TEXAS

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BOARD

REPORT 17

GROUND-WATER RESOURCES OF BEE COUNTY, TEXAS

FEBRUARY 1966

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GROUND-WATER RESOURCES OF BEE COUNTY, TEXAS

By

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United States Geological Survey

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GROUND-WATER RESOURCES OF BEE COUNTY, TEXAS

ABSTRACT

Bee County, in south-central Texas in the West Gulf Coastal Plain, has an area of 842 square miles. The topography ranges from nearly flat lands in the southern part of the county to gently rolling hills in the northwestern part.

Rock formations that crop out and yield fresh to slightly saline ground water are sedimentary deposits of Tertiary and Quaternary age. In order of decreasing age, the formations are Catahoula Tuff, Oakville Sandstone, Lagarto Clay, Goliad Sand, Lissie Formation, Beaumont Clay, and alluvium. The formations consist principally of interconnected and interbedded sand and clay deposits which are hydrologically connected. The deposits, except those of Recent age, crop out in belts roughly parallel to the coast line and dip southeastward at an angle greater than the slope of the land, thereby creating favorable conditions for the occurrence of artesian water. The deposits of Recent age are exposed in the stream valleys.

Ground water in the county moves southeastward from areas of recharge to areas of discharge at about 10 feet per year. Precipitation on the outcrop of the formations is the primary source of recharge; and because the water table averages about 50 feet below land surface, little if any ground water is discharged to streams or lost through evaporation or consumption by vegetation.

A total of about 6,300 acre-feet per year, or about 5.6 mgd (million gallons per day), was pumped from wells in 1963 to supply the needs of Bee County. The pumpage was about 2.3 mgd (72 percent pumped by Beeville) for public supply, 1.3 mgd for irrigation, 0.7 mgd for industrial use, and about 1.2 mgd for rural domestic and stock needs.

Ground-water levels have declined only slightly in the last 25 years. The average decline in 17 wells was 2.4 feet since 1939, or about 0.1 foot per year.

Additional ground water is available for development. About 8 mgd could be pumped perennially without depleting the supply. In addition to the 8 mgd, about 10,000,000 acre-feet of water in transient storage is available for development at depths less than 400 feet below land surface.

Areas most favorable for the development of additional supplies of ground water are in the southeastern half of the county where fresh to slightly saline water-bearing sand--containing less than 3,000 ppm (parts per million) dissolved solids--is thickest. Sufficient quantities of water for rural domestic and

stock needs can be obtained in most places from wells 150 feet deep, except in the outcrop of the Catahoula Tuff where wells may have to be drilled deeper than 300 feet.

The chemical quality of the ground water in the water-bearing formations is generally suitable for public supply, many industrial uses, and supplemental irrigation. Much of the water is hard, especially the relatively shallow water; but soft water may be obtained in places from depths exceeding about 800 feet. The dissolved-solids content of the water is rarely less than 500 ppm, but water having less than 1,000 ppm dissolved solids is available in many places. Generally, the better quality water for supplemental irrigation is found at relatively shallow depths.

The use of unlined open surface pits for the disposal of oil-field salt water is a threat to the potable water supply, and contamination from this source is believed to be occurring in some places. In 1961, almost 10,000 barrels of salt water per day was placed in open surface pits in the county.

GROUND-WATER RESOURCES OF BEE COUNTY, TEXAS

INTRODUCTION

Purpose and Scope of Investigation

In October 1963, the investigation in Bee County was begun as a cooperative project of the then Texas Water Commission and the U.S. Geological Survey. The purpose was to determine the occurrence, availability, dependability, quality, and quantity of the ground-water resources of the county and to publish these data as a guide to developing and obtaining maximum benefits from the available ground-water supplies.

Specifically included in the investigation were: a delineation of the location and extent of fresh to slightly saline--less than 3,000 ppm (parts per million) dissolved solids--water-bearing sands; the chemical quality of the water contained; the quantity of water being withdrawn and the effects of these withdrawals on water levels and quality; the hydraulic characteristics of the important water-bearing sands; and an estimate of the quantity of ground water available for development.

For purposes of this report, small yields of wells are those less than 100 gpm (gallons per minute), moderate are 100 to 1,000 gpm, and large are more than 1,000 gpm.

Methods of Investigation

To accomplish the main objectives of the investigation, the following detailed work was performed.

1. An inventory was made of 507 water wells and 25 oil tests (Table 5). The locations of the wells inventoried are shown in Plate 1.

2. Drillers' logs of 34 wells were obtained (Table 6), and more than 600 electric logs were examined in order to correlate the subsurface geology and to define the sand zones that comprise the aquifers.

3. An inventory was made of present and past ground-water pumpage.

4. Pumping tests were run on nine wells to determine the hydraulic characteristics of the aquifers.

5. Elevations from topographic maps were obtained for altitude control.

6. Measurements of water levels in wells were made and records of past fluctuations were compiled.

7. Climatological and streamflow data were collected and compiled.

8. Samples of water from 85 wells and 17 salt-water disposal pits were collected for chemical analysis and earlier available analyses on some wells were compiled for comparison of quality-of-water changes (Tables 7 and 8).

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

Previous Investigations

Prior to this investigation, few detailed studies had been made of the ground-water resources of Bee County. Among the first was a brief investigation in 1934, the results of which were discussed in reports by Lynch (1935a, b). A well inventory made during 1939 and 1940 included records of water wells and test wells, drillers' logs, chemical analyses of water, and a map showing locations of the wells (Lynch and Frazier, 1941). Broadhurst, Sundstrom, and Rowley (1950, p. 21-24) presented a summarized description of the public water supplies of southern Texas, including those of Beeville and Pettus. Wood's report (1956) on the availability of ground water in the Gulf Coast region applied to part of Bee County. Most of Bee County was considered in a reconnaissance investigation of the ground-water resources of the Gulf Coast region by Wood, Gabrysch, and Marvin (1963).

Although the geology of Bee County has not been studied in detail, the general geology of the county was included in reports by Deussen (1924) and by Sellards, Adkins, and Plummer (1932). The surface geology of the county is shown on the Geologic Map of Texas (Darton and others, 1937). Doering (1956), in his paper on the Quaternary formations of the Gulf Coast, has suggested changes in the Geologic Map of Texas, particularly in the Pleistocene units.

Location and Extent of Area

Bee County is in south-central Texas in the West Gulf Coastal Plain (Figure 1). It is bordered on the north by Karnes County, on the east by Goliad and Refugio Counties, on the south by San Patricio County, and on the west by Live Oak County. Beeville, the county seat and the principal commercial center in the county, is about 60 miles northwest of Corpus Christi and about 90 miles southeast of San Antonio. Pettus, Tuleta, and Skidmore are local markets and shipping centers serving farming, ranching, and oil-producing areas. The area of the county is 842 square miles.

Topography and Drainage

The land surface of Bee County, sloping generally toward the coast, is moderately rolling and hilly in the northern part and nearly flat to slightly rolling in the southern part. The altitude of the land surface ranges from 80 feet along the southeastern boundary of the county to about 500 feet in the northern part.

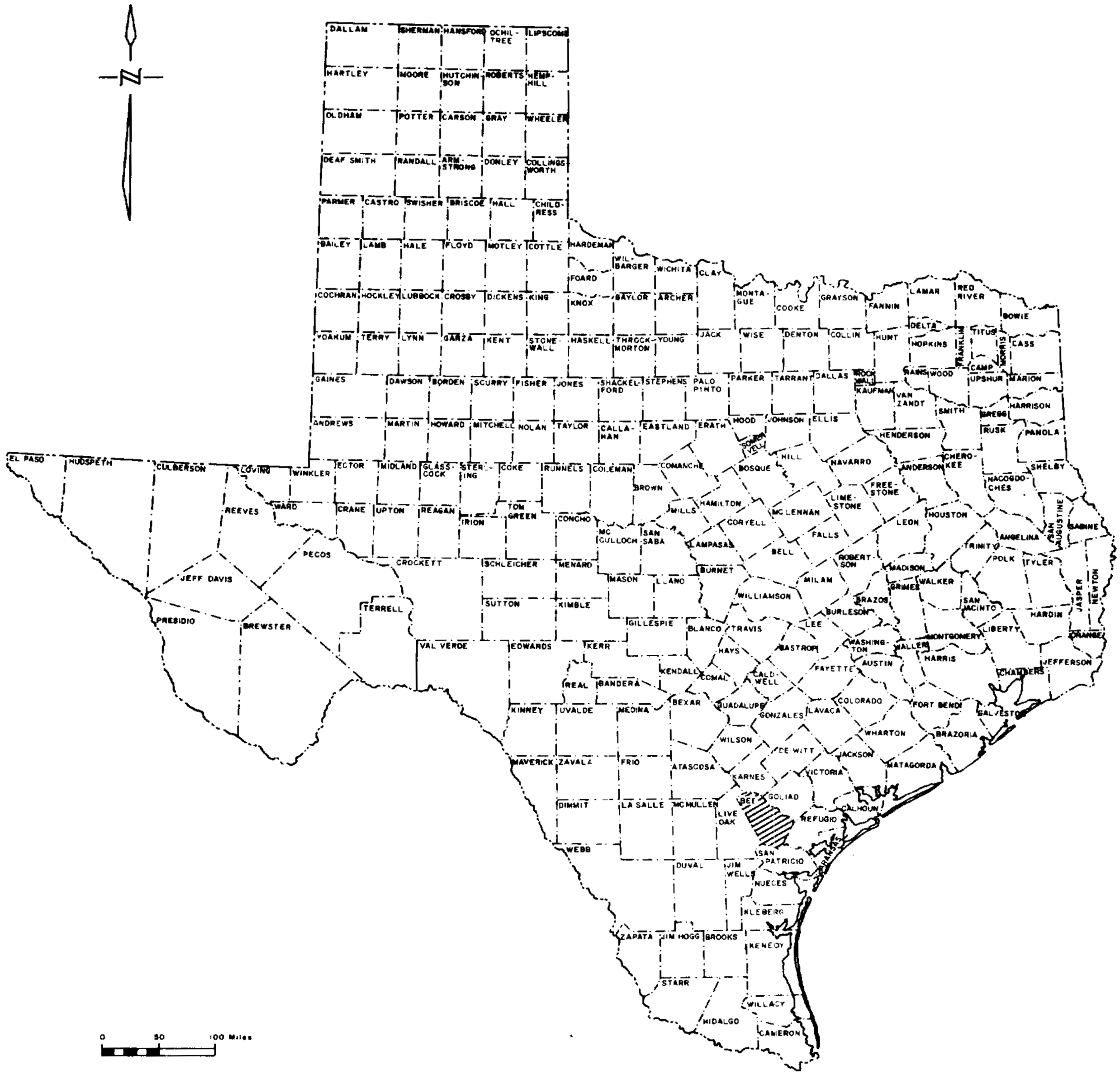


Figure 1

Index Map of Texas Showing the Location of Bee County

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

The major streams draining Bee County are the Aransas River, Medio Creek, and Blanco Creek. The streams are dry most of the time except after storm periods when surface runoff occurs.

The U.S. Geological Survey established a stream-gaging station on Medio Creek, 8 miles northeast of Beeville in March 1962. From March through September 1962, runoff occurred on 16 days, the maximum daily discharge being 1,250 cubic feet per second and the total discharge being 4,225 acre-feet. From October 1, 1962 through September 30, 1963, runoff occurred on 20 days--the total discharge being 1,760 acre-feet.

A stream-gaging station on Aransas River, about 4 miles northeast of Skidmore, was established in March 1964. Records are not yet sufficient to evaluate the flow at the station.

Some of the ranchers have constructed small surface ponds to catch runoff water for stock supplies, but no large surface reservoirs have been built in the county and no surface water is used for irrigation.

Population and Economy

During a 10-year period, 1950-60, the population of Bee County increased approximately 30 percent. In 1960 the population was 23,755, while that of Beeville was 13,811--more than half of the total number. The small towns of Pettus, Skidmore, Pawnee, Mineral, Tuleta, Normanna, and Tulsita had a combined population of about 1,400.

Expansion of the oil industry, coupled with farming and ranching, has resulted in a relatively stable economy. Some of the smaller towns serve as markets and shipping centers for farming, ranching, and oil products. Small industries in Beeville produce brooms, bedding, leather items, bakery goods, carbonated beverages, and metal products, many of which are marketed outside of the county.

Numerous highways and the railroad facilitate transportation and shipping. Furthermore, the proximity of the county to the port of Corpus Christi makes shipping by water an economic advantage.

Climate

Bee County has a dry subhumid climate according to the classification of Thornthwaite (1941, p. 2). At the weather station 5 miles northeast of Beeville, the precipitation averaged 29.32 inches annually during the period 1915 to 1962 and was fairly well distributed throughout the year, being greatest in September (3.8 inches) and least in February (1.7 inches). (See Figure 2.) The total annual precipitation usually is sufficient for most of the farm crops; however, irrigation is used when rainfall is deficient.

The average annual gross lake-surface evaporation of about 58 inches (Lowry, 1960) is about twice the average annual precipitation. Evaporation is lowest in February (2.7 inches), gradually increasing as the temperature becomes warmer, and reaching a peak in August (7.9 inches).

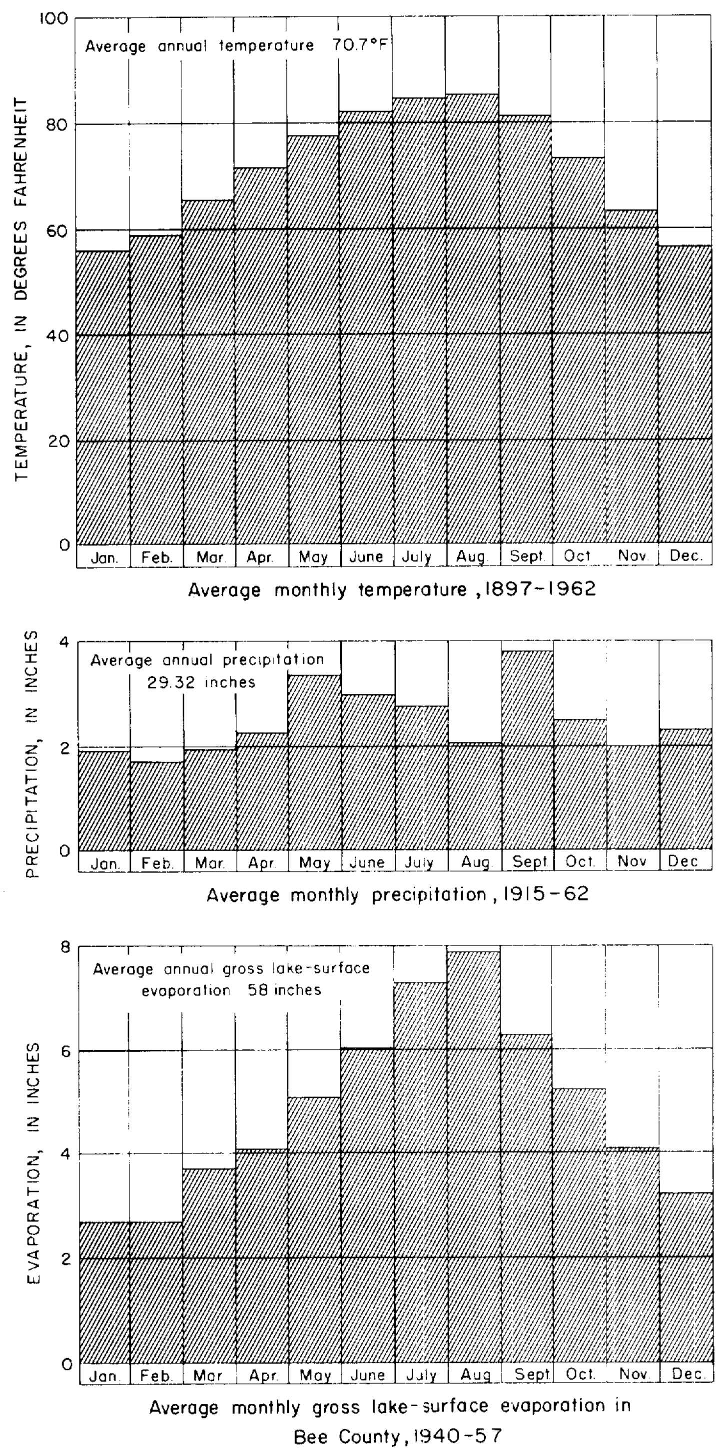


Figure 2

Average Monthly Temperature and Precipitation at Beeville, and Gross Lake-Surface Evaporation in Bee County

(From U.S. Weather Bureau, and Lowry, 1960)

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

The average annual temperature in Bee County is 70.7°F, the average January temperature being about 55°F and the average August temperature about 85°F. The mild climate is favorable to a widely diversified agriculture. Usually more than one crop may be grown per year, because the average frost-free period is 287 days.

Numbering Systems for Wells and Disposal Pits

The well-numbering system used in this report is the one adopted by the Texas Water Development Board for use throughout the State and is based on latitude and longitude. Under this system, each 1-degree quadrangle in the State is given a number consisting of 2 digits. These are the first 2 digits appearing in the well number. Each 1-degree quadrangle is divided into $7\frac{1}{2}$-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 $7\frac{1}{2}$-minute quadrangle is divided into $2\frac{1}{2}$-minute quadrangles which are given single-digit numbers from 1 to 9. These are the fifth digits of the well number. Finally, each well within a $2\frac{1}{2}$-minute quadrangle is given a 2-digit number in the order in which the well is inventoried, starting with 01. These are the last 2 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 Bee and adjacent counties are:

County	Prefix
Bee	AW
Goliad	KP
Karnes	PZ
Live Oak	SJ
Refugio	WH
San Patricio	WW

For example, well AW-79-51-501 is in Bee County, in the 1-degree quadrangle number 79, in the $7\frac{1}{2}$-minute quadrangle 51, the $2\frac{1}{2}$-minute quadrangle 5, and was the first well (01) inventoried in that $2\frac{1}{2}$-minute quadrangle.

The numbering system for the salt-water disposal pits is an abbreviated form of the State well-numbering system, the pit numbers consisting of only 5 digits and an alphabetical prefix. The first 4 digits continue to signify the numbers of the 1-degree and $7\frac{1}{2}$-minute quadrangles in the State. The fifth digit, however, indicates the number of the pit, in the order in which the pit was inventoried in the $7\frac{1}{2}$-minute quadrangle. The 2-letter prefix again identifies the county.

For example, pit number AW-79-26-3 is in Bee County, in the 1-degree quadrangle number 79, in the $7\frac{1}{2}$-minute quadrangle 26, and was the third pit inventoried in that $7\frac{1}{2}$-minute quadrangle.

On the map showing the locations of wells and salt-water disposal pits in Bee County (Plate 1), the 1-degree and $7\frac{1}{2}$-minute quadrangles are shown and numbered; the $2\frac{1}{2}$-minute quadrangles are not shown, because they would obscure other details. The 3-digit number shown with the well symbol includes the number of the $2\frac{1}{2}$-minute quadrangle in which the well is located and the number of the well within that quadrangle. The 1-digit number shown with the pit symbol indicates the order in which the pit was inventoried within the $7\frac{1}{2}$-minute quadrangle. Table 1 shows the well numbers used in this report and the corresponding numbers used in the report by Lynch and Frazier (1941).

Acknowledgments

The authors gratefully acknowledge the cooperation of many landowners and industrial and city officials in Bee County in supplying information about their wells, allowing access to their wells for water-level measurements, and also for their assistance in conducting pumping tests. Water-well drillers generously supplied drillers' logs, electric logs, and well-completion data which aided in making the report more complete. Fieldwork was further expedited through supporting data contributed by the Soil Conservation Service and the county agent.

GEOLOGY

Rock Formations and Their Water-Bearing Properties

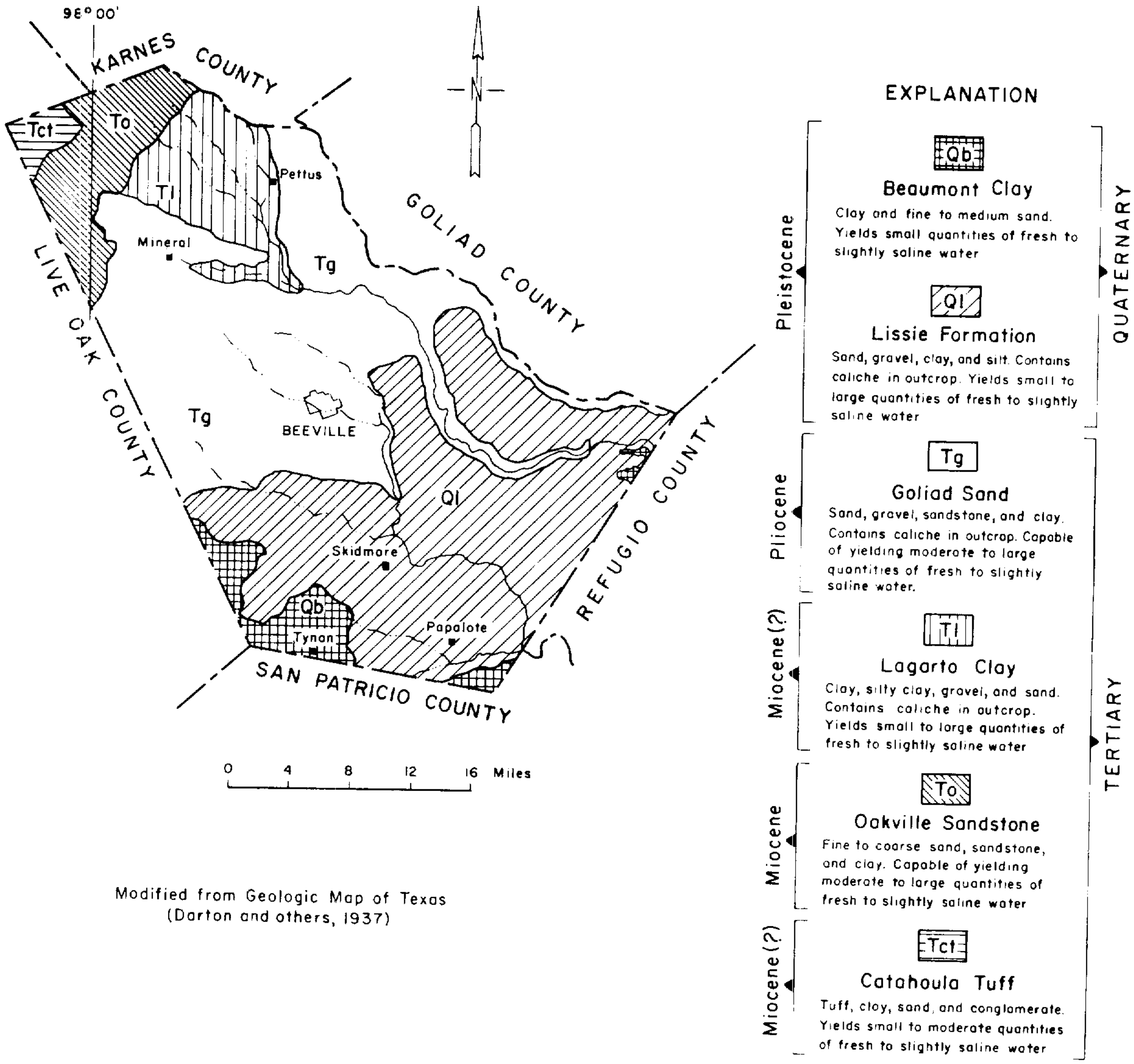
The rock formations that crop out in the county are sedimentary deposits of Tertiary and Quaternary age. They include, in order of decreasing age, the Catahoula Tuff, Oakville Sandstone, Lagarto Clay, Goliad Sand, Lissie Formation, Beaumont Clay, and alluvium (Figure 3 and Table 2). The formations, nonmarine in origin, are composed of sand and sandstone interbedded with clay. The sediments become finer toward the Gulf; thus, some of the sand layers grade into clay in that direction. Because of the heterogeneous character of the formations, correlation of individual sand or clay beds is difficult even in short distances. The formations younger than the Lagarto Clay are difficult to delineate in the subsurface owing to the similarity of the sediments, and these formations have not been differentiated on the cross sections (Plates 2, 3, and 4).

The formations trend northeastward and dip southeastward toward the Gulf of Mexico. The dip of the formations ranges from about 20 feet per mile for the Beaumont Clay to about 65 feet per mile for the Catahoula Tuff.

The Carrizo Sand of Eocene age is not tapped by water wells in Bee County; however, electric logs indicate that slightly saline water (1,000 to 3,000 ppm dissolved solids) may be obtained from the Carrizo in an area of about 10 square miles in the extreme northwestern part of the county at a depth of about 6,000 feet. The water has a high temperature at this depth and would require cooling for many uses. Because of the expense of drilling to the Carrizo and the high temperature of the water, development in Bee County is unlikely. Therefore, the Carrizo is not discussed further.

Table 1.--Well numbers used in this report and corresponding numbers in the report by Lynch and Frazier (1941)

Old no.	New no.	Old no.	New no.	Old no.	New no.	Old no.	New no.
1	AW-78-24-903	46	AW-79-25-607	91	AW-79-41-602	140	AW-79-35-302
2	78-32-201	50	79-26-401	92	79-42-402	141	79-35-301
3	78-24-905	51	79-26-503	93	79-42-102	143	79-35-304
4	79-25-104	52	79-26-604	94	79-42-201	144	79-36-401
5	78-32-309	53	79-26-601	95	79-42-205	145	79-36-801
6	79-25-105	54	79-26-603	96	79-42-601	151	79-50-201
9	79-17-802	55	79-26-906	97	79-42-504	152	79-50-202
10	79-17-703	57	79-26-904	98	79-42-803	153	79-50-302
11	79-17-702	58	79-26-905	99	79-42-502	154	79-50-602
21	79-17-901	59	79-34-206	100	79-42-901	155	79-50-303
22	79-17-903	60	79-26-504	102	79-34-604	157	79-51-401
24	79-18-701	62	79-27-705	107	79-34-204	158	79-50-603
25	79-25-309	64	79-26-701	110	79-34-301	168	79-43-503
26	79-17-904	66	79-26-406	115	79-35-501	169	79-43-501
27	79-17-905	67	79-25-903	116	79-34-503	171	79-43-901
28	79-18-704	68	79-25-905	117	79-34-806	178	79-43-806
29	79-26-201	69	79-34-102	124	79-35-703	179	79-43-807
30	79-18-805	71	79-33-501	126	79-43-114	200	79-44-101
31	79-18-902	73	79-33-301	127	79-43-504	201	79-44-402
34	79-26-301	75	79-34-504	132	79-36-701	202	79-43-404
38	79-25-601	78	79-34-703	133	79-35-902	220	79-36-901
40	79-25-703	80	79-34-205	134	79-35-903	226	79-37-902
41	79-25-802	81	79-34-201	135	79-35-801		
44	79-25-901	82	79-34-204	136	79-43-201		
45	79-25-904	84	79-26-802	137	79-35-705		



Modified from Geologic Map of Texas
(Darton and others, 1937)

Figure 3

Geologic Map of Bee County

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

Table 2.--Rock formations and their water-bearing properties in Bee County

System	Series	Rock formation	Approximate range in thickness (feet)	Character of rocks	Water-bearing properties
Quaternary	Recent	Alluvium	0 - 30	Fine sand, silt and clay.	Yields small quantities of water to domestic and stock wells.
		Unconformity			
	Pleistocene	Beaumont Clay	0 - 100	Clay, interbedded with layers of medium to fine sand.	Do.
		Unconformity			
		Lissie Formation	0 - 500	Sand with lentils of gravel interbedded with clay and silt. Contains caliche in the outcrop.	Yields small to large quantities of fresh to slightly saline water.
		Unconformity			
Tertiary	Pliocene	Goliad Sand	0 - 500?	Sand and sandstone interbedded with lentils of gravel and clay. Contains caliche in the outcrop.	Capable of yielding moderate to large quantities of fresh to slightly saline water.
		Unconformity			
	Miocene(?)	Lagarto Clay	0 - 900	Clay, silty calcareous clay, and interbedded sand and gravel. Contains caliche in the outcrop.	Yields small to large quantities of fresh to slightly saline water.
	Miocene	Oakville Sandstone	0 - 600	Fine to coarse sand, sandstone, and clay.	Capable of yielding moderate to large quantities of fresh to slightly saline water.
		Unconformity			
	Miocene(?)	Catahoula Tuff	400 - 700	Predominantly tuffaceous clay and tuff; locally sandy clay, bentonitic clay, and thin beds of sand and conglomerate.	Yields small to moderate quantities of fresh to slightly saline water.

Tertiary System

Miocene(?) Series

Catahoula Tuff

The Catahoula Tuff crops out in the northwestern part of the county and is the oldest formation exposed. Although it is composed predominantly of tuffaceous clay and tuff, locally it contains sandy clay, bentonitic clay, irregularly distributed lenses of sand, and conglomerate. The Catahoula ranges in thickness from 400 to about 700 feet.

The Catahoula Tuff is a relatively unimportant water-bearing formation in Bee County, yielding only small to moderate quantities of fresh to slightly saline water to wells in the county. Two wells in Pawnee furnish water for the school and enough water to irrigate a football field. All other wells tapping the Catahoula are used for rural domestic and stock needs and individually yield about 5 gpm or less. Interpretations of electric logs indicate that the water becomes rapidly mineralized downdip, and potable water is not available from the Catahoula more than a few miles southeast of the outcrop.

Miocene Series

Oakville Sandstone

The Oakville Sandstone crops out in an irregular pattern in the northwestern part of the county and unconformably overlies the Catahoula Tuff. The formation, consisting of fine to coarse sand, sandstone, and clay, ranges in thickness from slightly less than 400 feet in the southwestern part of the county to about 600 feet near the southern boundary.

The Oakville, one of the principal water-bearing formations in the northern half of the county, is capable of yielding moderate to large quantities of fresh to slightly saline water from properly constructed wells. A northeast-southwest line about 3 miles south of Beeville marks the approximate downdip limit of fresh to slightly saline water in the Oakville.

Water from the Oakville Sandstone is used chiefly for public supply in Bee County. Beeville obtains most of its water from the Oakville at depths from 1,400 to 1,600 feet, and one well tapping the Oakville furnishes part of the public supply at Pettus. Other major wells tapping the Oakville include 1 irrigation well 6 miles northwest of Pettus and 5 industrial wells which furnish water for cooling and other industrial purposes. Many domestic and stock wells on and near the outcrop of the formation furnish small quantities of water for farm and ranch needs.

Miocene(?) Series

Lagarto Clay

The Lagarto Clay, conformably overlying the Oakville Sandstone, crops out in the north-central part of Bee County, the outcrop extending southeastward down the valley of Medio Creek and westward up the valley of San Domingo Creek for about 4 miles. In the western part of the county, the Lagarto is completely overlapped by the Goliad Sand. The Lagarto, which thickens downdip from about 500 feet near Normanna to about 900 feet near the southern boundary of the county, consists primarily of clay and silty calcareous clay interbedded with lenses of sand and gravel. In places the outcrop consists of relatively thick beds of caliche. Where the Lagarto contains thick sand zones, differentiation of the Lagarto from the underlying Oakville Sandstone and the overlying Goliad Sand is difficult.

The Lagarto yields small to large quantities of fresh to slightly saline water to many wells for public supply, irrigation, and rural domestic and stock needs. Of the 19 wells used for public supply in the county, 7 produce from the Lagarto; 18 of the 42 irrigation wells and 6 of the 9 large industrial wells tap the Lagarto.

Pliocene Series

Goliad Sand

The Goliad Sand, unconformably overlying and overlapping the Lagarto Clay, crops out in a broad irregular area in central Bee County. The formation, about 500 feet thick, is predominantly sand and sandstone interbedded with clay and gravel. In some places the sand and clay beds contain only a small amount of calcareous material; in other places where solution and redeposition of calcium carbonate have taken place, beds on and near the land surface may contain more than 50 percent of caliche. The Goliad Sand, where cemented by caliche, is generally harder than the underlying Lagarto Clay; consequently, erosion has, in many places, formed a scarp which marks the surface contact of the two formations.

The Goliad Sand is one of the principal water-bearing formations in Bee County; it is capable of yielding moderate to large quantities of fresh to slightly saline water from properly constructed wells throughout the southern half of the county. Twelve wells tapping the Goliad were used for irrigation in 1964; the individual wells reportedly yielded up to 900 gpm.

The only industrial wells drawing water from the Goliad Sand were small-diameter wells used for oil-field supply. These wells usually are converted to rural domestic and stock use after their oil-field use is no longer required. One public supply well, furnishing water for the public school at Skidmore, also tapped the Goliad Sand.

Many farm and ranch wells furnish small amounts of water from the Goliad for stock and rural domestic use. Where only small quantities of water are needed for such purposes, the wells are drilled so that they penetrate only enough of the sand to obtain the necessary supplies.

Quaternary System

Pleistocene Series

Lissie Formation

The Lissie Formation, unconformably overlying the Goliad Sand, crops out in an irregularly shaped area occupying a large part of southern Bee County. The formation is composed of thick beds of sand and lentils of gravel interbedded with clay and silt. In places the outcrop consists of relatively thick beds of caliche. The thickness increases southeasterly to about 500 feet.

The surface of the Lissie is an almost featureless plain. Streams meander broadly across the flat surface and have wide shallow valleys. The only large vegetation growing on the Lissie is mainly along stream channels.

The Lissie Formation yields small to large quantities of fresh to slightly saline water to wells in the county. The largest use of water from the Lissie is for irrigation. Eleven irrigation wells tap the formation and individually yield as much as 1,100 gpm. Only small quantities of water for public supply, industrial, and rural domestic and stock needs are obtained from the Lissie.

Beaumont Clay

The Beaumont Clay crops out in small areas in the southern part of the county and covers about 40 square miles of the land surface. The Beaumont, consisting of clay interbedded with layers of medium to fine sand, has a maximum thickness of about 100 feet within the county. Part of the Beaumont outcrop is cultivated and irrigated intensely, the irrigation water being pumped from the underlying Lissie Formation and Goliad Sand.

The Beaumont yields only small quantities of fresh to slightly saline water for rural domestic and stock needs from shallow wells on the outcrop.

Recent Series

Alluvium

The alluvium is not an important water-bearing unit in Bee County. The alluvium, found only in some of the stream valleys, is as much as 30 feet thick and consists of fine sand, silt, and clay. Only small-diameter wells produce fresh to slightly saline water from the alluvium; because most of them are powered by windmills they produce no more than a few gallons per minute.

Source and Occurrence of Ground Water

The general circulation of water as it relates to the earth is called the "Hydrologic Cycle." A complete diagrammatic representation of the phenomena involved was published by Piper (1953, p. 9). A somewhat less comprehensive, but readily visualized diagram, indicating the major elements in the hydrologic cycle pertaining to Bee County and adjacent areas, is shown in Figure 4.

Precipitation is the source of all fresh ground water in Bee County. Of the total precipitation infiltrating the surface of the ground, a part may reappear very quickly as runoff, whereas the remainder may pass downward into the zone of aeration. Of the latter, some may be brought back to the surface by capillary action and evaporated, some may enter the plants through their root systems and be transpired, some may be used to make up deficiencies in soil moisture, and the rest may ultimately reach the zone of saturation. The zone of saturation is the zone below the water table where the open spaces in the sediments are filled with water.

Ground water in Bee County occurs under both water-table and artesian conditions. Water-table conditions prevail in the water-bearing formations near the land surface in most of the county, and artesian conditions prevail deeper in the formations or downdip where beds of clay or shale have a confining effect on the water. A well tapping the water-table part of a water-bearing formation becomes filled with water to a level where the water was first found--that is, a level equal to the surface of the zone of saturation or water table. Any changes in water levels in water-table wells reflect direct changes in the volume of water stored in the aquifer. A well tapping the artesian part of a water-bearing formation becomes filled with water to a level above where the water was first found--that is, a level proportional to the hydraulic pressure of the confined water. The pressure that causes the water to rise in the well is created and maintained by the water in the updip part of the formation, and changes in water levels represent primarily changes in pressure. The level or surface to which the water will rise in artesian wells is called the piezometric surface.

Recharge, Movement, and Discharge of Ground Water

Recharge of the water-bearing formations in Bee County is almost wholly from rainfall on the outcrops of the formations. The soil and outcropping rocks of the sandy parts of all of the formations in the county--the Catahoula Tuff, Oakville Sandstone, Lagarto Clay, Goliad Sand, Lissie Formation, Beaumont Clay, and alluvium--readily absorb rainfall and are therefore effective areas for replenishment of ground water.

The ground water in the county moves from the areas of recharge to the areas of discharge, gravity being the motivating force in the movement of the water. The water is in transient storage--that is, it is in a constant state of movement, and the volume of water moving out of the county or being discharged within the county is essentially offset by replenishment of water entering the formations. An average rate of movement might be on the order of 10 feet per year. The general direction of movement is southeastward toward the Gulf of Mexico.

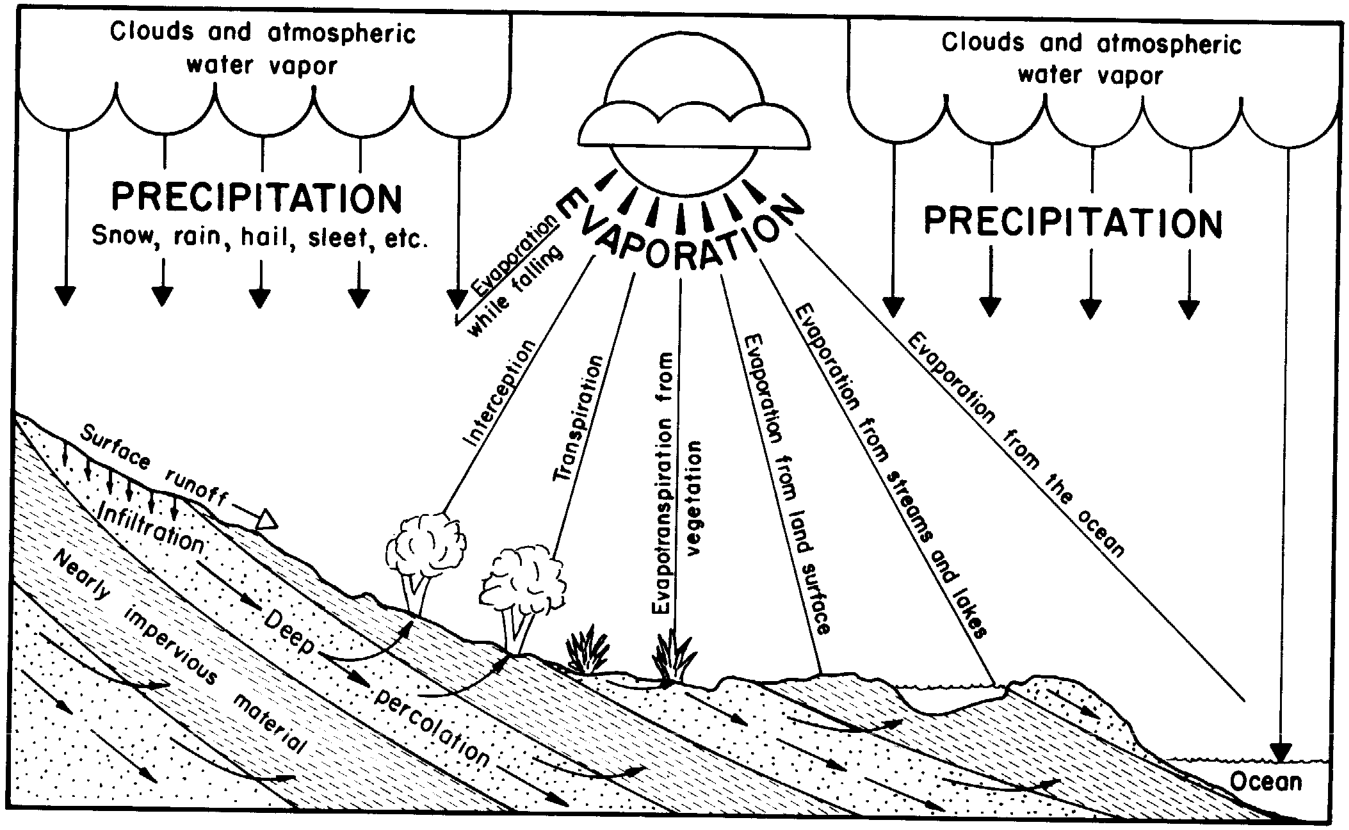


Figure 4

The Hydrologic Cycle in Bee County and Adjacent Areas

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

Discharge from the water-bearing formations occurs naturally by underflow out of the county to the southeast, evaporation of soil moisture, or transpiration by vegetation, and artificially by pumping wells. The quantity of water discharged by natural means is several times greater than the quantity discharged by wells. Little, if any, ground water is rejected or discharged into streams; thus, the streams in the county are not perennial.

The natural recharge-discharge relationship is altered by pumping or artificial discharge. Whenever pumping occurs, cones of depression (depressions in the water table or piezometric surface having the shape of inverted cones with the apexes of the cones at the points of discharge) are formed around the pumping wells and direct ground water to the wells from all directions. A beneficial effect of these cones of depression in Bee County is that they capture ground water which otherwise would move out of the county by underflow.

Pumping Tests

The development of an aquifer is largely dependent upon its ability to transmit water and its capacity to store water. These properties are described by the terms: coefficient of transmissibility, and coefficient of storage.

The coefficient of transmissibility is the number of gallons of water that will move in 1 day through a vertical strip of an aquifer 1 foot wide and having a height equal to the thickness of the aquifer when the hydraulic gradient is 1 foot per foot.

The coefficient of storage is defined as the volume of water that an aquifer releases, or takes into storage, per unit surface area of the aquifer per unit change in the component of head normal to that surface.

These properties may be determined in the laboratory by testing samples collected in the field, or by analyzing data obtained in the field from pumping tests on wells. The pumping-test method has advantages over the laboratory method because of the difficulty of obtaining laboratory samples of the formation that are representative of the undisturbed water-bearing material. Short-term pumping tests under water-table conditions are not desirable and do not give accurate aquifer coefficients because all of the water does not drain from the sediments in a short time, and complete drainage may require months or even years. Pump testing of artesian aquifers does not require drainage of the sediments but only lowering of the pressure head; hence, less time is needed to obtain the data for analysis.

The Theis non-equilibrium method as modified by Cooper and Jacob (1946, p. 526-534) and the Theis recovery method (Wenzel, 1942, p. 95-96) were used to analyze the aquifer test data obtained in Bee County and adjacent areas. Pumping tests were made on 8 wells in Bee County and 1 in San Patricio County (Table 3). The coefficients of transmissibility in wells tapping the Oakville Sandstone, Lagarto Clay, Goliad Sand, and Lissie Formation ranged from 7,500 gpd per foot (gallons per day per foot) to 30,000 gpd per foot (Table 3). Coefficients of storage were obtained only in the Lagarto Clay and Goliad Sand and ranged from 4.7×10^{-4} to 1.1×10^{-3}.

The coefficients may be used to predict the lowering of water levels caused by pumping wells. Figure 5 shows the computed maximum drawdown of water levels caused by pumping from wells tapping sands having assumed coefficients as shown.

Table 3.--Results of aquifer tests in Bee and San Patricio Counties

Geologic formation	Well number	Screened interval (feet)	Average discharge during test (gpm)	Coefficient of transmissibility (gpm/ft)	Specific capacity (gpm/ft)	Coefficient of storage	Remarks
Oakville Sandstone	AW-79-18-503	727- 767 797- 907	255	11,000	6.7	--	Recovery of pumped well.
Lagarto Clay	AW-79-34-902	526- 561 576- 622	340	7,500	4.2	--	Do.
Oakville Sandstone	AW-79-35-702	1,428-1,468 1,478-1,590	1,000	19,000	9.0	--	Do.
Lagarto Clay and Goliad Sand	AW-79-43-103	? - 770	1,070	26,000	--	8.5×10^{-4}	Drawdown in observation well.
Do.	AW-79-43-104	? - 770	1,070	29,000	--	4.7×10^{-4}	Do.
Do.	AW-79-43-105	? - 770	1,070	30,000	--	8.9×10^{-4}	Do.
Do.	AW-79-43-106	? - 770	1,070	19,000	--	1.1×10^{-3}	Do.
Do.	AW-79-43-401	340- 370 375- 400 412- 433 465- 498 570- 635 680- 690 725- 778 798- 835	1,070	20,000	--	--	Recovery of pumped well.
Goliad Sand and Lissie Formation	WW-79-51-705	280- 331 347- 588 639- 696 711- 751	1,600	23,000	10.7	--	Do.

The coefficients are typical of those that might be measured in wells in Bee County. The water levels, as shown on the graph, would be reached after equilibrium had been established. Before equilibrium can be established, water levels must decline sufficiently throughout the water-bearing formations to reduce the natural discharge or increase the recharge by an amount equal to the amount pumped. The calculations of drawdown assume sufficient recharge to prevent lowering the water table in the outcrop area which is assumed to be 18 miles from the center of pumping. The calculations also assume a pumping rate of 500 gpm (gallons per minute) from the various formations having average coefficients of transmissibility and storage as shown in Figure 5. If a discharge of 1,000 gpm instead of 500 gpm had been used in the calculations, the drawdown would have been approximately doubled for, in a homogeneous aquifer, the drawdown is directly proportional to the pumping rate.

On Figure 6 is shown the relation of drawdown (or decline of water levels in wells) to distance due to a well pumping 500 gpm continuously for 30 days, 1 year, and 10 years under artesian conditions. The calculations are based on coefficients of transmissibility and storage that might be typical for wells tested in the county. The approximate drawdown or decline, 1,000 feet from a well pumping continuously for 30 days, would be 16 feet; after 1 year, 24 feet; and after 10 years, 30 feet.

In Table 3 are shown specific capacities of four wells measured during the pumping tests. The specific capacity, an expression of the yield of a well in gallons per minute per foot of drawdown, is useful in estimating the yield of a well at various drawdowns.

Ground-Water Development

Table 4 shows pumpage of ground water in Bee County for public supply and industry from 1955-63 and for irrigation and rural domestic and stock needs for 1963. A total of about 6,300 acre-feet per year, or about 5.6 mgd (million gallons per day), was pumped from wells in 1963 to supply the needs of Bee County.

Records of 507 water wells were obtained during the ground-water investigation in the county (Table 5). The inventory included most of the public supply, industrial, and irrigation wells, and a representative number of domestic and stock wells. Locations of the wells inventoried are shown in Plate 1.

Public Supply

The pumpage of ground water for public supply in the county in 1963 was 2,584 acre-feet, or about 2.31 mgd. This is 41 percent of the total pumpage for all purposes in that year. Seventy-two percent (about 1.67 mgd) of the water pumped for public supply in 1963 was used by the city of Beeville, the city's water being pumped from 4 wells tapping the Oakville Sandstone and 1 well tapping the Lagarto Clay. Other centers of pumping for public supply in 1963 included: the U.S. Auxiliary Air Station at Chase Field, which pumped 480,000 gpd from the Lagarto Clay; the city of Pettus, about 90,000 gpd from the Lagarto and Oakville; the South Texas Children's Home, about 29,000 gpd from the Lagarto; the Skidmore Public School, about 21,000 gpd from the Goliad Sand and Lissie Formation; and the Pawnee Public School, about 18,000 gpd from the Catahoula Tuff.

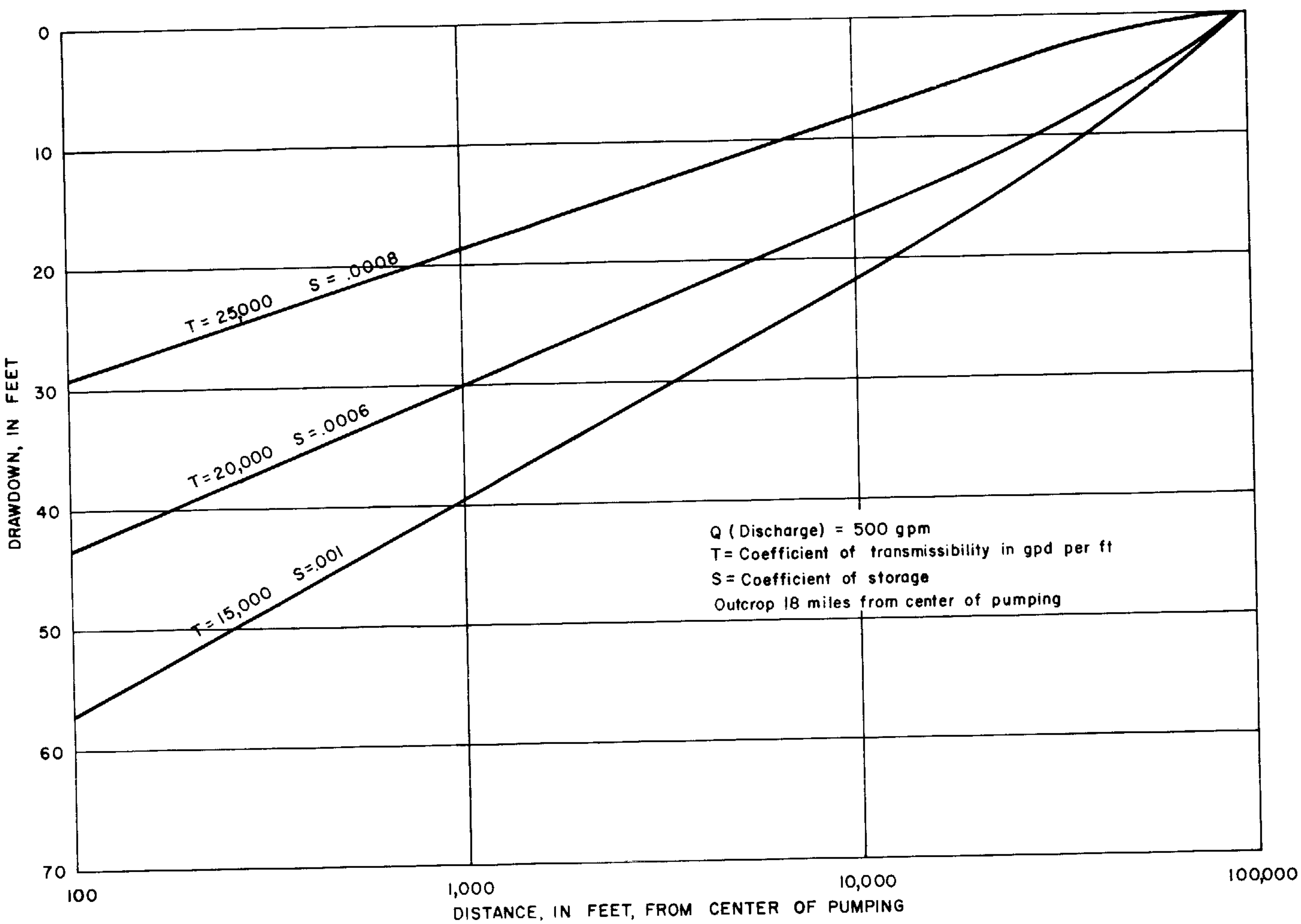


Figure 5

Relation of Drawdown to Distance for Various Coefficients of Transmissibility and Storage

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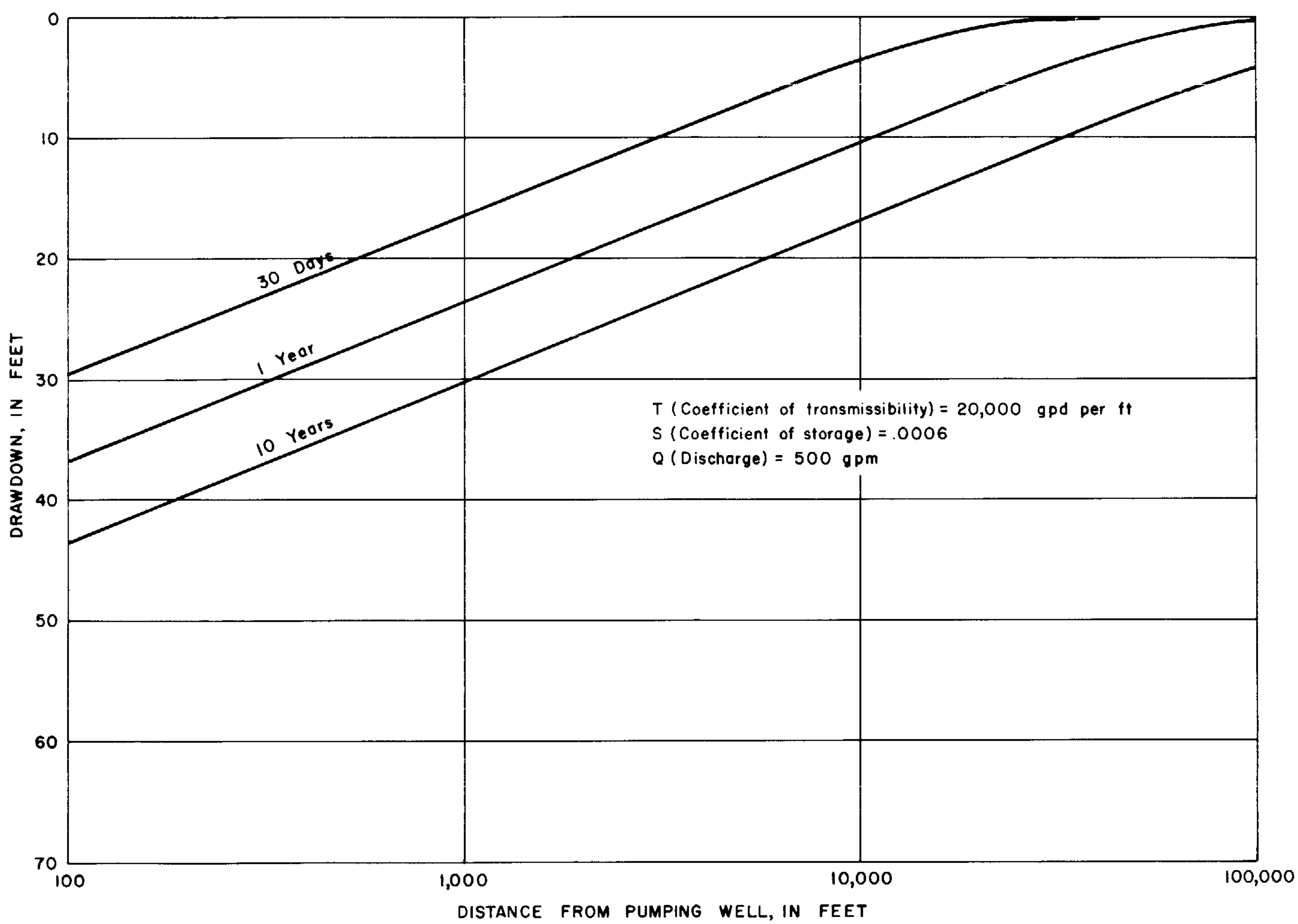

Figure 6

Relation of Drawdown to Distance for Various Periods of Time

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Public-supply usage in the county increased 122 percent from 1.04 mgd in 1955 to 2.31 mgd in 1963 (Table 4). About 75 percent of this increase was attributed to pumping by the city of Beeville.

Irrigation

Irrigation, practiced on a small scale for many years in the county, is largely supplementary and is significantly increased during periods of deficient rainfall. Of the 49 wells classed as irrigation wells, only 17 pump relatively large quantities of water, the average yield of these larger capacity wells being about 650 gpm. Several of the irrigation wells were formerly oil tests that were plugged back and perforated opposite fresh-water sands.

Industrial Use

The pumpage of ground water for industrial use in the county in 1963 was 811 acre-feet, or 0.72 mgd. This is 13 percent of the total withdrawals for all purposes in that year. The industrial use decreased 27 percent from 0.99 mgd in 1955 to 0.72 mgd in 1963 (Table 4).

All of the industrial water pumped in the county is used by the petroleum industry. The largest user is Pan American Petroleum Co., which pumps about 413 acre-feet per year for cooling purposes. Gasoline Production Corp. pumps about 202 acre-feet per year; Tidewater Oil Co., in operation since 1962, pumps about 147 acre-feet per year; and Danaho Refining Co. pumps about 49 acre-feet per year.

Rural Domestic and Livestock Needs

The pumpage of ground water for rural domestic and livestock needs in the county in 1963 was estimated to be 1,390 acre-feet, or 1.2 mgd. This is about 22 percent of the ground-water withdrawals for all purposes in that year.

Most of the rural domestic and stock wells are shallow and penetrate only enough water sand to produce the quantity of water needed. The wells are equipped with pumps powered by windmills, small electric motors, or small gasoline engines and are not designed to pump more than a few gallons per minute.

Changes in Water Levels

Changes in water levels in wells in the county are caused by factors such as changes in rates of recharge to and discharge from the water-bearing formations, changes in barometric pressure, and changes in hydraulic connection of wells and aquifers. These changes may be regional or local and of short or long duration.

Probably the most significant cause of regional water-level changes in the county is the lack of balance between recharge and discharge of ground water. During periods of low rainfall the recharge to the water-bearing formations is reduced and pumpage from wells is increased causing substantial reductions in

Table 4.--Pumpage of ground water in Bee County for public supply and industry, 1955-63, and for irrigation and rural domestic and stock needs, 1963

Year	Public supply		Irrigation		Industry		Rural domestic and stock needs		Totals*	
	Acre-feet per year	Million gallons per day	Acre-feet per year	Million gallons per day	Acre-feet per year	Million gallons per day	Acre-feet per year	Million gallons per day	Acre-feet per year	Million gallons per day
1955	1,165	1.04	--	--	1,109	0.99	--	--	2,300	2.1
1956	1,572	1.40	--	--	1,109	.99	--	--	2,700	2.4
1957	1,393	1.24	--	--	1,109	.99	--	--	2,500	2.2
1958	1,957	1.75	--	--	651	.58	--	--	2,600	2.3
1959	1,786	1.59	--	--	717	.64	--	--	2,500	2.2
1960	1,946	1.74	--	--	598	.53	--	--	2,500	2.2
1961	2,111	1.88	--	--	533	.48	--	--	2,600	2.3
1962	2,479	2.21	--	--	525	.47	--	--	3,000	2.7
1963	2,584	2.31	1,480	1.32	811	.72	1,390	1.24	6,300	5.6

* Figures are approximate because some of the pumpage is estimated. Totals are rounded to two significant figures. Totals are incomplete for the period 1955-62 because data for irrigation and rural domestic and stock were not available.

the quantity of ground water in storage and declines in water levels. Conversely, during periods of high rainfall when recharge is increased, the water previously withdrawn from storage may be replaced and water levels tend to rise.

Pumping may cause large local declines in water levels. When water is pumped, a cone of depression is created around the well. If pumping is continuous, the cone expands until it intercepts a source or sources of replenishment capable of supplying water equal to the quantity pumped. In an area where wells are closely spaced, the individual cones may overlap and cause larger water-level declines than would occur if the wells were spaced farther apart.

Heavily-pumped irrigation areas normally have significant water-level changes annually because of seasonal pumping. During the season when pumping is discontinued, the water levels usually rise and may reach their former levels prior to pumping.

Water levels in 17 wells measured in 1939 were measured again in 1963-64. The change in water levels ranged from a rise of 1.2 feet in well AW-79-25-905 to a decline of 5.3 feet in well AW-79-18-805. The average change in the 17 wells was a decline of 2.4 feet, or about 0.1 foot per year. Because most of the wells are water-table wells, the declines represent a reduction of water in storage in the water-bearing formations. In general however, the declines in water levels in Bee County since 1939 have not been large enough to be alarming.

Figure 7 shows the approximate altitude of the water levels in wells in Bee County, 1963-64. The figure represents chiefly measurements in water-table wells, although some of the measurements may represent the artesian piezometric surface. The map does not necessarily portray one single water surface. This is especially true in the northern part of the county where there appears to be a high on the water surface. The high apparently represents at least two water-level surfaces. Northwest of the high, the water levels probably represent the water surface in wells tapping the Catahoula Tuff and the lower part of the Oakville Sandstone; southeast of the high, the surface represents water levels in wells chiefly in the Lagarto Clay, Goliad Sand, and Lissie Formation. The chief value of the illustration is that it shows the approximate altitude that can be expected in wells drilled at any particular location in the county.

Well Construction

Large-capacity wells completed in the aquifers underlying Bee County have been drilled to supply the needs of some of the municipalities and irrigators; whereas, smaller-capacity wells are used throughout the county to supply water for domestic and stock needs.

Recently drilled municipal wells generally are underreamed, screened, and gravel packed. The gravel packing increases the effective diameter of the well, aids in preventing the entrance of sand into the well, and protects the casing from caving of the surrounding formation. The earlier-drilled municipal wells were completed without gravel packing.

Irrigation wells in Bee County generally are designed to pump a large quantity of water at as low a cost as possible. A few of the wells used for irrigation are underreamed and gravel packed. The wells generally are finished with torch-slotted casing and little effort is made to relate the width of the slot to the diameter of the sand particles. If the slots are too large, considerable quantities of sand enter the well, resulting in wear of the pumps and casing. On the other hand, slots that are too small, or an insufficient number of slots, may cause excessive "entrance losses" in head, thereby reducing the specific capacities of the wells.

Stock and domestic wells generally are of small capacity; most are equipped with windmills, pumpjacks, or small jet pumps. Generally, they are cased with galvanized pipe nearly to the bottom of the well and no screen or slotted casing is used; these are usually called "open-end" wells. Although the stock and domestic wells usually are pumped at less than 5 gpm, they still are vulnerable to sand troubles and some must be cleaned periodically. When larger yields are needed, the wells are completed with torch-slotted or perforated galvanized casing and equipped with submersible pumps or larger jet pumps.

Potential Development

Because most of the water-bearing formations in Bee County are composed chiefly of interbedded sand and clay, permitting water to move from one formation to another, the entire sequence of these water-bearing formations (excepting the Catahoula Tuff) might be considered to function as a single aquifer. Therefore, in discussing potential development the Oakville and younger water-bearing formations are treated as one aquifer. This sequence of water-bearing formations is designated the "Gulf Coast" aquifer, a term applied to a similar sequence of formations in other areas of the Texas Gulf Coastal region.

The amount of ground water that can be pumped perennially in the county without depleting the ground-water supply depends chiefly on the rate of recharge to the aquifers. The average rate of recharge can be estimated by determining the amount of water moving through the aquifers. This is computed using the formula $Q = TIL$, in which Q is the quantity of water in gallons per day moving through the aquifer, T is the coefficient of transmissibility in gallons per day per foot, I is the hydraulic gradient of the piezometric surface or water table in feet per mile, and L is the length of the aquifer in miles normal to the hydraulic gradient. The average gradient is estimated to be about 8 feet per mile, the coefficient of transmissibility of all fresh to slightly saline water sands through which the water passes near the southern boundary of the county is estimated to be about 50,000 gpd per foot, and the average width across the county approximately normal to the hydraulic gradient is 19 miles. On the basis of these figures, the average rate of recharge is approximately 8 mgd or about 9,000 acre-feet per year. Little, if any, ground water is discharged into streams as rejected recharge or lost through evaporation and consumption by vegetation, because the water table averages about 50 feet below land surface. Therefore, the 8 mgd represents the approximate quantity of water available for development on a perennial basis without depleting the aquifer.

Converted to annual precipitation the 8 mgd, or 9,000 acre-feet per year, is equivalent to about 0.5 inch of water covering and effectively recharging the sandy parts of the aquifer that crop out in the county; 0.5 inch of recharge is slightly less than 2 percent of the average annual precipitation. Most of the precipitation fails to recharge the aquifer, probably because infiltration of the water is impeded by the thick beds of caliche that form much of the outcrop area of the aquifers.

In addition to the 8 mgd, which is available on a perennial basis, about 48,000,000 acre-feet of fresh to slightly saline water is in transient storage in the county. Although most of this water is not available to wells, at least part is available for development--for example, about 10,000,000 acre-feet from the upper 400 feet of the aquifer. To utilize this large quantity of ground water, withdrawals exceeding the perennial yield of 8 mgd could be made for long periods before the water in the upper 400 feet would be depleted.

Areas most favorable for the development of large additional ground-water supplies are indicated by a map showing the approximate thickness of sand containing fresh to slightly saline water (Figure 8). In general, the areas having the thicker amounts of sand are the more favorable. The thickness of sand containing fresh to slightly saline water ranges from less than 50 feet in the northwestern corner of the county to more than 650 feet in the southeastern part. Thicknesses greater than 300 feet are, for the most part, restricted to the southeastern half of the county; thicknesses in excess of 400 feet occur in the Beeville area and in the southeastern quarter of the county. Yields of properly constructed wells might be expected to range from less than 100 gpm in the northwest to more than 1,000 gpm where the thickness is greatest. The stippled areas shown on Figure 8 are the most favorable for future development.

Ground water in sufficient quantities for rural domestic and stock needs can be obtained almost anywhere in the county from depths less than 150 feet. The only exceptions are in the outcrop of the Catahoula Tuff where, in places, wells may have to be drilled deeper than 300 feet.

CHEMICAL QUALITY OF GROUND WATER

The chemical constituents of ground water are dissolved from the soil and rock through which the water has passed; therefore the difference in the chemical character of the water indicates, in a general way, the nature of the geologic formations in contact with the water. Most deep ground water is free from contamination by organic matter but the chemical content of ground water usually increases with depth.

The suitability of a water supply depends on the chemical quality of the water and the limitations associated with the contemplated use of the water. Various criteria for water-quality requirements have been developed for most categories of water quality, including bacterial content, physical characteristics, and chemical constituents. Usually problems concerned with bacterial content and physical characteristics can be remedied rather economically, but removal or neutralization of unwanted chemical constituents may prove difficult and expensive. For many purposes, the dissolved-solids content of water is a major limitation on use of the water. The general classification of water shown on the following page is based on total dissolved-solids content (Winslow and Kister, 1956, p. 5).

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

The U.S. Public Health Service has established 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 public water supplies. According to the standards, chemical constituents should not be present in water supplies in excess of the listed concentrations shown in the following table, except where other more suitable supplies are not available. Below are some of the standards adopted by the U.S. Public Health Service (1962, p. 7-8):

Substance	Concentration (ppm)
Chloride (Cl)	250
Fluoride (F)	0.8*
Iron (Fe)	.3
Manganese (Mn)	.05
Nitrate (NO_3)	45
Sulfate (SO_4)	250
Total dissolved solids	500

*Assumed upper limit for Bee County based on an approximate annual average of maximum daily air temperature of 80°F at the station near Beeville.

Water having concentrations of chemical constituents in excess of the recommended limits may be objectionable for various reasons. Concentrations of nitrate in excess of 45 ppm in water used for feeding infants have been related to the incidence of infant cyanosis (methemoglobinemia or "blue baby" disease), a reduction of the oxygen content in the blood causing a form of asphyxiation (Maxcy, 1950, p. 271). High nitrate concentration may be an indication of pollution from organic matter, commonly sewage. Concentrations of iron and manganese in water in excess of 0.3 ppm and 0.05 ppm, respectively, cause reddish-brown or dark-gray precipitates that stain clothing and plumbing fixtures and impart an objectionable taste to the water. Water having a chloride content exceeding 250 ppm, and an equivalent amount of sodium, may have a salty taste; and water having a sulfate content in excess of 250 ppm may produce a laxative effect.

Excessive fluoride concentration may cause teeth to become mottled, whereas optimum amounts may reduce the incidence of tooth decay (Dean, Arnold, and Elvove, 1942, p. 1155-1179).

Calcium and magnesium are the principal constituents in water that cause hardness. Excessive hardness causes an increase in the consumption of soap and promotes the formation of scale in hot-water heaters, boilers, and water pipes. That portion of hardness equivalent to the amount of carbonate and bicarbonate is termed carbonate hardness; hardness exceeding this amount is termed noncarbonate hardness. Below are the commonly accepted standards and classifications of water hardness:

Hardness range (ppm)	Classification
60 or less	Soft
61 - 120	Moderately hard
121 - 180	Hard
More than 180	Very hard

Two general methods are commonly used to soften large quantities of water: the lime or lime-soda ash process which, in addition to softening, reduces the mineralization; and the zeolite process which involves the exchange of calcium and magnesium in the water for sodium in the exchange material. Carbonate hardness may be removed most economically by using lime as the precipitant. Because carbonate hardness predominates in Bee County, most of the water can be softened effectively by the lime process.

The quality-of-water requirements for various industries vary widely with each type of process. Water for industrial use may be classified into three principal categories--cooling water, boiler water, and process water.

Water for cooling purposes is usually selected on the basis of its temperature and the available source of supply, although its chemical quality is also significant. The temperature of ground water near the land surface approximates the mean annual air temperature of the region and increases with depth. The undesirable chemical constituents in cooling water are those which cause scale or corrosion, and thereby adversely affect the heat-exchange surfaces.

Scale formation can be caused by dissolved solids, such as calcium and magnesium, carbonate and bicarbonate, aluminum, iron, and silica. Among the soluble materials that make water corrosive are calcium and magnesium chloride, sodium chloride in the presence of magnesium, acids, and gases such as oxygen and carbon dioxide. Any corrosive water is objectionable because it attacks metal surfaces.

For steam boilers the problems of corrosion and scale are greatly intensified, and as a result the quality of water must meet rigid requirements. Treatment of boiler water may be necessary; therefore, examining the water from the viewpoint of suitability of treatment is preferable to examining it solely for use as raw water. In boiler water, silica is especially undesirable because silica forms a hard scale, the scale-forming tendency increasing with the pressure in the boiler.

Process water, which is incorporated in the manufactured product, is subject to a wide range of quality requirements that are usually rigidly controlled. For example, water used in textile manufacturing must be low in dissolved solids and free from the staining effects of iron and manganese. The beverage industry requires water free of iron, manganese, and organic substances. Water used in making high-grade paper must be free or have exceedingly small concentrations of heavy metals. Whereas cooling and boiler water can often be reused, process water may be consumed and therefore is not available for reuse.

The suitability of water for irrigation depends on the chemical quality of the water and on other factors, such as soil texture and composition, crop types, irrigation practices, and climate. Many classifications of irrigation water express the suitability of water in terms of one or more of these variables and offer criteria for evaluating the relative overall suitability of irrigation water rather than placing rigid limits on the concentrations of certain chemical constituents. The most important chemical characteristics pertinent to the evaluation of water for irrigation are: the proportion of sodium to total cations, an index of the sodium hazard; the total concentration of soluble salts, an index of the salinity hazard; the residual sodium carbonate; and the concentration of boron.

A system of classification commonly used for judging the quality of water for irrigation was proposed in 1954 by the U.S. Salinity Laboratory Staff (1954, p. 69-82). The classification (diagrammed in Figure 9) is based primarily on the salinity hazard as measured by the electrical conductivity of the water and on the sodium hazard as measured by the SAR (sodium-adsorption ratio).

The importance of the dissolved constituents in water to be used for irrigation depends upon the amount of salt accumulation in the soil. Kelly (1951, p. 95-99) cited areas having an average annual precipitation of about 18 inches in which salts did not accumulate in the soil. Wilcox (1955, p. 15) believes that the system of classification of irrigation water proposed by the Salinity Laboratory Staff is not directly applicable to supplemental irrigation in areas of relatively high rainfall. Therefore, in Bee County, where the annual average precipitation is about 30 inches, the system of classification by the Salinity Laboratory Staff may not be directly applicable. Wilcox (1955, p. 16) indicated that water generally may be used safely for supplemental irrigation if its conductivity is less than 2,250 micromhos per centimeter at 25°C, its SAR is less than 14, and soil-drainage conditions are good. Therefore, in Bee County, care should be taken when supplemental irrigation water approaches these limits (Figure 9).

Another factor in assessing the quality of water for irrigation is the RSC (residual sodium carbonate) in the water. Excessive RSC causes the water to be alkaline and the organic content of the soil tends 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 led to the conclusion that water containing: more than 2.5 epm (equivalents per million) RSC is not suitable for irrigation; from 1.25 to 2.5 epm is marginal; and less than 1.25 epm RSC probably is safe. Through good irrigation practices and proper use of amendments, however, even the marginal water may be successfully used for irrigation. Furthermore, the degree of leaching will modify the permissible limit to some extent (Wilcox, Blair, and Bower, 1954, p. 265).

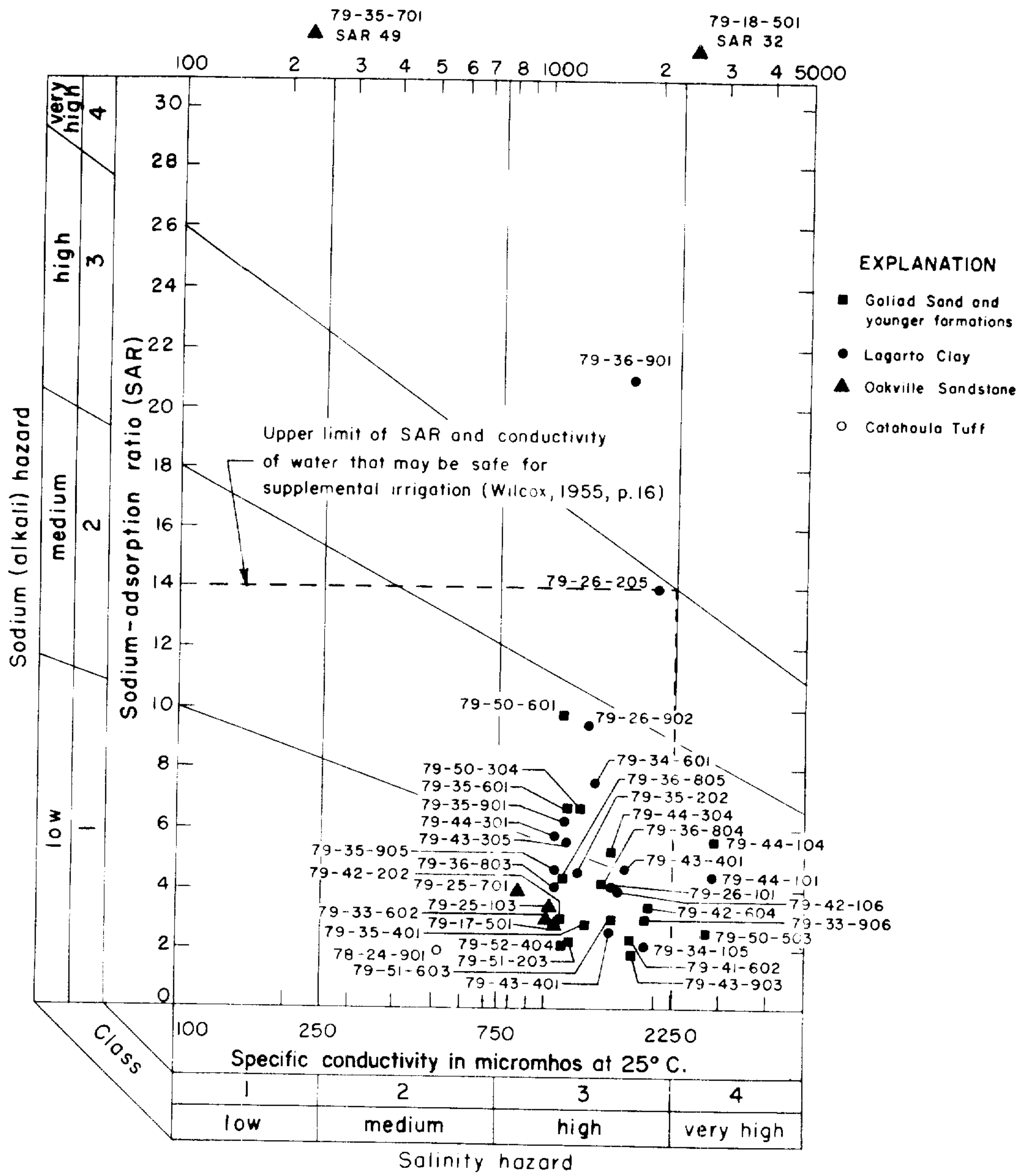

Figure 9

Diagram for the Classification of Irrigation Waters

(After United States Salinity Laboratory Staff, 1954, p. 80)

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An excessive concentration of boron will cause the water to be unsuitable for irrigation. Wilcox (1955, p. 11) suggests that a boron concentration of as much as 1.0 ppm is permissible for irrigating sensitive crops--as much as 3.0 ppm for tolerant crops.

All of Bee County is underlain by water-bearing strata containing fresh to slightly saline water that extend to varying depths (Plates 2, 3, and 4). The base of the fresh to slightly saline water (Figure 10) ranges from slightly more than 1,700 feet below sea level in the eastern part of the county, 23 miles east of Beeville, to more than 200 feet above sea level in the northwestern part. Rocks containing moderately saline water to brine underlie the fresh to slightly saline water.

A combination of electric logs and chemical analyses was used to determine the base of the fresh to slightly saline water. A comparison of the resistivities of water-bearing sand on electric logs with the quality of the water in the sand indicates that the apparent resistivity of sand containing water having about 3,000 ppm dissolved solids is about 10 ohms m^2/m based on the long normal curve. The apparent resistivity of sand containing water having about 1,000 ppm dissolved solids is about 20 ohms m^2/m. The correlation of chemical quality of ground water to resistivity is only approximate, because sand in different areas and at different depths contains water that may be of a different chemical type (sodium chloride water or sodium bicarbonate water) and has a different temperature. Other factors such as the degree of cementation and permeability of the sands also affect the curves.

The chloride and dissolved-solids content of the ground water from wells and their depth, as well as the chloride and dissolved-solids content of water from salt-water disposal pits, are shown in Figure 11. This illustration indicates the quality of ground water at various depths throughout the county and is useful in predicting the quality of water from future wells of similar depths. The presence of the highly mineralized water in the salt-water disposal pits points out the threat of contamination to nearby wells.

Tables 7 and 8 show 224 chemical analyses of water from 166 wells and 17 chemical analyses of water from salt-water disposal pits. These analyses stemmed from three principal sources: 1934 (field determinations of the U.S. Geological Survey), 1945, 1955, and 1960, from the U.S. Geological Survey; 1939, from the Works Progress Administration; and 1964, from the Texas State Department of Health. The wells and pits sampled are identified in Plate 1 by means of bars over the well and pit numbers. Determining the formations from which some wells produce is difficult, because the water-bearing formations in the county are principally a series of interconnected sand and clay beds. However, based on locations of the wells, estimated thickness of the formations, and depth of the wells, most of the wells have been assigned to a water-bearing formation.

The quality of water in the Catahoula Tuff, Oakville Sandstone, Lagarto Clay, and Goliad Sand and younger formations is discussed separately in the following sections.

Catahoula Tuff

Fresh to slightly saline water occurs in the outcrop of the Catahoula Tuff and for only short distances downdip beneath the overlying Oakville Sandstone.

The water rapidly becomes more mineralized with increasing depth of occurrence, as indicated by analyses of water and a study of electric logs. The dissolved-solids content in five samples from the Catahoula ranged from 247 to 4,041 ppm; in two samples, it was less than 500 ppm; but, in only two samples, more than 1,000 ppm. The two samples exceeding 1,000 ppm were from wells 275 and 375 feet deep, the deepest wells sampled. Electric logs and water analyses indicate that fresh water probably does not occur much deeper than 300 feet in the outcrop.

The Catahoula is capable of yielding water generally suitable for public supply, some industrial purposes, and supplemental irrigation. The water is typically hard to very hard, the hardness in five samples ranging from 153 to 677 ppm. Because of the hardness, the water may be unsuitable for some industrial purposes, especially if scale formation must be avoided. Well AW-78-24-901, used partially for irrigation, yields water having a SAR of only 1.4, 1.32 epm (equivalents per million) RSC, and a specific conductance of 515 micromhos (Figure 9). No boron determinations are available for water from the Catahoula in Bee County. On the basis of an average boron concentration of 2.6 ppm in water from the Catahoula in Live Oak and Karnes Counties, however, and assuming that water of this concentration might be found in the Catahoula in Bee County, only boron-tolerant crops should be irrigated in Bee County.

Oakville Sandstone

The Oakville Sandstone contains fresh to slightly saline water from the outcrop southward to a line trending northeast-southwest about 3 miles south of Beeville. The least mineralized water is in and near the outcrop, and the water becomes gradually more mineralized with increasing depth of occurrence.

The water in the Oakville is generally suitable for public supply and for some industrial purposes. Although the dissolved solids in most of the water sampled exceeds the limit established by the U.S. Public Health Service, the water nevertheless has been used for years for human consumption. The largest user of water for public supply is the city of Beeville, which has four wells drawing water from the Oakville.

The dissolved-solids content ranged from 479 to 2,990 ppm in 16 samples, exceeding 500 ppm in all but 1 sample, and exceeding 1,000 ppm in 9 samples. The hardness of 17 samples ranged from 23 to 1,070 ppm, exceeding 60 ppm in all but 3 samples. Soft water can generally be obtained from depths exceeding about 800 feet; shallower water generally is moderately hard to very hard. The silica content in 10 samples ranged from 16 to 63 ppm and averaged 38 ppm. The hardness and the relatively high silica content are undesirable in boiler and cooling water, because they contribute to scale formation in boilers and on heat-exchange surfaces. Sulfate and nitrate concentrations in the water tested are relatively low and not excessive for human consumption.

The water in and near the outcrop generally is more suitable for irrigation than deeper water farther south of the outcrop. Analyses of water from 6 wells showed that 2 samples had SAR's exceeding 14, while the conductivity of 5 samples was less than 2,250 micromhos (Figure 9). The SAR of 8 samples ranged from 2.9 to 49 and exceeded 14 in 3 samples; the RSC in 8 samples ranged from 0.31 to 9.39 epm and exceeded 2.5 epm in 4 samples. Most of the higher RSC and SAR values, which render water questionable for continuous irrigation, are associated with relatively deep water, but shallower water (less than 200 to 300 feet deep) is generally more suitable for irrigation. Only 1 boron determination was made on water from the Oakville in Bee County. Water from well AW-79-18-503, which contained 3.1 ppm boron, is of doubtful value in irrigating boron-tolerant crops; however, this concentration may not be necessarily representative of the Oakville throughout the county.

Lagarto Clay

The Lagarto Clay contains fresh to slightly saline water from the outcrop southward throughout the remainder of the county, except in the Skidmore-Tynan-Papalote area where the formation contains more highly mineralized water. On the basis of a study of the chemical analyses, there is little apparent relationship between the degree of mineralization and depth of occurrence of the water within the area of fresh to slightly saline water.

The water in the Lagarto is generally suitable for public supply and some industrial purposes. Although the dissolved solids in most of the water tested exceeds the 500 ppm limit established by the U.S. Public Health Service, the water has, nevertheless, been used for public supply for years without any known ill effects. The dissolved-solids content in 37 samples ranged from 405 ppm in a well 120 feet deep to 1,760 ppm in a well also 120 feet deep, and exceeded 500 ppm in all but 1 sample. The hardness of 55 samples ranged from 19 ppm in a public-supply well 831 feet deep to 1,157 ppm in a well 147 feet deep, and exceeded 60 ppm in 49 samples. Soft water can generally be obtained from depths exceeding about 800 feet; most of the shallower water is moderately hard to very hard. The silica content in 26 samples ranged from 10 to 80 ppm and averaged 35 ppm. The hardness of the water and the relatively high silica content are undesirable in boiler and cooling water because scale probably would be formed in the boilers and on the heat-exchange surfaces. Sulfate and nitrate concentrations in the water sampled are relatively low and not excessive for human consumption.

Most of the water in the Lagarto Clay is suitable for supplemental irrigation. Analyses of water from 16 wells show that 13 of the samples had conductivities less than 2,250 micromhos and SAR's less than 14 (Figure 9). The SAR of 20 samples ranged from 2.1 to 110, and the RSC in 18 samples ranged from 0.13 to 8.76 epm. Most of the lower values of SAR and RSC are associated with relatively shallow water. On the basis of boron concentrations in water from the Lagarto in neighboring Live Oak and Karnes Counties, boron probably is not a problem in using water from the Lagarto for irrigation in Bee County.

Goliad Sand and Younger Formations

The Goliad Sand and the younger formations (Lissie Formation, Beaumont Clay, and alluvium) probably contain fresh to slightly saline water throughout their extent in the county. Because their lithology is similar and they are probably in good hydraulic connection, the Goliad Sand and younger formations are treated as a unit. On the basis of the available chemical analyses, no significant relationship exists between the degree of mineralization of the water and the depth of occurrence of the water.

Water from the Goliad Sand and younger formations is generally suitable for public supply and some industrial purposes. The dissolved solids in 99 samples ranged from 304 to 2,957 ppm, exceeding 500 ppm in all but 5 samples. In only 28 samples, however, did it exceed 1,000 ppm. No public-supply wells derive their water from the Goliad Sand and younger formations, but numerous rural domestic wells pump water for human consumption. Most of the water sampled was very hard; the hardness in 133 samples ranged from 81 ppm in a well 465 feet deep to 1,527 ppm in a well 47 feet deep, and exceeded 180 ppm in all but 11 samples. The silica content in 48 samples ranged from 6 to 91 ppm and averaged 57 ppm. The hardness of the water and the high silica content are undesirable in water used either for cooling or for boilers because of the tendency to form scale. Sulfate and nitrate concentrations in the water sampled are relatively low and not excessive for human consumption.

Much of the water in the Goliad Sand and younger formations is suitable for supplemental irrigation. Analyses of water from 17 wells show that only 2 of the samples had conductivities greater than 2,250 micromhos while the SAR was less than 14 in all the samples (Figure 9). The SAR in 20 samples ranged from 1.9 to 10; and the RSC in 31 samples ranged from 0.11 to 4.25 epm, exceeding 2.5 epm in only 5 samples. Boron probably is not a serious problem in water from the Goliad and younger formations in Bee County.

PROBLEMS

Salt-Water Disposal

A statewide inventory conducted by the Railroad Commission of Texas in 1961 was analyzed statistically by the Texas Water Commission and Texas Water Pollution Control Board (1963) to determine the production and disposal of oil-field salt water. The survey indicated that the total quantity of salt water produced in the county in 1961 was reported to have been 23,741 barrels per day. Of this amount, 13,721 barrels per day (57.8 percent) was reported to have been returned to subsurface formations through injection wells, 9,990 (42.1 percent) was reported to have been placed in open surface pits, and the method of disposal of a reported 30 barrels per day (0.1 percent) was not determined.

The theory behind disposal through the use of pits is that the water will evaporate, leaving a residue of salts which will be retained in the pits. This theory can be true only if the pits are lined with impervious material and no water is allowed to escape. However, most of the pits in Bee County are unlined, thus permitting seepage of the salt water into the ground. The brine is thus free to contaminate potable water.

Because ground-water movement is slow, the salt water may not reach the potable water for years. Hence complaints may not be immediately made as no one may realize the potential damage. After the salt water reaches the potable water and water quality deteriorates, the damage cannot be rectified merely by eliminating it at the source, because a longer period will be required for purification by leaching and dilution than for the original pollution.

Table 8 shows the analyses of 17 samples from salt-water disposal pits in the county. Locations of these pits are shown in Plate 1 and Figure 11. The dissolved-solids content of the salt water ranged from 6,100 to 73,000 ppm and averaged about 35,000 ppm.

The amount of dissolved solids in water can also be expressed as tons per acre-foot of water. The average amount of dissolved solids in 9,990 barrels per day (the reported amount of salt water placed in open surface pits in 1961) was slightly more than 60 tons per day, or about 22,000 tons of salt in 1961. Assuming 80 pounds per cubic foot for the dissolved solids in a solid state, 560,000 cubic feet of salts would have been deposited in 1961 if all the oil-field salt water placed in open surface pits had been evaporated. Very little salt has actually been observed to have accumulated in the pits.

Injection of salt water into subsurface formations beneath the deepest beds containing fresh to slightly saline water is one of the safest ways to dispose of the oil-field waste. The proper construction and operation of the injection wells are important, however.

No direct evidence of salt-water contamination was found in the wells sampled. Contamination is believed to be occurring, nevertheless, because of the many unlined open surface pits. Intensive development of the ground water in Bee County would increase the slope of the water table and result in faster movement of ground water, thus allowing the water-bearing formations to become contaminated at a faster rate.

Improperly Cased Oil Wells

Water-bearing formations may be contaminated through improperly cased oil wells. The Oil and Gas Division of the Railroad Commission of Texas is responsible for the proper construction of oil wells, and the Texas Water Development Board is furnishing ground-water data to oil operators and to the Railroad Commission so that all fresh to slightly saline water sands may be protected. The Railroad Commission requires fresh-water strata to be protected by casing and cement.

A study of the published field rules of the Railroad Commission reveals that, of the 19 oil and gas fields having rules governing the amount of cemented casing required to protect the fresh to slightly saline water, only three fields had inadequate requirements. Under the present field rules, about 400 feet of fresh to slightly saline water strata are unprotected in the Caesar field; about 800 feet in the Pettus New field; and about 850 feet in the Voss field, abandoned in 1949. No cases have been determined in which salt-water contamination has resulted from inadequately cased oil wells in Bee County. In the above-named fields and in any other areas in which holes drilled for oil and gas are inadequately cased, however, contamination is a possibility.

CONCLUSIONS

Additional quantities of ground water are available for development in Bee County. About 8 mgd of fresh to slightly saline ground water is available for development perennially without depleting the ground-water supply. In addition to the 8 mgd, about 10,000,000 acre-feet in transient storage is available for development above a depth of 400 feet below land surface. In order to take advantage of this large quantity of ground water available for development, withdrawals exceeding the perennial yield of 8 mgd could be made for long periods of time before the 10,000,000 acre-feet would be depleted.

Areas most favorable for the development of additional ground-water supplies are in the southeastern half of the county where the sands containing fresh to slightly saline water are thickest. Thicknesses of sand in excess of 400 feet occur in the Beeville area and in the southeastern quarter of the county. Ground water in sufficient quantities for rural domestic and stock needs can be obtained almost anywhere from wells 150 feet deep. In some places wells shallower than 50 feet tap small quantities of water; and in other places, especially in the outcrop of the Catahoula Tuff, wells may have to be drilled deeper than 300 feet in order to obtain small quantities.

The quality of the ground water is generally suitable for public supply, many industrial needs, and irrigation. Relatively little water having a dissolved-solids content less than 500 ppm is available, but water having less than 1,000 ppm is available in many places. The ground water is typically hard, particularly the relatively shallow water; however, soft water can be obtained in places from depths exceeding about 800 feet. Much of the water is suitable for supplemental irrigation, and the better-quality irrigation water is obtained generally from relatively shallow depths.

The disposal of large quantities of oil-field salt water in open surface pits is a contamination threat to the potable water. Although no contaminated water was reported, contamination is believed to be occurring by seepage of salt water from unlined open surface pits.

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Table 5.--Records of wells in Bee 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: C, cylinder; E, electric; G, gasoline, butane, or Diesel engine; H, hand; J, jet; N, none; Ng, natural gas; T, turbine; W, windmill.
Use of water : D, domestic; Ind, industrial; Irr, irrigation; N, none; P, public supply; S, stock.
Water-bearing unit : Ql, Lissie Formation; Tg, Goliad Sand; Tl, Lagarto Clay; To, Oakville Sandstone; Tct, Catahoula Tuff.

Well	Owner	Driller	Date completed	Depth of well (ft)	Diameter of well (in.)	Water-bearing unit	Water level: Below land-surface datum (ft)	Water level: Date of measurement	Method of lift	Use of water	Remarks
Bee County											
AW-78-24-801	Sam E. Hoff	--	--	200	4	Tct	166.3	Jan. 22, 1964	C,W	D,S	Old well.
* 901	Pawnee Independent School District	August Pohler	1942	208	6	Tct	--	--	C,E	P	Well sanded up to about 130 ft. Slotted from 126 to 135 ft.
902	do	O. B. Martin	1955	217	8,	Tct	--	--	T,E	P,Irr	Reported to irrigate football field. Screen from 128 to 148 ft.
* 903	F. J. Hoff	Jonker & Goodout	1910	375	5	Tct	236.4	Nov. 8, 1939	C,W	D,S	
* 904	Walter Wernli	Walter Wernli	1961	54	4	Tct	49.4	Jan. 22, 1964	C,W	D,S	
* 905	Mrs. E. Cook	A. Cook	1926	135	4	Tct	116.1	Nov. 7, 1939	C,W	D,S	
* 32-201	W. Franke	G. Moses	1919	275	4	Tct	157.7 161.2	Apr. 26, 1960 Jan. 29, 1964	C,W	S	
301	W. L. Russell	Tidewater Oil Co.	1953	900	10	Tct	100	1959	T,E	Irr	Pump set at 250 ft. Perforated from 230-256, 670-701 ft. Reported odor of sulphur gas.
302	Wesley Wernli	--	1937	301	4	Tct	229.6	Jan. 22, 1964	C,W	S	Reported water salty.
* 303	O. B. Elliot	Carroll Drilling Co.	1962	127	6	To	75.3	Feb. 19, 1964	T,E	D,S	Slotted from 105-127 ft.
304	do	--	1925	122	4	To	82.9	do	C,W	D,S	
305	do	--	--	125	4	To	78.2	do	C,W	D,S	Old well.
306	-- Bailey	--	1940	160	4	Tct, To	90	1964	C,W	D,S	
307	-- Anderson	--	--	125	4	To	75	1964	J,E	D,S	Old well.
308	Henry Bues	L. R. Fuson	1960	150	4	To	--	--	C,E	S	
* 309	W. A. Mueller	G. Moses	1925	90	4	--	83.1 85.4	Nov. 8, 1939 Jan. 22, 1964	C,W	D,S	
601	A. L. Benham	--	--	150	4	Tct, To	--	--	T,E, C,W	D,S	
* 901	H. A. Kennedy	--	--	142	6	To	133.2	Jan. 22, 1964	C,W	D,S	Old well.
* 79-17-401	C. Lundquist	--	1960	180	4	To	--	--	C,W	D,S	Cased to bottom. Slotted from 169-180 ft.

See footnotes at end of table.

Table 5.--Records of wells in Bee and adjacent counties--Continued

Well	Owner	Driller	Date completed	Depth of well (ft)	Diameter of well (in.)	Water-bearing unit	Water level: Below land-surface datum (ft)	Water level: Date of measurement	Method of lift	Use of water	Remarks
AW-79-17-402	A. E. Goetz	--	--	200	4	To	150	1964	C,W	D,S	Cased to bottom.
* 501	M. S. Syring	M. S. Syring	1962	56	4	To	38.1	Mar. 5, 1963	C,W	D,S	Do.
502	F. A. Schultz	F. A. Schultz	1955	42	4	To	30	1964	C,W	D,S	Do.
601	T. H. Stewart	Ralph W. Letsinger	1957	--	6	To	95	1959	T,E	Irr	Pump set at 125 ft. Slotted from 93 to 143 ft. Irrigates 40 to 50 acres of row crops and pasture.
701	H. W. Marcheck	--	1955	228	4	--	157.1 159.5	Apr. 26, 1960 Jan. 29, 1964	C,W	D,S	Cased to bottom. This well is 20 ft east of well 8 in Bee County 1941 report.
* 702	John Olson	G. Moses	1914	200	4	To	--	--	C,W	D,S	Reported weak supply of soft water.
* 703	Schroeder & Holland	--	1900	312	4	To	247.1 260.0	May 23, 1934 Nov. 8, 1939	C,W	D,S	Do.
801	W. E. Rockman	--	--	150	4	To	127.7	Mar. 5, 1964	C,W	D,S	Supplies water for 4 families. Old well. Cased to bottom.
* 802	H. H. Voges	J. E. Fox	1912	276	4	To	231.2	Nov. 8, 1939	C,W	D,S	Reported weak supply of soft water.
901	Peterson Bros.	--	1938	153	4	To	133 128.0	1939 Apr. 26, 1960	C,W	D,S, Ind	Cased to bottom. Reported strong supply of soft water.
* 902	Luling Oil & Gas Co.	--	1940	590	4	--	270	1964	C,G	P,Ind	Cased to bottom. Pump set at 320 ft. Supplies water for 8 people.
903	A. Miller	W. L. McCoy	1934	138	6	To	103.3	Nov. 22, 1939	N	N	Abandoned.
* 904	H. Pullin	--	--	115	--	To	99.1 101.1	May 23, 1939 Nov. 14, 1939	C,W,G	D,S	Reported strong supply of hard water. Old well.
* 905	C. S. Page	J. H. Brooks	1930	170	4	Tl	65.2 70.9	June 4, 1934 Nov. 14, 1939	C,W	D,S	Reported weak supply of hard water.
907	W. E. Ruckman well 1	Siznog Oil Corp.	1954	2,400	--	--	--	--	--	--	Oil test. Altitude of land surface 472 ft. 2/
* 18-501	Pan-American Petroleum Co.	Layne-Texas Co.	1948	918	12, 6	To	330	June 1959	T,E	Ind	Water used for cooling tower. Pumps are to be lowered in 1963. Screen from 746-916 ft. 1/
502	do	Texas Water Wells	1956	925	14, 8	To	344	July 1959	T,E	Ind	Water used for cooling tower. Screen from 769-790, and 800-920 ft. 2/
* 503	do	Layne-Texas Co.	1948	910	12, 6	To	334	do	T,E	Ind	Water used for cooling tower. Screen from 727-767, and 797-907 ft. Pumping. Drilled to 928 ft, plugged back to 910 ft. Test on well in 1955.
504	I. Spielhagen	--	--	80	4	To	--	--	C,W	S	Cased to bottom. Old well.

See footnotes at end of table.

Table 5.--Records of wells in Bee and adjacent counties--Continued

Well	Owner	Driller	Date completed	Depth of well (ft)	Diameter of well (in.)	Water-bearing unit	Water level: Below land-surface datum (ft)	Water level: Date of measurement	Method of lift	Use of water	Remarks
AW-79-18-505	E. J. Spielhagen	--	1963	400	4	Tl	--	--	J,Ng	Ind	Supplied water for oil field well.
701	Raymond Dahl	M. T. Fox	--	176	4	Tl	116.2	Apr. 26, 1963	N	N	Well destroyed Jan. 29, 1964.
* 702	J. E. Fox	--	1902	120	4	Tl	60.7	Mar. 4, 1964	C,W	S	Cased to bottom.
703	H. C. Brinkoeter	--	1941	200	4	Tl	--	--	C,W	S	Cased to bottom. Slotted from 179 ft to bottom.
* 704	J. E. Copeland	--	1904	105	4	Tl	91.6 95.8	Nov. 14, 1939 Mar. 4, 1964	C,W,G	D,S	Reported strong supply of salt water.
801	Danaho Refining Co.	--	--	--	4	Tl	150 150	1959 1963	J,Ng	Ind	Estimated discharge 20 gpm. Used as standby well. Old well.
802	do	Layne-Texas Co.	1940?	439	4	Tl	137	1959	T,E	Ind	Reported discharge 60 gpm. Supplies water for cooling system.
803	do	do	1948	483	6, 4	Tl	141	do	T,E	Ind	Reported discharge 60 gpm. Screen from 441-471 ft. Supplies water for cooling system. 1/
804	H. C. Brinkoeter	--	--	120	4	Tl	67.9	Mar. 4, 1964	C,W	D,S	Cased to bottom. Old well.
* 805	G. A. Ray	--	--	76	5	Tl	61.1 66.4	Nov. 14, 1939 Mar. 4, 1964	C,W	S	Reported strong supply of salt water.
* 901	G. A. Ray, Jr.	W. E. Eeds	1959	167	4	Tl	75.6	Feb. 27, 1964	C,W	S	Cased to bottom. 1/
* 902	Houston Oil Co.	R. H. Pursley	1934	560	4	Tl	--	--	C,W	D,S	Reported strong supply of hard water. Temp. 81°F.
25-101	Wm. H. Welkener	--	1945	210	6	To	74.5 77.8	Apr. 27, 1960 Jan. 29, 1964	C,W	D,S	Water has changed from good to bad. Water level was 170 ft, but casing has corroded and bad water from above comes into well.
102	Edgar L. Williams	R. R. Lawson	1959	207	4	To	140	1964	C,E	S	Cased to bottom. Slotted from 190 ft to bottom. 1/
* 103	Ernest Overby	--	--	90	4	To	51.2	Mar. 4, 1964	C,W	D,S	Cased to bottom. Old well.
* 104	Mrs. C. Hoaglund	G. Moses	1914	119	4	To	106.6 105.3	Apr. 14, 1934 Nov. 8, 1939	C,W	D,S	Reported strong supply of soft water.
* 105	T. M. Plumer	B. M. Schindler	1931	275	4	To	73.5 76.9	Nov. 8, 1939 Mar. 4, 1964	C,W	D,S	Reported first water at 145 ft, screen at 205 ft.
301	Mrs. L. K. Helm	August Pohlar	1955	196	4	Tl	85.1 86.2	Apr. 26, 1960 Jan. 29, 1964	N	N	Supplied water for oil test.
302	H. Pullin	--	--	115	4	Tl	102.7	Mar. 4, 1964	N	N	Do.
* 303	A. J. Kimball	--	1900	118	4	Tl	98	1964	C,E	D,S	Cased to bottom.

See footnotes at end of table.

Table 5.--Records of wells in Bee and adjacent counties--Continued

Well	Owner	Driller	Date completed	Depth of well (ft)	Diameter of well (in.)	Water-bearing unit	Water level: Below land-surface datum (ft)	Water level: Date of measurement	Method of lift	Use of water	Remarks
AW-79-25-304	C. R. Ballard	C. R. Ballard	1945	50	4	Tl	37.9	Mar. 11, 1964	C,W	S	Cased to bottom. Slotted from 40 ft to bottom.
305	do	do	1950	150	4	Tl	50	1964	T,E	D,S	Cased to bottom. Slotted from 129 ft to bottom.
306	do	W. E. Eeds	1950	300	4	Tl	109.9	Mar. 12, 1964	C,W	S	Cased to bottom. Slotted from 279 ft to bottom.
307	do	C. R. Ballard	1960	156	8	Tl	40	1964	C,W	S	Cased to bottom. Slotted from 135 ft to bottom.
308	James T. Taylor, Jr.	W. E. Eeds	1959	440	4	Tl	150	1963	C,W	S	Cased to bottom. Slotted from 426 ft to bottom. Not used in 1963. 1/
* 309	W. G. Rutledge	-- Davis	1900	60	6	Tl	43	Nov. 1939	C,W	S	Reported strong supply of hard water.
401	Ernest Overby	W. E. Eeds	1958	402	4	To	270	1964	C,E	S	Cased to bottom. 1/
501	J. O. Harris	J. O. Harris	--	70	4	Tg	53	do	J,E	D,S	Old well.
502	Mrs. Ollie Sherwood	--	--	101	4	Tg	--	--	C,W	S	Cased to bottom. Old well.
503	Roy R. Dubose	--	1917	107	4	Tg	90	1964	C,E	D,S	Cased to bottom.
* 504	C. Romero	--	--	60	4	Tg	46.1	Mar. 5, 1964	C,W	D,S	Cased to bottom. Old well.
* 601	C. H. Cook	Bert Archer	1935	69	8	Tg	63.3 66.3	Apr. 27, 1960 Jan. 29, 1964	C,W	D,S	Cased to bottom.
* 602	South Texas Children's Home	Carl Vickers	1956	831	12	Tl	200	1963	T,E	P,S	Reported discharge 600 gpm. Produces some sulphur gas. Supplies water for 140 people and 100 head of stock. Screen from 730 to 830 ft. Temp. 87°F.
603	do	August Pohlar	1954	340	8	Tl	120	1960	T,Ng	D,S	Cased to bottom. Screen from 320 ft to bottom. Used as standby well.
604	do	--	1963	220	4	Tl	120	1963	C,W	S	Cased to bottom.
605	A. J. Kimball	--	--	59	4	Tg	45	1964	C,W	D,S	Old well.
606	do	--	1930	55	8	Tg	46.1	Mar. 11, 1964	C,W	S	Cased to bottom. Slotted from 45 ft to bottom.
* 607	R. C. Harris	--	--	136	3	Tg	85.1 87.2	Nov. 14, 1939 Mar. 5, 1964	C,W	D,S	Reported weak supply of hard water. Old well.
* 701	W. D. Maley	--	--	110	4	To	90.3	Mar. 5, 1964	C,W	D,S	
702	C. R. Ballard	--	--	124	4	To	75	1964	C,W	S	
703	O. D. Edwards	--	--	128	4	To	--	--	C,H	N	Abandoned. Old well.

See footnotes at end of table.

Table 5.--Records of wells in Bee and adjacent counties--Continued

Well	Owner	Driller	Date completed	Depth of well (ft)	Diameter of well (in.)	Water-bearing unit	Water level: Below land-surface datum (ft)	Water level: Date of measurement	Method of lift	Use of water	Remarks
AW-79-25-801	--	--	--	80	4	Tg	63.2	Mar. 11, 1964	C,W	S	
* 802	R. R. Dubose	R. R. Dubose	1917	101	6	Tg	89.1 90.0	Nov. 6, 1939 Mar. 4, 1964	C,W	D,S	Strong supply of soft water.
* 901	Mrs. H. E. Yoward	E. Schrock	1914	274	4	Tg	120.6 124.0	Apr. 29, 1960 Jan. 28, 1964	C,E	D,S	Reported strong supply of hard water.
902	--	--	--	79?	--	Tg	--	--	N	Ind	Formerly supplied water for drilling oil tests.
* 903	N. Arrizolla	--	--	65	60	Tg	45.7	Dec. 12, 1939	C,W	D,S	Dug well. Reported strong supply of hard water.
* 904	F. S. New	T. C. Randolph	1926	147	4	Tl?	105.1	May 11, 1939	C,W,G	D,S	Reported strong supply of hard water.
* 905	C. A. Bast	--	1890	100	--	Tg	77.5 76.3	Dec. 20, 1939 Apr. 5, 1964	C,W	D,S	Do.
* 26-101	C. R. Ballard	C. R. Ballard	1955	285	4	Tl	101.4	Mar. 12, 1964	C,W	S	Cased to bottom.
102	J. B. Hensley	R. R. Lawson	1960	173	4	Tl	75.2	Mar. 5, 1964	C,W	S	Cased to bottom. Slotted from 152 ft to bottom.
* 201	G. A. Ray	J. E. Fox	1910	130	5	Tl	107 108.7 110.7	1939 Apr. 26, 1960 Jan. 28, 1964	C,W	S	
202	C. G. Barnard	--	1929	300	8	Tl	--	--	T,E	P	Used as standby well. Formerly owned by M. P. Railroad.
203	do	Pohlar Well Service	1953	651	10, 7	To	--	--	T,E	P	Cased to bottom. Slotted from 624 ft to bottom. Privately owned public supply, 207 unmetered connections.
* 204	do	Layne-Texas Co.	1944	367	8, 6	Tl	--	--	T,E	P	Cased to 361 ft. Slotted from 327 ft to bottom.
* 205	do	R. R. Lawson	1958	410	6	Tl	--	--	T,E	P	Cased to bottom. Slotted from 360 ft to bottom.
206	Imogene Hall well 1	Paul J. Fly	1959	4,200	--	--	--	--	--	--	Oil test. Altitude of land surface 291 ft. 3/
* 301	Wallace McKinney	I. N. Powell	1914	190	4	Tl	125 127.9 131.6	1939 Apr. 29, 1960 Jan. 28, 1964	C,W	S	
* 401	Felipe Perez	--	--	127	4	Tl	114 108.2 112.1	1939 Apr. 27, 1960 Jan. 30, 1964	C,W	D,S	Cased to bottom. Old well.
402	Gasoline Production Corp.	--	1945	277	4	Tl	--	--	T,Ng	Ind	Cased to bottom. 1/

See footnotes at end of table.

Table 5.--Records of wells in Bee and adjacent counties--Continued

Well	Owner	Driller	Date completed	Depth of well (ft)	Diameter of well (in.)	Water-bearing unit	Water level: Below land-surface datum (ft)	Water level: Date of measurement	Method of lift	Use of water	Remarks
AW-79-26-403	Gasoline Production Corp.	--	1945	400	4	Tl or To	--	--	J	Ind	Drilled to 680 ft, plugged back to 400 ft.
* 404	Rath Estate	--	--	102	4	Tl	71.9	Mar. 11, 1964	C,W	S	
405	J. E. Rath Estate	--	--	100	4	Tl	80	1964	J,E	D,S	Cased to bottom.
* 406	P. L. Campbell	--	1884	120	4	Tl	90.9 99.0	Dec. 12, 1939 Mar. 5, 1964	C,W	D,S	Reported strong supply of hard water.
501	James Chandler	--	--	60	4	Tl	--	--	C,W	S	Cased to bottom. Old well.
502	do	R. R. Lawson	1963	412	5	Tl	60	1964	T,E	Irr	Cased to bottom. Reported irrigates 26 acres.
* 503	C. B. Steltzfos	C. B. Steltzfos	1919	104	5	Tl	66.2 69.5	May 15, 1934 Nov. 26, 1939	C,W	D,S	Reported strong supply of hard water.
* 504	Carlos Carrizoles	--	--	120	4	Tl	60.5	Dec. 12, 1939	C,W	D,S	Do.
* 601	Steltzfos Estate	--	1919	75	4	Tg	50 54.2 57.4	1939 Apr. 28, 1960 Jan. 28, 1964	C,E	S	Cased to bottom. Temp. 75°F.
602	Houston Natural Gas Co.	--	1945	85	4	Tl	60	1964	J,E	Ind	Cased to bottom. Slotted from 75 ft to bottom.
* 603	C. B. Steltzfos	R. H. Pursley	--	600	4	Tl	98.4 99.6	May 15, 1934 Nov. 26, 1939	C,W	S	Reported strong supply of soft water.
604	Dirks Bros.	W. L. McCoy	1930	348	--	Tl	148.6	May 16, 1934	N	N	Abandoned.
* 701	M. Beck	--	--	70	4	Tl	63.0	Dec. 12, 1939	C,W	D,S	Reported strong supply of hard water. Old well.
* 801	Leo Strauch	W. E. Eeds	1956	144	4	Tl	70	1964	C,E	D,S	Cased to bottom. Slotted from 124 to 143 ft.
* 802	H. W. Murphey	--	--	70	56	Tl	--	--	C,W,G	D,S, Irr	Reported supplies water for irrigation of truck garden. Quality of water reported changed by drilling an oil well nearby. Old well.
901	Tidewater Oil Co.	--	1950	350	4	Tl	--	--	N	Ind	Supplied water for drilling oil well.
* 902	do	W. E. Eeds	1962	413	12	Tl	175	1963	T,E	D,Ind	Reported discharge 131,000 gpd. Pump set at 268 ft.
903	James Chandler	R. R. Lawson	1954	252	4	Tl	--	--	C,E	D,S	Cased to bottom.
* 904	C. A. Butts	--	1900	60	4	Tl	43.3 45.6 49.1	June 16, 1934 Nov. 26, 1939 Mar. 4, 1964	C,H	D,S	Reported weak supply of soft water.

See footnotes at end of table.

Table 5.--Records of wells in Bee and adjacent counties--Continued

Well	Owner	Driller	Date completed	Depth of well (ft)	Diameter of well (in.)	Water-bearing unit	Water level: Below land-surface datum (ft)	Water level: Date of measurement	Method of lift	Use of water	Remarks
AW-79-26-905	Hicks & Hall Estate	R. H. Pursley	1933	300	4	Tl	95.3	June 18, 1934	--	--	
* 906	G. T. Roberts	--	--	104	6	Tl	75.3 75.2	Nov. 26, 1939 Mar. 4, 1964	C,W	D,S	Reported strong supply of hard water. Old well.
907	H. A. Rabe	Atlantic Refining Co., and Tidewater Associated Oil Co.	1956	9,379	--	--	--	--	--	--	Oil test. Altitude of land surface 298 ft. 2/
* 27-401	J. W. Dial	-- Britt	1950	125	4	Tg	114.3	Apr. 4, 1964	C,W	D,S	Cased to bottom. Slotted from 110 ft to bottom.
701	Eldo E. Davis, Jr.	R. R. Lawson	1961	182	4	Tl	73.2	Feb. 27, 1964	C,W	S	Cased to bottom. Slotted from 170 ft to bottom. 1/
702	C. R. Davis	do	1960	240	4	Tl	150	1964	T,E	D,S	Cased to bottom. Slotted from 218 ft to bottom.
703	James T. Taylor, Jr.	--	--	100	4	Tg	80	do	C,E	D,S	Cased to bottom.
* 704	Mrs. John R. Scott	--	--	60	4	Tg	40.2 40.8	Apr. 28, 1960 Jan. 28, 1964	C,W	D,S	
705	School District No. 33	-- Brooks	1923	100	4	Tg	48.4 50.2	May 16, 1934 Nov. 26, 1939	C,W	D	Reported strong supply of hard water.
801	A. R. Hatcher	--	--	75	6	Tl	--	--	C,W	S	Cased to bottom.
901	Humble Oil & Refining Co.	Thompson Well Service	1953	396	--	Tl	--	--	N	Ind	Supplied water for drilling oil well. Casing pulled. 1/
902	S. P. Farish	do	1954	176	4	Tl	94.2	Oct. 16, 1963	C,W	S	Cased to bottom. Slotted from 155 to 176 ft.
903	Thelma B. Hardison	--	1930	180	4	Tl	82.3	June 3, 1964	C,W	S	Cased to bottom. Slotted from 159 to 180 ft.
904	do	--	--	115	4	Tl	88.1	do	C,W	S	Cased to bottom. Slotted from 97 to 115 ft.
905	do	--	1932	238	4	Tl	108	1964	J,E	D,S	Cased to bottom. Slotted from 217 to 238 ft.
906	do	--	--	113	4	Tl	81	do	C,E	D,S	Cased to bottom. Old well.
907	do	--	--	244	12	Tg	90	do	T,Ng	Irr	Cased to bottom. Screen from 223-244 ft. Pump set at 160 ft. Irrigates 100 acres of grass.
28-701	Tennaco Oil Co.	W. E. Eeds	1952	188	2	Tg	32.2	Oct. 16, 1963	N	Ind	Supplied water for drilling oil test. 1/
* 702	J. J. O'Brien	--	1924	120	4	Tg	60	1964	C,W	D,S	

See footnotes at end of table.

Table 5.--Records of wells in Bee and adjacent counties--Continued

Well	Owner	Driller	Date completed	Depth of well (ft)	Diameter of well (in.)	Water-bearing unit	Water level: Below land-surface datum (ft)	Water level: Date of measurement	Method of lift	Use of water	Remarks
* AW-79-28-801	H. F. Sehlke	W. E. Eeds	1950	117	4	Tg	71.3	June 3, 1964	C,W	D,S	
33-201	Ben W. Adams	R. R. Lawson	1962	180	4	Tg	125.0	Mar. 4, 1964	C,W	S	Cased to bottom. Slotted from 160 ft to bottom. 1/
202	W. L. Duffy	--	--	60	4	Tg	37.8	Mar. 31, 1964	C,W	S	Cased to bottom. Old well.
203	D. B. Graham	R. R. Lawson	1952	220	6	--	100	1964	C,E	D,S	Cased to bottom. Slotted from 200 to 220 ft.
204	do	do	1956	135	4	Tg	98.2	Apr. 1, 1964	C,W	S	Cased to bottom.
205	Ben Adams	--	--	150	4	Tg	100	1964	C,W	--	Cased to bottom. Old well.
206	Williams Ranch	--	--	150	4	Tg	--	--	C,W	S	Cased to bottom.
* 301	Sophie E. Williams	--	--	67	36	Tg	56.4 58.7 59.7	June 13, 1934 Apr. 27, 1960 Apr. 4, 1964	C,W	S	Cased to bottom. Dug well. Old well.
302	Ben W. Adams	--	1961	280	4	Tg	190	1964	C,E	D,S	Cased to 259 ft. Pump set at 210 ft. 1/
303	J. R. Salmon	L. R. Fuson	1958	170	4	Tg	60	do	C,E	D,S	Cased to bottom. Slotted from 152 to 170 ft.
304	Ben Adams	--	--	120	4	Tg	110	do	C,E	S	Cased to bottom.
* 501	Mrs. -- Renfro	--	--	153	4	Tg	120.1 121.8 124.6	May 19, 1934 Apr. 27, 1960 Jan. 30, 1964	C,W	D,S	Cased to bottom. Old well.
* 502	W. L. Duffy	--	1953	80	4	Tg	70	1964	C,W	D,S	Cased to bottom.
503	Fleming Estate	--	--	150	4	Tg	74.1	Apr. 1, 1964	C,E	S	Do.
504	Kenneth Fraesier	W. E. Eeds	1963	300	4	Tg	100	1964	J,E	D,S	
505	Fleming Estate	--	--	160	4	Tg	83.1	Apr. 5, 1964	C,W	S	
601	L. Q. Jordon	--	--	82	4	Tg	66	1964	C,E	D,S	Cased to bottom. Old well.
* 602	McCord Ranch	R. R. Lawson	--	515	6, 4	Tl?, To?	160	do	T,E	D,S	Cased to bottom.
603	Fleming Estate	--	--	90	4	Tg	61.1	Apr. 1, 1964	C,W	D,S	
604	--	--	--	151	3	Tg	113.3	do	C,W	N	Old well.
605	Ben Adams	R. R. Lawson	1955	140	4	Tg	77.2	Apr. 5, 1964	C,W	S	Cased to bottom. Slotted from 119 ft to bottom.
801	H. D. Hughes	-- Reeder	1942	81	4	Tg	71.9	Apr. 1, 1964	C,W	S	Cased to bottom.

See footnotes at end of table.

Table 5.--Records of wells in Bee and adjacent counties--Continued

Well	Owner	Driller	Date completed	Depth of well (ft)	Diameter of well (in.)	Water-bearing unit	Water level: Below land-surface datum (ft)	Water level: Date of measurement	Method of lift	Use of water	Remarks
AW-79-33-901	McCord Ranch	--	--	142	4	Tg	90	1964	C,W	S	Cased to bottom. Slotted from 121 ft to bottom.
902	do	R. R. Lawson	--	167	4	Tg	107.7	Mar. 20, 1964	C,W	S	Cased to bottom. Slotted from 107 ft to bottom.
903	do	--	--	137	4	Tg	91.1	do	C,W	S	Cased to bottom. Old well.
904	do	R. R. Lawson	--	162	4	Tg	119.7	do	C,W	S	Cased to bottom. Slotted from 141 ft to bottom.
905	H. D. Hughes	--	--	140	4	Tg	82.1	Apr. 1, 1964	C,W	S	Cased to bottom. Old well.
* 906	do	W. E. Eeds	1959	250	4	Tg	--	--	T,E	D,S	Cased to bottom. Slotted from 208 ft to bottom.
907	do	--	--	140	4	Tg	83.0	Apr. 1, 1964	C,W	S	Cased to bottom. Old well.
* 908	T. J. Robertson	--	1875	91	60	Tg	82.2	May 27, 1964	C,W	S	Dug well. Temp. 78°F.
909	R. Malone well 1	Allen & Shumate	1961	5,005	--	--	--	--	--	--	Oil test. Altitude of land surface 291 ft. 3/
34-101	Dougherty Co.	--	--	125	4	Tg	101.6	Mar. 17, 1964	N	Ind	Supplied water for drilling oil test.
* 102	Community Church	--	--	60	5	Tg	41.7	Dec. 20, 1939	C,H	D	Reported weak supply of hard water.
103	John Looney	R. R. Lawson	1958	130	4	Tg	105.4	Mar. 18, 1964	C,W	S	Cased to bottom. 1/
104	Buck Looney	--	--	90	4	Tg	62.3	do	C,W	S	Cased to bottom. Old well.
* 105	Mim Oil Co.	August Pohler	1950	620	4	Tl	--	--	J,G	S,Ind	Supplied water for drilling oil test. Now used for stock.
* 201	Mrs. J. A. Black	M. Powell	1928	130	4	Tg	100 116.0 116.6	Dec. 1939 Apr. 27, 1960 Jan. 3, 1964	C,E	D,S	Cased to bottom.
202	Mrs. M. L. Travland	R. R. Lawson	1925	175	4	Tl	100	1964	C,W	D,S	Do.
203	Elario Benavides	--	--	110	5	Tl	86.6	Mar. 16, 1964	C,W	S	Cased to bottom. Old well.
* 204	W. Brice	--	--	98	4	Tg	72.1 99.6	Nov. 6, 1939 Mar. 6, 1964	C,W	D,S	Old well.
* 205	W. Nations	--	1928	80	4	Tg	68.1 72.7	Dec. 20, 1939 Mar. 19, 1964	C,W	D,S	
206	D. L. Demory	--	--	108	--	Tl?	92.0	Dec. 5, 1939	C,W	D,S	Old well.
* 301	Mrs. J. H. Hill	--	--	160	4	Tg	112.8 116.2	Apr. 28, 1960 Jan. 30, 1964	C,W	D,S	Cased to bottom. Old well.

See footnotes at end of table.

Table 5.--Records of wells in Bee and adjacent counties--Continued

Well	Owner	Driller	Date completed	Depth of well (ft)	Diameter of well (in.)	Water-bearing unit	Water level: Below land-surface datum (ft)	Water level: Date of measurement	Method of lift	Use of water	Remarks
AW-79-34-401	John E. Martin	--	1904	90	4	Tg	63.7	Mar. 17, 1964	C,W	D,S	
402	Tidewater Oil Co.	--	--	145	4	Tg	107.5	do	N	Ind	Supplied water for drilling oil test. Cased to bottom.
403	John Looney	--	1908	105	4	Tg	80	1964	C,W	D,S	Cased to bottom.
404	J. L. Gardner	--	--	110	--	Tg	101.1	Mar. 17, 1964	C,E	S	
*405	D. C. Roberts	W. E. Eeds	1958	140	4	Tg	100	1964	C,E	D,S	Cased to bottom. Slotted from 119 ft to bottom.
406	do	--	1934	100	4	Tg	85	do	C,W	S	Cased to bottom. Slotted from 80 ft to bottom.
407	F. W. Jones	W. E. Eeds	1964	325	4	Tl	--	--	J,Ng	D,S	Cased to bottom.
408	T. J. Robertson	R. R. Lawson	1944	110	4	Tg	66.9	Apr. 2, 1964	C,W	S	Cased to bottom. Slotted from 100 ft to bottom.
501	Vernon Collyer	--	--	75	4	Tg	50	1964	J,E	D,S	Cased to bottom.
502	Gerald Hollis	--	--	120	4	Tg	100	do	C,W,E	D,S	Do.
*503	R. B. Burditt	-- Brooks	1927	115	4	Tg	69.8	Nov. 15, 1939	C,H	D,S	
*504	T. J. Foreman Estate	--	--	73	4	Tg	57.8	Nov. 6, 1939	C,W	D,S	
*601	Beeville Country Club	Layne-Texas Co.	1956	478	16, 10	Tl	174	1964	T,E	Irr	Cased to bottom. Screen from 320-366, 394-406, and 426-466 ft. Irrigates fairways and greens at golf course. Drilled to 991 ft, plugged back to 478 ft. 1/
602	do	do	1954	478	--	Tl	--	--	T,E	Irr	
603	Swim Parks, Inc.	W. E. Eeds	1962	260	4	Tl	75	1964	T,E	P	Cased to bottom. Slotted from 239 ft to bottom. Pump set at 120 ft. Supplies water for a commercial swimming pool.
*604	P. T. Martin	J. Kelly	1890	97	4	Tg	70.1	Dec. 11, 1939	N	N	Cased 20 ft. Abandoned.
*605	J. M. Lunsford	W. E. Eeds	1964	140	4	Tg	100	1964	T,E	D,S	Cased to bottom. Slotted from 119 ft to bottom.
701	Frank Jones	--	--	140	4	Tg	--	--	C,W	S	Cased to bottom.
702	Sidney Smith	--	--	300	4	Tg	--	--	C,W	D,S	Cased to bottom.
*703	Whitehead Estate	--	--	49	4	Tg	26.9	Nov. 15, 1939	N	N	Destroyed in 1964. Old well.
704	Thomas J. Robertson	--	--	135	5	Tg	62.3	Apr. 2, 1964	C,W	D,S	Old well.
705	A. L. B. Williams	--	--	142	4	Tg	120	1964	C,W	D,S	Not used at present. Old well.

See footnotes at end of table.

Table 5.--Records of wells in Bee and adjacent counties--Continued

Well	Owner	Driller	Date completed	Depth of well (ft)	Diameter of well (in.)	Water-bearing unit	Water level: Below land-surface datum (ft)	Water level: Date of measurement	Method of lift	Use of water	Remarks
AW-79-34-706	Truman Gill	W. E. Eeds	1953	202	4	Tg	118	1964	T,E	S	Cased to bottom. Slotted from 181 ft to bottom.
801	Jesse Ball	--	--	105	4	Tg	75	do	C,W,E	D,S	Cased to 50 ft. Old well.
802	John Carpenter	--	--	120	4	Tg	100	do	C,W,E	D,S	Cased to 70 ft. Old well.
803	do	W. E. Eeds	1950	135	4	Tg	105	do	C,W	S	Cased to bottom. Slotted from 114 ft to bottom.
804	A. L. B. Williams	--	1925	142	4	Tg	132.1	Apr. 2, 1964	C,W	D,S	Cased to bottom.
805	Edgar Rothlisberger	--	1907	140	4	Tg	120	1964	C,W	D,S	Do.
* 806	W. P. Richardson	-- Brooks	--	140	4	Tg	96.4	Nov. 15, 1939	C,W	D,S	Old well.
807	Truman Gill	--	--	60	4	Tg	40	1964	C,W	S	Cased to bottom. Old well.
808	do	--	--	60	4	Tg	40	do	C,W	S	Do.
809	do	--	--	174	4	Tg	118	do	C,W	S	Do.
810	do	--	--	240	4	Tg	--	--	T,E	S	Cased to bottom. Slotted from 219 ft to bottom.
811	do	W. E. Eeds	1961	282	4	Tg	--	--	T,E	S	Cased to bottom. Slotted from 261 ft to 282 ft. 1/
901	City of Beeville	Layne-Texas Co.	1947	1,526	11, 8, 6	To	--	--	T,E	P	Cased to 1,526 ft. Screen from 1,355-1,410; 1,429-1,450; and 1,469-1,519 ft. Drilled to 1,592 ft, plugged back to 1,526 ft. 1/ 2/
902	do	do	1945	622	14, 8	Tl	--	--	T,E	P	Cased to bottom. Screen from 528-561, and 5,760 ft to bottom. 2/
903	do	Carl Vickers	1958	1,554	14, 12	To	--	--	T,E	P	Cased to bottom. Screen from 1,228-1,322; 1,380-1,426; and 1,454 ft to bottom. 2/
904	H. W. Ellsworth	W. E. Eeds	1959	155	4	Tg	55	1964	T,E	P	Cased to bottom. Slotted from 134 ft to bottom. Pump set at 180 ft. Supplies water for 14 people.
905	Paul W. Treptow	do	1964	179	4	Tg	150	do	T,E	D,S	Cased to bottom. Slotted from 158 ft to bottom.
906	do	do	1960	126	4	Tg	100	do	C,E	D,S	Cased to bottom. Slotted from 105 ft to bottom.
35-101	W. M. Hooper	R. R. Lawson	1945	130	4	Tg	72.0	Apr. 6, 1964	C,W	D,S	Cased to bottom. Slotted from 109 ft to bottom.

See footnotes at end of table.

Table 5.--Records of wells in Bee and adjacent counties--Continued

Well	Owner	Driller	Date completed	Depth of well (ft)	Diameter of well (in.)	Water-bearing unit	Water level: Below land-surface datum (ft)	Water level: Date of measurement	Method of lift	Use of water	Remarks
AW-79-35-102	George Dickenson	--	1950	240	4	Tl	108	1964	N	N	Supplied water for drilling oil test. Cased to bottom. Slotted from 200 ft to bottom.
103	do	R. R. Lawson	1939	127	4	Tg	--	--	C,W	S	Cased to bottom. Slotted from 106 ft to bottom.
104	do	--	--	127	4	Tg	--	--	C,W	S	Cased to bottom. Old well.
105	Mrs. John Monroe	R. R. Lawson	1963	188	4	Tl	--	--	C,W	S	Cased to bottom. Slotted from 167 ft to bottom. 1/
201	V. T. Heldenfels	--	1890	96	4	Tg	81	1964	C,E	D,S	Cased to bottom.
* 202	A. R. Hatcher	--	--	250	4	Tl	--	--	C,W	S	Cased to bottom. Old well.
203	W. H. Hawn	--	1935	87	4	Tg	75.2	Apr. 8, 1964	C,W	S	Cased to bottom. Slotted from 77 ft to bottom.
204	Scott McNeil	--	--	90	4	Tg	70	1964	C,W	S	Cased to bottom. Old well.
205	do	--	--	85	4	--	70	do	C,W	S	Do.
* 301	Mrs. W. E. Handy	--	--	156	5	Tg	57.8 74.3 76.1	June 9, 1934 May 6, 1960 Jan. 30, 1964	C,E	S	Cased to bottom. Old well.
* 302	Pryor Lucas	--	--	56	5	Tg	42.1	Nov. 28, 1939	C,W	D,S	Old well.
303	Scott McNeil	--	--	80	--	Tg	--	--	N	N	
* 304	Heard & Heard	--	--	127	6	Tg	70.4	Nov. 28, 1939	C,W	D,S	Old well.
305	A. D. Cobb, Jr.	--	--	150	4	Tg	68.9	June 3, 1964	C,W	D,S	Cased to bottom. Old well.
306	do	--	--	100	4	Tg	67.4	do	C,W	S	Do.
* 401	Beeville Memorial Park	August Pohlar	1955	290	6	Tg	100	1964	T,E	Irr	Cased to bottom. Slotted from 250 ft to bottom. Pump set at 200 ft. Irrigates 10-acre cemetery.
402	Burlye Stuart	W. E. Eeds	1951	100	4	Tg	80	do	J,E	D,S	Cased to bottom. Slotted from 79 ft to bottom.
403	Mrs. D. L. Travland	R. R. Lawson	1963	160	4	Tg	100	do	T,E	D,S	Cased to bottom. Slotted from 139 ft to bottom.
404	B. H. Hickman	--	1960	90	4	Tg	30	do	C,W	S	
405	do	R. R. Lawson	1958	132	4	Tg	100	do	C,W	S	Cased to bottom. Slotted from 111 ft to bottom.

See footnotes at end of table.

Table 5.--Records of wells in Bee and adjacent counties--Continued

Well	Owner	Driller	Date completed	Depth of well (ft)	Diameter of well (in.)	Water-bearing unit	Water level: Below land-surface datum (ft)	Water level: Date of measurement	Method of lift	Use of water	Remarks
* AW-79-35-406	B. H. Hickman	R. R. Lawson	1958	163	5	Tg	98	1964	J,E	D,S	Cased to bottom. Slotted from 142 ft to bottom. 1/
407	do	--	--	90	4	Tg	60	do	C,W	S	
* 501	Texas Experiment Farm	I. N. Powell	--	148	4	Tg	73 67.0	1939 Apr. 28, 1960	C,W	D,S, Irr	Cased to bottom. Reported very small scale irrigation. Old well.
502	W. H. Hawn	--	1930	56	4	Tg	50	1964	T,E	D,S	Cased to bottom.
503	G. A. Hall	--	1930	87	4	Tg	75	do	C,E	D,S	Do.
504	do	--	--	85	4	Tg	75	do	C,W	S	Cased 4 ft. Not used in 1964. Old well.
505	do	--	--	87	4	Tg	75	do	C,W	N	Cased to bottom. Old well.
* 506	C. H. Ray	--	--	100	4	Tg	80.6	Apr. 8, 1964	C,W	D,S	Cased to bottom.
507	do	--	--	90	4	Tg	70	1964	C,W	S	Do.
* 601	A. D. Cobb, Jr.	--	--	200	4	Tg	70	do	T,E	D,S	Do.
602	J. J. O'Brien	Youngblood Well Service	1954	310	4	Tg	--	--	C,W	S	Cased to bottom. Slotted from 288 ft to bottom.
603	A. D. Cobb, Jr.	--	--	90	4	Tg	67.5	June 3, 1964	C,W	S	Cased to bottom. Old well.
604	do	--	--	100	4	Tg	80	1964	C,W	S	Cased to bottom. Old well.
605	do	--	--	100	4	Tg	80	do	C,W	S	Do.
606	C. H. Ray	--	--	80	4	Tg	60	do	C,W	S	
607	Scott E. McNeil	Afroma Oil & Gas Inc.	1953	3,652	--	--	--	--	--	--	Oil test. Altitude of land surface 203 ft. 3/
* 701	City of Beeville well 3	Layne-Texas Co.	1941	1,533	12, 6	To	--	--	T,E	P	Cased to 1,533 ft. Screen from 1,484 to 1,533 ft. Drilled to 1,539 ft, plugged back to 1,533 ft.
702	City of Beeville well 6	do	1954	1,600	14, 12, 8	To	--	--	T,E	P	Cased to 1,600 ft. Screen from 1,428-1,468; and 1,478-1,590 ft. Drilled to 1,628 ft, plugged back to 1,600 ft. 2/
* 703	J. T. Taylor	--	--	73	4	Tg	39.7	Nov. 28, 1939	N	N	Well has been destroyed. Old well.
704	G. B. Love	Otto Chessir	1953	230	4	Tg	70	1964	C,W,E	D,S	Cased to bottom. Slotted for 21 ft.
* 705	J. Ballard	--	1936	100	4	Tg	59.1	Oct. 13, 1939	C,W	D,S	Cased to bottom.
801	R. A. Baber	--	1904	60	4	Tg	32.1	do	C,W	D,S	Do.
802	T. F. Welder Estate	--	--	90	4	Tg	60	1964	C,W	S	Cased to bottom. Old well.

See footnotes at end of table.

Table 5.--Records of wells in Bee and adjacent counties--Continued

Well	Owner	Driller	Date completed	Depth of well (ft)	Diameter of well (in.)	Water-bearing unit	Water level: Below land-surface datum (ft)	Water level: Date of measurement	Method of lift	Use of water	Remarks
AW-79-35-803	C. H. Ray	--	--	80	4	Tg	60	1964	C,W	S	Cased to bottom.
804	Rosa Borroum	Michael T. Halbounty	1955	2,446	--	--	--	--	--	--	Oil test. Altitude of land surface 211 ft. 2/
* 901	U.S. Naval Station (Chase Field)	Layne-Texas Co.	1954	539	10, 5	Tl	96	Dec. 1963	T,E	P	Cased to bottom. Screen from 456-527 ft. Pumping level 154 ft. Drilled to 616 ft, plugged back to 539 ft. 1/
* 902	Ralph V. Ellis	--	--	90	4	Tg	61.7 62.1	May 5, 1960 Apr. 8, 1964	C,W	S	Cased to bottom. Old well.
* 903	A. Welder	-- Alsup	1925	67	3	Tg	53.3 57.2	Nov. 3, 1939 Apr. 10, 1964	C,W	D,S	Reported ruined for domestic purposes by nearby oil test.
904	Amos Welder	W. E. Eeds	1950	120	4	Tg	--	--	C,E	D,S	Cased to bottom. Slotted from 100 ft to bottom.
* 905	do	do	1964	500	4	Tl	100	1964	T,E	D,S	Cased to bottom. Slotted from 470 ft to bottom.
906	do	--	--	80	4	Tg	57.4	June 2, 1964	C,W	S	Cased to bottom. Old well.
907	do	W. E. Eeds	1956	120	4	Tg	64.1	do	C,W	S	Cased to bottom. Slotted from 99 ft to bottom.
* 36-101	Otto Boemer	--	1925	125	4	Tg	60	1964	J,E	D,S	Cased to bottom.
* 102	Hilda Dorsey	--	--	100	4	Tg	65.8	June 3, 1964	C,W	D,S	Cased to bottom. Old well.
103	J. J. O'Brien	--	--	200	4	Tg	70	1964	C,W	D,S	Do.
104	Ball Unit well 1	T. S. Hargest	1961	2,400	--	--	--	--	--	--	Oil test. Altitude of land surface 220 ft. 2/
201	J. Valenta Estate	--	--	125	4	Tg	--	--	C,W	S	Cased to bottom.
401	J. M. O'Brien	--	1900	125	5	Tg	52	1939	C,W,G	S	
402	J. J. O'Brien	Youngblood Well Service	1953	350	4	Tg	76.3	June 3, 1964	C,W	S	Cased to bottom. Slotted from 329 ft to bottom.
403	do	do	1953	250	4	Tg	60	1964	C,W	S	Cased to bottom. Slotted from 229 ft to bottom.
501	J. M. O'Brien	--	1900	125	5	Tg	52	1939	C,W	S	
502	Heard Estate	--	--	100	4	Tg	--	--	C,W	S	Cased to bottom. Old well.
602	J. J. O'Brien	Youngblood Well Service	1954	350	4	Tg	72.8	June 3, 1964	C,W	S	Cased to bottom. Slotted from 329 ft to bottom.
603	do	--	--	750	2	Tl	+	1964	Flows, C,W	S	Cased to bottom. Old well.

See footnotes at end of table.

Table 5.--Records of wells in Bee and adjacent counties--Continued

Well	Owner	Driller	Date completed	Depth of well (ft)	Diameter of well (in.)	Water-bearing unit	Water level: Below land-surface datum (ft)	Water level: Date of measurement	Method of lift	Use of water	Remarks
* AW-79-36-701	W. Ellis	--	--	100	3	Tg	59.7	Oct. 13, 1939	C,W	D,S	
702	J. J. O'Brien	Youngblood Well Service	1954	250	4	Tg	60	1964	C,W	S	Cased to bottom. Slotted from 229 ft to bottom.
703	Ralph Ellis	--	1963	500	4	Tl	95	do	T,E	D,S	Cased to bottom. Slotted from 460 ft to bottom.
704	J. J. O'Brien	--	--	200	4	Tg	60	do	C,W	S	Cased to bottom.
705	Mary & Margaret Murphy	Head, Welch, Chizum and Rhodes & Hicks	1955	4,755	--	--	--	--	--	--	Oil test. Altitude of land surface 146 ft. 3/
* 801	J. J. O'Brien	--	--	115	6	Tg	60.4	Nov. 3, 1939	C,W	D,S	Old well.
* 802	do	Youngblood Well Service	1947	1,113	6	Tl	--	--	T,E	D	Cased to bottom. Slotted from 1,050 ft to bottom.
* 803	do	--	--	550	6	Tl	--	--	T,E	D,S	Cased to bottom.
* 804	do	Youngblood Well Service	1953	200	4	Tg	63.8	June 3, 1964	C,W	S	
* 805	do	do	1954	350	4	Tg	75.4	do	C,W	S	Cased to bottom. Slotted from 329 ft to bottom.
* 901	J. M. O'Brien	--	1928	928	8	Tl	18.0 21.4	May 6, 1960 June 1, 1964	C,W	S	Cased to bottom. Slotted from 900 ft to bottom. Reported water level was 4.10 ft below land surface in 1939.
902	J. J. O'Brien	H & S Well Service	1964	708	24, 12	Tl	60	1964	T,G	Irr	Cased to bottom. Slotted from 524 ft to bottom. Reported irrigates 150 acres. 1/
903	do	Youngblood Well Service	1953	400	4	Tg	75	do	C,W	S	Cased to bottom. Slotted from 379 ft to bottom.
904	do	do	1953	350	4	Tg	81.2	June 3, 1964	C,W	S	Cased to bottom. Slotted from 329 ft to bottom.
* 905	do	--	--	750	2	Tl	+	1964	Flows, C,W	S	Cased to bottom. Old well.
37-701	Mrs. Grace Malone	--	--	160	4	Tg	61.6	May 29, 1964	C,W	S	Cased to bottom.
* 702	do	--	--	80	4	Tg	60.4	do	C,W	S	Cased to bottom. Old well.
703	J. J. O'Brien	Youngblood Well Service	1953	350	4	Tg	65	1964	C,W	S	Cased to bottom. Slotted from 329 ft to bottom.
704	do	Kelly Well Service	--	240	4	Tg	60	do	C,W	S	Cased to bottom. Slotted from 219 ft to bottom.
801	Cyrus Fox	--	1945	200?	4	Tg	30.1	May 3, 1960	C,W	S	Supplied water for drilling oil test.

See footnotes at end of table.

Table 5.--Records of wells in Bee and adjacent counties--Continued

Well	Owner	Driller	Date completed	Depth of well (ft)	Diameter of well (in.)	Water-bearing unit	Water level: Below land-surface datum (ft)	Water level: Date of measurement	Method of lift	Use of water	Remarks
AW-79-37-802	Manning well 1	Tex-Kan Oil Co.	1957	5,425	9, 8	--	--	--			
* 803	Mrs. Grace Malone	--	--	200	4	Tg	64.9	May 29, 1964	C,W	S	Cased to bottom.
804	do	--	--	100	4	Tg	--	--	C,W	S	Cased to bottom. Old well.
805	Mrs. Grace Handy	W. E. Eeds	1958	126	4	Tg	--	--	C,W	S	Cased to bottom. 1/
* 902	M. McGill Estate	B. E. Beady	1892	64	4	Tg	38 39.2	1939 May 3, 1960	C,W	D,S	
906	C. J. Turman	Youngblood Well Service	1947	750	2	Tl	--	--	J,E	D,S	Cased to bottom. Reported flowed when drilled. Screen from 729 ft to bottom. 1/
907	Guy Warren	H & S Drilling Co.	1962	1,000	12, 8	Tl	+	1964	Flows, T,Ng	Irr	Cased to bottom. Slotted from 300 ft to bottom. Reported irrigates 300 acres.
* 908	Mrs. Grace Malone	Kelly Well Service	--	180	4	Tg	60	do	T,E	D,S	Cased to bottom. Slotted from 159 ft to bottom.
* 41-301	Ernest Schmidt	Burl L. Sikes	1955	610	12, 8	Tl	140	1957	T,G	Irr	Cased to bottom. Slotted from 458 ft to bottom. Reported discharge 750 gpm.
302	C. W. McMahon	W. D. Walton	1958	219	6	Tg	--	--	T,E	D,S	Cased to bottom. Slotted from 197 ft to bottom. 1/
303	do	--	--	120	4	Tg	90	1964	T,E	D,S	
304	Bolland Ranch	--	--	500	4	Tl	--	--	C,E	D,S	Cased to bottom.
305	do	--	--	150	4	Tg	--	--	C,W	S	Do.
601	Mrs. -- Handly	A. A. Wench	1955	640	12	Tl	120	1959	N	N	Cased to bottom. Slotted from 440 ft to bottom. Abandoned and plugged in 1964.
* 602	Emil Kinkler	--	1906	224	4	Tg	104.8 106.0	Nov. 1, 1939 Apr. 2, 1964	C,W	D,S	Reported slight sulphur taste.
42-101	Truman Gill	W. E. Eeds	1951	180	4	Tg	104.8	Apr. 6, 1964	C,W	S	Cased to bottom. Slotted from 159 ft to bottom.
* 102	Ernest Kinkler	--	--	120	4	Tg	84.1 89.1	Nov. 1, 1939 Apr. 3, 1964	C,W	D,S	Old well.
* 103	Truman Gill	W. E. Eeds	1960	327	4	Tg	118	1964	T,E	S	Cased to bottom. Slotted from 306 ft to bottom. 1/
104	Gill-Grogan Co.	--	1954	332	4	Tg	118	do	T,E	S	Cased to bottom. Slotted from 311 ft to bottom.
105	do	--	--	220	4	Tg	118	do	T,E	S	Cased to bottom. Slotted from 200 ft to bottom.

See footnotes at end of table.

Table 5.--Records of wells in Bee and adjacent counties--Continued

Well	Owner	Driller	Date completed	Depth of well (ft)	Diameter of well (in.)	Water-bearing unit	Water level: Below land-surface datum (ft)	Water level: Date of measurement	Method of lift	Use of water	Remarks
* AW-79-42-106	Gill-Grogan Co.	--	--	591	4	Tl	--	--	T,E	S	Cased to bottom.
107	Truman Gill	W. E. Eeds	1960	160	4	Tg	--	--	C,W	S	Cased to bottom. Slotted from 139 ft to bottom.
108	do	do	1960	251	4	Tg	--	--	T,E	S	Cased to bottom. Slotted from 230 ft to bottom.
109	do	--	--	189	4	Tg	--	--	C,W	S	Cased to bottom. Slotted from 168 ft to bottom.
110	do	--	--	120	4	Tg	--	--	C,W	S	Cased to bottom. Slotted from 100 ft to bottom.
111	T. M. Gill well 1	Del Mar Drilling Co.	1958	4,612	--	--	--	--	--	--	Oil test. Altitude of land surface 237 ft. 3/
201	F. H. Boothe	-- Lawson	1929	159	4	Tg	99.3 105.2 106.2	May 21, 1934 Apr. 28, 1960 Apr. 2, 1964	C,W	D,S	Cased to bottom. Temp. 76°F.
* 202	Paul Spikes	W. E. Eeds	1962	200	4	Tg	160	1964	J,E	S	Cased to bottom. Slotted from 179 ft to bottom.
203	James Riggle	R. R. Lawson	1959	100	4	Tg	80	do	J,E	D,S	
204	do	do	1959	104	4	Tg	81.2	Apr. 2, 1964	C,W	S	
* 205	E. Mueller	--	1914	96	4	Tg	79.8	Nov. 1, 1939	C,W	D,S	
206	Hicks Baird	W. E. Eeds	1961	125	4	Tg	100	1964	T,E	S	Cased to bottom. Slotted from 104 ft to bottom.
207	Truman Gill	--	--	172	4	Tg	118	do	C,W	S	Cased to bottom. Slotted from 151 ft to bottom.
208	do	--	--	70	4	Tg	--	--	C,W	S	Cased to bottom. Old well.
209	do	--	--	325	4	Tg	--	--	T,E	S	Cased to 325 ft. Slotted from 300 ft to bottom.
210	do	--	--	240	4	Tg	--	--	T,E	S	Cased to bottom. Slotted from 219 ft to bottom.
211	do	--	--	240	4	Tg	--	--	T,E	S	Cased to bottom.
212	do	--	--	240	4	Tg	--	--	T,E	S	Cased to bottom. Slotted from 219 ft to bottom.
301	Paul Krause	Sinclair Oil Co.	1955	365	4	Tg	100	1959	T,E	Irr	Cased to bottom. Pump set at 150 ft. Reported 110 ft of water sands. Supplied water for drilling oil test.

See footnotes at end of table.

Table 5.--Records of wells in Bee and adjacent counties--Continued

Well	Owner	Driller	Date completed	Depth of well (ft)	Diameter of well (in.)	Water-bearing unit	Water level: Below land-surface datum (ft)	Water level: Date of measurement	Method of lift	Use of water	Remarks
AW-79-42-302	C. H. Sugarek & Son	--	1942	360	4	Tg	70	1959	J,Ng	Irr	Reported pumps into a surface tank.
303	do	W. E. Eeds	1955	637	4	Tl	70	do	J,Ng	Irr	Cased to bottom. Reported pumps into a surface tank.
304	do	R. R. Lawson	1956?	530	4	Tl	70	do	J,Ng	Irr	Do.
401	J. B. Scfcik	-- Coe	1955	600	12	Tl	110 150.6 156.8	1957 Apr. 22, 1960 Apr. 2, 1964	T,G	Irr	Cased to bottom. Reported discharge 800 to 900 gpm.
* 402	Mrs. T. J. Hilard	Walker & Alsup	1929	119	3	Tg	103.3 100.1 103.7	May 21, 1934 Apr. 29, 1960 Apr. 3, 1964	C,W	D,S	Cased to bottom. Temp. 76°F.
403	J. W. Maxwell	M. G. Hobbs	1955	738	12	Tl	--	--	T,E	Irr	Cased to bottom.
404	Burley Stuart	--	--	90	4	Tg	70	1964	C,E	S	Cased to bottom. Old well.
501	do	W. E. Eeds	1954	90	4	Tg	70	do	C,E	S	Cased to bottom. Slotted from 80 ft to bottom.
* 502	I. J. Miller	-- Powell	1918	98	6	Tg	91.2	Nov. 1, 1939	J,E	D,S	
503	Burley Stuart	W. E. Eeds	1961	90	4	Tg	--	--	C,W	D,S	Cased to bottom. Slotted from 80 ft to bottom.
* 504	A. W. Kinkler	R. W. Lawson	1900	103	4	Tg	88.0 87.3	June 4, 1934 Nov. 1, 1939	C,W,G	D,S	Temp. 74°F.
* 601	C. H. Sugarek	--	--	72	4	Tg	60.6 58.9 57.7 59.2	May 22, 1934 Nov. 2, 1939 Apr. 29, 1960 Apr. 3, 1964	C,E	D,S	Old well. Temp. 74°F.
602	Meridith Schnecaenbuger	--	1904	70	4	Tg	--	--	C,E	D,S	Cased to bottom.
603	R. B. Madray	--	--	80	6	Tg	60	1964	C,E	D,S	Cased to bottom. Old well.
* 604	Lonnie Borrum	R. R. Lawson	1963	240	4	Tg	80	do	C,W	D,S	Cased to bottom. Slotted from 200 ft to bottom.
605	Ed Kubala well 1	Howell & Rudman	1956	4,310	--	--	--	--	--	--	Oil test. Altitude of land surface 211 ft. 3/
702	John P. Impson	--	--	110	4	Ql	103.2	Apr. 3, 1964	C,W	D,S	Cased to bottom. Old well.
703	do	W. E. Eeds	1963	230	4	Ql	105	1964	T,E	D,S	Cased to bottom.
704	E. L. Wagoner	--	1914	125	4	Ql	107.2	Apr. 3, 1964	C,W	D,S	Do.
705	do	--	--	127	4	Ql	120	1964	C,W	D,S	Cased to bottom. Old well.

See footnotes at end of table.

Table 5.--Records of wells in Bee and adjacent counties--Continued

Well	Owner	Driller	Date completed	Depth of well (ft)	Diameter of well (in.)	Water-bearing unit	Water level: Below land-surface datum (ft)	Water level: Date of measurement	Method of lift	Use of water	Remarks
AW-79-42-801	Melvin Baird	Carl Vickers	1956	609	24, 12	Tg	135	1959	N	N	Plugged and abandoned in 1964.
802	Hicks Baird	--	--	100	4	Ql	--	--	C,W	D,S	Cased to bottom. Old well.
* 803	J. P. Impson	J. Impson	1888	110	6	Ql	100	Nov. 1939	C,W	D,S	
804	Henry Hanus	W. E. Eeds	1964	90	4	Ql	50	1964	T,E	D,S	Cased to bottom. Slotted from 80 ft to bottom.
805	J. J. Doubrava	--	1904	74	3	Ql	69	1963	C,W	D,S	
806	Paul W. Treptow	W. E. Eeds	1963	105	4	Ql	80	1964	J,E	S	Cased to bottom. Slotted from 90 ft to bottom. 1/
* 901	J. T. Ernest	--	--	85	6	Ql	56.4 59.8	June 5, 1934 Nov. 2, 1939	C,W	D,S	Old well. Temp. 74°F.
902	Hank Woffard	R. R. Lawson	1962	280	4	Ql	--	--	T,E	D,S	Cased to bottom.
43-101	W. E. Eeds	W. E. Eeds	1956	582	4	Tl	70	1960	J,E	Irr	Cased to bottom. Slotted from 540 ft to 580 ft.
102	F. W. Heldenfels Farms	--	--	715	4	Tl	90	1959	J,E	Irr,S	Oil test; converted to water well.
103	do	W. E. Eeds	1956	770	4	Tl and Tg	96.3	Feb. 11, 1964	J,E	Irr,S	Cased to bottom. Slotted from ? ft to bottom.
104	do	do	1955	770	4	Tl and Tg	94.8	do	J,E	Irr,S	Do.
105	do	do	1955	770	4	Tl and Tg	95.7	do	J,E	Irr,S	Do.
106	do	do	1955	770	4	Tl and Tg	72.6	do	J,E	Irr,S	Do.
107	do	--	--	90	4	Tg	70	1964	C,W	S	Cased to bottom. Old well.
108	C. W. Seger	W. E. Eeds	1960	100	4	Tg	58	do	C,E	D,S	Cased to bottom. Slotted from 80 ft to bottom.
* 109	do	August Pohler	--	225	4	Tg	71.0	Apr. 7, 1964	C,W	S	Cased to bottom.
110	Louis P. Landrum	--	--	180	4	Tg	--	--	C,W	S	Do.
111	do	--	--	90	4	Tg	80	1964	C,W	S	Do.
112	do	--	--	100	4	Tg	80	do	C,W	S	Do.
113	do	--	--	170	4	Tg	--	--	C,W,E	D,S	Cased to bottom. Old well.
* 114	V. L. Kelley	Walker & Alsup	1933	80	6	Tg	50.3 55.0	May 25, 1934 Nov. 2, 1939	C,W	D,S	Temp. 75°F.

See footnotes at end of table.

Table 5.--Records of wells in Bee and adjacent counties--Continued

Well	Owner	Driller	Date completed	Depth of well (ft)	Diameter of well (in.)	Water-bearing unit	Water level: Below land-surface datum (ft)	Water level: Date of measurement	Method of lift	Use of water	Remarks
* AW-79-43-201	E. A. Zappe	--	--	70	4	Tg	39.2 42.2	Dec. 11, 1939 Apr. 8, 1964	C,W	D,S	Old well.
301	U.S. Naval Station (Chase Field)	Carl Vickers	1943	565	10, 7	Tl	--	--	T,E	P	Cased to bottom. Screen from 481 ft to 556 ft. Reported discharge 350 gpm.
302	do	do	1943	557	10, 6	Tl	--	--	T,E	P	Cased to 557 ft. Screen from 485 ft to 557 ft. Reported discharge 350 gpm. Drilled to 614 ft, plugged back to 557 ft.
303	do	H & B Drilling Co.	1962	558	12, 6	Tl	--	--	T,E	P	Cased to bottom. Screen from 488 ft to bottom.
* 304	Claud E. Heard	--	--	120	4	Tg	50	1964	T,E	D,S	Cased to bottom. Old well.
* 305	do	W. E. Eeds	1953	580	4	Tl	--	--	T,E	D,S	Cased to bottom. Slotted from 550 ft to bottom.
* 306	do	--	--	140	4	Tg	--	--	C,W	S	Cased to bottom. Old well.
307	Mrs. Ida Wood	--	--	95	6	Tg	70	1964	C,W	S	Cased to bottom.
* 401	F. W. Heldenfels Farms	M. G. Hobbs	1957	840	12	Tl	82.1	Feb. 10, 1964	T,E	Irr,S	Cased to bottom. Screen from 340-370, 375-400, 412-433, 465-498, 570-635, 680-690, 725-778, and 798-835 ft. Pump set at 260 ft. 1/
402	E. R. Villareal	Casey Drilling Co.	1964	450	10	Tg,Tl	90	1964	T,G	Irr	Reported irrigated about 25 acres in 1964.
403	Heldenfels Farms	--	--	80	4	Tg	61.3	Mar. 3, 1964	C,W	S	
404	G. J. Grass	--	--	88	4	Tg	36.0	Nov. 17, 1939	C,W	S	
405	C. W. Segar	--	1910	90	4	Tg	70	1964	C,W	S	Cased to bottom.
406	do	R. R. Lawson	1950	100	4	Tg	71.2	Apr. 7, 1964	C,W	S	Cased to bottom. Slotted from 79 ft to bottom.
407	do	--	1930	52	4	Ql	47.1	do	C,W	D,S	Cased to bottom.
408	do	R. R. Lawson	1950	150	4	Tg	70	1964	C,E	D,S	Cased to bottom. Slotted from 129 ft to bottom.
409	Linke Estate well 1	Gorman Drilling Co.	1952	4,217	--	--	--	--	--	--	Oil test. Altitude of land surface 159 ft. 2/
* 501	D. Perrez	-- Powell	1915	50	--	Ql	44.4	Dec. 11, 1939	C,W	D,S	
502	A. J. Ford	--	--	80	4	Tg	70	1964	C,W	D,S	Cased to bottom. Old well.
* 503	R. L. Jones	-- Brooks	1939	50	4	Ql	32.3	Dec. 11, 1939	C,W	D,S	
* 504	Oscar Leming	Oscar Leming	1932	47	4	Ql	35.4	Nov. 2, 1939	-,G	S	

See footnotes at end of table.

Table 5.--Records of wells in Bee and adjacent counties--Continued

Well	Owner	Driller	Date completed	Depth of well (ft)	Diameter of well (in.)	Water-bearing unit	Water level: Below land-surface datum (ft)	Water level: Date of measurement	Method of lift	Use of water	Remarks
AW-79-43-601	Mrs. Ida Wood	--	--	70	4	Ql	--	--	C,W	S	Cased to bottom. Old well.
602	Claude E. Heard	--	--	100	4	Ql	60	1964	C,W	S	Do.
701	T. H. McCracken	--	--	100	4	Ql	--	--	C,W	D,S	Cased to bottom. Old well.
* 702	G. E. Mattingly	R. R. Lawson	1944	100	4	Ql	75	1964	C,E	D,S	Cased to bottom. Slotted from 85 ft to bottom.
703	I. H. McCracken	Oceanic Oil Co.	1955	4,825	--	--	--	--	--	--	Oil test. Altitude of land surface 166 ft. 2/
801	Skidmore School District	W. E. Eeds	1958	185	4	Tg	--	--	T,E	P	Cased to bottom. Slotted from 164 ft to bottom.
802	do	--	--	90	4	Ql	50	1964	C,E	P	Cased to 70 ft. Old well.
803	Truman Gill	W. E. Eeds	--	189	4	Tg	100	do	C,E	P,Ind	Cased to bottom. Slotted from 168 ft to bottom.
804	J. R. Curbello	--	--	90	4	Ql	79.6	Apr. 8, 1964	C,W	D,S	Cased to bottom. Old well.
805	R. H. Coffman	R. R. Lawson	1946	89	4	Ql	64	1964	C,E	D,S	Cased to bottom. Slotted from 79 ft to bottom.
* 806	T. & No. RR.	G. Nesbit	1927	745	8	Tl	63	Oct. 1939	C,E	Ind	
* 807	do	--	--	125	8	Ql	65	1939	C,G	Ind	Used as standby well. Old well.
* 901	W. J. Homan	--	--	64	4	Ql	42.2	Nov. 17, 1939	C,W	D,S	
902	C. W. Hammonds	R. R. Lawson	1958	109	4	Ql	65	1964	T,E	S	Cased to bottom. Slotted from 88 ft to bottom. 1/
* 903	Driscoll Estate	do	1962	260	4	Tg	63.2	June 4, 1964	C,W	S	Cased to bottom. Slotted from 239 ft to bottom.
904	do	--	--	93	4	Ql	62.2	do	C,W	S	Cased to bottom. Old well.
905	Clara Driscoll	W. B. Cleary, Inc.	1958	4,845	--	--	--	--	--	--	Oil test. Altitude of land surface 125 ft. 2/
* 44-101	C. E. Heard	R. H. Pursley	1930	600	4	Tl	81.2	Nov. 3, 1939	C,W	S	
102	do	B. T. Sikes	1962	610	8	Tl	125	1964	T,E	Irr	Cased to bottom. Slotted from 300 ft to bottom. Pump set at 260 ft.
103	do	R. R. Lawson	--	150	4	Tg	54.3	June 2, 1964	C,W	S	Cased to bottom. Slotted from 129 ft to bottom.
* 104	do	do	1963	320	4	Tg	60.0	do	C,W	S	Cased to bottom. Slotted from 300 ft to bottom.

See footnotes at end of table.

Table 5.--Records of wells in Bee and adjacent counties--Continued

Well	Owner	Driller	Date completed	Depth of well (ft)	Diameter of well (in.)	Water-bearing unit	Water level: Below land-surface datum (ft)	Water level: Date of measurement	Method of lift	Use of water	Remarks
* AW-79-44-105	C. E. Heard	--	--	160	4	Tg	60.7	June 2, 1964	C,W	S	Cased to bottom. Old well.
106	do	--	--	150	4	Tg	60.3	do	C,W	S	Do.
201	J. J. O'Brien	Youngblood Well Service	1953	355	4	Tg	66.1	June 3, 1964	C,W	S	Cased to bottom. Slotted from 334 ft to bottom.
202	Mrs. Ira Heard	--	--	150	4	Tg	60	1964	C,W	S	Cased to bottom.
* 301	Trunkline Gas Co.	Layne-Texas Co.	1955	520	10, 5	Tl	180	do	T,E	Ind, Irr	Reported discharge 16,000 to 18,000 gpd for industrial use; irrigates about 15 acres. Cased to bottom. Screen from 495 ft to bottom.
302	do	do	--	520	10, 5	Tl	180	do	T,E	Ind, Irr	Cased to bottom.
303	Mrs. Grace Malone	--	--	160	4	Tg	64.3	May 29, 1964	C,W	D,S	Cased to bottom. Old well.
* 304	do	R. R. Lawson	1959	284	4	Tg	77	1964	T,E	S	Cased to bottom. Slotted from 242 ft to bottom. 1/
305	do	--	--	110	4	Tg	62.7	May 27, 1964	C,W	S	Cased to bottom. Old well.
306	do	--	--	150	4	Tg	60	1964	C,W	S	
307	J. J. O'Brien	Youngblood Well Service	1953	350	4	Tg	59.6	June 3, 1964	C,W	S	Cased to bottom. Slotted from 329 ft to bottom.
308	Dan Foy Estate well 1	Stice Drilling Co.	1954	5,214	--	--	--	--	--	--	Oil test. Altitude of land surface 130 ft. 3/
401	Claude E. Heard	--	--	88	4	Ql	40	1964	C,W	S	Cased to bottom. Old well.
402	do	--	--	106	4	Ql	49.5	Nov. 17, 1939	C,W,G	S	Old well.
501	do	--	--	150	4	Tg	71.8	May 27, 1964	C,W	S	Cased to bottom.
502	do	--	--	100	4	Ql	60	1964	C,W	S	
601	Mrs. Josephine Chestnutt well 1	Silby Walker Corp.	--	--	--	--	--	--	--	--	Oil test. Altitude of land surface 148 ft. 2/
701	Driscoll Estate	R. R. Lawson	1962	180	4	Ql	74.3	June 4, 1964	C,W	S	Cased to bottom. Slotted from 159 ft to bottom. 1/
702	do	--	--	75	4	Ql	65.4	do	C,W	S	Cased to bottom. Old well.
45-101	Mrs. Grace Malone	R. R. Lawson	1959	307	4	Tg	60	1964	T,E	S	Cased to bottom. 1/
102	do	--	--	115	4	Tg	--	--	C,W	S	Cased to bottom. Old well.
103	J. J. O'Brien	--	--	700	2	Tl	20	1964	C,W	S	Reported flowed until 1940. Old well.

See footnotes at end of table.

Table 5.--Records of wells in Bee and adjacent counties--Continued

Well	Owner	Driller	Date com-pleted	Depth of well (ft)	Diam-eter of well (in.)	Water-bearing unit	Water level: Below land-surface datum (ft)	Water level: Date of measurement	Method of lift	Use of water	Remarks
AW-79-45-104	J. J. O'Brien	--	--	640	4	Tl	--	--	C,W	S	Cased to bottom. Old well.
201	Jewell May well 2	Pure Oil Co.	--	--	--	--	--	--	--	--	Oil test. Altitude of land surface 97 ft. 2/
202	Molly Fox	--	--	100	4	Ql	59.3	May 29, 1964	C,W	S	Do.
* 203	Mrs. Grace Malone	Kelley Well Service	1960	180	4	Tg	--	--	T,E	S	Cased to bottom. Slotted from 159 ft to bottom.
204	Josephine Chesnutt	--	--	79	4	Ql	43	1939	--	S	Cased to bottom.
205	H. C. Wood	--	--	100	4	Ql	--	--	C,W	D,S	Do.
* 302	C. E. Barber	--	--	65	4	Ql	41.7	May 29, 1964	C,W	S	Old well.
401	Josephine Chesnutt	--	--	110	4	Ql	95	1939	C,W	S	Cased to bottom.
501	Lawrence Wood	--	--	60	--	--	42.0	Dec. 9, 1961	C,W	S	Altitude of land surface 87 ft. Old well.
503	E. McCurdy "A"	Amarada Petroleum Corp.	1960	5,508	--	--	--	--	--	--	Oil test. Altitude of land surface 93 ft. 2/
701	Welder-McCan	do	--	150	4	--	63.5	Nov. 27, 1961	C,W	S	Old well.
703	do	--	--	150	4	--	45.0	do	C,W	S	Do.
704	do	--	--	150	4	--	44.9	do	C,W	S	Do.
* 50-201	J. Wallek	Ervin Straw	1913	110	4	Ql	83.3 81 81.4	June 14, 1934 1939 Apr. 29, 1960	C,W	D,S	Cased to bottom.
* 202	E. C. Steinmight	--	--	130	4	Ql	96.0 95.7	June 14, 1934 Nov. 2, 1939	C,W	D,S	Old well.
203	Mrs. C. Duderstadt	--	--	125	4	Ql	--	--	C,W	D,S	Cased to bottom. Old well.
204	O. J. Riggle, Jr.	--	1886	120	4	Ql	100	1964	C,E	D,S	
205	E. A. Myer	--	1958	800	8	Tg	120	do	T,G	Irr	Oil test; converted to water well. Cased to bottom. Perforated from 460-500 ft. Pump set at 260 ft.
* 301	H. F. Jostes	B. T. Sikes	1956	333	12	Ql	125.8 117.6	Apr. 21, 1960 Apr. 6, 1964	T,E	Irr	Drilled to 500 ft; plugged back to 333 ft. Reported sulphur odor. 1/
* 302	Frank Trlica	--	1910	85	4	Ql	66.6	Nov. 2, 1939	C,W	D,S	
* 303	Herman Jostes	E. Strogh	1910	130	4	Ql	108.4	do	C,W	D,S	
* 304	H. W. Adams	H. & S. Drilling Co.	1963	525	10	Tg	120	1964	T,E	Irr	Cased to bottom. Slotted from 375 ft to bottom.

See footnotes at end of table.

Table 5.--Records of wells in Bee and adjacent counties--Continued

Well	Owner	Driller	Date completed	Depth of well (ft)	Diameter of well (in.)	Water-bearing unit	Water level: Below land-surface datum (ft)	Water level: Date of measurement	Method of lift	Use of water	Remarks
AW-79-50-305	M. J. White well 1	Producers Corp. of Nevada	1950	197	--	--	--	--	--	--	Oil test. Altitude of land surface 181 ft. 2/
501	E. A. Myer	--	1923	121	3	Ql	117	1964	C,E	D,S	Cased to bottom.
502	Ed Fojtik	R. R. Lawson	1960	246	4	Ql	100	do	C,E	D,S	Cased to 244 ft. Slotted from 225 ft to bottom.
*503	W. L. Schiwitz	B. T. Sikes	1954	247	4	Ql	100	do	C,W	D,S	Cased to bottom. Slotted from 226 ft to bottom.
*601	Fritz G. Bremer	August Pohlar	1955	465	8	Tg	120	1955	T,E	Irr	Cased to bottom. Reported discharge 300 to 400 gpm.
*602	Charles Menger	E. Bruns	1938	138	4	Ql	115.8 115.3	June 14, 1934 Nov. 2, 1939	C,W	D,S	
*603	Steinmeyer & Co.	G. Darnbuch	1909	120	5	Ql	99.9 106.7	May 25, 1939 Oct. 27, 1939	C,W,G	D,S, Ind	
604	E. G. Mengers	--Bradfoot	1963	220	4	Ql	110	1964	T,E	D,S	Cased to bottom.
*51-101	E. G. Range	R. R. Lawson	1959	155	4	Ql	88	do	J,E	D,S	Cased to bottom. Slotted from 134 ft to bottom.
102	C. A. Lamprecht	--	--	90	4	Ql	82.6	June 5, 1964	C,W	D,S	Cased to bottom. Old well.
201	Edwin Snyder	M. G. Hobbs	1959	565	12, 8	Tg	84.6	May 5, 1960	T,G	Irr	Cased to bottom. Slotted from 195-238, 250-272, 355-380, 425-460, and 532 ft to bottom. Reported discharge 900 gpm. Drilled to 650 ft, plugged back to 565 ft. 1/
202	C. H. Griffith	--	--	68	5	Ql	61.6	June 4, 1964	N	N	Abandoned.
*203	Edward Porlish	R. R. Lawson	1961	320	6	Tg	60	1964	T,E	D,S	Cased to bottom. Slotted from 299 ft to bottom.
204	M. G. Erwin Estate	--	--	95	6	Ql	80.7	June 5, 1964	C,W	S	Cased to bottom. Old well.
301	C. H. Griffith	--	--	80	4	Ql	--	--	C,W	S	Do.
302	do	--	--	80	4	Ql	67.3	June 4, 1964	C,W	S	Cased to bottom.
*401	A. A. Stautzenbarger	E. Bruns	1932	105	4	Ql	90.7 93.5	Nov. 2, 1939 Apr. 29, 1960	C,W	S	
*402	Jack Pickens	B. T. Sikes	1963	250	10	Ql	120	1964	T,E	Irr	Cased to bottom. Temp. 78°F.
403	A. F. Staupzenberter	--	--	120	4	Ql	90	do	C,E	D,S	Cased to bottom. Old well.
404	C. A. Galloway	--	--	200	4	Ql	100	do	J,E	D,S	Cased to bottom.
*405	Milton Oelschlegel	B. T. Sikes	1957	280	4	Ql	101.1	June 5, 1964	C,W	D,S	Cased to bottom. Temp. 78°F.

See footnotes at end of table.

Table 5.--Records of wells in Bee and adjacent counties--Continued

Well	Owner	Driller	Date completed	Depth of well (ft)	Diameter of well (in.)	Water-bearing unit	Water level: Below land-surface datum (ft)	Water level: Date of measurement	Method of lift	Use of water	Remarks
AW-79-51-501	J. L. Copeland	W. E. Eeds	1955	260	8	Ql	75	1959	T,G	Irr	Cased to bottom. Slotted from 160 ft to bottom.
502	Dumas Curlee	O. B. Martin	1957	360	8	Ql	--	--	T,G	Irr	Cased to bottom. Slotted from 260 ft to bottom.
503	Sam Bingham	--	1910	100	4	Ql	60	1964	C,E	D,S	
504	C. H. Griffith	R. R. Lawson	1960	400	4	Tg	60	do	C,W	S	Cased to bottom. Slotted from 379 ft to bottom.
505	Dumas Curlee	--	--	100	4	Ql	62.7	June 4, 1964	C,W	S	Cased to bottom.
506	do	--	--	90	4	Ql	60	1964	C,W	S	Cased to bottom. Old well.
601	Glenn Dorris & Others	Carl Vickers	1957	390	12	Tg	--	--	T,E	Irr	Cased to bottom.
602	E. L. Gilliam	--	1930	70	4	Ql	40	1964	C,W	S	Do.
* 603	C. H. Griffith	--	--	275	4	Ql	100	do	C,E	D,S	Cased to bottom. Slotted from 254 ft to bottom.
604	do	--	--	144	4	Ql	--	--	C,W	D,S	Cased to bottom.
605	do	--	--	80	4	Ql	--	--	C,W	S	Cased to bottom. Old well.
606	do	--	--	80	4	Ql	64.1	June 4, 1964	C,W	S	Do.
701	J. W. Setliff	M. G. Hobbs	1956	402	12	Ql	--	--	T,E	Irr	Cased to bottom. Slotted from 135-165, 185-216, 220-265, 300-320, and 383-402 ft. 1/
706	C. A. Galloway	Bob Patterson	1963	412	10	Ql	125	1964	T,E	Irr	Cased to bottom. Slotted from 238 to 398 ft.
901	C. H. Griffith	B. T. Sikes	1956	382	12, 8	Ql	50	1960	T,E	Irr	Cased to bottom. Slotted from 183 ft to bottom.
905	do	--	--	350	4	Ql	80	1964	C,W	S	Cased to bottom.
52-101	Driscoll Estate	--	--	90	4	Ql	56.5	June 4, 1964	C,W	S	Cased to bottom. Old well.
102	do	--	--	70	4	Ql	50	1964	C,W	S	Cased to bottom.
201	do	--	--	100	4	Ql	67.1	June 4, 1964	C,W	S	Cased to bottom. Old well.
202	do	--	--	80	4	Ql	50	1964	C,W	S	Cased to bottom. Old well.
301	L. D. Thompson	--	--	65	4	Ql	44	1939	C,W	S	Cased to bottom.
401	V. G. Gwynn	M. G. Hobbs	1957	375	12	Ql	50	1960	T,E	Irr	Cased to bottom. Slotted from 185 ft to bottom.
402	do	--	1956	500	10	Tg	31.8	May 9, 1960	N	N	Cased to bottom. Slotted from 160 ft to bottom.

See footnotes at end of table.

Table 5.--Records of wells in Bee and adjacent counties--Continued

Well	Owner	Driller	Date completed	Depth of well (ft)	Diameter of well (in.)	Water-bearing unit	Water level: Below land-surface datum (ft)	Water level: Date of measurement	Method of lift	Use of water	Remarks
AW-79-52-403	V. G. Gwynn	M. G. Hobbs	1957	315	12	Ql	53.1	May 9, 1960	T,E	Irr	Cased to bottom. Slotted from 189 ft to bottom. Drilled to 635 ft, plugged back to 315 ft. 1/
* 404	E. L. Gilliam	-- Bruns	1927	64	4	Ql	40	1964	J,E	D,S	Cased to bottom.
405	D. Quintero	--	--	63	4	Ql	40.4	June 4, 1964	C,W	S	Cased to bottom. Old well.
* 406	W. L. Gardes	--	--	65	4	Ql	40.2	do	C,W	D,S	Do.
501	Tuttle 1 "A"	Carr Oil Co.	--	--	--	--	--	--	--	--	Oil test. Altitude of land surface 98 ft.
502	Mrs. J. A. Hynes well 1	Quinn, Murchison, & Massingill	1950	5,595	--	--	--	--	--	--	Oil test. Altitude of land surface 80 ft.
601	J. E. Wilson	--	--	90	4	Ql	--	--	C,W	D,S	
701	Abe Katz	Carl Vickers	1956	620	26, 16, 14	Tg	--	--	T,E	Irr	Cased to bottom. Slotted from 190 ft to bottom. Reported discharge 900 gpm. Drilled to 830 ft, plugged back to 620 ft. 2/
702	F. E. Felsing	M. G. Hobbs	1958	435	17	Tg	--	--	T,E	Irr	
708	do	--	--	75	4	Ql	51.8	June 4, 1964	C,W	S	Cased to bottom. Old well.
709	David Ellis	--	1944	80	4	Ql	60	1964	C,E	D,S	
802	Homer & Robert Mick	B. T. Sikes	1957	390	12, 8	Ql	20	do	T,E	Irr	Cased to bottom. Slotted from 200 ft to bottom. Pump set at 110 ft.
803	John L. Harrell	--	--	100	4	Ql	--	--	J,E	D,S	Cased to bottom. Old well.
					Goliad County						
KP-79-28-501	Magnolia Petroleum Co.	--	1947	11,494	--	--	--	--	--	--	Oil test. Altitude of land surface 230 ft.
					Karnes County						
PZ-79-09-701	Ernest Esse well 1	John J. Coyle	1954	6,520	--	--	--	--	--	--	Oil test. Altitude of land surface 482 ft.
					Live Oak County						
SJ-79-33-401	Morrey Bros.	Dirks & Woods, et al.	1950	3,986	--	--	--	--	--	--	Oil test. Altitude of land surface 273 ft.
49-901	Reeves Brown	Ryan, Hayes, & Burns, et al. & Alaska Steamship Co.	1948	4,512	--	--	--	--	--	--	Oil test. Altitude of land surface 74 ft.

See footnotes at end of table.

Table 5.--Records of wells in Bee and adjacent counties--Continued

Well	Owner	Driller	Date completed	Depth of well (ft)	Diameter of well (in.)	Water-bearing unit	Water level: Below land-surface datum (ft)	Water level: Date of measurement	Method of lift	Use of water	Remarks
						San Patricio County					
WW-79-51-705	F. H. Vansing well 6	Layne-Texas Co.	1953	767	16, 14	Wl,Tg	114.2	Nov. 18, 1955	T,E	Irr	Cased to bottom. Slotted from 280-331, 347-588, 639-696, and 711-751 ft.

* For chemical analysis of water from well see Table 7.
1/ For driller's log of well see Table 6.
2/ Electric log in files of U.S. Geological Survey, Austin, Texas.
3/ Electric log in files of Texas Water Development Board.

Table 6.--Drillers' logs of wells in Bee County

Well AW-79-18-501

Owner: Pan American Petroleum Co. Driller: Layne-Texas Co.

	Thickness (feet)	Depth (feet)		Thickness (feet)	Depth (feet)
Surface soil	3	3	Clay and boulders	29	530
Caliche	30	33	Clay, sandy, and layers of boulders	44	574
Clay, sandy	22	55	Caliche and lime	141	715
Clay	12	67	Clay, sandy, and sand streaks	30	745
Sand	10	77	Sand, hard, fine	30	775
Caliche	45	122	Clay, hard	21	796
Sand	23	145	Caliche and lime	12	808
Clay	5	150	Shale, sandy	9	817
Sand	37	187	Sand	8	825
Clay, sandy, and hard layers	29	216	Sand and lime layers	26	851
Sand, hard	17	233	Limerock, hard	2	853
Clay	88	321	Lime and layers of hard rock	12	865
Clay, hard	49	370	Sand, clear, and hard layers	31	896
Caliche and lime	50	420	Sand	10	906
Caliche and clay	25	445	Shale	12	918
Sand	26	471			
Caliche and lime	30	501			

Well AW-79-18-803

Owner: Vanaho Refining Co. Driller: Layne-Texas Co.

Topsoil	3	3	Sandrock, hard	4	24
Caliche, sandy	17	20	Caliche, sandy	19	43

(Continued on next page)

Well AW-79-18-803--Continued

	Thickness (feet)	Depth (feet)		Thickness (feet)	Depth (feet)
Shale, hard	47	90	Shale, tough	109	403
Sand and shale	19	109	Shale and sand layers	38	441
Shale	18	127	Shale breaks, tough	3	444
Sand and sandy shale	39	166	Sand with shale breaks	29	473
Shale and few sand breaks	109	275	Shale, tough	10	483
Shale, sandy	19	294			

Well AW-79-18-901

Owner: George A. Ray, Jr. Driller: W. E. Eeds.

	Thickness (feet)	Depth (feet)		Thickness (feet)	Depth (feet)
Surface soil	3	3	Clay, red	40	135
Sand	13	16	Sand	10	145
Caliche	6	22	Shale	7	152
Clay, red	33	55	Sand	15	167
Sand	40	95			

Well AW-79-25-102

Owner: Edgar L. Williams. Driller: R. R. Lawson.

	Thickness (feet)	Depth (feet)		Thickness (feet)	Depth (feet)
Surface soil	1	1	Shale	11	168
Clay	107	108	Rock and shale	6	174
Sand, salty	27	135	Shale, sticky	18	192
Shale, blue	13	148	Sand	15	207
Rock strips	9	157			

Well AW-79-25-308

Owner: James T. Taylor, Jr. Driller: W. E. Eeds.

	Thickness (feet)	Depth (feet)		Thickness (feet)	Depth (feet)
Surface soil	3	3	Sand	15	119
Clay, red	25	28	Shale and hard rock	78	197
Sand	14	42	Shale, blue	188	385
Clay, red	14	56	Sand	15	400
Sand	11	67	Shale, blue	26	426
Shale, blue	37	104	Sand	14	440

Well AW-79-25-401

Owner: Ernest Overby. Driller: W. E. Eeds.

	Thickness (feet)	Depth (feet)		Thickness (feet)	Depth (feet)
Surface soil	4	4	Shale, brown	113	270
Clay, red, and streaks of caliche	93	97	Shale, blue	90	360
Sand	7	104	Sand	23	383
Shale, blue	36	140	Shale	19	402
Sand	17	157			

Well AW-79-26-402

Owner: Gasoline Production Corp. Driller: --

	Thickness (feet)	Depth (feet)		Thickness (feet)	Depth (feet)
Caliche	55	55	Sand streaks, shale, and caliche	55	185
Shale	30	85	Shale, hard	20	205
Sand	10	95	Shale, streaks of sand, and caliche	72	277
Shale with streaks of caliche	35	130			

Well AW-79-27-701

Owner: Eldo E. Davis, Jr. Driller: R. R. Lawson.

	Thickness (feet)	Depth (feet)		Thickness (feet)	Depth (feet)
Soil and clay	6	6	Clay	58	140
Shale, sandy	24	30	Sand and rock	10	150
Sand	11	41	Sand	20	170
Clay	34	75	Rock	2	172
Rock and sand	7	82	Sand and rock	10	182

Well AW-79-27-901

Owner: Humble Oil Co. Driller: Thompson Well Service.

	Thickness (feet)	Depth (feet)		Thickness (feet)	Depth (feet)
Surface sand and clay	60	60	Shale	17	173
Shale	45	105	Sand	30	203
Sand	18	123	Caliche and sand streaks	145	348
Shale	20	143	Sand	48	396
Sand	13	156			

Well AW-79-28-701

Owner: Tennaco Oil Co. Driller: W. E. Eeds.

	Thickness (feet)	Depth (feet)		Thickness (feet)	Depth (feet)
Surface soil	4	4	Clay, red	36	104
Sand and caliche	28	32	Sand	10	114
Clay, white	28	60	Clay, red	54	168
Sand	8	68	Sand	20	188

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

Well AW-79-33-201

Owner: Ben W. Adams. Driller: R. R. Lawson.

Surface soil	1	1	Sand	9	150
Caliche	42	43	Sand and shale streaks	10	160
Shale, sandy, and clay	98	141	Sand	20	180

Well AW-79-33-302

Owner: Ben W. Adams. Driller: --

Surface soil	1	1	Sand	10	152
Clay	131	132	Clay	105	257
Sand	9	141	Sand	23	280
Clay	1	142			

Well AW-79-34-103

Owner: John Looney. Driller: R. R. Lawson.

Surface soil	1	1	Sand	8	75
Caliche	22	23	Shale	6	81
Shale, red	25	48	Sand and shale	11	92
Sand, dry	3	51	Shale	24	116
Shale, gray	16	67	Sand and rock	14	130

Well AW-79-34-601

Owner: Beeville Country Club. Driller: Layne-Texas Co.

Surface soil	1	1	Caliche, sandy	15	52
Caliche	5	6	Clay and caliche	71	123
Caliche, hard	31	37	Shale and caliche	23	146

(Continued on next page)

Table 6.--Drillers' logs of wells in Bee County--Continued

	Thickness (feet)	Depth (feet)
Well AW-79-34-601--Continued		
Clay, sandy	7	153
Sand and clay layers	47	200
Clay, sandy	13	213
Clay and caliche	32	245
Shale, sandy	12	257
Shale, hard, sandy, streaky	43	300
Shale, sandy	35	335
Sand	27	362
Shale, hard, sandy	48	410
Sand and shale layers	43	453
Shale, sandy	5	458
Sand	5	463
Shale, sandy	20	483
Shale, hard, sandy	17	500
Shale, sandy	25	525
Shale	20	545
Shale, sandy	30	575
Shale	16	591
Shale and sand	57	648
Shale	18	666
Shale, sandy	6	672
Shale	11	683
Shale, sandy, and broken sand	18	701
Shale	12	713
Shale, sandy	5	718
Sand	9	727
Shale, sandy	51	778
Shale	36	814
Shale, sandy, and shale breaks	14	828
Shale and sandy shale	30	858
Shale, sandy, and sand	25	883
Sand	17	900
Shale, sandy	12	912
Sand, hard	20	932
Shale, sandy	21	953
Shale, hard, streaky	11	964
Shale, sandy	9	973
Shale, hard, streaky	18	991

Well AW-79-34-811

Owner: Truman Gill. Driller: W. E. Eeds.

	Thickness (feet)	Depth (feet)		Thickness (feet)	Depth (feet)
Surface soil	2	2	Shale	23	169
Sand and caliche	60	62	Sand	16	185
Shale, white	52	114	Shale, sandy, white	87	272
Sand	32	146	Sand	10	282

Well AW-79-34-901

Owner: City of Beeville. Driller: Layne-Texas Co.

	Thickness (feet)	Depth (feet)		Thickness (feet)	Depth (feet)
Surface soil	4	4	Sand	15	902
Caliche	46	50	Shale, sandy	10	912
Caliche, broken	95	145	Shale	47	959
Clay, broken	70	215	Shale and sandy shale	32	991
Sand, caliche, and clay	75	290	Shale, sticky	37	1,028
Clay and tuff	108	398	Shale, hard	5	1,033
Clay, sandy	39	437	Shale, sandy	48	1,081
Shale	35	472	Shale, hard	7	1,088
Shale, limy	42	514	Shale, sandy	26	1,114
Sand and sandy shale	101	615	Shale, hard	23	1,137
Lime, hard, and shale	31	646	Shale, sandy, and sand	47	1,184
Shale, sticky	76	722	Shale	20	1,204
Shale, sandy	10	732	Shale, sandy	19	1,223
Sand and broken shale	32	764	Shale, hard	18	1,241
Shale, broken	53	817	Shale	12	1,253
Shale, sticky	70	887	Shale, sandy, and sand	64	1,317

(Continued on next page)

Well AW-79-34-901--Continued

	Thickness (feet)	Depth (feet)		Thickness (feet)	Depth (feet)
Shale, hard, broken sand, and shale	31	1,348	Sand	59	1,531
Shale and boulders	52	1,400	Shale and sandy shale	16	1,547
Sand and shale	17	1,417	Shale, broken	22	1,569
Shale and broken layers	19	1,436	Sand	12	1,581
Shale, sandy	21	1,457	Shale, broken	11	1,592
Shale	15	1,472			

Well AW-79-35-105

Owner: Mrs. John Monroe. Driller: R. R. Lawson.

	Thickness (feet)	Depth (feet)		Thickness (feet)	Depth (feet)
Surface soil	2	2	Clay, gray, sandy	38	120
Clay, gray	6	8	Sand, white, and rock	15	135
Caliche	37	45	Clay, red	6	141
Clay, gray, sandy	35	80	Sand, red, rocky	47	188
Sand, white	2	82			

Well AW-79-35-406

Owner: B. H. Hickman. Driller: R. R. Lawson.

	Thickness (feet)	Depth (feet)		Thickness (feet)	Depth (feet)
Surface soil	1	1	Shale	31	136
Hardrock	57	58	Rock and sand	3	139
Sandrock	3	61	Shale	7	146
Rock and shale	41	102	Sand and rock	17	163
Sand	3	105			

Well AW-79-35-901

Owner: U.S. Naval Station. Driller: Layne-Texas Co.

	Thickness (feet)	Depth (feet)		Thickness (feet)	Depth (feet)
Surface soil	2	2	Clay, red	48	330
Caliche and clay	25	27	Sand, fine, brown	13	343
Caliche, hard	20	47	Clay, red	111	454
Clay, brown, sticky	13	60	Clay, sandy	13	467
Sand	3	63	Sand and streaks of clay	49	516
Sand, broken, and gravel and clay layers	28	91	Sand and clay layers	11	527
Sand, fine, gray	18	109	Clay	29	556
Clay, sticky	26	135	Sand, broken	18	574
Clay	25	160	Clay	5	579
Clay, sandy	67	227	Sand, broken	11	590
Sand, coarse, brown, and streaks of clay	56	282	Clay, sandy, and clay	26	616

Well AW-79-36-902

Owner: J. J. O'Brien. Driller: H & S Well Service.

	Thickness (feet)	Depth (feet)		Thickness (feet)	Depth (feet)
Clay	12	12	Clay	22	212
Sand	23	35	Sand	45	257
Shale and caliche streaks	19	54	Shale	16	273
Caliche, hard	2	56	Shale, sandy	72	345
Sand	2	58	Shale	25	370
Clay and caliche streaks	84	142	Sand	32	402
Sand and clay	48	190	Shale	122	524
			Sand	122	646

(Continued on next page)

Table 6.--Drillers' logs of wells in Bee County--Continued

Well AW-79-36-902--Continued

	Thickness (feet)	Depth (feet)		Thickness (feet)	Depth (feet)
Shale	10	656	Shale	8	668
Sand	4	660	Sand	40	708

Well AW-79-37-805

Owner: Mrs. Grace Handy. Driller: W. E. Eeds.

	Thickness (feet)	Depth (feet)		Thickness (feet)	Depth (feet)
Surface soil	3	3	Clay, red	41	109
Sand and caliche	65	68	Sand	17	126

Well AW-79-37-906

Owner: C. J. Turman. Driller: Youngblood Well Service.

	Thickness (feet)	Depth (feet)		Thickness (feet)	Depth (feet)
Surface soil	2	2	Shale	30	400
Clay	26	28	Sand	21	421
Sand	47	75	Shale, red	120	541
Clay	75	150	Sand	38	579
Sand	15	165	Shale	39	618
Shale	135	300	Sand	38	656
Sand	24	324	Shale	59	715
Shale	29	353	Sand	35	750
Sand	17	370			

Well AW-79-41-302

Owner: C. W. McMahon. Driller: W. D. Walton.

	Thickness (feet)	Depth (feet)		Thickness (feet)	Depth (feet)
Surface soil	1	1	Rock, concrete	32	46
Caliche, sand, and gravel	13	14	Packsand and clay	49	95

(Continued on next page)

Table 6.--Drillers' logs of wells in Bee County--Continued

Well AW-79-41-302--Continued

	Thickness (feet)	Depth (feet)		Thickness (feet)	Depth (feet)
Sand, fine	20	115	Clay	20	197
Clay	40	155	Sand	19	216
Sand	22	177	Clay	3	219

Well AW-79-42-103

Owner: Truman Gill. Driller: W. E. Eeds.

	Thickness (feet)	Depth (feet)		Thickness (feet)	Depth (feet)
Surface soil	3	3	Sand	21	117
Sand and caliche	59	62	Shale, red	183	300
Clay	34	96	Sand	27	327

Well AW-79-42-806

Owner: Paul W. Treptow. Driller: W. E. Eeds.

	Thickness (feet)	Depth (feet)		Thickness (feet)	Depth (feet)
Surface soil	2	2	Shale, sandy	18	90
Sand and caliche	56	58	Sand	15	105
Sand	14	72			

Well AW-79-43-401

Owner: F. W. Heldenfels Farms. Driller: M. G. Hobbs.

	Thickness (feet)	Depth (feet)		Thickness (feet)	Depth (feet)
Clay	10	10	Shale and streaks of sand	15	145
Caliche	45	55	Shale	63	208
Sand and streaks of clay	15	70	Sand	32	240
Caliche	10	80	Shale	100	340
Sand	12	92	Sand	30	370
Shale	38	130			

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Table 6.--Drillers' logs of wells in Bee County--Continued

Well AW-79-43-401--Continued

	Thickness (feet)	Depth (feet)		Thickness (feet)	Depth (feet)
Boulders	5	375	Sand and hard streaks	65	635
Sand	25	400	Shale	45	680
Shale	12	412	Sand	10	690
Sand	21	433	Shale	35	725
Shale	29	462	Sand	53	778
Rock	3	465	Shale	17	795
Sand	33	498	Sand	40	835
Shale	72	570	Shale	5	840

Well AW-79-43-902

Owner: C. W. Hammonds. Driller: R. R. Lawson.

	Thickness (feet)	Depth (feet)		Thickness (feet)	Depth (feet)
Surface soil	2	2	Gravel and clay	9	70
Clay	6	8	Sand and rock	3	73
Rock and gravel	6	14	Clay	7	80
Clay	21	35	Sand	3	83
Shale, sandy	22	57	Clay	13	96
Sand and rock	4	61	Sand	13	109

Well AW-79-44-304

Owner: Mrs. Grace Malone. Driller: R. R. Lawson.

	Thickness (feet)	Depth (feet)		Thickness (feet)	Depth (feet)
Topsoil	1	1	Sand	4	82
Clay	22	23	Clay	43	125
Clay and gravel	12	35	Sand	7	132
Shale, sandy	43	78	Clay	23	155

(Continued on next page)

Table 6.--Drillers' logs of wells in Bee County--Continued

	Thickness (feet)	Depth (feet)		Thickness (feet)	Depth (feet)
Well AW-79-44-304--Continued					
Sand	10	165	Clay	17	241
Shale, sandy	50	215	Sand	42	283
Sand streaks	9	224	Clay	1	284

Well AW-79-44-701

Owner: Driscoll Estate. Driller: R. R. Lawson.

Surface soil	1	1	Clay	44	105
Clay	11	12	Clay, rocky, sandy	7	112
Sand	10	22	Sand, rocky	6	118
Clay, sandy	19	41	Clay	22	140
Sand and rock streaks	15	56	Sand, rocky	40	180
Rock	5	61			

Well AW-79-45-101

Owner: Mrs. Grace Malone. Driller: R. R. Lawson.

Surface soil	1	1	Shale, sandy	29	154
Clay	17	18	Sand	7	161
Sand and gravel	27	45	Shale, sandy	36	197
Sand	5	50	Sand	19	216
Shale, sandy	70	120	Shale, sandy, and rock	19	235
Sand	5	125	Rock and sand	72	307

Well AW-79-50-301

Owner: H. F. Jostes. Driller: B. T. Sikes.

	Thickness (feet)	Depth (feet)		Thickness (feet)	Depth (feet)
Topsoil	3	3	Clay	19	244
Clay	12	15	Clay, sandy	44	288
Caliche	6	21	Clay	8	296
Clay and caliche	34	55	Clay, sandy	13	309
Caliche	5	60	Clay	3	312
Rock	10	70	Clay, sandy	6	318
Caliche and rock	20	90	Sand	15	333
Sand	3	93	Clay	27	360
Caliche and rock	22	115	Sand	20	380
Sand	8	123	Clay	2	382
Rock	4	127	Sand	3	385
Sand	18	145	Clay	58	443
Clay and caliche	17	162	Sand	26	469
Sand and rock	28	190	Rock	1	470
Sand and clay	25	215	Sand	27	497
Rock	2	217	Rock	1	498
Caliche	8	225	Clay	2	500

Well AW-79-51-201

Owner: Edwin Snyder. Driller: M. G. Hobbs.

	Thickness (feet)	Depth (feet)		Thickness (feet)	Depth (feet)
Clay	30	30	Shale	23	75
Sand and streaks of caliche	22	52	Sand, hard	22	97

(Continued on next page)

	Thickness (feet)	Depth (feet)		Thickness (feet)	Depth (feet)
Well AW-79-51-201--Continued					
Shale	5	102	Shale	28	408
Sand and hard streaks	18	120	Sand	4	412
Shale	25	145	Shale	4	416
Sand	20	165	Sand	9	425
Shale	30	195	Sand and shale	21	446
Sand and gravel	43	238	Sand	14	460
Shale	12	250	Shale	72	532
Sand and shale	22	272	Sand	33	565
Shale	83	355	Shale	15	580
Sand, shale, and streaks of sand	25	380	Sand	70	650

Well AW-79-51-701

Owner: J. W. Setcliff. Driller: M. G. Hobbs.

Clay	35	35	Sand	45	265
Hard streaks	100	135	Shale	7	272
Sand, streaks of shale, and hard streaks	30	165	Sand	20	292
			Shale	8	300
Shale and streaks of sand	20	185	Sand	20	320
Sand and gravel	31	216	Shale	63	383
Shale	4	220	Sand	19	402

Table 6.--Drillers' logs of wells in Bee County--Continued

Well AW-79-52-403

Owner: V. G. Gwynn. Driller: M. G. Hobbs.

	Thickness (feet)	Depth (feet)		Thickness (feet)	Depth (feet)
Clay	15	15	Shale	20	335
Caliche streaks, hard	37	52	Sand and shale	30	365
Clay	5	57	Sand, broken	45	410
Clay and hard streaks	31	88	Shale and streaks of sand	35	445
Sand	12	100	Shale, sandy	30	475
Shale	15	115	Sand, fine, and streaks of shale	15	490
Sand and shale	55	170	Shale, sandy	25	515
Sand	23	193	Sand, fine	30	545
Shale	50	243	Shale	45	590
Shale, streaks of caliche, and sand	27	270	Sand	45	635
Sand (good)	45	315			

Table 7.--Chemical analyses of water from wells in Bee and adjacent counties

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

Water-bearing unit: Ql, Lissie Formation; Tg, Goliad Sand; Tl, Lagarto Clay; To, Oakville Sandstone; Tct, Catahoula Tuff.

Analyses in 1934 (field determinations), 1945, and 1955 by U.S. Geological Survey, 1939 by Work Projects Administration, and 1964 by Texas State Department of Health.

Well	Depth of well (ft)	Date of collection	Water-bearing unit	Silica (SiO_2)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium and potassium (Na + K)*	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Dissolved solids	Hardness as $CaCO_3$	Sodium adsorption ratio (SAR)	Residual sodium carbonate (RSC)	Specific conductance (micromhos at 25°C)	pH
									Bee County										
AW-78-24-901	208	Aug. 10, 1960	Tct	21	--	55	4	55	268	13	25	0.6	3.5	332	154	1.9	1.32	515	7.2
903	375	Nov. 8, 1939	Tct	--	--	225	28	1,156	244	--	2,120	--	--	3,650	677	19	0	--	--
904	54	Apr. 22, 1964	Tct	80	--	52	7	217	278	41	152	1.1	186	873	159	--	1.39	1,340	7.3
905	135	Nov. 7, 1939	Tct	--	--	54	4	39	238	12	21	--	b/	247	153	--	.88	--	--
32-201	275	Nov. 8, 1939	Tct	--	--	197	36	1,328	305	a/	2,320	--	b/	4,041	643	23	--	--	--
303	127	Apr. 22, 1964	To	35	--	70	6	156	301	56	156	.7	b/	628	199	--	.95	1,084	7.5
309	90	May 8, 1934	--	--	--	--	--	--	328	--	595	--	--	--	682	--	--	--	--
309	90	Nov. 8, 1939	--	--	--	1,231	32	305	323	244	605	.6	b/	1,577	710	--	--	--	--
901	142	Apr. 29, 1964	To	28	--	58	16	443	417	70	550	.8	b/	1,370	210	--	2.62	2,460	7.9
79-17-401	180	Apr. 21, 1964	To	47	--	354	45	610	334	1,000	770	.9	<.4	2,990	1,070	--	--	4,340	7.2
501	56	do	To	51	--	99	10	113	259	23	123	.9	168	718	291	2.9	--	1,130	7.7
702	200	May 8, 1934	To	--	--	--	--	--	488	--	670	--	--	--	222	--	--	--	--
702	200	Nov. 8, 1939	To	--	--	45	13	631	445	199	720	.9	b/	1,850	174	21.3	3.97	--	--
703	312	do	To	--	--	143	24	530	360	136	830	--	b/	1,840	455	11	--	--	--
802	276	May 8, 1934	To	--	--	--	--	--	300	--	528	--	--	--	393	--	--	--	--
802	276	Nov. 8, 1939	To	--	--	120	21	339	305	176	490	.7	b/	1,297	388	7.5	--	--	--
802	276	Apr. 21, 1964	To	26	--	97	20	350	239	149	540	1.0	<.4	1,300	324	--	--	2,330	7.6
902	590	do	--	19	--	18	4	393	422	< 3	408	.9	<.4	1,060	63	22	5.69	1,920	7.8
904	115	May 9, 1934	To	--	--	--	--	--	304	--	380	--	--	--	548	--	--	--	--
904	115	Nov. 14, 1939	To	--	--	152	39	112	262	72	330	--	33	867	539	--	--	--	--
905	170	May 9, 1934	Tl	--	--	--	--	--	266	--	645	--	--	--	548	--	--	--	--
905	170	Nov. 14, 1939	Tl	--	--	141	34	308	244	96	610	--	b/	1,309	491	--	--	--	--
18-501	918	Apr. 21, 1964	To	16	--	13	4	520	484	171	447	1.5	<.4	1,410	49	32	6.95	2,460	7.9

See footnotes at end of table.

Table 7.--Chemical analyses of water from wells in Bee 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 and potassium (Na + K)*	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Dissolved solids	Hardness as $CaCO_3$	Sodium adsorption ratio (SAR)	Residual sodium carbonate (RSC)	Specific conductance (micromhos at 25°C)	pH
AW-79-18-503	928	Mar. 23, 1955	To	19	--	15	4	552	475	219	450	1.0	0.2	1,500	53	32	6.72	2,530	7.9
702	120	Apr. 21, 1964	Tl	42	--	220	54	342	340	156	770	.8	4	1,760	770	--	--	3,110	7.7
704	105	May 7, 1934	Tl	--	--	--	--	--	386	--	158	--	--	--	249	--	--	--	--
704	105	Nov. 14, 1939	Tl	--	--	166	45	294	262	70	620	--	93	1,417	598	--	--	--	--
805	76	Apr. 21, 1964	Tl	24	--	58	24	309	305	37	445	0.8	<.4	1,050	242	--	0.14	1,930	7.6
901	167	Apr. 18, 1964	Tl	49	--	181	33	157	281	107	426	.5	2	1,100	590	--	--	1,950	7.5
902	560	June 29, 1934	Tl	--	--	--	--	--	360	--	745	--	--	--	321	--	--	--	--
902	560	Nov. 14, 1939	Tl	--	--	71	25	551	329	172	730	.1	b/	1,711	280	14	--	--	--
25-103	90	Apr. 22, 1964	To	42	--	80	12	118	273	34	175	1.2	3	601	245	3.3	--	1,065	7.7
104	119	Nov. 8, 1939	To	--	--	76	11	96	305	26	120	--	b/	479	237	--	.31	--	--
105	275	Nov. 9, 1934	To	--	--	70	18	473	393	276	472	1.1	b/	--	--	--	1.47	--	--
105	275	Nov. 8, 1939	To	--	--	48	11	401	366	167	400	.4	b/	1,207	167	11.1	--	--	--
303	118	Apr. 22, 1964	Tl	80	--	105	19	123	320	72	270	.6	3.5	878	341	--	--	1,500	7.2
309	60	May 15, 1934	Tl	--	--	--	--	--	400	--	975	--	--	--	982	--	--	--	--
309	60	Nov. 14, 1939	Tl	--	--	136	55	405	177	164	760	.5	75	1,683	559	--	--	--	--
504	60	Apr. 29, 1964	Tg	77	--	78	17	97	455	20	54	1.5	9	579	267	--	2.17	902	7.6
601	69	Dec. 20, 1939	Tg	--	--	111	25	215	348	68	348	--	b/	938	380	--	--	--	--
602	831	Aug. 10, 1960	Tl	--	--	5.5	1.3	469	575	24	382	1.2	0	1,180	19	47	--	2,010	7.6
602	831	Apr. 22, 1964	Tl	19	--	7	1	455	560	23	374	1.4	<.4	1,150	22	42	8.76	2,005	8.0
607	136	May 11, 1934	Tg	--	--	--	--	--	336	--	470	--	--	--	502	--	--	--	--
607	136	Nov. 14, 1939	Tg	--	--	88	33	265	153	23	555	--	b/	1,039	356	--	--	--	--
701	110	Apr. 29, 1964	To	60	--	45	12	117	321	24	76	1.1	21	517	161	4.0	2.02	834	7.7
802	101	May 10, 1934	Tg	--	--	--	--	--	322	--	270	--	--	--	309	--	--	--	--
802	101	Nov. 6, 1939	Tg	--	--	100	19	150	281	32	260	--	27	726	327	--	--	--	--
901	274	Apr. 29, 1934	Tg	--	--	--	--	--	302	--	825	--	--	--	968	--	--	--	--
901	274	Nov. 6, 1939	Tg	--	--	262	58	310	268	196	810	.4	b/	1,772	896	4.5	--	--	--
901	274	Apr. 29, 1964	Tg	44	--	248	61	320	292	192	810	.8	4	1,820	870	--	--	3,170	7.5

See footnotes at end of table.

Table 7.--Chemical analyses of water from wells in Bee 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 and potassium (Na + K)*	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Dissolved solids	Hardness as $CaCO_3$	Sodium adsorption ratio (SAR)	Residual sodium carbonate (RSC)	Specific conductance (micromhos at 25°C)	pH
AW-79-25-903	65	Dec. 12, 1939	Tg	--	--	62	11	133	311	40	103	--	60	562	202	--	1.11	--	--
904	147	May 11, 1934	Tl?	--	--	--	--	--	220	--	1,032	--	--	--	1,125	--	--	--	--
904	147	Nov. 6, 1939	Tl?	--	--	337	77	273	171	132	1,040	--	b/	1,950	1,157	--	--	--	--
905	100	Dec. 20, 1939	Tg	--	--	104	24	156	323	44	275	--	b/	762	360	--	--	--	--
26-101	285	Apr. 22, 1964	Tl	60	--	88	25	*173	233	71	313	0.8	<0.4	842	322	4.2	--	1,500	7.7
201	130	May 15, 1934	Tl	--	--	--	--	--	328	--	295	--	--	--	423	--	--	--	--
201	130	Nov. 14, 1939	Tl	--	--	105	22	131	287	56	240	--	b/	705	354	--	--	--	--
204	367	Apr. 18, 1945	Tl	33	1.9	182	31	189	344	81	428	.6	b/	1,370	582	--	--	--	7.2
205	410	Apr. 21, 1964	Tl	18	--	34	11	373	328	7	485	.6	<.4	1,090	132	14	2.78	2,030	8.0
301	190	June 16, 1934	Tl	--	--	--	--	--	384	--	128	--	--	--	312	--	--	--	--
301	190	Dec. 5, 1939	Tl	--	--	109	16	91	342	25	164	--	b/	573	340	--	--	--	--
401	127	May 11, 1934	Tl	--	--	--	--	--	348	--	125	--	--	--	213	--	--	--	--
401	127	Nov. 14, 1939	Tl	--	--	58	19	133	342	52	124	.8	b/	555	222	--	1.15	--	--
404	102	Apr. 21, 1964	Tl	28	--	147	55	346	104	86	840	.7	<.4	1,560	590	--	--	2,890	7.4
406	120	Dec. 12, 1939	Tl	--	--	131	25	105	262	60	270	--	b/	730	430	--	--	--	--
503	104	May 15, 1934	Tl	--	--	--	--	--	356	--	152	--	--	--	333	--	--	--	--
503	104	Nov. 26, 1939	Tl	--	--	--	--	--	354	50	155	--	b/	603	--	--	--	--	--
504	120	Dec. 12, 1939	Tl	--	--	69	16	67	336	--	60	--	b/	405	240	--	.75	--	--
601	75	May 15, 1934	Tg	--	--	--	--	--	368	--	195	--	--	--	345	--	--	--	--
601	75	Nov. 26, 1939	Tg	--	--	79	24	183	366	96	205	--	b/	771	295	--	--	--	--
601	75	Apr. 21, 1964	Tg	51	--	101	22	130	367	68	184	.8	<.4	734	343	--	--	1,250	7.6
603	600	Nov. 8, 1934	Tl	--	8.6	60	24	232	208	a/	395	.9	b/	--	248	6.4	--	--	--
701	70	Dec. 12, 1939	Tl	--	--	90	21	145	293	88	210	--	b/	698	313	--	--	--	--
801	144	Apr. 20, 1964	Tl	38	--	230	56	223	227	72	740	.7	7	1,480	800	--	--	2,740	7.3
802	70	Dec. 12, 1939	Tl	--	--	77	16	88	323	44	68	--	54	506	260	--	.13	--	--
902	413	Apr. 21, 1964	Tl	26	--	30	10	235	367	23	224	.7	<.4	734	117	9.5	3.70	1,310	7.9
904	60	May 26, 1934	Tl	--	--	--	--	--	552	--	125	--	--	--	278	--	--	--	--

See footnotes at end of table.

Table 7.--Chemical analyses of water from wells in Bee 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 and potassium (Na + K)*	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Dissolved solids	Hardness as $CaCO_3$	Sodium adsorption ratio (SAR)	Residual sodium carbonate (RSC)	Specific conductance (micromhos at 25°C)	pH
AW-79-26-904	60	Nov. 26, 1939	Tl	--	--	59	16	183	427	40	150	1.2	b/	667	215	--	2.74	--	--
906	104	June 18, 1934	Tl	--	--	--	--	--	376	--	232	--	--	--	330	--	--	--	--
906	104	Nov. 26, 1939	Tl	--	--	89	22	169	366	62	220	--	b/	751	314	--	--	--	--
27-401	125	Apr. 29, 1964	Tg	73	--	54	15	132	414	27	82	2.1	<0.4	590	196	--	2.87	929	7.8
704	60	Apr. 30, 1964	Tg	65	--	85	13	*86	373	21	72	.8	23	551	265	--	.80	887	7.6
28-702	120	June 3, 1964	Tg	70	--	106	26	166	364	46	249	1.2	31	875	375	--	--	1,500	7.9
801	117	do	Tg	82	--	123	24	166	409	69	248	.8	9	922	406	--	--	1,550	7.7
33-301	67	May 11, 1934	Tg	--	--	--	--	--	388	--	190	--	--	--	381	--	--	--	--
301	67	Nov. 6, 1939	Tg	--	--	98	21	133	342	54	190	--	22	686	333	--	--	--	--
501	153	May 26, 1934	Tg	--	--	--	--	--	362	--	153	--	--	--	264	--	--	--	--
501	153	Nov. 15, 1939	Tg	--	--	76	19	142	336	48	170	--	b/	635	267	--	.16	--	--
502	80	Apr. 29, 1964	Tg	67	--	139	33	218	317	96	416	.8	17	1,140	480	--	--	1,990	7.5
602	515	Apr. 29, 1964	Tl? To?	63	--	73	15	108	277	43	152	.6	2.0	589	246	3.0	--	1,000	7.4
906	250	do	Tg	47	--	182	35	158	250	95	446	.6	7	1,090	600	3.1	--	1,960	7.4
908	91	May 27, 1964	Tg	82	--	56	9	136	322	24	109	1.3	27	607	177	--	1.75	953	7.5
34-102	60	Dec. 20, 1939	Tg	--	--	57	14	83	384	22	28	.7	b/	394	199	--	2.30	--	--
105	620	Apr. 22, 1964	Tl	67	--	183	42	120	259	105	406	.6	6.5	1,060	630	2.1	--	1,870	7.3
201	120	Dec. 20, 1939	Tg	--	--	138	45	196	232	28	520	--	b/	1,041	528	--	--	--	--
204	98	Nov. 6, 1939	Tg	--	--	138	26	137	317	60	300	--	b/	820	451	--	--	--	--
205	80	Dec. 20, 1939	Tg	--	--	58	13	155	354	66	124	.7	b/	591	198	--	1.84	--	--
301	160	May 18, 1934	Tg	--	--	--	--	--	230	--	850	--	--	--	1,058	--	--	--	--
301	160	Dec. 5, 1939	Tg	--	--	257	76	230	183	112	840	--	b/	1,611	957	--	--	--	--
405	140	Apr. 29, 1964	Tg	75	--	61	11	104	310	23	94	.6	13.5	533	198	--	1.14	851	7.7
503	115	May 18, 1934	Tg	--	--	--	--	--	322	--	48	--	--	--	124	--	--	--	--
503	115	Nov. 15, 1939	Tg	--	--	24	10	113	305	26	48	.8	b/	372	101	--	2.98	--	--
504	73	May 8, 1934	Tg	--	--	--	--	--	304	--	210	--	--	--	198	--	--	--	--
504	73	Nov. 6, 1939	Tg	--	--	84	20	163	372	56	190	--	b/	715	292	--	.27	--	--

See footnotes at end of table.

Table 7.--Chemical analyses of water from wells in Bee 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 and potassium (Na + K)*	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Dissolved solids	Hardness as $CaCO_3$	Sodium adsorption ratio (SAR)	Residual sodium carbonate (RSC)	Specific conductance (micromhos at 25°C)	pH
AW-79-34-601	478	Apr. 22, 1964	Tl	21	--	42	13	226	329	46	237	0.7	<0.4	753	160	7.8	2.22	1,350	7.8
604	97	Dec. 11, 1939	Tg	--	--	28	9	132	329	28	66	--	b/	425	106	--	3.25	--	--
605	140	Apr. 22, 1964	Tg	56	--	124	42	207	312	71	419	.9	2.0	1,080	481	--	--	--	--
703	49	May 22, 1934	Tg	--	--	--	--	--	268	--	30	--	--	--	140	--	--	--	--
703	49	Nov. 15, 1939	Tg	--	--	52	10	57	305	11	24	--	b/	304	171	--	1.59	--	--
806	140	May 21, 1934	Tg	--	--	--	--	--	378	--	105	--	--	--	196	--	--	--	--
806	140	Nov. 15, 1939	Tg	--	--	52	11	110	336	19	84	.8	b/	442	177	--	2.02	--	--
35-202	250	Apr. 22, 1964	Tl	77	--	72	18	169	394	17	128	1.0	123	800	255	4.7	1.39	1,250	7.9
301	156	Nov. 9, 1934	Tg	--	--	78	17	162	397	51	164	.9	b/	--	265	--	1.22	--	--
301	156	Nov. 28, 1939	Tg	--	--	76	11	175	390	56	170	--	b/	680	237	--	--	--	--
302	56	June 15, 1934	Tg	--	--	--	--	--	384	--	175	--	--	--	384	--	--	--	--
302	56	Nov. 28, 1939	Tg	--	--	115	25	129	384	60	180	--	49	747	390	--	--	--	--
304	127	June 15, 1934	Tg	--	--	--	--	--	342	--	690	--	--	--	900	--	--	--	--
304	127	Nov. 28, 1939	Tg	--	--	73	14	124	384	24	114	.7	b/	546	239	--	1.50	--	--
401	290	Apr. 22, 1964	Tg	67	--	101	31	138	315	71	245	1.0	3	810	379	3.1	--	1,390	7.6
406	163	Apr. 28, 1964	Tg	91	--	69	12	129	344	34	125	1.0	5	635	221	--	1.21	995	7.4
501	148	June 13, 1934	Tg	--	--	--	--	--	372	--	135	--	--	--	246	--	--	--	--
501	148	Nov. 28, 1939	Tg	--	--	67	15	151	372	44	135	.8	b/	612	229	--	1.53	--	--
506	100	July 1, 1964	Tg	88	--	79	21	148	329	4	191	1.5	15.0	743	283	--	--	1,220	7.4
601	200	June 3, 1964	Tg	30	--	40	12	200	322	35	192	.9	<.4	667	152	7.1	2.29	1,173	7.7
701	1,539	Apr. 19, 1945	To	19	0.15	7.1	1.3	541	601	a/	480	1.8	b/	1,370	23	4.9	9.39	231	7.5
703	73	June 19, 1934	Tg	--	--	--	--	--	340	--	145	--	--	--	267	--	--	--	--
703	73	Nov. 18, 1939	Tg	--	--	75	16	128	348	44	140	--	b/	580	255	--	--	--	--
705	100	Oct. 13, 1939	Tg	--	--	69	19	127	366	26	140	1.3	b/	562	252	--	1.00	--	--
801	60	do	Tg	--	--	78	10	113	317	64	110	--	b/	531	236	--	.48	--	--
901	539	Apr. 28, 1964	Tl	20	--	38	14	184	364	41	161	.7	<.4	635	155	6.5	2.93	1,143	7.7
902	90	Oct. 13, 1939	Tg	--	--	297	85	85	305	236	1,120	--	b/	2,340	1,093	--	--	--	--

See footnotes at end of table.

Table 7.--Chemical analyses of water from wells in Bee 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 and potassium (Na + K)*	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Dissolved solids	Hardness as $CaCO_3$	Sodium adsorption ratio (SAR)	Residual sodium carbonate (RSC)	Specific conductance (micromhos at 25°C)	pH
AW-79-35-903	67	Nov. 3, 1939	Tg	--	--	--	--	--	--	117	1,110	--	b/	--	--	--	--	--	--
905	500	June 2, 1964	Tl	21	--	46	19	154	331	40	152	0.6	<0.4	592	193	4.8	1.57	1,068	7.8
36-101	125	June 3, 1964	Tg	84	--	107	15	170	450	43	199	.7	7	852	330	--	.81	1,410	7.4
102	100	June 3, 1964	Tg	77	--	105	22	160	355	76	226	.9	3	850	353	--	--	1,410	7.6
701	100	Oct. 13, 1939	Tg	--	--	277	85	413	323	188	1,050	--	b/	2,172	1,043	--	--	--	--
801	115	June 8, 1934	Tg	--	--	--	--	--	428	--	252	--	--	--	318	--	--	--	--
801	115	Nov. 3, 1939	Tg	--	--	86	19	210	390	71	250	--	b/	829	292	--	--	--	--
801	115	June 3, 1964	Tg	54	--	75	21	217	384	73	248	.7	<.4	875	273	--	.82	1,510	8.0
802	1,113	do	Tl	16	--	9	1	412	281	45	458	2.9	<.4	1,090	29	110	4.08	2,000	8.2
803	550	do	Tl	23	--	52	20	146	359	47	140	.7	<.4	608	214	4.1	1.65	1,077	7.8
804	200	June 3, 1964	Tg	51	--	105	24	179	307	57	311	.6	2.0	884	361	4.1	--	1,560	7.8
805	350	do	Tg	23	--	45	26	145	245	45	205	.7	1.5	616	221	4.3	--	1,133	7.7
901	928	Oct. 13, 1939	Tl	--	--	19	5	337	220	40	410	.8	b/	920	68	--	--	--	--
901	928	June 1, 1964	Tl	16	--	13	4	342	210	37	401	1.2	<.4	913	48	21	2.46	1,720	7.9
905	750	June 3, 1964	Tl	19	--	10	3	412	317	124	383	1.1	3	1,110	36	--	4.45	1,980	8.4
37-702	80	May 29, 1964	Tg	30	--	95	38	311	383	105	456	1.2	2	1,230	396	--	--	2,190	7.5
803	200	do	Tg	40	--	65	35	184	167	35	373	.7	<.4	815	306	4.6	--	1,540	7.5
902	64	June 5, 1934	Tg	--	--	--	--	--	408	--	225	--	--	--	378	--	--	--	--
902	64	Oct. 17, 1939	Tg	--	--	104	33	130	378	52	223	--	b/	728	395	--	--	--	--
908	180	May 29, 1964	Tg	21	--	72	33	247	405	85	302	.9	<.4	965	315	--	.34	1,710	8.0
41-301	610	Apr. 29, 1964	Tl	67	--	133	26	127	292	73	279	.8	4	852	440	2.6	--	1,490	7.3
602	224	May 24, 1934	Tg	--	--	--	--	--	226	--	822	--	--	--	1,252	--	--	--	--
42-102	120	do	Tg	--	--	--	--	--	308	--	482	--	--	--	818	--	--	--	--
102	120	Nov. 1, 1939	Tg	--	--	--	--	--	--	10	25	--	23	--	--	--	--	--	--
103	327	May 27, 1964	Tg	63	--	161	33	122	268	76	365	1.0	7	964	540	2.3	--	1,720	7.3
106	591	do	Tl	10	--	98	27	179	167	48	397	.4	<.4	845	356	4.1	--	1,540	7.5
202	200	Apr. 30, 1964	Tg	67	--	77	24	127	338	61	156	1.0	4	689	293	3.2	--	1,143	7.6

See footnotes at end of table.

Table 7.--Chemical analyses of water from wells in Bee 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 and potassium (Na + K)A	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Dissolved solids	Hardness as $CaCO_3$	Sodium adsorption ratio (SAR)	Residual sodium carbonate (RSC)	Specific conductance (micromhos at 25°C)	pH
AW-79-42-205	96	May 25, 1934	Tg	--	--	--	--	--	354	--	218	--	--	--	297	--	--	--	--
205	96	Nov. 1, 1939	--	--	--	81	22	169	336	52	230	--	b/	729	294	--	--	--	--
402	119	Nov. 9, 1934	Tg	--	--	143	41	184	326	123	368	0.7	b/	--	526	--	--	--	--
402	119	Nov. 1, 1939	Tg	--	--	144	47	169	226	120	405	--	50	1,046	554	--	--	--	--
502	98	May 25, 1934	Tg	--	--	--	--	--	276	--	955	--	--	--	1,012	--	--	--	--
502	98	Nov. 1, 1939	Tg	--	--	287	60	308	214	184	895	--	b/	1,842	962	--	--	--	--
504	103	June 5, 1934	Tg	--	--	--	--	--	232	--	470	--	--	--	488	--	--	--	--
504	103	Nov. 1, 1939	Tg	--	--	181	45	164	195	68	530	--	21	1,105	638	--	--	--	--
601	72	June 26, 1934	Tg	--	--	--	--	--	428	--	378	--	--	--	510	--	--	--	--
601	72	Nov. 2, 1939	Tg	--	--	137	36	216	378	72	410	--	b/	1,057	493	--	--	--	--
604	240	Apr. 30, 1964	Tg	67	--	147	33	185	276	83	424	.9	8.0	1,080	500	3.6	--	1,930	7.5
803	110	May 21, 1934	Ql	--	--	--	--	--	296	--	288	--	--	--	426	--	--	--	--
803	110	Nov. 1, 1939	Ql	--	--	136	28	115	366	20	235	.5	66	781	458	--	--	--	--
901	85	Nov. 2, 1939	Ql	--	--	35	44	225	207	72	362	--	b/	840	267	--	0.09	--	--
43-109	225	July 1, 1964	Tg	24	--	107	42	192	174	85	450	1.5	<.4	992	442	4.0	--	1,890	7.9
114	80	Nov. 8, 1934	Tg	--	--	81	24	129	372	38	162	1.2	b/	--	301	--	--	--	--
114	80	Nov. 2, 1939	Tg	--	--	--	--	--	--	31	160	--	b/	--	--	--	--	--	--
201	70	Dec. 11, 1939	Tg	--	--	--	--	--	372	28	160	--	b/	593	--	--	--	--	--
304	120	June 2, 1964	Tg	63	--	145	34	116	292	100	290	.8	6	902	500	--	--	1,550	7.6
305	580	do	Tl	21	--	41	18	178	342	41	173	.6	<.4	646	176	5.8	2.08	1,144	7.9
306	140	do	Tg	75	--	321	116	425	275	272	1,200	1.0	3	2,550	1,280	5.2	--	4,330	7.5
401	840	Feb. 11, 1964	Tl	38	--	97	27	200	255	41	392	.8	2	930	351	4.8	--	1,720	7.5
501	50	Dec. 11, 1939	Ql	--	--	104	40	171	342	68	310	--	b/	873	425	--	--	--	--
503	50	do	Ql	--	--	132	37	187	329	118	350	--	b/	990	483	--	--	--	--
504	47	May 25, 1934	Ql	--	--	--	--	--	376	--	215	--	--	--	426	--	--	--	--
504	47	Nov. 2, 1939	Ql	--	--	418	117	425	329	317	1,290	.3	38	2,767	1,527	--	--	--	--
702	100	Apr. 30, 1964	Ql	87	--	85	21	159	371	35	195	1.0	23	792	299	--	.11	1,290	7.6

See footnotes at end of table.

Table 7.--Chemical analyses of water from wells in Bee 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 and potassium (Na + K) a/	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Dissolved solids	Hardness as $CaCO_3$	Sodium adsorption ratio (SAR)	Residual sodium carbonate (RSC)	Specific conductance (micromhos at 25°C)	pH
AW-79-43-806	745	Oct. 20, 1939	Tl	--	--	41	11	194	354	60	154	0.7	b/	641	147	7.0	2.85	--	--
807	125	Apr. 30, 1964	Ql	67	--	83	20	93	349	35	121	1.1	1.5	593	290	--	--	978	7.4
901	64	Nov. 17, 1939	Ql	--	--	320	100	376	281	140	1,170	--	b/	2,249	1,212	--	--	--	--
903	260	June 4, 1964	Tg	63	--	168	40	104	285	56	370	.6	3.5	945	580	1.9	--	1,710	7.4
44-101	600	June 16, 1934	Tl	--	--	--	--	--	254	--	365	--	--	--	461	--	--	--	--
101	600	Nov. 3, 1939	Tl	--	--	208	46	217	336	109	560	.5	b/	1,307	709	--	--	--	--
101	600	June 2, 1964	Tl	47	--	242	53	287	305	171	720	.9	<.4	1,680	820	4.4	--	2,910	7.3
104	320	June 2, 1964	Tg	63	--	175	59	350	303	106	760	1.2	<.4	1,670	680	5.8	--	2,970	7.8
105	160	do	Tg	63	--	97	28	213	384	84	285	1.2	<.4	965	357	--	--	1,650	7.5
301	520	Apr. 30, 1964	Tl	23	--	38	16	176	383	55	125	.7	<.4	626	161	6.0	3.06	1,085	7.6
304	284	May 29, 1964	Tg	38	--	87	25	221	285	46	363	.8	<.4	925	320	5.4	--	1,680	7.8
45-203	180	do	Tg	21	--	55	28	247	316	69	320	.9	<.4	900	251	--	.14	1,640	7.5
302	65	July 1, 1964	Ql	43	--	40	26	540	109	105	820	.6	<.4	1,620	207	--	--	2,990	7.8
50-201	110	May 29, 1934	Ql	--	--	--	--	--	350	--	251	--	--	--	333	--	--	--	--
201	110	Nov. 2, 1939	Ql	--	--	121	16	143	336	44	250	--	b/	749	370	--	--	--	--
202	130	May 24, 1934	Ql	--	--	--	--	--	326	--	305	--	--	--	378	--	--	--	--
202	130	Nov. 2, 1939	Ql	--	--	147	24	126	311	66	290	.4	b/	813	465	--	--	--	--
301	333	May 20, 1964	Ql	67	--	176	36	210	321	146	446	.9	3	1,250	590	3.8	--	2,140	7.2
302	85	May 28, 1934	Ql	--	--	--	--	--	304	--	326	--	--	--	345	--	--	--	--
302	85	Nov. 2, 1939	Ql	--	--	156	50	189	317	38	440	--	b/	1,013	513	--	--	--	--
303	130	May 24, 1934	Ql	--	--	81	18	155	388	42	176	.9	b/	--	276	--	--	--	--
303	130	Nov. 2, 1939	Ql	--	--	88	19	139	372	26	185	--	b/	648	297	--	.15	--	--
304	525	May 20, 1964	Tg	35	--	52	11	206	323	67	199	1.0	<.4	726	175	6.8	1.80	1,260	7.6
503	247	Apr. 30, 1964	Ql	35	--	264	61	182	207	92	750	.8	<.4	1,480	910	2.6	--	2,750	7.6
601	465	Apr. 29, 1964	Tg	6	--	13	12	218	343	41	160	.6	<.4	627	81	10	4.25	1,138	8.6
602	138	May 24, 1934	Ql	--	--	--	--	--	302	--	742	--	--	--	758	--	--	--	--
602	138	Nov. 2, 1939	Ql	--	--	138	27	211	427	95	330	--	b/	1,013	457	--	--	--	--

See footnotes at end of table.

Table 7.--Chemical analyses of water from wells in Bee 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 and potassium (Na + K)*	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Dissolved solids	Hardness as $CaCO_3$	Sodium adsorption ratio (SAR)	Residual sodium carbonate (RSC)	Specific conductance (micromhos at 25°C)	pH
AW-79-50-603	120	May 25, 1934	Ql	--	--	--	--	--	304	--	990	--	--	--	1,065	--	--	--	--
603	120	Oct. 27, 1939	Ql	--	--	514	95	434	232	300	1,500	0.2	b/	2,957	1,674	--	--	--	--
51-101	155	June 5, 1964	Ql	70	--	93	13	113	348	46	140	1.2	2	653	284	--	--	1,057	7.5
AW-79-51-203	320	June 4, 1964	Tg	54	--	114	27	104	326	55	207	.8	<.4	725	396	2.3	--	1,240	7.4
401	105	May 25, 1934	Ql	--	--	--	--	--	332	--	268	--	--	--	402	--	--	--	--
401	105	Nov. 2, 1939	Ql	--	--	199	31	40	329	82	250	--	b/	767	624	--	--	--	--
402	250	Apr. 30, 1964	Ql	65	--	111	28	151	271	95	285	.9	3.0	872	395	3.3	--	1,510	7.7
405	280	June 5, 1964	Ql	49	--	117	31	177	235	56	386	.9	<.4	931	421	3.8	--	1,720	7.7
603	275	June 4, 1964	Ql	63	--	152	45	177	276	74	461	.9	<.4	1,110	560	3.2	--	1,980	7.3
52-404	64	do	Ql	67	--	106	29	98	339	38	192	.6	6	708	384	2.2	--	1,200	7.4
406	65	do	Ql	80	--	201	109	540	349	181	1,160	1.8	3.5	2,450	950	--	--	4,220	7.8
San Patricio County																			
WW-79-51-705	767	Nov. 18, 1955	Tg	24	--	53	14	484	404	15	625	--	0.6	1,420	190	45	2.83	2,520	7.9

* Sodium and potassium calculated as sodium (Na).
a/ Sulfate less than 10 ppm.
b/ Nitrate less than 20 ppm.

Table 8.--Chemical analyses of water from salt-water disposal pits, Bee County

(Analyses given are in parts per million except specific conductance and pH.)

Well	Date of collection	Silica (SiO_2)	Calcium (Ca)	Magnesium (Mg)	Sodium and potassium (Na + K)*	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Dissolved solids	Hardness as $CaCO_3$	Specific conductance (micromhos at 25°C)	pH
AW-79-17-1	June 29, 1964	25	780	159	20,000	800	< 3	33,700	0.3	<0.4	54,600	2,600	>12,000	6.7
18-1	June 25, 1964	13	83	32	7,000	445	4	10,700	1.7	<.4	18,100	338	>12,000	8.0
2	June 23, 1964	33	530	100	14,800	870	3	24,100	1.6	<.4	40,000	1,730	>12,000	7.1
25-1	June 29, 1964	17	418	109	15,600	980	< 3	25,200	.2	<.4	41,800	1,490	>12,000	7.3
2	June 23, 1964	27	277	54	14,000	990	< 3	21,700	1.2	<.4	36,500	910	>12,000	7.4
26-1	do	47	424	85	16,800	920	5	25,900	1.9	<.4	43,700	1,410	>12,000	7.2
2	do	48	73	14	8,200	1,630	27	11,600	2.9	<.4	20,800	240	>12,000	7.7
3	do	68	12	2	3,100	2,760	38	3,120	2.9	<.4	7,700	38	11,750	7.6
28-1	June 30, 1964	22	46	11	2,350	210	3	3,550	.6	<.4	6,100	161	10,300	7.2
33-1	June 23, 1964	22	1,480	590	25,700	170	< 3	45,100	.2	<.4	73,000	6,120	>12,000	7.0
2	June 29, 1964	7	1,080	174	16,600	96	< 3	28,400	.5	<.4	46,400	3,420	>12,000	6.4
42-1	July 1, 1964	21	154	16	7,200	360	11	12,000	1.6	<.4	20,100	450	>12,000	7.9
2	do	27	235	40	8,300	472	21	13,300	2.5	<.4	22,200	880	>12,000	8.3
43-1	June 22, 1964	29	166	31	8,200	500	< 3	12,400	1.2	<.4	21,000	540	>12,000	7.3
1	June 30, 1964	24	1,130	198	22,500	322	4	36,900	1.6	<.4	60,800	3,650	>12,000	7.1
50-1	July 1, 1964	24	118	27	9,600	750	< 3	14,900	1.6	<.4	25,000	407	>12,000	7.6
52-1	do	22	1,200	226	18,100	135	9	31,200	.2	<.4	50,900	3,930	>12,000	7.3

* Sodium and potassium calculated as sodium (Na).