & Hindes	L. & J. Swierc	1963	412	7	Ts	--	--	--	T,E, 30	Irr	Cased to 412 ft. Slotted from 303 to 412 ft. Irrigates 80 acres.
* 801	Allen Hime	--	1955	2,150	12,8	Tc	434	42.7	Apr. 29, 1965	T,G, 102	Irr	Casing: 12-in. to 500 ft, 8-in. from 500 to 1,910 ft. Open hole from 1,910 to 2,150 ft. 210 ft of 8-in. column pipe. Irrigates 225 acres.
802	Allen Hime well 1	Forney & Winn	1952	2,070	--	--	419	--	--	--	--	Oil test.[1]
901	J. House	E. E. Swierc	1956	2,250	8,5	Tc	--	118	1963	T,G	Irr	Casing: 8-in. to 300 ft, 5-in. from 300 to 2,250 ft. Perforated from 1,960 to 2,250 ft. 200 ft of 6-in. column pipe. Irrigates 80 acres.
12-101	Leonard Schorsch	McKinley Drilling Co.	1948	2,119	10,8	Tc	--	80	1964	T,Ng	Irr	Casing: 10-in. to 350 ft, 8-in. from 350 to 2,119 ft. Slotted from 1,839 to 2,119 ft. 145 ft of 8-in. column pipe. Irrigates 132 acres.
102	P. F. Tudyk well 3	J. C. Hawkins	1947	7,412	--	--	472	--	--	--	--	Oil test.[1]
103	C. M. Teague	--	1909	707	5	Tqc	--	4	1943	T,E	D,S	Well 281 in Water-Supply Paper 1079-C.

See footnotes at end of table.

Table 8.--Records of wells in Atascosa, Frio, and adjacent counties--Continued

Atascosa County

Well	Owner	Driller	Date completed	Depth of well (ft)	Diameter of well (in.)	Water-bearing unit	Altitude of land-surface (ft)	Water level		Method of lift	Use of water	Remarks
								Below land surface datum (ft)	Date of measurement			
AL-78-12-104	H. McCollum	--	1929	1,100	6	Tqc	--	--	--	T,E	D	Well 283 in Water-Supply Paper 676.
* 105	Jerome Jasik	--	1913	1,340	6	Tqc	--	2.0 20	May 25, 1944 1965	J,E	D,S	Supplies water for dairy. Flowed until 1946. Well 282 in Water-Supply Paper 676. Temp. 88°F.
* 201	J. J. Vyvlecka	E. E. Swierc	1954	2,075	10,6	Tc	--	+71 9.1	May 1954 Apr. 25, 1965	T,G, 70	Irr	Casing: 10-in. to 200 ft, 6-in. from 200 to 2,075 ft. Flowed 800 gpm May 1954, stopped flowing in spring of 1964. Perforated from 1,925 to 2,075 ft. Irrigates 100 acres. Temp. 98°F.
202	do	L. & J. Swierc	1962	426	7	Ts	--	28.4	Apr. 28, 1965	C,W	S	Cased to 426 ft. Perforated from 384 to 426 ft. 50 ft of 3-in. column pipe.
203	Alfred Steinle	--	1946	1,900	6	Tc	--	20	1963	T,E	Irr	Cased to 1,900 ft. Irrigates 70 acres. Flowed 400 gpm in 1946.
204	Ella Mahoney	Walter Cook	1926	700	4	Tqc	--	12.6	Apr. 28, 1965	C,W	D,S	Reported flowed when completed in 1926.
* 205	do	L. & J. Swierc	1963	459	4	Ts	--	--	--	C,W	S	Cased to 459 ft. Perforated from 417 to 459 ft.
* 301	James Jenkins	E. E. Swierc	1954	2,150	8,5	Tc	--	17 38.5	July 1956 Apr. 28, 1965	T,G	S	Casing: 8-in. to 180 ft, 5-in. from 180 to 2,150 ft. 80 ft of 4-in. column pipe. Reported flowed until 1956. Texas Water Development Board observation well.
302	W. L. Muckleroy	do	1954	2,170	8,5	Tc	--	30	1963	T,G	Irr	Casing: 8-in. to 180 ft, 5-in. from 180 to 2,170 ft. 110 ft of 5-in. column pipe. Irrigates 30 acres. Reported flowed until 1956.
401	E. Sullivan	--	--	1,500	4	Tqc	--	--	--	--	S	Oil test; converted to water well. Well 301 in Water-Supply Paper 676.
501	W. Parker	Keeney Well Service	1963	2,570	10,7	Tc	--	68.5 60.6	Nov. 7, 1963 June 23, 1965	T,G	Irr	Casing: 10-in. to 450 ft, 7-in. from 450 to 2,570 ft.
701	R. J. Berger	--	1956	2,300	10,7	Tc	--	45 65 75.6	1962 1963 June 23, 1965	T,G, 40	Irr	Cased to 2,300 ft. 170 ft of 6-in. column pipe. Irrigates 70 acres. Development test, 1965, Peerless Equipment Co.: 502 gpm at 101 ft pumping level, 880 gpm at 200 ft.
702	Herbert E. Vandiver, well 1	Tynan & Yonker	1953	2,099	--	--	470	--	--	--	--	Oil test.[1]
13-101	Arlie Low	McKinley Drilling Co.	1956	2,600	12,8, 7	Tc	--	+ 4 +	Nov. 1963 May 1965	Flows, T,G	Irr	Casing: 12-in. to 306 ft, 8-in. from 306 to 2,300 ft, 7-in. from 2,300 to 2,600 ft. 100 ft of 8-in. column pipe. Irrigates 130 acres.
201	A. F. Smith well 1	Armstrong & Horn	1955	6,014	--	--	377	--	--	--	--	Oil test.

See footnotes at end of table.

Table 8.--Records of wells in Atascosa, Frio, and adjacent counties--Continued

Atascosa County

Well	Owner	Driller	Date completed	Depth of well (ft)	Diameter of well (in.)	Water-bearing unit	Altitude of land-surface (ft)	Water level		Method of lift	Use of water	Remarks
								Below land surface datum (ft)	Date of measurement			
*AL-78-13-202	A. Smith	W. Stempel	1928	148	4	Ty	--	70 84.2	1930 June 23, 1965	C,W	S	Well 332 in Water-Supply Paper 676.
401	Mrs. -- Peeler	E. E. Swierc	1955	1,740	5	Tqc	--	+	June 1965	Flows	D,S	Formerly used for irrigation.
* 402	C. D. Baldree	-- Schwartz	1917	1,314	6,4	Tqc	--	+	June 1965	Flows	D,S	Was city of Christine municipal well until 1954. Flowed 30 gpm, June 23, 1965. Cased to 1,314 ft. Slotted from 1,280 to 1,314 ft. Flowed 30 gpm, June 23, 1965.
501	E. G. Hendricks	Clyde Ormand	1943	1,325	4	Tqc	--	+	June 1965	Flows	D,S	Well 79 in Water-Supply Paper 1079-C. Temp. 92°F.
* 502	Clyant Smith	--	--	285	4	Ty	--	+	June 1965	Flows	N	Well 80 in Water-Supply Paper 1079-C. Temp. 78°F.
601	Mrs. Janie B. Gray	Geo. Guenther	1962	463	7	Ty	--	+	June 1965	Flows	S	Cased to 463 ft. Slotted from 00 to 463 ft.
* 701	City of Christine	--	1911	956	6,4	Ts Ts	342	+19.5 +	May 25, 1949 June 1965	Flows	S	Well 296 in Water-Supply Paper 676. Temp. 89°F.
* 702	do	E. E. Swierc	1954	1,717	5	Tqc	--	+	June 1965	Flows	P	Cased to 1,717 ft. Slotted from 1,567 to 1,717 ft. Replaced well AL-78-13-402.
901	Campbell & Harrison	--	1906	2,000	8	Tqc	--	+	1964	Flows	S	Well 297 in Water-Supply Paper 676. Temp. 81°F.
14-101	J. D. Harrison	--	--	1,200	6	Tqc	307	+	June 1965	N	S	Flowed 10 gpm, May 16, 1944. Well 302 in Water-Supply Paper 676. Temp. 92°F.
* 102	W. H. Thane	-- Draper	1915	900	--	Tcm	--	+	June 1965	N	D,S	Well 303 in Water-Supply Paper 676. Temp. 91°F.
103	Joe K. Williams	McKinley Drilling Co.	1965	3,053	12,8	Tc	270	+104	Apr. 1965	Flows	Irr	Casing: 12-in. to 325 ft, 8-in. from 325 to 3,047 ft. Slotted from 2,753 to 3,047 ft., open hole from 3,047 to 3,053 ft. Irrigates 155 acres. Flowed 1,187 gpm, Jan. 1965. Temp. 100°F.
104	Joe K. Williams well 1	Tri-Mark & Rexita Oil Co.	1953	2,572	--	--	266	--	--	--	--	Oil test.
201	E. A. Kinsel	--	--	3,300	10	Tc	--	+	1964	Flows, T,G	Irr	Irrigates 150 acres.
202	T. W. Smith	W. Stempel	1929	147	4	Ty	--	39.1	May 16, 1944	C,W	S	Cased to 147 ft. Well 309 in Water-Supply Paper 676.
301	Leroy Alberts	McKinley Drilling Co.	1956	3,455	10,8	Tc	--	+	1965	Flows	D,S, Irr	Casing: 10-in. to 300 ft, 8-in. from 300 to 3,455 ft. Reported flowed 800 gpm, October 1956.
* 401	J. D. Harrison	--	--	1,600	4	Tqc	--	+	1964	Flows	D,S	Cased to 1,600 ft. Flowed 40 gpm, May 16, 1944. Well 113 in Water-Supply Paper 1079-C. Temp. 102°F.

See footnotes at end of table.

Table 8.--Records of wells in Atascosa, Frio, and adjacent counties--Continued

Atascosa County

Well	Owner	Driller	Date completed	Depth of well (ft)	Diameter of well (in.)	Water-bearing unit	Altitude of land-surface (ft)	Water level		Method of lift	Use of water	Remarks
								Below land surface datum (ft)	Date of measurement			
*AL-78-14-402	J. S. Abercrombie	--	--	1,698	10	Tqc	--	+	--	Flows	S	Drilled to 2,938 ft, plugged back to 1,698 ft. Well 298 in Water-Supply Paper 676.
501	A. P. Beshears well 1	Henderson, Coquat, & Longhorn Drilling Co.	--	5,708	--	--	280	--	--	--	--	Oil test.[1]
701	J. D. Harrison	--	1931	3,600	8	Tc	330	+ 40.5	May 25, 1944 1964	Flows	S	Well 114 in Water-Supply Paper 1079-C. Temp. 109°F.
702	do	--	1928	1,600	4	Ts	--	+	1965	Flows	S	Well 326 in Water-Supply Paper 676.
703	J. D. Harrison	--	1931	3,600	6	Tc	--	+	--	Flows	D,S	Well 115 in Water-Supply Paper 1079-C.
* 801	Lower Nueces River Water Supply District, well 5	Layne-Texas Co.	1951	3,992	18,10, 8	Tc	242	+148 +119.9	Apr. 1951 June 22, 1965	Flows	P,S	Casing: 18-in. to 360 ft, 10-in. from 360 to 3,480 ft, and 8-in. from 3,480 to 3,992 ft. Slotted from 3,480 to 3,560 ft; 3,580 to 3,680 ft; 3,730 to 3,790 ft; and 3,930 to 3,990 ft. Used occasionally during summer months.
802	Lower Nueces River Water Supply District, well 7	do	1951	3,663	18,10 8	Tc	234	+184 +133.9	May 1951 June 22, 1965	Flows	P,S	Casing: 18-in. to 360 ft, 10-in. from 360 to 3,250 ft, and 8-in. from 3,250 to 3,663 ft. Slotted from 3,295 to 3,548 ft, and 3,615 to 3,661 ft. Measured flow 1,750 gpm in 1951.
15-101	J. A. Bruner, well 1	Payne & Mead	1947	5,911	--	--	345	--	--	--	--	Oil test.[1]
102	Rosita Campbell well 1	Southern Minerals Corp.	1947	5,898	--	--	303	--	--	--	--	Do.
201	Mattie Corbett well 1	do	1951	6,083	--	--	322	--	--	--	--	Do.
202	E. F. Jendrusch well 1	H. R. Smith, et al.	1948	3,356	--	--	389	--	--	--	--	Oil test.[1]
* 301	Gillring Oil Co.	--	1958	4,800	10,7	Tc	--	90	1958	T,E, 15	Ind	Casing: 10-in. to 1,000 ft, 7-in. from 1,000 to 4,800 ft.
401	L. Brister	W. Stempel	1928	323	4	Ty	--	70.6	May 22, 1965	C,W	D	Well 313 in Water-Supply Paper 676.
501	Ada Tom, well 1	H. R. Smith, et al.	1946	3,678	--	--	400	--	--	--	--	Oil test.[1]
502	-- Urbanczyk well 1	Appell Drilling Co.	1947	3,603	--	--	384	--	--	--	--	Do.
503	Emma Tart, well 1	Gulf Oil Corp.	1961	6,800	--	--	404	--	--	--	--	Do.
* 504	Gulf Oil Co.	Bay City Drilling Co.	1958	4,326	13,9, 7	Tc	--	21 40	Aug. 1963 Apr. 1965	T,E, 15	Ind	Casing: 13-in. to 400 ft, 9-in. from 400 to 3,550 ft, and 7-in. from 3,550 to 4,326 ft. Slotted from 4,020 to 4,326 ft. 113 ft of 6-in. column pipe.

See footnotes at end of table.

Table 8.--Records of wells in Atascosa, Frio, and adjacent counties--Continued

Atascosa County

Well	Owner	Driller	Date completed	Depth of well (ft)	Diameter of well (in.)	Water-bearing unit	Altitude of land-surface (ft)	Water level		Method of lift	Use of water	Remarks
								Below land surface datum (ft)	Date of measurement			
AL-78-15-505	Lone Star Producing Co.	Gulf Oil Co.	--	3,850	13,9	Tc	--	92	Mar. 1965	T,E, 20	Ind	Casing: 13-in. to 1,800 ft, 9-in. from 1,800 to 3,850 ft. Slotted from 3,650 to 3,850 ft. 152 ft of 6-in. column pipe.
* 601	George Wiegang	J. Shafer	1939	185	5	Tj	--	120	1964	C,W	D	Cased to 185 ft. Temp. 77°F.
602	H. Kellner	D. P. Paschal	1923	110	4	Tj	--	--	--	N	N	Abandoned. Well 317 in Water-Supply Paper 676.
603	Herman Richter	T. Moy	1957	500	4	Tj	--	135.9	June 23, 1965	C,E	D,S	Cased to 500 ft. Slotted from 478 to 500 ft.
604	Felix Frenzel well 1	Caroline Hunt Trust Estate	1949	4,506	--	--	400	--	---	--	--	Oil test.[1]
605	-- Weigang, well 1	H. R. Smith, et al.	1946	3,781	--	--	420	--	--	--	--	Do.
701	R. L. Eschenberg well 1	M. G. Perry	1948	6,183	---	--	280	--	--	--	--	Do.
702	Jake Pollack well 1	Appell Drilling Co.	1947	3,560	--	--	355	--	--	--	--	Do.
703	Smith & Mowinkle well 1	Alaska Steamship Co. & Newman Bros.	1948	3,802	--	--	346	--	--	--	--	Do.
704	do	Appell Drilling Co.	1947	3,615	--	--	314	--	--	--	--	Do.
801	Hurt & Tartt well 6	H. R. Smith, et al.	1946	3,790	--	--	433	--	--	--	--	Do.
802	Smith & Mowinkle well 1	do	1947	3,856	--	--	363	--	--	--	--	Do.
803	J. L. Tom, well 1	Appell Drilling Co.	1948	3,974	--	--	373	--	--	--	--	Do.
* 804	Felix Henke	--	--	765	4	Tj	--	--	--	C,W	S	Cased to 765 ft. Well 109 in Water-Supply Paper 1079-C.
901	Hurt & Tartt, well 1	H. R. Smith, et al.	1946	3,928	--	---	445	--	--	--	--	Oil test.[1]
902	Richard Rudolph	Roy Sadler	1962	110	6	Tj	--	--	--	C,W	S	Cased to 110 ft.
* 18-201	Hindes Inc.	W. Cook	--	480	4	Ts	--	.4 3.2	May 11, 1944 Apr. 29, 1965	J,E	D	Cased to 480 ft. Well 287 in Water-Supply Paper 676.
* 202	Atascosa State Bank	--	1915	350	4	Ts	--	+20 3.7	1929 May 11, 1944	C,W	S	Cased to 350 ft. Well 286 in Water-Supply Paper 676.
* 301	Edgar Linkenhoger well 1	McKinley Drilling Co.	1963	2,400	13,8	Tc	--	20	May 1963	T,G	S,Irr	Casing: 13-in. to 400 ft, 8-in. from 400 to 2,400 ft. Slotted from 2,150 to 2,400 ft. Cemented from surface to 2,080 ft. Development test by Peerless Equipment Co., 1963: 1,108 gpm at 91 ft pumping level, 1,421 gpm at 124 ft.

See footnotes at end of table.

Table 8.--Records of wells in Atascosa, Frio, and adjacent counties--Continued

Atascosa County

Well	Owner	Driller	Date completed	Depth of well (ft)	Diameter of well (in.)	Water-bearing unit	Altitude of land-surface (ft)	Water level		Method of lift	Use of water	Remarks
								Below land surface datum (ft)	Date of measurement			
AL-78-18-302	Edgar Linkenhoger well 1	C. Edwards	--	400	4	Ts	--	--	--	J,E	S	Well 288 in Water-Supply Paper 676. Cased to 400 ft.
303	R. Hindes	do	1918	450	4	Ts	--	+20 1.1	1929 Apr. 29, 1965	J,E	D,S	Cased to 450 ft. Well 290 in Water-Supply Paper 676.
304	do	do	1895	445	4	Ts	--	+	Apr. 1965	Flows	S	Cased to 445 ft. Well 289 in Water-Supply Paper 676.
* 601	Edgar Linkenhoger well 2	McKinley Drilling Co.	1964	2,507	12,8	Tc	--	+ 0.5	Apr. 1964	T,G, 125	Irr	Casing: 12-in. to 510 ft, 8-in. from 510 to 2,493 ft. Slotted from 2,150 to 2,250 ft and 2,310 to 2,493 ft. 120 ft of 8-in. column pipe. Development test, 1963, Peerless Equipment Co.: 1,069 gpm at 57 ft pumping level, 1,965 gpm at 160 ft. Temp. 108°F.
602	Edgar Linkenhoger	J. R. Johnson	1965	2,495	16,12, 10	Tc	--	--	--	--	--	Casing: 16-in. to 600 ft, 12-in. from 600 to 1,923 ft, 10-in. from 1,923 to 2,495 ft.
603	Nana D. Newton well 1	Zander, Liston, & Foster	1949	6,400	--	--	451	--	--	--	--	Oil test.[1]
* 19-301	S. W. Berrey	Favor Drilling Co.	1959	1,560	10,7	Tqc	--	50	Aug. 1963	T,E	S	Cased to 1,560 ft. Slotted from 1,260 to 1,560 ft. Temp. 96°F.
302	L. C. Berry, well 2	Ray McDonald & H. & J. Drilling Co.	1957	2,255	--	--	371	--	--	--	--	Oil test.[1]
* 401	Jess McNeal	-- Schrubah	1933	1,012	4	Tqc	--	13.1 22.2	June 3, 1944 Apr. 29, 1965	C,E	S	Cased to 1,012 ft. Well 122 in Water-Supply Paper 1079-C.
* 402	do	do	1933	860	8	Ts	--	+23.5	June 3, 1944	Flows	D,S	Ceased to 860 ft. Well 123 in Water-Supply Paper 1079-C.
701	M. T. Flannagan well 1	Morgan Minerals, et al.	1956	6,788	--	--	373	--	--	--	--	Oil test.[1]
901	H. D. Countiss well 1-A	S. F. Hurlburt	--	5,372	--	--	341	--	--	--	--	Do.
* 20-101	Tom Peeler	J. Hillier	1962	2,794	10,7	Tc	--	92.7	June 23, 1965	T,G, 200	S,Irr	Casing: 10-in. to 400 ft, 7-in. from 400 to 2,794 ft. Slotted from 2,680 to 2,794 ft. 240 ft of 8-in. column pipe.
201	Ruth Hagen Unit well 1	Sun Oil Co.	1959	5,393	--	--	388	--	--	--	--	Oil test.[1]
202	Walter Ernst	O. L. Boone	1959	1,950	8,7	Tqc	--	+	1965	Flows	Irr	Casing: 8-in. to 105 ft, 7-in. from 105 to 1,950 ft. Slotted from 1,750 to 1,950 ft. Measured flow 38 gpm, June 23, 1965.

See footnotes at end of table.

Table 8.--Records of wells in Atascosa, Frio, and adjacent counties--Countinued

Atascosa County

Well	Owner	Driller	Date completed	Depth of well (ft)	Diameter of well (in.)	Water-bearing unit	Altitude of land-surface (ft)	Water level		Method of lift	Use of water	Remarks
								Below land surface datum (ft)	Date of measurement			
AL-78-20-301	Alonzo Peeler	J. Hillier	1964	2,975	10,7	Tc	--	+ 59.4	June 23, 1965	Flows	Irr	Casing: 10-in. to 400 ft, 7-in. from 400 to 2,975 ft. Slotted from 2,800 to 2,975 ft. Irrigates 160 acres.
* 703	Sam Countiss	E. E. Swierc	1955	2,185	8	Tqc	--	+	1965	Flows	D,S	Cased to 2,185 ft. Estimated flow 100 gpm. Temp. 103°F.
21-101	A. M. Peeler well 1	Sun Oil Co.	1948	5,532	--	--	297	--	--	--	--	Oil test.[1]
401	A. B. Peeler well B-1	Thomas Drilling Corp.	--	6,186	--	--	369	--	--	--	--	Oil test.[1]
402	A. B. Peeler well C-1	do	1959	5,889	--	--	282	--	--	--	--	Do.
601	J. S. Abercrombie	--	--	4,400	12	Tc	--	+	1964	Flows	D,S	
902	do	--	--	4,400	10	Tc	--	+	1964	Flows	S	
22-101	Donna Farms, well 2	Don B. Megahan	--	4,005	--	--	380	--	--	--	--	Oil test.[1]
* 201	Lower Nueces River Water Supply District	Layne-Texas Co.	1951	4,015	18,10, 8	Tc	228	+190 +104.6	1951 June 22, 1965	Flows	P	Casing: 18-in. to 361 ft, 10-in. from 361 to 3,517 to 4,015 ft. Slotted from 3,560 to 3,640 ft, 3,690 to 3,760 ft, 3,790 to 3,830 ft, 3,895 to 3,940 ft, and 3,950 to 4,010 ft. Measured flow 1,905 gpm in 1951.
202	do	do	1951	4,132	18,10, 8	Tc	233	+189	Feb. 1951	Flows	P	Casing: 18-in. to 360 ft, 10-in. from 360 to 3,425 ft, and 8-in. from 3,425 to 4,130 ft. Slotted from 3,643 to 3,784 ft, 3,884 to 3,915 ft, 3,930 to 3,950 ft, and 4,020 to 4,128 ft. Measured flow 1,175 gpm Feb. 1951. Supplies city of Campbellton. Temp. 142°F.
301	L. May, well 1	Appell Drilling Co.	1948	3,605	--	--	294	--	--	--	--	Oil test.[1]
601	Phillip Tom, well 1	do	1947	4,019	--	--	248	--	--	--	--	Do.
602	Minnie Lee Tom well 2	Calvin Michelson	1963	6,688	--	--	250	--	--	--	--	Do.
* 23-101	H. R. Smith	--	--	4,200	8	Tc	--	35.4	May 22, 1965	T,E, 10	D,S	Cased to 4,200 ft. 60 ft of 6-in. column pipe. Temp. 143°F.
102	L. Tom	W. Stempel	1927	249	4	Tj	--	135	1929	C,W	S	Cased to 249 ft. Well 328 in Water-Supply Paper 676.
103	do	do	1927	247	4	Tj	--	140	1929	C,W	S	Cased to 247 ft. Well 329 in Water Supply Paper 676.

See footnotes at end of table.

Table 8.--Records of wells in Atascosa, Frio, and adjacent counties--Continued

Atascosa County

Well	Owner	Driller	Date completed	Depth of well (ft)	Diameter of well (in.)	Water-bearing unit	Altitude of land-surface (ft)	Water level		Method of lift	Use of water	Remarks
								Below land surface datum (ft)	Date of measurement			
AL-78-23-104	J. L. Tom, well 1	Southern Minerals Corp.	1946	6,505	--	--	279	--	--	--	--	Oil test.[1]
* 201	H. G. Boening	--	1930	175	5	Tj	--	65	Aug. 1964	C,E	D	
203	-- Ermis	D. P. Paschal	1923	155	4	Tj	--	50	1929	C,W	D,S	Cased to 155 ft.
* 204	H. R. Smith	--	--	4,169	8	Tc	--	+	1965	Flows	S	Cased to 4,169 ft. Estimated flow 75 gpm, June 22, 1965. Well 111 in Water-Supply Paper 1079-C. Temp. 147°F.
205	Smith & Mowinkle well 2	W. H. Appell	1948	4,112	--	--	365	--	--	--	--	Oil test.[1]

Frio County

KB-68-57-101	J. W. Ward	Alfred Mann	1962	203	7	Tc	--	147	Oct. 1962	C,W	S	Cased to 190 ft. Top of Carrizo Sand at 147 ft.
201	C. O. Fargason	E. H. Cannon	1963	237	12	Tc	--	99	May 1963	T,E	Irr	Cased to 237 ft. Slotted from 137 to 237 ft. Gravel-packed. Top of Carrizo Sand at 137 ft. 100 ft of 8-in. column pipe. Development test by Peerless Equipment Co., May 1963: 1,104 gpm at 115 ft pumping level, 1,505 gpm at 122 ft.
202	do	--	1956	150	8	Tc	--	85	Nov. 1963	T,G, 50	Irr	Estimated discharge 500 gpm, Nov. 1963. 140 ft of 6-in. column pipe.
203	Fair Oaks Ranch	L. E. Upton	1952	150	12	Tc	--	82	May 1952	N	N	Replaced by well KB-68-57-506, May 1963. Development test by Peerless Equipment Co., May 1952: 1,084 gpm at 105 ft pumping level, 1,863 gpm at 135 ft. Abandoned 1962.
301	J. E. Ingram	E. H. Cannon	1964	237	12	Tc	--	109	Mar. 1964	T,E, 75	Irr	Cased to 237 ft. Slotted from 100 to 237 ft. Gravel-packed. Top of Carrizo Sand at 100 ft. 140 ft of 8-in. column pipe. Development test by Peerless Equipment Co., Mar. 1964: 1,071 gpm at 127 ft pumping level, 1,875 gpm at 139 ft.
401	R. M. Stevens	C. Brown	1956	343	8	Tc	--	99	1956	T,E, 125	Irr	Cased to 220 ft. Reported discharge 750 gpm, Nov. 1960. Top of Carrizo Sand at 113 ft.
402	G. Casinero	--	1959	260	7	Tc	--	134.3 139.7 148.4 154.3	Nov. 30, 1960 Feb. 12, 1962 Jan. 22, 1964 Feb. 1, 1965	C,E	S	Texas Water Development Board observation well.
403	C. Messec	L. E. Upton	1952	359	7	Tc	--	159	Sept. 1963	T,E, 40	D,Irr	Reported discharge 350 gpm. 180 ft of 4-in. column pipe.
404	D. Ornelas	E. H. Cannon	1956	480	12	Tc	--	111	May 1956	T,G, 100	Irr	190 ft of 8-in. column pipe. Development test by Peerless Equipment Co., May 1956: 1,186 gpm at 175 ft pumping level, 1,751 gpm at 195 ft.

See footnotes at end of table.

Table 8.--Records of wells in Atascosa, Frio, and adjacent counties--Continued

Frio County

Well	Owner	Driller	Date completed	Depth of well (ft)	Diameter of well (in.)	Water-bearing unit	Altitude of land-surface (ft)	Water level		Method of lift	Use of water	Remarks
								Below land surface datum (ft)	Date of measurement			
KB-68-57-405	J. Zimmerman	do	1964	429	13	Tc	--	96	Feb. 1964	T,E, 75	Irr	Cased to 429 ft. Slotted from 229 to 429 ft. Top of Carrizo Sand at 175 ft. 180 ft of 8-in. column pipe. Development test by Peerless Equipment Co., Feb. 1964: 900 gpm at 132 ft pumping level, 1,104 gpm at 142 ft.
406	G. H. Harrison	Favor Drilling Co.	1964	330	12	Tc	--	116	Feb. 1964	T,G	Irr	Cased to 330 ft. Slotted from 217 to 330 ft. Cemented from surface to 212 ft. Top of Carrizo Sand at 192 ft. 140 ft of 8-in. column pipe. Development test by Stewart & Stevenson Services Inc., Feb. 1964: 1,080 gpm at 153 ft pumping level, 1,893 gpm at 168 ft.
407	Floyd Prue	do	1963	390	12	Tc	--	160	Dec. 1963	T,E, 125	Irr	Cased to 321 ft. Slotted from 223 to 321 ft. 230 ft of 8-in. column pipe. Development test by Stewart & Stevenson Services, Inc., Dec. 1963: 1,217 gpm at 185 ft pumping level, 1,613 gpm at 197 ft.
408	R. M. Stevens	do	1964	372	13	Tc	--	130	Mar. 1964	T,E, 125	Irr	Cased to 372 ft. 180 ft of 8-in. column pipe. Development test by Stewart & Stevenson Services Inc., Mar. 1964: 1,230 gpm at 148 ft pumping level, 2,151 gpm at 169 ft.
409	Frank Wall, well 1	C. C. Winn	1956	3,401	--	--	599	--	--	--	--	Oil test.[1]
501	Fair Oaks Ranch	L. E. Upton	1951	150	12	Tc	--	68	Sept. 1951	T,-	Irr	Cased to 150 ft. Top of Carrizo Sand at 98 ft. Development test by Peerless Equipment Co., Sept. 1951: 1,292 gpm at 84 ft pumping level, 1,904 gpm at 102 ft.
502	do	do	1951	150	12	Tc	--	68	Sept. 1951	T,-	Irr	Cased to 150 ft. Top of Carrizo Sand at 98 ft. Development test by Peerless Equipment Co. Sept. 1951: 1,401 gpm at 98 ft pumping level, 1,722 gpm at 101 ft.
503	do	do	1951	150	12	Tc	--	70	Oct. 1951	T,-	Irr	Cased to 150 ft. Top of Carrizo Sand at 100 ft. Development test by Peerless Equipment Co., Oct. 1951: 1,208 gpm at 81 ft pumping level, 1,766 gpm at 101 ft.
504	Fair Oaks Ranch	L. E. Upton	1952	150	12	Tc	--	180	June 1952	T,-	Irr	Development test by Peerless Equipment Co., June 1952: 1,055 gpm at 210 ft pumping level, 2,208 gpm at 220 ft. Temp. 77°F.
505	W. W. Thompson	Thompson Water Well Service	1963	170	4	Tc	--	71	Feb. 1963	--	D	Cased to 170 ft. Slotted from 150 to 170 ft.

See footnotes at end of table.

Table 8.--Records of wells in Atascosa, Frio, and adjacent counties--Continued

Frio County

Well	Owner	Driller	Date completed	Depth of well (ft)	Diameter of well (in.)	Water-bearing unit	Altitude of land-surface (ft)	Water level		Method of lift	Use of water	Remarks
								Below land surface datum (ft)	Date of measurement			
KB-68-57-506	Fair Oaks Ranch	E. H. Cannon	1963	252	16	Tc	--	94	May 1963	T,G, 125	Irr	Cased to 252 ft. Slotted from 80 to 252 ft. Top of Carrizo Sand at 80 ft. 150 ft of 10-in. column pipe. Development test by Peerless Equipment Co., May 1963: 1,093 gpm at 114 ft pumping level, 1,392 gpm at 118 ft.
507	D. Ornelas, well 1	Melba Production Co.	1958	3,197	--	--	605	--	--	--	--	Oil test.
508	Floyd Newman	E. H. Cannon	1964	290	12	Tc	--	87	Oct. 1964	T,E, 60	Irr	Cased to 290 ft. Slotted from 90 to 290 ft. Gravel-packed. 140 ft of 8-in. column pipe. Top of Carrizo Sand at 90 ft. Development test by Peerless Equipment Co., Oct. 1964: 1,148 gpm at 101 ft pumping level, 2,073 gpm at 119 ft.
601	Edward Mann	--	1954	403	--	Tc	--	118	Jan. 1954	T,G, 100	Irr	Top of Carrizo Sand at 229 ft. 160 ft of 8-in. column pipe. Development test by Peerless Equipment Co., Jan. 1954: 1,057 gpm at 138 ft pumping level, 1,850 gpm at 175 ft.
602	J. L. Mikulik	--	1956	550	10	Tc	--	114 143.8	Apr. 1956 Nov. 1, 1963	T,G, 125	Irr	Cased to 550 ft. 160 ft of 8-in. column pipe. Development test by Peerless Equipment Co., Apr. 1956: 1,027 gpm at 139 ft pumping level, 2,010 gpm at 165 ft.
603	Calvin C. Boyd	L. E. Upton	1955	550	12	Tc	--	85	Apr. 1956	T,G, 125	Irr	Cased to 270 ft. Top of Carrizo Sand at 270 ft. 200 ft of 8-in. column pipe. Development test by Peerless Equipment Co., Apr. 1954: 1,027 gpm at 112 ft pumping level, 2,500 gpm at 140 ft.
604	W. C. Wilkinson	Favor Drilling Co.	1962	475	8	Tc	--	170	Oct. 1963	T,E, 30	Irr	Cased to 475 ft. Reported discharge 350 gpm.
605	C. A. Pfeiffer	L. E. Upton	1957	550	12	Tc	--	170	Oct. 1963	T,G, 100	Irr	Cased to 550 ft. Slotted from 450 to 550 ft. 240 ft of 8-in. column pipe.
606	O. F. Brotherman	Smyrl Drilling Co.	1964	380	14	Tc	--	--	--	T,G	Irr	Cased to 380 ft. Slotted from 280 to 380 ft. Reported discharge 1,000 gpm.
607	W. Hadeler	O. L. Boone	1958	480	8	Tc	--	105	1958	T,G	Irr	Cased to 480 ft. Reported discharge 550 gpm.
608	La Mesa Land & Cattle Co. well 1	Kingwood Oil Co.	1944	3,850	--	--	663	--	--	--	--	Oil test.1/
609	H. P. Bradford	L. E. Upton	1962	500	10	Tc	--	--	--	T,E, 75	Irr	Cased to 500 ft.
610	Ernest Weiser	Smyrl Drilling Co.	1964	480	14	Tc	--	130	Feb. 1964	T,G	Irr	Cased to 480 ft. Slotted from 380 to 480 ft. 200 ft of 8-in. column pipe. 1,800 gpm at 158 ft pumping level.

See footnotes at end of table.

Table 8.--Records of wells in Atascosa, Frio, and adjacent counties--Continued

Frio County

Well	Owner	Driller	Date completed	Depth of well (ft)	Diameter of well (in.)	Water-bearing unit	Altitude of land-surface (ft)	Water level		Method of lift	Use of water	Remarks
								Below land surface datum (ft)	Date of measurement			
KB-68-57-611	-- Farber	A. W. Heine	1956	372	8	Tc	--	168	1956	T,G	S,Irr	Cased to 270 ft. Reported discharge 350 gpm. 240 ft of 4-in. column pipe.
612	Aldridge Nursery well 3	L. E. Upton	1962	280	12	Tc	--	205	Sept. 1962	T,E, 60	Irr	Cased to 168 ft. Top of Carrizo Sand at 141 ft. 240 ft of 6-in. column pipe. Development test by Peerless Equipment Co., July 1962: 889 gpm at 235 ft pumping level, 1,186 gpm at 240 ft.
613	Aldridge Nursery well 4	Adcock Pipe & Supply Co.	1963	300	12	Tc	--	163	Dec. 1963	T,E, 40	Irr	Cased to 219 ft. Slotted from 66 to 219 ft. Top of Carrizo Sand at 140 ft. Development test by Peerless Equipment Co., Dec. 1963: 1,013 gpm at 185 ft pumping level, 1,416 gpm at 197 ft.
614	Cox Feed Lot	Rushing Drilling Co.	1962	285	8	Tc	--	145	Nov. 1963	T,E, 7½	S	Cased to 285 ft. Slotted from 265 to 285 ft. Reported discharge 125 gpm.
615	Fair Oaks Ranch	L. E. Upton	1952	150	12	Tc	--	--	--	T,G	Irr	Cased to 150 ft.
616	P. R. Miniel	Favor Drilling Co.	1963	300	12	Tc	--	125 170.3	June 1963 May 22, 1965	T,E, 60	Irr	Cased to 300 ft. Slotted from 120 to 300 ft. Gravel-packed. 190 ft of 6-in. column pipe. Reported discharge 800 gpm.
617	C. C. Tribble well 1	North & Walton	1930	3,554	--	--	--	--	--	--	--	Oil test. Well 26 in Water-Supply Paper 676.
618	E. N. Saddler well 1	Coastal Bend Oil Co.	1956	3,640	--	--	--	--	--	--	--	Oil test.
701	J. E. Berry	N. Graham	1910	720	8	Tc	--	10 31.0 63.1 95.2	1929 July 21, 1949 Jan. 31, 1961 Feb. 1, 1965	N	N	Texas Water Development Board observation well. Well 24 in Water-Supply Paper 676.
702	J. E. Berry	--	--	--	--	Tqc	--	30.4 33.1	July 22, 1952 Apr. 13, 1955	N	N	
* 801	Siebert & Nelms	A. Mann	1926	190	5	Tr	--	41.9	July 21, 1949	C,W	D,S	Cased to 190 ft. Well 25 in Water-Supply Paper 676.
802	M. M. Hitzfelder	--	1935	580	8	Tc	--	53	Apr. 1956	N	N	Unused irrigation well.
803	A. Hitzfelder well 1	Rock Hill Oil Co.	1955	3,625	--	--	599	--	--	--	--	Oil test.1/
804	M. R. Chiles	M. E. Higdon	1957	725	8,7	Tc	--	95 150	Feb. 1957 Sept. 1963	T,Ng, 45	Irr	Casing: 8-in. to 350 ft, 7-in. from 350 ft to 566 ft. 180 ft of 6-in. column pipe. Top of Carrizo Sand at 550 ft.
805	Tate Ranch	do	1963	867	12,8	Tc	--	135	Mar. 1963	T,Ng, --	Irr	Casing: 12-in. to 400 ft, 8-in. from 400 to 600 ft. 170 ft of 8-in. column pipe. Top of Carrizo Sand at 600 ft. Development test by Peerless Equipment Co., Mar. 1963: 1,082 gpm at 140 ft pumping level, 1,685 gpm at 161 ft.

See footnotes at end of table.

Table 8.--Records of wells in Atascosa, Frio, and adjacent counties--Continued

Frio County

Well	Owner	Driller	Date completed	Depth of well (ft)	Diameter of well (in.)	Water-bearing unit	Altitude of land-surface (ft)	Water level		Method of lift	Use of water	Remarks
								Below land surface datum (ft)	Date of measurement			
KB-68-57-901	Aldridge Nursery	L. E. Upton	1956	720	12	Tc	--	128.0 124.1 143.0 155.9	Nov. 29, 1960 Jan. 31, 1961 Feb. 6, 1964 Feb. 1, 1965	T,Ng	Irr	Cased to 360 ft. 175 ft of 8-in. column pipe. Top of Carrizo Sand at 607 ft. Texas Water Development Board observation well.
902	Aldridge Nursery well 1	do	1954	600	--	Tc	--	117	Apr. 1956	T,Ng	Irr	175 ft of 8-in. column pipe. Top of Carrizo Sand at 545 ft.
903	A. E. Willms	do	1955	519	12	Tc	--	105	Feb. 1955	T,G, 60	Irr	Cased to 354 ft. 150 ft of 8-in. column pipe. Top of Carrizo Sand at 335 ft. Development test by Peerless Equipment Co., Feb. 1955: gpm at 145 ft pumping level, 1,802 gpm at 160 ft.
904	Ned & Sam Curtis	Sam Curtis	1960	600	12	Tc	--	100	Nov. 1963	T,G	Irr	Cased to 600 ft. Reported discharge 800 gpm.
905	R. O. Hundley, Jr. well 1	M. E.	1957	671	12	Tc	--	114 123.9	Dec. 1957 Oct. 30, 1963	T,Ng, 100	Irr	Cased to 407 ft. 170 ft of 8-in. column pipe. Casing cemented from surface to 407 ft. Top of Carrizo Sand at 418 ft. Development test by Peerless Equipment Co., Dec. 1957: 1,027 gpm at 127 ft pumping level, 2,314 gpm at 160 ft.
906	R. O. Hundley, Jr. well 2	M. E. Higdon	1957	815	12	Tc	--	108 125	Nov. 1957 Oct. 1963	T,Ng, 100	Irr	Cased to 550 ft. Cemented from surface to 550 ft. 180 ft of 8-in. column pipe. Top of Carrizo Sand at 556 ft. Development test by Peerless Equipment Co., Nov. 1957: 1,027 gpm at 116 ft pumping level, 2,538 gpm at 145 ft.
* 907	M. R. Chiles	do	1956	775	8,7	Tc, Twi	635	95 150	Dec. 1956 Sept. 1963	T,Ng, 45	Irr	Casing: 8-in. to 300 ft, 7-in. from 300 to 550 ft. 180 ft of 6-in. column pipe. Reported discharge 650 gpm. Temp. 80°F.
908	Ned & Sam Curtis	Sam Curtis	1946	300	12	Tc	--	75	Nov. 1963	T,Ng, 60	Irr	Cased to 300 ft. Reported discharge 500 gpm.
909	-- McFarren, well 1	Miller Royalty Co. & C. C. Dauchy	1949	3,138	--	--	592	--	--	--	--	Oil test.[1]
910	M. R. Chiles well 1	M. E. Higdon	1956	750	10,8	Tc	--	90 170	Apr. 1956 July 1964	T,Ng, 75	Irr	Casing: 10-in. to 300 ft, 8-in. from 300 to 550 ft. Reported discharge 700 gpm. 180 ft of 6-in. column pipe.
911	M. R. Chiles well 3	do	1956	855	8,7	Tc	--	95 150	Dec. 1956 Sept. 1963	T,Ng, 45	Irr	Casing: 8-in. to 354 ft, 7-in. from 354 to 654 ft. Reported discharge 600 gpm.
912	M. R. Chiles well 1	Lundells, Inc.	1952	3,037	--	--	592	--	--	--	--	Oil test.
58-201	C. A. Davidson well 1	Theljohn Oil Co.	1954	2,429	--	--	570	--	--	--	--	Oil test.[1]

See footnotes at end of table.

Table 8.--Records of wells in Atascosa, Frio, and adjacent counties--Continued.

Frio County

Well	Owner	Driller	Date completed	Depth of well (ft)	Diameter of well (in.)	Water-bearing unit	Altitude of land-surface (ft)	Water level		Method of lift	Use of water	Remarks
								Below land surface datum (ft)	Date of measurement			
*KB-68-58-401	Thomas & Frazier	--	1919	115	4	Tr	--	100	June 1932	C,W	Ind	Well 29 in Water-Supply Paper 676. Supplied water for boilers for cotton gin. Unused.
402	N. E. Walton	--	1863	55	48	Tr	--	42.7	Sept. 9, 1963	T,E, 1	D	Dug well. Cased to 55 ft.
403	do	E. H. Cannon	1963	300	12	Tc	--	108	Apr. 1963	T,G, 100	Irr	Cased to 300 ft. Slotted from 200 to 300 ft. Gravel-packed. Top of Carrizo Sand at 200 ft. 160 ft of 8-in. column pipe. Development test by Peerless Equipment Co., Apr. 1963: 1,200 gpm at 131 ft pumping level, 1,700 gpm at 145 ft.
404	Leigh Cooney	do	1964	425	12	Tc	--	--	--	T,E, 100	Irr	Cased to 425 ft. Slotted from 225 to 425 ft. Top of Carrizo Sand at 225 ft.
405	D. Parker	Lawrence & Joe Swierc	19611	258	7	Tc	--	81	Nov. 1961	T,E, 314	D	Cased to 238 ft. Slotted from 216 to 238 ft. Reported discharge 15 gpm.
406	E. H. Bruff	Lawrence & Joe Swierc	1962	292	7	Tc	--	81	July 1962	C,W	S	Cased to 292 ft. Slotted from 261 to 292 ft.
407	Church of Christ	Alfred Mann	1962	131	5	Tr	--	85	Dec. 1962	--	P	Cased to 131 ft. Slotted from 112 to 125 ft.
501	Fred I. Parker	E. H. Cannon	1965	352	12	Tc	--	--	--	T,G	Irr	Cased to 352 ft. Slotted from 202 to 352 ft. Top of Carrizo Sand at 190 ft. 140 ft of 8-in. column pipe.
502	do	Alfred Mann	1945	--	4	Tc	--	129	Sept. 1963	T,E	D	
503	Rio Vista Farms	E. H. Cannon	1962	399	10	Tc	--	103	Apr. 1962	T,E, 25	Irr	Cased to 302 ft. Slotted from 262 to 302 ft. Top of Carrizo Sand at 260 ft. 160 ft of 6-in. column pipe. Development test by Peerless Equipment Co., Apr. 1962: 512 gpm at 119 ft pumping level, 989 gpm at 132 ft.
504	do	--	1962	300	6	Tc	--	--	--	T,E, 15	Irr	Cased to 250 ft. Reported discharge 250 gpm. 160 ft of 4-in. column pipe.
505	Rio Vista Farms	E. H. Cannon	1963	474	10	Tc	--	90	Feb. 1963	T,E, 50	Irr	Cased to 400 ft. Slotted from 350 to 400 ft. Top of Carrizo Sand at 350 ft. 130 ft of 6-in. column pipe. Development test by Peerless Equipment Co., Feb. 1963: 508 gpm at 105 ft pumping level, 1,114 gpm at 120 ft.
506	J. E. Ingram	do	1963	636	12	Tc	--	118 121.0 128.9	Mar. 1963 Feb. 10, 1964 Feb. 1, 1965	T,G, 100	Irr	Cased to 550 ft. Slotted from 430 to 550 ft. Top of Carrizo Sand at 430 ft. 150 ft of 8-in. column pipe. Development test by Peerless Equipment Co., Mar. 1963: 1,049 gpm at 147 ft pumping level, 1,650 gpm at 158 ft. Texas Water Development Board observation well.

See footnotes at end of table.

Table 8.--Records of wells in Atascosa, Frio, and adjacent counties--Continued

Frio County

Well	Owner	Driller	Date completed	Depth of well (ft)	Diameter of well (in.)	Water-bearing unit	Altitude of land-surface (ft)	Water level		Method of lift	Use of water	Remarks
								Below land surface datum (ft)	Date of measurement			
KB-68-58-507	Marshall Hays	do	1963	457	12	Tc	--	82	Aug. 1963	T,E, 60	Irr	Cased to 402 ft. Slotted from 250 to 402 ft. Top of Carrizo Sand at 250 ft. 100 ft of 8-in. column pipe. Development test by Peerless Equipment Co., Aug. 1963: 1,025 gpm at 85 ft pumping level, 1,424 gpm at 88 ft.
508	Rio Vista Farms	E. H. Cannon	1964	466	12	Tc	--	97	Feb. 1964	T,E, 50	Irr	Cased to 445 ft. Slotted from 345 to 445 ft. Top of Carrizo Sand at 345 ft. 140 ft of 6-in. column pipe. Development test by Peerless Equipment Co., Feb. 1964: 1,027 gpm at 105 ft pumping level, 1,802 gpm at 114 ft.
509	J. E. Ingram	do	1964	650	12	Tc	--	82	Jan. 1965	T,G, 75	Irr	Cased to 610 ft. Slotted from 460 to 610 ft. Top of Carrizo Sand at 460 ft. 130 ft of 8-in. column pipe. Development test by Peerless Equipment Co., Jan. 1965: 1,148 gpm at 115 ft pumping level, 2,152 gpm at 131 ft.
701	Mrs. Gladys Boyd	do	1962	657	12,10	Tc	--	90 141	Mar. 1962 Sept. 1963	T,G, 90	Irr	Casing: 12-in. to 250 ft, 10-in. from 250 to 657 ft. Slotted from 350 to 657 ft. 170 ft of 8-in. column pipe. Top of Carrizo Sand at 350 ft. Reported discharge 1,000 gpm. Temp. 80°F.
702	B. R. Grimm	L. & J. Swierc	1963	592	10	Tc	--	183	1963	T,E, 75	Irr	Cased to 592 ft. Slotted from 462 to 592 ft. Cemented from surface to 458 ft. Reported discharge 1,082 gpm.
703	G. Davidson, well 1	Sun Oil Co.	1953	3,544	--	--	627	--	--	--	--	Oil test.[1]
801	Miss Ann Burns	M. E. Higdon	--	840	8,7	Tc	--	138.2 138.1 139.1	Nov. 29, 1960 Jan. 31, 1961 Dec. 17, 1962	T,E	S	Cased to 840 ft.
802	Gerardo Santos	O. L. Boone	1952	614	8,5	Tc	--	100	1952	T,G	Irr	Casing: 8-in. to 300 ft, 5-in. from 300 to 614 ft. Reported discharge 1,190 gpm in 1952.
803	Ann Burns	E. E. Swierc	1956	652	8,7	Tc	--	70	Aug. 1956	T,E, 10	S	Casing: 8-in. to 250 ft, 7-in. from 250 to 652 ft. Reported discharge 580 gpm, August 1956.
804	W. E. Dickerson well 1	Wherry & Green	1953	3,262	--	--	635	--	--	--	--	Oil test.[1]
805	-- Burns, well B-17	The Texas Co.	1954	3,587	--	--	609	--	--	--	--	Do.
* 61-901	O. W. Machen well 1	E. H. Cannon	1946	260	11	Tc	--	85.2 98.8 99.4	July 12, 1951 July 14, 1953 Apr. 14, 1955	T,G	Irr	Cased to 260 ft. Slotted from 154 to 260 ft. 220 ft of 8-in. column pipe. Top of Carrizo Sand at 154 ft. Reported discharge 1,500 gpm.
902	O. W. Machen	--	1925	227	5	Tc	--	84 87.1 109.4 120.6	1929 July 12, 1941 Apr. 14, 1955 Jan. 16, 1958	C,W	D,S	Cased to 227 ft. Well 1 in Water-Supply Paper 676.

See footnotes at end of table.

Table 8.--Records of wells in Atascosa, Frio, and adjacent counties--Continued

Frio County

Well	Owner	Driller	Date completed	Depth of well (ft)	Diameter of well (in.)	Water-bearing unit	Altitude of land-surface (ft)	Water level		Method of lift	Use of water	Remarks
								Below land surface datum (ft)	Date of measurement			
KB-69-61-903	O. W. Machen well 2	E. H. Cannon	1962	378	16	Tc	--	155	Mar. 1965	T,G	Irr	Cased to 378 ft. Slotted from 220 to 378 ft. 220 ft of 10-in. column pipe. Top of Carrizo Sand at 220 ft. Reported discharge 2,000 gpm at 200 ft pumping level.
904	O. W. Machen well 3	do	1962	425	16	Tc	--	155	Mar. 1965	T,G	Irr	Cased to 425 ft. Slotted from 200 to 425 ft. 280 ft of 10-in. column pipe. Top of Carrizo Sand at 200 ft. Reported discharge 2,000 gpm.
905	Harold Johnson	-- Hickerson	1960	325	16	Tc	--	132 147	Apr. 1960 May 1965	T,G, 75	Irr	Cased to 325 ft. 180 ft of 8-in. column pipe. Development test by Peerless Equipment Co., Apr. 1960: 1,027 gpm at 149 ft pumping level, 2,135 gpm at 164 ft.
906	J. H. Hiler	E. H. Cannon	1964	338	16	Tc	--	148 145.1	Feb. 1964 May 22, 1965	T,G	Irr	Cased to 338 ft. Slotted from 130 to 338 ft. Top of Carrizo Sand at 130 ft. 220 ft of 10-in. column pipe. Development test by Stewart & Stevenson Services, Inc., Feb. 1964: 1,120 gpm at 162 ft pumping level, 1,960 gpm at 173 ft.
907	R. H. Harris well 1	Wilcox Oil & Gas Co.	1939	4,065	--	--	655	--	--	--	--	Oil test.[1]
908	Tom P. Harris well 7	E. H. Cannon	1965	440	14	Tc	--	--	--	T,E	Irr	Cased to 440 ft. Slotted from 230 to 440 ft. Top of Carrizo Sand at 230 ft. 240 ft of 8-in. column pipe.
909	Tom P. Harris well 8	do	1965	454	14	Tc	--	--	--	T,E	Irr	Cased to 454 ft. Slotted from 345 to 454 ft. Top of Carrizo Sand at 345 ft. 240 ft of 8-in. column pipe.
910	Tom P. Harris well 10	-- Burch	1965	520	14, 12, 10	Tc	--	--	--	T,E	Irr	Cased to 520 ft. 240 ft of 8-in. column pipe.
62-501	J. B. McMahon	--	--	137	6	Tc	--	60 61.0 72.2 88.1	1929 July 20, 1949 Jan. 21, 1957 Feb. 1, 1965	C,W	D,S	Cased to 137 ft. Well 2 in Water-Supply Paper 676. Texas Water Development Board observation well.
502	G. A. Blackaller well 1	Lefevre & Storey	--	--	12	Tc(?)	688	80.6 85.5 91.7	July 12, 1951 July 14, 1953 Apr. 14, 1955	N	N	Well 3 in Water-Supply Paper 676. Drilled to 3,005 ft as an oil test; plugged back and completed as a water well.
503	G. A. Blackaller	--	--	--	6	Tc(?)	--	89.2 100.3 104.0 103.8	July 12, 1951 Jan. 10, 1956 Jan. 21, 1957 Jan. 16, 1958	C,W	S	

See footnotes at end of table.

Table 8.--Records of wells in Atascosa, Frio, and adjacent counties--Continued

Frio County

Well	Owner	Driller	Date completed	Depth of well (ft)	Diameter of well (in.)	Water-bearing unit	Altitude of land-surface (ft)	Water level		Method of lift	Use of water	Remarks
								Below land surface datum (ft)	Date of measurement			
KB-69-62-504	H. D. Harrison, Inc.	E. H. Cannon	1964	393	12	Tc	--	115	Oct. 1964	T,G, 150	Irr	Cased to 393 ft. Slotted from 190 to 393 ft. Top of Carrizo Sand at 190 ft. 240 ft of 8-in. column pipe. Development test by Peerless Equipment Co., Oct. 1964: 1,001 gpm at 136 ft pumping level, 1,303 gpm at 205 ft.
505	-- Ireland, well 1	E. A. Graham	1959	3,184	--	--	660	--	--	--	--	Oil test.[1]
601	J. J. Little	--	--	--	5	Tc	--	100	1929	C,W	S	Well 6 in Water-Supply Paper 676.
602	do	--	--	52	5	Tc	--	41	1929	C,W	D,S	Well 7 in Water-Supply Paper 676.
701	Frio Grain & Cotton Co.	J. R. Johnson	1943	616	10,8	Tc	--	62	Mar. 1943	T,E, 2	D,S	Casing: 10-in. to 110 ft, 8-in. from 110 to 302 ft, and 7-in. from 302 to 616 ft. Slotted from 319 to 429 ft, and from 494 to 520 ft.
702	Frio Grain & Cotton	McKinley Drilling	1951	623	12	Tc	--	95 200	Dec. 1951 Nov. 1963	T,G, 75	Irr	Cased to 425 ft. Slotted from 400 to 425 ft. Top of Carrizo Sand at 400 ft. 320 ft of 8-in. column pipe. Development test, Dec. 1951: 3,200 gpm. Operated at 1,000 gpm.
703	do	E. H. Cannon	1952	645	20, 12	Tc	--	90	Apr. 1956	T,E, 100	Irr	Casing: 20-in. to 480 ft, 12-in. from 480 to 645 ft. Slotted from 420 to 645 ft. Top of Carrizo Sand at 420 ft. 300 ft of 8-in. column pipe.
704	do	do	1954	545	12,10	Tc	--	123	Apr. 1956	T,G	Irr	Casing: 12-in. to 430 ft, 10-in. from 430 to 545 ft. Slotted from 430 to 545 ft. 300 ft of 8-in. column pipe. Top of Carrizo Sand at 430 ft.
705	do	--	1961	650	14	Tc	--	200	Nov. 1963	T,G	Irr	Cased to 650 ft. Reported discharge 1,000 gpm.
706	B. L. Roberts & John M. Barkley	McKinley Drilling Co.	1952	620	12	Tc	--	87.5 93.4 95	Nov. 13, 1953 Oct. 13, 1954 May 1956	T,E, 75	Irr	Cased to 450 ft. Slotted from 400 to 450 ft. Top of Carrizo Sand at 420 ft. Measured discharge 900 gpm at 186 ft pumping level, May 9, 1956. Temp. 78°F.
707	do	E. H. Cannon	1952	590	12	Tc	--	99.5	Aug. 19, 1952	T,E, 50	Irr	Cased to 422 ft. Top of Carrizo Sand at 410 ft. Measured discharge 790 gpm at 221 ft pumping level, May 10, 1956. Temp. 79°F.
708	Tom P. Harris well 1	do	1964	470	14	Tc	--	--	--	T,E, 100	Irr	Cased to 470 ft. Slotted from 274 to 470 ft. Top of Carrizo Sand at 274 ft. 240 ft of 8-in. column pipe.
709	Tom P. Harris well 2	do	1964	472	14	Tc	---	161	Sept. 1964	T,E, 100	Irr	Cased to 472 ft. Slotted from 276 to 470 ft. Top of Carrizo Sand at 276 ft. 240 ft of 8-in. column pipe. Development test, Sept. 1964: 1,693 gpm at 198 ft pumping level.

See footnotes at end of table.

Table 8.--Records of wells in Atascosa, Frio, and adjacent counties--Continued

Frio County

Well	Owner	Driller	Date completed	Depth of well (ft)	Diameter of well (in.)	Water-bearing unit	Altitude of land-surface (ft)	Water level		Method of lift	Use of water	Remarks
								Below land surface datum (ft)	Date of measurement			
KB-69-62-710	Tom P. Harris well 3	E. H. Cannon	1964	472	14	Tc	--	170	Sept. 1964	T,E, 100	Irr	Cased to 472 ft. Slotted from 294 to 472 ft. Top of Carrizo Sand at 294 ft. 240 ft of 8-in. column pipe. Development test, Sept. 1964: 1,560 gpm at 223 ft pumping level.
711	Tom P. Harris well 4	do	1964	413	14	Tc	--	--	--	T,E, 100	Irr	Cased to 413 ft. Slotted from 176 to 413 ft. Top of Carrizo Sand at 176 ft. 240 ft of 8-in. column pipe.
712	Tom P. Harris well 5	do	1964	424	14	Tc	--	--	--	T,E, 100	Irr	Cased to 424 ft. Slotted from 245 to 424 ft. Top of Carrizo Sand at 245 ft. 240 ft of 8-in. column pipe.
713	Tom P. Harris well 6	do	1964	450	14	Tc	--	--	--	T,E, 100	Irr	Cased to 450 ft. Slotted from 262 to 450 ft. Top of Carrizo Sand at 262 ft. 240 ft of 8-in. column pipe.
714	Tom P. Harris well 9	do	1965	502	14	Tc	--	--	--	T,E, 100	Irr	Cased to 502 ft. Slotted from 345 to 502 ft. Top of Carrizo Sand at 345 ft. 240 ft of 8-in. column pipe.
715	Tom P. Harris well 12	do	1965	532	12	Tc	--	--	--	T,E,	Irr	Cased to 532 ft. Slotted from 406 to 532 ft. Top of Carrizo Sand at 406 ft. 240 ft of 8-in. column pipe.
716	Tom P. Harris well 11	do	1965	532	12	Tc	--	--	--	T,E, 100	Irr	Cased to 532 ft. Slotted from 412 to 532 ft. Top of Carrizo Sand at 412 ft. 240 ft of 8-in. column pipe.
717	H. D. Harrison, Inc.	do	1965	462	12	Tc	--	145	Jan. 1965	T,G, 150	Irr	Cased to 462 ft. Slotted from 260 to 462 ft. Top of Carrizo Sand at 260 ft. 280 ft of 8-in. column pipe. Development test by Peerless Equipment Co., Jan. 1965: 1,001 gpm at 178 ft pumping level, 2,096 gpm at 208 ft.
718	Tom P. Harris well 13	do	1965	382	14	Tc	--	145	Mar. 1965	T,E, 100	Irr	Cased to 382 ft. Slotted from 169 to 372 ft. Top of Carrizo Sand at 125 ft. 240 ft of 8-in. column pipe. Development test by Peerless Equipment Co., Mar. 1965: 1,027 gpm at 151 ft pumping level, 2,010 gpm at 177 ft.
719	Tom P. Harris well 14	do	1965	334	14	Tc	--	--	--	T,E, 100	Irr	Cased to 334 ft. Slotted from 183 to 334 ft. Top of Carrizo Sand at 146 ft. 240 ft of 8-in. column pipe.
720	Tom P. Harris well 14	do	1965	442	14	Tc	--	--	--	T,E, 100	Irr	Cased to 442 ft. Slotted from 191 to 430 ft. Top of Carrizo Sand at 170 ft. 240 ft of 8-in. column pipe.
721	Tom P. Harris well 16	do	1965	365	14	Tc	--	--	--	T,E, 100	Irr	Cased to 365 ft. Slotted from 215 to 365 ft. Top of Carrizo Sand at 168 ft. 240 ft of 8-in. column pipe.

See footnotes at end of table.

Table 8.--Records of wells in Atascosa, Frio, and adjacent counties--Continued

Frio County

Well	Owner	Driller	Date completed	Depth of well (ft)	Diameter of well (in.)	Water-bearing unit	Altitude of land-surface (ft)	Water level		Method of lift	Use of water	Remarks
								Below land surface datum (ft)	Date of measurement			
KB-69-62-722	Tom P. Harris well 17	E. H. Cannon	1965	339	14	Tc	--	--	--	T,E, 100	Irr	Cased to 339 ft. Slotted from 178 to 339 ft. Top of Carrizo Sand at 188 ft. 240 ft of 8-in. column pipe.
723	Tom P. Harris well 18	do	1965	400	14	Tc	--	--	--	T,E, 100	Irr	Cased to 400 ft. Slotted from 198 to 400 ft. Top of Carrizo Sand at 229 ft. 240 ft of 8-in. column pipe.
724	Frio Grain & Cotton Co.	J. R. Johnson	1943	160	--	Tc	--	60	Apr. 1943	T,E, 2	S	
725	C. Woodward	--	--	400	6	Tc	--	78	1929	C,W	S	Well 4 in Water-Supply Paper 676.
* 801	Roberts Ranch	--	1909	197	6	Tc	--	48.8 50.3 66.0 61.0	Mar. 3, 1930 July 20, 1949 Jan. 21, 1957 Feb. 13, 1962	N	N	Well 9 in Water-Supply Paper 676. Well replaced in 1962.
802	Dan J. Rheiner	E. H. Cannon	1953	623	12	Tc	--	118	July 1953	T,E, 10	D,S	Cased to 410 ft. Slotted from 345 to 410 ft. Top of Carrizo Sand at 345 ft. Development test by Peerless Equipment Co., July 1953: 1,300 gpm at 161 ft pumping level.
* 803	Roberts Ranch	--	--	208	5	Tr	--	82.0 91.8 101.0 96.9	July 20, 1949 July 22, 1952 Feb. 21, 1957 Jan. 16, 1958	C,W	D,S	
804	do	--	--	208	5	Tc	--	50.9	Mar. 3, 1930	N	N	
901	T. J. Goad well 3	E. H. Cannon	1956	831	12	Tc	--	87	Feb. 1956	T,E, 60	Irr	Cased to 622 ft. Slotted from 472 to 622 ft. Top of Carrizo Sand at 474 ft. Development test by Peerless Equipment Co., Feb. 1956: 1,027 gpm at 117 ft pumping level, 2,314 gpm at 132 ft.
902	T. J. Goad, well 4	E. H. Cannon	1957	717	12	Tc	---	102	Feb. 1957	T,E	Irr	Cased to 550 ft. Slotted from 402 to 550 ft. Top of Carrizo Sand at 391 ft. Development test by Peerless Equipment Co., Feb. 1957: 1,108 gpm at 140 ft pumping level, 1,702 gpm at 150 ft.
63-301	J. W. Ward, well 1	Melvin Rossman	1959	2,226	--	--	673	--	--	--	--	Oil test.
302	A. C. Eschenberg well 1	W. F. Seeger	1959	1,862	--	--	657	--	--	--	---	Do.
401	O. C. Henry, well 1	G. W. Strake	1946	3,614	--	--	686	--	--	--	--	Oil test.[1]
601	H. W. Eschenberg	Alfred Mann	1953	184	10	Tc	--	80 90	1953 Oct. 1964	T,E 60	Irr	Cased to 160 ft. Slotted from 130 to 160 ft. Reported discharge 1,200 gpm.
602	Duke Wilson	do	1952	182	12	Tc	--	60 83	1952 Apr. 1956	T,E 100	Irr	Cased to 75 ft. Development test, 1952: 2,165 gpm. Temp. 76°F.

See footnotes at end of table.

Table 8.--Records of wells in Atascosa, Frio, and adjacent counties--Continued

Frio County

Well	Owner	Driller	Date completed	Depth of well (ft)	Diameter of well (in.)	Water-bearing unit	Altitude of land-surface (ft)	Water level		Method of lift	Use of water	Remarks
								Below land surface datum (ft)	Date of measurement			
KB-69-63-603	Duke Wilson	C. H. Brown	1964	200	12	Tc	--	--	--	T,G	Irr	Cased to 170 ft.
604	Buford Allen	Alfred Mann	1956	233	10	Tc	--	83 105	Apr. 1956 1963	T,E, 40	Irr	Cased to 221 ft. Top of Carrizo Sand at 217 ft.
605	N. A. Brown	E. H. Cannon	1962	300	12	Tc	--	--	--	--	Irr	Cased to 175 ft. Top of Carrizo Sand at 175 ft.
606	N. A. Brown	do	1962	250	8	Tc	--	--	--	--	Irr	Cased to 175 ft. Top of Carrizo Sand at 175 ft.
607	Duke Wilson	C. H. Brown	1964	200	12	Tc	--	--	--	T,G	Irr	Cased to 170 ft.
801	Tom King	E. H. Cannon	1963	638	12	Tc	--	118	Apr. 1963	T,E, 75	Irr	Cased to 638 ft. Slotted from 340 to 638 ft. Top of Carrizo Sand at 340 ft. 200 ft of 8-in. column pipe. Development test by Peerless Equipment Co., Apr. 1963: 1,060 gpm at 145 ft pumping level, 1,256 gpm at 158 ft.
802	C. C. Carter	-- Hankerson	1958	640	16,12	Tc	--	103	Dec. 1958	T,E, 75	Irr	Cased to 640 ft. 200 ft of 8-in. column pipe. Development test by Peerless Development Co., Dec. 1958: 1,027 gpm at 147 ft pumping level, 1,750 gpm at 200 ft.
803	T. J. Goad, well 1	A. T. Jergens & Sons	1953	3,930	--	--	660	--	--	--	--	Oil test.
901	W. H. Cowden	M. E. Higdon	1963	755	12,8	Tc	--	145	Mar. 1965	T,E, 75	Irr	Cased to 755 ft. 230 ft of 8-in. column pipe. Development test by Stewart & Stevenson Services Inc., Nov. 1963: 900 gpm at 190 ft pumping level, 1,383 gpm at 218 ft.
902	Bruce Marek	--	1948	750	16,12	Tc	--	145	Mar. 1965	T,G, E	D, Irr	Cased to 750 ft. Two pumps in well. Domestic supply from submersible pump, 2 horsepower electric motor. 250 ft of 8-in. column pipe. Reported discharge 1,250 gpm.
64-101	-- Hardt	--	1957	284	12	Tc	--	--	--	--	Irr	Cased to 183 ft. Slotted from 53 to 183 ft. Reported discharge 1,277 gpm.
102	do	--	1957	248	12	Tc	--	--	--	--	Irr	Cased to 171 ft. Slotted from 86 to 171 ft. Reported discharge 1,350 gpm.
103	E. J. Gracey	E. H. Cannon	1962	437	12	Tc	--	104	Oct. 1962	T,E, 60	Irr	Cased to 437 ft. Slotted from 220 to 437 ft. Top of Carrizo Sand at 220 ft. 250 ft of 7-in. column pipe. Development test by Peerless Equipment Co., Oct. 1962: 640 gpm at 168 ft pumping level, 1,000 gpm at 225 ft.
401	Calvin Hardt	--	1956	165	12	Tc	--	90.1 100	Dec. 1, 1960 Nov. 1963	T,E, 50	Irr	Cased to 165 ft. Estimated discharge 950 gpm, Dec. 1, 1960.

See footnotes at end of table.

Table 8.--Records of wells in Atascosa, Frio, and adjacent counties--Continued

Frio County

Well	Owner	Driller	Date completed	Depth of well (ft)	Diameter of well (in.)	Water-bearing unit	Altitude of land-surface (ft)	Water level		Method of lift	Use of water	Remarks
								Below land surface datum (ft)	Date of measurement			
KB-69-64-402	Calvin Hardt	--	1958	320	12	Tc	--	98.4 107.4 112.6	Dec. 1, 1960 Jan. 22, 1964 May 22, 1965	T,E, 50	Irr	Cased to 180 ft. Estimated discharge 1,200 gpm, Dec. 1, 1960. Texas Water Development Board observation well.
403	E. E. Brown	-- Brown	--	140	8	Tc	--	100	Nov. 1963	T,G	Irr	Cased to 140 ft. Reported discharge 600 gpm.
404	A. B. Voss	E. H. Cannon	1962	610	10	Tc	--	200	Nov. 1964	T,E, 50	Irr	Cased to 500 ft. Slotted from 400 to 500 ft. Top of Carrizo Sand at 380 ft. Reported discharge 900 gpm.
405	E. J. Gracey	C. H. Brown	1963	450	12	Tc	--	119	Aug. 1963	T,G, 125	Irr	Cased to 450 ft. Slotted from 250 to 450 ft. 140 ft of 8-in. column pipe. Development test by Peerless Equipment Co., Aug. 1963: 1,083 gpm at 140 ft pumping level, 1,497 gpm at 157 ft.
406	Calvin Hardt	E. H. Cannon	1962	345	12	Tc	--	109	Aug. 1962	T,E, 50	Irr	Cased to 345 ft. Slotted from 135 to 345 ft. Top of Carrizo Sand at 135 ft. Development test by Peerless Equipment Co., Aug. 1962: 1,027 gpm at 122 ft pumping level, 1,512 gpm at 131 ft.
407	H. B. Finch, well 1	R. P. Holland & W. L. Scheig	1958	2,444	--	--	611	--	--	--	--	Oil test.
501	L. F. Sirianni	L. E. Upton	1950	357	12	Tc	--	163	Sept. 1950	T,G, 135	Irr	Cased to 357 ft. Reported discharge 1,000 gpm.
502	Otis Jones, well 2	J. C. McCabe	1953	3,312	--	--	686	--	--	--	--	Oil test.
601	-- Hemming	--	1954	509	10	Tc	--	95	Apr. 1956	T,G	N	Cased to 209 ft. Unused irrigation well. Reported discharge 500 gpm.
602	J. W. Winters	A. Doodlestadt	--	--	--	Tc	--	101 102.1 104.6 106.0	1929 July 21, 1949 July 15, 1953 Jan. 15, 1958	C,W	D	Well 19 in Water-Supply Paper 676.
603	J. E. Ingram	E. H. Cannon	1964	480	12	Tc	--	177	Mar. 1964	T,E, 100	Irr	Cased to 402 ft. Slotted from 270 to 402 ft. Top of Carrizo Sand at 270 ft. 200 ft of 8-in. column pipe. Development test by Peerless Equipment Co., Mar. 1964: 1,001 gpm at 185 ft pumping level, 1,802 gpm at 193 ft.
604	Travis McCulloch	Alfred Mann	1962	151	7	Tr	--	95	Dec. 1962	T,E	D	Cased to 151 ft. Slotted from 125 to 145 ft.
605	J. W. Cook	do	1963	323	7,5	Tc	--	143	Feb. 1963	T,E, 3/4	D	Cased to 323 ft. Slotted from 298 to 323 ft.
606	Bettie Ferguson well 1	J. H. Etheridge	1954	2,973	--	--	--	--	--	--	--	Oil test.

See footnotes at end of table.

Table 8.--Records of wells in Atascosa, Frio, and adjacent counties--Continued

Frio County

Well	Owner	Driller	Date completed	Depth of well (ft)	Diameter of well (in.)	Water-bearing unit	Altitude of land-surface (ft)	Water level		Method of lift	Use of water	Remarks
								Below land surface datum (ft)	Date of measurement			
KB-69-64-701	E. J. Gracey	E. H. Cannon	1957	933	8	Tc	--	188	Aug. 1957	T,E, 50	D,S, Irr	Cased to 933 ft. Slotted from 664 to 933 ft. Top of Carrizo Sand at 664 ft. 250 ft of 6-in. column pipe. 950 gpm at 215 ft pumping level.
702	Gracey & Wegenhoff well 1	P. G. Lake, Inc.	1954	3,829	--	--	651	--	--	--	--	Oil test.
801	L. F. Sirianni	-- Wuensch	1954	522	12	Tr, Tc	--	168.0	Apr. 17, 1956	T,G, 135	Irr	Cased to 252 ft. Cemented from surface to 252 ft. Top of Carrizo Sand at 354 ft. Reported discharge 1,120 gpm.
901	W. O. Brown, well 1	Donaldson Oil & Gas Co.	--	2,846	--	--	704	--	--	--	--	Oil test. Well 22 in Water-Supply Paper 676.
77-05-301	M. L. Browne well 1	M. G. Rowe, Jr.	1962	5,013	--	--	--	--	--	--	--	Oil test.[1]
302	M. L. Browne well 1-A	Kirkwood & Alsabrook	1961	4,840	--	--	757	--	--	--	--	Do.
303	Frio Grain & Cotton Co.	Patterson Drilling Co.	1962	800	14	Tc	--	158.8	Nov. 13, 1963	N	N	Unused irrigation well. Top of Carrizo Sand at 450 ft.
601	W. G. Baxter	E. H. Cannon	1951	1,230	12,8	Tc	--	90	May 1951	T,G, 100	N	Casing: 12-in. to 1,000 ft, 8-in. from 1,000 to 1,230 ft. Top of Carrizo Sand at 1,004 ft. Unused irrigation well.
901	Griffith Williams well 1	R. L. Kirkwood	1949	4,265	--	--	601	--	--	--	--	Oil test.[1]
06-101	B. L. Roberts	E. H. Cannon	1955	680	12,10	Tc	--	160	Apr. 1956	T,E, 75	Irr	Casing: 12-in. to 450 ft, 10-in. from 450 to 680 ft. Slotted from 430 to 680 ft. Top of Carrizo Sand at 420 ft. 260 ft of 8-in. column pipe.
102	do	do	1951	605	12,10	Tc	--	98.5 92.6 95.1	Aug. 19, 1952 Nov. 13, 1953 Oct. 13, 1954	N	N	Replaced by well KB-77-06-104, July 1963.
103	do	do	1953	1,115	12,10, 8	Tc	--	120	Apr. 1956	N	N	Casing: 12-in. to 600 ft, 10-in. from 600 to 867 ft, and 8-in. from 867 to 1,115 ft. Slotted from 867 to 1,115 ft. Unused irrigation well. Top of Carrizo Sand at 867 ft.
104	do	do	1963	615	12	Tc	--	192	Nov. 1963	T,G	Irr	Cased to 615 ft. Slotted from 465 to 615 ft. Top of Carrizo Sand at 465 ft.
201	do	do	1951	585	10	Tc	--	96.0 99.5 104.0	Aug. 19, 1952 Feb. 21, 1957 Jan. 16, 1958	T,E, 60	Irr	Cased to 450 ft. Slotted from 410 to 450 ft. Top of Carrizo Sand at 430 ft.

See footnotes at end of table.

Table 8.--Records of wells in Atascosa, Frio, and adjacent counties--Continued

Frio County

Well	Owner	Driller	Date completed	Depth of well (ft)	Diameter of well (in.)	Water-bearing unit	Altitude of land-surface (ft)	Water level		Method of lift	Use of water	Remarks
								Below land surface datum (ft)	Date of measurement			
KB-77-06-301	Mrs. Carrie E. Thompson	McKinley Drilling Co.	1942	816	7,5	Tc	--	96.4 128.3 177.8	Dec. 1, 1960 Jan. 22, 1964 Feb. 1, 1965	T,E, 25	D	Texas Water Development Board observation well.
302	do	do	1952	950	12,10	Tc	--	60	Nov. 1952	T,E, 60	Irr	Top of Carrizo Sand at 720 ft. Measured discharge 732 gpm, June 19, 1962.
303	do	do	1953	941	12,10	Tc	--	60	Jan. 1953	T,E, 75	Irr	Top of Carrizo Sand at 720 ft. Measured discharge 791 gpm, June 19, 1962.
* 304	Roberts Ranch	--	--	--	6	Tr	--	69.5 76.1	July 20, 1949 Nov. 17, 1961	C,W	S	
305	Mrs. Carrie Thompson	E. H. Cannon	1963	950	12	Tc	--	200	Nov. 1963	T,E, 100	Irr	Cased to 950 ft. Slotted from 730 to 950 ft. Top of Carrizo Sand at 730 ft. Reported discharge 1,300 gpm.
306	T. J. Goad, well 5	do	1957	746	8	Tc	--	93	Feb. 1957	T,E, 40	Irr	Cased to 746 ft. Slotted from 400 to 600 ft. Top of Carrizo Sand at 350 ft.
801	Halff & Oppenheimer well 1	C. C. Dunwoody, Jr.	1953	4,023	--	--	--	--	--	--	--	Oil test.[1]
* 07-101	W. B. Waters, Jr.	E. H. Cannon	1964	1,136	12	Tr, Tc	--	132	Apr. 1964	T,E, 100	Irr	Cased to 850 ft. Slotted from 500 to 850 ft. Cemented from surface to 500 ft. Top of Carrizo Sand at 650 ft. 370 ft of 8-in. column pipe. Development test by Peerless Equipment Co., April 1964: 1,104 gpm at 308 ft pumping level, 1,505 gpm at 336 ft. Temp. 83°F.
* 102	do	--	1957	700	8	Tr	--	--	--	T,E, 20	D,S, Irr	Cased to 700 ft. Reported discharge 200 gpm.
* 103	do	--	1943	300	6	Tqc	--	90	Aug. 1964	C,W	S	Cased to 300 ft. Temp. 77°F.
104	F. J. Saddler	--	1957	950	12,10	Tc	--	--	--	N	N	Cased to 800 ft. Unused irrigation well.
105	do	--	1957	950	12,10	Tc	--	--	--	T,E, 125	Irr	Cased to 800 ft. 250 ft of 8-in. column pipe.
106	do	McKinley Drilling Co.	1958	934	12,10	Tc	--	--	--	T,E, 50	Irr	Casing: 12-in. to 392 ft, 10-in. from 392 to 934 ft. 190 ft of 8-in. column pipe.
107	do	L. E. Upton	1956	990	12	Tc	--	--	--	T,E, 50	Irr	Cased to 790 ft. 190 ft of 8-in. column pipe. Reported discharge 1,200 gpm.
108	Karey Yeager	McKinley Drilling	1957	870	12,10	Tc	--	132	Nov. 1963	T,E, 75	Irr	Casing: 12-in. to 490 ft, 10-in. from 490 to 870 ft. Slotted from 660 to 870 ft. 220 ft of 8-in. column pipe. Reported discharge 800 gpm.

See footnotes at end of table.

Table 8.--Records of wells in Atascosa, Frio, and adjacent counties--Continued

Frio County

Well	Owner	Driller	Date completed	Depth of well (ft)	Diameter of well (in.)	Water-bearing unit	Altitude of land-surface (ft)	Water level		Method of lift	Use of water	Remarks
								Below land surface datum (ft)	Date of measurement			
KB-77-07-109	Fleetwood & May	L. E. Upton	1958	990	12	Tc	--	132	Nov. 1963	T,E, 100	Irr	Cased to 780 ft. 220 ft of 8-in. column pipe. Reported discharge 1,000 gpm.
201	do	do	1958	990	12	Tc	--	132	Nov. 1963	T,E, 75	Irr	Cased to 790 ft. 200 ft of 8-in. column pipe. Reported discharge 1,000 gpm.
202	W. T. Cowden well 1	-- Morgan	1958	3,546	--	--	557	--	--	--	--	Oil test.
401	Halff & Oppenheimer well 2	Forest Oil Corp.	1953	3,955	--	--	577	--	--	--	--	Do.
* 501	H & B Farms, well 1	E. H. Cannon	1954	1,300	12,8	Tc	555	122.0 81.3 110.6 123.5	Feb. 20, 1957 Nov. 30, 1960 Dec. 19, 1962 May 21, 1965	T,E, 75	Irr	Casing: 12-in. to 400 ft, 8-in. from 400 to 1,055 ft. Top of Carrizo Sand at 1,040 ft. Measured discharge 900 gpm at 142 ft pumping level, May 9, 1956. Texas Water Development Board observation well. Temp. 90°F.
502	H & B Farms	--	1952	--	12	--	--	58.1 62.5 61.0 58.3	July 22, 1952 Jan. 11, 1956 Jan. 20, 1957 Jan. 16, 1958	T,E, 75	Irr	
503	H & B Farms, well 2	McKinley Drilling Co.	1955	1,380	12,10	Tc	--	--	--	T,E, 75	Irr	Casing: 12-in. to 400 ft, 10-in. from 400 to 1,270 ft. Slotted from 1,150 to 1,270 ft. Measured discharge 1,100 gpm at 146 ft pumping level, May 9, 1956. Temp. 90°F.
504	Halff & Oppenheimer well 4	Forest Oil Corp.	1953	4,060	--	--	547	--	--	--	--	Oil test.
505	W. T. Cowden well 1	Newman Bros. Drilling Co.	1956	3,625	--	--	--	--	--	--	--	Do.
601	Halff & Oppenheimer well 3	Forest Oil Corp.	1953	3,745	--	--	596	--	--	--	--	Do.
701	Halff & Oppenheimer well 1	do	1953	4,532	--	--	571	--	--	--	--	Do.
801	H & B Farms, well 3	McKinley Drilling	1960	1,414	12,10	Tc	539	76.7 67.5 109.4	Nov. 30, 1960 Jan. 31, 1961 Dec. 19, 1962	T,E, 75	Irr	Casing: 12-in. to 500 ft, 10-in. from 500 to 1,354 ft. Slotted from 1,235 to 1,354 ft. Top of Carrizo Sand at 1,250 ft. Reported discharge 1,125 gpm. Texas Water Development Board observation well.
901	Fred Sanders	E. H. Cannon	1954	1,641	12,8	Tc	600	130 128.2 192.4 198.4	Sept. 1954 Jan. 31, 1961 Feb. 6, 1964 Feb. 21, 1965	T,Ng, 200	Irr	Casing: 12-in. to 400 ft, 8-in. from 400 to 1,309 ft. Top of Carrizo Sand at 1,296 ft. 400 ft of 8-in. column pipe. Development test by Peerless Equipment Co., Sept. 1954: 1,027 gpm at 165 ft pumping level, 1,828 gpm at 210 ft. Texas Water Development Board observation well.

See footnotes at end of table.

Table 8.--Records of wells in Atascosa, Frio, and adjacent counties--Continued

Frio County

Well	Owner	Driller	Date completed	Depth of well (ft)	Diameter of well (in.)	Water-bearing unit	Altitude of land-surface (ft)	Water level		Method of lift	Use of water	Remarks
								Below land surface datum (ft)	Date of measurement			
KB-77-07-902	Halff & Oppenheimer	McKinley Drilling Co.	1962	1,610	12,10, 8	Tc	--	168	Feb. 1962	T,E, 125	Irr	Casing: 12-in. to 505 ft, 10-in. from 505 to 1,265 ft, and 8-in. from 1,265 to 1,610 ft. Slotted from 1,065 to 1,610 ft. Cemented from surface to 900 ft. 340 ft of 8-in. column pipe. Development test by Peerless Equipment Co., Feb. 1962: 1,027 gpm at 195 ft pumping level, 1,512 gpm at 213 ft.
903	C. A. Beever	E. H. Cannon	1955	1,385	12,8	Tc	--	113	Jan. 1956	T,Ng, 120	Irr	Casing: 12-in. to 400 ft, 8-in. from 400 to 1,385 ft. Slotted from 1,030 to 1,385 ft. Top of Carrizo Sand at 1,030 ft. Reported discharge 1,000 gpm.
904	Leona Farms	McKinley Drilling Co.	1964	1,725	12,10	Tc	--	187	Dec. 1964	T,E, 150	Irr	Casing: 12-in. to 840 ft, 10-in. from 840 to 1,720 ft. Slotted from 1,470 to 1,720 ft. Cemented from surface to 1,400 ft. Top of Carrizo Sand at 1,330 ft. 320 ft of 8-in. column pipe. Development test by Peerless Equipment Co., Dec. 1964: 1,001 gpm at 211 ft pumping level, 1,900 gpm at 237 ft.
905	Sanders & Beever well 1	Texita Oil Co. & W. L. Dugger	1955	5,510	--	--	581	--	--	--	--	Oil test.
08-101	E. J. Gracey well 1	Pronto Drilling Co. & K & H Operating Co.	1955	3,750	--	--	651	--	--	--	--	Do.
201	A. C. Hardcastle	--	1958	906	5	Tc	700	207.8 208.6 235.5 251.2	Dec. 1, 1960 Feb. 14, 1962 Feb. 6, 1964 Feb. 1, 1965	C,W	D,S	Cased to 900 ft. Slotted from 860 to 900 ft. Texas Water Development Board observation well.
202	G. R. Hastings well 1	Tower Production Co.	1958	3,127	--	--	703	--	--	--	--	Oil test.
301	Frio-Tex Oil & Gas Corp.	-- McKenzie	1957	920	4	Tc	--	75	Feb. 1957	N	N	Reported discharge 100 gpm. Formerly supplied water for drilling rig.
302	-- Berry	G. E. Smith	1938	5,161	--	--	692	--	--	--	--	Oil test.[y]
401	-- Hitzfelder	--	--	--	6	--	--	111.2 106.8 104.1	July 21, 1949 Apr. 13, 1955 Jan. 15, 1958	C,W	D,S	
402	A. E. Hitzfelder	--	--	1,245	--	Tc	665	--	--	N	N	Replaced by well KB-77-08-409, Sept. 1962.

See footnotes at end of table.

Table 8.--Records of wells in Atascosa, Frio, and adjacent counties--Continued

Frio County

Well	Owner	Driller	Date completed	Depth of well (ft)	Diameter of well (in.)	Water-bearing unit	Altitude of land-surface (ft)	Water level		Method of lift	Use of water	Remarks
								Below land surface datum (ft)	Date of measurement			
*KB-77-08-403	Medina Electric Cooperative, Inc.	E. H. Cannon	1959	1,434	20,8	Tc	660	204 200 298 266	June 1959 Feb. 1962 July 1964 Jan. 1965	T,E, 125	Ind	Casing: 20-in. to 1,041 ft, 8-in. from 1,041 to 1,434 ft. Slotted from 1,134 to 1,429 ft. Top of Carrizo Sand at 1,150 ft. 370 ft of 8-in. column pipe. Development test by Layne-Texas Co., June 1959: 1,027 gpm at 224 ft pumping level, 1,921 gpm at 275 ft. Temp. 92°F.
404	do	do	1959	1,408	13,8	Tc	645	191 180	June 1959 Feb. 1962	T,E, 125	Ind	Casing: 13-in. to 1,011 ft, 8-in. from 1,011 to 1,408 ft. Slotted from 1,116 to 1,408 ft. 370 ft of 8-in. column pipe. Development test by Layne-Texas Co., June 1959: 1,027 gpm at 210 ft pumping level, 2,011 gpm at 243 ft.
405	do	do	1959	1,471	13	Tc	636	185	July 1959	N	N	Standby well. Casing slotted from 1,146 to 1,471 ft. Development test by Layne-Texas Co., July 1959: 1,108 gpm at 210 ft pumping level, 1,965 gpm at 235 ft.
406	do	do	1959	1,507	13,8	Tc	643	182 179	July 1959 Feb. 1962	T,E, 125	Ind	Casing: 13-in. to 1,027 ft, 8-in. from 1,027 to 1,507 ft. Perforated from 1,206 to 1,507 ft. 370 ft of 8-in. column pipe. Development test by Layne-Texas Co., July 1959: 1,027 gpm at 199 ft pumping level, 2,011 gpm at 228 ft.
* 407	A. R. Strong	D. Upton	1918	130	8	Tqc	--	78 63.6 69.7 68.6	1929 July 21, 1949 Oct. 4, 1954 Jan. 15, 1958	C,E	Irr	Well 41 in Water-Supply Paper 676. Temp. 76°F.
408	George Uhl	--	--	90	42	Tqc	--	63.4 64.2 68.6 69.2	July 21, 1949 July 22, 1952 May 23, 1955 Jan. 15, 1958	N	Irr	Dug well. Cased to 90 ft.
409	A. E. Hitzfelder	McKinley Drilling Co.	1962	1,443	12,8	Tc	--	--	--	T,G	Irr	Casing: 12-in. to 623 ft, 8-in. from 623 to 1,436 ft. Slotted from 1,151 to 1,436 ft. Cemented from surface to 1,110 ft. Top of Carrizo Sand at 1,180 ft.
601	San Antonio Joint Stock Land Bank, well 1	F. L. & D. M. Thompson	1938	5,687	--	--	610	--	--	--	--	Oil test.[1]
701	F. A. Bredthauer	D. Upton	--	--	8	Tqc	--	48 40.9 38.3	1929 July 12, 1951 Jan. 16, 1958	N	D	Well 72 in Water-Supply Paper 676.
702	do	--	--	120	8	Tqc	--	40.0 40.7	July 12, 1951 Jan. 16, 1958	-,E	D	
703	W. E. Weissinger	J. M. Sorrell	1928	1,337	8	Tc	--	96	1929	N	N	Well 96 in Water-Supply Paper 676.

See footnotes at end of table.

Table 8.--Records of wells in Atascosa, Frio, and adjacent counties--Continued

Frio County

Well	Owner	Driller	Date completed	Depth of well (ft)	Diameter of well (in.)	Water-bearing unit	Altitude of land-surface (ft)	Water level		Method of lift	Use of water	Remarks
								Below land surface datum (ft)	Date of measurement			
*KB-77-08-704	J. L. Hammett	--	--	40	--	Tqc	--	12	June 1932	C,W	D	Well 154-A in Water-Supply Paper 676.
705	W. A. Carter	E. H. Cannon	1964	1,570	13,40	Tc	--	214	Feb. 1964	T,Ng, 200	Irr	Casing: 13-in. to 700 ft, 10-in. from 700 to 1,570 ft. Slotted from 1,290 to 1,570 ft. Top of Carrizo Sand at 1,290 ft. 320 ft of 8-in. column pipe. Development test by Peerless Equipment Co., Jan. 1964: 1,027 gpm at 237 ft pumping level, 1,828 gpm at 258 ft.
706	Manuel L. Trevino	McKinley Drilling Co.	1963	1,533	12,8	Tc	--	205	Dec. 1962	T,E, 125	Irr	Casing: 12-in. to 500 ft, 8-in. from 500 to 1,495 ft. Cemented from surface to 1,190 ft. Slotted from 1,245 to 1,495 ft. Top of Carrizo Sand at 1,240 ft. 300 ft of 8-in. column pipe. Development test by Peerless Equipment Co., Dec. 1962: 1,125 gpm at 233 ft pumping level, 1,725 gpm at 262 ft.
707	Frio Farms	--	--	--	5	Tqc	--	--	--	T,E, 7½	D,S	
* 708	R. W. Brown	E. Braton	1916	110	8	Tqc	--	50	June 1932	T,G	Irr	Well 44 in Water-Supply Paper 676. Temp. 90°F.
709	C. C. Vaughan, Jr.	--	--	600	--	Tqc	--	--	--	T,E, 20	Irr	Reported discharge 500 gpm.
710	Pearsall High School	McKinley & Foster	1938	1,343	10	Tc	--	213.5	June 13, 1962	N	N	Top of Carrizo Sand at 1,200 ft.
711	City of Pearsall	--	1908	1,500	8,6	Tc	620	60	1929	N	N	Well 95 in Water-Supply Paper 676.
* 712	do	Layne-Texas Co.	1926	1,303	16,6	Tc	--	60	1929	N	N	Well 94 in Water-Supply Paper 676. Temp. 92°F.
* 713	do	do	1942	1,302	10,7	Tc	--	88	Oct. 1942	T,E, 40	P	Cased to 1,302 ft. 330 ft of 6-in. column pipe. Temp. 93°F.
* 714	do	McKinley Drilling Co.	1950	1,350	13,8	Tc	--	88 159 235 238	Mar. 1950 July 1954 Aug. 1956 Feb. 1964	T,E,	P	Cased to 1,350 ft. Top of Carrizo Sand at 1,200 ft.
715	do	do	1957	1,392	14,10	Tc	--	210 247.3 247 287	Mar. 1957 Sept.28, 1962 Feb. 1964 Oct. 1964	T,E, 100	P	Casing: 14-in. to 716 ft, 10-in. from 716 to 1,392 ft. Slotted from 1,142 to 1,392 ft. Top of Carrizo Sand at 1,170 ft. 330 ft of 8-in. column pipe. Development test by Peerless Equipment Co., Mar. 1957: 1,001 gpm at 247 ft pumping level, 1,416 gpm at 256 ft. Pumping test, Sept. 28, 1962: 760 gpm at 263 ft pumping level.

See footnotes at end of table.

Table 8.--Records of wells in Atascosa, Frio, and adjacent counties--Continued

Frio County

Well	Owner	Driller	Date completed	Depth of well (ft)	Diameter of well (in.)	Water-bearing unit	Altitude of land-surface (ft)	Water level: Below land surface datum (ft)	Water level: Date of measurement	Method of lift	Use of water	Remarks
KB-77-08-716	City of Pearsall	E. H. Cannon	1963	1,572	14	Tc	--	253 232 240 227	Nov. 1963 Dec. 1964 Jan. 1965 Mar. 1965	T,Ng, 200	P	Cased to 1,572 ft. Slotted from 1,320 to 1,570 ft. Cemented from surface to 1,250 ft. Top of Carrizo Sand at 1,270 ft. 400 ft of 8-in. column pipe. Development test by Peerless Equipment Co., Nov. 1963: 1,037 gpm at 270 ft pumping level, 1,664 gpm at 292 ft.
717	Halff & Oppenheimer well 1	Pronto Drilling Co.	1955	4,399	--	--	618	--	--	--	--	Oil test.
801	G. L. Heiser	McKinley Drilling Co.	1955	1,445	12,10	Tc	663	170 179.9 237.9 266.6	Mar. 1955 Jan. 31, 1961 Feb. 6, 1964 Feb. 1, 1965	T,E, 150	Irr	Casing: 12-in. to 350 ft, 10-in. from 350 to 1,375 ft. Top of Carrizo Sand at 1,210 ft. Development test by Peerless Equipment Co., Mar. 1955: 1,000 gpm at 213 ft pumping level, 1,727 gpm at 235 ft. Texas Water Development Board observation well.
* 802	R. T. Barnhart	--	--	200	5	Tqc	--	50	June 1932	C,W	D	Well 154-C in Water-Supply Paper 676.
803	Cecil Cudd	M. E. Higdon	1956	1,352	8,6	Tc	--	280	Nov. 1963	T,G	Irr	Casing: 8-in. to 500 ft, 6-in. from 500 to 1,200 ft. Slotted from 1,120 to 1,200 ft. Top of Carrizo Sand at 1,126 ft. Reported discharge 500 gpm.
804	Leo Newsom well 1	McKinley Drilling Co.	1955	1,480	12,10	Tc	--	191 281	Oct. 1955 Nov. 1963	T,Ng, 200	Irr	Casing: 12-in. to 400 ft, 10-in. from 400 to 1,420 ft. Slotted from 1,150 to 1,420 ft. Development test by Peerless Equipment Co., Oct. 1955: 1,027 gpm at 205 ft pumping level, 1,750 gpm at 245 ft.
805	-- Cudd, well 1	Newman Bros. Drilling Co. & Alaska Steamship Co.	1949	4,342	--	--	642	--	--	--	--	Oil test.[1]
* 806	E. H. Cannon	E. H. Cannon	1963	1,426	8	Tc	642	306 297 237.0	July 1964 Aug. 1964 May 20, 1965	T,E, 20	D,Ind	Cased to 1,100 ft. Slotted from 1,040 to 1,100 ft. Cemented from surface to 1,000 ft. Reported discharge 132 gpm. Supplies water for distilled water business. Temp. 91°F.
807	L. Padgett, well 1	Jergins Oil Co.	1948	4,318	--	--	638	--	--	--	--	Oil test.[1]
808	E. H. Cannon	E. H. Cannon	1965	720	6	Tqc	--	200.3	May 20, 1965	T,E	D	Cased to 720 ft. Slotted from 680 to 720 ft.
809	Virgil Toalson	do	1964	1,500	10,6	Tc	--	--	--	T,Ng	Irr	Casing: 10-in. to 600 ft, 6-in. from 600 to 1,491 ft. Slotted from 1,188 to 1,491 ft. Slotted from 1,188 to 1,491 ft. Top of Carrizo Sand at 1,160 ft.

See footnotes at end of table.

Table 8.--Records of wells in Atascosa, Frio, and adjacent counties--Continued

Frio County

Well	Owner	Driller	Date completed	Depth of well (ft)	Diameter of well (in.)	Water-bearing unit	Altitude of land-surface (ft)	Water level		Method of lift	Use of water	Remarks
								Below land surface datum (ft)	Date of measurement			
KB-77-08-901	J. M. Riggan well 1	Oil & Gas Properties Management, Inc.	1961	4,130	--	--	614	--	--	--	--	Oil test.[1/]
902	do	McKinley Drilling Co.	1955	1,560	12,10	Tc	--	239	Oct. 1963	T,Ng, 200	Irr	Casing: 12-in. to 400 ft, 10-in. from 400 to 1,560 ft. Slotted from 1,290 to 1,560 ft. Reported discharge 1,000 gpm.
903	do	E. H. Cannon	1964	1,477	12	Tc	--	244	Dec. 1964	T,Ng, 200	Irr	Cased to 1,477 ft. Slotted from 1,277 to 1,477 ft. Top of Carrizo Sand at 1,240 ft. 330 ft of 8-in. column pipe. Development test by Peerless Equipment Co., Dec. 1964: 1,093 gpm at 260 ft pumping level, 1,734 gpm at 276 ft.
904	Leo Newsom, well 1	Martin, Shelly, & Thomas	1951	4,410	--	--	628	--	--	--	--	Oil test.
13-301	J. K. Stark	-- Verdell	1952	1,511	12,8	Tc	--	134.8 133.0 189.4 223.5	Dec. 1, 1960 Feb. 13, 1962 Jan. 22, 1964 Feb. 1, 1965	T,E, 75	Irr	Casing: 12-in. to 948 ft, 8-in. from 948 to 1,511 ft. Slotted from 1,141 to 1,511 ft. Reported discharge 1,200 gpm. Temp. 93°F.
901	Marrs McLean well B-1 Fee	Humble Oil & Refining Co.	1951	4,258	--	--	599	--	--	--	--	Oil test.[1/]
14-101	Hauser Estate well 1-A	-- Skinner et al.	1947	4,563	--	--	610	--	--	--	--	Do.
401	-- Talasek well 1	Humble Oil & Refining Co.	1949	6,701	--	--	581	--	--	--	--	Do.
501	J. H. Calvert well 2	Katz Oil Co., & Lone Star Production Co.	1960	4,147	--	--	549	--	--	--	--	Oil test.
601	Murchison Ranch, Inc., well 6	--	1952	1,450	12	Tc	--	60 102.2 154.2 200.1	Apr. 1956 Feb. 13, 1962 Feb. 10, 1964 Feb. 1, 1965	T,G, 140	Irr	Top of Carrizo Sand at 1,229 ft. Texas Water Development Board observation well.
602	Murchison Ranch, Inc., well 7	E. H. Cannon	1954	1,578	12,10	Tc	--	85	Oct. 1955	T,G, 140	Irr	Casing: 12-in. to 399 ft, 10-in. from 399 to 1,241 ft. Top of Carrizo Sand at 1,240 ft.
603	do	--	1910	1,408	10,8	Tc	--	--	--	N	N	Well 102 in Water-Supply Paper 676. Reported flowed 450 gpm in 1910.
604	Murchison Ranch, Inc., well 1	McKinley Drilling Co.	1953	1,483	12,10	Tc	--	45 97.7	Jan. 1953 Nov. 16, 1960	T,E, 100	Irr	Casing: 12-in. to 351 ft, 10-in. from 351 to 1,318 ft. Top of Carrizo Sand at 1,160 ft. Development test by Peerless Equipment Co., Jan. 1953: 1,027 gpm at 113 ft pumping level, 1,598 gpm at 146 ft.

See footnotes at end of table.

Table 8.--Records of wells in Atascosa, Frio, and adjacent counties--Continued

Frio County

Well	Owner	Driller	Date completed	Depth of well (ft)	Diameter of well (in.)	Water-bearing unit	Altitude of land-surface (ft)	Water level		Method of lift	Use of water	Remarks
								Below land surface datum (ft)	Date of measurement			
KB-77-14-605	Murchison Ranch, Inc., well 2	E. H. Cannon	1954	1,605	12,10	Tc	--	93	Aug. 1954	T,G, 140	Irr	Casing: 12-in. to 385 ft, 10-in. from 385 to 1,323 ft. Top of Carrizo Sand at 1,323 ft. Development test by Peerless Equipment Co., Aug. 1954: 1,027 gpm at 133 ft, pumping level, 1,572 gpm at 150 ft.
606	Murchison Ranch, Inc., well 3	do	1954	1,577	12,10	Tc	--	104	Aug. 1954	T,G, 140	Irr	Casing: 12-in. to 401 ft, 10-in. from 401 to 1,330 ft. Top of Carrizo Sand at 1,330 ft. Development test by Peerless Equipment Co., Aug. 1954: 1,069 gpm at 144 ft, pumping level, 1,482 gpm at 162 ft.
607	Murchison Ranch, Inc., well 4	do	1954	1,610	12,10	Tc	--	93	July 1954	T,G, 140	Irr	Casing: 12-in. to 400 ft, 10-in. from 400 to 1,370 ft.
608	Murchison Ranch, Inc., well 5	do	1954	1,611	12,10	Tc	--	104	Oct. 1955	T,G, 140	Irr	Casing: 12-in. to 405 ft, 10-in. from 405 to 1,438 ft.
701	F. Doering, well 1	Humble Oil & Refining Co.	1948	6,647	--	--	577	--	--	--	--	Oil test.[1]
702	M. McLean, well 1 fee	do	1949	6,829	--	--	578	--	--	--	--	Do.
* 801	R. S. Parks	--	1910	210	5	Ts	--	65	June 1932	C,W	D	Well 152-C in Water-Supply Paper 676.
802	J. H. Calvert well 1	Katz Oil Co. & Lone Star Producing Co.	1958	10,993	--	--	552	--	--	--	--	Oil test.[1]
803	do	--	1962	1,625	8	Tc	--	--	--	T,Ng, 100	Irr	Cased to 1,625 ft. Slotted from 1,350 to 1,625 ft.
804	Rex Shuptrine well 1	Massingill & Howeth	1949	6,705	--	--	533	--	--	--	--	Oil test.[1]
805	do	E. H. Cannon	1964	1,653	12	Tc	--	247	Nov. 1964	T,Ng, 200	Irr	Cased to 1,653 ft. Slotted from 1,403 to 1,653 ft. Top of Carrizo Sand at 1,290 ft. 380 ft of 8-in. column pipe. Development test by Peerless Equipment Co., Nov. 1964: 1,049 gpm at 289 ft pumping level, 1,854 gpm at 329 ft.
* 901	Divot School	--	--	200	--	Ts	--	--	--	N	N	
902	J. F. Burdwell	W. P. Alley	1928	173	6	Ts	--	71	June 1932	C,W	D	
903	J. H. King	E. H. Cannon	1955	1,672	12,10	Tc	--	135	July 1955	T,E, 100	Irr	Casing: 12-in. to 413 ft, 10-in. from 413 to 1,672 ft. Slotted from 1,516 to 1,662 ft. Top of Carrizo Sand at 1,345 ft. Test, July 1955: 1,037 gpm at 163 ft pumping level, 1,303 gpm at 175 ft.

See footnotes at end of table.

Table 8.--Records of wells in Atascosa, Frio, and adjacent counties--Continued

Frio County

Well	Owner	Driller	Date completed	Depth of well (ft)	Diameter of well (in.)	Water-bearing unit	Altitude of land-surface (ft)	Water level		Method of lift	Use of water	Remarks
								Below land surface datum (ft)	Date of measurement			
KB-77-14-904	R. C. Kiefer	A. A. Wuensch	1956	1,628	12,8	Tc	--	110	Feb. 1956	T,G	Irr	Casing: 12-in. to 400 ft, 8-in. from 400 to 1,404 ft. Top of Carrizo Sand at 1,290 ft. Reported discharge 618 gpm at 174 ft pumping level, Feb. 1956.
* 905	C. W. Hearrell	--	1921	180	--	Tqc	--	--	--	N	N	Abandoned.
906	Maury King	McKinley Drilling Co.	1942	1,608	8	Tc	--	--	--	T,E, 20	Irr	Cased to 1,608 ft. Reported flowed in 1942.
907	Arthur Kiefer	E. H. Cannon	1955	1,728	12,10	Tc	--	90 193.0	July 1955 Apr. 18, 1956	T,G, 140	Irr	Casing: 12-in. to 430 ft, 10-in. from 430 to 1,673 ft. Slotted from 1,388 to 1,673 ft. Top of Carrizo Sand at 1,388 ft. Test, Apr. 1956: 1,040 gpm at 195 ft pumping level, 1,312 gpm at 200 ft.
201	W. S. Cude	Gulf Coast Drilling Co.	1912	1,419	6	Tc	--	+1.0	1929	N	N	Well 100 in Water-Supply Paper 676. Temp. 98°F.
202	Halff & Oppenheimer well 1	Gulfton Oil Co.	1955	5,311	--	--	504	--	--	--	--	Oil test.
* 301	Wilbur Toalson	--	--	1,350	8	Tc	--	270	Nov. 1963	T,-	Irr	Well 97 in Water-Supply Paper 676. Reported discharge 700 gpm.
302	J. N. Long	J. N. Long	1909	1,324	8	Tc	--	9 28.3 66.6	1929 July 11, 1951 Jan. 11, 1956	N	N	Well 99 in Water-Supply Paper 676.
303	Halff & Oppenheimer	--	1905	1,473	8,4	Tc	539	14	1929	C,W	S	Well 98 in Water-Supply Paper 676. Reported flowed from 1905 to 1915. Temp. 96°F.
304	Manual C. Trevino	E. H. Cannon	1963	1,460	13,10	Tc	--	126	Jan. 1963	T,G, 135	Irr	Casing: 13-in. to 607 ft, 10-in. from 607 to 1,460 ft. Top of Carrizo Sand at 1,210 ft. 270 ft of 8-in. column pipe. Development test by Peerless Equipment Co., Jan. 1963: 1,071 gpm at 187 ft pumping level, 1,576 gpm at 206 ft.
305	-- Melms, well 1	Amerada Petroleum Co.	1937	3,887	--	--	555	--	--	---	--	Oil test.[1]
306	Halff & Oppenheimer well 1	Howeth & Mason	1952	3,928	--	--	548	--	--	--	--	Oil test.
401	C. A. Miller well 1	Hawkins, Nichols, & Henshaw	1948	5,484	--	--	610	--	--	--	--	Oil test.[1]
402	Cory & McWilliams well 2	do	1948	5,616	--	--	587	--	--	--	--	Do.

See footnotes at end of table.

Table 8.--Records of wells in Atascosa, Frio, and adjacent counties--Continued

Frio County

Well	Owner	Driller	Date completed	Depth of well (ft)	Diameter of well (in.)	Water-bearing unit	Altitude of land-surface (ft)	Water level		Method of lift	Use of water	Remarks
								Below land surface datum (ft)	Date of measurement			
KB-77-15-501	A. M. Michael well 4	Midstates Oil Corp.	1949	5,716	--	--	496	--	--	--	--	Oil test.[1]
601	W. E. Beall	E. H. Cannon	1954	1,760	12,8	Tc	507	90 69.3 126.5 140.5	Aug. 1954 Feb. 10, 1961 Dec. 17, 1962 Feb. 10, 1964	T,E, 100	Irr	Cased to 1,230 ft. Top of Carrizo Sand at 1,230 ft. Development test by Peerless Equipment Co., Aug. 1954: 1,240 gpm at 106 ft pumping level, 1,930 gpm at 146 ft. Texas Water Development Board observation well.
* 602	do	--	1914	1,672	10,6	Tc	--	+ 25 8	June 1932 Apr. 1956	T,E, 60	Irr	Casing: 10-in. to 260 ft, 6-in. from 260 to 1,210 ft. Top of Carrizo Sand at 1,210 ft.
603	L. M. Josey, Inc.	E. H. Cannon	1953	1,650	12,8	Tc	--	95	Apr. 1956	T,E, 125	Irr	Cased to 1,350 ft. Top of Carrizo Sand at 1,350 ft.
604	-- Cude, well 1	Carr Oil Co.	1954	5,421	--	--	531	--	--	--	--	Oil test.[1]
605	Jose Siller	E. H. Cannon	1963	1,700	13,8	Tc	--	181	Mar. 1963	T,E, 150	Irr	Casing: 13-in. to 500 ft, 8-in. from 500 to 1,700 ft. Slotted from 1,350 to 1,700 ft. Top of Carrizo Sand at 1,350 ft. 400 ft of 8-in. column pipe. Development test by Peerless Equipment Co., Mar. 1963: 1,025 gpm at 246 ft, 1,424 gpm at 272 ft.
606	A. Malone	--	1911	1,540	8	Tc	533	10	1929	N	N	Formerly an irrigation well. Reported flowed until 1928. Temp. 98°F.
607	do	--	--	1,515	8,7	Tc	553	178.3	May 19, 1965	N	Irr	Unused irrigation well. Casing: 8-in. to 500 ft, 7-in. from 500 to 1,515 ft. Slotted from 1,215 to 1,515 ft.
701	J. L. Evans	--	--	1,525	8	Tc	--	50	Apr. 1956	T,G, 60	Irr	Cased to 1,300 ft. Top of Carrizo Sand at 1,300 ft.
702	do	--	--	1,520	10,8	Tc	--	60	Apr. 1956	T,E, 100	Irr	Casing: 10-in. to 300 ft, 8-in. from 300 to 1,310 ft. Top of Carrizo Sand at 1,310 ft.
703	Josey Ranch	McKinley Drilling Co.	1943	1,755	10	Tc	--	--	--	T,G	Irr	Cased to 1,755 ft. Top of Carrizo Sand at 1,230 ft. Reported flowed 1,490 gpm, Jan. 1943.
704	do	do	1942	1,687	10	Tc	--	--	--	T,G	Irr	Cased to 1,687 ft. Top of Carrizo Sand at 1,300 ft. Reported flowed 1,290 gpm, Dec. 1942.
705	J. H. King	do	1964	1,650	13,10	Tc	--	180	Feb. 1964	T,E, 150	Irr	Casing: 13-in. to 750 ft, 10-in. from 750 to 1,627 ft. Slotted from 1,377 to 1,627 ft. Cemented from surface to 1,368 ft. 320 ft of 8-in. column pipe. Development test by Peerless Equipment Co., Feb. 1964: 1,027 gpm at 207 ft pumping level, 1,623 gpm at 229 ft.

See footnotes at end of table.

Table 8.--Records of wells in Atascosa, Frio, and adjacent counties--Continued

Frio County

Well	Owner	Driller	Date completed	Depth of well (ft)	Diameter of well (in.)	Water-bearing unit	Altitude of land-surface (ft)	Water level		Method of lift	Use of water	Remarks
								Below land surface datum (ft)	Date of measurement			
*KB-77-15-706	F. J. Avant	McKinley Drilling Co.	1963	1,622	13	Tc	493	198 224.0	Sept. 1963 Aug. 26, 1965	T,Ng, 200	Irr	Cased to 1,601 ft. Slotted from 1,300 to 1,601 ft. Cemented from surface to 1,230 ft. Top of Carrizo Sand at 1,290 ft. 320 ft of 8-in. colum column pipe. Development test by Peerless Equipment Co., Sept. 1963: 1,060 gpm at 217 ft pumping level, 1,457 gpm at 253 ft.
801	J. W. Talley	Hugh Ward	1918	1,750	8,6	Tc	--	+ 28	1929	T,E	D	Well 106 in Water-Supply Paper 676. Formerly an irrigation well. Reported flow 800 gpm in 1929. Temp. 98°F.
802	Gouger-McCarrick Co., well 2	McKinley Drilling Co.	1964	1,700	12,10	Tc	472	148	Apr. 1964	T,Ng, 200	Irr	Casing: 12-in. to 600 ft, 10-in. from 600 to 1,691 ft. Cemented from surface to 1,391 ft. Slotted from 1,430 to 1,690 ft. 250 ft of 8-in. column pipe. Development test by Peerless Equipment Co., Apr. 1964: 1,001 gpm at 167 ft pumping level, 1,693 gpm at 186 ft.
803	Gouger & McCarrick well 3	do	1964	1,685	12,10	Tc	470	145	May 1964	T,Ng, 200	Irr	Casing: 12-in. to 610 ft, 10-in. from 610 to 1,658 ft. Cemented from surface to 1,321 ft. Slotted from 1,407 to 1,658 ft. Development test by Peerless Equipment Co., May 1964: 1,104 gpm at 177 ft pumping level, 1,591 gpm at 198 ft.
* 901	H. Bennett	--	--	285	7	Tqc	--	45	June 1932	C,W	D	Well 152-A in Water-Supply Paper 676.
* 902	H. J. Hardcastle, Jr.	--	1940	200	--	Tqc	--	--	--	N	N	
* 903	do	--	1940	277	--	Tqc	--	--	--	C,W	D	Cased to 200 ft.
904	S. L. Bennett, Sr. well 2	McKinley Drilling Co.	1955	1,867	12,10	Tc	--	--	--	T,G, 220	Irr	Casing: 12-in. to 411 ft, 10-in. from 411 to 1,867 ft. Slotted from 1,590 to 1,867 ft. 330 ft of 8-in. column pipe. Reported discharge 2,000 gpm, May 1955.
* 905	John Bennett	-- Dodd	1917	1,700	10,8	Tc	--	10	June 1932	T,Ng	N	Unused irrigation well. Well 109 in Water-Supply Paper 676. Reported flow 890 gpm in 1932.
906	do	W. E. Smith	1910	306	6	Tqc	--	71	1929	C,E	D	Well 153 in Water-Supply Paper 676.
907	Campbell Mills	--	1914	1,761	8,6	Tc	495	+ 16	1929	T,E	S	Formerly an irrigation well. Well 107 in Water-Supply Paper 676. Well flowed until 1948.
908	J. Thompson	--	1913	1,760	8,6	Tc	---	+ 12	1929	T,E	Irr	Well 108 in Water-Supply Paper 676.

See footnotes at end of table.

Table 8.--Records of wells in Atascosa, Frio, and adjacent counties--Continued

Frio County

Well	Owner	Driller	Date completed	Depth of well (ft)	Diameter of well (in.)	Water-bearing unit	Altitude of land-surface (ft)	Water level		Method of lift	Use of water	Remarks
								Below land surface datum (ft)	Date of measurement			
KB-77-16-101	C. C. Vaughan	E. H. Cannon	1963	1,283	12,8	Tr, Tc	--	214	Dec. 1963	T,G	Irr	Casing: 12-in. to 753 ft, 8-in. from 753 to 1,270 ft. Slotted from 600 to 700 ft, and from 1,120 to 1,270 ft. Top of Carrizo Sand at 1,000 ft. Development test by Peerless Equipment Co., Dec. 1963: 1,013 gpm at 237 ft pumping level, 1,854 gpm at 259 ft.
* 102	C. McKinley	D. Upton	1926	242	6	Tqc	--	99	June 1932	C,W	D	Well 148 in Water-Supply Paper 686.
103	C. A. Beever	E. H. Cannon	1955	1,492	12,8	Tc	--	--	--	T,Ng	Irr	Casing: 12-in. to 500 ft, 8-in. from 500 to 1,135 ft. Slotted from 1,105 to 1,135 ft. Top of Carrizo Sand at 1,020 ft.
104	Mrs. Mary Holmes	do	1962	1,620	12,8	Tc	--	--	--	T,E, 125	Irr	Casing: 12-in. to 415 ft, 8-in. from 415 to 1,620 ft. Slotted from 1,290 to 1,620 ft. Top of Carrizo Sand at 1,290 ft.
105	T. J. Gilliam well 2	Wiegand Bros.	1946	4,358	--	--	572	--	--	--	--	Oil test.[1]
106	J. H. Woodward well 1	Drilling & Exploration Co.	1954	5,544	--	--	608	--	--	--	--	Oil test.
201	Hubert Toalson	E. H. Cannon	1955	1,647	12,10	Tc	652	175 195.8 255.0 295.3	Jan. 1955 Jan. 31, 1961 Feb. 6, 1964 Feb. 2, 1965	N	N	Casing: 12-in. to 382 ft, 10-in. from 382 to 1,581 ft. Slotted from 1,481 to 1,581 ft. Top of Carrizo Sand at 1,241 ft. Texas Water Development Board observation well. Irrigation well unused.
202	Frank Carter	do	1954	1,607	12,8, 7	Tc	--	185	Apr. 1956	T,Ng, 150	Irr	Casing: 12-in. to 402 ft, 8-in. from 402 to 1,309 ft, and 7-in. from 1,309 to 1,607 ft. 400 ft of 8-in. column pipe. Top of Carrizo Sand at 1,309 ft.
203	J. H. Mann	A. A. Wuensch	1956	1,650	12,10	Tc	--	260	Nov. 1963	T,E, 125	Irr	Casing: 12-in. to 400 ft, 10-in. from 400 to 1,650 ft.
204	G. F. Toalson well 1	Sun Oil Co.	1948	4,799	--	--	712	--	--	--	--	Oil test.[1]
205	Hubert Toalson	E. H. Cannon	1964	1,570	12,10	Tc	--	296	Jan. 1964	T,E, 150	Irr	Casing: 12-in. to 800 ft, 10-in. from 800 to 1,570 ft. Slotted from 1,370 to 1,570 ft. Top of Carrizo Sand at 1,150 ft. 400 ft of 8-in. column pipe. Development test by Peerless Equipment Co., Jan. 1964: 1,001 gpm at 324 ft pumping level, 1,591 gpm at 340 ft.
206	Howard Shelton	E. H. Cannon	1964	1,695	12,10	Tc	--	243	Jan. 1963	T,G, 200	Irr	Cased to 1,695 ft. Slotted from 1,360 to 1,695 ft. Top of Carrizo Sand at 1,360 ft. 330 ft of 8-in. column pipe. Development test by Peerless Equipment Co., Dec. 1963: 1,125 gpm at 276 ft pumping level, 1,729 gpm at 301 ft.

See footnotes at end of table.

Table 8.--Records of wells in Atascosa, Frio, and adjacent counties--Continued

Frio County

Well	Owner	Driller	Date completed	Depth of well (ft)	Diameter of well (in.)	Water-bearing unit	Altitude of land-surface (ft)	Water level		Method of lift	Use of water	Remarks
								Below land surface datum (ft)	Date of measurement			
*KB-77-16-401	Clyde T. McKinley	McKinley Drilling Co.	1950	1,507	10,7	Tc	--	85	Feb. 1955	T,E, 2	D	Casing: 10-in. to 200 ft, 7-in. from 200 to 1,507 ft. Slotted from 1,307 to 1,507 ft. Temp. 89°F.
402	Pat Morris	E. H. Cannon	1954	1,670	12,8	Tc	--	50	Mar. 1954	T,E, 100	Irr	Casing: 12-in. to 304 ft, 8-in. from 304 to 1,404 ft. Slotted from 1,350 to 1,404 ft. Top of Carrizo Sand at 1,350 ft. Development test by Peerless Equipment Co., Mar. 1954: 1,027 gpm at 100 ft pumping level, 1,850 gpm at 172 ft.
* 403	W. J. Watkins	--	1912	228	6	Tqc	--	58	June 1932	C,W	D,S	Well 146 in Water-Supply Paper 676.
* 404	Clyde T. McKinley	McKinley Drilling Co.	1955	1,625	12,10	Tc	--	90 230	Apr. 1956 Nov. 1963	T,E, 125	Irr	Casing: 12-in. to 540 ft, 10-in. from 540 to 1,625 ft. Slotted from 1,355 to 1,625 ft. 320 ft of 8-in. column pipe. Temp. 92°F.
405	Clyde Vaughan, Jr.	A. A. Wuensch	1956	--	12	Tc	--	--	--	T,E, 125	Irr	350 ft of 8-in. column pipe.
406	H. Woodward	E. H. Cannon	1964	1,540	12,10	Tc	--	213	Jan. 1964	T,Ng, 225	Irr	Casing: 12-in. to 803 ft, 10-in. from 803 to 1,540 ft. Slotted from 1,241 to 1,540 ft. Top of Carrizo Sand at 1,241 ft. 350 ft of 8-in. column pipe. Development test by Peerless Equipment Co., Jan. 1964: 1,001 gpm at 243 ft pumping level, 1,875 gpm at 270 ft.
407	W. W. McKinley	McKinley Drilling Co.	1964	1,870	12	Tc	--	239	Oct. 1964	T,G, 200	Irr	Cased to 1,870 ft. Slotted from 1,570 to 1,870 ft. Top of Carrizo Sand at 1,480 ft. 400 ft of 8-in. column pipe. Development test by Peerless Equipment Co., Oct. 1964: 1,027 gpm at 269 ft pumping level, 1,512 gpm at 290 ft.
501	H. F. Stacy	E. H. Cannon	1955	1,665	12,10	Tc	--	--	--	T,E, 125	Irr	Casing: 12-in. to 380 ft, 10-in. from 380 to 1,450 ft. Slotted from 1,450 to 1,665 ft. Top of Carrizo Sand at 1,450 ft. Reported discharge 1,000 gpm.
* 502	W. W. McKinley	McKinley Drilling Co.	1956	1,725	12,10	Tc	--	126 250	Mar. 1956 Nov. 1963	T,E, 125	Irr	Casing: 12-in. to 414 ft, 10-in. from 414 to 1,725 ft. Slotted from 1,459 to 1,725 ft. 400 ft of 8-in. column pipe. Development test by Peerless Equipment Co., Mar. 1956: 1,027 gpm at 150 ft pumping level, 1,942 gpm at 190 ft. Temp. 96°F.
503	W. W. McKinley well 1	O. W. Killiam	1953	4,914	--	--	559	--	--	--	--	Oil test.
504	Frank Carter well 1	C. G. Dunwoody, Jr.	1953	4,640	--	--	560	--	--	--	--	Do.
601	Irma Mills, well 1	Producers Corp. of Nevada	1954	4,842	--	--	673	--	--	--	--	Oil test.[1]

See footnotes at end of table.

Table 8.--Records of wells in Atascosa, Frio, and adjacent counties--Continued

Frio County

Well	Owner	Driller	Date completed	Depth of well (ft)	Diameter of well (in.)	Water-bearing unit	Altitude of land-surface (ft)	Water level		Method of lift	Use of water	Remarks
								Below land surface datum (ft)	Date of measurement			
KB-77-16-602	John G. Kain	McKinley Drilling Co.	1955	1,740	12,10	Tc	--	270	Nov. 1963	T,Ng	Irr	Casing: 12-in. to 420 ft, 10-in. from 420 to 1,740 ft. Slotted from 1,475 to 1,740 ft.
603	J. H. Woodward	E. H. Cannon	1963	1,785	13,10	Tc	640	250	Feb. 1963	T,Ng, 225	Irr	Casing: 13-in. to 600 ft, 10-in. from 600 to 1,785 ft. Slotted from 1,585 to 1,785 ft. Top of Carrizo Sand at 1,585 ft. Development test by Peerless Equipment Co., Feb. 1963: 1,049 gpm at 287 ft pumping level, 1,321 gpm at 299 ft.
701	A. J. Gidley	McKinley Drilling Co.	1955	1,788	12,10	Tc	--	--	--	T,E, 100	Irr	Casing: 12-in. to 400 ft, 10-in. from 400 to 1,788 ft. Slotted from 1,488 to 1,788 ft.
702	Desiderio Elizondo	do	1963	1,711	12,8	Tc	--	183	Apr. 1963	T,E, 125	Irr	Casing: 12-in. to 500 ft, 8-in. from 500 to 1,700 ft. Slotted from 1,450 to 1,700 ft. Cemented from surface to 1,400 ft. Top of Carrizo Sand at 1,450 ft. 320 ft of 8-in. column pipe. Development test by Peerless Equipment Co., Apr. 1963: 915 gpm at 232 ft pumping level, 1,150 gpm at 255 ft.
703	Catarino Elizondo	do	1963	1,720	12,8	Tc	--	218	May 1963	T,E, 125	Irr	Casing: 12-in. to 500 ft, 8-in. from 500 to 1,700 ft. Slotted from 1,450 to 1,700 ft. Cemented from surface to 1,400 ft. Top of Carrizo Sand at 1,440 ft. 320 ft of 8-in. column pipe. Development test by Peerless Equipment Co., May 1963: 900 gpm at 249 ft pumping level, 1,104 gpm at 264 ft.
704	Bennett Bros.	E. H. Cannon	1956	1,826	12	Tc	--	--	--	T,Ng, 200	Irr	Cased to 1,600 ft. Top of Carrizo Sand at 1,576 ft. 400 ft of 8-in. column pipe. Reported discharge 1,050 gpm.
705	do	do	1963	1,870	12	Tc	--	184	Dec. 1963	T,Ng, 200	Irr	Cased to 1,870 ft. Slotted from 1,520 to 1,870 ft. Top of Carrizo Sand at 1,519 ft. 350 ft of 8-in. column pipe. Development test by Peerless Equipment Co., Dec. 1963: 1,027 gpm at 208 ft pumping level, 1,828 ft at 250 ft.
706	do	do	1964	1,813	12	Tc	--	266	July 1964	T,Ng, 200	Irr	Cased to 1,813 ft. Slotted from 1,643 to 1,813 ft. Top of Carrizo Sand at 1,643 ft. 360 ft of 8-in. column pipe. Development test by Peerless Equipment Co., July 1964: 1,350 gpm at 280 ft pumping level.
707	Jesse Dobbs well 1	Dunwoody & Alaska Steamship Co.	1954	5,068	--	--	529	--	--	--	--	Oil test.1/

See footnotes at end of table.

Table 8.--Records of wells in Atascosa, Frio, and adjacent counties--Continued

Frio County

Well	Owner	Driller	Date completed	Depth of well (ft)	Diameter of well (in.)	Water-bearing unit	Altitude of land-surface (ft)	Water level		Method of lift	Use of water	Remarks
								Below land surface datum (ft)	Date of measurement			
KB-77-16-708	Holliday Haley	McKinley Drilling Co.	1964	1,800	12	Tc	--	264	Nov. 1964	T,E, 150	Irr	Cased to 1,785 ft. Slotted from 1,535 to 1,785 ft. Cemented from surface to 1,455 ft. Top of Carrizo Sand at 1,500 ft. 400 ft of 8-in. column pipe. Development test by Peerless Equipment Co., Nov. 1964: 1,140 gpm at 285 ft pumping level, 1,693 gpm at 305 ft.
801	Bennett Bros. well 1	E. H. Cannon	1952	1,828	12,8	Tc	524	60 98.0 135.0 166.2	Dec. 1952 Dec. 19, 1955 Mar. 11, 1957 May 21, 1965	N	N	Unused irrigation well. Casing: 12-in. to 328 ft, 8-in. from 328 to 1,628 ft. Top of Carrizo Sand at 1,630 ft.
802	Bennett Bros. well 2	do	1954	1,850	12,8	Tc	510	50 98 218.0 152.0	Nov. 1954 Apr. 1956 Oct. 9, 1964 May 21, 1965	T,Ng, 200	Irr	Casing: 12-in. to 411 ft, 8-in. from 411 to 1,648 ft. Top of Carrizo Sand at 1,640 ft. Reported discharge 1,050 gpm. Water levels measured by owners and Texas Water Development Board. Observation well.
803	L. D. S. Welfare Farm	A. A. Wuensch	1955	1,919	12,10	Tc	565	115 210	Apr. 1956 Nov. 1963	T,Ng, 225	Irr	Casing: 12-in. to 400 ft, 10-in. from 400 to 1,710 ft. Top of Carrizo Sand at 1,685 ft. 330 ft of 8-in. column pipe. Reported discharge 1,200 gpm. Temp. 100°F.
804	L. L. Smith well 1	General Crude Oil Co.	1955	5,223	--	--	559	--	--	--	--	Oil test.
901	Shiner Ranch well 1	Ginther & Warren	1950	5,610	--	--	575	--	--	--	--	Do.
21-301	H. A. Buerger Estate	E. H. Cannon	1955	1,976	12,10	Tc	--	--	--	T,G, 125	Irr	Casing: 12-in. to 400 ft, 10-in. from 400 to 1,850 ft. Top of Carrizo Sand at 1,850 ft. 400 ft of 8-in. column pipe. Reported discharge 1,000 gpm.
22-101	Lena Buerger well 1	Skinner Corp.	1958	4,606	--	--	616	--	--	--	--	Oil test.
201	Josey Ranch	McKinley Drilling Co.	1942	1,803	10,7	Tc	--	58	Apr. 1956	T,G, 135	Irr	Casing: 10-in. to 200 ft, 7-in. from 200 to 1,803 ft. Top of Carrizo Sand at 1,501 ft. 400 ft of 6-in. column pipe. Reported discharge 850 gpm.
202	Roberts & Speer well 1	Kirkwood & Morgan	1948	7,448	--	--	629	--	--	--	--	Oil test.[1/]
301	Josey Ranch	McKinley Drilling Co.	1942	1,790	10,7	Tc	--	54 138.9 208.0 252.5	Apr. 1956 Dec. 18, 1962 Feb. 10, 1964 Feb. 2, 1965	C,W	S	Formerly an irrigation well. Casing: 10-in. to 200 ft, 7-in. from 200 to 1,790 ft. Slotted from 1,490 to 1,790 ft. Texas Water Development Board observation well.

See footnotes at end of table.

Table 8.--Records of wells in Atascosa, Frio, and adjacent counties--Continued

Frio County

Well	Owner	Driller	Date completed	Depth of well (ft)	Diameter of well (in.)	Water-bearing unit	Altitude of land-surface (ft)	Water level		Method of lift	Use of water	Remarks
								Below land surface datum (ft)	Date of measurement			
KB-77-22-302	Maurry King	McKinley Drilling Co.	1964	1,681	13,10	Tc	--	196	Feb. 1964	T,E, 150	Irr	Casing: 13-in. to 750 ft, 10-in. from 750 to 1,680 ft. Slotted from 1,430 to 1,680 ft. Top of Carrizo Sand at 1,370 ft. 320 ft of 8-in. column pipe. Development test by Peerless Equipment Co., Feb. 1964: 927 gpm at 216 ft pumping level, 1,729 gpm at 252 ft.
501	Viola B. Bain	do	1952	1,930	10,8	Tr, Tc	--	230	Apr. 1956	--	D,S	Formerly an irrigation well. Casing: 10-in. to 400 ft, 8-in. from 400 to 1,200 ft. Top of Carrizo Sand at 1,680 ft.
502	Milton Urban	E. H. Cannon	1955	2,150	12,10	Tc	--	261.1 307.8	Feb. 10, 1964 Feb. 2, 1965	T,G, 120	Irr	Casing: 12-in. to 600 ft, 10-in. from 600 to 2,150 ft. Slotted from 1,850 to 1,950 ft, and from 2,050 to 2,150 ft. Reported discharge 1,1 1,100 gpm. Texas Water Development Board observation well.
* 503	J. P. Weatherford	--	--	171	4	Tcm	--	100	Feb. 1956	J,E	D,S	
504	-- Urban, well 1	Anderson, Kirkwood, & Morgan	1952	4,940	--	--	591	--	--	--	--	Oil test.
505	C. H. Chiodo	E. H. Cannon	1965	1,950	12,10	Tc	--	--	--	T,G	Irr	Casing: 12-in. to 1,000 ft, 10-in. from 1,000 to 1,950 ft. Slotted from 1,790 to 1,950 ft. Top of Carrizo Sand at 1,790 ft.
601	Sue B. Groves well 1	Alaska Steamship Co. & C. G. Dunwoody, Jr.	1954	5,176	--	--	563	--	--	--	--	Oil test.
602	J. H. Nicholson well 1	Kirkwood & Morgan	1952	5,998	--	--	579	--	--	--	--	Oil test.
904	-- Cox, well 1	do	1952	5,136	--	--	539	--	--	--	--	Do.
23-101	Josey Ranch	E. H. Cannon	1955	1,720	16,12	Tc	--	---	--	T,G	Irr	Casing: 16-in. to 312 ft, 12-in. from 312 to 1,600 ft. Slotted from 1,400 to 1,600 ft. Top of Carrizo Sand at 1,410 ft. 300 ft of 10-in. column pipe.
102	do	McKinley Drilling Co.	1943	1,800	10	Tc	--	+	Jan. 1943	T,G	Irr	Cased to 1,800 ft. Top of Carrizo Sand at 1,535 ft. Flowed 350 gpm in January 1943.
103	M. C. Powers	--	1926	250	4	Tcm, Ts	--	130	June 1932	C,W	S	Cased to 250 ft.
104	R. H. & H. E. Gill well 1	Kirkwood & Morgan	1948	5,495	--	--	581	--	--	--	--	Oil test.1/
201	A. Klopek	E. H. Cannon	1954	1,945	16,10	Tc	--	100	Apr. 1956	T,E, 150	Irr	Casing: 16-in. to 300 ft, 10-in. from 300 to 1,685 ft. Top of Carrizo Sand at 1,685 ft. 400 ft of 8-in. column pipe.

See footnotes at end of table.

Table 8.--Records of wells in Atascosa, Frio, and adjacent counties--Continued

Frio County

Well	Owner	Driller	Date completed	Depth of well (ft)	Diameter of well (in.)	Water-bearing unit	Altitude of land-surface (ft)	Water level: Below land surface datum (ft)	Water level: Date of measurement	Method of lift	Use of water	Remarks
KB-77-23-202	Gouger & McCarrick well 1	McKinley Drilling Co.	1962	1,795	12,10	Tc	--	194	July 1962	T,Ng, 200	Irr	Casing: 12-in. to 409 ft, 10-in. from 409 to 1,785 ft. Slotted from 1,551 to 1,785 ft. Cemented from surface to 1,494 ft. Top of Carrizo Sand at 1,555 ft. 350 ft of 8-in. column pipe. Development test by Peerless Equipment Co., July 1962: 889 gpm at 261 ft pumping level, 1,108 at 274 ft.
203	Albert Klopek	E. H. Cannon	1962	1,942	15,8	Tc	--	--	--	T,E, 150	Irr	Casing: 15-in. to 501 ft, 8-in. from 501 to 1,942 ft. Slotted from 1,692 to 1,942 ft. Top of Carrizo Sand at 1,692 ft. 400 ft of 8-in. column pipe.
204	H. A. Brundrett	do	1963	1,952	12	Tc	--	220	Apr. 1965	T,E, 150	Irr	Casing: 12-in. to 582 ft, 8-in. from 582 to 1,952 ft. Slotted from 1,700 to 1,952 ft. Top of Carrizo Sand at 1,700 ft. 400 ft of 8-in. column pipe.
205	Coleman Bros.	McKinley Drilling Co.	1965	1,987	12	Tc	--	258	Feb. 1965	T,Ng, 200	Irr	Cased to 1,954 ft. Slotted from 1,715 to 1,954 ft. Cemented from surface to 1,630 ft. Top of Carrizo Sand at 1,720 ft. 400 ft of 8-in. column pipe. Development test by Peerless Equipment Co., Feb. 1965: 1,001 gpm at 292 ft pumping level, 1,929 gpm at 314 ft.
301	W. E. Beall Estate	E. H. Cannon	1954	1,919	12,8	Tc	--	72 106.1 160.3 180.5	Aug. 1954 Nov. 16, 1960 Feb. 10, 1964 May 20, 1965	T,G	Irr	Casing: 12-in. to 386 ft, 8-in. from 386 to 1,530 ft. Top of Carrizo Sand at 1,530 ft. Development test by Peerless Equipment Co., Aug. 1954: 1,027 gpm at 120 ft pumping level, 1,875 gpm at 155 ft. Texas Water Development Board observation well.
302	Hobart Taylor	A. A. Wuensch	1955	1,800	12,8	Tc	--	--	--	T,G	Irr	Cased to 1,800 ft. 270 ft of 8-in. column pipe. Reported discharge 800 gpm.
* 303	Calvin Gulley	E. H. Cannon	1955	1,954	12,10	Tc	--	95 173	Aug. 1955 Oct. 1956	T,E, 100	Irr	Casing: 12-in. to 410 ft, 10-in. from 410 to 1,946 ft. Slotted from 1,635 to 1,946 ft. Top of Carrizo Sand at 1,635 ft. 400 ft of 8-in. column pipe. Development test by Peerless Equipment Co., Aug. 1955: 1,197 gpm at 182 ft pumping level, 1,693 gpm at 210 ft.
501	Robert Good	--	1955	1,946	10,7	Tc	--	--	--	T,Ng, 150	Irr	Casing: 10-in. to 482 ft, 7-in. from 482 to 1,672 ft. Top of Carrizo Sand at 1,650 ft. 400 ft of 8-in. column pipe.
* 502	Hauser Bros.	W. D. Morrison	1927	305	10	Tcm	--	95	June 1932	N	N	Abandoned irrigation well. Well 121 in Water-Supply Paper 676.

See footnotes at end of table.

Table 8.--Records of wells in Atascosa, Frio, and adjacent counties--Continued

Frio County

Well	Owner	Driller	Date completed	Depth of well (ft)	Diameter of well (in.)	Water-bearing unit	Altitude of land-surface (ft)	Water level		Method of lift	Use of water	Remarks
								Below land surface datum (ft)	Date of measurement			
KB-77-23-503	H. A. Brundrett	E. H. Cannon	1954	1,930	12,10	Tc	--	80	Apr. 1956	T,E, 150	Irr	Casing: 12-in. to 500 ft, 10-in. from 500 to 1,930 ft. Slotted from 1,700 to 1,930 ft. Top of Carrizo Sand at 1,700 ft. 400 ft of 8-in. column pipe.
504	C. H. Brown	C. H. Brown	1963	360	8	Ts	--	120	Apr. 1965	T,E, 25	Irr	Cased to 360 ft. Slotted from 300 to 360 ft. 240 ft of 5-in. column pipe. Reported discharge 450 gpm.
505	F. Blesse	G. Karsch	1913	2,410	6,4	Tc	--	54	1929	N	N	Abandoned irrigation well. Well 112 in Water-Supply Paper 676.
506	H. A. Brundrett	A. A. Wuensch	1954	2,000	8,6	Tc	--	--	--	N	N	Abandoned irrigation well.
507	H. A. Brundrett well 1	Kirkwood & Morgan	1952	5,628	--	--	524	--	--	--	--	Oil test.
508	L. M. Dugger well 1	do	1952	5,545	--	--	536	--	--	--	--	Do.
* 601	Walter Stephenson	--	1941	110	4	Tcm	--	--	--	C,W	D,S	"Sheephill well."
602	Eugene Proctor	E. H. Cannon	1964	2,080	12	Tc	--	216	Nov. 1964	T,Ng, 200	Irr	Cased to 2,080 ft. Slotted from 1,750 to 2,080 ft. Top of Carrizo Sand at 1,750 ft. 400 ft of 8-in. column pipe. Development test by Peerless Equipment Co., Nov. 1964: 1,001 gpm at 259 ft pumping level, 1,885 gpm at 294 ft.
701	J. M. Sorrell	E. H. Cannon	1955	2,045	12,10	Tc	--	140 153.8 222.8 264.9	Apr. 1956 Feb. 10, 1961 Feb. 10, 1964 Feb. 2, 1965	T,E, 150	Irr	Casing: 12-in. to 400 ft, 10-in. from 400 to 2,045 ft. Slotted from 1,870 to 2,045 ft. Top of Carrizo Sand at 1,870 ft. 400 ft of 8-in. column pipe. Texas Water Development Board observation well. Temp. 104°F.
* 801	City of Dilley well 1	McMaster & Pomeroy	1924	2,010	8,6	Tc	--	17 29.5 30.0	Jan. 1928 Aug. 27, 1932 Jan. 15, 1938	N	N	Abandoned city well. Well 113 in Water-Supply Paper 676. Flowed in 1924. Temp. 102°F.
802	City of Dilley well 2	McKinley Drilling Co.	1952	523	10	Ts	--	111 125 106 116	Oct. 1952 Mar. 1957 Aug. 1962 May 1965	T,E, 40	P	Cased to 340 ft. Slotted from 260 to 340 ft. Cemented from surface to 230 ft. 300 ft of 6-in. column pipe. Reported discharge 450 gpm.
803	do	do	1956	2,082	12,10	Tc	--	182 167 193.7 220.5	July 1956 May 1957 Sept.27, 1962 May 20, 1965	T,E, 100	P	Casing: 12-in. to 500 ft, 10-in. from 500 to 1,930 ft. Slotted from 1,810 to 1,930 ft. Top of Carrizo Sand at 1,800 ft. 400 ft of 8-in. column pipe. Development test by Samsco Equipment Co., July 1956: 1,140 gpm at 270 ft pumping level. Pumping test, Sept. 27, 1962: 692 gpm at 223 ft pumping level.

See footnotes at end of table.

Table 8.--Records of wells in Atascosa, Frio, and adjacent counties--Continued

Frio County

Well	Owner	Driller	Date completed	Depth of well (ft)	Diameter of well (in.)	Water-bearing unit	Altitude of land-surface (ft)	Water level: Below land surface datum (ft)	Water level: Date of measurement	Method of lift	Use of water	Remarks
*KB-77-23-804	Ross & Avant	--	--	200	--	Tcm	--	--	--	C,E	D	Well 130 in Water-Supply Paper 676.
* 805	G. B. Nauerman	W. D. Morrison	1927	307	10	Tcm	--	100	Jan. 1928	C,E	D,S	Well 132 in Water-Supply Paper 676.
806	A. H. McLean well 1	Kirkwood & Morgan	1952	5,236	--	--	560	--	--	--	--	Oil test.
901	Jose Obregon	E. H. Cannon	1954	2,003	10,7	Tc	--	84	Dec. 1954	T,G	Irr	Casing: 10-in. to 500 ft, 7-in. from 500 to 2,003 ft. Slotted from 1,790 to 2,003 ft. Top of Carrizo Sand at 1,790 ft. Development test by Peerless Equipment Co., Dec. 1954: 1,001 gpm at 172 ft pumping level, 1,207 gpm at 193 ft.
* 902	W. D. Morrison	W. D. Morrison	1929	370	12	Tcm	--	110	June 1932	N	N	Well 133 in Water-Supply Paper 676.
* 24-101	J. C. Thompson	E. H. Cannon	1955	1,996	12,10	Tc	--	99 130	May 1955 May 1956	T,Ng, 225	Irr	Casing: 12-in. to 400 ft, 10-in. from 400 to 1,782 ft. Slotted from 1,732 to 1,782 ft. Top of Carrizo Sand at 1,707 ft. 350 ft of 8-in. column pipe. Development test by Peerless Equipment Co., Apr. 1955: 1,000 gpm at 120 ft pumping level, 2,170 gpm at 158 ft. Temp. 100°F
102	N. W. Jones	E. H. Cannon	1963	2,000	13,10	Tc	--	111	Feb. 1963	N	N	Pump not installed. Casing slotted from 1,700 to 2,000 ft. Development test by Peerless Equipment Co., Feb. 1963: 1,069 gpm at 139 ft pumping level, 1,598 gpm at 159 ft.
* 201	G. L. Samuels	Pegg Bros.	1942	2,140	10,7,5	Tc	--	72.2	Feb. 10, 1961	T,E, 7½	S	Casing: 10-in. to 19 ft, 7-in. from 19 to 1,769 ft, 5-in. from 1,769 to 2,140 ft. Slotted from 1,940 to 2,140 ft. Reported discharge 40 gpm. Temp. 96°F.
202	Benton Roberts	E. H. Cannon	1963	2,030	13,10	Tc	--	111	Jan. 1963	T,Ng, 150	Irr	Casing: 13-in. to 512 ft, 10-in. from 512 to 2,030 ft. Slotted from 1,760 to 2,030 ft. Top of Carrizo Sand at 1,760 ft. Reported discharge 1,050 gpm.
* 203	P. J. Morales well 2	E. H. Cannon	1962	2,096	12,10, 8	Tc	--	102	Mar. 1962	T,E, 125	Irr	Casing: 12-in. to 496 ft, 10-in. from 512 to 2,030 ft. Slotted from 1,760 to 2,030 ft. Top of Carrizo Sand at 1,820 ft. 260 ft of 8-in. column pipe. Development test by Peerless Equipment Co., Mar. 1962: 1,148 gpm at 127 ft pumping level, 1,779 gpm at 155 ft.
301	H. D. Harrison, Inc.	McKinley Drilling Co.	1963	2,160	13,10	Tc	--	188	Aug. 1963	T,Ng, 225	Irr	Casing: 13-in. to 600 ft, 10-in. from 600 to 2,142 ft. Slotted from 1,830 to 2,142 ft. Cemented from surface to 1,750 ft. Top of Carrizo Sand at 1,757 ft. 300 ft of 8-in. column pipe. Development test by Peerless Equipment Co., Aug. 1963: 1,001 gpm at 223 ft pumping level, 1,125 gpm at 231 ft.

See footnotes at end of table.

Table 8.--Records of wells in Atascosa, Frio, and adjacent counties--Continued

Frio County

Well	Owner	Driller	Date completed	Depth of well (ft)	Diameter of well (in.)	Water-bearing unit	Altitude of land-surface (ft)	Water level		Method of lift	Use of water	Remarks
								Below land surface datum (ft)	Date of measurement			
KB-77-24-302	H. D. Harrison, Inc.	McKinley Drilling Co.	1963	2,167	13,8	Tc	--	200	Sept. 1963	T,Ng, 225	Irr	Casing: 13-in. to 615 ft, 8-in. from 615 to 2,164 ft. Slotted from 1,864 to 2,164 ft. Cemented from surface to 1,700 ft. Top of Carrizo Sand at 1,755 ft. 300 ft of 8-in. column pipe. Development test by Peerless Equipment Co., Sept. 1963: 925 gpm at 243 ft pumping level, 1,025 gpm at 251 ft.
303	P. J. Morales, well 1	E. H. Cannon	1962	2,166	12,10	Tc	--	118	Feb. 1962	T,E, 125	Irr	Casing: 12-in. to 498 ft, 10-in. from 498 to 2,160 ft. Slotted from 1,926 to 2,161 ft. Top of Carrizo Sand at 1,926 ft. 260 ft of 8-in. column pipe. Development test by Peeless Equipment Co., Feb. 1962: 1,027 gpm at 137 ft pumping level, 1,600 gpm at 165 ft.
304	Emma F. Shiner well 1	Hassie Hunt Trust	1951	5,767	--	--	495	--	--	--	--	Oil test.
501	-- Shiner well 2	Alaska Steamship Co. & C. G. Dunwoody, Jr.	1954	5,457	--	--	491	--	--	--	--	Oil test.
502	Emma F. Shiner well 2	Hassie Hunt Trust	1951	5,817	--	--	--	--	--	--	--	Do.
78-01-101	J. E. Berry	--	1900	150	6	Tqc	--	20 31.0 33.4 47.3	1929 July 21, 1949 July 15, 1953 Jan. 20, 1957	C,W	D,S	Well 23 in Water-Supply Paper 676.
102	M. Berry, well 1	George Parker	1953	3,000	--	--	590	--	--	--	--	Oil test.[1]
103	Frio-Tex Oil & Gas Corp.	E. H. Cannon	1958	930	8	Tc	--	80 158	1958 Oct. 1963	T,E, 15	Ind	Cased to 930 ft. Slotted from 822 to 930 ft. Reported discharge 125 gpm.
104	W. O'Quinn	do	--	973	12	Tc	--	--	--	T,G, 50	N	Cased to 884 ft. Unused irrigation well. Casing slotted from 780 to 884 ft. Top of Carrizo Sand at 545 ft.
105	W. D. Syers	I. U. Bettison	--	1,978	--	--	--	--	--	--	--	Well 155 in Water-Supply Paper 676. Oil test.
106	G. M. Williams well 1	J. C. Wynne	1953	3,006	--	--	585	--	--	--	--	Oil test.
107	Esther Berry well 1	J. R. Love & H. L. Poole	1960	3,335	--	--	558	--	--	--	--	Do.
201	F. Biediger	--	1930	500	8	Tc	--	5 14.0 15.7	1929 July 21, 1949 July 11, 1951	C,E	D,S	Well 28 in Water-Supply Paper 676.

See footnotes at end of table.

Table 8.--Records of wells in Atascosa, Frio, and adjacent counties--Continued

Frio County

Well	Owner	Driller	Date completed	Depth of well (ft)	Diameter of well (in.)	Water-bearing unit	Altitude of land-surface (ft)	Water level		Method of lift	Use of water	Remarks
								Below land surface datum (ft)	Date of measurement			
KB-78-01-202	F. Biediger	--	--	--	--	Tc	--	18.0 21.3 23.7 37.9	July 15, 1954 Apr. 13, 1955 Jan. 12, 1956 Jan. 20, 1957	C,W	S	
* 203	O. H. Griffin	M. E. Higdon	1961	890	7,5	Tc	--	55	Sept. 1963	T,E	D,S	Casing: 7-in. to 500 ft, 5-in. from 500 to 890 ft. Reported discharge 450 gpm.
204	C. R. Thompson	McKinley Drilling Co.	1961	850	8	Tc	--	--	--	--	D	Cased to 850 ft. Slotted from 650 to 850 ft. Cemented from surface to 617 ft. Top of Carrizo Sand at 725 ft.
205	A. L. Jones	E. H. Cannon	1962	900	12,10	Tc	--	111	1962	T,Ng, 125	Irr	Casing: 12-in. to 400 ft, 10-in. from 400 to 900 ft. Slotted from 670 to 900 ft. Top Carrizo Sand at 670 ft. Development test by Peerless Equipment Co., 1962: 1,010 gpm at 145 ft pumping level, 1,457 gpm at 165 ft.
206	G. E. Tate, well 3	Frio-Tex Oil & Gas Corp.	1957	3,402	--	--	577	--	--	--	--	Oil test.
301	T. W. Bain, well 1	W. G. Darsey	1950	3,289	--	--	588	--	--	--	--	Oil test.[1]
302	W. P. Jones	Shell Oil Co., Inc.	1953	1,400	7	Tc	--	--	--	N	N	Abandoned irrigation well. Drilled as an oil test, plugged back to 1,400 ft, and converted to an irrigation well. Not used since 1954.
303	Ruth Bowman	Page & Co.	1963	180	4	Tqc	--	70	Aug. 1963	N	N	Cased to 180 ft. Slotted from 160 to 180 ft. Supplied water for drilling oil test.
304	Ruth Bowman well 1	C. L. Wright & Kewanee Oil Co.	1963	3,439	--	--	563	--	--	--	--	Oil test.[1]
401	W. W. McKinley well 1	Magnolia Petroleum Co.	1947	11,944	--	--	601	--	--	--	--	Do.
501	M. R. McDonald	Pegg Bros.	1956	1,199	12	Tc	--	75 55.3 80.4 104.2	Nov. 1956 Feb. 12, 1962 Feb. 6, 1964 Feb. 1, 1965	T,E, 100	Irr	Cased to 850 ft. Development test by Peerless Equipment Co., Nov. 1956: 1,027 gpm at 113 ft pumping level, 2,050 gpm at 137 ft. Texas Water Development Board observation well.
502	T. W. Labatt	Pronto Drilling Co.	1955	1,500	7	Tc	--	25	1955	T,G, 50	Irr	Cased to 1,500 ft. Reported discharge 300 gpm.
503	do	-- Swierc	1951	462	4	Tqc	--	35	1952	J,E	D,S	Cased to 462 ft.
504	W. T. Youngblood	H & J Drilling Co., & F. C. Gaines, Jr.	1958	3,778	--	--	506	--	--	--	--	Oil test.[1]
701	Mrs. H. C. Parramore	--	--	46	48	--	--	41	May 1932	C,W	S	Dug well. Well 75 in Water-Supply Paper 676.

See footnotes at end of table.

Table 8.--Records of wells in Atascosa, Frio, and adjacent counties--Continued

Frio County

Well	Owner	Driller	Date completed	Depth of well (ft)	Diameter of well (in.)	Water-bearing unit	Altitude of land-surface (ft)	Water level		Method of lift	Use of water	Remarks
								Below land surface datum (ft)	Date of measurement			
KB-78-01-702	Oppenheimer & Lang well 1	Newman Bros. Drilling Co. & Alaska Steamship Co.	1949	4,195	--	--	507	--	--	--	--	Oil test.1/
703	C. R. Woodward well 1	J. P. Bell	1949	4,514	--	--	534	--	--	--	--	Do.
801	Ralph A. Johnston	McKinley Drilling Co.	1959	1,413	12,10	Tc	--	50 42.4 89.9 114.7	Apr. 1959 Jan. 31, 1961 Feb. 6, 1964 Feb. 1, 1965	T,E, 100	Irr	Casing: 12-in. to 468 ft, 10-in. from 468 to 1,413 ft. Slotted from 1,185 to 1,413 ft. 150 ft of 8-in. column pipe. Development test by Peerless Equipment Co., Apr. 1959: 1,027 gpm at 74 ft pumping level, 2,010 gpm at 115 ft. Texas Water Development Board observation well.
802	Ralph A. Johnston	McKinley Drilling	1962	1,477	12,10, 8	Tc	--	105	Mar. 1962	T,E, 100	Irr	Casing: 12-in. to 219 ft, 10-in. from 219 to 1,131 ft, 8-in. from 1,131 to 1,425 ft. Slotted from 860 to 1,425 ft. Cemented from surface to 800 ft. Development test by Peerless Equipment Co., Mar. 1962: 1,027 gpm at 127 ft pumping level, 1,575 gpm at 165 ft.
803	M. C. Peters well 1	Athens & Fitzgerald	1954	5,388	--	--	497	--	--	--	--	Oil test.1/
804	Leo Newsom	McKinley Drilling Co.	1962	1,311	12,10	Tc	--	82	Dec. 1962	T,E, 125	Irr	Casing: 12-in. to 511 ft, 10-in. from 511 to 1,309 ft. Slotted from 1,012 ft to 1,309 ft. Top of Carrizo Sand at 1,000 ft. Development test by Peerless Equipment Co., Dec. 1962: 1,049 gpm at 112 ft pumping level, 1,715 gpm at 125 ft.
805	M. R. McDonald	J. R. Johnson	1964	1,300	12,8	Tc	--	143	Dec. 1964	T,E, 125	Irr	Casing: 12-in. to 1,090 ft, 8-in. from 1,090 to 1,300 ft. Slotted from 1,100 to 1,300 ft. 220 ft of 8-in. column pipe. Development test by Peerless Equipment Co., Dec. 1964: 1,330 gpm at 234 ft pumping level, 1,850 gpm at 290 ft.
901	Oppenheimer & Lang well 1-A	Newman Bros. Drilling Co.	1949	4,189	--	--	528	--	--	--	--	Oil test.1/
902	Oppenheimer & Lang well C-2	Alaska Steamship Co., Newman Bros. Drilling Co. & Calvert Corp.	1950	4,223	--	--	530	--	--	--	--	Do.
903	Oppenheimer well A-1	Magnolia Petroleum Co.	1949	4,504	--	--	567	--	--	--	--	Do.

See footnotes at end of table.

Table 8.--Records of wells in Atascosa, Frio, and adjacent counties--Continued

Frio County

Well	Owner	Driller	Date completed	Depth of well (ft)	Diameter of well (in.)	Water-bearing unit	Altitude of land-surface (ft)	Water level		Method of lift	Use of water	Remarks
								Below land surface datum (ft)	Date of measurement			
KB-78-01-904	Edward Mann	E. H. Cannon	1965	1,570	12	Tc	--	137	Jan. 1965	T,G, 225	Irr	Cased to 1,570 ft. Slotted from 1,220 to 1,570 ft. Top of Carrizo Sand at 1,220 ft. 250 ft of 8-in. column pipe. Development test by Peerless Equipment Co., Jan. 1965: 1,060 gpm at 162 ft pumping level, 2,156 gpm at 183 ft.
02-101	C. R. Thompson well 1	Miller Royalty Co. & Milam Drilling Co.	1949	3,300	--	--	562	--	--	--	--	Oil test.[1]
102	T. P. Nowlin well 1	Graham & Carr	1951	3,449	--	--	571	--	--	--	--	Do.
201	T. B. Staurt well 5	Stanolind Oil & Gas Co.	1954	3,747	--	--	593	--	--	--	--	Do.
202	C. S. Thompson	--	1954	900	4	Tc	--	155	Sept. 1963	C,E	D,S	Cased to 900 ft.
203	A. L. Witting well 1	Holland Oil Co.	1940	5,277	--	--	609	--	--	--	--	Oil test.[1]
204	C. S. Thompson well 1	Chiles Well Servicing Co.	1950	3,514	--	--	655	--	--	--	--	Oil test.
401	Russell Davis	--	1951	1,162	--	Tc	--	95	Apr. 1956	T,E, 30	Irr	Drilled as an oil test to 3,780 ft, plugged back to 1,162 ft. Converted to an irrigation well. Top of Carrizo Sand at 950 ft.
402	Mrs. Alma Marburger	McKinley Drilling Co.	1955	1,445	12,8	Tc	--	85 109	Apr. 1956 June 1962	T,E, 100	Irr	Casing: 12-in. to 400 ft, 8-in. from 400 to 1,445 ft. Slotted from 1,135 to 1,445 ft. Temp. 90°F.
403	Tony Mann well 1	Big Six Drilling Co.	1956	3,989	--	--	569	--	--	--	--	Oil test.[1]
501	Russell Davis	--	1950	--	12	Tc	--	50 107.6 129.1 151.4	Dec. 1950 Nov. 29, 1960 Feb. 6, 1964 Feb. 1, 1965	T,-	Irr	Top of Carrizo Sand at 885 ft. Reported discharge 800 gpm. Texas Water Development Board observation well.
502	Jack Wier	McKinley Drilling Co.	1955	1,265	10,8	Tc	--	42 58.8 85.9	Mar. 1955 Apr. 17, 1956 May 20, 1965	T,E, 50	Irr	Casing: 10-in. to 307 ft, 8-in. from 307 to 1,247 ft. Slotted from 977 to 1,247 ft. Development test by Peerless Equipment Co., Mar. 1955: 708 gpm at 95 ft pumping level, 952 gpm at 145 ft.
503	do	Favor Drilling Co.	1958	650	4	--	--	--	--	-,E	D,S	Cased to 650 ft.
701	Otto Mann, Sr.	E. H. Cannon	1954	1,588	10,7	Tc	--	60	Apr. 1965	T,E, 150	Irr	Casing: 10-in. to 300 ft, 7-in. from 300 to 1,200 ft. Top of Carrizo Sand at 1,175 ft.

See footnotes at end of table.

Table 8.--Records of wells in Atascosa, Frio, and adjacent counties--Continued

Frio County

Well	Owner	Driller	Date completed	Depth of well (ft)	Diameter of well (in.)	Water-bearing unit	Altitude of land-surface (ft)	Water level		Method of lift	Use of water	Remarks
								Below land surface datum (ft)	Date of measurement			
KB-78-02-702	W. E. Stacy	McKinley Drilling	1955	1,764	12,10	Tc	--	59.5 100.2 125.3 105.7	Jan. 31, 1961 Feb. 6, 1964 Feb. 1, 1965 May 20, 1965	T,E, 125	Irr	Casing: 12-in. to 406 ft, 10-in. from 406 to 1,764 ft. Slotted from 1,580 to 1,764 ft. Top of Carrizo Sand at 1,420 ft. Reported discharge 1,000 gpm. Texas Water Development Board observation well.
703	-- Peters, well 18-C	Sutton Production Co.	1961	4,146	--	--	530	--	--	--	--	Oil test.[1]
704	Mrs. John P. Sewell	E. H. Cannon	1955	1,750	12,10	Tc	--	--	--	T,E, 125	Irr	Casing: 12-in. to 400 ft, 10-in. from 400 to 1,250 ft. Top of Carrizo Sand at 1,230 ft. Development test by Peerless Equipment Co., June 1955: 1,027 gpm at 149 ft pumping level, 1,675 gpm at 180 ft.
705	do	McKinley Drilling Co.	1960	1,604	12,10, 8	Tc	--	--	--	T,E, 150	Irr	Casing: 12-in. to 404 ft, 10-in. from 404 to 1,534 ft, 8-in. from 1,534 to 1,604 ft. Slotted from 1,269 to 1,604 ft. Reported discharge 1,000 gpm.
706	Ed Mann	do	1957	1,528	12,8	Tc	--	120	Jan. 1957	T,G, 150	Irr	Casing: 12-in. to 624 ft, 8-in. from 624 to 1,528 ft. Slotted from 1,288 to 1,528 ft. Top of Carrizo Sand at 1,275 ft. 250 ft of 8-in. column pipe. Development test by Peerless Equipment Co., Jan. 1957: 1,000 gpm at 158 ft pumping level, 1,400 gpm at 185 ft.
707	Otto Mann, Jr.	McKinley Drilling Co.	1964	1,500	12	Tc	--	166	Dec. 1964	T,E, 125	Irr	Cased to 1,498 ft. Slotted from 1,210 to 1,379 ft, and from 1,417 to 1,498 ft. Cemented from surface to 1,150 ft. Top of Carrizo Sand at 1,100 ft. 250 ft of 8-in. column pipe. Development test by Peerless Equipment Co., Dec. 1964: 1,001 gpm at 179 ft pumping level, 2,184 gpm at 209 ft.
801	-- Sanchez, well 1	Texita Oil Co. & E. W. Gill	1955	4,360	--	--	550	--	--	--	--	Oil test.[1]
802	C. Luna, well 1	Kirkwood & Morgan	1949	4,610	--	--	538	--	--	--	--	Do.
803	L. Tschirhart	Lawrence & Joe Swierc	1962	694	7	Tqc	--	128	Sept. 1962	C,W	D	Cased to 694 ft. Slotted from 634 to 694 ft.
804	H. P. Watson & H. D. Kane	McKinley Drilling Co.	1963	1,647	12,8	Tc	--	118	Feb. 1963	T,-	Irr	Casing: 12-in. to 507 ft, 8-in. from 507 to 1,632 ft. Slotted from 1,371 to 1,632 ft. Cemented from surface to 1,307 ft. Top of Carrizo Sand at 1,385 ft. Development test by Stewart & Stevenson Services, Inc., Feb. 1963: 1,020 gpm at 177 ft pumping level.
09-101	Clyde R. Cox	E. H. Cannon	1955	1,700	12,8	Tc	--	65	Jan. 1955	T,E, 100	Irr	Casing: 12-in. to 350 ft, 8-in. from 350 to 1,600 ft. Top of Carrizo Sand at 1,300 ft.

See footnotes at end of table.

Table 8.--Records of wells in Atascosa, Frio, and adjacent counties--Continued

Frio County

Well	Owner	Driller	Date completed	Depth of well (ft)	Diameter of well (in.)	Water-bearing unit	Altitude of land-surface (ft)	Water level		Method of lift	Use of water	Remarks
								Below land surface datum (ft)	Date of measurement			
KB-78-09-102	R. V. Moore	E. H. Cannon	1963	1,640	13,	Tc	--	132	1963	T,-	Irr	Casing: 13-in. to 600 ft, 8-in. from 600 to 1,640 ft. Slotted from 1,363 to 1,640 ft. Top of Carrizo Sand at 1,363 ft.
103	-- Oppenheimer well 1	Parker & McCune	1947	4,754	--	--	556	--	--	--	--	Oil test.[1]
104	Arthur Sharber, Jr.	E. H. Cannon	1965	1,501	10,8	Tc	--	185	Feb. 1965	T,Ng, 210	Irr	Casing: 10-in. to 724 ft, 8-in. from 724 to 1,501 ft. Slotted from 1,261 to 1,501 ft. Top of Carrizo Sand at 1,240 ft. Development test by Peerless Equipment Co., Feb. 1965: 1,013 gpm at 217 ft pumping level, 1,416 gpm at 235 ft.
201	J. D. Oppenheimer well 1	Plymouth Oil Co.	1949	4,516	--	--	523	--	--	--	--	Oil test.[1]
301	Ed Mann, Jr.	McKinley Drilling Co.	1953	1,460	--	Tc	--	--	--	T,G, 100	Irr	Top of Carrizo Sand at 1,172 ft. 200 ft of 8-in. column pipe.
* 302	Oppenheimer & Lang well 2	O. Z. Boone	1929	860	4	Tqc	--	+ 32	May 1932	--	S	Well 84 in Water-Supply Paper 676.
303	J. C. Cox	McKinley Drilling Co.	1955	1,710	12,8	Tc	--	20	Jan. 1955	T,E, 150	Irr	Casing: 12-in. to 333 ft, 8-in. from 333 to 1,710 ft. Slotted from 1,410 to 1,710 ft. Top of Carrizo Sand at 1,460 ft. 200 ft of 8-in. column pipe. Development test by Peerless Equipment Co., Jan. 1955: 1,069 gpm at 68 ft pumping level, 1,750 gpm at 120 ft..
304	E. A. Lothrop	--	1956	1,413	12	Tc	--	58 90	Dec. 1956 Oct. 1963	T,E, 100	Irr	Development test by Peerless Equipment Co., Dec. 1956: 1,027 gpm at 90 ft pumping level, 2,157 gpm at 127 ft.
305	Lee White	McKinley Drilling Co.	1964	1,678	12,8	Tc	--	68	Jan. 1964	T,E, 125	Irr	Casing: 12-in. to 603 ft, 8-in. from 603 to 1,678 ft. Slotted from 1,425 to 1,675 ft. Cemented from surface to 1,368 ft. 170 ft of 8-in. column pipe. Development test by Peerless Equipment Co., Jan. 1964: 1,069 gpm at 115 ft pumping level, 1,865 gpm at 171 ft.
401	Sam Johnson well 1	Sun Oil Co.	1953	4,777	--	--	583	--	--	--	--	Oil test.[1]
402	W. H. Gifford Estate well 1	Alaska Steamship Co.	1952	5,077	--	--	557	--	--	--	--	Oil test.
501	-- Skinner	--	1939	1,840	4	Tc	--	8 85.3 115.6 162.7	1939 Nov. 29, 1960 Dec. 18, 1962 Feb. 2, 1965	C,W	D,S	Cased to 1,840 ft. Slotted from 1,740 to 1,840 ft. Texas Water Development Board observation well.

See footnotes at end of table.

Table 8.--Records of wells in Atascosa, Frio, and adjacent counties--Continued

Frio County

Well	Owner	Driller	Date completed	Depth of well (ft)	Diameter of well (in.)	Water-bearing unit	Altitude of land-surface (ft)	Water level		Method of lift	Use of water	Remarks
								Below land surface datum (ft)	Date of measurement			
KB-78-09-502	Oppenheimer & Lang	I. U. Bettison	1912	1,757	12,6	Tc	--	160	Oct. 1963	T,E, 40	Irr	Well 110 in Water-Supply Paper 676. Temp. 96°F.
* 503	do	--	1952	1,700	--	Tc	534	60	Dec. 1954	T,E, 100	Irr	Drilled to 5,004 ft as an oil test, plugged back to 1,700 ft and converted to an irrigation well. Top of Carrizo Sand at 1,510 ft.
504	do	McKinley Drilling Co.	1963	1,804	12,10	Tc	--	165	Dec. 1963	T,E, 100	Irr	Casing: 12-in. to 726 ft, 10-in. from 726 to 1,800 ft. Slotted from 1,550 to 1,800 ft. Cemented from surface to 1,490 ft. 300 ft of 8-in. column pipe. Development test by Peerless Equipment Co., Dec. 1963: 806 gpm at 210 ft pumping level, 975 gpm at 225 ft.
601	Oppenheimer & Lang	--	1951	1,950	--	Tc	--	120	Apr. 1956	C,W	S	
602	do	McKinley Drilling Co.	1964	1,862	12,10	Tc	--	107	Feb. 1964	T,E, 125	Irr	Casing: 12-in. to 680 ft, 10-in. from 680 to 1,860 ft. Slotted from 1,610 to 1,860 ft. Cemented from surface to 1,550 ft. Top of Carrizo Sand at 1,580 ft. 280 ft of 8-in. column pipe. Development test by Peerless Equipment Co., Feb. 1964: 1,104 gpm at 184 ft pumping level, 1,613 gpm at 257 ft.
701	J. G. Kain	do	1955	1,800	12,10	Tc	--	--	--	T,Ng, 210	Irr	Casing: 12-in. to 386 ft, 10-in. from 386 to 1,800 ft. Slotted from 1,510 to 1,800 ft. Reported discharge 1,000 gpm. Temp. 97°F.
702	W. A. Karnes, well 1	L. H. Haring, Jr.	1953	5,012	--	--	530	--	--	--	--	Oil test.
* 801	Floyd McGowen	--	--	1,700	10	Tc	--	+	1932	--	D,S	Well 111 in Water-Supply Paper 676. Temp. 98°F.
802	J. D. Oppenheimer well 1	W. L. Pickens	1948	5,138	--	--	488	--	--	--	--	Oil test.1/
10-101	Euland Cox	A. A. Wuensch	1956	1,760	12,8	Tc	--	--	--	T,E, 125	Irr	Casing: 12-in. to 350 ft, 8-in. from 350 to 1,760 ft. Slotted from 1,510 to 1,760 ft. 190 ft of 8-in. column pipe. Reported discharge 1,000 gpm.
102	Andreas Garcia	-- Swierc	1955	1,737	10,8	Tc	--	80	1955	T,G	Irr	Casing: 10-in. to 1,500 ft, 8-in. from 1,500 to 1,717 ft. Reported discharge 800 gpm.
103	Paul Stutz	McKinley Drilling Co.	1961	1,550	12,8	Tc	--	144	Aug. 1961	T,E, 100	Irr	
104	J. D. Oppenheimer well 1	R. D. Mebane	1952	4,687	--	--	556	--	--	--	--	Oil test.
401	Oppenheimer & Lang well 1	Parker & McCune	1948	5,200	--	--	510	--	--	--	--	Oil test.1/

See footnotes at end of table.

Table 8.--Records of wells in Atascosa, Frio, and adjacent counties--Continued

Frio County

Well	Owner	Driller	Date completed	Depth of well (ft)	Diameter of well (in.)	Water-bearing unit	Altitude of land-surface (ft)	Water level		Method of lift	Use of water	Remarks
								Below land surface datum (ft)	Date of measurement			
KB-78-10-501	Ruth McLean Bowman, well 1	W. L. Goldston	1948	5,305	--	--	541	--	--	--	--	Oil test.[1]
502	Marrs McLean well 22	Lewis Oil Co.	1949	5,295	--	--	550	--	--	--	--	Do.
701	Oppenheimer & Lang well 1	Schimmel Drilling Co.	1954	5,673	--	--	556	--	--	--	--	Do.
702	Oppenheimer & Lang well 1	J. C. Case	1954	5,174	--	--	492	--	--	--	--	Do.
* 703	E. S. Crews well 2	T. W. Crews	1962	5,805	--	--	428	--	--	--	--	Oil test.
17-201	Ida Shiner well 1	Alaska Steamship Co., & C. G. Dunwoody, Jr.	1954	5,485	--	--	536	--	--	--	--	Do.
* 301	E. S. Crews	M. E. Higdon	1945	193	5	Tcm	--	--	--	J,E	D,S	Reported discharge 17 gpm.
302	F. B. Thompson well 1	Argo Oil Corp. & E. L. Cox	1953	6,212	--	--	527	--	--	---	--	Oil test.[1]
303	H. R. White well 1	Humble Oil & Refining Co.	1949	6,003	--	--	495	--	--	--	--	Do.
601	W. F. Smith well 1	do	1949	6,449	--	--	495	--	--	--	--	Do.
602	-- Schorp	Lawrence & Joe Swierc	1961	439	5	Tcm	--	90	Dec. 1961	--	S	Cased to 439 ft. Slotted from 316 to 439 ft. Reported discharge 60 gpm.
603	W. F. Smith well 1	F. W. Carr	1951	6,309	--	--	521	--	--	--	--	Oil test.[1]
18-203	W. L. Pickens well 1	Milam Drilling Co.	1950	5,616	--	--	475	--	--	--	--	Do.
* 204	H. & R. C. Roos well 1	Humble Oil & Refining Co.	1945	1,833	10	Tc	473	+	Apr. 1946	--	S	Oil test drilled to 8,599 ft, plugged back to 1,833 ft and converted to a water well. Casing perforated from 1,812 to 1,833 ft. Estimated flow 400 gpm, Apr. 18, 1946.
205	W. L. Pickens well B-1	The Texas Co.	1956	5,798	--	--	448	--	--	--	--	Oil test.[1]
501	W. J. Hindes	--	1917	2,114	8	Tc	--	+ 80 + 44.5 22.2	1929 Apr. 11, 1944 May 18, 1965	T,E	S	Well 114 in Water-Supply Paper 676. Formerly an irrigation well. Reported flow 600 gpm in 1929. Estimated flow 300 gpm, Apr. 11, 1944. Measured flow 7 gpm, June 13, 1962. Temp. 99°F.

See footnotes at end of table.

Table 8.--Records of wells in Atascosa, Frio, and adjacent counties--Continued

Frio County

Well	Owner	Driller	Date completed	Depth of well (ft)	Diameter of well (in.)	Water-bearing unit	Altitude of land-surface (ft)	Water level: Below land surface datum (ft)	Water level: Date of measurement	Method of lift	Use of water	Remarks
KB-78-18-502	W. R. Hindes Estate, well 1	P. B. Lack	1953	6,449	--	--	495	--	--	--	--	Oil test.
703	E. B. Simmons, Jr. well 1	L. H. Haring, Jr.	1958	3,499	--	--	460	--	--	--	--	Oil test.[1]

Bexar County

AY-68-53-701	James Baird	Walter Cook	1916	171	4	Tc	570	116.8	Jan. 28, 1965	C,W	S	Texas Water Development Board observation well.[1]

Dimmit County

HZ-77-29-201	G. W. Hatch	--	1929	1,800	12	Tc	640	96.1 102.5 236.3 336.4	Nov. 18, 1929 July 25, 1945 Sept.20, 1955 July 26, 1965	C,W	D,S	Cased to 1,800 ft. Texas Water Development Board observation well. Well 0-7-3 in Texas Board of Water Engineers Bulletin 6003.

La Salle County

RX-77-30-101	Joe McMillian well 1	W. J. Steeger	1958	5,354	--	--	544	--	--	--	--	Oil test.
78-25-202	John Schorp, well 1	Skelley Oil Co.	1951	6,310	--	--	459	--	--	--	--	Do.

Live Oak County

SJ-78-23-202	James E. Esse	J. M. Ponder	1945	4,143	10,6	Tc	364	17.2	June 22, 1965	N	N	Cased to 4,143 ft. Reported flow 60 gpm, Aug. 1964.
502	Humble Oil & Refining Co.	Layne-Texas Co.	1948	4,842	10,6, 4	Tc	--	+	Aug. 8, 1956	Flows	D,S, Ind	Reported discharge 200 gpm. Perforated from 4,689 to 4,789 ft. Well A-4 in Texas Water Commission Bulletin 6105. Temp. 150°F.
701	P. Taylor, well 1	H. L. Massingill & Wilcox Oil Co.	1948	6,250	--	--	235	--	--	--	--	Oil test. Well C-10 in Texas Board of Water Engineers Bulletin 6105.[1]

Medina County

TD-68-58-203	E. Mullins	--	1897	114	--	Tc	640	92.7 96.6	Feb. 22, 1930 June 30, 1951	C,W	D,S	Well J-8-1 in Water-Supply Papers 678 and 1422.
* 69-64-201	J. H. Cunningham	--	--	110	6	Tc	664	101.3 107.8	Mar. 11, 1930 Feb. 19, 1952	--	D,S	Well I-9-29 in Water-Supply Paper 1422.

McMullen County

SU-78-18-901	M. T. Flannagan well 1	Bay City Drilling Co.	1955	5,514	--	--	478	--	--	--	--	Oil test.
20-701	H. D. Countiss well 1	S. F. Hurlbut, et al.	1944	5,793	--	--	309	--	--	--	--	Oil test.[1]

See footnotes at end of table.

Table 8.--Records of wells in Atascosa, Frio, and adjacent counties--Continued

McMullen County

Well	Owner	Driller	Date completed	Depth of well (ft)	Diameter of well (in.)	Water-bearing unit	Altitude of land-surface (ft)	Water level		Method of lift	Use of water	Remarks
								Below land surface datum (ft)	Date of measurement			
SU-78-20-702	H. D. Countiss well 1	Kirkwood & Morgan	1952	6,022	--	--	321	--	--	--	--	Oil test.
801	Sam Countiss	E. E. Swierc	1948	2,300	8	Tqc	--	+	Nov. 1963	T,E	D,S	Temp. 106°F.
21-801	Adolph Poenish	Far West Drilling Co.	1950	3,600	5	Tc	380	22.0 27.1	Mar. 23, 1959 Feb. 1, 1965	--	D,S	Texas Water Development Board observation well. Reported flow in April 1950, 500 gpm. Was used for irrigation.
802	Y. M. Brown, et al.	Santa Clara Oil Co.	1945	6,303	--	--	371	--	--	--	--	Oil test. 1/
803	Adolph Poenish well 1	H. Hunt Trust	1952	6,524	--	--	386	--	--	--	--	Oil test.
901	V. M. Brown, well 1	Santa Clara Oil Co.	1945	6,415	--	--	365	--	--	--	--	Oil test. 1/
22-701	J. Dickenson well 1	Porter, et al.	1933	1,005	--	--	--	--	--	--	--	Oil test.

Wilson County

ZL-68-62-101	Fairview Farms well 3	McKinley Drilling Co.	1956	1,355	12	Tc	533	--	--	T,G	Irr	Cased to 1,355 ft. Slotted from 1,061 to 1,355 ft.
401	Fairview Farms well 1	do	1956	1,020	12,10	Tc	511	--	--	T,G	Irr	Casing: 12-in. to 229 ft, 10-in. from 229 to 1,020 ft. Slotted from 720 to 1,020 ft. Reported drawdown 38 ft, discharging 2,100 gpm.
402	Fairview Farms well 2	do	1956	1,396	12	Tc	524	--	--	T,G	Irr	Cased to 1,300 ft. Slotted from 1,050 to 1,300 ft. Irrigated 300 acres of pasture from wells ZL-68-62-401 and ZL-68-62-402 in 1964.
404	Fairview Farms well 4	do	1958	1,265	13,12	Tc	507	--	--	T,G	S	Casing: 13-in. to 305 ft, 12-in. from 305 to 1,265 ft. Slotted from 1,000 to 1,265 ft.
902	Schmalstieg Bros.	Wise Drilling Co.	1953	1,600	12,8	Tc	437	55.3 30.8	Jan. 27, 1965 May 26, 1965	T,G	Irr	Casing: 12-in. to 61 ft, 8-in. from 261 to 1,600 ft. Slotted from 1,460 to 1,600 ft. Drawdown 38 ft after discharging 1,600 gpm for 4 hours. Well F-65 in Texas Board of Water Engineers Bulletin 5710. Texas Water Development Board observation well.
06-301	Hugo Pundt	Boone & Ormand	1946	677	7	Ts	--	13.7	Mar. 22, 1955	C,W	D,S	Cased to 675 ft. Slotted from 615 to 675 ft.
302	Earl Bryan	L. M. wise	1953	2,022	10,7	Tc	377	+ 6.0	Jan. 29, 1964	Cf,E, 5	S,Irr	Casing: 10-in. to 93 ft, 7-in. from 93 to 2,115 ft. Well J-2 in Texas Board of Water Engineers Bulletin 5710. Reported flow, 75 gpm in 1954.

See footnotes at end of table.

Table 8.--Records of wells in Atascosa, Frio, and adjacent counties--Continued

Wilson County

Well	Owner	Driller	Date completed	Depth of well (ft)	Diameter of well (in.)	Water-bearing unit	Altitude of land-surface (ft)	Water level		Method of lift	Use of water	Remarks
								Below land surface datum (ft)	Date of measurement			
ZL-78-06-601	J. T. Harris	-- Thierry	1954	2,440	7,4	Tc	394	21.3	Feb. 22, 1955	C,E	S,Irr	Casing: 7-in. to 250 ft, 4-in. from 250 to 2,440 ft. Slotted from 2,300 to 2,440 ft.
602	do	do	1946	2,500	10,7	Tc	383	+28.3	do	N	D,S Irr	Casing: 10-in. to 200 ft, 7-in. from 200 to 2,500 ft. Slotted from 2,300 to 2,500 ft.

1/ Electric logs in files of Texas Water Development Board.

* For chemical analyses of water from wells in Atascosa, Frio, and adjacent counties see Table 9.

Table 9.--Chemical analyses of water from wells in Atascosa, Frio, and adjacent counties

(Analyses are in parts per million except specific conductance, pH, percent sodium, sodium adsorption ratio, and residual sodium carbonate.)

Water-bearing unit: Kea, Edwards and associated limestones; Tc, Carrizo Sand; Tcm, Cook Mountain Formation; Tqc, Queen City Sand; Tj, Jackson Group; Tr, Reklaw Formation; Ts, Sparta Sand; Twi, Wilcox Group; Ty, Yegua Formation.

Well	Depth of well (ft)	Date of collection	Water-bearing unit	Silica (SiO_2)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3) a/	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Boron (B)	Dissolved solids	Hardness as $CaCO_3$	Percent sodium	Sodium adsorption ratio (SAR)	Residual sodium carbonate (RSC)	Specific conductance (micromhos at 25°C)	pH
Atascosa County																						
AL-68-50-201	2,379	Nov. 1, 1955	Kea	14	0.84	70	22	80	5.8	232	182	49	1.4	0.0	0.52	539	265	39	2.1	0.00	858	7.7
201	2,379	Mar. 8, 1963	Kea	18	.12	100	34	*24		220	191	38	3.0	.0	--	516	390	12	.5	.00	802	6.8
301	2,507	Mar. 6, 1957	Kea	17	--	252	84	145	9.2	214	683	300	--	.2	.50	1,600	974	24	2.0	.00	2,300	7.4
301	2,507	Aug. 21, 1964	Kea	--	--	--	--	--	--	240	81	34	--	--	--	--	278	--	--	.00	618	7.5
302	2,498	Jan. 17, 1956	Kea	17	--	102	33	31	3.0	218	196	59	1.2	.0	.09	549	390	15	.7	.00	854	7.5
303	2,428	Oct. 26, 1955	Kea	13	--	63	15	75	1.1	242	15	15	--	4.8	.05	253	219	7	.2	.00	445	7.4
51-101	2,656	Oct. 10, 1961	Kea	15	--	420	169	*299		139	1,370	600	2.8	.0	--	2,940	1,740	27	3.1	.00	3,870	6.7
101	2,656	June 24, 1964	Kea	--	--	--	--	--	--	236	720	350	--	--	--	--	1,050	--	--	.00	2,450	6.8
803	166	July 29, 1963	Tc	19	4.5	35	7.0	43	7.3	38	41	102	.2	.0	.05	274	116	43	1.7	.00	487	5.6
52-401	203	May 31, 1944	Tc	32	.60	33	6.8	*30		64	30	63	.6	.5	--	246	110	--	1.2	.00	--	6.8
701	175	June 18, 1932	Tc	--	.38	10	--	*27		31	21	32	--	.4	--	107	34	--	2.0	.00	--	--
701	175	May 31, 1944	Tc	--	--	--	--	--	--	31	14	58	--	--	--	81	--	--	--	--	--	--
706	169	do	Tc	--	.50	--	--	--	--	32	16	45	--	--	--	60	--	--	--	--	--	--
59-202	125	June 2, 1944	Tc	--	4.3	--	--	--	--	43	16	63	--	--	--	--	102	--	--	--	--	--
401	380	Feb. 22, 1928	Tc	18	1.10	31	6.2	28	5.1	52	50	51	--	.10	--	227	103	36	1.2	.00	--	--
401	380	June 2, 1944	Tc	--	.6	--	--	--	--	57	24	60	--	--	--	--	114	--	--	--	--	--
504	411	Aug. 27, 1963	Tc	20	5.3	24	5.4	26	7.3	49	30	54	.2	.0	.09	191	82	38	1.2	.00	340	6.7
603	460	Aug. 7, 1945	Tc	--	.2	--	--	--		41	34	48	--	--	--	--	68	--	--	--	--	--
612	380	Aug. 8, 1945	Tr	--	7.6	--	--	--		60	26	52	--	--	--	--	87	--	--	--	--	--
615	560	Dec. 6, 1930	Tc	--	--	26	8.7	*23		61	35	46	--	.0	--	169	101	33	1.0	.00	--	--
619	270	Aug. 8, 1945	Tr	--	.15	--	--	--		88	40	52	--	--	--	--	104	--	--	--	--	--
620	521	do	Tc	--	1.6	--	--	--		43	42	59	--	--	--	--	86	--	--	--	--	--
801	640	June 18, 1932	Tc	--	1.43	40	7.9	*20		84	41	45	--	.0	--	196	132	24	.8	.00	--	--
802	578	Aug. 8, 1945	Tc	--	3.0	--	--	--		103	55	32	--	--	--	--	124	--	--	--	--	--

See footnotes at end of table.

Table 9.--Chemical analyses of water from wells in Atascosa, Frio, and adjacent counties--Continued

Well	Depth of well (ft)	Date of collection	Water-bearing unit	Silica (SiO_2)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3) a/	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Boron (B)	Dissolved solids	Hardness as $CaCO_3$	Percent sodium	Sodium adsorption ratio (SAR)	Residual sodium carbonate (RSC)	Specific conductance (micromhos at 25°C)	pH
AL-68-59-808	500	Aug. 8, 1945	Tr,Tc	--	0.45	--	--	--		108	32	35	--	--	--	--	114	--	--	--	--	--
814	560	do	Tc	--	.10	--	--	--		70	26	52	--	--	--	--	94	--	--	--	--	--
903	600	May 26, 1932	Tc	19	1.14	29	6.0	21	7.4	60	36	43	--	--	--	191	97	30	0.9	0.00	--	--
904	715	Aug. 8, 1945	Tc	--	.53	--	--	--		39	34	52	--	--	--	--	81	--	--	--	--	--
910	630	May 30, 1944	Tc	--	.25	--	--	--		64	34	53	--	--	--	--	90	--	--	--	--	--
60-102	450	Aug. 6, 1945	Tc	--	3.5	--	--	--		77	24	59	--	--	--	--	100	--	--	--	--	--
303	145	July 30, 1963	Tc	25	.02	19	5.7	39	8.7	38	24	78	0.2	0.0	0.03	219	71	51	2.0	.00	377	5.8
407	540	Aug. 7, 1945	Tc	--	.40	--	--	--		49	38	60	--	--	--	--	75	--	--	--	--	--
411	850	June 1, 1944	Tc	--	1.0	--	--	--		40	34	64	--	--	--	--	102	--	--	--	--	--
414	265	Aug. 7, 1945	Tc	--	6.8	--	--	--		54	46	63	--	--	--	--	86	--	--	--	--	--
724	540	Aug. 8, 1945	Tc	--	.10	--	--	--		52	24	46	--	--	--	--	72	--	--	--	--	--
801	1,090	May 8, 1944	Tc	--	.87	--	--	--		176	42	45	--	--	--	--	159	--	--	--	--	--
802	1,010	do	Tc	--	.71	--	--	--		126	16	39	--	--	--	--	102	--	--	--	--	--
803	956	Aug. 5, 1964	Tc	17	1.1	26	4.2	22	7.3	51	32	44	.2	.0	.07	178	82	34	1.1	.00	317	6.2
809	835	May 26, 1932	Tc	16	.05	28	6.1	21	7.0	55	32	47	--	.0	--	184	95	31	.9	.00	--	--
821	840	Feb. 22, 1928	Tc	18	.58	23	4.8	23	4.3	43	33	46	--	.21	--	180	77	38	1.1	.00	--	--
823	840	May 26, 1932	Tc	15	6.7	50	9.3	21	8.7	166	32	32	--	.0	--	250	163	21	.7	.00	--	--
61-209	810	Aug. 20, 1964	Tc	25	.54	20	4.9	26	8.6	34	34	52	.1	.0	.00	188	70	41	1.4	.00	316	6.5
402	320	June 5, 1944	Tqc	--	1.9	--	--	--		279	52	90	--	--	--	--	237	--	--	--	--	--
406	66	June 19, 1932	Tqc	--	1.1	130	31	*110		286	120	235	--	.0	--	767	452	35	2.3	.00	--	--
410	1,100	June 5, 1944	Tc	--	1.9	--	--	--		202	22	39	--	--	--	--	150	--	--	--	--	--
601	1,057	June 24, 1955	Tc	17	1.3	22	4.8	22	8.3	48	36	40	.1	.0	.06	174	75	36	1.1	.00	299	6.7
704	274	Aug. 26, 1964	Tqc	19	3.5	88	28	*146		342	171	104	.5	.0	--	725	334	49	3.5	.00	1,140	7.5
62-702	455	July 21, 1936	Tqc	--	.38	18	10	*200		298	90	128	.3	1.3	--	607	86	83	9.4	3.16	--	--
78-02-301	1,205	Apr. 6, 1964	Tc	16	.00	92	9.4	26	5.5	241	63	50	.4	.2	.07	382	268	17	.7	.00	650	6.8
03-401	1,207	June 2, 1944	Tc	--	1.7	--	--	--		271	34	37	--	--	--	--	207	--	--	--	--	--
408	1,750	Aug. 6, 1964	Tc	15	1.9	50	12	*69		304	35	27	.6	.0	--	358	174	46	2.3	1.49	612	7.1
409	1,940	do	Tc,Twi	16	3.6	30	9.0	189	8.6	320	111	114	.5	.0	.89	636	112	77	7.8	3.00	1,070	7.8

See footnotes at end of table.

Table 9.--Chemical analyses of water from wells in Atascosa, Frio, and adjacent counties--Continued

Well	Depth of well (ft)	Date of collection	Water-bearing unit	Silica (SiO_2)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3) a/	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Boron (B)	Dissolved solids	Hardness as $CaCO_3$	Percent sodium	Sodium adsorption ratio (SAR)	Residual sodium carbonate (RSC)	Specific conductance (micromhos at 25°C)	pH
AL-78-03-504	2,624	Aug. 6, 1964	Twi	19	0.24	4.5	1.0	*446		444	200	290	0.8	1.5	--	1,180	15	98	50	6.98	1,960	8.2
04-103	1,565	Aug. 20, 1964	Tc	15	.19	63	7.2	25	4.9	181	46	37	.3	.2	0.12	288	187	22	.8	.00	490	7.2
204	1,454	May 12, 1944	Tc	--	.71	--	--	--		212	44	36	--	--	--	--	204	--	--	--	--	--
205	1,405	May 9, 1944	Tc	--	.81	--	--	--		192	42	34	--	--	--	--	174	--	--	--	--	--
206	1,400	do	Tc	--	.64	--	--	--		190	22	38	--	--	--	--	150	--	--	--	--	--
301	1,500	do	Tc	--	1.6	--	--	--		200	40	37	--	--	--	--	174	--	--	--	--	--
402	1,040	June 18, 1932	Tr	--	1.66	48	23	*88		272	73	75	--	.5	--	442	214	47	2.6	.17	--	--
502	1,635	do	Tc	--	.90	68	15	*39		278	41	33	--	.0	--	333	232	27	1.1	.00	--	--
502	1,635	Aug. 14, 1945	Tc	13	.67	69	13	26	11	266	31	32	.4	.5	--	336	226	19	.8	.00	573	7.6
†502	1,635	May --, 1960	Tc	--	.89	60	18	27	--	--	28	35	.3	.4	--	342	225	--	--	--	570	7.4
602	1,505	Feb. 21, 1928	Tc	22	.96	77	12	28	4.3	264	37	34	--	.0	--	344	242	20	.8	.00	--	--
605	701	June 3, 1944	Tqc	--	.25	--	--	--		385	3	111	--	--	--	--	78	--	--	--	--	--
703	1,900	Aug. 30, 1964	Tc	17	.04	48	12	41	7.7	211	40	39	.3	.2	.17	309	170	33	1.4	.07	522	7.5
803	1,960	Aug. 5, 1964	Tc	16	.56	73	11	27	6.8	270	28	28	.5	.0	--	323	227	20	.8	.00	552	7.2
901	2,350	Aug. 27, 1964	Tc	16	2.2	67	12	*41		284	32	28	.4	.0	--	336	216	29	1.2	.32	568	7.3
906	333	Aug. 26, 1964	Ts	14	2.2	133	119	*524		212	996	530	--	3.8	--	2,420	822	58	8.0	.00	3,520	7.?
05-101	1,550	Aug. 14, 1945	Tc	13	.89	64	7.8	27	10	206	40	36	1.0	.0	--	300	192	23	.8	.00	509	7.5
103	815	Feb. 2, 1928	Tqc	20	.09	6.8	3.7	173	3.0	356	2.2	90	--	.1	--	474	32	91	13	5.19	--	--
103	815	Aug. 14, 1945	Tqc	15	.05	7.8	3.8	175	6.3	354	.7	94	.2	.0	--	480	35	90	13	5.11	838	8.?
104	1,700	July 31, 1963	Tc	15	.46	80	7.7	28	5.6	255	38	34	.3	.0	.10	334	231	20	.8	.00	553	6.7
108	790	Aug. 5, 1964	Tqc	16	.17	10	5.1	162	5.0	342	.0	91	.6	.2	.31	458	46	87	10	4.69	793	7.6
115	208	June 5, 1944	Tqc	--	.20	--	--	--		309	20	83	--	--	--	--	102	--	--	--	--	--
116	1,200	do	Tc	--	.47	--	--	--		248	22	55	--	--	--	--	162	--	--	--	--	--
117	1,925	Feb. 20, 1928	Tc	20	.52	59	8.5	28	3.5	189	39	34	--	--	--	285	182	25	.9	.00	--	--
207	700	May 18, 1944	Tqc	--	--	--	--	--		442	4	82	--	--	--	--	30	--	--	--	--	--
208	700	do	Tqc	--	--	--	--	--		666	65	171	--	--	--	--	42	--	--	--	--	--
209	600	do	Tqc	--	--	--	--	--		560	15	134	--	--	--	--	30	--	--	--	--	--
303	600	do	Tqc	--	--	--	--	--		602	80	107	--	--	--	--	6	--	--	--	--	--

See footnotes at end of table.

Table 9.--Chemical analyses of water from wells in Atascosa, Frio, and adjacent counties--Continued

Well	Depth of well (ft)	Date of collection	Water-bearing	Silica (SiO_2)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3) a/	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Boron (B)	Dissolved solids	Hardness as $CaCO_3$	Percent sodium	Sodium adsorption ratio (SAR)	Residual sodium carbonate (RSC)	Specific conductance (micromhos at 25°C)	pH
AL-78-05-306	1,050	June 19, 1932	Tqc	--	--	5	--	*249		542	1	81	--	--	--	583	18	--	--	--	--	--
307	900	May 10, 1944	Tqc	--	0.08	--	--	--		494	2	93	--	--	--	--	24	--	--	--	--	--
308	1,900	do	Tc	--	4.4	--	--	--		266	36	42	--	--	--	--	204	--	--	--	--	--
309	1,100	do	Tqc	--	.05	--	--	--		564	2	95	--	--	--	--	18	--	--	--	--	--
405	1,750	May 9, 1944	Tc	--	.14	--	--	--		284	36	35	--	--	--	--	207	--	--	--	--	--
501	1,943	do	Tc	--	.20	--	--	--		278	24	30	--	--	--	--	216	--	--	--	--	--
502	1,722	June 19, 1932	Tc	--	.69	82	12	*28		268	47	33	--	0.0	--	334	254	19	0.8	0.00	--	--
502	1,722	May 9, 1944	Tc	--	.34	--	--	--		268	40	38	--	--	--	--	228	--	--	--	--	--
601	903	May 10, 1944	Tqc	--	.32	--	--	--		474	2	98	--	--	--	--	21	--	--	--	--	--
603	885	Aug. 14, 1945	Tqc	16	.14	3.7	1.2	373	15	624	94	164	1.0	.0	--	996	14	--	43	9.96	1,690	8.4
603	885	Aug. 5, 1964	Tqc	14	.03	2.5	1.0	*396		646	97	168	1.0	.0	--	998	10	99	54	10.4	1,650	8.2
604	1,000	May 18, 1944	Tqc	--	--	--	--	--		724	140	263	--	--	--	--	--	--	--	--	--	--
606	700	do	Tqc	--	--	--	--	--		836	80	376	--	--	--	--	3	--	--	--	--	--
702	640	do	Ts	--	--	--	--	--		461	500	505	--	--	--	--	--	--	--	--	--	--
703	1,500	do	Tqc	--	--	--	--	--		530	2	74	--	--	--	--	12	--	--	--	--	--
801	2,060	do	Tc	--	--	--	--	--		280	22	25	--	--	--	--	180	--	--	--	--	--
801	2,060	Aug. 19, 1964	Tc	17	.30	60	12	*41		276	26	24	.3	.0	--	316	199	31	1.3	.54	538	6.9
802	2,993	do	Tc	17	.98	65	12	29	8.3	272	29	25	.4	.0	0.13	320	212	22	.9	.23	541	7.2
902	1,159	Aug. 25, 1964	Tqc	16	.05	2.0	.2	*314		580	80	91	.7	.0	--	789	6	92	56	9.39	1,270	8.2
06-201	2,165	July 17, 1956	Tc	18	--	64	14	52	10	274	54	43	--	.0	.21	390	217	33	1.5	.15	644	7.4
401	2,010	May 10, 1944	Tc	--	2.0	--	--	--		302	44	46	--	--	--	--	204	--	--	--	--	--
403	550	May 18, 1944	Ts	--	--	--	--	--		422	550	280	--	--	--	--	42	--	--	--	--	--
603	--	May 16, 1944	Tqc	--	.08	--	--	--		972	120	605	--	--	--	--	24	--	--	--	--	--
801	1,300	do	Tqc	--	--	--	--	--		1,660	140	1,040	--	--	--	--	--	--	--	--	--	--
901	3,195	July 17, 1956	Tc	22	--	19	7.9	128	7.8	349	46	25	--	.0	.20	432	80	76	6.2	4.12	677	7.6
903	3,500	Aug. 19, 1964	Tc	21	.03	22	8.5	124	7.8	350	46	23	.4	.0	.23	425	90	73	5.7	3.94	680	7.3
10-602	3,710	Apr. 6, 1964	Twi	24	.00	2.2	.6	*660		998	169	315	1.7	.5	--	1,660	8	99	101	16.2	2,690	8.1

See footnotes at end of table.

Table 9.--Chemical analyses of water from wells in Atascosa, Frio, and adjacent counties--Continued

Well	Depth of well (ft)	Date of collection	Water-bearing unit	Silica (SiO_2)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3) a/	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Boron (B)	Dissolved solids	Hardness as $CaCO_3$	Percent sodium	Sodium adsorption ratio (SAR)	Residual sodium carbonate (RSC)	Specific conductance (micromhos at 25°C)	pH
AL-78-11-101	1,869	Aug. 5, 1964	Tc	15	0.48	72	13	31	7.5	276	44	30	0.3	0.2	--	349	233	22	0.9	0.00	591	7.3
205	3,575	Aug. 26, 1964	Twi	22	--	2.0	.7	*642		944	188	305	1.5	1.5	--	1,630	8	99	99	15.3	2,610	8.0
301	2,122	July 18, 1956	Tc	16	--	76	12	33	6.9	275	43	33	--	.0	0.13	357	238	23	.9	.00	596	7.4
801	2,150	do	Tc	18	--	65	13	31	9.7	271	42	22	--	.0	.13	334	215	23	.9	.14	553	7.4
12-105	1,340	May 23, 1944	Tqc	--	--	--	--	--		354	4	68	--	--	--	--	36	--	--	--	--	--
201	2,075	Aug. 1, 1963	Tc	17	.73	72	12	43	9.1	267	55	41	.6	.0	.33	381	229	28	1.2	.00	629	6.8
205	459	Aug. 26, 1964	Ts	15	1.5	95	44	*660		176	896	550	--	1.0	--	2,350	418	77	14	.00	3,570	7.7
301	2,150	July 17, 1956	Tc	16	--	68	13	40	8.7	270	47	36	--	.0	.17	362	222	27	1.2	.00	605	7.4
701	2,300	Aug. 18, 1964	Tc	19	.03	16	14	60	12	180	56	28	.4	.0	.11	295	98	54	2.6	1.00	479	8.2
13-202	148	May 17, 1944	Ty	--	--	--	--	--		322	2,000	720	--	--	--	--	--	--	--	--	--	--
402	1,314	June 19, 1932	Tqc	--	--	--	--	*672		781	153	475	--	.68	--	1,652	9	--	--	--	--	--
402	1,314	May 25, 1944	Tqc	14	.08	4.8	1.4	667	4.6	743	152	497	1.7	2.0	--	1,710	18	98	68	11.8	3,070	8.2
502	285	May 17, 1944	Ty	--	--	--	--	--		245	2,000	1,580	--	--	--	--	--	--	--	--	--	--
701	956	June 19, 1932	Ts	21	.10	4.8	2.3	643	14	769	152	460	--	2.5	--	1,680	21	97	61	11.3	--	--
702	1,717	Aug. 5, 1964	Tqc	18	.09	25	.2	264	1.5	504	83	66	.6	.0	.43	684	7	98	43	8.12	1,120	8.2
14-102	900	June 19, 1932	Tcm	--	--	--	--	*1,255		1,670	163	850	--	.0	--	2,980	10	--	--	--	--	--
102	900	May 16, 1944	Tcm	--	--	--	--	--		1,680	130	845	--	--	--	--	--	--	--	--	--	--
401	1,600	do	Tqc	--	--	--	--	--		598	120	194	--	--	--	--	30	--	--	--	--	--
402	1,698	May 17, 1944	Tqc	--	--	--	--	--		1,260	120	475	--	--	--	--	24	--	--	--	--	--
801	3,992	Mar. 14, 1951	Tc	30	.19	3.6	.7	244	2.0	504	65	44	.6	.0	--	675	12	97	32	8.02	1,010	8.1
15-301	4,800	Aug. 6, 1964	Tc	33	.0	3.0	.6	234	3.0	496	37	54	.4	.0	.34	609	10	97	32	7.93	973	8.1
504	4,326	Aug. 26, 1963	Tc	33	--	3.0	.1	*216		468	46	32	.6	.0	--	561	8	98	33	7.51	969	7.6
601	185	Aug. 20, 1964	Tj	20	11	780	48	*778		434	1,840	1,020	--	2.0	--	4,660	2,020	46	75	.00	6,020	6.2
804	765	May 25, 1944	Tj	--	--	--	--	--		976	20	740	--	--	--	--	--	--	--	--	--	--
18-201	480	June 19, 1932	Ts	--	--	--	--	*639		324	547	412	--	2.7	--	1,700	28	98	53	4.75	--	--
202	350	May 11, 1944	Ts	--	--	--	--	--		225	550	472	--	--	--	--	--	--	--	--	--	--
301	2,400	May 5, 1964	Tc	17	.00	52	10	42	8.3	265	38	13	.5	.0	.05	311	170	34	1.4	.93	517	7.5

See footnotes at end of table.

Table 9.--Chemical analyses of water from wells in Atascosa, Frio, and adjacent counties--Continued

Well	Depth of well (ft)	Date of collection	Water-bearing unit	Silica (SiO_2)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3) a/	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Boron (B)	Dissolved solids	Hardness as $CaCO_3$	Percent sodium	Sodium adsorption ratio (SAR)	Residual sodium carbonate (RSC)	Specific conductance (micromhos at 25°C)	pH
AL-78-18-601	2,507	Aug. 18, 1964	Tc	19	0.02	25	9.4	88	6.2	286	45	15	0.3	0.0	0.15	349	101	64	3.8	2.67	560	7.3
19-301	1,560	do	Tqc	17	.20	2.8	.5	*245		416	93	73	.5	.0	--	637	9	98	36	6.64	1,030	8.2
401	1,012	June 3, 1944	Tqc	--	.10	--	--	--		618	220	1,320	--	--	--	--	129	--	--	--	--	--
402	860	do	Ts	--	.00	--	--	--		770	210	660	--	--	--	--	60	--	--	--	--	--
20-101	2,794	Apr. 9, 1964	Tc	22	.00	13	6.7	108	5.2	280	47	17	.4	.0	.08	357	60	78	6.1	3.39	577	7.5
703	2,185	Mar. 3, 1959	Tqc	22	--	2.2	.4	*384		752	106	79	1.0	.0	--	970	7	99	63	12.2	1,540	8.5
703	2,185	Aug. 27, 1964	Tqc	20	.05	2.2	.1	*385		760	102	79	.8	.0	--	963	6	99	68	12.4	1,540	8.3
22-201	4,015	July 16, 1956	Tc	30	--	2.8	.3	270	3.4	569	59	46	1.0	.0	.35	693	8	98	42	9.17	1,070	8.1
23-101	4,200	May 25, 1944	Tc	31	.02	3.8	.8	*289		628	35	63	.6	.0	--	739	13	98	35	10.0	1,250	8.2
101	4,200	July 17, 1956	Tc	33	--	2.2	.1	224	2.4	434	59	60	--	.2	--	594	6	98	40	6.99	984	8.1
201	175	Aug. 18, 1964	Tj	50	4.0	238	17	*791		324	1,220	600	--	1.0	--	3,000	664	72	13	.00	4,390	7.8
204	4,169	May 24, 1955	Tc	32	.02	3.3	.4	*312		686	17	74	1.0	.0	--	817	10	99	43	11.1	1,370	8.1
Frio County																						
KB-68-57-801	190	June 18, 1932	Tr	--	1.52	63	22	*95		388	47	62	1.0	1.0	--	482	248	46	2.6	1.41	--	--
907	775	Aug. 13, 1964	Tc,Twi	22	.76	141	12	70	6.2	226	130	171	.4	.0	0.16	664	402	27	1.5	.00	1,110	6.5
58-401	115	June 18, 1932	Tr	51	.21	34	8.6	53	9.3	149	45	54	--	.6	--	330	120	47	2.1	.05	--	--
69-61-901	260	Aug. 19, 1952	Tc	24	--	119	16	*18		391	26	26	.4	2.0	.01	430	363	10	.4	.00	724	7.2
62-706	620	do	Tc	14	--	110	13	*21		332	50	37	.6	1.0	.10	434	328	12	.5	.00	711	7.2
801	197	May 17, 1930	Tc	--	5.0	94	16	*21		317	36	35	--	.0	--	358	301	13	.5	.00	--	--
803	208	Aug. 19, 1952	Tr	14	--	90	17	*42		307	58	50	.6	1.0	--	424	294	24	1.1	.00	739	7.4
77-06-304	--	do	Tr	18	--	46	22	*107		302	69	83	.6	1.0	--	496	206	53	3.2	.84	859	7.8
07-101	1,136	Aug. 13, 1964	Tr,Tc	14	1.8	94	14	42	7.6	332	66	39	.6	.0	.18	440	292	23	1.1	.00	734	7.3
102	700	do	Tr	13	1.6	46	14	156	11	304	92	125	.7	.0	.36	607	172	65	5.2	1.53	1,030	7.2
103	300	do	Tqc	18	1.2	33	21	*271		418	190	153	1.0	.0	--	893	169	78	9.1	3.47	1,440	7.5
501	1,300	do	Tc	15	.22	100	15	25	5.2	320	66	28	.5	.0	.15	412	311	15	.6	.00	648	6.8
08-403	1,434	Aug. 27, 1964	Tc	15	.40	92	15	*30		306	63	27	.5	.0	--	393	291	18	.8	.00	664	7.1
407	130	Jan. 18, 1928	Tqc	52	.08	176	22	138	12	304	177	282	--	9.1	--	1,050	530	36	2.6	.00	--	--

See footnotes at end of table.

Table 9.--Chemical analyses of water from wells in Atascosa, Frio, and adjacent counties--Continued

Well	Depth of well (ft)	Date of collection	Water-bearing unit	Silica (SiO_2)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3) a/	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Boron (B)	Dissolved solids	Hardness as $CaCO_3$	Percent sodium	Sodium adsorption ratio (SAR)	Residual sodium carbonate (RSC)	Specific conductance (micromhos at 25°C)	pH
KB-77-08-704	40	June 18, 1932	Tqc	--	0.15	118	61	*131		446	121	228	--	20	--	899	545	34	2.4	0.00	--	--
708	110	do	Tqc	--	.26	145	18	*128		331	114	228	--	2.5	--	800	436	39	2.7	.00	--	--
†712	1,303	Feb. 20, 1943	Tc	20	.4	89	16	*28		299	62	28	0.4	.4	--	394	288	--	--	--	--	--
713	1,302	May 9, 1945	Tc	18	.62	95	17	*17		296	62	25	.6	.0	--	391	307	11	.4	.00	628	7.1
†714	1,350	Jan. 20, 1958	Tc	--	.34	80	16	*33		304	59	27	.4	.4	--	338	265	--	--	--	563	6.9
802	200	June 18, 1932	Tqc	--	3.7	312	65	*302		284	273	838	--	5.4	--	1,940	1,050	39	4.0	.00	--	--
806	1,426	Aug. 20, 1964	Tc	16	.70	84	14	*33		308	53	22	.4	.0	--	373	267	21	.9	.00	611	7.3
14-801	210	June 17, 1932	Ts	--	7.8	176	34	*1,350		390	1,180	1,380	--	4.5	--	4,320	579	83	24	.00	--	--
901	200	Mar. 20, 1940	Ts	--	--	--	--	--		334	1,100	750	.5	--	--	3,120	--	--	--	--	--	7.7
902	173	June 17, 1932	Ts	--	.27	42	22	*878		362	712	755	--	2.6	--	2,620	195	91	27	2.02	--	--
905	180	Sept. 17, 1941	Tqc	24	--	76	17	*358		434	224	317	.8	.0	--	1,240	260	75	9.7	1.92	--	--
15-301	1,350	June 17, 1932	Tc	22	4.0	99	18	22	6.2	331	59	25	--	.05	--	414	321	13	.5	.00	--	--
602	1,672	do	Tc	--	.15	83	16	*26		295	58	18	--	2.7	--	349	273	17	.7	.00	--	--
706	1,622	Aug. 26, 1964	Tc	11	3.2	61	14	27	5.9	260	33	18	.3	.0	0.03	298	210	21	.8	.07	513	7.4
901	285	June 18, 1932	Tqc	--	.36	149	82	*323		345	436	460	--	32	--	1,650	709	50	5.3	.00	--	--
901	285	Aug. 14, 1940	Tqc	--	--	44	20	*490		218	554	355	.4	.0	--	1,600	192	85	15	.00	--	7.0
902	200	Aug. 19, 1940	Tqc	--	--	44	23	*485		202	540	375	.4	.8	--	1,580	204	84	15	.00	--	7.0
903	277	July 24, 1940	Tqc	--	--	46	23	*486		212	540	375	.4	1.0	--	1,560	209	83	15	.00	--	7.2
905	1,700	June 17, 1932	Tc	23	.22	70	13	36	6.1	284	47	18	--	.6	--	349	228	25	1.0	.10	--	--
16-102	242	June 18, 1932	Tqc	14	.55	127	57	438	20	301	676	408	--	2.6	--	1,890	551	62	8.1	.00	--	--
401	1,507	Aug. 19, 1964	Tc	16	4.2	88	15	*29		314	55	20	.4	.0	--	377	281	18	.8	.00	621	7.2
403	228	June 18, 1932	Tqc	--	.45	94	19	*118		273	79	148	--	69	--	662	313	45	2.9	.00	--	--
404	1,625	Aug. 19, 1964	Tc	17	2.2	62	13	46	6.7	290	51	20	.4	.0	.05	359	208	32	1.4	.59	589	7.4
502	1,725	Aug. 20, 1964	Tc	16	.28	56	11	76	6.3	292	60	39	.4	.0	.09	409	184	46	2.4	1.10	675	7.4
803	1,919	Aug. 19, 1964	Tc	16	.31	72	13	28	6.7	282	45	16	.4	.0	.08	336	233	20	.8	.00	556	7.1
22-503	171	Feb. 19, 1956	Tcm	--	--	--	--	--		234	--	1,250	--	--	--	--	1,260	--	--	--	4,460	7.2
23-103	250	June 17, 1932	Tcm,Ts	--	1.4	104	39	*214		328	377	158	--	.5	--	1,050	420	53	4.5	.00	--	--

See footnotes at end of table.

Table 9.--Chemical analyses of water from wells in Atascosa, Frio, and adjacent counties--Continued

Well	Depth of well (ft)	Date of collection	Water-bearing unit	Silica (SiO_2)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3) a/	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Boron (B)	Dissolved solids	Hardness as $CaCO_3$	Percent sodium	Sodium adsorption ratio (SAR)	Residual sodium carbonate (RSC)	Specific conductance (micromhos at 25°C)	pH
KB-77-23-303	1,954	Aug. 13, 1964	Tc	17	0.32	56	11	41	6.5	274	37	13	0.5	0.2	0.11	317	184	32	1.3	0.80	524	7.2
502	305	June 17, 1932	Tcm	27	.31	102	36	221	9.6	341	254	248	--	.4	--	1,090	403	54	4.8	.00	--	--
601	110	Sept. --, 1942	Tcm	--	--	273	74	*69		218	386	385	--	15	--	1,310	984	13	1.0	.00	--	--
701	2,045	July 13, 1956	Tc	22	--	25	9.4	99	5.5	292	51	26	--	.2	.18	382	102	66	4.3	2.75	622	7.8
701	2,045	Aug. 12, 1964	Tc	21	.08	28	11	98	5.1	298	50	24	.5	.0	.16	385	115	64	4.0	2.58	616	7.6
801	2,010	Jan. 23, 1928	Tc	27	.24	32	11	80	4.6	282	45	18	--	.4	--	350	125	57	3.1	2.12	--	--
†801	2,010	Apr. 13, 1945	Tc	--	.6	31	10	*89		280	47	23	.7	.4	--	370	119	--	--	--	--	7.9
801	2,010	May 9, 1945	Tc	27	--	--	--	--		--	--	20	--	.2	--	365	--	--	--	--	--	--
†802	340	Nov. 17, 1954	Ts	20	.6	42	16	*217		311	227	107	.9	--	--	810	171	--	--	--	--	--
†802	340	Sept. 28, 1961	Ts	--	5.4	90	31	*200		293	288	162	.8	--	--	1,140	385	--	--	--	1,900	--
803	2,082	Aug. --, 1959	Tc	--	16	26	8	*66		--	72	5	.4	.4	--	341	98	--	--	--	568	7.8
804	200	June 17, 1932	Tcm	--	2.5	88	39	*107		349	131	135	--	.0	--	672	380	38	2.4	.00	--	--
805	307	Jan. 20, 1928	Tcm	22	2.4	166	65	305	18	292	650	325	--	.4	--	1,750	682	48	5.1	.00	--	--
902	370	June 16, 1932	Tcm	--	.57	120	55	*427		245	730	350	--	.2	--	1,800	526	64	8.1	.00	--	--
24-101	1,996	July 13, 1956	Tc	16	--	57	12	34	6.5	269	34	11	--	.0	.02	308	192	27	1.1	.57	507	7.5
201	2,140	do	Tc	22	--	153	56	64	17	317	243	182	.8	.0	--	894	612	18	1.1	.00	1,450	7.3
203	2,096	Aug. 13, 1964	Tc	18	.25	38	8.0	100	4.8	320	52	25	.5	.0	.24	404	128	62	3.8	2.68	655	7.6
‡78-01-203	890	May 23, 1961	Tc	--	--	87	25	*25		256	76	39	--	--	--	526	325	--	--	--	--	--
503	462	Apr. 3, 1952	Tqc	21	--	--	--	--	--	--	146	170	--	.0	--	--	--	--	--	--	1,570	--
02-402	1,445	Aug. 13, 1964	Tc	14	.21	98	11	30	5.4	312	49	37	.4	.0	.17	398	290	18	.8	.00	665	6.8
09-302	860	May 26, 1932	Tqc	20	3.4	90	40	199	21	374	172	258	--	.0	--	987	389	51	4.4	.00	--	--
503	1,700	Aug. 13, 1964	Tc	16	1.0	74	13	28	6.8	282	44	22	.5	.0	.14	344	238	20	.8	.00	573	7.2
701	1,800	July 14, 1956	Tc	16	--	70	13	32	6.7	281	45	19	--	.0	.10	340	228	23	.9	.05	566	7.6
801	1,700	May 26, 1932	Tc	17	.17	66	14	25	7.8	270	38	15	--	.0	--	308	222	19	.7	.00	--	--
17-301	193	June 17, 1952	Tcm	15	6.4	67	45	*321		257	355	330	.6	3.0	.68	1,280	352	66	7.4	.00	2,100	8.0
18-204	1,833	Apr. 18, 1946	Tc	--	--	52	11	*48		261	40	17	--	.0	--	311	175	37	1.6	1.59	--	--
†501	2,114	July 14, 1956	Tc	20	--	3.6	1.2	190	3.1	371	74	36	--	.0	.13	516	14	96	22	5.80	812	8.3

See footnotes at end of table.

Table 9.--Chemical analyses of water from wells in Atascosa, Frio, and adjacent counties--Continued

Well	Depth of well (ft)	Date of collection	Water-bearing unit	Silica (SiO_2)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3) a/	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Boron (B)	Dissolved solids	Hardness as $CaCO_3$	Percent sodium	Sodium adsorption ratio (SAR)	Residual sodium carbonate (RSC)	Specific conductance (micromhos at 25°C)	pH
Medina County																						
†TD-69-64-201	110	May 20, 1930	Tc	--	--	111	12	*403		403	40	28	--	7.5	--	327	327	--	--	--	--	--
McMullen County																						
SU-78-21-801	3,600	Mar. 23, 1959	Tc	26	--	2.2	.7	*309		601	76	76	1.0	.0	--	787	8	99	46	9.67	1,100	8.7

a/ Includes the equivalent of any carbonate (CO_3) present.
* Sodium and potassium calculated as sodium (Na).
† Analyzed by Texas State Department of Health.
‡ Analyzed by Texas Agricultural Experiment Station.

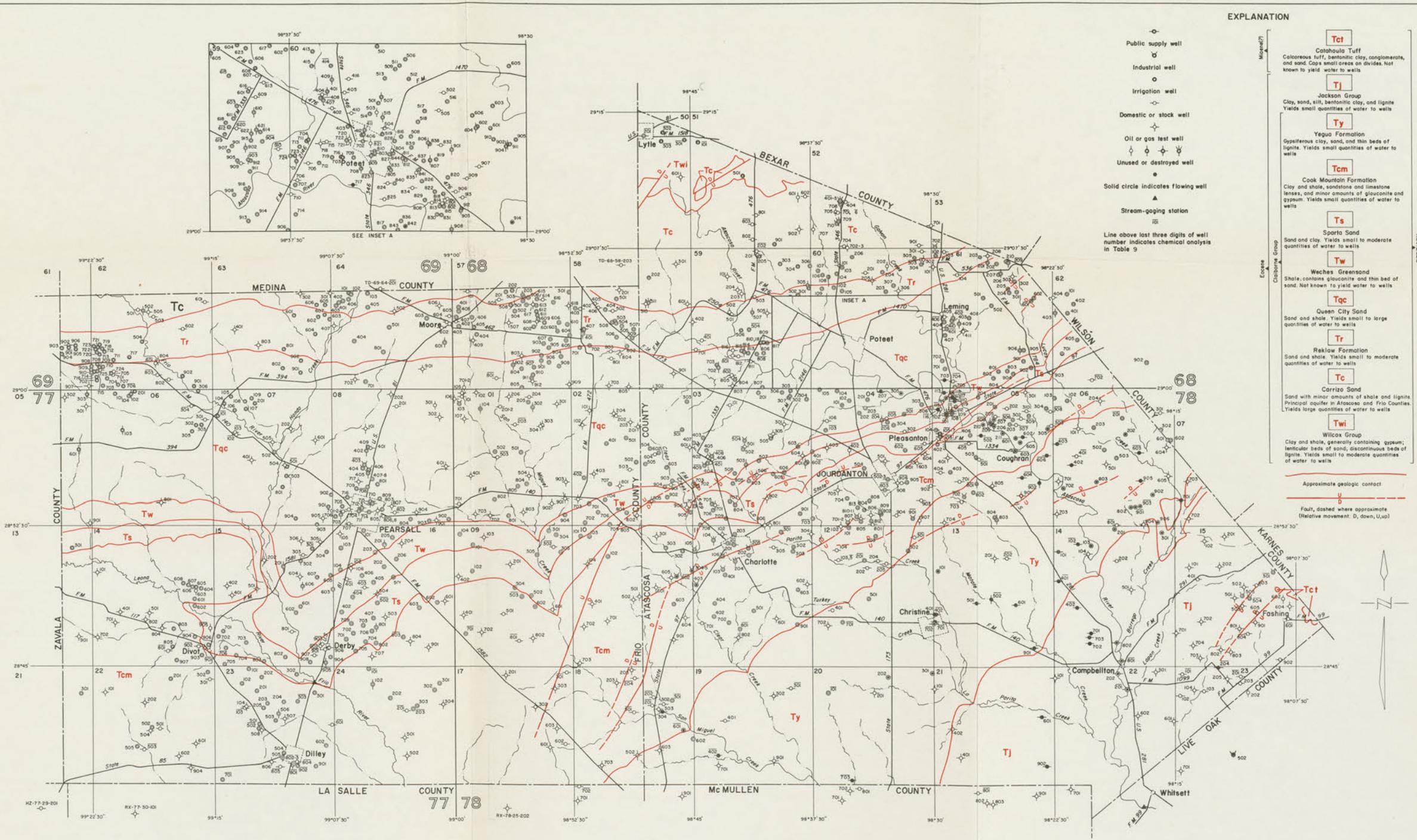

Figure 34

Geologic Map Showing Locations of Wells

U.S. Geological Survey in cooperation with the Texas Water Development Board

Base compiled from county maps of the Texas State Highway Department

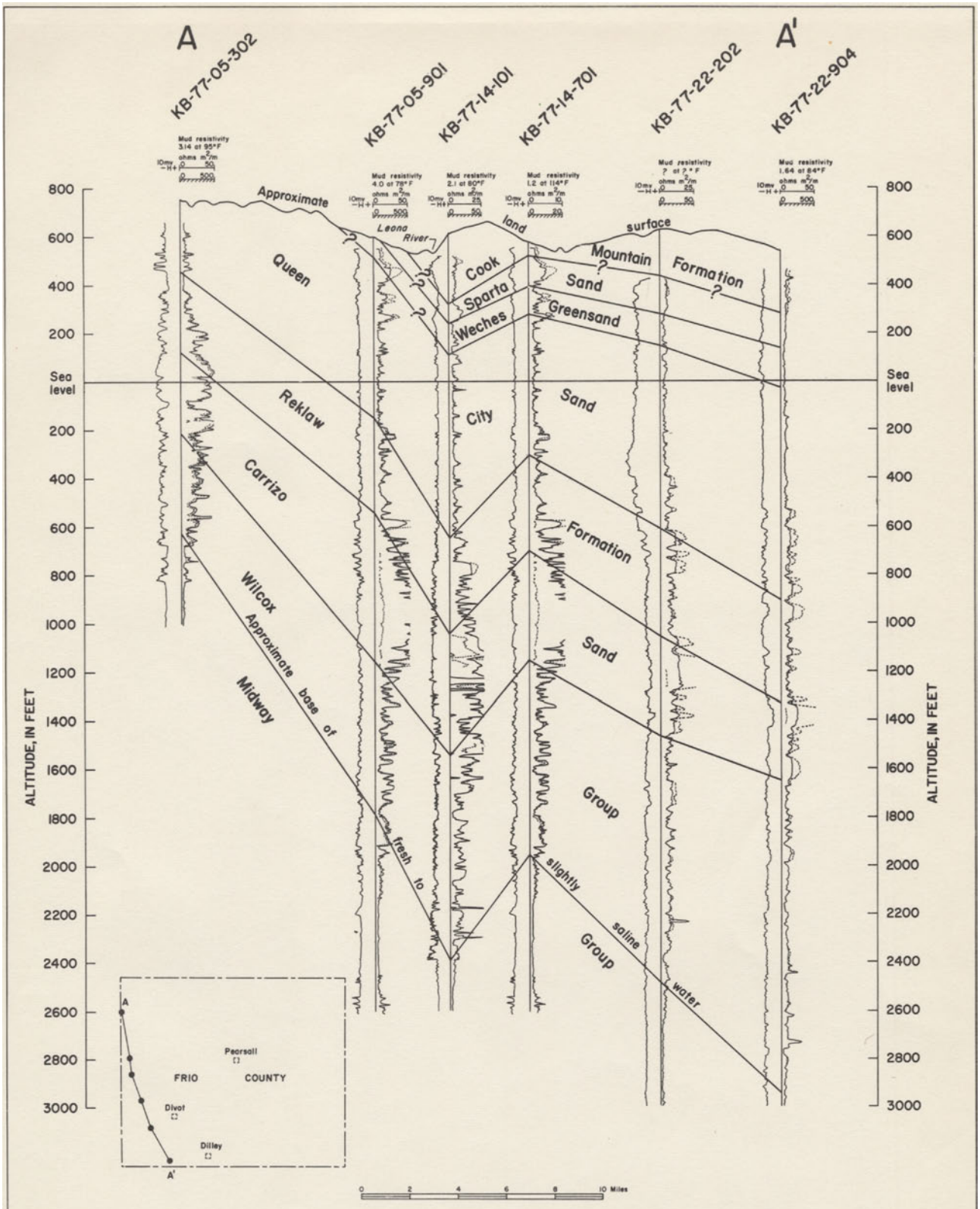

Figure 35

Geologic Section A-A', Frio County

U. S Geological Survey in cooperation with the Texas Water Development Board

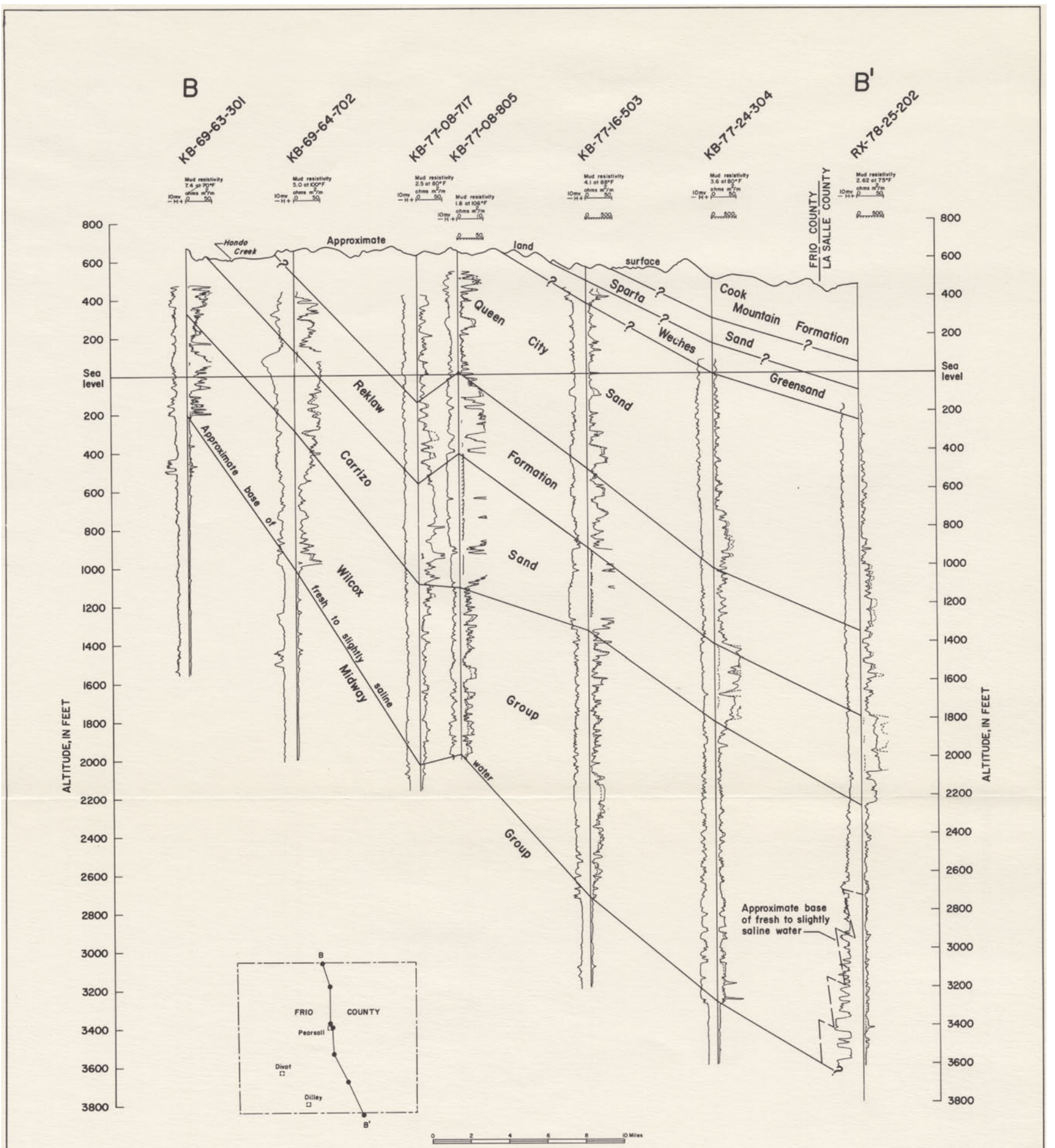

Figure 36

Geologic Section B-B', Frio and La Salle Counties

U.S. Geological Survey in cooperation with the Texas Water Development Board

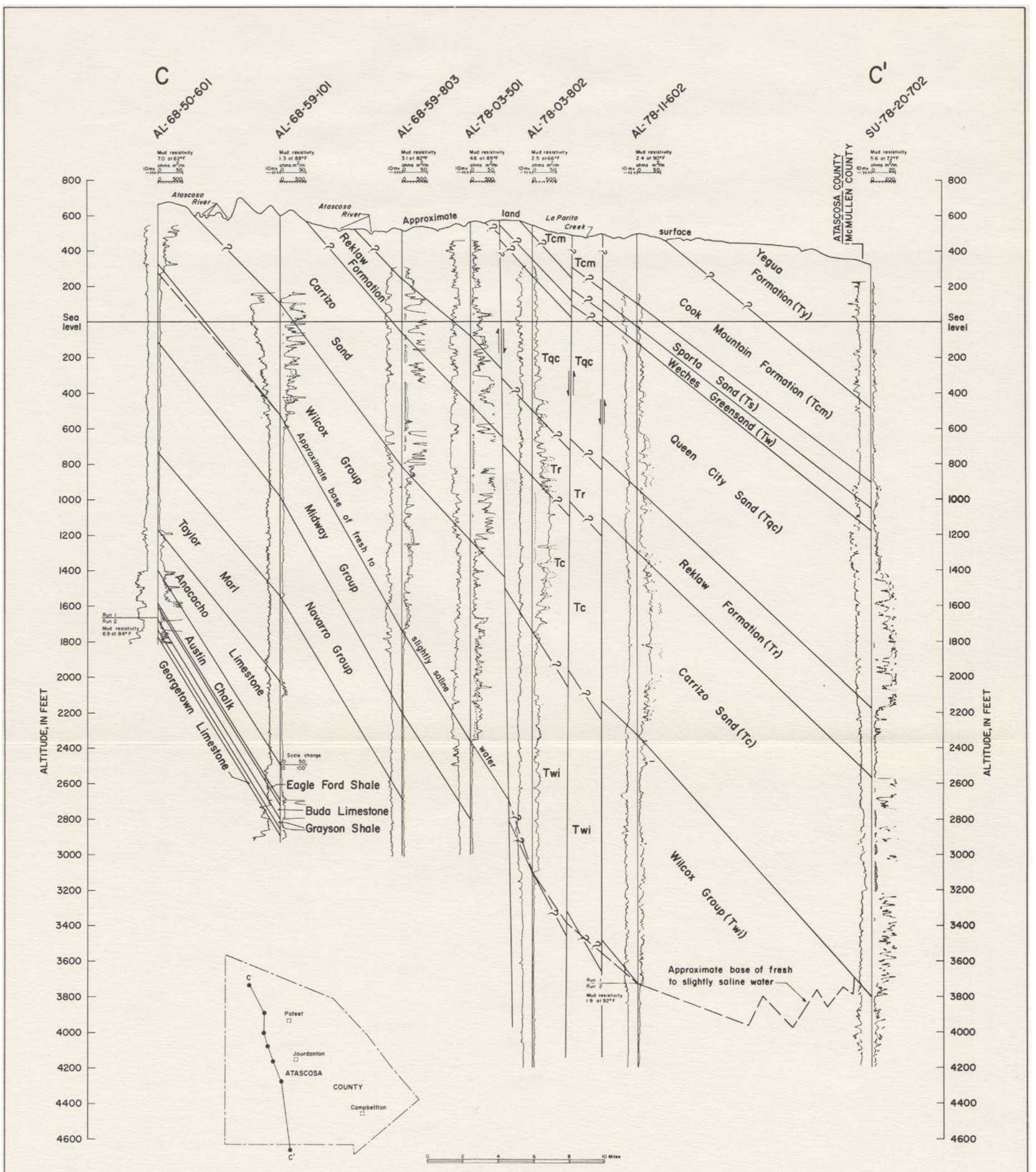

Figure 37

Geologic Section C-C', Atascosa and Mc Mullen Counties

U.S. Geological Survey in cooperation with the Texas Water Development Board

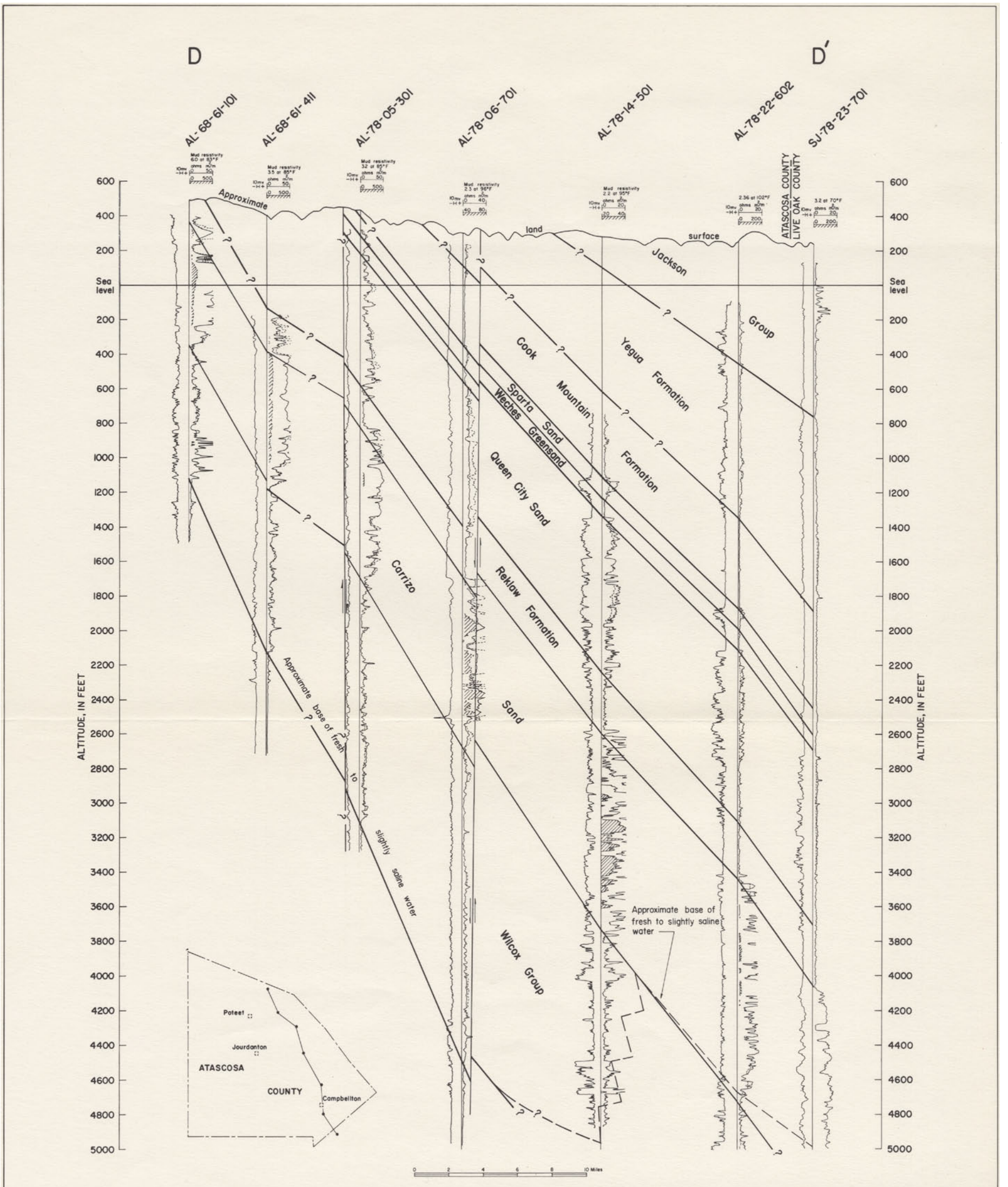

Figure 38

Geologic Section D-D', Atascosa and Live Oak Counties

U.S. Geological Survey in cooperation with the Texas Water Development Board

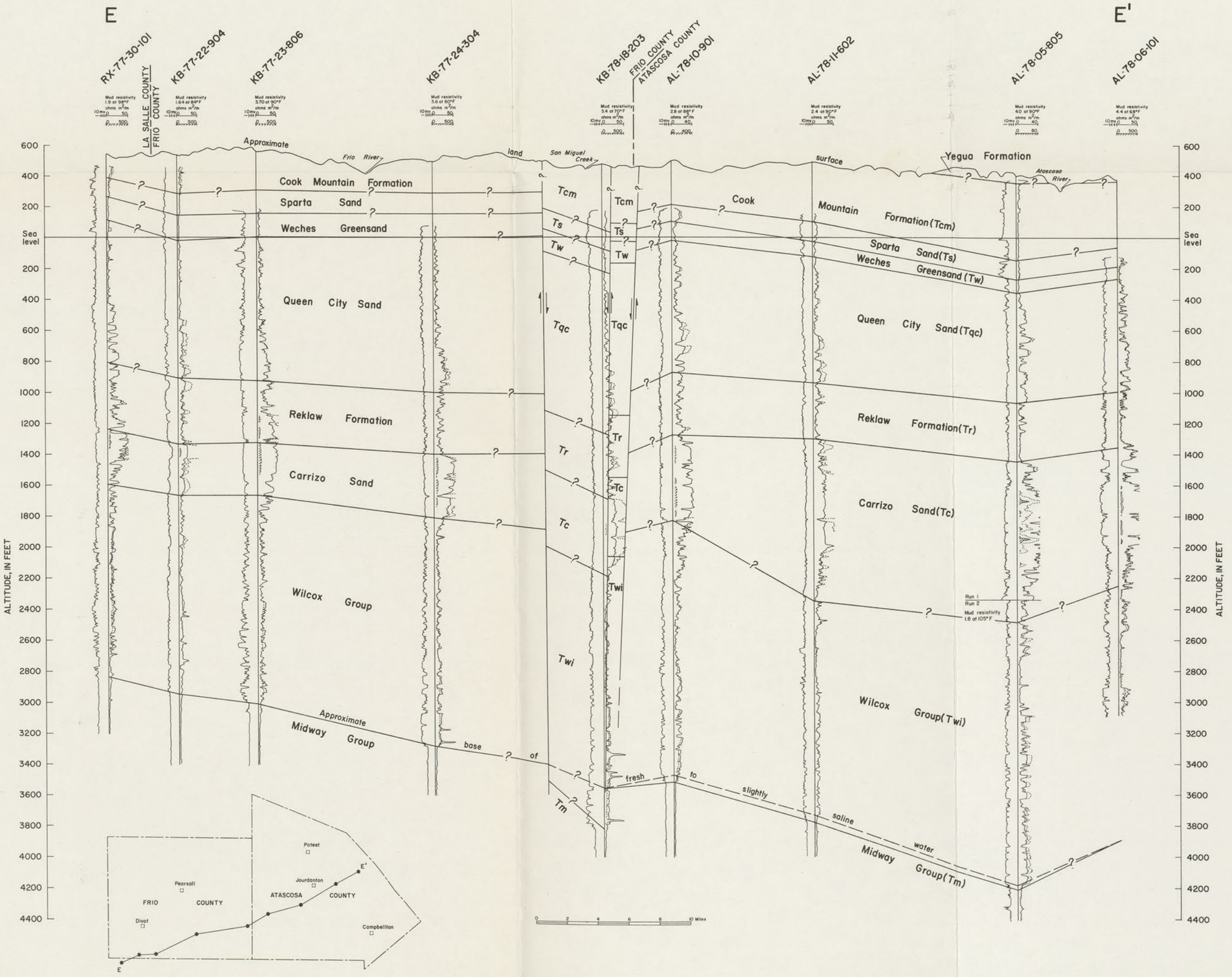

Figure 39

Geologic Section E-E', La Salle, Frio, and Atascosa Counties

U.S. Geological Survey in cooperation with the Texas Water Development Board