TEXAS WATER DEVELOPMENT BOARD

REPORT 170

GROUND-WATER RESOURCES OF WHEELER AND EASTERN GRAY COUNTIES, TEXAS

By

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United States Geological Survey

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GROUND-WATER RESOURCES OF WHEELER AND EASTERN GRAY COUNTIES, TEXAS

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ABSTRACT

Wheeler and eastern Gray Counties are in the east-central part of the Texas Panhandle. The two counties are characterized by rolling to fairly rugged topography with many sand-dune areas and a well developed drainage system.

The Ogallala Formation, the principal source of fresh ground water in the area, supplies nearly all the water for municipal supply and slightly more than half of the water used for irrigation. The Blaine Formation and the Whitehorse Group are sources of water principally for irrigation. Ground-water pumpage in 1966 was about 10,200 acre-feet, an increase of nearly three times the amount pumped in 1955. Of the pumpage in 1966, 6,900 acre-feet was for irrigation, most of which was in Wheeler County. Available water-level records are inadequate to determine a definite trend in the water levels, but the withdrawals of ground water since at least 1955 apparently have not caused a serious decline in the water table or in the amount of water in storage.

The Ogallala Formation yields water that generally contains less than 500 mg/l (milligrams per liter) dissolved solids and is the calcium bicarbonate type. The water from the Blaine Formation and Whitehorse Group, which is unsuitable for domestic or municipal supplies, is more highly mineralized and is of the calcium sulfate type. The water is used for irrigation seemingly without detrimental effect.

On the basis of the capacity of the Ogallala Formation to transmit water under the present hydraulic gradient (30 feet per mile), about 13 mgd (million gallons per day) or 15,000 acre-feet per year is moving through the aquifer. This quantity, which is somewhat greater than the quantity of water pumped (10,200 acre-feet) in 1966, reasonably may be assumed to be the amount of water that is perennially available for development without depleting the aquifer.

GROUND-WATER RESOURCES OF WHEELER AND EASTERN GRAY COUNTIES, TEXAS

INTRODUCTION

Location and Extent of the Area

Wheeler and eastern Gray Counties are located in the east-central part of the Texas Panhandle (Figure 1). The study area encompasses about 1,300 square miles. The population of the major cities, according to a 1965 estimate, is Shamrock, 3,100; McLean, 1,459; Wheeler, 1,150; and Lefors, 864.

Figure 1.—Location of Wheeler and Eastern Gray Counties

Purpose and Scope of the Investigation

The primary purpose of the investigation was to obtain data on the occurrence, location, and quality of the ground water in the two-county area with emphasis on the source and suitability of the water for public supply, industrial use, and irrigation. Recommendations are made for future and more detailed work to better delineate the quantity and quality of the ground-water resources.

Basic data were obtained by an inventory of 613 wells and 33 springs, by the collection of 185 water samples, and from the compilation of well data obtained from previous investigations of the U.S. Geological Survey, the Texas Water Development Board, and other State agencies. The locations of the wells and springs are shown in Figure 11. Data were obtained from the U.S. Department of Agriculture, the Gray County Conservation Ground Water District, representatives of the municipalities, oil industry, and water well drilling companies, and from the many other individuals contacted during the inventory.

Previous Investigations

Many studies on the ground-water resources in the High Plains have been made; a few of the reports pertinent to the present study include those of McAdoo, Leggat, and Long (1964), Baker and others (1963), Alexander (1961), Cronin (1961), Long (1961), and Rayner (1958).

Physiography and Drainage

Wheeler and eastern Gray Counties are located along the east margin of the Southern High Plains and the west margin of the Osage Plains. The area between the High Plains and the Osage Plains is commonly referred to as the "breaks". In this report, the "breaks" area is considered part of the marginal part of the High Plains and includes the western two-thirds of Wheeler County and almost all of eastern Gray County.

The "breaks" and the Osage Plains are characterized by a rolling to fairly rugged topography with many areas of sand dunes and a well developed drainage system. The topography is fairly rugged in much of southeastern Wheeler County, in northwestern Wheeler, and much of eastern Gray County. Most of northeastern and southwestern Wheeler County has gently rolling topography where the geologic units are composed mainly of sand, sandstone, and shale. The altitude of the land surface ranges from about 3,100 feet above mean sea level in the western part of eastern Gray County to about 2,000 feet in eastern Wheeler County.

The area is drained by North Fork Red River, McClellan Creek, Sweetwater Creek, and other smaller tributaries of the Red River. Except during periods of heavy precipitation, the streams are little more than dry

channels, but records of the U.S. Geological Survey show that a peak discharge of 11,200 cfs (cubic feet per second) has passed the gaging station, North Fork Red River near Shamrock.

Climate

The climate in the Texas Panhandle is characterized by low humidity, a wide range of temperature and precipitation, and frequent windstorms. The annual precipitation for Shamrock for the period 1955-66 ranged from a low of about 14 inches to a high of about 34 inches (Figure 2) and averaged about 23 inches. A substantial part of the precipitation occurs during the growing season, but the amount and distribution of rainfall often is inadequate to insure good crop yields.

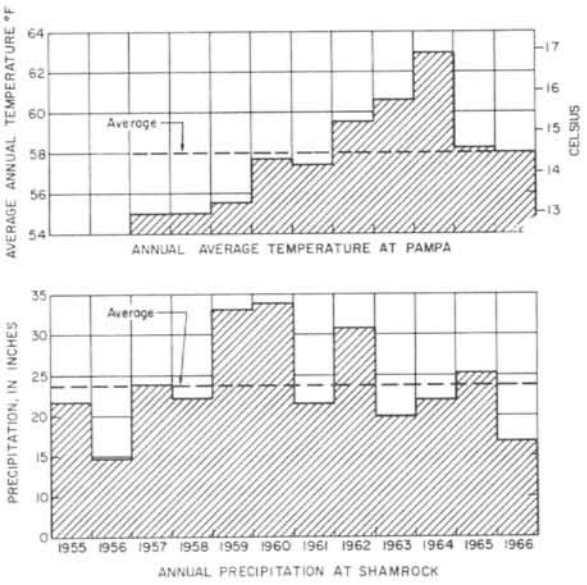


Figure 2.—Annual Precipitation at Shamrock, 1955-66 and Annual Average Temperature at Pampa, 1957-66

During any given year the temperature may range from a high during the summer months of above 100°F (38°C) to a low of many degrees below zero (°F) during winter months. The annual average temperature at Pampa for the period 1957 to 1966 ranged from 55°F (13°C) to 63°F (17°C). The average annual temperature for the 10-year period was 58°F (14°C) (Figure 2).

Economic Development

Most of the land in Wheeler and eastern Gray Counties is devoted to ranching, but each year an increasing amount of land is giving way to irrigated farming. The number of irrigation wells in use increased from 33 in 1955 to 85 in 1966. Irrigation was first started on the High Plains and has only recently moved into the "breaks area" and the Osage Plains.

Industrial development has been related to the production of oil and gas and the availability of ground water. Such industries as carbon black plants, pipeline companies, refineries, and petrochemical plants have resulted from the discovery of oil and gas, but the location of many of the plants has been dictated by the availability of ground water. In many areas, the production of natural gas has aided in the development of ground water for irrigation because of its low cost relative to other fuels.

Well-Numbering System

The numbers assigned to wells and springs in this report conform to the statewide system used by the Texas Water Development Board. The system is based on the division of the state into 1-degree quadrangles and repeated division of these quadrangles into small units as illustrated in Figure 3.

The largest quadrangle, a 1-degree quadrangle, is divided into sixty-four 7½-minute quadrangles, each of which is further divided into nine 2½-minute quadrangles. Each 1-degree quadrangle in the state has been assigned a 2-digit number for identification. The 7½-minute quadrangles are numbered with 2-digit numbers consecutively from left to right beginning in the upper left hand corner of the 1-degree quadrangle, and the 2½-minute quadrangles within the 7½-minute quadrangle are similarly numbered. The first two digits of a location number identify the 1-degree quadrangle, the third and fourth digits identify the 7½-minute quadrangle, the fifth digit identifies the 2½-minute quadrangle, and the last two digits designate the order in which the well or spring was inventoried within the 2½-minute quadrangle.

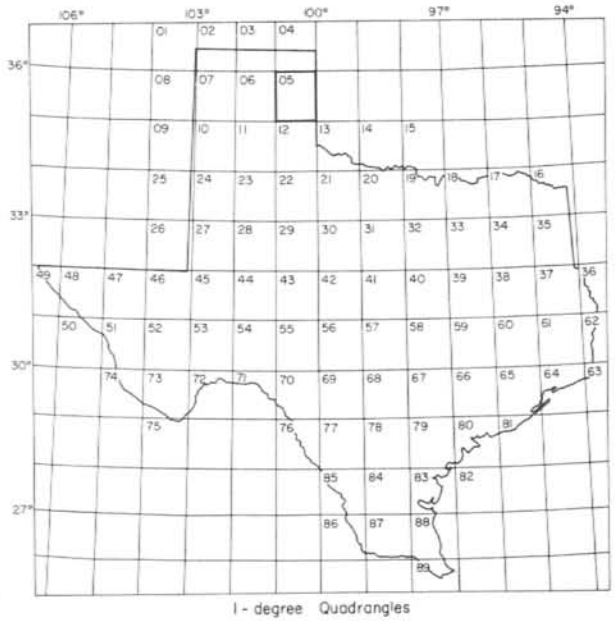
In addition to the 7-digit well number, a 2-letter prefix is used to identify the county; the prefix for Wheeler County is ZB, and that for Gray County is KS.

GEOLOGIC UNITS AND THEIR WATER-BEARING PROPERTIES

Rocks of Permian, Tertiary, and Quaternary ages are exposed in the area (Table 1). The Permian rocks are several thousand feet thick and include, from oldest to youngest: The Wichita, Clear Fork, Pease River, and Whitehorse Groups, of which only the Pease River and Whitehorse Groups are significant as sources of water. The Tertiary and Quaternary rocks are the principal sources of fresh ground water in some parts of the area. Rocks of Triassic age, which overlie the Permian rocks in

Table 1.—Geologic Units and Their Water-Bearing Characteristics

ERA	SYSTEM	SERIES	GROUP	STRATIGRAPHIC UNIT	APPROXIMATE MAXIMUM THICKNESS (FT)	CHARACTER OF ROCKS	WATER-BEARING CHARACTERISTICS
Cenozoic	Quaternary	Pleistocene and Holocene undifferentiated		Dune sand	75	Mostly poorly stratified sand with some silt and clay.	Yields small quantities of fresh water in local areas. Mostly the sand dunes form major areas of natural recharge.
				Alluvium	100	Poorly stratified, sorted to poorly sorted deposits of sand, silt, clay, and gravel.	Yields small to large quantities of fresh to slightly saline water along major streams and tributaries to domestic, stock, and irrigation wells.
		Pleistocene		Terrace deposits	150 +	Poorly stratified, sorted to poorly sorted deposits of sand, silt, clay, and gravel.	Yields small to large quantities of fresh to slightly saline water in the southeastern and central parts of Wheeler County to domestic, stock, and irrigation wells.
	Tertiary	Pliocene		Ogallala	600 +	Unconsolidated to poorly consolidated, well sorted to poorly sorted, stratified to poorly stratified deposits of sand, silt, clay, gravel, and caliche.	Major source of fresh water. Yields moderate to large quantities of fresh water to municipal, industrial, and irrigation wells.
Paleozoic	Permian	Upper	Whitehorse		500 +	Shale with beds of sandstone, siltstone, gypsum, anhydrite, and dolomite.	Yields small to moderate quantities of fresh to moderately saline water to domestic, stock, industrial, and irrigation wells.
			Pease River	Dog Creek Shale and Blaine Formation undifferentiated	300 +	Anhydrite and gypsum, also shale and dolomite. Anhydrite and gypsum commonly cavernous.	Blaine Formation yields moderate to large quantities of fresh to moderately saline water to industrial and irrigation wells. Some water may be obtained from Dog Creek Shale.
				Flowerpot Shale	?	Shale with some anhydrite and gypsum. Exposed only in southeastern part of Wheeler County.	Yields small quantities of water to domestic and stock wells.



1 - degree Quadrangles

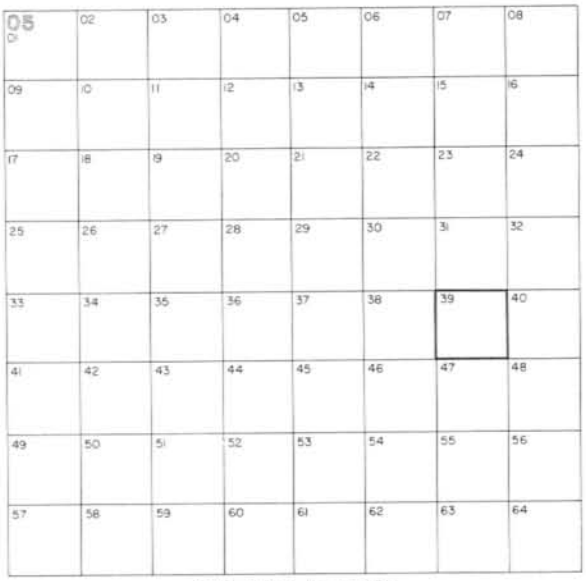
Location of Well 05-39-6-01

05 1 - degree quadrangle

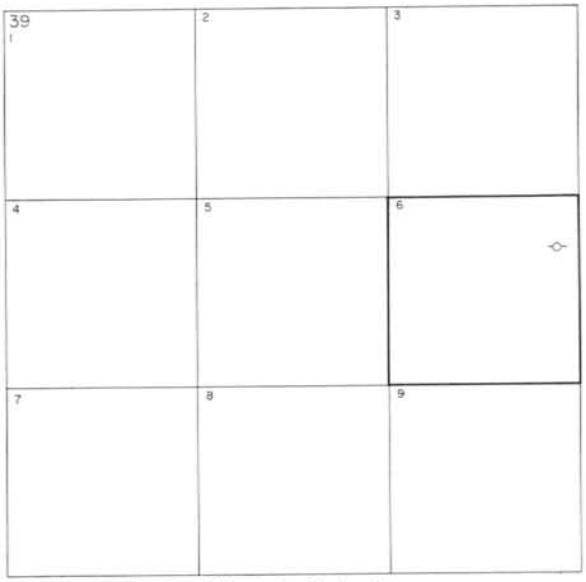
39 7 1/2 - minute quadrangle

6 2 1/2 - minute quadrangle

01 Well number within 2 1/2 - minute quadrangle



7 1/2 - minute Quadrangles



2 1/2 minute Quadrangles

Figure 3

Well-Numbering System

much of the High Plains, probably are not present in this area, although some drillers report their occurrence in the northwestern part of Wheeler County and the northern part of eastern Gray County. However, Triassic rocks are not a likely source of water in the area.

The areal extent of the outcropping rocks are shown on the geologic map (Figure 4), and the physical and water-bearing properties of each are described in Table 1. The subsurface relationships are shown in Figure 5. The contacts between the various rock units are based largely on "picks" made by oil company geologists; consequently, the thicknesses assigned to the various rock units in this report may be at variance with those of other authors.

The most prominent geologic structures in the area are the Amarillo Uplift, the axis of which trends southeastward through the southern part of Wheeler and eastern Gray Counties, and the Anadarko Basin, a structural depression underlying the area north and northeast of the uplift. These structures seemingly have had little effect on the occurrence of water in the Permian rocks that crop out in the area.

Other significant structural features in the area are the sinkholes that are common in parts of Wheeler County. These sinkholes, some of which are of recent origin, are the result of local solution weathering of the water-soluble rocks in the Blaine Formation and Dog Creek Shale.

In the description of the water-bearing properties of the geologic units, the yields of wells are described according to the following rating.

DESCRIPTION	YIELD (GALLONS PER MINUTE)
Small	Less than 50
Moderate	50 to 500
Large	More than 500

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

DESCRIPTION	DISSOLVED-SOLIDS CONTENT (MILLIGRAMS PER LITER)
Fresh	Less than 1,000
Slightly saline	1,000 to 3,000
Moderately saline	3,000 to 10,000
Very saline	10,000 to 35,000
Brine	More than 35,000

Permian System

Pease River Group

The Pease River Group (the El Reno Group in Oklahoma), which crops out in the south-central and southeastern parts of Wheeler County (Figure 4), includes, from oldest to youngest, the San Angelo Sandstone, the Flowerpot Shale, the Blaine Formation, and the Dog Creek Shale. Of these, the Blaine Formation is the most important as a source of water, principally for irrigation. The San Angelo Sandstone, equivalent to the Duncan Sandstone in Oklahoma, does not crop out in the area nor is it known to have been tapped by wells. The San Angelo probably would yield more highly mineralized water than the Blaine Formation. The Flowerpot Shale is a source of water only in the extreme southeastern part of Wheeler County where a few wells yield a small amount of water, probably from thin beds of gypsum in the upper part of the formation.

Blaine Formation and Dog Creek Shale

The Blaine Formation and Dog Creek Shale crop out in the southeastern part of Wheeler County (Figure 4). Because it is difficult to differentiate these formations in drillers' logs and in some geophysical logs, they are shown on the geologic map (Figure 4) and in the cross section (Figure 5) as a unit.

In general, the Blaine Formation consists of reddish-brown and gray shale, anhydrite, gypsum, and dolomite. The distinguishing features of the formation are five prominent members named, in ascending order, Haystack Gypsum, Cedartop Gypsum, Collingsworth Gypsum, Mangum Dolomite, and Acme Gypsum. In some places the dolomite member marks the top of the Blaine, in other places the member may be absent, and as a result the contact between the Blaine and the Dog Creek Shale is indistinct.

In the subsurface, the Blaine has a thickness ranging from 140 to 220 feet. As used in this report, the Blaine more closely conforms to the formation as described by Scott and Ham (1957) in Oklahoma rather than to that by Sellards and others (1933) in Texas. In the latter, the Blaine includes a part of the underlying Flowerpot Shale and part or all of the overlying Dog Creek Shale. Westward in Gray County, the Blaine grades into the San Andres Limestone; as a result, the contact between the two units is difficult to determine.

The Dog Creek Shale is composed of red shale, gypsum, and dolomite. The beds of gypsum and dolomite are less conspicuous on radioactivity logs and generally thinner than those in the Blaine. The maximum thickness of the Dog Creek is not definitely known, but on the basis of a few geophysical logs of oil tests, it is on the order of 125 feet.

Of the two formations, the Blaine is the more important as a source of water in the report area. In fact, it is presently the only source of large supplies of water in the southeastern part of Wheeler County. Wells tapping the cavernous and honeycombed beds of anhydrite and dolomite in the Blaine yield large quantities of water that generally is not suitable for drinking because of the high sulfate content, but is satisfactory for irrigation.

Little is known about the water-bearing properties of the Dog Creek Shale. Doubtlessly, some of the wells that are known to be open to the Blaine also obtain water from the Dog Creek; however, none are known to obtain water solely from the Dog Creek.

Whitehorse Group

The Whitehorse Group is exposed in the southeastern and west-central parts of the area. Because of limited exposures, some rocks of the Cloud Chief Formation, and possibly the Quartermaster Formation, have been mapped as part of the Whitehorse Group. The Cloud Chief and Quartermaster Formations have been mapped in Roger Mills and Beckham Counties, Oklahoma, and are known to be present in the subsurface in the report area. The Whitehorse, which consists of shale, fine sandy shale, silty sand, fine sand, sandstone, gypsum, anhydrite, and dolomite, is important as a source of water only in or near the outcrop area. The maximum thickness of the Whitehorse in the study area could not be determined, but is about 500 feet in the outcrop area.

The Whitehorse Group yields small to moderate quantities of fresh to moderately saline water to a few wells. It is not unusual for wells in the Whitehorse Group to pump large quantities of fine sand, and as a result, some wells either have caved in and had to be abandoned or the yields have had to be sharply reduced to eliminate the pumping of sand. Larger yields could be obtained from the Whitehorse if wells are screened to keep the fine sand, which is characteristic of the Whitehorse, from entering the wells.

Tertiary System

Ogallala Formation

The Ogallala Formation, which is present in nearly all of the eastern part of Gray County and about two-thirds of western and northern Wheeler County (Figure 4), is composed of yellow and pink to reddish clay silt, fine to coarse gray or buff sand, gravel, and caliche. The caliche beds generally occur at or near the top of the formation. The basal part of the formation is composed of gravel. The formation has a maximum thickness of about 600 feet in the northern part of eastern Gray County.

The Ogallala Formation is the principal source of fresh ground water in the report area. In the northwestern part of Wheeler County and in eastern Gray County, the Ogallala yields large quantities of fresh water to wells for municipal supply, industrial use, and irrigation. In the rest of the area, where the Ogallala is relatively thin, yields of wells are considerably less.

Quaternary System

The youngest rocks exposed in the report area are the terrace deposits, alluvium, and dune sand of Quaternary age. The terrace deposits consist of stream-laid sediments and plains deposits on or near the upper slopes and divides of stream valleys; the alluvium includes the sediments in or near the bottom lands along the major streams.

Terrace Deposits

The terrace deposits consist of poorly sorted sand, gravel, clay, and silt. The largest areas of terrace deposits are east and northwest of Shamrock and south of the North Fork of the Red River (Figure 4), where the thickness reaches a maximum of about 150 feet. Terrace deposits occur elsewhere in the report area, but they have not been shown on the geologic map because of their limited areal extent.

Wells in the terrace deposits in the southeastern and central parts of Wheeler County yield small to large quantities of fresh to slightly saline water.

Alluvium

The alluvium is composed of poorly sorted sand, gravel, silt, and clay. The thickness of these sediments probably does not exceed 100 feet. Where the alluvium is thick, it probably will yield moderate to large amounts of fresh to slightly saline water to wells.

Sand Dunes

Aeolian (windblown) sand mantles a large part of the report area but only where the thickness of the sand exceeds about 5 feet is it shown on the geologic map. The sand is uniformly fine grained and reaches a maximum thickness of about 75 feet in the dune area in the northeastern part of Wheeler County. A few wells obtain small quantities of fresh water from the windblown sediments for stock needs.

SOURCE, OCCURRENCE, AND MOVEMENT OF GROUND WATER

The ground water in Wheeler and eastern Gray Counties is derived from precipitation in the outcrop

areas of the water-bearing formations. Of the approximately 23 inches of rainfall that is received annually in the report area, only a small amount reaches the water table; most of it runs off or is lost by evapotranspiration.

In the report area, ground water occurs under both water-table and artesian conditions. The water in the Quaternary deposits, the Ogallala Formation, and in the outcrop areas of the Whitehorse and Pease River Groups generally is unconfined (water-table condition) and the water does not rise in a well above the level at which it is encountered.

Where the aquifer is overlain by a relatively impermeable bed, the water in the aquifer may be confined under hydrostatic pressure and will rise in a well to a level above the top of the aquifer. Artesian conditions exist locally in the Ogallala Formation and in the Whitehorse and Pease River Groups downdip from their outcrop area. In the south-central part of Wheeler County, where the Pease River Group crops out, the ground water is locally under artesian pressure. The water in the Quaternary deposits and Ogallala Formation locally may be perched, that is the water is separated from the main body of water by unsaturated strata.

Ground water in the report area moves by gravity from areas of recharge to areas of discharge. The rate of movement, which is rarely uniform in space or time, is in proportion to the hydraulic gradient and to the permeability of the rocks through which it moves. In the sand aquifers, such as the Ogallala Formation and the Quaternary alluvium, water moves slowly, perhaps on the order of a few hundred feet per year; in the cavernous and honey combed beds of gypsum and dolomite in and near the outcrop area of the Pease River Group, the water moves more rapidly. Downdip, however, these beds are relatively impermeable and movement is sharply reduced.

The general direction of movement (hydraulic gradient) of the ground water in the report area is shown by a contour map (Figure 6) of the water surface. In a broad sense, the water moves eastward, but in detail it moves from the uplands to the major streams. In effect, the water surface (water table) is a modified image of the land surface.

The configuration of the water surface is controlled largely by the topography but to a lesser extent by stratigraphy. This is clearly shown in the south-central part of the report area, where the contours indicate that the water moves through the Ogallala Formation into the Whitehorse, thence into the Pease River Group, eventually to be discharged into North Fork Red River. In this area, the Permian rocks dip south and southwestward in contrast to the northeastward slope of the water table.

USE OF GROUND WATER

Nearly all the water used in Wheeler and eastern Gray Counties is from ground-water supplies. During the 12-year period from 1955 to 1966, the withdrawals of ground water for municipal supply, industrial use, and irrigation increased three-fold from about 3,400 to about 10,200 acre-feet (Table 2). The use of water for domestic and stock needs was not determined, but it is doubtful that it exceeded 10 percent of the total pumpage for other uses. Figure 7 shows the annual pumpage of ground water for municipal and industrial use during the period 1955-66. The graph is based on data obtained from the files of the Texas Water Development Board.

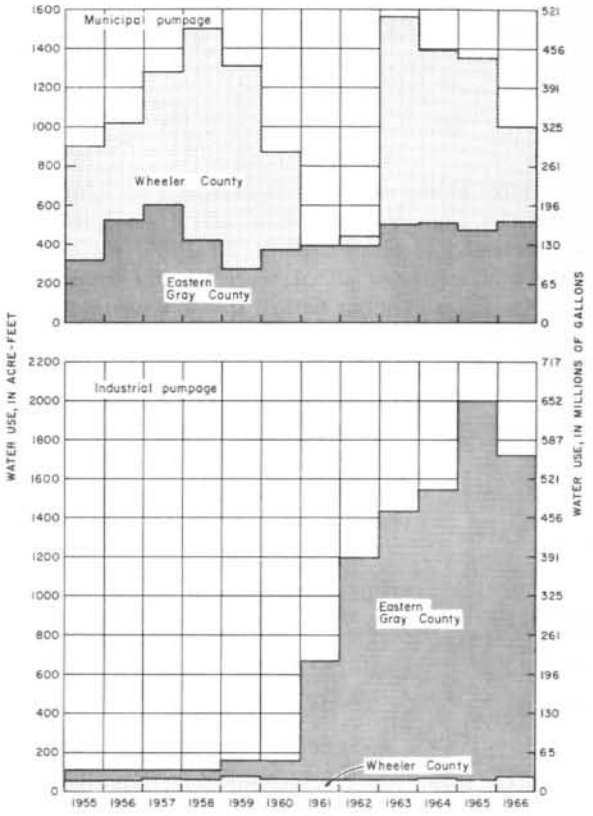


Figure 7.—Annual Ground-Water Pumpage for Municipal Supply and Industrial Use, 1955-66

Irrigation

Prior to 1955, the use of ground water for irrigation was insignificant. In 1955, 33 wells were used to pump about 2,000 acre-feet. By 1961, the number of wells had increased to 45 and pumpage had increased to about 2,800 acre-feet. Because of the generally below average rainfall during the following 5 years, irrigation increased markedly, and by 1966, 85 wells were used to pump nearly 7,000 acre-feet of water.

Table 2.—Use of Ground Water in 1955 and 1966

USE	1955 WHEELER COUNTY (ACRE-FEET)	1955 EASTERN GRAY COUNTY (ACRE-FEET)	1955 TOTAL (ACRE-FEET)
Municipal	900	300	1,200
Industrial	60	120	180
Irrigation	1,600	427	2,027
Total	2,560	847	3,407

USE	1966 WHEELER COUNTY (ACRE-FEET)	1966 EASTERN GRAY COUNTY (ACRE-FEET)	1966 TOTAL (ACRE-FEET)
Municipal	1,000	510	1,510
Industrial	70	1,725	1,795
Irrigation	4,500	2,400	6,900
Total	5,570	4,635	10,205

Most of the wells and the pumpage for irrigation is in Wheeler County, although in recent years, irrigation has increased in Gray County. In 1966, the Ogallala Formation furnished all of the water for irrigation in Gray County and about half of that in Wheeler County. Of the 4,500 acre-feet pumped in 1966 (Table 3) in Wheeler County, 21 percent or about 950 acre-feet was from the Whitehorse Group and 17 percent or nearly 800 acre-feet was from the Blaine Formation.

Industrial Use

A substantial part of the industrial use of water is for oil field repressuring. Until 1961, the industrial use of water was relatively small (about 235 acre-feet in 1960), and most of the water was used for oil and gas transmission stations. By 1966, the industrial use of ground water increased to about 1,800 acre-feet, of which all but 70 acre-feet was pumped in Gray County.

Table 3.—Use of Water for Irrigation in 1955 and 1966

	Wheeler County			Eastern Gray County	
YEAR	NUMBER OF WELLS IN USE	ACRE-FEET	YEAR	NUMBER OF WELLS IN USE	ACRE-FEET
1955	25	1,600	1955	8	427
1961	34	2,230	1961	11	561
1966	60	4,500	1966	25	2,400

Municipal Supply

The water needs of Mobeetie, Shamrock, and Wheeler in Wheeler County and Lefors and McLean in eastern Gray County are supplied by wells, most of which are in the Ogallala Formation. Since 1955, the use of ground water for municipal supply has ranged from 700,000 gpd (gallons per day) in 1961, when rainfall at Mobeetie and Shamrock was above normal (Figure 2), to 1.84 mgd (million gallons per day) in 1963. In 1966, 1.36 mgd was pumped, of which 794,000 gpd was for the supply of Shamrock.

The city of Shamrock obtains its water supply from 13 wells in separate fields about 14 miles north and about 20 miles west of town. McLean, the second largest user (312,000 gpd in 1966) is supplied by 4 wells in the Ogallala Formation.

RECHARGE AND DISCHARGE OF GROUND WATER

Recharge to the aquifers that underlie the report area occurs principally from the infiltration of precipitation and subsurface inflow from other aquifers or areas. Some recharge to the alluvium in the floodplain occurs by seepage from the streams during periods of high flow.

The scarcity of existing data precludes a direct determination of the quantity of recharge derived from precipitation. Substantial rises in water levels in several wells (Figure 8) during periods of exceptionally heavy rainfall indicates that precipitation reaches the water table. The hydrographs show also that recharge from precipitation varies widely from place to place and from aquifer to aquifer, but is greatest in the outcrop areas of the Blaine Formation in which solution channels in the gypsum beds extend to or near the surface.

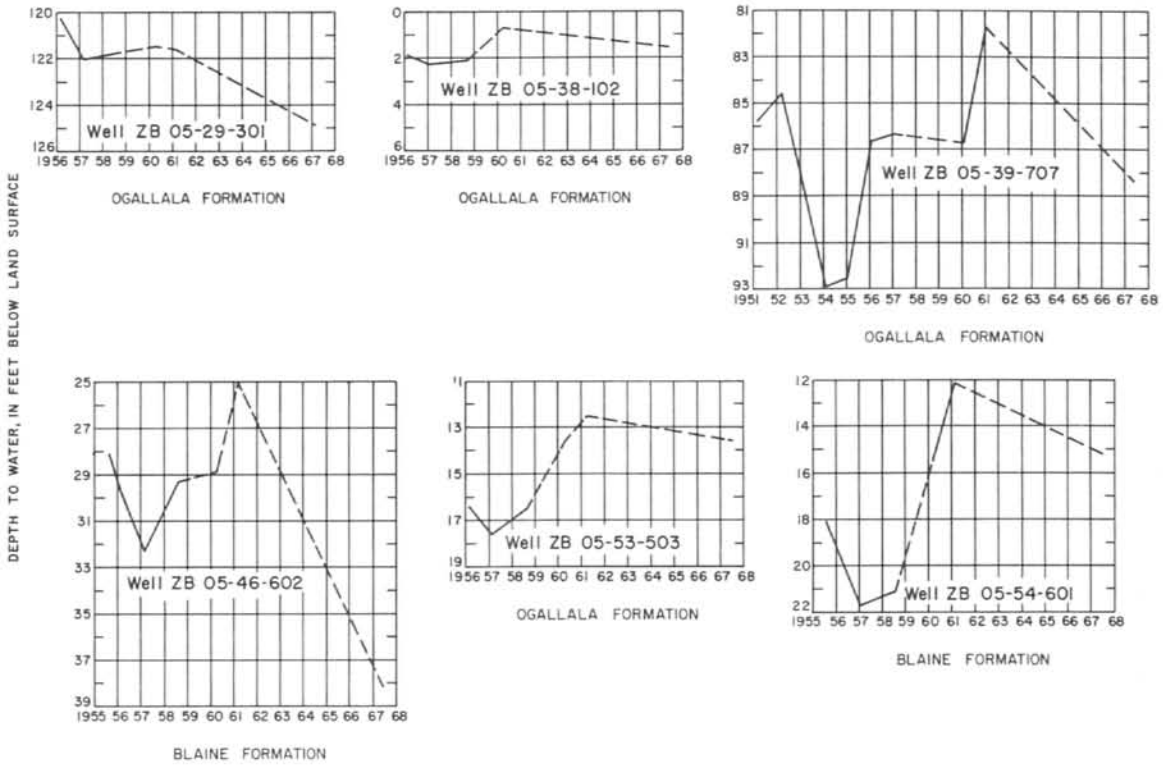


Figure 8.—Hydrographs of Six Wells in Wheeler County

Contours on the water table (Figure 6) show a mounding of the water table about 4 miles east of Shamrock, where precipitation moves downward through the highly porous and permeable surficial terrace deposits into the underlying Whitehorse Group, Dog Creek Shale, and Blaine Formation. Mounding of the water table is indicated also in the northeastern part of the report area where dune sand, which allows little surface runoff, directly overlies the Ogallala Formation.

The water-table map shows that water moves into the report area largely from the west and southwest. The amount moving cannot be measured accurately, but an estimate can be made, based on the ability of the Ogallala Formation to transmit water under the present hydraulic gradient.

Because of the lack of suitable wells and pumping schedules, aquifer tests to determine the ability of the aquifers to transmit and store water could not be made. Nevertheless, tests made in other parts of the High Plains show that the Ogallala Formation has an average hydraulic conductivity (the flow of water in gallons per day, at the prevailing temperature, through a cross section of 1-square foot of the aquifer under unit hydraulic gradient) on the order of about 200 gpd per square foot.

Assuming an average permeability of 200 gpd per square foot, an average saturated thickness of 50 feet along the 2,700-foot contour on the water table (Figure 6), an hydraulic gradient of 30 feet per mile, and a width of 45 miles, the quantity of water moving into the report area from the west is about 13 mgd, or about 15,000 acre-feet per year. Figure 6 shows that the water crossing the 2,700-foot contour moves eastward where it eventually is discharged to the two principal streams, Sweetwater Creek and the North Fork Red River. These two streams are generally perennial except during extreme dry periods when evapotranspiration rates are high.

The natural discharge of ground water in the report area occurs by seepage through springs and into streams, evaporation, transpiration, and flow into adjoining aquifers. Figure 6 shows that the ground water in the report area moves toward the main drainageways, where it is discharged through springs and seeps. The 33 springs inventoried in Wheeler County had discharges ranging from less than 5 gpm (gallons per minute) to 628 gpm. The discharge of many of the springs actually was the aggregate discharge from a group of springs and seeps. Part of this discharge is consumed by evapotranspiration in the stream valleys; the remainder maintains the base flow of the streams.

The records of the U.S. Geological Survey indicate that during the period 1962-67, the winter (December to March) base flow of Sweetwater Creek, as measured at the stream-gaging station near Kelton (Figure 11), ranged between 10 and 20 cfs or 7,000 to 14,000 acre-feet per year. During the growing season (April to November) much or all of the base flow is consumed by evapotranspiration.

If it is assumed that the accretion of ground water to the North Fork Red River is at least equivalent to that of Sweetwater Creek (10 cfs), on the order of 20 cfs or 14,000 acre-feet (12 mgd) is discharged naturally from the aquifers in the report area. This estimate which compares favorably to the estimate of the quantity of water that enters the report area from the west, may be somewhat conservative because it neglects the water which has been consumed by evapotranspiration.

CHANGES IN WATER LEVELS

Water levels in an aquifer respond to changes in the recharge-discharge relationship. The discharge from wells and recharge from precipitation are the most important factors controlling the changes in water levels. The magnitude of the change depends mainly on the proximity of the observation well to an area of discharge or recharge.

Few records are available from which definite trends of water levels can be determined. The changes in water levels in six wells (two in the Blaine Formation and four in the Ogallala Formation) in Wheeler County are illustrated by the hydrographs in Figure 8.

Water levels declined during the period 1953-57, when rainfall was below normal. The largest declines occurred in wells in the Blaine Formation. During the next 4 years, water levels rose in most of the wells because rainfall was at or above normal. The greatest rises occurred in the two wells in the Blaine Formation. Measurements made in 1967 show that water levels had declined, and in two wells, the levels were the lowest of record.

Measurements made in 16 other wells during the period 1956-67 (Table 6) would indicate a change in water levels ranging from a rise of 4.4 feet in well ZB-05-47-201 to a decline of 9.4 feet in a well in the Shamrock well field, 14 miles north of the city. Although these records are inconclusive, they indicate that pumping of ground water in Wheeler County has not caused a serious decline in water levels nor a serious depletion in the amount of water in storage.

YIELDS OF WELLS

The yield of wells screened in the Ogallala Formation depends largely on the thickness and permeability of the water-bearing material screened, the efficiencies of the wells, and the allowable drawdown; those tapping the Blaine Formation or the Dog Creek Shale are governed by the size and (or) the number of solution openings penetrated by the well. The yields of even closely spaced wells may range over wide limits because of the erratic distribution of these solution openings.

The yields, either reported or measured, of a large number of wells are included in Table 5. Most of the wells used for irrigation generally yield more than 100 gpm; however, some wells, principally stock and domestic, are not pumped at their maximum capacity, hence the yield shown in the table is not indicative of the potential of the aquifer at that well site.

In general, the largest yields, as much as 950 gpm, have been reported from wells in the Ogallala Formation. The average of nearly 100 wells was about 315 gpm. Where yields are small, generally less than 100 gpm, wells are drilled commonly in multiples to provide sufficient water for irrigation. In some places, as in the vicinity of Mobeetie, as many as eight wells are necessary to produce 250 gpm. In this part of the area, the Ogallala Formation has a saturated thickness of less than 40 feet.

The Whitehorse Group, which supplies water to only a few wells in the outcrop area near Shamrock, reportedly yielded as much as 620 gpm; the average yield of 16 large-capacity wells was slightly less than 300 gpm. Actually, the aquifer may be capable of yielding larger quantities of water, but in order to reduce the pumping of sand, yields are reduced.

The specific capacities (the ratio of the yield in gallons per minute to the drawdown in feet) determined for about 67 wells ranged from less than 1 to about 86 gpm per foot of drawdown. The average for the various aquifers ranged from 12.6 gpm per foot of drawdown for five wells in the alluvium to 15.7 gpm per foot of drawdown for 8 wells in the Blaine Formation. The average of 48 wells in the Ogallala, the principal source of ground water in the area, was 13.5 gpm per foot of

drawdown. The higher average specific capacity for wells in the Blaine is to be expected because the permeable zones in the gypsum beds permit almost unrestricted flow.

CHEMICAL QUALITY OF GROUND WATER

The suitability of the ground water in the report area depends upon chemical quality of the water and the limitations imposed by the contemplated use of the water. The chemical quality of the ground water is shown by the analyses of samples of water from 131 wells and 23 springs in Wheeler County and from 30 wells in eastern Gray County. The locations of the wells and springs sampled are shown on Figure 11, and the results of the analyses are shown in Table 7. In addition, 4 samples in Wheeler County and two samples in eastern Gray County were analyzed for pesticides. Results of all six samples indicate no presence of pesticides.

The chemical quality of the water generally reflects the chemical composition of rocks with which the water comes in contact. The amount of minerals dissolved from the rocks depends on several factors, including temperature of the water, length of time the water is in contact with the rocks, the rate of movement of water through the rocks, and the solubility of the rocks.

The dissolved-mineral constituents of water (Table 7) are reported in mg/l (milligrams per liter), which is defined as the weight of a solute per liter of solution. However, it is frequently more convenient for interpretive purposes to compare water in terms of milliequivalents per liter, which is a measure of the reactive weights of the different constituents. The chemical character of samples of water from the various aquifers in the report area is shown graphically (Figure 9) by means of patterns modified from a system suggested by Stiff (1951). In this system, the three principal cations, calcium, magnesium, and sodium (includes potassium), are shown at the left of the zero point; and the three principal anions, bicarbonate (includes CO_3 if present), sulfate, chloride (includes fluoride), are at the right of the zero point. In general, water native to a particular formation has a more or less characteristic shape or pattern. Variations from this distinctive pattern occur, due principally to the blending of water from other aquifers or sources.

The specific conductance, which was determined both in the field and in the laboratory, can be used to estimate the dissolved-solids content of the water. Although no exact relation exists between conductance and dissolved solids in natural water, the conductivity (Table 7) multiplied by a constant (0.7 for the Ogallala, 0.9 for the Blaine Formation, and 0.8 for the Whitehorse Group) is a close approximation to the dissolved solids in milligrams per liter. In highly mineralized water, the use of these constants may lead to considerable error; nevertheless, the constants are useful as an indication of the mineralization.

Ground water in the report area is used for irrigation, public supply (includes domestic supply), industry, and stock; and the water-quality requirements differ for these uses. Hardness and the concentrations of the more commonly determined constituents are of concern where the water is to be used for public supply; and salinity, the sodium hazard, and boron, as well as other factors not related to water quality, are important where the water is used for irrigation. Also of concern to the water user is the effect on the chemical quality of ground water through the use of pesticides, particularly the chlorinated hydrocarbons of which DDT is the most cited example. Chemical requirements for industrial uses vary according to the industry, but the most common industrial uses of water are for cooling and waterflooding of oil reservoirs.

Most State and municipal authorities have adopted the standards set by the U.S. Public Health Service (1962) for drinking water used on common carriers in interstate commerce. The standards are useful in evaluating public-water supplies, although they may not be directly applicable in some parts of the report area where the available ground water may exceed the standards for some of the constituents. According to the standards, the chemical constituents in a public-water supply should not be present in excess of the concentrations shown in the following table.

SUBSTANCE	CONCENTRATION (MG/L)
Chloride	250
Fluoride	1.0*
Iron	.3
Nitrate	45
Sulfate	250
Dissolved solids	500

*Based on the average of maximum daily air temperature of 71.3° F at Amarillo.

Ogallala Formation

Water from the Ogallala Formation is used for municipal and domestic supply, irrigation, and industrial use. Characteristically, the water is hard to very hard, has a dissolved-solids content of less than 500 mg/l, and is a calcium bicarbonate type. The water meets the chemical standard established by the U.S. Public Health Service for drinking water although in a few samples, the fluoride and nitrate content exceeded slightly the recommended limits of 1.0 and 45 mg/l, respectively.

Water from the Ogallala Formation has been used successfully for irrigation for several years. The SAR (sodium-adsorption ratio) and the RSC (residual sodium carbonate) are factors used in assessing the quality of water for irrigation. Figure 10, a diagram for the classification of irrigation waters (U.S. Salinity Laboratory Staff, 1954) shows that the water from the Ogallala Formation is suitable for irrigation, being low in sodium hazard (expressed as SAR) and medium in salinity hazard (expressed in specific conductance).

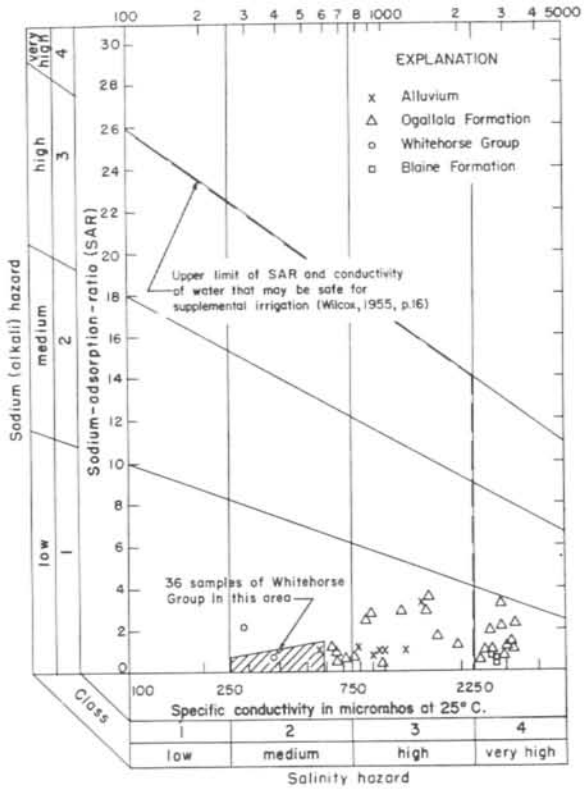


Figure 10.—Classification of Irrigation Water

Samples of water were collected for pesticide analyses from three wells tapping the Ogallala Formation. The results of these analyses showed no evidence that pesticides have percolated downward through the soil zone into the aquifer. Studies made in other parts of the country indicate that much of the pesticide is adsorbed on the soil particles. In fact, Scalf and others (1968) reported that a major proportion of the DDT (a chlorinated hydrocarbon) injected into the Ogallala aquifer near Amarillo, Texas (about 60 miles west of the study area) during recharge remained adsorbed to the material in the aquifer after pumping.

Much of the water from the Ogallala used by industry is for cooling and water-flood operations. The temperature of the water, which is an important property in the consideration of water for cooling, ranges from about 14°C to 15°C (upper 50's°F) to about 19°C to 20°C (upper 60's°F). Water from springs in the Ogallala is somewhat higher in temperature. The silica content may render much of the water in the Ogallala undesirable for use in boilers operating at high pressures—about 400 psi (pounds per square inch)—without first treating the water.

Blaine Formation

Water from the Blaine Formation is more mineralized than that in the Ogallala, is very hard, and is a calcium sulfate type. The dissolved-solids content ranged from about 700 to 7,000 mg/l; most of the samples ranged between 2,000 and 3,000 mg/l. Because of the hardness and the high sulfate content, the water in the Blaine in the southeastern part of the area generally is unsuitable for domestic or municipal supply.

Most of the water pumped from the Blaine is for irrigation. The water is very high in salinity hazard but low in sodium hazard. Despite the high salinity, the water has been used for irrigation for several years without apparent detrimental effect. Doubtlessly, the well-drained soil and the low sodium hazard are factors in the successful use of the water. Generally, water of this type when used for irrigation is applied in excess of the needs of the plant to provide leaching of the salts in the soil. Consequently, an increase in mineralization might result from return seepage of the water applied for irrigation. A sample of water from well ZB-05-54-501, 64 feet deep and used to supply water for stock, contained no pesticides. The well, which pumps only 2 gpm, is not in the heavily irrigated part of the area; consequently, the results may be inconclusive.

No wells are known that tap the Blaine Formation elsewhere in the area. In all likelihood, the water is too mineralized for irrigation and most industrial purposes.

Whitehorse Group

The Whitehorse Group furnishes water principally for irrigation; although in some places in the outcrop area, the water is used for domestic and stock needs. The chemical quality of the water from wells that tap only the Whitehorse is similar to that from the Blaine, except that it is generally less mineralized. The water is of the calcium sulfate type except in well ZB-05-46-302 in which the magnesium was the principal cation. In most of the water samples, magnesium commonly exceeded sodium and bicarbonate exceeded chloride.

The dissolved-solids content ranged from about 400 to slightly less than 2,700 mg/l, except well ZB-05-46-302 which yielded water containing 7,080 mg/l dissolved solids. Water of relatively low mineralization in the Whitehorse occurs where the

conditions are good for recharge from the Ogallala. Where such recharge occurs, the water generally is suitable for human consumption.

The Whitehorse Group is second in importance to the Ogallala Formation as a source of water for irrigation. The water is low in sodium hazard and medium to very high in salinity hazard. Although water from the Whitehorse has been pumped for irrigation for only a relatively short period, no apparent ill effects on crop growth have been reported.

Other Aquifers

The chemical quality of water in the other aquifers—the Quaternary alluvium and the dune sands—varies widely depending on the source of recharge. The analysis of water from 11 wells that are screened only in the alluvium are shown in Table 7; the chemical characteristics of several of these wells are shown in Figure 9. Where the alluvium overlies or adjoins Permian rocks or is recharged at least in part by streamflow, the water more than likely will be of the calcium sulfate type; where it overlies or is in proximity to the Ogallala Formation, or where it is recharged principally from the direct infiltration of rainfall as in the dune-sand area, the water will be fairly low in mineralization and of the bicarbonate type. Of the 11 samples analyzed, five contained sulfate in excess of the 250 mg/l. The alluvium supplies water suitable for irrigation and the yields generally are inadequate.

Where large yields are needed, wells often are screened in more than one aquifer. Such a well commonly blends the different chemical characters of these water-bearing units. The chemical quality or character of the pumped water is more or less peculiar to one or another of the permeable zones tapped, depending in part on the position of the pump intake, the physical characteristics of the water-bearing sediments, and the difference in pressure heads. Examples of variation in the chemical character of water from a well tapping more than one aquifer are shown in Figure 9.

PRODUCTION AND DISPOSAL OF OIL-FIELD BRINES

Large quantities of brine are produced in the report area in conjunction with the production of oil and gas. Table 4 shows the reported amount of brine produced in 1961 in the Panhandle oil and gas fields and the methods used for the disposal of the brine. This table, which is based on a report of the Texas Water Commission and Texas Water Pollution Control Board (1963), shows that the total brine production in the report area in 1961 was 8,734,275 barrels (about 1,100 acre-feet), of which 6,713,899 barrels were produced in the eastern part of Gray County. Of the brine produced, nearly 68 percent or 5,925,415 barrels were disposed of through unlined surface pits. The rest of the brine was disposed of through injection wells.

The open pit method of brine disposal is hazardous to water quality. Generally, brine in open pits is allowed to evaporate, but the ineffectiveness of disposal by evaporation is readily recognized by the general absence of appreciable quantities of precipitates. Unless the pit is lined, and few are, the brine usually is free to soak into the ground, eventually percolating downward to the water table.

A statewide "no-pit" order was issued by the Railroad Commission of Texas to become effective January 1, 1969. Despite the elimination of most of the disposal pits, the salt water that has percolated from these pits represents a potential source of contamination. When these wastes eventually reach the water table, they will be diluted so slowly that the effects of contamination may be long lasting.

The horizons into which the brine is injected are not known, but some of the salt water probably is injected into the lower part of the Blaine Formation; particularly in the western part of the report area where the unit not only lies at a considerable depth but also contains water that generally is too mineralized for most uses.

AVAILABILITY OF GROUND WATER

Data are not available to evaluate quantitively the potential development of the aquifers in the report area. In 1966, pumpage from the various aquifers was about 10,200 acre-feet, which is less than the quantity of water being transmitted through the Ogallala Formation from the west and southwest. The water being transmitted may be assumed to be the quantity of water that is perennially available for development without depleting the aquifers. Nevertheless, any additional large-scale development of the water supplies in the Ogallala in the report area would result in taking water from storage, in effect "mining" the available water. However, the aquifer contains a substantial quantity of water in transient storage. On the basis of an average saturated thickness of 100 feet, an area of 900 square miles, and a specific yield of 15 percent, approximately 8½ million acre-feet is theoretically available for development. Even if only 50 percent of this water could be economically developed, the supply would represent a tremendous potential for additional development.

The amount of ground water perennially available in the other aquifers is difficult to determine because much of the recharge to these aquifers is derived from the Ogallala Formation. Consequently, a substantial increase in pumping from the Ogallala would effectively reduce the quantity of water moving into the other aquifers. Under present conditions, it seems likely that

Table 4.—Production and Disposal of Oil-Field Brine, 1961, Wheeler and Eastern Gray Counties

FIELD NAME[1]	DISPOSAL IN OPEN PITS (BBLS)	DISPOSAL IN INJECTION WELLS (BBLS)	TOTAL BRINE PRODUCTION (BBLS)
Panhandle East, Gray County	15,060	–	15,060
Panhandle East, Wheeler County	29,307	–	29,307
Panhandle Gray County	4,527,197	2,162,238	6,689,435[a]
Panhandle Osborne Area	334,548	333,975	668,523
Panhandle West, Gray County	9,267	–	9,404[b]
Panhandle Wheeler County	1,010,036	308,130	1,322,546[c]
Totals	5,925,415	2,804,343	8,734,275

Summary

AREA AND TYPE OF DISPOSAL	BARRELS IN 1961	PERCENT
Gray County		
Open Surface Pits	4,551,524	67.8
Injection Wells	2,162,238	32.2
Miscellaneous	36	0.0
Unknown	101	0.0
Total	6,713,899	
Wheeler County		
Open Surface Pits	1,373,891	68.0
Injection Wells	642,105	31.8
Miscellaneous	1,825	0.1
Unknown	2,555	0.1
Total	2,020,376	

[a] Part of field outside of study area.
[b] Field outside study area, includes 137 bbls. disposed by unknown and miscellaneous methods.
[c] Includes 4,380 bbls. disposed by unknown and miscellaneous methods.
[1] Field names shown are from the Texas Railroad Commission and are part of the Panhandle Oil and Gas Fields shown on Figure 11.

these aquifers, particularly the Blaine Formation and the Whitehorse Group, are capable of further development, but only in their outcrop area where the potential for recharge is good and the quality of water is satisfactory for irrigation.

The northern one-third of the report area has the greatest potential for additional development. In this area, the saturated thickness ranges from at least 100 feet to as much as 300 feet, nearly all of which is in the Ogallala Formation.

NEED FOR ADDITIONAL STUDIES

The present (1968) water needs of Wheeler and eastern Gray Counties are supplied largely from ground-water sources. The data collected during the present study were inadequate for an accurate evaluation of the potential of the aquifers. It seems likely, however, that the 1966 rate of ground-water withdrawal can be sustained indefinitely. Whether the available supplies are adequate to meet the expected increased demands for water for public supply, irrigation, and industrial use could not be determined. More detailed studies should be related to: (1) the hydrologic properties of the aquifers; (2) sources and rate of natural recharge and discharge; (3) the effect of pumping on the regional water table; (4) the hydrologic relation between aquifers; (5) the quantity of water in storage; (6) changes in chemical quality due to pumping; (7) and the subsurface extent of usable water in the Whitehorse Group and the Blaine Formation.

The periodic collection of basic data, such as the observation of water levels, an inventory of pumpage, and the collection of water samples for quality studies are necessary items for a detailed evaluation of the ground-water resources of the area. An inventory of springs discharging at least 50 gpm is also needed, particularly in that part of the area drained by the North Fork Red River, where the natural discharge of ground water to the river is practically impossible to determine. More detailed geologic mapping with particular emphasis on the water-bearing units—primarily gypsum beds—in the Blaine Formation, the Dog Creek Shale, and the Whitehorse Group is needed to determine the relation between local geology and stratigraphy and the occurrence and movement of fresh or slightly saline water. Of particular concern is the source of the high chloride and nitrate content of the water in various parts of the area. Data are needed to determine whether it is naturally occurring or the result of man's activities.

Although an accurate determination of the potential of the ground-water supply requires this information, it also requires an adequate description of the hydrologic flow system and geologic framework throughout the region. Consequently, further studies should include an area considerably larger than Wheeler and eastern Gray Counties.

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Table 5.--Records of Wells and Springs

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: E, electric; G, gasoline, butane, or Diesel engine; J, jet; P, piston or cylinder; S, submergible; T, turbine; W, windmill. Number indicates horsepower.
Use of water : D, domestic; Irr, irrigation; Ind, industrial; P, public supply; S, stock; U, unused.
Water-bearing unit : Qal_1, Alluvium, low terrace and channel fill deposits; Qal_2, Alluvium, high terrace plain deposits; Qal_3, Quaternary dune sand; To, Ogallala Formation; Pw, Whitehorse Group; Pdb, Dog Creek and Blaine Formation; Pf, Flowerpot shale.

WELL	OWNER	DATE COMPLETED	DEPTH OF WELL (FT)	CASING DIAMETER (IN)	WATER-BEARING UNITS	ALTITUDE OF LAND SURFACE (FT)	WATER LEVEL		METHOD OF LIFT	USE OF WATER	DISCHARGE IN GPM	DRAWDOWN IN FEET	FIELD SPECIFIC CONDUCTANCE (MICROMHOS AT 25°F)	REMARKS
							BELOW LAND SURFACE DATUM (FT)	DATE OF MEASUREMENT						
						Wheeler County								
ZB-05-28-301	M.S. Mixon	1955	501	16	To	2,981	313.5	Mar. 24, 1967	T,G	Irr	†200	††187	--	Original depth 435 ft. Open hole 435-501 ft.
* 601	W.J. Johnson	--	159	6	To	2,810	137.2	Apr. 4, 1967	P,W	S	† 2	--	447	
901	Mobeetie School Land	--	31	4	Qal_1	2,710	26.0	Apr. 5, 1967	P,W	U	--	--	--	
29-101	J.T. Johnson	1955	350	16	To	2,822	162.7 163.8	Jan. 15, 1956 Apr. 3, 1967	T,G	Irr	†580	46	--	Cased to 170 ft. Irrigated 80 acres, 1966. 1/
105	B. McLaughlin	1965	198	7	To	2,818	160	Oct. 1965	P,W	S	† 1	--	--	
* 201	D.K. Corse	1955	280	16	To	2,784	140.2 140.4	Jan. 15, 1956 Feb. 1, 1961	T,G	Irr	†500	††138	468	Cased to 110 ft. Reported irrigates 130 acres. 1/
301	W. McCray	1955	335	16	To	2,726	120.3 124.9	Jan. 15, 1956 Mar. 24, 1967	T,G	Irr	--	--	--	Cased to 235 ft. Pump set at 190 ft. 1/
302	E. Williams	1955	308	16	To	2,704	223.9	Mar. 24, 1967	T,G	Irr	477	110	--	Cased to 208 ft. Irrigated 80 acres, 1966.
305	Phillips Petroleum Co.	1964	264	7	To	2,690	115	Aug. 1964	N	U	--	--	--	Cased to 231 ft.
306	J. Selby	1963	345	16	To	2,668	82.8	Mar. 24, 1967	T,G	Irr	733	--	--	Cased to 40 ft. Red bed at 345 ft. Irrigates 160 acres.
402	J. Haggard	--	101	5	To	2,732	73.0	Apr. 20, 1967	P,W	S	--	--	--	
* 403	T. Willis	--	Spring	--	To	2,637	+	July 11, 1967	Flows	S	140	--	388	Temp. 63°F.
501	L. Hathaway	1955	458	16	To	2,733	107.1 109.8	July 15, 1955 Mar. 23, 1967	T,G	Irr	277	108	--	Irrigated 180 acres, 1966. Red beds at 430 ft. 1/
502	L. Carwile Ranch	--	101	6	To	2,724	82.0	Apr. 4, 1967	P,W	S	3	--	--	
* 503	do.	--	Spring	--	To	2,630	+	July 11, 1967	Flows	S	† 20	--	370	
606	do.	--	151	6	To	2,758	139.0	Mar. 24, 1967	P,W	S	3	--	400	Temp. 60°F.
* 607	do.	--	178	6	To	2,880	149.9	Apr. 9, 1967	P,W	S	2	--	435	Temp. 65°F.

See footnotes at end of table.

Table 5.--Records of Wells and Springs--Continued

WELL	OWNER	DATE COMPLETED	DEPTH OF WELL (FT)	CASING DIAMETER (IN)	WATER-BEARING UNITS	ALTITUDE OF LAND SURFACE (FT)	WATER LEVEL		METHOD OF LIFT	USE OF WATER	DISCHARGE IN GPM	DRAWDOWN IN FEET	FIELD SPECIFIC CONDUCTANCE (MICROMHOS AT 25°F)	REMARKS
							BELOW LAND SURFACE DATUM (FT)	DATE OF MEASUREMENT						
						Wheeler County								
ZB-05-29-608	L. Carwile Ranch	--	Spring	--	To	2,618	+	July 11, 1967	Flows	S	† 10	--	--	
711	G. Harris	1966 ?	270	16	To	2,690	60.0	Mar. 22, 1967	T,G	Irr	†600	--	--	Cased to 230 ft. Irrigated 80 acres, 1966.
* 712	H.F. Lee	1963	174	14	To	2,632	1.0	do.	T,G	Irr	864	10	392	Cased to 143 ft. Irrigated 80 acres, 1966. Red beds at 180 feet. Temp. 63°F.
713	C. Carter	--	123	7	To	2,742	87.6	Apr. 20, 1967	P,W	S	† 1	--	360	Temp. 65°F.
801	B. Scribner	1955	83	10	To	2,580	17.0 18.9	Jan. 15, 1956 Mar. 21, 1967	T,E	Irr	†250	--	--	Cased to 33 ft. Irrigated about 5 acres, 1966.
* 802	A.G. Caldwell	1953	260	10	To	2,686	75	1953	T,E	P	160	††125	464	Cased to 219 ft. Temp 62°F.
805	V.T. Sims	1965	105	7	To	2,642	37	Sept. 1965	P,E	Ind	† 3	†† 4	--	Casing: 7 inch to 60 feet.
808	G. Harris	1966	111	16	To	2,605	53.6	Mar. 21, 1967	T,G	Irr	†250	--	--	Reportedly drilled to 200 ft. Irrigated 40 acres, 1966.
809	do.	1966	110	6	To	2,579	20.4	do.	S,E	Irr	--	--	--	Manifold system of 6 wells. Total discharge est 250 gpm.
810	do.	1966	110	6	To	2,579	21.2	do.	S,E	Irr	--	--	--	Do.
811	do.	1966	119	6	To	2,579	23.7	do.	S,E	Irr	--	--	--	Do.
812	do.	1966	99	16	To	2,579	24.0	do.	T,G	Irr	--	--	--	Do.
813	do.	1966	111	6	To	2,579	23.4	do.	S,E	Irr	†250	--	--	Do.
814	do.	1966	132	6	To	2,578	20.6	do.	S,E	Irr	†250	--	--	Irrigated 40 acres 1966, from 6-well manifold system.
815	Lee & Pierce	1963	260	16	To	2,672	75.0	Mar. 22, 1967	T,G	Irr	410	44	--	Red bed at 240 ft. Irrigated 120 acres 1966. Cased to 140 ft.
816	Hall Estate	--	Spring	--	To	2,542	+	July 11, 1967	Flows	S	† 6	--	--	
901	W.S. Marsh	--	112	6	To	2,603	96.9	Apr. 20, 1967	P,W	S	--	--	--	
30-101	C.R. Miller	1955	135	14	To	2,618	10	Apr. 1955	T,G	Irr	†400	†† 6	--	Cased to 4 ft. Irrigated 45 acres, 1966.
102	D.V. Smith	1955	204	12	To	2,660	57.8	Mar. 24, 1967	T,G	Irr	†250	--	--	

See footnotes at end of table.

Table 5.--Records of Wells and Springs--Continued

WELL	OWNER	DATE COMPLETED	DEPTH OF WELL (FT)	CASING DIAMETER (IN)	WATER-BEARING UNITS	ALTITUDE OF LAND SURFACE (FT)	WATER LEVEL		METHOD OF LIFT	USE OF WATER	DISCHARGE IN GPM	DRAWDOWN IN FEET	FIELD SPECIFIC CONDUCTANCE (MICROMHOS AT 25°F)	REMARKS
							BELOW LAND SURFACE DATUM (FT)	DATE OF MEASUREMENT						
						Wheeler County								
ZB-05-30-103	G. Dodd	1963	400	16	To	2,655	39.5	Mar. 24, 1967	T,G	Irr	650	10	--	Cased to 160 ft. Irrigated 80 acres, 1966. Red bed at 400 ft. Temp. 63°F.
104	M.P. Allison	--	43	6	To	2,645	27.9	Apr. 5, 1967	P,W	S	--	--	--	
* 201	M. Finsterwald	--	84	5	To	2,613	48.4	do.	P,W	S	† 3	--	449	Temp. 64°F.
202	J.L. Hefley	--	74	5	To	2,641	52.6	do.	P,W	S	--	--	--	
203	do.	--	42	6	To	2,560	20.0	do.	P,W	S	† 3	--	--	
204	J.M. Finsterwald	--	51	5	To	2,622	34.9	Apr. 7, 1967	P,W	S	† 1	--	--	
* 301	J.L. Hefley	--	23	6	Qal_3,To	2,548	18.4	Apr. 5, 1967	P,W	S	† 1	--	372	Temp. 70°F.
* 302	City of Briscoe	1929	300	8	To	2,657	71	Jan. 1929	T,E	P	† 45	--	455	Red bed at 289 ft. Temp. 74°F.
303	T.A. Tredwell	--	103	4	To	2,642	87.7	Apr. 6, 1967	P,W	S	† 2	--	--	
401	M. Finsterwald	--	128	7	To	2,671	54.9	Apr. 4, 1967	P,E	U	--	--	--	Well reportedly drilled to 150 ft.
402	do.	--	100	12	To	2,666	56.6	do.	N	U	--	--	--	
403	do.	1946	378	16	To	2,670	85.7	do.	N	U	--	--	--	Abandoned.
404	W. McCray	1930	112	16	To	2,665	58.6	do.	T,E	Irr	† 98	††106	--	Reportedly drilled to 160 ft. Irrigated 20 acres, 1966.
408	D. Tipps	--	104	4	To	2,708	88.1	Apr. 5, 1967	P,W	S	† 1	--	--	
* 409	C.C. Dyson	1967	385	16	To	2,717	139.4	Apr. 20, 1967	T,G	Irr	450	114	370	Cased to 345 ft. Red bed at 385 ft. Irrigates 40 acres.
410	A. Finsterwald	--	60	4	To	2,598	21.5	Apr. 7, 1967	P,W	S	† 1	--	--	
* 501	O. Horn	--	153	6	To	2,697	97.6 104.0	Jan. 11, 1953 Apr. 6, 1967	P,W	S	† 1	--	273	Temp. 64°F.
502	T. Tredwell	--	90	6	To	2,668	70.6 77.7	Jan. 11, 1953 Apr. 6, 1967	P,W	S	† 1	--	--	1
503	L. Lancaster	--	84	6	To	2,662	41.8	Apr. 7, 1967	P,W	S	† 1	--	--	
504	A. Finsterwald	--	74	6	To	2,635	64.6	do.	P,W	S	† 2	--	--	
505	Texaco Inc.	1966	240	4	To	2,595	49.7	do.	N	U	--	--	--	

See footnotes at end of table.

Table 5.--Records of Wells and Springs--Continued

WELL	OWNER	DATE COMPLETED	DEPTH OF WELL (FT)	CASING DIAMETER (IN)	WATER-BEARING UNITS	ALTITUDE OF LAND SURFACE (FT)	WATER LEVEL		METHOD OF LIFT	USE OF WATER	DISCHARGE IN GPM	DRAWDOWN IN FEET	FIELD SPECIFIC CONDUCTANCE (MICROMHOS AT 25°F)	REMARKS
							BELOW LAND SURFACE DATUM (FT)	DATE OF MEASUREMENT						
						Wheeler County								
ZB-05-30-506	F.A. Cocke	--	142	6	To	2,600	76.9	Apr. 7, 1967	P,W	S	† 1	--	--	
601	A.C. DeSpain	--	55	6	To	2,605	30.7	Apr. 6, 1967	P,W	S	† 2	--	--	
602	do.	--	74	6	To, Qal_3	2,608	60.9	do.	P,W	S	† 1	--	--	
603	D.E. Atherton	--	103	6	To	2,522	85.1	do.	P,W	U	--	--	--	
701	A. Finsterwald	--	111	6	To	2,552	73.8	Apr. 7, 1967	P,W	S	† 2	--	--	
* 702	M. Finsterwald	--	--	3	To	2,502	+ 11.2	do.	Flows	S	3	--	429	Temp. 61°F.
703	A. Finsterwald	--	--	3	To	2,512	+ 14.6	do.	Flows	S	4	--	--	
704	J. Kite	--	70	6	To	2,491	45.4	do.	P,W	S	--	--	--	
705	C. Kelly	--	96	10	Qal_1, To	2,438	3.0	May 3, 1967	T,G	Irr	† 400	--	--	Not used since drilled.
* 706	M. Finsterwald	--	Spring	--	To	2,520	+	July 12, 1967	Flows	S	† 112	--	503	Temp. 75°F. Discharge represents flow of several seeps.
801	J.W. Erickson	--	93	6	To	2,540	63.9 60.9 61.2	July 16, 1958 Mar. 21, 1960 Apr. 6, 1967	P,W	S	--	--	--	
802	R.J. Holt	--	96	6	To	2,496	65.7 64.8	July 16, 1956 Apr. 6, 1967	P,W	S	† 3	--	--	1/
803	W.L. Erwin	--	64	6	To	2,432	41.4	Apr. 7, 1967	P,W	S	† 3	--	--	
804	E. Sorenson	--	40	6	Qal_1	2,417	6.6	do.	P,W	S	† 2	--	--	
* 805	do.	--	20	6	Qal_3, To	2,469	5.6	do.	P,W	S	† 2	--	258	Temp. 62°F.
806	A. Finsterwald	--	111	6	To	2,539	84.1	do.	P,W	S	† 2	--	--	
* 901	F.W. Walker	--	76	6	To	2,473	67.5	Apr. 6, 1967	P,W	S	† 1	--	399	Temp. 63°F.
* 902	J.C. Lunsford	--	Spring	--	To	2,475	+	July 12, 1967	Flows	S	† 144	--	459	Temp. 75°F.
* 31-101	D. Tipps	1967	460	8	To	2,642	73	Apr. 1967	T,G	Irr	412	66	350	Irrigated 60 acres, 1966. Cased to 145 ft. Temp. 63°F.
102	W. Lohberger	--	140	4	To	2,662	128.8	Apr. 11, 1967	P,W	S	2	--	318	
103	E.A. Zyback	--	113	6	To	2,635	92.9	Apr. 13, 1967	P,W	S	2	--	600	
104	do.	--	120	5	To	2,668	88.4	do.	P,W	S	† 1	--	450	

See footnotes at end of table.

Table 5.--Records of Wells and Springs--Continued

WELL	OWNER	DATE COMPLETED	DEPTH OF WELL (FT)	CASING DIAMETER (IN)	WATER-BEARING UNITS	ALTITUDE OF LAND SURFACE (FT)	WATER LEVEL		METHOD OF LIFT	USE OF WATER	DISCHARGE IN GPM	DRAWDOWN IN FEET	FIELD SPECIFIC CONDUCTANCE (MICROMHOS AT 25°F)	REMARKS
							BELOW LAND SURFACE DATUM (FT)	DATE OF MEASUREMENT						
						Wheeler County								
*ZB-05-31-201	C. Helton	--	158	5	To	2,648	111.9 108.9	Jan. 11, 1953 Feb. 1, 1961	P,W	S	2	--	335	Temp. 64°F. 1/
301	B. McCoy	--	220	16	To	2,538	63.2 61.5	Feb. 8, 1952 Jan. 14, 1956	N	U	† 600	--	--	Abandoned. 1/
302	R.D. Bird	--	230	6	To	2,616	114.0	Apr. 13, 1967	P,W	S	1	--	380	Temp. 60°F.
* 303	Roberts & Eddleman	--	103	6	To	2,558	49.9	do.	P,W	S	1	--	350	Temp. 65°F.
304	F. Segert	--	167	5	To	2,612	109.9	do.	P,W	S	2	--	340	Temp. 58°F.
401	C. Zyback	--	96	4	To	2,602	--	--	P,W	D,S	† 2	--	340	Temp. 61°F.
* 402	L. Willis	--	133	4	To	2,608	36.6	Apr. 11, 1967	P,W	S	3	--	318	Temp. 63°F.
403	T.C. Lott	--	--	4	To,Qal_3	2,471	+ 7.9	do.	Flows	S	8	--	345	Flowing core hole. Temp. 60°F.
404	do.	--	107	6	To,Qal_3	2,564	96.2	do.	P,W	S	--	--	--	
405	C.N. Reed	--	20	8	To,Qal_3	2,510	12.8	Apr. 12, 1967	P,W	S	--	--	--	
501	B. McCoy	--	180	16	To	2,500	36.9 36.8	Feb. 8, 1952 Mar. 16, 1960	N	U	† 600	--	--	Abandoned.
502	T.C. Lott	1966	101	7	To	2,543	73.0	Apr. 11, 1967	P,W	S	3	†† 12	380	Temp. 61°F.
503	B. McCoy	--	72	7	To,Qal_3	2,518	53.9	Apr. 12, 1967	P,W	S	2	--	380	Temp. 63°F.
* 504	do.	--	58	5	To	2,539	33.9	Apr. 13, 1967	P,W	S	2	--	400	Temp. 64°F.
601	do.	--	200	16	To	2,512	47.2 41.3	Jan. 1, 1957 Apr. 13, 1967	N	U	--	--	--	Red beds at 200 ft.
* 602	do.	--	80	6	To,Qal_3	2,499	30	June 1961	N	U	- 2	--	--	
603	do.	--	88	4	To,Qal_3	2,535	47.0	Apr. 12, 1967	P,W	S	--	--	--	
604	do.	--	162	6	To	2,574	79.5	Apr. 13, 1967	P,W	S	2	--	365	Temp. 60°F.
605	do.	--	134	6	To	2,548	56.9	do.	P,W	S	2	--	600	Do.
* 606	do.	--	40	5	To,Qal_3	2,483	6.2	do.	P,W	S	† 1	--	340	Do.
701	F.W. Walker	--	87	6	To	2,441	69.0	Apr. 14, 1967	P,W	S	--	--	--	
* 702	do.	--	153	6	To,Qal_3	2,533	108.6	do.	P,W	S	1	--	320	Temp. 60°F.
801	T.C. Lott	--	72	6	To	2,501	59.0	Apr. 11, 1967	P,W	S	--	--	--	

See footnotes at end of table.

Table 5.--Records of Wells and Springs--Continued

WELL	OWNER	DATE COMPLETED	DEPTH OF WELL (FT)	CASING DIAMETER (IN)	WATER-BEARING UNITS	ALTITUDE OF LAND SURFACE (FT)	WATER LEVEL		METHOD OF LIFT	USE OF WATER	DISCHARGE IN GPM	DRAWDOWN IN FEET	FIELD SPECIFIC CONDUCTANCE (MICROMHOS AT 25°F)	REMARKS
							BELOW LAND SURFACE DATUM (FT)	DATE OF MEASUREMENT						
						Wheeler County								
ZB-05-31-802	J.R. Reed	--	115	6	To,Qal_3	2,435	90.5	Apr. 12, 1967	P,W	U	--	--	--	
803	do.	--	106	6	To,Qal_3	2,468	59.5	do.	P,W	S	--	--	--	
* 901	do.	--	73	6	To,Qal_3	2,399	37.0	do.	P,W	S	1	--	425	Temp. 66°F.
902	M.E. Sessions	--	95	5	To,Qal_3	2,472	66.7	do.	P,W	S	--	--	--	
* 903	J.R. Reed	--	Spring	--	Qal_1,To	2,360	+	July 13, 1967	Flows	S	† 50	--	306	Temp. 78°F. Discharge is total of several seeps and springs.
32-101	L. Grayson	1963	335	12	To	2,585	124.7	Apr. 19, 1967	T,G	Irr	†500	--	380	Irrigated 100 acres in 1966. Casing slotted from 185 to 335 ft. Red beds at 320 ft.
* 102	City of Allison	1936	219	5	To	2,611	122.4	Apr. 20, 1967	S,E	P	† 12	--	380	Temp. 63°F.
103	City of Allison well 3	1928	200	4	To	2,614	--	--	P,E	P	† 6	--	390	Do.
104	Allison High School	1928	146	5	To	2,608	97.1	Apr. 20, 1967	S,E	P	† 50	--	380	Cased to 110 ft. Temp. 64°F.
105	--	--	100	7	To	2,569	80.7	do.	P,W	S	2	--	420	Temp. 63°F.
* 201	J.D. Jones	--	208	5	To	2,617	161.8	Apr. 19, 1967	P,W	S	2	--	340	Temp. 60°F.
202	R.C. Curlee	--	166	5	To	2,578	134.2	do.	P,W	S	3	--	400	Do.
301	W.E. Colley	--	174	6	To	2,549	125.0	do.	P,W	S	2	--	420	Do.
* 302	B. Parks	--	123	7	To	2,503	81.7	do.	P,W	S	3	--	430	Temp. 61°F.
401	Britt Ranch	--	54	4	To	2,438	37.0	Apr. 14, 1967	P,W	S	1	--	380	Temp. 66°F.
402	L. Hays	--	131	6	To	2,531	95.3	do.	P,W	S	† 1	--	450	Temp. 62°F.
* 403	E.T. Redford	--	63	4	To	2,440	16.7	Apr. 19, 1967	P,W	S	1	--	340	Temp. 59°F.
501	Britt Ranch	--	134	4	To	2,479	54.0	Apr. 18, 1967	P,W	S	† 1	--	380	Temp. 61°F.
* 502	do.	--	28	7	Qal_3,To	2,401	0.6	do.	P,W	S	2	--	440	Temp. 56°F.
601	J.R. Reed	--	111	4	To	2,488	91.2	do.	P,W	S	† 1	--	460	Temp. 60°F.
* 602	D.B. Kay	--	138	5	To	2,525	104.5	do.	P,W	S	2	--	380	Temp. 62°F.
603	W.S. Kroon	--	164	4	To,Pw	2,524	101.3	do.	P,W	S	1	--	1,000	Temp. 60°F.
604	J.R. Reed	--	62	4	To,Pw	2,453	44.5	do.	P,W	S	1	--	520	Temp. 63°F.

See footnotes at end of table.

Table 5.--Records of Wells and Springs--Continued

WELL	OWNER	DATE COMPLETED	DEPTH OF WELL (FT)	CASING DIAMETER (IN)	WATER-BEARING UNITS	ALTITUDE OF LAND SURFACE (FT)	WATER LEVEL		METHOD OF LIFT	USE OF WATER	DISCHARGE IN GPM	DRAWDOWN IN FEET	FIELD SPECIFIC CONDUCTANCE (MICROMHOS AT 25°F)	REMARKS
							BELOW LAND SURFACE DATUM (FT)	DATE OF MEASUREMENT						
						Wheeler County								
ZB-05-32-605	D. Reed	1966	171	7	To	2,530	133.9	Apr. 18, 1967	P,W	S	--	--	--	
* 701	T.G. Frye	--	Spring	--	To	2,330	+	July 14, 1967	Flows	S	†180	--	382	Temp. 73°F. Discharge is total of 5 springs & seeps.
* 702	Britt Ranch	--	Spring	--	To, Pw	2,270	+	do.	Flows	S	† 90	--	1,310	Temp. 70°F. Discharge is total of several seeps.
* 801	do.	--	39	7	Qal_3, To	2,359	1.8	Apr. 18, 1967	P,W	S	4	1	600	Temp. 58°F.
802	do.	--	123	6	To	2,475	96.9	do.	P,W	S	† 2	--	470	Temp. 61°F.
803	do.	--	70	6	To	2,375	28.2	do.	P,W	S	† 1	--	380	Temp. 60°F.
* 901	C. Meadow	--	84	9	Qal_3, To	2,469	68.7	do.	P,W	S	† 1	--	500	Temp. 61°F.
902	J.R. Reed	--	80	6	Qal_3, To	2,456	65.5	do.	P,W	S	1	--	400	Temp. 63°F.
903	do.	--	91	5	Qal_3, To	2,457	73.9	do.	P,W	S	--	--	--	
* 36-301	I. Huselby	--	135	4	To	2,807	125.9	Apr. 20, 1967	P,W	S	1	--	420	Temp. 66°F.
302	J.E. Allen	--	71	4	To	2,709	60.2	do.	P,W	S	1	--	530	Temp. 67°F.
* 303	M. Arrington	--	95	4	To	2,729	61.3	do.	P,W	S	† 2	--	460	Temp. 64°F.
* 601	I. Huselby	--	156	6	To	2,753	103.4	Apr. 21, 1967	P,W	S	2	--	400	Temp. 63°F.
602	M. Arrington	--	46	7	Pw	2,515	13.6	do.	P,W	S	1	--	650	Temp. 62°F.
603	I. Huselby	--	Spring	--	To	2,548	+	do.	Flows	S	12	--	740	Reported spring was dry in 1967. Temp. 65°F.
901	Kewanee Oil Co.	1960	90	13	Qal_1	2,458	13.0	Jan. 25, 1964	T,E	Ind	†476	†† 9	--	
* 902	M. Arrington	--	80	7	Pw	2,477	23.0	Apr. 21, 1967	P,W	S	3	--	1,600	Temp. 62°F.
* 37-101	W.A. Scribner	1960	120	7	To	2,712	81.2	do.	P,W	S	† 2	--	300	Do.
102	Byers & Hefley	--	74	5	To	2,668	52.0	do.	P,W	S	2	--	400	Temp. 63°F.
* 103	P.P. Cocoran	--	Spring	--	To	2,605	+	July 25, 1967	Flows	S	108	--	511	Discharge is total of several seeps. Temp. 72°F.
205	T. Dunn	--	65	7	To	2,642	41.4	May 1, 1967	P,W	S	3	--	460	Temp. 60°F.
206	G. Harris	1966	47	12	Qal_1, To	2,534	11.5	Mar. 22, 1967	C,G	U	--	--	--	Manifold system of 12 wells: ZB-05-37-206 - ZB-05-37-217; discharge of 8 wells in use 250 gpm. Irrigated 35 acres, 1966. Cased to 12 ft.

See footnotes at end of table.

Table 5.--Records of Wells and Springs--Continued

WELL	OWNER	DATE COMPLETED	DEPTH OF WELL (FT)	CASING DIAMETER (IN)	WATER-BEARING UNITS	ALTITUDE OF LAND SURFACE (FT)	WATER LEVEL		METHOD OF LIFT	USE OF WATER	DISCHARGE IN GPM	DRAWDOWN IN FEET	FIELD SPECIFIC CONDUCTANCE (MICROMHOS AT 25°F)	REMARKS
							BELOW LAND SURFACE DATUM (FT)	DATE OF MEASUREMENT						
						Wheeler County								
ZB-05-37-207	G. Harris	1966	59	6	Qal_1,To	2,534	11.5	Mar. 22, 1967	C,G	U	--	--	--	
208	do.	1966	42	6	Qal_1,To	2,534	11.5	do.	C,G	U	--	--	--	
209	do.	1966	45	6	Qal_1,To	2,534	11.5	do.	C,G	U	--	--	--	
210	do.	1966	44	6	Qal_1,To	2,533	10.2	do.	C,G	Irr	--	--	--	
211	do.	1966	50	6	Qal_1,To	2,533	10.0	do.	C,G	Irr	--	--	--	
212	do.	1966	47	6	Qal_1,To	2,533	10.0	do.	C,G	Irr	250	--	--	
213	do.	1966	46	6	Qal_1,To	2,532	9.4	do.	C,G	Irr	250	--	--	
214	do.	1966	47	6	Qal_1,To	2,532	9.9	do.	C,G	Irr	250	--	--	
215	do.	1966	43	6	Qal_1,To	2,530	8.4	do.	C,G	Irr	250	--	--	
216	do.	1966	45	6	Qal_1,To	2,530	8.6	do.	C,G	Irr	250	--	--	
217	do.	1966	40	6	Qal_1,To	2,529	8.0	do.	C,G	Irr	250	--	--	
* 218	E.R. Duncan	--	144	4	To	2,665	102.2	May 1, 1967	P,W	S	1	--	400	Temp. 61°F.
219	J. Dunn	1967	48	6	Qal_1,To	2,586	6.9	Mar. 23, 1967	C,G	Irr	--	--	--	Manifold system of 6 wells: ZB-05-37-219 to 05-37-224. Total discharge estimates 384 gpm.
220	do.	1967	53	6	Qal_1,To	2,585	6.4	do.	G	Irr	--	--	--	Cased to 12 ft.
221	do.	1967	55	6	Qal_1,To	2,585	6.0	do.	G	Irr	--	--	--	
222	do.	1967	56	6	Qal_1,To	2,585	6.2	do.	G	Irr	384	--	480	
223	do.	1967	54	6	Qal_1,To	2,585	6.1	do.	G	Irr	--	--	--	
224	do.	1967	59	6	Qal_1,To	2,585	5.9	do.	G	Irr	--	--	--	
225	G. Harris	1966	60	6	Qal_1,To	2,541	--	Mar. 22, 1967	S,E	U	--	--	--	Manifold system of 8 wells: ZB-05-37-225 to 05-37-232, 3 of which are unused. Discharge of 5 wells 300 gpm.
226	do.	1966	60	6	Qal_1,To	2,540	--	--	S,E	U	--	--	--	
227	do.	1966	54	6	Qal_1,To	2,538	12.8	Mar. 22, 1967	S,E	U	--	--	--	
228	do.	1966	60	6	Qal_1,To	2,537	--	--	S,E	Irr	--	--	--	

See footnotes at end of table.

Table 5.--Records of Wells and Springs--Continued

WELL	OWNER	DATE COMPLETED	DEPTH OF WELL (FT)	CASING DIAMETER (IN)	WATER-BEARING UNITS	ALTITUDE OF LAND SURFACE (FT)	WATER LEVEL		METHOD OF LIFT	USE OF WATER	DISCHARGE IN GPM	DRAWDOWN IN FEET	FIELD SPECIFIC CONDUCTANCE (MICROMHOS AT 25°F)	REMARKS
							BELOW LAND SURFACE DATUM (FT)	DATE OF MEASUREMENT						
						Wheeler County								
ZB-05-37-229	G. Harris	1966	60	6	Qal_1,To	2,537	--	--	S,E	Irr	--	--	--	
230	do.	1966	60	6	Qal_1,To	2,536	--	--	S,E	Irr	--	--	40	Cased to 12 ft.
231	do.	1966	60	6	Qal_1,To	2,536	--	--	S,E	Irr	--	--	--	Do.
232	do.	1966	60	6	Qal_1,To	2,536	--	--	S,E	Irr	--	--	--	Do.
301	do.	1966	55	16	Qal_1,To	2,520	4.7	Mar. 22, 1967	T,G	Irr	†425	--	--	Originally reported depth-61 ft. Cased to 49 ft. Irrigates approximately 40 acres.
302	E. Gordon	1966	53	6	Qal_1,To	2,517	8.2	Mar. 23, 1967	C,G	Irr	†450	--	--	Manifold system of 6 wells: ZB-05-37-302 to 05-37-307. Wells pumped a total of 450 gpm on 25 acres, 1966.
303	do.	1966	53	6	Qal_1,To	2,517	8.3	do.	C,G	Irr	--	--	--	Cased to 12 ft.
304	do.	1966	43	6	Qal_1,To	2,517	8.2	do.	C,G	Irr	--	--	--	Do.
305	do.	1966	44	6	Qal_1,To	2,517	8.3	do.	C,G	Irr	--	--	††550	Cased to 12 ft. Irrigates approximately 25 acres.
306	do.	1966	54	6	Qal_1,To	2,517	8.3	do.	C,G	Irr	--	--	--	Do.
307	do.	1966	51	6	Qal_1,To	2,517	8.3	do.	C,G	Irr	--	--	--	Do.
308	C.J. Van Zandt	1966	47	6	Qal_1,To	2,500	8.2	May 2, 1967	P,W	S	--	--	--	
* 309	M.D. Border	--	90	4	To	2,635	74.9	do.	S,E	D	† 5	--	480	Temp. 64°F.
310	S. Petitt	--	140	4	To	2,666	109.5	do.	P,W	S	--	--	--	
* 401	C.M. Webb	--	42	4	To	2,635	34.3	Apr. 21, 1967	P,W	S	2	--	410	Temp. 64°F.
* 402	J.D. Johnson	--	Spring	--	To	2,530	+	May 1, 1967	Flows	S	150	--	440	Temp. 66°F. Discharge is total of 5 springs & seeps.
501	P. Cocoran	--	62	7	To	2,648	52.7	do.	P,W	S	3	--	520	Temp. 61°F.
502	do.	--	86	7	To	2,617	68.0	do.	P,W	S	2	--	420	Do.
503	S.E. Thomas	--	115	7	To	2,625	32.6	do.	P,W	S	--	--	--	
* 504	J.D. Johnson	--	83	5	To	2,591	62.0	do.	P,W	S	3	--	360	Temp. 60°F.
601	do.	--	62	4	Pw	2,538	60.5	do.	P,W	D	† 2	--	1,200	Temp. 64°F.
602	W.J. Price	--	79	7	To	2,546	56.7	May 2, 1967	P,W	S	2	--	480	Temp. 62°F.

See footnotes at end of table.

Table 5.--Records of Wells and Springs--Continued

WELL	OWNER	DATE COMPLETED	DEPTH OF WELL (FT)	CASING DIAMETER (IN)	WATER-BEARING UNITS	ALTITUDE OF LAND SURFACE (FT)	WATER LEVEL		METHOD OF LIFT	USE OF WATER	DISCHARGE IN GPM	DRAWDOWN IN FEET	FIELD SPECIFIC CONDUCTANCE (MICROMHOS AT 25°F)	REMARKS
							BELOW LAND SURFACE DATUM (FT)	DATE OF MEASUREMENT						
						Wheeler County								
*ZB-05-37-603	G. Porter	1964	146	14	To	2,459	18.5	May 8, 1967	T,G	Irr	†350	--	499	Cased to 40 ft. Drilled to red beds. Temp. 62°F.
701	J.D. Johnson	--	69	4	Pw	2,503	45.7	Apr. 21, 1967	P,W	S	1	--	2,800	Temp. 64°F.
* 702	do.	--	41	5	Pw	2,462	32.9	May 1, 1967	P,W	S	1	--	2,800	Temp. 61°F.
703	J. Perkins	--	75	7	To, Pw	2,491	60.8	May 2, 1967	N	U	--	--	--	
* 801	J.D. Johnson	--	80	4	Pw	2,472	42.7	May 1, 1967	P,W	S	1	--	2,600	Temp. 62°F.
802	R.W. Adams	--	15	7	Qal_1, Qal_3	2,366	1.9	May 2, 1967	P,W	S	3	--	600	Temp. 58°F.
803	W.K. Davis	--	61	7	Qal_1, To	2,439	45.8	do.	P,W	S	† 3	--	750	Temp. 60°F.
901	G. Porter	--	20	5	To, Pw	2,405	6.3	do.	P,W	S	1	--	650	Temp. 64°F.
* 902	do.	--	41	5	Pw	2,350	7.9	do.	P,W	S	2	--	2,700	Temp. 62°F.
903	A.C. Reeves	--	200	7	Pw, Pdb	2,369	+ 3.3	do.	Flows	U	† 20	--	--	Old core hole.
904	do.	--	200	7	Pw, Pdb	2,369	+ 2.8	do.	Flows	U	† 20	--	3,000	Temp. 64°F.
905	do.	--	30	7	Qal_1, Pw	2,372	20.2	do.	P,W	S	1	--	1,230	Temp. 64°F.
38-102	C. Kelly	1951	140	12	Qal_1, To	2,450	1.9 1.6	Jan. 15, 1956 May 3, 1967	C,G	Irr	†150	†† 20	480	Cased to 30 ft. Irrigated 10 acres, 1966. Red bed at 140 ft. Temp. 62°F.
103	R. Hogan	1955	212	16	To	2,592	85.1 85.4	July 15, 1955 May 4, 1967	T,G	Irr	600	--	600	Cased to 112 ft. Irrigated 120 acres, 1966. Temp. 66°F.
105	H & H Milling Co.	1965	160	7	To	2,612	94.5	May 4, 1967	S,E	Ind	† 30	--	360	Cased to 150 ft. Temp. 60°F.
* 106	H. Wofford	--	248	7	To	2,622	131.3	May 3, 1967	P,W	S	† 2	--	540	Temp. 63°F.
107	J.H. Gordon	--	95	6	To	2,565	72.7	do.	P,W	S	--	--	--	
205	Red Estate	1966	118	7	To	2,487	--	--	P,W	S	† 2	--	520	Cased to 110 ft. Temp. 62°F.
206	H. Hall	1965	85	7	To	2,543	58.2	May 3, 1967	S,E	S	† 15	†† 17	520	Casing slotted 75 to 85 ft. Temp. 62°F.
* 207	R. Bradstreet	1955	59	5	To	2,490	50.9	do.	J,E	S,D	† 3	--	625	
208	A.T. Markham	--	38	7	To	2,518	33.8	do.	P,W	S	1	--	480	Temp. 64°F.

See footnotes at end of table.

Table 5.--Records of Wells and Springs--Continued

WELL	OWNER	DATE COMPLETED	DEPTH OF WELL (FT)	CASING DIAMETER (IN)	WATER-BEARING UNITS	ALTITUDE OF LAND SURFACE (FT)	WATER LEVEL		METHOD OF LIFT	USE OF WATER	DISCHARGE IN GPM	DRAWDOWN IN FEET	FIELD SPECIFIC CONDUCTANCE (MICROMHOS AT 25°F)	REMARKS
							BELOW LAND SURFACE DATUM (FT)	DATE OF MEASUREMENT						
Wheeler County														
ZB-05-38-301	L.H. Sims	1953	57	13	To	2,403	--	--	N	U	--	--	--	Cased to 27 ft. Red beds at 52 ft.
302	do.	--	36	5	To	2,400	18.3	May 3, 1967	N	U	--	--	--	
* 303	O. Reid	--	13	5	To	2,390	5.3	do.	P,W	S	† 7	--	556	Temp. 67°F.
304	R.L. McLain	--	85	6	To	2,490	66.2	do.	P,W	S	--	--	--	
* 405	L. Lamb	1965	160	13	To	2,580	52.4	May 4, 1967	T,G	Irr	†600	†† 50	480	Cased to 140 ft. Irrigated 120 acres 1966. Temp. 64°F.
406	--Farmer	1961	180	16	To	2,608	76.9	do.	T,G	Irr	†400	--	--	Cased to 80 ft. Irrigated 40 acres, 1966.
407	G. Porter	--	54	6	To,Pw	2,502	29.4	do.	P,W	S	--	--	--	
501	City of Wheeler	--	125	16	To	2,510	--	--	T,E	P	†200	--	520	Temp. 61°F. Red bed at 125 ft.
502	do.	1959	80	14	To	2,510	80	1959	T,E	P	†100	--	--	Cased to 40 ft. Originally drilled to red bed, 150 ft. Pump set at 80 ft.
503	J. Hodges	--	150	--	To	--	--	--	--	U	--	--	--	Destroyed.
* 504	City of Wheeler	1962	125	16	To	2,510	7.7	May 4, 1967	T,E	P	†275	15	520	Cased to 90 ft. Red beds at 125 ft. Temp. 62°F.
505	do.	--	79	7	To	2,515	25.1	do.	N	U	--	--	--	
506	E.M. Moore	1961	140	12	To	2,553	34	May 1967	T,G	Irr	†700	--	--	Cased to 65 ft. Red bed at 140 ft.
507	E. Howard	--	115	6	To	2,600	76.0	May 4, 1967	P,W	S	1	--	520	Irrigates about 160 acres.
508	E.M. Moore	1963	130	14	To	2,589	50	1963	T,G	Irr	†650	--	500	Cased to 75 ft. Irrigates about 160 ac. Temp. 66°F.
* 509	4-J Ranch	--	Spring	--	To	2,480	+	July 16, 1967	Flows	S,Irr	† 34	--	477	Temp. 78°F.
* 601	City of Wheeler	1939	125	10	To	2,510	--	--	T,E	P	†200	--	480	Temp. 60°F.
602	B. Taylor	1945	95	10	Pw	2,453	11.5 20.8	July 12, 1955 May 3, 1967	T,G	Irr	111	†† 70	2,100	Casing slotted 55 to 95 ft. Irrigated 12 acres, 1966. Temp. 63°F. 1/
605	B. Hardcastle	1966	72	7	To	2,558	34.2	May 5, 1967	P,W	S	1	--	340	
606	C. Brotherton	--	94	7	To	2,521	47.8	May 8, 1967	P,W	S	2	†† 5	550	Temp. 68°F.

See footnotes at end of table.

Table 5.--Records of Wells and Springs--Continued

WELL	OWNER	DATE COMPLETED	DEPTH OF WELL (FT)	CASING DIAMETER (IN)	WATER-BEARING UNITS	ALTITUDE OF LAND SURFACE (FT)	WATER LEVEL		METHOD OF LIFT	USE OF WATER	DISCHARGE IN GPM	DRAWDOWN IN FEET	FIELD SPECIFIC CONDUCTANCE (MICROMHOS AT 25°F)	REMARKS
							BELOW LAND SURFACE DATUM (FT)	DATE OF MEASUREMENT						
						Wheeler County								
*ZB-05-38-607	Murray Gin Co.	--	95	7	To,Pw	2,512	45.8	May 8, 1967	S,E	Ind	† 50	--	650	Temp. 64°F.
* 608	O. Nations	--	Spring	--	To,Pw	2,438	+	July 26, 1967	Flows	S,R	†188	--	866	Temp. 77°F.
* 701	D.H. Porter	--	25	4	Qal_1,Pw	2,368	16.3	May 4, 1967	P,W	S	1	--	650	Temp. 59°F.
702	G.W. Porter	--	45	6	Pw	2,469	26.2	do.	P,W	S	1	--	650	Temp. 60°F.
801	City of Shamrock	1954	170	13	To	2,635	118.2 126.6	Jan. 14, 1956 May 5, 1967	N	U	--	--	--	Cased to 121 ft. 1/
802	do.	1954	138	13	To	2,613	86.9 90.2	Jan. 14, 1956 May 5, 1967	T,E	P	†300	†† 35	--	Cased to 93 ft. 1/
803	do.	1954	128	13	To	2,604	95.4 98.6	Jan. 19, 1956 May 5, 1967	T,E	P	†250	†† 29	420	Cased to 82 ft. 1/ Temp. 63°F.
* 804	do.	1954	134	13	To	2,603	73.5 85.2	Jan. 11, 1955 May 5, 1967	T,E	P	†250	†† 46	431	Cased to 85 ft. 1/ Temp. 64°F.
805	P. Millet & G. Porter	--	44	7	Qal_1	2,440	14.5	May 5, 1967	S,E	D	† 10	--	625	Temp. 60°F. Red bed at 35 ft.
901	City of Shamrock	1954	84	13	To	2,539	20.6 29.9	Jan. 12, 1954 Feb. 14, 1961	T,E	P	†230	†† 29	380	Casing slotted from 31 to 61 ft. Red beds at 61 ft. Temp. 63°F. 1/
902	do.	1954	134	13	To	2,609	89.8 87.3	Jan. 19, 1957 May 5, 1967	T,E	P	†200	†† 35	--	Casing slotted from 96-135 ft. Red bed at 129 ft. 1/
903	do.	1954	187	13	To	2,649	108	--	T,E	P	†300	†† 34	360	Casing slotted 115-180 ft. Red bed at 180 ft. Temp. 60°F.
904	V. Smith	1966	65	7	To	2,569	50	1966	S,E	Ind	† 15	†† 6	--	
* 906	W.E. Bowen	--	34	7	Qal_3,Pw	2,380	17.4	May 5, 1967	P,W	S	1	--	600	Temp. 62°F.
907	A.M. Galmon	--	85	6	To	2,578	53.4	do.	P,W	S	† 2	--	--	
* 39-101	G.A. Weens	--	53	7	To	2,400	43.2	May 9, 1967	P,W	S	† 2	--	592	Temp. 63°F.
102	J.H. Close	--	87	7	To	2,401	38.7	do.	P,W	S	3	--	380	Temp. 64°F.
103	C.J. Hess	--	12	4	Qal_1	2,318	9.5	do.	N	U	--	--	--	
104	C.L. Moore	--	49	7	Pw	2,401	29.7	do.	P,W	S	2	--	1,100	Temp. 64°F.
* 201	H. Hunter	1954	44	12	Qal_1	2,279	8.9 6.9	Jan. 15, 1956 May 9, 1967	T,E	Irr	†160	--	650	Irrigated 19 acres, 1966. Casing slotted 29-44 ft. Red bed at 44 ft. 1/

See footnotes at end of table.

Table 5.--Records of Wells and Springs--Continued

WELL	OWNER	DATE COMPLETED	DEPTH OF WELL (FT)	CASING DIAMETER (IN)	WATER-BEARING UNITS	ALTITUDE OF LAND SURFACE (FT)	WATER LEVEL		METHOD OF LIFT	USE OF WATER	DISCHARGE IN GPM	DRAWDOWN IN FEET	FIELD SPECIFIC CONDUCTANCE (MICROMHOS AT 25°F)	REMARKS
							BELOW LAND SURFACE DATUM (FT)	DATE OF MEASUREMENT						
						Wheeler County								
*ZB-05-39-203	G.L. Moore	--	23	7	Qal_1, Pw	2,310	9.8	Jan. 15, 1956 May 9, 1967	P,W	S	† 3	--	2,050	Temp. 64°F.
301	H. Hunter	1954	44	6	Qal_1	2,279	9.8 4.5	July 21, 1955 Feb. 3, 1961	N	U	--	--	--	Cased to 24 ft. 1/
302	H. Young	--	61	7	To, Pw	2,353	57.5	May 9, 1967	P,W	S	4	--	640	Temp. 65°F.
* 406	S.D. Conwell	--	69	5	Pw	2,440	40.2	do.	P,W	S	2	--	2,200	Temp. 64°F.
* 407	E. Herd	--	Spring	--	To, Pw	2,450	+	July 27, 1967	Flows	S	† 18	--	1,020	Temp. 72°F.
501	H.T. Frye	--	62	5	Pw	2,378	38.1	May 9, 1967	P,W	S	2	--	2,500	Temp. 65°F.
* 502	T. Young	--	35	10	To, Pw	2,445	11.7	May 10, 1967	P,W	S	1	--	725	Temp. 66°F.
503	J.D. Heard	--	50	--	To, Pw	2,502	37.0	do.	P,W	S	2	--	650	Temp. 65°F.
601	J. Montgomery	--	48	7	To, Pw	2,381	41.5	May 9, 1967	P,W	S	3	--	600	Red bed at 47 ft. Temp. 64°F.
602	V. Simmons	1949	28	4	To, Pw	2,412	3	1949	C,G	Irr	†200	--	--	Manifold system of 8 wells. All wells drilled to same depth. Total discharge reportedly 200 gpm. Irrigated 50 acres, 1966 from system. Cased to 16 feet.
603	R.H. Lacy	--	Spring	--	To, Pw	2,400	+	May 10, 1967	Flows	S	† 25	--	600	Temp. 69°F.
* 604	J. Moore	1959	66	7	To	2,451	43.2	do.	P,W	S	3	--	280	Temp. 64°F.
701	City of Shamrock	1928	50	18	To	2,505	26.5 25.4	Dec. 13, 1946 May 9, 1967	T,E	U	†175	--	--	1/
702	do.	1928	36	18	To	2,499	22.8 18.8	Dec. 13, 1946 May 9, 1967	T,E	P	†175	--	360	Temp. 64°F. 1/
703	do.	1928	48	18	To	2,509	32.1 28.5	Dec. 13, 1946 May 9, 1967	T,E	P	†250	†† 5	--	1/
* 704	do.	1928	66	18	To	2,518	34.9 35.9	Dec. 14, 1946 May 9, 1967	T,E	P	†250	†† 11	366	Temp. 62°F. 1/
705	do.	1928	73	18	To	2,522	42.8 42.1	Dec. 14, 1946 May 9, 1967	N	U	--	††250	--	1/
706	do.	1947	118	19	To	2,550	66.8 66.2	Feb. 8, 1952 May 8, 1967	T,E	P	†300	†† 35	--	Red bed at 113 ft. 1/

See footnotes at end of table.

Table 5.--Records of Wells and Springs--Continued

WELL	OWNER	DATE COMPLETED	DEPTH OF WELL (FT)	CASING DIAMETER (IN)	WATER-BEARING UNITS	ALTITUDE OF LAND SURFACE (FT)	WATER LEVEL		METHOD OF LIFT	USE OF WATER	DISCHARGE IN GPM	DRAWDOWN IN FEET	FIELD SPECIFIC CONDUCTANCE (MICROMHOS AT 25°F)	REMARKS
							BELOW LAND SURFACE DATUM (FT)	DATE OF MEASUREMENT						
Wheeler County														
ZB-05-39-707	City of Shamrock	1947	136	18	To	2,572	85.7 88.6	Feb. 22, 1951 May 8, 1967	T,E	P	†300	†† 36	--	Casing slotted 98-127 ft. Red bed at 132 ft. 1/
708	M.L. Bonner	--	50	6	To	2,522	46.1	May 9, 1967	P,W	S	1	--	280	Temp. 64°F.
709	Johnson Ranch	--	39	5	To	2,504	37.5	May 10, 1967	P,W	S	2	--	400	Temp. 63°F.
710	C. & G. Newman	--	68	7	Pw	2,377	35.1	May 11, 1967	P,W	S	† 5	--	1,600	Temp. 64°F.
801	F.H. Davidson	--	38	5	To,Pw	2,422	7.3	May 10, 1967	P,W	S	2	--	580	Temp. 62°F.
802	L.W. Newkirk	--	50	7	To	2,487	40.1	do.	P,W	S	--	--	--	
* 803	W.T. McCarty	--	65	6	Pw	2,370	35.4	do.	P,W	S	2	--	1,900	Temp. 66°F.
* 901	B.T. Clemens	--	58	--	Pw	2,323	35.1	do.	P,W	S	2	--	700	Temp. 64°F.
902	J.B. Calcote	--	43	7	Pw	2,347	10.9	do.	N	U	--	--	--	
903	V. Simmons	--	63	5	Pw	2,480	57.5	do.	P,W	S	2	--	825	Temp. 65°F.
* 904	R. Moore	1966	110	12	Pw	2,255	5	1966	T,G	Irr	†350	--	2,200	Casing slotted 40-110 ft. Irrigated 80 acres, 1966. Temp. 64°F.
40-101	Britt Ranch	--	71	7	Pw	2,257	21.5	May 11, 1967	P,W	S	5	--	2,500	Temp. 64°F.
* 102	do.	--	53	6	Qal_1, Pw	2,249	24.1	do.	S,E	D	† 25	--	975	Do.
* 201	Stiles Ranch	--	29	5	To	2,282	13.8	do.	P,W	S	3	--	550	Temp. 62°F.
202	do.	--	33	7	Pw	2,204	10.4	do.	P,W	S	2	--	1,200	Do.
* 203	do.	--	23	7	Pw	2,188	6.6	May 12, 1967	--	S	1	--	2,300	Temp. 61°F.
301	L.M. Taylor	--	152	6	Pw	2,302	53.8	May 11, 1967	P,W	S	3	--	1,650	Temp. 64°F.
302	J.R. Reed	--	104	10	To,Pw	2,369	53.1	do.	P,W	S	2	--	900	Temp. 67°F.
* 303	O.K. Henson	--	49	5	Pw	2,299	21.8	do.	P,W	S	2	--	625	Temp. 63°F.
304	T.L. Ladd	--	48	6	To,Pw	2,378	41.6	do.	P,W	S	1	--	550	Temp. 74°F.
305	E.F. Armstrong	--	59	5	Pw	2,231	38.2	do.	P,W	S	1	--	2,600	Temp. 63°F.
401	J.F. Rothjen	--	138	4	Pw	2,339	86.3	do.	P,W	D,S	2	--	800	Temp. 62°F.
402	Irven Hink	--	75	5	Pw	2,291	42.2	May 12, 1967	P,W	S	2	--	2,000	Temp. 61°F.
* 403	Stiles Ranch	--	113	7	Pw	2,261	27.6	do.	P,W	S	5	--	1,800	Temp. 59°F.

See footnotes at end of table.

Table 5.--Records of Wells and Springs--Continued

WELL	OWNER	DATE COMPLETED	DEPTH OF WELL (FT)	CASING DIAMETER (IN)	WATER-BEARING UNITS	ALTITUDE OF LAND SURFACE (FT)	WATER LEVEL		METHOD OF LIFT	USE OF WATER	DISCHARGE IN GPM	DRAWDOWN IN FEET	FIELD SPECIFIC CONDUCTANCE (MICROMHOS AT 25°F)	REMARKS
							BELOW LAND SURFACE DATUM (FT)	DATE OF MEASUREMENT						
						Wheeler County								
ZB-05-40-404	Stiles Ranch	--	92	5	Qal_3,To	2,274	72.2	May 12, 1967	P,W	S	2	--	500	Temp. 61°F.
505	do.	1965	88	7	Pw	2,220	53.1	do.	P,W	S	3	--	700	Red bed at 24 ft. Temp. 63°F.
506	do.	--	85	6	To,Pw	2,236	59.0	do.	P,W	S	4	--	600	Temp. 61°F.
* 507	Davis Ranch	--	140	6	To,Pw	2,265	89.3	May 16, 1967	P,W	S	2	--	460	Temp. 65°F.
508	N.D. Bartlett	--	59	4	Pw	2,217	16.5	do.	P,W	S	1	--	1,700	Temp. 70°F.
601	E. Miller	--	39	5	Pw	2,195	23.3	May 11, 1967	P,W	S	1	--	1,750	Temp. 62°F.
602	T.A. Treadwell	--	67	6	To	2,210	49.6	do.	P,W	S	2	--	440	Temp. 60°F.
* 603	D.E. Atherton	1967	103	14	Qal_1	2,168	6.0	May 12, 1967	T,G	Irr	621	†† 97	1,200	Cased to 75 ft. Irrigated 50 acres, 1966. Temp. 62°F.
604	do.	1966	90	12	Qal	2,160	11.8	do.	T,G	Irr	†250	70	--	Irrigated 35 acres, 1966. Red bed at 90 ft. Cased to 20 ft.
605	L.L. Hagerman	1960	210	12	Pw	2,203	53.0	May 15, 1967	T,G	Irr	†100	--	--	Irrigated 20 acres, 1966.
705	H. Hink	1965	52	7	Pw	2,277	20	1965	P,W	S	† 2	†† 12	--	
706	A. Burrell	1965	100	10	Pw	2,280	22.1	May 12, 1967	T,G	Irr	†420	--	--	Irrigated 60 acres, 1966.
707	C. Killingsworth	--	39	5	Pw	2,240	28.1	May 15, 1967	P,W	S	1	--	1,300	Temp. 65°F.
708	R. Moore	1966	160	12	Pw	2,259	18.1	May 16, 1967	T,G	Irr	†350	--	--	Cased to 40 ft. Irrigated 70 acres, 1966.
709	--Henderson	--	48	7	Pw	2,233	22.0	do.	P,W	S	† 2	--	2,000	Temp. 65°F.
* 710	R. Seeds	--	Spring	--	Pw	2,215	+	July 27, 1967	Flows	S	628	--	2,810	
801	M.H. Bryant	--	35	12	Pw	2,142	19.8	May 15, 1967	J,E	D,S	25	--	2,100	Temp. 64°F.
* 802	do.	--	Spring	--	Pw	2,117	+	do.	Flows	D	225	--	2,200	Temp. 69°F.
803	O.O. Dale	--	58	7	Pw	2,172	9.3	do.	P,W	S	--	--	--	
* 901	G.J. McHugh	--	44	7	Pw	2,160	22.0	do.	P,W	S	2	--	570	Temp. 66°F.
902	R. Moore	--	122	4	Pw	2,217	74.3	do.	P,W	S	--	--	--	
* 44-301	J.S. Carwile	--	96	4	Pw	2,551	60.3	May 16, 1967	P,W	S	2	--	500	Temp. 70°F.
302	R.L. Harlan	--	49	4	To	2,597	35.0	do.	P,W	S	1	--	520	Temp. 74°F.

See footnotes at end of table.

Table 5.--Records of Wells and Springs--Continued

WELL	OWNER	DATE COMPLETED	DEPTH OF WELL (FT)	CASING DIAMETER (IN)	WATER-BEARING UNITS	ALTITUDE OF LAND SURFACE (FT)	WATER LEVEL		METHOD OF LIFT	USE OF WATER	DISCHARGE IN GPM	DRAWDOWN IN FEET	FIELD SPECIFIC CONDUCTANCE (MICROMHOS AT 25°F)	REMARKS
							BELOW LAND SURFACE DATUM (FT)	DATE OF MEASUREMENT						
Wheeler County														
ZB-05-44-605	M. Crockett	1966	195	16	To	2,758	127.1	May 17, 1967	T,G	Irr	550	--	440	Temp. 66°F.
* 606	W.F. Burdine & Carwile	--	128	4	To	2,732	116.2	May 16, 1967	S,E	S	3	--	380	Temp. 65°F.
607	R.A. Massey	--	67	4	To	2,640	25.4	do.	P,W	S	--	--	--	
608	R.W. Bailey	--	228	6	To	2,860	202.0	May 17, 1967	P,W	S	1	--	600	Temp. 61°F.
901	City of Shamrock	1959	181	12	To	2,726	67	May 1967	T,E	P	† 250	--	560	Temp. 64°F.
* 902	do.	1959	195	12	To	2,725	59.7	May 17, 1967	T,E	P	† 220	†† 40	--	Red bed at 180 ft.
903	do.	1959	190	12	To	2,748	91.9	do.	T,E	P	† 200	--	--	
* 904	do.	1959	200	12	To	2,749	80	May 1967	T,E	P	† 275	35	520	Temp. 64°F.
905	O.N. Elliot	--	137	4	To	2,755	115.4	May 16, 1967	P,W	S	1	--	470	Temp. 63°F.
45-101	Warren & Gulf Oil Co.	1947	110	10	To,Pw	2,530	8.7	May 18, 1967	N	U	--	--	--	Red bed at 92 ft.
102	do.	1946	135	10	To,Pw	2,530	8.7	do.	N	U	† 100	--	--	Water reported salty; used as a standby well for fire protection.
* 103	do.	1955	71	13	To	2,535	16.0	do.	T,G	Ind	† 75	†† 50	510	Cased to 36 ft. Red bed at 68 ft. Temp. 60°F.
104	do.	1959	68	13	To	2,565	34	--	T,E	Ind	† 50	--	420	Cased to 34 ft. Red bed at 62 ft. Temp. 62°F.
105	do.	1935	90	7	To,Pw	2,560	27.9	May 18, 1967	S,E	Ind	† 55	†† 25	540	Pumped 54.5 million gallons in 1966 from 4 wells. Reported conductance changes when well pumped hard.
201	J.J. Perkins	--	69	7	To	2,482	33.2	do.	P,W	S	2	--	500	Temp. 67°F.
* 202	J. Brown	1933	150	7	Pw	2,537	110.7	do.	P,W	S	3	--	1,400	Test well.
203	G.W. Williams	--	Spring	--	To	2,550	+	do.	Flows	S	† 5	--	380	Temp. 72°F.
301	J.S. Ryan	--	28	7	Qal_1	2,414	21.6	May 19, 1967	P,W	S	2	--	1,850	Temp. 63°F.
302	W.E. Bentley	--	138	4	Pw	2,402	88.5	do.	P,W	S	† 4	--	6,500	Temp. 66°F.
303	G. Martin	--	300	4	To	2,535	82.4	do.	P,W	S	4	--	550	Temp. 63°F.
* 304	W.E. Bentley	--	43	8	Qal_1	2,345	12.4	May 23, 1967	J,E	D	† 10	--	1,070	Temp. 64°F.

See footnotes at end of table.

Table 5.--Records of Wells and Springs--Continued

WELL	OWNER	DATE COMPLETED	DEPTH OF WELL (FT)	CASING DIAMETER (IN)	WATER-BEARING UNITS	ALTITUDE OF LAND SURFACE (FT)	WATER LEVEL: BELOW LAND SURFACE DATUM (FT)	WATER LEVEL: DATE OF MEASUREMENT	METHOD OF LIFT	USE OF WATER	DISCHARGE IN GPM	DRAWDOWN IN FEET	FIELD SPECIFIC CONDUCTANCE (MICROMHOS AT 25°F)	REMARKS
						Wheeler County								
ZB-05-45-406	B.C. Holwick & E.R. Ware	1963	200	13	To	2,732	122.7	May 17, 1967	T,G	Irr	† 200	†† 77	440	Irrigated 23 acres, 1966. Well usually pumped at 185 gpm. Temp. 64°F.
* 407	E.R. Ware	1963	88	4	To	2,641	53.9	do.	P,W	S	3	--	380	Temp. 63°F.
* 501	J. Morris	--	91	6	To	2,621	68.6	May 18, 1967	P,W	S	2	--	420	Do.
* 502	E.P. Cadra	--	156	6	To	2,712	110.6	do.	P,W	S	1	--	450	Temp. 66°F.
503	A.W. Williams	--	111	7	To	2,654	81.6	do.	S,E	S	† 5	--	450	Do.
* 601	J. Mertel	1927	78	4	To	2,609	65.4	do.	P,W	S	1	--	540	Do.
602	do.	--	88	7	To	2,632	65.7	do.	P,W	S	--	--	--	
603	T.R. Cole	--	88	4	To	2,523	62.8	May 19, 1967	P,W	S	4	--	600	Temp. 65°F.
604	C. Turney	--	28	7	Pw	2,450	4.6	do.	P,W	S	--	--	850	Temp. 63°F.
701	G. Orrick	1967	16	52	To	2,655	13.5	May 17, 1967	N	U	--	--	430	Temp. 65°F.
* 702	O.O. Tate	1956	120	12	To,Pw	2,715	75	May 1967	S,E	Irr	† 150	15	750	Cased to 70 ft. Irrigated 25 acres, 1966. Temp. 65°F.
703	do.	1954	100	8	To,Pw	2,715	75	do.	S,E	Irr	† 45	†† 20	--	Cased to 87 ft.
704	R. Lane	1966	100	16	To,Pw	2,628	15	do.	T,G	Irr	† 300	†† 85	--	Cased to 15 ft.
705	B. Teteder	--	120	6	To	2,715	92.6	May 17, 1967	P,W	S	2	--	380	Original depth 158 ft. Temp. 67°F.
* 706	G.R. Reneau	--	Spring	--	Pw	2,620	+	Aug. 7, 1967	Flows	S	† 63	--	1,180	Temp. 87°F.
801	--	1934	204	12	Pw	2,648	56	May 1967	N	U	--	--	--	Red bed at 140 ft.
901	J.W. Gooch	--	60	16	Qal_1,To	2,548	8.7 6.7	July 16, 1955 Feb. 3, 1961	N	U	--	--	--	1/
902	do.	--	140	16	Pw	2,538	6.3 3.7	Jan. 15, 1956 Feb. 3, 1961	T,G	Irr	--	--	--	Reported well not used in 1967. 1/
903	do.	--	--	--	Pw	2,549	26.4 24.3	Jan. 15, 1956 Feb. 3, 1961	--	Irr	--	--	--	Do. 1/
904	J.P. Macina, Sr.	1967	106	7	To	2,640	70.3	May 19, 1967	P,W	S	5	--	460	Temp. 70°F.
* 905	--Simms	--	105	4	To	2,623	83.2	do.	P,W	S	3	--	550	Temp. 67°F.
906	J.W. Gooch	1965	110	14	To	2,581	55	June 1967	T,N	U	† 200	--	--	

See footnotes at end of table.

Table 5.--Records of Wells and Springs--Continued

WELL	OWNER	DATE COMPLETED	DEPTH OF WELL (FT)	CASING DIAMETER (IN)	WATER-BEARING UNITS	ALTITUDE OF LAND SURFACE (FT)	WATER LEVEL		METHOD OF LIFT	USE OF WATER	DISCHARGE IN GPM	DRAWDOWN IN FEET	FIELD SPECIFIC CONDUCTANCE (MICROMHOS AT 25°F)	REMARKS
							BELOW LAND SURFACE DATUM (FT)	DATE OF MEASUREMENT						
						Wheeler County								
*ZB-05-46-101	C. Hamilton	--	82	4	Qal_3, Pw	2,357	64.3	May 23, 1967	P,W	S	2	--	875	Temp. 64°F.
102	W.E. Bentley	1942	100	7	Pw	2,372	60.0	do.	P,W	S	3	--	3,100	Do.
* 202	R. Throckmorton	--	35	6	Qal_1	2,281	11.3 7.8 7.8	Jan. 15, 1956 Mar. 17, 1960 Aug. 8, 1967	P,W	S	1	--	1,900	Temp. 65°F.
204	do.	1967	80	14	Qal_1	2,270	2.5	May 24, 1967	T,G	Irr	614	19	2,200	Cased to 56 ft. Irrigates 80 acres. Temp. 64°F.
205	J.C. Vice	--	85	13	Qal_1	2,290	9.2	do.	T,G	Irr	† 600	--	--	Irrigates 80 acres.
206	do.	--	27	7	Qal_1	2,350	26.9	do.	P,W	S	2	--	840	Temp. 68°F.
207	R. Throckmorton	1954	90	13	Qal_1	2,276	4.2	do.	N	U	--	--	--	
301	A. Reeves	--	41	7	Pw	2,365	26.1	do.	P,W	S	5	--	1,750	Temp. 64°F.
* 302	M. Porter	--	25	7	Pw	2,300	9.0	do.	P,W	S	3	--	5,400	Temp. 62°F.
303	J.M. Tindall	--	61	6	Pw	2,338	22.0	do.	N	U	--	--	--	
* 401	C. Hamilton	--	60	9	Qal_1	2,380	34.4	May 23, 1967	P,W	S	2	--	750	Temp. 63°F.
* 402	M.E. Ackley	--	Spring	--	Pdb	2,345	+	do.	Flows	S	25	--	2,800	Temp. 64°F.
403	C. Hamilton	--	112	7	Qal_2, Pw	2,439	84.8	do.	P,W	S	--	--	--	
501	C. Hampton	--	Spring	--	Pdb	2,272	+	May 22, 1967	Flows	S	15	--	2,250	Temp. 70°F.
* 502	C. Hamilton	--	34	7	Qal_1	2,281	26.0	May 23, 1967	P,W	S	3	--	1,280	Temp. 63°F.
503	W. Sammons	--	62	7	Pdb	2,291	37.0	May 24, 1967	P,W	S	1	--	10,000	Temp. 64°F.
601	J.E. Baker	1955	135	13	Pdb	2,257	34.8 44.3	Jan. 15, 1956 May 24, 1967	T,G	Irr	† 400	--	--	Casing slotted 55-125 ft. Open hole 125-135 ft. Irrigated 100 ac. 1966. 1/
602	J.M. Tindall	1954	120	13	Pdb	2,250	28.1 38.7	July 12, 1955 May 25, 1967	N	U	--	--	--	Cased to 60 ft. 1/
603	do.	1954	145	13	Pdb	2,265	30.8 54.7	July 15, 1958 May 24, 1967	T,G	Irr	† 250	--	--	Cased to 50 ft. Irrigated 30 acres, 1966. 1/
* 604	E. Blake	--	52	6	Pdb	2,279	34.3 34.6	July 16, 1958 May 23, 1967	P,W	S	1	--	2,250	Temp. 68°F. 1/
606	J.M. Tindall	--	60	7	Pdb	2,335	56.9	do.	P,W	S	1	--	850	Temp. 65°F.
607	M. Pillers	1961	175	13	Pdb	2,278	53.0	May 24, 1967	T,G	Irr	700	12	2,400	Cased to 135 ft. Temp. 64°F.

See footnotes at end of table.

Table 5.--Records of Wells and Springs--Continued

WELL	OWNER	DATE COMPLETED	DEPTH OF WELL (FT)	CASING DIAMETER (IN)	WATER-BEARING UNITS	ALTITUDE OF LAND SURFACE (FT)	WATER LEVEL		METHOD OF LIFT	USE OF WATER	DISCHARGE IN GPM	DRAWDOWN IN FEET	FIELD SPECIFIC CONDUCTANCE (MICROMHOS AT 25°F)	REMARKS
							BELOW LAND SURFACE DATUM (FT)	DATE OF MEASUREMENT						
						Wheeler County								
ZB-05-46-608	J.M. Tindall	1962	131	20	Pdb	2,254	42.2	May 25, 1967	T,C	Irr	† 600	--	100	Cased to 40 ft. Irrigated 100 acres, 1966.
609	do.	--	200	13	Pdb	2,300	82.8	do.	T,C	Irr	--	--	--	Original depth 245' plugged back to 200'. Reported water is salty, owner plans to abandon well.
* 701	F. Barxton	1952	107	7	Pw	2,424	90.2	May 22, 1967	P,W	S	4	--	2,600	Temp. 68°F.
702	B. Trostle	1943	144	7	Pdb	2,452	106.7	do.	P,W	S	4	--	2,200	Temp. 65°F.
* 703	do.	--	75	7	To	2,493	24.9	May 23, 1967	S,E	S	† 3	--	360	Temp. 63°F.
805	C. Payne	1966	57	10	Qal_1	2,220	17.9	May 22, 1967	S,E	Irr	† 200	†† 17	2,200	Irrigated 35 acres, 1966. Red bed at 56'. Temp. 64°F. Cased to 37 ft.
* 806	C. Hamilton	1960	62	7	Pdb	2,325	41.1	do.	P,W	S	2	--	2,200	Temp. 64°F.
* 901	C.E. Harbour	--	63	6	Pdb	2,275	50.2	May 23, 1967	P,W	S	1	--	2,200	Temp. 67°F.
902	Hefley Ranch	--	43	7	Pdb	2,270	31.3	do.	P,W	S	2	--	2,200	Temp. 68°F.
903	do.	--	89	7	Pdb	2,305	76.5	do.	P,W	S	--	--	--	
47-101	A.C. Reeves	--	Spring	--	Pw	2,250	+	May 25, 1967	Flows	S	10	--	--	
* 102	E.F. Lesater	--	39	7	Pw	2,261	5.6	do.	P,W	S	3	--	2,200	Temp. 64°F.
201	J.R. Hefley	1955	202	13	Pw	2,233	25.1 20.7	Jan. 14, 1956 May 25, 1967	T,G	Irr	† 400	†† 65	--	Cased to 35 ft. Irrigated 120 acres, 1966.
202	do.	1954	82	12	Pw	2,230	11.2 13.4	Jan. 14, 1956 May 25, 1967	T,G	Irr	† 85	--	--	Cased to 28 ft. Irrigated 20 acres, 1966. 1/
204	E.J. Miller	1965	150	11	Pw	2,230	2.7	do.	T,C	Irr	† 280	†† 28	--	Irrigated 80 acres, 1966.
205	B.W. Buckingham	--	42	7	Pw	2,280	18.9	do.	J,E	D	† 10	--	2,600	Temp. 70°F.
* 206	J.R. Hefley	--	Spring	--	Pw	2,225	+	Aug. 8, 1967	Flows	S	40	--	3,010	Temp. 87°F.
306	A. Burrell	1964	151	12	Pw	2,296	11.7	May 12, 1967	T,C	Irr	† 620	†† 13	--	Irrigated 80 acres, 1966.
307	G.W. Moore	1965	65	6	Pw	2,240	4.0	May 26, 1967	C,C	Irr	--	--	--	Manifold system of 6 wells, all drilled to same depth. Total discharge 300 gpm. Irrigated 40 to 50 acres, 1966.
* 308	do.	--	Spring	--	Pw	2,226	+	Aug. 8, 1967	Flows	S	100	--	2,510	Temp. 78°F.

See footnotes at end of table.

Table 5.--Records of Wells and Springs--Continued

WELL	OWNER	DATE COMPLETED	DEPTH OF WELL (FT)	CASING DIAMETER (IN)	WATER-BEARING UNITS	ALTITUDE OF LAND SURFACE (FT)	WATER LEVEL		METHOD OF LIFT	USE OF WATER	DISCHARGE IN GPM	DRAWDOWN IN FEET	FIELD SPECIFIC CONDUCTANCE (MICROMHOS AT 25°F)	REMARKS
							BELOW LAND SURFACE DATUM (FT)	DATE OF MEASUREMENT						
Wheeler County														
*ZB-05-47-309	J.W. Henderson	--	Spring	--	Pw	2,185	+	Aug. 9, 1967	Flows	S	15	--	2,330	Temp. 68°F.
* 406	J.M. Tindall	--	126	4	Pw	2,275	119.9	May 25, 1967	P,W	S	1	--	2,250	Do.
407	Hefley Ranch	--	88	7	Pdb	2,315	70.5	June 5, 1967	P,W	S	3	--	2,100	Temp. 65°F.
408	J.M. Tindall	1964	150	13	Pdb	2,238	32	May 25, 1967	T,G	Irr	† 500	11	4,000	Irrigated 80 acres, 1966. Temp. 66°F.
409	do.	1964	131	13	Pdb	2,231	33.7	May 25, 1967	T,G	Irr	† 300	--	--	Irrigated 32 acres, 1966.
410	H.O. McCormick	--	37	7	Pw	2,205	24.3	May 26, 1967	J,E	D	† 5	--	3,000	Temp. 64°F.
411	C.B. Sloss	1963	118	8	Pdb	2,202	45.0	June 6, 1967	S,E	Irr	† 100	†† 70	2,900	Cased to 78 ft. Irrigated 15 acres, 1966, from 2 wells. Temp. 64°F.
412	do.	1962	115	7	Pdb	2,211	40.0	do.	S,E	Irr	† 65	†† 71	3,400	Cased to 50 ft. Temp. 64°F.
501	T. Welty	1966	50	12	Pw	2,200	8.2	May 26, 1967	N	U	--	--	--	Well caved in.
502	do.	1961	50	10	Pw	2,205	8.7 4.0	May 26, 1967 June 8, 1967	T,G	Irr	† 250	36	2,100	Irrigated 90 acres, 1966. Drawdown 22.5 after pumping 180 gpm, June 8, 1967. Temp. 65°F. 1/
* 503	do.	1965	97	12	Pw	2,220	40	May 1967	T,G	--	† 200	--	2,100	Cased to 70 ft. 1/ Irrigates 35 acres.
504	J.M. Tindall	--	71	7	Pw	2,165	21.7	May 26, 1967	P,W	S	--	--	--	
601	T.B. Henderson	--	77	7	Pw	2,204	50.7	do.	P,W	S	2	--	2,100	Temp. 66°F.
* 602	G. Bell	--	36	6	Pw	2,120	20.1	do.	P,W	S	5	--	2,600	Temp. 64°F.
* 701	E.J. Gorman	1960	90	7	Pdb	2,181	41.7	June 5, 1967	P,W	S	† 2	--	5,000	Do.
702	J. Gorman	1966	151	8	Pdb	2,228	44.8	do.	T,G	Irr	† 120	†† 75	2,100	Irrigated 33 acres, 1966. Temp. 74°F.
* 801	H.F. Vermillion	--	21	6	Qal_1	2,199	15.6	Aug. 9, 1967	P,W	S	2	--	700	Temp. 62°F.
901	W.G. Copeland	--	92	6	Qal_2	2,230	69.0	June 5, 1967	S,E	D	† 5	--	900	Temp. 72°F.
* 902	L. West	--	48	6	Qal_2, Pw	2,146	24.7	do.	J,E	D	† 3	--	1,400	Temp. 80°F.
48-101	R. Moore	1966	55	6	Pw	2,239	.8	June 6, 1967	C,G	Irr	† 150	--	2,100	Manifold system of 6 wells. Total reported discharge 150 gpm. Irrigates about 20 acres. Temp. 64°F.

See footnotes at end of table.

Table 5.--Records of Wells and Springs--Continued

WELL	OWNER	DATE COMPLETED	DEPTH OF WELL (FT)	CASING DIAMETER (IN)	WATER-BEARING UNITS	ALTITUDE OF LAND SURFACE (FT)	WATER LEVEL		METHOD OF LIFT	USE OF WATER	DISCHARGE IN GPM	DRAWDOWN IN FEET	FIELD SPECIFIC CONDUCTANCE (MICROMHOS AT 25°F)	REMARKS
							BELOW LAND SURFACE DATUM (FT)	DATE OF MEASUREMENT						
						Wheeler County								
*28-05-48-102	G. Davidson	--	94	6	Pw	2,226	47.6	June 6, 1967	P,W	S	† 1	--	750	Temp. 74°F.
* 103	J.R. Brown	--	Spring	--	Pw	2,180	+	Aug. 8, 1967	Flows	S	† 50	--	1,820	Temp. 82°F.
104	J.W. Harris	1934	47	4	Pw	2,212	28.3	June 8, 1967	P,W	S	2	--	825	Temp. 65°F.
* 301	F.H. Davidson	--	55	7	Pw	2,122	45.4	June 6, 1967	P,W	S	2	--	2,100	Temp. 66°F.
302	do.	--	76	--	Pw	2,100	52.1	June 8, 1967	P,W	S	--	--	--	
* 401	Mills Ranch	--	36	4	Pw	2,142	32.5	do.	P,W	S	4	--	825	Temp. 64°F.
* 402	E.E. Henderson	--	Spring	--	Pw	2,148	+	Aug. 9, 1967	Flows	S	10	--	1,910	Temp. 72°F.
502	Mills Ranch	--	60	--	Pw	2,142	53.4	June 6, 1967	P,W	S	1	--	560	Temp. 64°F.
* 503	do.	1967	120	7	Pw	2,201	93.5	June 8, 1967	P,W	S	† 2	--	675	Cased to 94 ft. Temp. 65°F.
* 601	G.W. Harris	--	44	6	Pw	2,058	40.1	June 6, 1967	P,W	S	2	--	900	Temp. 66°F.
602	Mills Ranch	1966	85	7	Pw	2,116	46.8	do.	P,W	S	† 1	--	1,800	Do.
* 603	do.	--	105	7	Pw	2,157	97.5	June 8, 1967	P,W	S	2	--	1,900	Temp. 68°F.
* 701	S.E. Arnold	1966	78	12	Qal_2,Pw	2,132	5	June 1967	T,G	Irr	† 550	--	1,350	Casing slotted from 26-41 and 63-78 ft. Temp. 64°F.
702	E.S. Harvey	--	145	6	Pw	2,222	120.3	June 7, 1967	P,W	S	1	--	1,700	Temp. 70°F.
* 801	Mills Ranch	--	Spring		Qal_2	2,093	+	do.	Flows	S	112	--	625	Temp. 68°F.
802	do.	--	75	7	Qal_2,Pw	2,106	41.4	do.	P,W	S	3	--	1,450	Temp. 64°F.
* 803	do.	1967	90	7	Qal_2,Pw	2,118	56.0	do.	P,W	S	3	--	1,025	Do.
804	R.E. Haynes	1965	70	7	Qal_2	2,140	39.5	do.	P,W	S	2	--	560	Temp. 78°F.
901	Mills Ranch	1965	110	7	Qal_2,Pw	2,078	58.6	do.	P,W	S	3	--	1,300	Temp. 64°F.
902	do.	1967	35	7	Qal_1	2,020	17.2	do.	P,W	S	2	--	3,800	Temp. 63°F.
903	F. Ellis	--	67	6	Qal_2,Pw	2,106	45.1	do.	P,W	S	† 3	--	1,300	Temp. 74°F.
* 904	Mills Ranch	1964	100	7	Pw	2,111	71.6	do.	P,W	S	3	--	2,600	Temp. 64°F.
905	R.F. Douglas	--	142	7	Pw	2,158	102.9	do.	P,W	S	1	--	2,100	Temp. 68°F.
52-301	C.J. Denson	--	158	7	To	2,787	115.6	June 8, 1967	P,W	S	2	--	420	Temp. 65°F.
* 302	R. McCracken	1965	134	7	To	2,810	83.3	do.	S,E	D	† 15	--	420	Do.

See footnotes at end of table.

Table 5.--Records of Wells and Springs--Continued

WELL	OWNER	DATE COMPLETED	DEPTH OF WELL (FT)	CASING DIAMETER (IN)	WATER-BEARING UNITS	ALTITUDE OF LAND SURFACE (FT)	WATER LEVEL		METHOD OF LIFT	USE OF WATER	DISCHARGE IN GPM	DRAWDOWN IN FEET	FIELD SPECIFIC CONDUCTANCE (MICROMHOS AT 25°F)	REMARKS
							BELOW LAND SURFACE DATUM (FT)	DATE OF MEASUREMENT						
						Wheeler County								
ZB-05-52-303	O.O. Tate	--	75	7	To	2,736	43.4	June 9, 1967	J,E	D	† 13	--	460	Temp. 70°F. Red bed at 75 ft.
601	A.E. Carpenter	1924	37	4	To	2,736	25.2	June 8, 1967	P,W	D	† 2	--	500	Temp. 68°F.
* 602	F. Nelson	--	81	7	To,Pw	2,750	48.5	June 9, 1967	P,W	S	† 2	--	675	Temp. 64°F.
53-101	W. Fields	1966	156	16	To	2,664	22.7	do.	T,G	Irr,Ind	† 550	--	--	
102	F.M. Brown	1962	195	14	To	2,692	100	June 1967	S,E	Irr	† 350	†† 35	750	Cased to 100 ft. Irrigated 20 acres, 1966. Red bed 195 ft. Temp. 64°F.
* 201	M. Pakan	--	82	7	To,Pw	2,685	70.5	June 12, 1967	P,W	S	2	--	650	Temp. 64°F.
202	J.W. Grogan	--	Spring	--	To,Pw	2,586	+	do.	Flows	S	15	--	1,050	Temp. 72°F.
203	F. Venter	--	67	7	To	2,603	48.7	do.	J,E	D	† 5	--	615	Temp. 64°F.
204	J.W. Gorgan	--	74	7	To	2,645	47.1	June 13, 1967	P,W	S	3	--	520	Temp. 66°F.
301	J.W. Gooch	1955	84	14	To	2,531	24.0 24.8	July 16, 1955 June 12, 1967	N	U	--	--	--	
302	do.	1955	140	14	To	2,533	21.9 24.1	July 16, 1955 June 12, 1967	P,W	S	† 5	--	600	Originally drilled for irrigation, insufficient yield, converted to stock well. Temp. 63°F.
* 303	D.L. Johnston	--	21	4	Qal_1	2,460	3.1	June 13, 1967	S,E	D,S	† 5	--	1,700	Temp. 62°F.
304	J.W. Gooch	1965	36	7	Qal	2,486	9	June 1967	C,G	Irr	† 500	--	--	Manifold system of 6 wells. Total reported discharge of system 500 gpm. Irrigated 30 acres, 1966. Cased to 16 ft.
401	A.W. Lankford	1967	78	12	To	2,651	10.3	June 9, 1967	T,G	Irr	† 500	--	286	Cased to 9 ft.
402	do.	--	97	7	To	2,644	67.4	June 13, 1967	P,W	S	1	--	460	Temp. 64°F.
* 501	E.R. Wallace	--	62	7	Pw	2,566	32.4	do.	P,W	S	2	--	1,600	Temp. 62°F.
502	L. Hunt	1955	160	13	To,Pw	2,562	97.5 26.6	Jan. 15, 1956 June 13, 1967	T,G	Irr	† 250	--	--	Cased to 120 ft. Irrigated 35 acres, 1966. Red bed at 160 ft.
503	do.	1957	37	7	To	2,548	16.4 13.5	Jan. 15, 1956 June 13, 1967	J,G	S	--	--	--	

See footnotes at end of table.

Table 5.--Records of Wells and Springs--Continued

WELL	OWNER	DATE COMPLETED	DEPTH OF WELL (FT)	CASING DIAMETER (IN)	WATER-BEARING UNITS	ALTITUDE OF LAND SURFACE (FT)	WATER LEVEL		METHOD OF LIFT	USE OF WATER	DISCHARGE IN GPM	DRAWDOWN IN FEET	FIELD SPECIFIC CONDUCTANCE (MICROMHOS AT 25°F)	REMARKS
							BELOW LAND SURFACE DATUM (FT)	DATE OF MEASUREMENT						
Wheeler County														
ZB-05-53-504	L. Hunt	1957	42	8	Qal_1	2,520	0.8	Jan. 15, 1956	C,G	Irr	† 250	--	1,100	Manifold system of 5 wells. All drilled to same depth. Total reported discharge of wells, 250 gpm. Irrigated 40 acres, 1966.
505	do.	--	140	14	To,Pw	2,548	--	--	N	U	--	--	--	
* 603	D. McDowell	1948	104	5	Pw	2,515	68.8	June 13, 1967	P,W	S	4	--	2,300	Temp. 65°F.
54-105	J.W. Hanes	1965	187	8	Pw	2,510	175.3	June 14, 1967	P,W	S	1	--	1,100	Temp. 62°F.
106	A.V. Hanes	1966	114	11	Pw	2,407	60	Jan. 1966	T,G	Irr	† 250	--	1,600	Will be used to supply water for irrigation. Casing 64-84, 96-111 ft. Temp. 66°F.
107	J. Morris	1965	107	7	Pw	2,423	70.0	June 14, 1967	P,W	S	2	--	1,125	Cased to 80 ft. Temp. 65°F.
109	R. Martin	--	65	7	Pw	2,460	39.8	do.	P,W	S	1	--	1,300	Temp. 78°F.
* 202	C. Troxell	1966	108	10	Pw	2,380	40	June 1967	T,G	Irr	405	†† 60	1,100	Cased to 40 ft. Irrigates about 20 acres. Temp. 65°F.
203	E. Bradley	--	82	7	Pdb	2,366	69.3	June 14, 1967	P,W	S	3	--	2,400	Temp. 65°F.
* 204	B. Turnbow	--	90	6	Pdb	2,362	64.4	do.	P,W	S	4	--	2,400	Do.
305	E. Holland	1965	129	10	Pdb	2,356	52.3	June 15, 1967	T,G	Irr	† 100	†† 40	2,400	Irrigated 20 acres, 1966. Casing slotted 72-92 ft. Open hole, 92-129 ft. Temp. 78°F.
306	do.	1965	91	10	Pdb	2,362	62.7	do.	T,G	Irr	† 100	†† 30	--	Cased to 60 ft. Irrigates 20 acres.
307	R.C. Hawk	1965	103	13	Pdb	2,325	65.8	June 14, 1967	T,G	Irr	† 300	†† 24	2,600	Cased to 67 ft. Irrigates about 40 acres. Temp. 64°F.
405	R. Terry	1964	262	7	Pw	2,563	199.0	June 13, 1967	S,E	D	† 5	†† 15	700	Temp. 72°F.
406	M. Hyman	1965	240	7	Pw	2,628	110	June 1967	--	S	† 2	--	--	Cased to 192 ft.
* 408	A.L. Troxell	1965	137	7	Pw	2,506	87	do.	P,W	D,S	† 2	--	1,000	Temp. 64°F.
* 501	R.A. Nichols	--	64	4	Pdb	2,354	47.8	June 15, 1967	P,W	S	2	--	750	Temp. 62°F.

See footnotes at end of table.

Table 5.--Records of Wells and Springs--Continued

WELL	OWNER	DATE COMPLETED	DEPTH OF WELL (FT)	CASING DIAMETER (IN)	WATER-BEARING UNITS	ALTITUDE OF LAND SURFACE (FT)	WATER LEVEL		METHOD OF LIFT	USE OF WATER	DISCHARGE IN GPM	DRAWDOWN IN FEET	FIELD SPECIFIC CONDUCTANCE (MICROMHOS AT 25°F)	REMARKS
							BELOW LAND SURFACE DATUM (FT)	DATE OF MEASUREMENT						
						Wheeler County								
ZB-05-54-502	C. Bednorz	--	116	6	Pw	2,422	111.5	June 15, 1967	P,W	S	1	--	1,025	Temp. 64°F.
601	J.W. Gooch	1955	74	16	Pdb	2,277	18.1 15.4	July 16, 1955 June 15, 1967	N	U	--	--	--	Casing slotted from 34 to 74 ft. 1/
602	do.	--	72	--	Pdb	2,280	--	--	N	U	--	--	--	Abandoned and plugged.
603	do.	--	Spring	--	Pdb	2,258	+	June 15, 1967	Flows	S	3	--	1,150	Temp. 80°F.
* 55-101	D.L. Gregg	--	60	6	Pdb	2,249	48.2	June 16, 1967	S,E	S	† 10	--	2,400	Temp. 64°F.
102	E. Tindall	--	134	5	Pdb	2,341	109.9	do.	P,W	S	2	--	2,200	Temp. 62°F.
201	M. McKinney	1965	155	7	Pdb	2,350	100	Feb. 1965	P,W	S	† 4	--	--	
202	I.A. Brooks	--	124	7	Pw	2,351	92.7	June 20, 1967	P,W	D,S	† 2	--	1,550	Temp. 65°F.
* 203	J.E. Throckmorton	--	122	7	Qal_2,Pw	2,371	97.0	do.	P,E	D	† 10	--	480	Temp. 69°F.
301	United Carbon	1952	126	9	Pdb	2,312	66	1952	T,E	U	† 50	†† 22	--	
302	do.	1952	108	9	Pdb	2,315	64	1952	T,E	U	† 100	†† 12	--	
303	do.	1953	104	9	Pdb	2,306	57	1953	T,E	U	† 160	†† 23	--	
304	do.	1951	94	9	Pdb	2,288	37	1951	T,E	U	† 60	†† 20	--	
305	do.	1951	87	9	Pdb	2,283	--	--	T,E	U	† 135	--	--	
306	do.	1951	130	9	Pdb	2,285	35.3	June 20, 1967	N	U	--	--	--	
307	do.	1951	96	9	Pdb	2,291	--	--	T,E	U	† 100	--	--	
308	do.	1952	101	9	Pdb	2,311	63	1952	T,E	U	† 50	†† 18	--	
309	do.	1952	120	9	Pdb	2,269	34	1952	T,E	U	† 75	--	--	
310	do.	1952	100	9	Pdb	2,277	37	June 1967	T,E	Ind	† 42	--	1,600	Standby well for fire protection. Temp. 66°F.
* 311	G.H. Copeland	1961	92	7	Qal_2,Pw	2,300	82.3	June 20, 1967	P,W	D	† 2	--	750	Temp. 68°F.
312	H. Williams	--	103	7	Pw	2,320	66.7	do.	P,W	D,S	2	--	1,300	Temp. 68°F.
313	D.C. Dayberry	--	94	7	Qal_2,Pw	2,329	83.9	June 16, 1967	P,W	S	1	--	725	Temp. 70°F.
* 401	Gardner Estate	--	53	4	Pdb	2,262	39.2	June 21, 1967	P,W	S	2	--	1,800	Temp. 64°F.
501	C.A. Whittles	--	95	7	Pdb	2,293	77.0	June 16, 1967	P,W	S	2	--	2,400	Do.
502	Laycock Ranch	--	Spring	--	Pdb	2,172	+	do.	Flows	S	† 251	--	2,000	Temp. 74°F.

See footnotes at end of table.

Table 5.--Records of Wells and Springs--Continued

WELL	OWNER	DATE COMPLETED	DEPTH OF WELL (FT)	CASING DIAMETER (IN)	WATER-BEARING UNITS	ALTITUDE OF LAND SURFACE (FT)	WATER LEVEL		METHOD OF LIFT	USE OF WATER	DISCHARGE IN GPM	DRAWDOWN IN FEET	FIELD SPECIFIC CONDUCTANCE (MICROMHOS AT 25°F)	REMARKS
							BELOW LAND SURFACE DATUM (FT)	DATE OF MEASUREMENT						
						Wheeler County								
*ZB-05-55-503	Laycock Ranch	--	82	8	Pdb	2,264	72.3	June 16, 1967	S,E	S	† 10	--	2,025	Temp. 74°F.
601	United Carbon	1953	100	7	Pdb	2,251	30	1953	N	U	†200	†† 18	--	
602	do.	1953	92	7	Pdb	2,235	39	1953	N	U	†180	†† 28	--	
603	do.	1952	94	7	Pdb	2,251	30.1	June 20, 1967	N	U	†120	†† 21	--	
604	J.H. Oldham	1967	60	7	Pdb	2,239	28.0	do.	--	D	--	--	--	Temp. 76°F.
* 605	do.	--	87	6	Pdb	2,269	76.7	do.	--	S	3	--	1,900	Temp. 66°F.
56-102	H.V. Parish	1967	80	7	Qal_2, Pw	2,202	59.5	June 22, 1967	S,E	S	--	--	1,800	Temp. 63°F.
* 103	C. Mitchell	--	60	7	Pdb	2,163	45.9	do.	P,W	S	2	--	2,200	Temp. 66°F.
201	W.J. Gillis	1949	100	7	Pdb	2,173	78.0	June 21, 1967	P,W	D	† 2	--	2,200	Temp. 76°F.
202	C. Mitchell	1952	117	7	Pdb	2,170	60.4	June 22, 1967	P,W	S	† 3	--	2,100	Temp. 64°F.
* 203	G.R. Sewell	--	Spring	--	Pdb	2,025	+	Aug. 10, 1967	Flows	S	224	--	4,940	Temp. 70°F.
301	F. Sanders	--	52	6	Pdb	2,145	43.5	June 21, 1967	P,W	S	2	--	2,200	Temp. 64°F.
302	B. Gibson	1951	62	6	Pdb	2,145	5.7	do.	P,W	S	1	--	2,600	Temp. 84°F.
* 303	J. Mitchell	--	75	4	Pdb	2,133	32.6	do.	P,W	S	2	--	2,200	Temp. 63°F.
405	Southwestern Gas Co.	1965	114	8	Pdb	2,227	80	June 1965	--	Ind	† 50	--	--	Cased to 90 ft.
406	E.C. Hunter & R.M. Bradshaw	--	91	6	Pdb	2,252	51.7	June 21, 1967	P,W	S	2	--	2,200	Temp. 66°F.
407	F. Nicholson	--	87	7	Pdb	2,242	74.9	do.	P,W	S	2	--	1,900	Do.
* 408	B. Lang	--	94	7	Pdb	2,202	81.1	do.	P,W	D,S	2	--	2,200	Do.
501	Laycock Ranch	1954	35	6	Qal_1	1,991	7.2	do.	C,G	Irr	400	--	2,300	Manifold system of 12 wells. All wells drilled to same depth. Total discharge of system 400 gpm. Temp. 64°F.
* 502	W.T. Moore	1960	45	12	Qal_1	1,967	6.1	do.	N	U	--	--	2,000	Manifold system of 4 wells, unused. All wells drilled to same depth. Temp. 64°F.
* 601	Palmer Ranch	--	67	--	Pdb	2,133	36.1	do.	P,W	S	3	--	2,000	Temp. 68°F.

See footnotes at end of table.

Table 5.--Records of Wells and Springs--Continued

WELL	OWNER	DATE COMPLETED	DEPTH OF WELL (FT)	CASING DIAMETER (IN)	WATER-BEARING UNITS	ALTITUDE OF LAND SURFACE (FT)	WATER LEVEL		METHOD OF LIFT	USE OF WATER	DISCHARGE IN GPM	DRAWDOWN IN FEET	FIELD SPECIFIC CONDUCTANCE (MICROMHOS AT 25°F)	REMARKS
							BELOW LAND SURFACE DATUM (FT)	DATE OF MEASUREMENT						
Eastern Gray County														
*KS-05-27-801	Moody Farms Inc.	--	135	7	To	2,877	117.3	Dec. 5, 1967	P,W	S	3	--	280	Temp. 62°F.
* 28-801	L.J. Seitz	1955	370	16	To	2,803	167.6	do.	T,G	Irr	†450	†† 30	430	Cased to 310 ft. Irrigated 120 acres, 1966. Temp. 62°F.
34-301	Kewanee Oil Co.	1966	193	13	To	2,990	122	Dec. 1967	T,E	Ind	†210	†† 10	--	Cased to 130 ft.
603	Coltexo Corp.	1930	100	12	To	2,800	26.9	Dec. 5, 1967	T,E	Ind	†100	--	--	Cased to 75 ft.
604	do.	1929	100	12	To	2,803	29.9	do.	T,E	Ind	†125	4	360	Do.
* 605	do.	1962	125	12	To,Pw	2,820	35	Dec. 1967	T,E	Ind	†600	†† 45	760	Cased to 95 ft. Temp. 62°F.
606	G.H. Saunders	1965	865	16	Pw	2,811	41	July 1965	T,G	Ind	†400	--	--	Cased to 132 ft.
* 701	F. Vanderburg	--	228	7	To	2,984	140.6	Dec. 7, 1967	P,W	S	2	--	360	Temp. 60°F.
702	Clayton well 2	1962	270	16	To	2,920	70	Mar. 1962	T,G	Ind	†510	†† 21	440	Cased to 143 ft. Temp. 61°F.
703	Clayton well 1	1962	257	16	To	2,930	85	do.	T,G	Ind	†409	--	--	
801	Vincent Ranch	--	89	4	To	2,888	46.0	Dec. 7, 1967	P,W	S	3	--	380	Temp. 60°F.
* 901	B.B. Davis	--	88	7	To	2,877	74.7	do.	P,W	S	--	--	360	Do.
35-101	G. Cox	--	106	4	To	2,873	92.1	Dec. 5, 1967	P,W	S	--	--	--	
* 102	do.	--	171	7	To	2,911	145.7	Dec. 8, 1967	P,W	S	† 3	--	320	
201	--	--	139	7	To	2,868	109.9	Nov. 17, 1967	P,W	S	--	--	--	
301	Franklin Ranch	--	35	4	To	2,743	14.2	do.	P,W	S	4	--	310	Temp. 62°F.
401	B.B. Davis Ranch	--	125	9	To	2,838	75.5	Dec. 5, 1967	N	U	--	--	--	
402	Skelly Oil Co.	1966	235	10	To,Pw	2,761	10	Dec. 1967	S,E	Ind	†125	†† 10	--	
403	R.C. Mayberry	1955	195	18	To	2,870	120	do.	T,G	Ind	†120	--	--	Cased to 148 ft. Screen set from 150 to 195 feet.
501	Franklin Ranch	--	81	4	To	2,802	71.0	Nov. 1967	P,W	S	2	--	300	Temp. 63°F.
502	A. Chapman	1965	142	16	To	2,740	19	Apr. 1965	T,G	V	†250	†† 95	--	Cased to 59 ft.
601	J. Haynes & J.S. Morse	--	101	7	Pw	2,687	89.3	Nov. 17, 1967	P,W	S	2	--	800	Temp. 62°F.
* 602	Franklin Ranch	1947	55	13	Qal_1,To	2,692	11.6	do.	T,E	Irr	†100	--	500	Irrigated 3 acres and lawn, 1966.

See footnotes at end of table.

Table 5.--Records of Wells and Springs--Continued

WELL	OWNER	DATE COMPLETED	DEPTH OF WELL (FT)	CASING DIAMETER (IN)	WATER-BEARING UNITS	ALTITUDE OF LAND SURFACE (FT)	WATER LEVEL		METHOD OF LIFT	USE OF WATER	DISCHARGE IN GPM	DRAWDOWN IN FEET	FIELD SPECIFIC CONDUCTANCE (MICROMHOS AT 25°F)	REMARKS
							BELOW LAND SURFACE DATUM (FT)	DATE OF MEASUREMENT						
						Eastern Gray County								
KS-05-35-701	V. Dickey	--	135	7	Pw	2,852	105.5	Nov. 16, 1967	P,W	S	--	--	2,500	Temp. 62°F.
* 801	do.	--	147	7	Pw	2,760	89.6	do.	P,W	S	† 2	--	2,000	Temp. 64°F.
802	do.	--	132	7	To	2,839	114.7	do.	P,W	S	--	--	--	
* 901	J. Haynes & J.S. Morse	--	75	7	To	2,670	47.5	do.	P,W	S	2	--	300	Temp. 64°F.
* 36-101	J.H. Eastland	--	181	4	To	2,833	178.2	do.	P,W	S	4	--	290	
201	Webb Ranch	--	215	14	To	2,809	142.9	Nov. 15, 1967	N	U	† 450	--	--	Not used since drilled.
202	do.	--	103	4	To	2,795	99.5	do.	P,W	S	2	--	390	Temp. 62°F.
401	J. Haynes & J.S. Morse	--	70	7	To	2,708	30.7	Nov. 16, 1967	P,W	S	3	--	290	Temp. 61°F.
501	L. Webb	--	62	7	To	2,672	49.4	Nov. 15, 1967	P,W	S	3	--	360	Temp. 63°F.
* 502	C. Webb	--	96	5	To	2,747	87.4	do.	P,W	S	3	--	340	Do.
701	Phillips Petroleum Co.	1942	90	7	To	2,606	--	--	T,E	Ind	† 90	--	320	Do.
* 702	Kewanee Oil Co.	1961	110	16	Qal_1	2,572	23	Jan. 1964	T,E	Ind	† 335	†† 40	1,100	Cased to 60 ft. Temp. 60°F.
703	do.	1960	131	7	To,Pw	2,625	--	--	P,E	P,Ind	3	--	700	Cased to 38 ft. Temp. 64°F.
704	do.	1958	373	11	Pw	2,601	50	1964	T,E	Ind	† 292	†† 95	6,000	Cased to 330 ft. Temp. 65°F.
801	do.	1958	150	14	Qal_1	2,535	33.5	Nov. 15, 1967	N	U	† 210	†† 70	--	Cased to 65 ft.
802	do.	--	71	13	Qal_1	2,512	8	Nov. 1967	N	U	† 190	†† 55	--	Cased to 25 ft.
803	do.	--	69	--	Qal_1	2,510	--	--	N	U	--	--	--	Abandoned.
804	do.	1959	212	13	Qal_1,Pw	2,530	35.0	Nov. 15, 1967	N	U	† 150	††110	--	Cased to 67 ft.
805	I. Huselby	--	115	6	To	2,622	101.0	do.	P,W	U	--	--	--	
42-101	Taylor Ranch	--	290	7	To	3,116	252.2	Dec. 7, 1967	P,W	S	3	--	350	Temp. 60°F.
* 201	Darsey Ranch	--	151	8	To	2,967	127.7	Dec. 8, 1967	P,W	S	4	--	320	Do.
301	E.D. Warner	--	155	7	To	2,947	136.5	Dec. 7, 1967	P,E	Ind	† 10	--	290	Do.
* 401	Taylor Ranch	--	218	7	To	3,056	194.0	Dec. 6, 1967	P,W	S	4	--	400	Do.

See footnotes at end of table.

Table 5.--Records of Wells and Springs--Continued

WELL	OWNER	DATE COMPLETED	DEPTH OF WELL (FT)	CASING DIAMETER (IN)	WATER-BEARING UNITS	ALTITUDE OF LAND SURFACE (FT)	WATER LEVEL		METHOD OF LIFT	USE OF WATER	DISCHARGE IN GPM	DRAWDOWN IN FEET	FIELD SPECIFIC CONDUCTANCE (MICROMHOS AT 25°F)	REMARKS
							BELOW LAND SURFACE DATUM (FT)	DATE OF MEASUREMENT						
Eastern Gray County														
KS-05-42-501	Taylor Ranch	--	70	4	To	2,862	51.5	Dec. 7, 1967	P,W	S	3	--	360	Temp. 60°F.
* 601	Darsey Ranch	--	152	7	To	2,925	131.2	Dec. 8, 1967	P,W	S	3	--	380	Do.
701	Taylor Ranch	--	267	7	To	3,085	241.6	Dec. 6, 1967	P,W	S	2	--	340	Do.
* 801	do.	--	105	7	To	2,903	76.6	Dec. 7, 1967	P,W	S	4	--	350	Do.
901	Bruce Nurseries	1946	106	10	To	2,795	34.8	do.	T,G	Irr	† 200	†† 30	--	Cased to 86 ft. Irrigated 40 acres, 1966.
902	L.E. Glass	1964	230	16	To	2,895	139.0	Dec. 8, 1967	T,G	Irr	† 550	†† 60	--	Cased to 130 ft. Irrigated 80 acres, 1966.
903	T.E. Crisp	1965	230	16	To	2,880	102.1	do.	T,G	Irr	† 650	†† 60	--	Irrigated 120 acres, 1966.
904	E. Darsey	--	105	16	To	2,737	10	Dec. 1967	T,G	Irr	† 650	†† 60	--	Irrigated 100 acres, 1966.
43-101	J.E. Parker & B.B. Davis	--	162	7	To	2,940	154.1	Nov. 14, 1967	P,W	S	3	--	380	Temp. 64°F.
* 201	V.D. Dickey	--	141	7	To	2,870	123.1	Nov. 13, 1967	P,W	S	2	--	340	Do.
301	J.E. Cubine	--	145	7	To	2,769	114.1	Nov. 10, 1967	P,W	S	3	--	500	Temp. 63°F.
401	V.D. Dickey Ranch	--	101	6	To	2,859	94.7	Nov. 14, 1967	P,W	D,S	3	--	400	Temp. 61°F.
501	Pursley Ranch	--	63	4	Pw	2,690	31.7	do.	P,W	D	† 3	--	--	
* 601	Hudgins Ranch	1916	60	5	Pw	2,648	25.3	do.	P,E	D,S	5	--	525	Temp. 60°F.
701	Johnson Ranch	--	178	7	To	2,902	145.8	Nov. 9, 1967	P,W	S	† 3	--	380	Do.
702	D. Word	1967	198	16	Qal_1,To	2,732	15.6	Nov. 13, 1967	T,G	Irr	† 500	--	320	Cased to 60 ft. Temp. 64°F.
* 703	do.	1960	150	16	Qal_1,To	2,744	15.3	do.	T,G	Irr	†2,352	††100	450	Cased to 30 ft. Pump test by Green Machinery Co. Temp. 64°F. Irrigated 300 acres, 1966, with 2 wells.
* 801	C. Willis	1900	72	4	To	2,803	63.2	Nov. 10, 1967	P,W	S	1	--	340	Temp. 62°F.
901	W. Major	--	27	4	To	2,750	19.3	do.	P,W	S	2	--	370	Temp. 63°F.
44-101	Bach School Land	--	105	6	To	2,719	96.5	Nov. 7, 1967	P,W	S	3	--	300	Do.
201	E. Emmel	--	60	--	Qal_1	2,505	--	--	T,-	U	--	--	--	
* 202	J.M. Carpenter	--	35	7	To,Pw	2,551	19.1	Nov. 7, 1967	J,E	D	5	†† 1	1,100	Temp. 64°F.
303	--	--	124	8	To	2,616	82.6	do.	P	U	--	--	--	

See footnotes at end of table.

Table 5.--Records of Wells and Springs--Continued

WELL	OWNER	DATE COMPLETED	DEPTH OF WELL (FT)	CASING DIAMETER (IN)	WATER-BEARING UNITS	ALTITUDE OF LAND SURFACE (FT)	WATER LEVEL		METHOD OF LIFT	USE OF WATER	DISCHARGE IN GPM	DRAWDOWN IN FEET	FIELD SPECIFIC CONDUCTANCE (MICROMHOS AT 25°F)	REMARKS
							BELOW LAND SURFACE DATUM (FT)	DATE OF MEASUREMENT						
						Eastern Gray County								
KS-05-44-304	--	--	90	6	To	2,616	82.5	Nov. 7, 1967	N	U	--	--	--	
401	T. Johnson	--	85	7	To	2,730	62.4	do.	P,W	S	2	--	280	Temp. 62°F.
501	D.L. Miller	--	30	4	To	2,649	7.5	Nov. 8, 1967	P,W	S	3	--	350	Temp. 61°F.
609	J. Cliett	1961	208	10	To	2,838	180.8	Nov. 7, 1967	T,E	Irr	† 160	--	--	Cased to 178 ft. Irrigates 20 acres.
* 610	do.	1965	230	7	To	2,831	178	Nov. 1967	S,E	Irr	† 90	--	400	Cased to 200 ft. Irrigated 20 acres, 1966. Temp. 62°F.
* 701	D. Everett	1962	235	12	To	2,839	102	do.	T,G	Irr	† 60	††108	400	Cased to 102 ft. Irrigated 10 acres, 1966. Temp. 63°F.
702	T. Johnson	1965	185	16	To	2,847	136.1	Nov. 2, 1967	T,G	Irr	† 360	--	--	Cased to 140 ft.
703	do.	1966	199	13	To	2,848	137	Nov. 1967	T,G	Irr	† 360	†† 33	--	Cased to 139 ft.
704	do.	1954	160	16	To	2,847	126.0	Nov. 2, 1967	T,G	Irr	† 100	†† 28	--	Irrigated 100 acres, 1966, from 3 wells.
801	T.J. Bailey	--	162	4	To	2,803	116.0	Nov. 8, 1967	P,W	S	1	--	350	Temp. 60°F.
* 50-101	Tibbetts Ranch	--	148	7	To	2,969	117.8	Dec. 6, 1967	P,W	S	3	--	440	Do.
201	Johnson Ranch	--	18	4	Qal_1,To	2,816	9.3	do.	P,W	S	3	--	370	Do.
* 301	do.	--	148	7	To	2,925	138.0	do.	P,W	S	2	--	380	Temp. 59°F.
302	C.E. Glass	1967	228	16	To	2,870	88.0	Dec. 8, 1967	T,G	Irr	† 950	††127	--	Cased to 90 ft. Irrigated 40 acres, 1966.
401	Johnson Ranch	--	175	7	To	3,167	147.3	Dec. 6, 1967	P,W	S	3	--	400	
* 501	do.	--	300	--	To	3,123	193.5	do.	P,W	S	† 4	--	380	Temp. 62°F.
601	do.	--	208	6	To	2,980	183.6	do.	P,W	S	3	--	380	Temp. 60°F.
* 51-101	Alanreed School	1960	310	8	To	3,002	216.0	Nov. 8, 1967	S,E	P	† 50	--	380	Temp. 62°F.
102	B.J. Shaw	1966	222	13	To	2,903	142.7	Nov. 9, 1967	T,G	Irr	† 350	--	--	Cased to 160 ft. Irrigated 100 acres, 1966.
201	Q. Blankenship	1966	180	7	To	2,910	145.0	do.	P	S	2	--	550	Temp. 60°F.
301	Haynes-Mullaneux	1954	106	16	To	2,809	57.5	Nov. 1, 1967	T,G	Irr	† 300	--	--	Cased to 66 ft.
* 302	J. Haynes	1963	231	7	To	2,950	199	Nov. 1967	T,E	Ind	† 77	--	380	Cased to 221 ft. Temp. 60°F.

See footnotes at end of table.

Table 5.--Records of Wells and Springs--Continued

WELL	OWNER	DATE COMPLETED	DEPTH OF WELL (FT)	CASING DIAMETER (IN)	WATER-BEARING UNITS	ALTITUDE OF LAND SURFACE (FT)	WATER LEVEL		METHOD OF LIFT	USE OF WATER	DISCHARGE IN GPM	DRAWDOWN IN FEET	FIELD SPECIFIC CONDUCTANCE (MICROMHOS AT 25°F)	REMARKS
							BELOW LAND SURFACE DATUM (FT)	DATE OF MEASUREMENT						
Eastern Gray County														
KS-05-51-303	J.B. Rice	--	124	4	To	2,858	110.7	Nov. 9, 1967	P,W	S	3	--	400	Temp. 61°F.
401	M. Hall	1957	109	7	To	2,877	89.4	do.	P,W	S	3	--	320	Do.
501	W.O. Hommell	--	159	5	To	2,903	130.6	do.	P,W	S	--	--	--	
601	W.J. Lewis	--	125	7	To	2,834	80.4	do.	P,W	S	4	--	360	Temp. 62°F.
52-101	D. Everett	1963	200	14	To	2,862	--	--	T,G	Irr	† 250	--	--	Cased to 130 ft. Irrigated 80 acres, 1966, from 2 wells.
102	do.	1957	180	12	To	2,847	112.5	Nov. 1, 1967	T,G	Irr	† 250	†† 25	--	Cased to 130 ft.
103	Kennedy & Smitherman	1963	172	12	To	2,861	110.2	Nov. 2, 1967	T,G	Irr	† 500	--	--	Cased to 112 ft.
104	do.	1963	165	12	To	2,851	107.5	do.	T,G	Irr	† 450	--	--	Cased to 110 ft. Irrigated 160 acres, 1966, from 2 wells.
105	City of McLean	1943	209	11	To	2,861	122.9	Nov. 3, 1967	T,E	P	† 185	†† 20	--	Screen set from 142-192 ft.
106	do.	1933	165	12	To	2,855	115	Nov. 1967	T,E	P	† 260	†† 6	--	
107	do.	1927	156	18	To	2,855	108	do.	T,E	P	† 260	†† 16	--	Cased to 126 ft.
* 108	do.	1963	170	16	To	2,849	101.6	Nov. 3, 1967	T,E	P	† 315	†† 20	450	Cased to 100 ft. Temp. 61°F.
109	G. Saunders	1954	150	16	To	2,868	118.7	do.	T,G	Irr	† 300	--	--	Cased to 110 ft.
110	O.L. Tibbetts	1953	146	13	To	2,835	84.9	Nov. 7, 1967	T,G	Irr	† 350	--	--	Cased to 86 ft.
201	P. Everett	1966	160	16	To	2,839	99.6	Nov. 1, 1967	T,G	Irr	† 225	†† 30	--	Cased to 110 ft. Irrigated 20 acres, 1966.
202	do.	1954	150	16	To	2,848	110	Nov. 1967	N	U	† 80	--	--	Abandoned.
203	C. Seaney	1963	149	16	To	2,831	92.5	Nov. 2, 1967	T,G	Irr	† 200	--	--	Cased to 80 ft.
204	L. Williams	1956	90	13	To	2,791	43.0	do.	T,G	Irr	† 200	†† 30	360	Cased to 40 ft. Irrigated 60 acres, 1966. Temp. 56°F.
205	El Paso Natural Gas Co.	1967	133	11	To	2,831	107	Nov. 1967	S,E	Ind	† 70	†† 20	--	Cased to 99 ft.
304	do.	1957	131	8	To	2,823	100	do.	T,E	Ind	† 38	--	--	Cased to 91 ft.

See footnotes at end of table.

Table 5.--Records of Wells and Springs--Continued

WELL	OWNER	DATE COMPLETED	DEPTH OF WELL (FT)	CASING DIAMETER (IN)	WATER-BEARING UNITS	ALTITUDE OF LAND SURFACE (FT)	WATER LEVEL		METHOD OF LIFT	USE OF WATER	DISCHARGE IN GPM	DRAWDOWN IN FEET	FIELD SPECIFIC CONDUCTANCE (MICROMHOS AT 25°F)	REMARKS
							BELOW LAND SURFACE DATUM (FT)	DATE OF MEASUREMENT						
Eastern Gray County														
KS-05-52-305	El Paso Natural Gas Co.	1965	124	8	To	2,828	102	Nov. 1967	T,E	Ind	† 35	--	--	Cased to 94 ft.
306	do.	1958	125	8	To	2,829	109.5	Nov. 3, 1967	T,E	Ind	† 60	--	--	Cased to 100 ft. Standby well, not used often.
* 401	W.J. Lewis	--	100	7	To	2n796	85.8	Nov. 9, 1967	P,W	S	3	--	340	Temp. 61°F.
501	C. McCurley	--	90	--	To	2,750	30	Nov. 1967	T,G	Irr	† 250	--	--	
502	T. Johnson	1966	69	16	To	2,749	27.0	Nov. 8, 1967	N	U	--	--	--	
603	do.	1966	86	16	To	2,735	22.3	Nov. 2, 1967	T,G	Irr	† 520	--	--	Cased to 21 ft. Reported discharge from 2 wells irrigates 130 acres.
604	do.	1965	66	16	To	2,728	11	Nov. 1967	T,G	Irr	† 450	--	--	Cased to 46 ft.

* For analyses of water from wells and springs in Wheeler and Eastern Gray Counties, see Table 7.
† Reported or estimated discharge.
†† Reported or estimated drawdown.
1/ For additional records of water levels in Wheeler County, see Table 6.

Table 6.—Records of Water Levels in Wheeler County

WELL	DATE	WATER LEVEL FEET BELOW LAND SURFACE
ZB-05-29-101	Jan. 15, 1956	162.73
	Jan. 20, 1957	163.24
	Apr. 16, 1958	163.10
	Mar. 21, 1960	162.90
	Feb. 1, 1961	162.84
	Apr. 3, 1967	163.85
05-29-201	Jan. 15, 1956	140.22
	Jan. 20, 1957	139.61
	Apr. 16, 1958	139.38
	Mar. 21,1960	139.10
	Feb. 1, 1961	140.40[a/]
05-29-301	Jan. 15, 1956	120.30
	Jan. 20, 1957	122.13
	Apr. 16, 1958	121.81
	Mar. 21, 1960	121.48
	Feb. 1, 1961	121.63
	Mar. 24, 1967	124.91
05-29-501	July 15, 1955	107.08
	Jan. 15, 1956	107.88
	Jan. 20, 1957	104.72
	Apr. 16, 1958	104.03
	Mar. 21, 1960	103.56
	Feb. 1, 1961	103.33
	Mar. 23, 1967	109.83
05-29-801	Jan. 15, 1956	17.05
	Jan. 20, 1957	36.46[b/]
	Apr. 16, 1958	17.41
	Mar. 21, 1960	14.90
	Feb. 1, 1961	15.72
	Mar. 21, 1967	18.90
05-30-501	Jan. 11, 1953	97.59
	Jan. 12, 1954	98.32
	Jan. 11, 1955	98.86
	Jan. 14, 1956	99.59
	Jan. 20, 1957	100.41
	Apr. 15, 1958	101.48
	July 15, 1958	101.82
	Mar. 16, 1960	102.74
	Feb. 3, 1961	105 [c/]
	Apr. 6, 1967	103.99
05-30-502	Jan. 11, 1953	70.63
	Jan. 12, 1954	71.51
	Jan. 11, 1955	72.14
	Jan. 14, 1956	71.68
	Jan. 20, 1957	76.88
	Apr. 6, 1967	77.71
05-30-802	July 16, 1956	65.68
	Mar. 21, 1960	65.58
	Feb. 3, 1961	65.28
	Apr. 6, 1967	64.78
05-31-201	Jan. 11, 1953	111.86
	Jan. 12, 1954	111.97
	Jan. 11, 1955	111.66
	Jan. 14, 1956	111.78
	Jan. 20, 1957	112.11
	July 15, 1958	115.95
	Mar. 16, 1960	111.63
	Feb. 1, 1961	108.94[a/]
05-31-301	Feb. 8, 1952	63.15
	Jan. 11, 1953	62.49
	Jan. 12, 1954	62.44
	Jan. 11, 1955	61.60
	Jan. 14, 1956	61.52
ZB-05-31-501	Feb. 8, 1952	36.88
	Jan. 11, 1953	37.85
	Jan. 12, 1954	37.76
	Jan. 11, 1955	37.69
	Jan. 14, 1956	37.26
	July 15, 1958	38.48
	Mar. 16, 1960	36.78
05-38-102	Jan. 15, 1956	1.91
	Jan. 20, 1957	2.35
	July 15, 1958	2.14
	Mar. 22, 1960	0.79
	Feb. 3, 1961	0.81
	May 3, 1967	1.60
05-38-602	July 12, 1955	11.46
	Jan. 15, 1956	32.82
	Jan. 20, 1957	18.77
	July 15, 1958	12.13
	Mar. 21, 1960	9.42
	Feb. 3, 1961	8.78
	May 3, 1967	20.79[a/]
05-38-801	Jan. 14, 1956	118.20
	Jan. 19, 1957	120.75
	July 16, 1958	123.18
	Mar. 22, 1960	121.54
	Feb. 14, 1961	120.39
	May 5, 1967	126.58
05-38-802	Jan. 14, 1956	86.90
	Jan. 19, 1957	96.71
	Mar. 22, 1960	91.64
	Feb. 14, 1961	89.88
	May 5, 1967	90.24
05-38-803	Jan. 19, 1957	95.35
	Mar. 22, 1960	90.14
	Feb. 14, 1961	88.74
	May 5, 1967	98.57
05-38-804	Jan. 11, 1955	73.54
	Jan. 19, 1957	80.98
	Feb. 14, 1961	82.51
	May 5, 1967	85.18
05-38-901	Jan. 12, 1954	20.65
	Jan. 19, 1957	33.7
	Feb. 14, 1961	29.85
05-38-902	Jan. 19, 1957	89.75
	Mar. 22, 1960	88.21
	Feb. 14, 1961	86.71
	May 5, 1967	87.30
05-39-201	Jan. 15, 1956	8.90
	Jan. 20, 1957	9.02
	July 15, 1958	6.46
	Mar. 21, 1960	5.00
	Feb. 3, 1961	5.35
	May 9, 1967	6.87
05-39-301	July 21, 1955	9.78
	Jan. 15, 1956	10.20
	Jan. 20, 1957	8.43
	July 15, 1958	5.54
	Mar. 21, 1960	4.11
	Feb. 3, 1961	4.48
05-39-701	Dec. 13, 1946	26.5
	Feb. 22, 1951	24.25
	Feb. 8, 1952	28.64
	Jan. 11, 1953	28.82
	Jan. 10, 1955	32.59

Table 6.—Records of Water Levels in Wheeler County—Continued

WELL	DATE	WATER LEVEL FEET BELOW LAND SURFACE
ZB-05-39-701 (Cont'd)	Jan. 14, 1956	28.81
	Jan. 19, 1957	28.57
	July 16, 1958	29.47
	Mar. 22, 1960	29.20
	Feb. 14, 1961	23.58
	May 9, 1967	25.36
05-39-702	Dec. 13, 1946	22.8 [a]
	Dec. 14, 1946	21.28[a]
	Feb. 22, 1951	18.60
	Jan. 11, 1953	24.19
	Jan. 10, 1955	27.47
	Jan. 14, 1956	22.47
	Jan. 19, 1957	22.33
	Feb. 14, 1961	16.94
	May 9, 1967	18.78
05-39-703	Dec. 13, 1946	32.1 [a]
	Feb. 22, 1951	27.75
	Feb. 8, 1952	32.20
	Jan. 11, 1953	35.29
	Jan. 10, 1955	36.03
	Jan. 14, 1956	31.59
	Jan. 19, 1957	31.23
	Feb. 14, 1961	27.12
	May 9, 1967	28.53
05-39-704	Dec. 14, 1946	34.88[a]
	Feb. 22, 1951	33.36
	Jan. 10, 1955	41.72
	Jan. 19, 1957	42.55
	May 9, 1967	35.92
05-39-705	Dec. 14, 1946	42.8
	Feb. 22, 1951	40.70
	Jan. 11, 1953	52.17[a]
	Jan. 19, 1957	51.10
	Mar. 22, 1960	46.37
	Feb. 14, 1961	40.51
	May 9, 1967	42.11
05-39-706	Feb. 8, 1952	66.79
	Jan. 11, 1953	70.16
	Jan. 10, 1955	72.57
	Jan. 14, 1956	67.01
	Jan. 19, 1957	66.90
	Mar. 22, 1960	68.02
	Feb. 14, 1961	62.35
	May 8, 1967	66.19
05-39-707	Feb. 22, 1951	85.71
	Feb. 8, 1952	84.48
	Jan. 11, 1953	88.27
	Jan. 12, 1954	92.90
	Jan. 10, 1955	92.45
	Jan. 14, 1956	86.58
	Jan. 19, 1957	86.27
	Mar. 22, 1960	86.67
	Feb. 14, 1961	81.57
	May 8, 1967	88.56
05-45-901	July 16, 1955	8.70
	Jan. 15, 1956	8.00
	Jan. 20, 1957	8.65
	July 16, 1958	7.92
	Mar. 30, 1960	6.54
	Feb. 3, 1961	6.72
05-45-902	Jan. 15, 1956	6.30
	Jan. 20, 1957	7.02
	July 16, 1958	5.89
	Mar. 30, 1960	3.12
	Feb. 3, 1961	3.70
ZB-05-45-903	Jan. 15, 1956	26.38
	Jan. 20, 1957	27.54
	July 16, 1958	25.99
	Mar. 30, 1960	23.64
	Feb. 3, 1961	24.28
05-46-601	Jan. 15, 1956	34.84
	Jan. 20, 1957	37.26
	July 15, 1958	34.71
	Mar. 17, 1960	33.42
	Feb. 3, 1961	30.66
	Mar. 24, 1967	44.25
05-46-602	July 12, 1955	28.08
	Jan. 15, 1956	29.77
	Jan. 20, 1957	32.28
	July 15, 1958	29.26
	Mar. 17, 1960	28.89
	Feb. 3, 1961	24.99
	May 25, 1967	38.67
05-46-603	July 15, 1958	30.81
	Mar. 17, 1960	28.93
	Feb. 3, 1961	26.34
	May 24, 1967	54.70
05-46-604	July 16, 1958	34.28
	Mar. 17, 1960	33.10
	Feb. 3, 1961	30.09
	May 23, 1967	34.65
05-47-201	Jan. 14, 1956	25.11
	Jan. 20, 1957	23.93
	July 15, 1958	21.68
	Mar. 17, 1960	16.20
	Feb. 3, 1961	12.18
	May 25, 1967	20.69
05-47-202	Jan. 14, 1956	11.15
	Jan. 20, 1957	12.52[a]
	July 15, 1958	10.89
	Mar. 17, 1960	11.00
	Feb. 3, 1961	11.02
	May 25, 1967	13.39
05-53-502	Jan. 15, 1956	97.52[a]
	Jan. 21, 1957	28.65
	July 16, 1958	28.20
	Mar. 17, 1960	25.59
	Feb. 3, 1961	24.12
	June 13, 1967	26.62
05-53-503	Jan. 15, 1956	16.40
	Jan. 21, 1957	17.62
	July 16, 1958	16.54[a]
	Mar. 17, 1960	13.52
	Feb. 3, 1961	12.41
	June 13, 1967	13.52
05-54-601	July 16, 1955	18.08
	Jan. 15, 1956	19.39
	Jan. 21, 1957	21.67
	July 16, 1958	21.08
	Mar. 17, 1960	14.89
	Feb. 3, 1961	12.05
	June 15, 1967	15.45

[a] Recently pumped.
[b] Pumping level.
[c] Estimated.

Table 7.—Chemical Analyses of Water From Selected Wells and Springs

(Analyses given are in milligrams per liter except specific conductance, pH, percent sodium, sodium adsorption ratio, and residual sodium carbonate.)

Water-bearing unit: Qal_3, Quaternary Dune Sand; Qal_1, Quaternary alluvium, low terrace and channel fill deposits; Qal_2, Quaternary alluvium, high terrace plain deposits; To, Tertiary Ogallala; Pw, Permian Whitehorse; Pdb, Permian Dog Creek and Blaine; Pf, Permian Flowerpot.

WELL	DEPTH OR PRODUCING INTERVAL (FT)	DATE OF COLLECTION	WATER BEARING UNIT	SILICA (SiO_2)	IRON (Fe)	MANGANESE (Mn)	CALCIUM (Ca)	MAGNESIUM (Mg)	SODIUM AND POTASSIUM		BICARBONATE (HCO_3)	SULFATE (SO_4)	CHLORIDE (Cl)	FLUORIDE (F)	NITRATE (NO_3)	PHOSPHATE (PO_4)	BORON (B)	DISSOLVED SOLIDS	HARDNESS AS $CaCO_3$	PERCENT SODIUM	SODIUM ADSORPTION RATIO (SAR)	RESIDUAL SODIUM CARBONATE (RSC)	SPECIFIC CONDUCTANCE (MICROMHOS AT 25° C)	pH
									Na	K														
Wheeler County																								
28-05-28-601	159	July 11, 1967	To	33	--	--	70	9.1	11	3.1	254	13	10	1.3	4.4	--	--	280	212	10	0.3	0.00	447	7.6
29-201	280	July 12, 1967	To	32	--	--	63	15	12	3.0	240	12	23	.6	6.4	--	--	285	219	10	.4	.00	468	7.6
403	Spring	do.	To	--	--	--	--	--	--		236	8.0	5.4	--	--	--	--	--	192	--	--	.03	388	7.7
503	Spring	do.	To	--	--	--	--	--	--		210	9.2	10	--	--	--	--	--	174	--	--	.00	370	7.2
607	178	do.	To	40	--	--	66	8.3	12	1.9	215	18	23	.9	2.2	--	--	278	199	11	.4	.00	435	7.8
712	174	do.	To	30	--	--	39	19	14	4.6	220	12	11	.7	5.0	--	--	243	175	14	.5	.10	392	7.7
802	260	do.	To	32	--	0.00	48	19	22	5.0	243	20	19	.8	3.8	0.00	0.07	289	198	19	.7	.02	464	7.6
30-201	84	do.	To	--	--	--	--	--	--		257	14	9.8	--	--	--	--	--	202	--	--	.17	449	7.7
301	23	do.	Qal_3, To	22	--	--	66	6.6	4.4	.7	222	5.6	3.0	.3	12	--	--	230	192	5	.1	.00	372	7.6
302	300	do.	To	18	0.00	.00	81	3.3	5.5	.8	184	10	8.4	.1	55	.00	.18	272	216	5	.2	.00	455	7.7
409	385	July 11, 1967	To	22	--	--	48	13	13	2.7	210	13	14	.9	1.8	--	--	218	173	14	.4	.00	386	7.8
501	153	July 12, 1967	To	--	--	--	50	2.5	--		174	1.2	2.0	--	--	--	--	--	135	--	--	.15	273	7.8
702	--	do.	To	--	--	--	--	--	--		228	14	18	--	--	--	--	--	192	--	--	.00	429	7.7
706	Spring	do.	To	--	--	--	--	--	--		296	10	16	--	--	--	--	--	196	--	--	.93	503	7.5
805	20	do.	Qal_3, To	23	--	--	43	2.4	6.7	1.0	138	4.8	1.8	.5	16	--	--	167	117	11	.3	.00	258	7.8
901	76	do.	To	27	--	--	60	6.6	16	1.8	222	12	4.4	.4	16	--	--	253	177	16	.5	.10	399	7.6
902	Spring	do.	To	--	--	--	--	--	--		294	7.6	6.4	--	--	--	--	--	224	--	--	.34	459	8.0
31-101	460	do.	To	--	--	--	58	5.7	--		218	6.4	2.4	--	--	--	--	--	168	--	--	.21	359	7.6
201	158	do.	To	28	--	--	53	8.4	12	1.4	218	8.0	4.6	.3	2.0	--	--	225	167	13	.4	.24	356	8.0
303	103	do.	To	--	--	--	62	3.8	--		229	6.0	3.2	--	--	--	--	--	170	--	--	.35	373	7.7
402	133	July 13, 1967	To	28	--	--	54	3.6	10	1.1	198	4.0	2.8	.3	2.0	--	--	203	150	13	.4	.25	320	7.7
504	58	July 12, 1967	To	--	--	--	71	4.6	--		212	12	1.8	--	29	--	--	--	196	--	--	.00	406	8.0
602	80	June 22, 1961	Qal_3, To	34	--	--	74	5.1	*23		256	10	9.5	.4	26	--	--	308	206	20	.7	.09	487	7.2
606	40	July 13, 1967	Qal_3, To	--	--	--	92	5.5	--		262	16	15	--	32	--	--	--	252	--	--	.00	534	7.5
702	153	do.	Qal_3, To	--	--	--	49	6.2	--		212	8.0	3.0	--	--	--	--	--	148	--	--	.52	353	7.8
901	73	do.	Qal_3, To	31	--	--	60	7.3	29	1.6	260	18	5.4	.7	5.7	--	--	287	180	26	.9	.67	448	7.7
903	Spring	do.	Qal, To	--	--	--	--	--	--		169	14	7.0	--	--	--	--	--	110	--	--	.57	306	7.5
32-102	219	do.	To	25	--	.00	67	3.3	14	1.2	244	5.2	4.0	.2	5.2	.00	.02	245	181	14	.5	.38	395	7.6
201	208	do.	To	--	--	--	--	--	--		244	4.8	3.0	--	--	--	--	--	184	--	--	.32	383	7.7
302	123	do.	To	22	--	--	67	7.7	22	1.8	276	8.0	10	.2	.2	--	--	275	199	19	.7	.55	456	7.5

See footnotes at end of table.

Table 7.--Chemical Analyses of Water From Selected Wells and Springs--Continued

WELL	DEPTH OR PRODUCING INTERVAL (FT)	DATE OF COLLECTION	WATER BEARING UNIT	SILICA (SiO_2)	IRON (Fe)	MANGANESE (Mn)	CALCIUM (Ca)	MAGNESIUM (Mg)	SODIUM AND POTASSIUM Na	SODIUM AND POTASSIUM K	BICARBONATE (HCO_3)	SULFATE (SO_4)	CHLORIDE (Cl)	FLUORIDE (F)	NITRATE (NO_3)	PHOSPHATE (PO_4)	BORON (B)	DISSOLVED SOLIDS	HARDNESS AS $CaCO_3$	PERCENT SODIUM	SODIUM ADSORPTION RATIO (SAR)	RESIDUAL SODIUM CARBONATE (RSC)	SPECIFIC CONDUCTANCE (MICROMHOS AT 25° C)	pH
									Wheeler County															
28-05-32-403	63	July 13, 1967	To	24	--	--	58	5.3	11	1.5	221	5.6	3.2	0.3	3.2	--	--	221	166	12	0.4	0.29	356	7.6
502	28	July 14, 1967	Qal_3, To	27	--	--	65	8.9	19	1.5	246	20	8.8	.3	7.6	--	--	279	199	17	.6	.06	444	7.5
602	138	July 13, 1967	To	--	--	--	--	--		--	246	5.2	5.6	--	--	--	--	--	184	--	--	.35	393	7.8
701	Spring	July 14, 1967	To	--	--	--	--	--		--	184	37	9.6	--	--	--	--	--	138	--	--	.26	382	7.7
702	Spring	do.	To, Pw	--	--	--	--	--		--	508	241	63	--	--	--	--	--	438	--	--	.00	1,310	8.0
801	39	do.	Qal_3, To	--	--	--	--	--		--	282	17	9.6	--	--	--	--	--	212	--	--	.38	478	7.7
901	84	July 27, 1967	Qal_3, To	25	--	--	78	5.4	27	1.0	267	22	6.0	.3	28	--	--	324	216	21	.8	.05	515	7.6
36-301	135	July 24, 1967	To	28	--	--	68	4.4	9.2	1.5	190	3.8	2.6	.7	56	--	--	267	188	10	.3	.00	413	7.8
303	95	do.	To	27	--	--	77	4.4	14	1.0	234	7.8	9.2	.7	31	--	--	287	210	13	.4	.00	469	7.6
601	152	do.	To	--	--	--	--	--		--	229	13	14	--	--	--	--	--	184	--	--	.07	426	7.8
902	80	do.	Pw	36	--	--	222	45	108	2.4	308	534	122	1.0	2.8	--	--	1,220	739	24	1.7	.00	1,690	7.6
37-101	120	do.	To	--	--	--	--	--		--	187	4.8	3.6	--	--	--	--	--	152	--	--	.02	310	7.5
103	Spring	July 25, 1967	To	--	--	--	--	--		--	290	18	15	--	--	--	--	--	226	--	--	.23	511	7.6
218	144	do.	To	29	--	--	58	9.9	14	2.1	234	7.2	11	.3	7.3	--	--	254	185	14	.4	.13	409	8.1
309	90	do.	To	--	--	--	--	--		--	234	16	11	--	34	--	--	--	196	--	--	.00	485	7.8
401	42	July 24, 1967	To	27	--	--	65	4.0	21	1.2	232	8.0	5.2	.5	27	--	--	273	179	20	.7	.23	426	7.7
402	Spring	do.	To	--	--	--	--	--		--	280	10	13	--	--	--	--	--	212	--	--	.35	477	7.8
504	83	July 25, 1967	To	--	--	--	--	--		--	216	4.8	9.0	--	--	--	--	--	186	--	--	.00	379	7.6
603	146	do.	To	27	0.01	--	52	18	30	1.8	264	24	17	.4	8.0	--	--	308	204	24	.9	.26	499	7.8
702	41	July 24, 1967	Pw	--	--	--	--	--		--	320	1,770	64	--	--	--	--	--	2,100	--	--	.00	3,180	7.6
801	80	July 25, 1967	Pw	47	--	--	550	106	76	2.0	134	1,730	25	.5	17	--	--	2,620	1,810	8	.8	.00	2,780	7.5
902	41	do.	Pw	--	--	--	--	--		--	296	1,560	79	--	--	--	--	--	1,800	--	--	.00	2,870	7.6
38-106	248	do.	To	26	--	--	75	2.8	34	2.5	244	13	5.4	.2	65	--	--	344	198	27	1.1	.03	540	7.6
207	59	July 26, 1967	To	--	--	--	--	--		--	286	42	26	--	17	--	--	--	256	--	--	.00	612	7.8
303	13	July 27, 1967	To	47	--	--	66	20	32	.5	340	27	3.7	1.6	3.5	--	--	368	247	22	.9	.63	556	7.9
405	160	July 25, 1967	To	--	--	--	--	--		--	272	11	7.6	--	24	--	--	--	232	--	--	.00	492	7.6
504	125	July 26, 1967	To	32	.00	--	76	5.2	32	1.1	286	15	8.8	.5	29	0.03	0.04	341	211	25	1.0	.47	528	7.6
509	Spring	do.	To	--	--	--	--	--		--	226	17	29	--	--	--	--	--	160	--	--	.50	477	7.2
601	125	Dec. 13, 1960	To	32	.00	0.01	71	9.8	18	.6	242	12	6.5	1.1	43	.02	.06	313	218	15	.5	.00	500	7.1
607	95	July 26, 1967	To, Pw	--	--	--	--	--		--	364	41	13	--	--	--	--	--	156	--	--	2.85	751	7.9
608	Spring	do.	To, Pw	39	--	--	84	17	95	5.3	432	53	49	1.0	8.3	--	--	564	280	42	2.5	1.49	866	8.2
701	25	July 25, 1967	Qal_1, Pw	28	--	--	192	51	54	2.1	314	494	33	.8	.5	--	--	1,010	689	15	.9	.00	1,360	7.6
804	134	July 28, 1967	To	23	.00	--	74	2.6	8.5	.9	194	9.6	4.6	.4	45	.02	.30	264	195	9	.3	.00	431	7.4

See footnotes at end of table.

Table 7.--Chemical Analyses of Water From Selected Wells and Springs--Continued

WELL	DEPTH OR PRODUCING INTERVAL (FT)	DATE OF COLLECTION	WATER BEARING UNIT	SILICA (SiO_2)	IRON (Fe)	MANGANESE (Mn)	CALCIUM (Ca)	MAGNESIUM (Mg)	SODIUM AND POTASSIUM Na	SODIUM AND POTASSIUM K	BICARBONATE (HCO_3)	SULFATE (SO_4)	CHLORIDE (Cl)	FLUORIDE (F)	NITRATE (NO_3)	PHOSPHATE (PO_4)	BORON (B) (PO_4)	DISSOLVED SOLIDS	HARDNESS AS $CaCO_3$	PERCENT SODIUM	SODIUM ADSORPTION RATIO (SAR)	RESIDUAL SODIUM CARBONATE (RSC)	SPECIFIC CONDUCTANCE (MICROMHOS AT 25° C)	pH
									Wheeler County															
28-05-38-906	34	July 26, 1967	Qal_3, Pw	27	--	--	98	17	25	0.5	388	17	24	0.4	1.2	--	--	401	314	15	0.6	0.07	666	7.7
39-101	53	July 27, 1967	To	--	--	--	--	--	--	--	272	49	15	--	--	--	--	--	220	--	--	.06	592	7.7
201	44	July 26, 1967	Qal_1	36	--	--	128	29	45	1.7	264	250	35	.4	24	--	--	679	439	18	.9	.00	977	7.5
203	23	July 27, 1967	Qal_1, Pw	--	--	--	--	--	--	--	286	1,370	73	--	--	--	--	--	1,300	--	--	.00	2,700	7.7
406	69	do.	Pw	26	--	--	545	131	47	3.2	60	1,810	56	.8	4.1	--	--	2,650	1,900	5	.5	.00	2,810	7.7
407	Spring	do.	To, Pw	--	--	--	--	--	--	--	396	119	65	--	--	--	--	--	228	--	--	1.93	1,020	7.8
502	35	do.	To, Pw	--	--	--	--	--	--	--	302	21	38	--	--	--	--	--	308	--	--	.00	744	7.6
604	66	do.	To	22	--	--	57	1.9	10	.5	180	8.8	1.3	.5	20	--	--	211	150	13	.4	.00	330	7.8
704	66	Dec. 13, 1946	To	18	0.04	--	68	4.5	7.2	1.7	202	7.6	6.0	.0	30	--	--	261	188	8	.2	.00	408	7.4
704	66	July 27, 1967	To	20	--	--	62	4.0	9.9	.6	190	10	1.9	.3	32	0.00	0.07	234	171	11	.3	.00	373	7.8
803	65	do.	Pw	44	--	--	305	66	86	1.6	118	924	100	.3	40	--	--	1,620	1,030	15	1.2	.00	1,990	7.5
901	58	do.	Pw	--	--	--	--	--	--	--	382	13	30	--	--	--	--	--	344	--	--	.00	741	7.8
904	110	do.	Pw	55	.00	--	450	90	63	1.8	184	1,360	44	.7	5.3	--	--	2,160	1,490	8	.7	.00	2,370	7.9
40-102	53	July 14, 1967	Qal_1, Pw	28	--	--	124	31	68	1.8	280	316	23	.8	2.2	--	--	733	437	25	1.4	.00	1,040	7.5
201	29	July 28, 1967	To	--	--	--	--	--	--	--	358	19	13	--	--	--	--	--	133	--	--	3.21	589	7.6
203	23	do.	Pw	44	--	--	498	136	135	2.7	248	1,540	210	--	1.0	--	--	2,690	1,800	14	1.4	.00	3,070	8.0
303	49	July 27, 1967	Pw	25	--	--	77	24	34	.8	396	15	8.5	.7	16	--	--	396	290	20	.9	.68	644	7.6
403	113	July 28, 1967	Pw	--	--	--	--	--	--	--	176	932	48	--	--	--	--	--	1,140	--	--	.00	1,840	8.0
507	140	do.	To, Pw	44	--	--	38	27	29	1.1	264	10	17	.4	24	--	--	320	206	23	.9	.21	499	7.9
603	103	July 27, 1967	Qal_1	49	.01	--	86	16	36	1.7	248	122	8.1	.5	19	--	--	460	280	22	.9	.00	655	7.7
710	Spring	do.	Pw	--	--	--	--	--	--	--	192	1,660	53	--	--	--	--	--	1,790	--	--	.00	2,810	7.8
802	Spring	Aug. 8, 1967	Pw	--	--	--	--	--	--	--	116	1,860	78	--	--	--	--	--	1,940	--	--	.00	3,050	7.2
901	44	July 27, 1967	Pw	57	--	--	74	51	13	1.3	412	18	21	.4	47	--	--	486	394	7	.3	.00	739	7.9
44-301	96	July 28, 1967	Pw	--	--	--	--	--	--	--	266	18	17	--	--	--	--	--	204	--	--	.28	512	7.7
606	128	do.	To	24	--	--	66	2.9	11	1.1	215	7.8	7.3	.5	10	--	--	237	177	12	.4	.00	380	7.6
902	195	Dec. 13, 1960	To	30	.01	0.01	92	10	28	1.6	254	77	20	.4	27	.00	.16	429	270	18	.7	.00	643	7.0
904	200	Oct. 5, 1967	To	25	.00	.00	65	8.4	37	2.1	236	50	11	.2	16	.01	.06	331	196	29	1.2	.00	515	7.8
45-103	71	Aug. 7, 1967	To	24	--	--	74	5.9	38	1.9	304	16	16	.6	2.0	--	--	327	209	28	1.1	.80	537	7.5
202	150	do.	Pw	--	--	--	--	--	--	--	234	70	360	--	--	--	--	--	528	--	--	.00	1,620	7.5
304	43	do.	Qal_1	28	--	--	189	20	66	1.7	268	333	71	.5	38	--	--	879	554	21	1.2	.00	1,260	7.5
407	88	do.	To	--	--	--	--	--	--	--	232	5.6	4.6	--	--	--	--	--	190	--	--	.00	398	7.5
501	91	do.	To	--	--	--	--	--	--	--	220	21	24	--	--	--	--	--	208	--	--	.00	462	7.5
502	156	do.	To	19	--	--	67	6.2	15	1.9	232	23	10	.5	.0	--	--	257	193	14	.5	.00	430	7.4

See footnotes at end of table.

Table 7.--Chemical Analyses of Water From Selected Wells and Springs--Continued

WELL	DEPTH OR PRODUCING INTERVAL (FT)	DATE OF COLLECTION	WATER BEARING UNIT	SILICA (SiO_2)	IRON (Fe)	MANGANESE (Mn)	CALCIUM (Ca)	MAGNESIUM (Mg)	SODIUM AND POTASSIUM		BICARBONATE (HCO_3)	SULFATE (SO_4)	CHLORIDE (Cl)	FLUORIDE (F)	NITRATE (NO_3)	PHOSPHATE (PO_4)	BORON (B)	DISSOLVED SOLIDS	HARDNESS AS $CaCO_3$	PERCENT SODIUM	SODIUM ADSORPTION RATIO (SAR)	RESIDUAL SODIUM CARBONATE (RSC)	SPECIFIC CONDUCTANCE (MICROMHOS AT 25° C)	pH
									Na	K														
Wheeler County																								
ZB-05-43-601	78	Aug. 7, 1967	To	--	--	--	--	--	--		286	21	11	--	--	--	--	--	228	--	--	0.13	563	7.8
702	120	do.	To,Pw	28	--	--	115	11	33	2.2	280	102	42	0.4	12	--	--	484	332	18	0.8	.00	758	7.4
706	Spring	do.	Pw	--	--	--	--	--	--		340	242	80	--	--	--	--	--	348	--	--	.00	1,180	7.9
905	105	do.	To	--	--	--	--	--	--		282	13	14	--	--	--	--	--	256	--	--	.00	600	7.7
46-101	82	do.	Pw,Qal	24	--	--	154	14	39	1.6	272	235	35	.4	15	--	--	652	442	16	.8	.00	952	7.7
202	35	Aug. 8, 1967	Qal_1	--	--	--	--	--	--		310	2,100	88	--	--	--	--	--	2,360	--	--	.00	3,470	7.6
302	25	do.	Pw	41	--	--	480	790	524	3.3	340	4,850	210	--	14	--	--	7,080	4,450	20	3.4	.00	6,960	7.8
401	60	do.	Qal_1	29	--	--	108	15	41	1.0	320	52	58	.8	26	--	--	488	331	21	1.0	.00	796	7.6
402	Spring	Aug. 7, 1967	Pdb	--	--	--	--	--	--		288	1,590	238	--	--	--	--	--	1,850	--	--	.00	3,320	7.8
502	34	do.	Qal_1	--	--	--	--	--	--		204	589	48	--	--	--	--	--	800	--	--	.00	1,440	7.5
604	52	Aug. 8, 1967	Pdb	24	--	--	635	43	85	3.0	282	1,530	78	1.6	26	--	--	2,560	1,760	9	.9	.00	2,810	7.3
701	107	Aug. 7, 1967	Pw	20	--	--	635	70	118	2.5	188	1,580	228	.7	19	--	---	2,770	1,870	12	1.2	.00	3,170	7.6
703	75	do.	To	26	--	--	55	5.9	17	1.1	222	8.4	5.3	.4	3.2	--	--	231	161	19	.6	.41	370	7.9
806	62	Aug. 8, 1967	Pdb	--	--	--	--	--	--		196	1,450	72	--	--	--	--	--	1,720	--	--	.00	2,600	7.4
901	63	do.	Pdb	17	--	--	568	63	78	3.0	204	1,460	128	.8	17	--	--	2,430	1,680	9	.8	.00	2,730	7.5
47-102	39	do.	Pw	--	--	--	--	--	--		298	1,850	9.5	--	--	--	--	--	2,150	--	--	.00	2,950	7.5
206	Spring	do.	Pw	53	--	--	550	108	125	4.1	168	1,830	39	--	39	--	--	2,830	1,820	13	1.3	.00	3,010	7.7
308	Spring	do.	Pw	--	--	--	--	--	40	--	300	1,380	39	--	18	--	--	--	1,700	--	--	.00	2,510	7.9
309	Spring	Aug. 9, 1967	Pw	--	--	--	--	--	--		266	1,320	8.8	--	--	--	--	--	1,540	--	--	.00	2,330	7.8
406	126	Aug. 8, 1967	Pw	16	--	--	552	142	73	2.6	56	1,940	58	.8	3.0	--	--	2,820	1,960	7	.7	.00	2,960	7.4
503	97	do.	Pw	--	--	--	--	--	--		61	1,180	32	--	--	--	--	--	1,240	--	--	.00	2,100	7.9
602	36	do.	Pw	46	--	--	300	124	164	14	264	1,140	126	1.0	113	--	--	2,160	1,260	22	2.0	.00	2,660	7.6
701	90	do.	Pdb	--	--	--	--	--	--		108	1,600	2,050	--	--	--	--	--	3,540	--	--	.00	7,790	7.4
801	21	Aug. 9, 1967	Qal_1	32	--	--	128	30	30	1.2	284	230	22	.7	12	--	--	626	443	13	.6	.00	913	7.5
902	48	do.	Qal_2,Pw	--	--	--	--	--	--		364	512	89	--	--	--	--	--	675	--	--	.00	1,680	7.8
48-102	94	Aug. 8, 1967	Pw	28	--	--	42	52	14	1.5	290	55	36	.6	9.4	--	--	382	319	9	.3	.00	650	7.4
103	Spring	do.	Pw	--	--	--	--	--	--		364	744	62	--	--	--	--	--	970	--	--	.00	1,820	8.3
301	55	do.	Pw	49	--	--	430	122	79	1.6	184	1,420	96	.6	23	--	--	2,310	1,580	10	.9	.00	2,630	7.6
401	36	Aug. 9, 1967	Pw	--	--	--	--	--	14	--	300	258	5.7	--	40	--	--	--	520	--	--	.00	941	7.6
402	Spring	do.	Pw	--	--	--	--	--	--		726	656	7.9	--	--	--	--	--	1,220	--	--	.00	1,910	7.8
503	120	Aug. 8, 1967	Pw	53	--	--	117	57	14	1.3	262	302	24	.8	2.2	--	--	700	526	5	.3	.00	980	7.7
601	44	do.	Pw	--	--	--	--	--	--		296	292	43	--	--	--	--	--	545	--	--	.00	1,060	7.9
603	105	do.	Pw	--	--	--	--	--	--		156	1,240	47	--	--	--	--	--	1,430	--	--	.00	2,210	7.7

See footnotes at end of table.

Table 7.--Chemical Analyses of Water From Selected Wells and Springs--Continued

WELL	DEPTH OR PRODUCING INTERVAL (FT)	DATE OF COLLECTION	WATER BEARING UNIT	SILICA (SiO_2)	IRON (Fe)	MANGANESE (Mn)	CALCIUM (Ca)	MAGNESIUM (Mg)	SODIUM AND POTASSIUM		BICARBONATE (HCO_3)	SULFATE (SO_4)	CHLORIDE (Cl)	FLUORIDE (F)	NITRATE (NO_3)	PHOSPHATE (PO_4)	BORON (B)	DISSOLVED SOLIDS	HARDNESS AS $CaCO_3$	PERCENT SODIUM	SODIUM ADSORPTION RATIO (SAR)	RESIDUAL SODIUM CARBONATE (RSC)	SPECIFIC CONDUCTANCE (MICROMHOS AT 25° C)	pH
									Na	K														
Wheeler County																								
ZB-05-48-701	78	Aug. 9, 1967	Qal_2,Pw	36	--	--	68	22	106	1.0	340	118	56	0.7	0.0	--	--	575	260	47	2.9	0.37	899	7.2
801	Spring	do.	Qal_2	--	--	--	--	--	--	--	450	23	14	--	--	--	--	--	306	--	--	.15	743	8.3
803	90	do.	Qal_2,Pw	33	--	--	106	26	128	1.6	444	162	70	.4	35	--	--	780	372	43	2.9	.00	1,200	7.7
904	100	do.	Pw	34	--	--	425	106	192	2.8	132	1,030	520	--	3.2	--	--	2,380	1,500	22	2.2	.00	3,240	7.3
52-302	134	do.	To	27	--	--	77	5.8	13	1.3	244	10	4.9	.5	39	--	--	298	216	12	.4	.00	471	7.7
602	81	do.	To,Pw	--	--	--	--	--	--	--	426	24	7.5	--	--	--	--	--	192	--	--	3.14	760	7.6
53-201	82	do.	To,Pw	--	--	--	--	--	--	--	290	122	23	--	--	--	--	--	324	--	--	.00	737	7.5
303	21	do.	Qal_1	33	--	--	168	39	294	.6	604	364	249	1.6	14	--	--	1,460	580	52	5.3	.00	2,230	7.6
501	62	do.	Pw	--	--	--	--	--	--	--	472	476	124	--	--	--	--	--	365	--	--	.00	1,900	7.6
603	104	do.	Pw	31	--	--	365	62	286	2.1	324	1,260	107	.3	43	--	--	2,320	1,170	35	3.6	.00	2,920	7.6
54-202	108	do.	Pw	29	--	--	116	24	119	2.4	334	280	74	.6	3.2	--	--	812	388	40	2.6	.00	1,210	7.7
204	90	do.	Pdb	--	--	--	--	--	--	--	236	1,640	134	--	--	--	--	--	1,940	--	--	.00	3,010	7.5
408	137	do.	Pw	--	--	--	--	--	--	--	374	61	132	--	--	--	--	--	426	--	--	.00	1,120	7.6
501	64	do.	Pdb	--	--	--	--	--	--	--	416	25	8.9	--	--	--	--	--	404	--	--	.00	764	7.7
55-101	60	do.	Pdb	--	--	--	--	--	--	--	256	1,580	106	--	--	--	--	--	1,960	--	--	.00	2,900	7.5
203	122	Aug. 10, 1967	Qal_2,Pw	26	--	--	55	16	34	1.4	276	20	6.6	.5	30	--	--	326	203	27	1.0	.46	523	7.8
311	92	do.	Qal_2,Pw	26	--	--	79	22	95	2.1	478	54	19	.3	33	--	--	565	288	42	2.4	2.08	887	7.7
401	53	Aug. 9, 1967	Pdb	19	--	--	575	59	55	2.6	216	1,140	120	.9	52	--	--	2,330	1,680	7	.6	.00	2,670	7.8
503	82	Aug. 10, 1967	Pdb	--	--	--	--	--	--	--	254	1,540	43	--	--	--	--	--	1,810	--	--	.00	2,690	7.4
605	87	do.	Pdb	23	--	--	632	77	40	2.8	231	1,580	61	.8	90	--	--	2,620	1,890	4	.4	.00	2,810	7.3
56-103	60	do.	Pdb	--	--	--	--	--	--	--	284	1,600	67	--	--	--	--	--	1,830	--	--	.00	2,900	7.3
203	Spring	do.	Pdb	--	--	--	--	--	--	--	234	1,740	820	--	--	--	--	--	2,440	--	--	.00	4,940	7.7
303	75	do.	Pdb	--	--	--	--	--	--	--	326	1,940	66	--	--	--	--	--	2,200	--	--	.00	3,330	7.2
408	94	do.	Pdb	--	--	--	--	--	--	--	304	1,500	210	--	--	--	--	--	1,870	--	--	.00	3,110	7.2
502	45	do.	Qal_1	7.7	--	--	492	147	39	5.1	137	1,710	36	.7	1.2	--	--	2,310	1,830	4	.4	.00	2,700	7.1
601	67	do.	Pdb	20	--	--	602	98	75	3.0	268	1,710	38	.9	31	--	--	2,710	1,900	8	.7	.00	2,880	7.3
Eastern Gray County																								
KS-05-27-801	135	Dec. 5, 1967	To	24	--	--	47	3.6	7.1	2.4	168	5.4	2.5	1.0	9.6	--	--	188	140	10	.3	.00	295	7.8
28-801	370	do.	To	28	--	--	46	18	44	5.0	246	34	30	1.0	4.8	--	--	332	189	33	1.4	.25	539	7.5
34-605	125	do.	To,Pw	27	--	--	66	18	128	4.1	236	76	171	.9	5.0	--	--	612	238	53	3.6	.00	1,050	7.5
701	228	Dec. 7, 1967	To	27	--	--	44	19	19	3.6	234	13	15	.7	3.0	--	--	259	188	18	.6	.08	427	7.6
901	88	do.	To	--	--	--	--	--	--	--	193	7.0	8.5	--	--	--	--	--	186	--	--	.00	385	7.5
35-102	171	Dec. 8, 1967	To	--	--	--	--	--	--	--	211	11	7.7	--	--	--	--	--	181	--	--	.00	376	7.5

See footnotes at end of table.

Table 7.--Chemical Analyses of Water From Selected Wells and Springs--Continued

WELL	DEPTH OR PRODUCING INTERVAL (FT)	DATE OF COLLECTION	WATER BEARING UNIT	SILICA (SiO_2)	IRON (Fe)	MANGANESE (Mn)	CALCIUM (Ca)	MAGNESIUM (Mg)	SODIUM AND POTASSIUM Na	SODIUM AND POTASSIUM K	BICARBONATE (HCO_3)	SULFATE (SO_4)	CHLORIDE (Cl)	FLUORIDE (F)	NITRATE (SO_3)	PHOSPHATE (PO_4)	BORON (B)	DISSOLVED SOLIDS	HARDNESS AS $CaCO_3$	PERCENT SODIUM	SODIUM ADSORPTION RATIO (SAR)	RESIDUAL SODIUM CARBONATE (RSC)	SPECIFIC CONDUCTANCE (MICROMHOS AT 25° C)	pH
Eastern Gray County																								
KS-05-35-602	55	Nov. 17, 1967	Qal_1,To	25	--	--	70	9.3	32	2.6	204	29	57	0.6	2.8	--	--	328	213	24	1.0	0.00	554	7.6
801	147	Nov. 16, 1967	Pw	19	--	--	475	103	196	4.1	59	1,850	33	1.7	1.5	--	--	2,710	1,610	21	2.1	.00	2,900	6.8
901	75	Dec. 8, 1967	To	--	--	--	--	--	--		207	5.4	3.1	--	--	--	--	--	169	--	--	.01	338	7.4
36-101	181	Nov. 16, 1967	To	--	--	--	--	--	--		195	8.0	4.9	--	--	--	--	--	164	--	--	.00	330	7.7
502	96	Nov. 15, 1967	To	--	--	--	--	--	--		228	7.2	4.1	--	--	--	--	--	179	--	--	.16	376	7.8
702	110	Nov. 14, 1967	Qal_1	21	--	--	110	25	150	3.2	246	76	305	.8	1.0	--	--	813	378	46	3.4	.00	1,410	7.5
42-201	151	Dec. 8, 1967	To	25	--	--	58	7.3	10	1.9	210	10	4.3	.5	8.7	--	--	229	175	11	.3	.00	362	7.5
401	218	Dec. 6, 1967	To	27	--	--	48	22	20	4.5	239	26	22	1.0	1.8	--	--	290	210	17	.6	.00	481	7.5
601	152	Dec. 8, 1967	To	--	--	--	--	--	--		241	48	28	--	--	--	--	--	190	--	--	.15	554	7.4
801	105	Dec. 7, 1967	To	--	--	--	--	--	--		223	15	7.7	--	--	--	--	--	182	--	--	.02	399	7.6
43-201	141	Nov. 13, 1967	To	28	--	--	50	11	24	2.8	230	14	8.6	.4	9.5	--	--	261	170	23	.8	.37	408	8.1
601	60	Nov. 14, 1967	Pw	--	--	--	--	--	--		232	22	54	--	--	--	--	--	260	--	--	.00	634	7.9
703	150	Nov. 13, 1967	Qal_1,To	27	--	--	51	15	37	3.4	226	36	30	.6	3.5	--	--	314	188	29	1.2	.00	512	7.8
801	72	Nov. 10, 1967	To	--	--	--	--	--	--		230	15	8.6	--	--	--	--	--	186	--	--	.05	417	7.7
44-202	35	Nov. 7, 1967	To,Pw	21	--	--	123	8.6	145	2.0	152	9.6	365	.1	7.1	--	--	756	342	48	3.4	.00	1,410	7.4
610	230	do.	To	--	--	--	--	--	--		256	19	16	--	--	--	--	--	211	--	--	.00	485	7.8
701	235	Nov. 1, 1967	To	--	--	--	--	--	--		252	15	19	--	--	--	--	--	210	--	--	.00	481	7.8
50-101	148	Dec. 6, 1967	To	27	--	--	63	15	46	3.3	340	21	10	.8	1.8	--	--	355	218	31	1.4	1.20	573	7.4
301	148	do.	To	--	--	--	--	--	--		251	16	18	--	--	--	--	--	223	--	--	.00	469	7.5
501	300	do.	To	28	--	--	66	14	14	2.8	270	10	11	.5	3.2	--	--	282	222	12	.4	.00	459	7.4
51-101	310	Nov. 8, 1967	To	29	0.00	0.14	67	10	16	2.3	260	11	12	.3	2.5	0.00	0.06	278	208	14	.5	.10	446	7.7
302	231	Nov. 9, 1967	To	--	--	--	--	--	--		229	14	20	--	--	--	--	--	202	--	--	.00	435	7.7
52-108	170	Nov. 3, 1967	To	29	.00	.00	70	6.5	22	1.9	226	15	19	.1	21	.00	.07	296	201	19	.7	.00	471	7.6
401	100	Nov. 9, 1967	To	--	--	--	--	--	--		221	12	6.4	--	--	--	--	--	184	--	--	.00	376	8.0

* Sodium and potassium calculated as sodium (Na).