TEXAS WATER DEVELOPMENT BOARD

REPORT 165

GROUND-WATER RESOURCES OF MOTLEY AND NORTHEASTERN FLOYD COUNTIES, TEXAS

By

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United States Geological Survey

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GROUND-WATER RESOURCES OF MOTLEY AND NORTHEASTERN FLOYD COUNTIES, TEXAS

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ABSTRACT

The principal sources of ground water in Motley County and northeastern Floyd County are the alluvial deposits of Quaternary age, the Ogallala Formation of Tertiary age, and the upper part of the Dockum Group (Trujillo Formation) of Triassic age. Rocks of Permian age supply small amounts of slightly saline to very saline water.

The alluvial deposits and the upper part of the Dockum Group are the most prolific aquifers. The average yield of irrigation wells tapping these units is about 400 gpm (gallons per minute). The Permian rocks usually yield less than 100 gpm to wells that range in depth from about 50 to over 300 feet. The alluvial deposits cover only about 25 percent of the area, but supply a large part of the water needs. The Permian rocks are used almost entirely as a source of water for domestic and stock supplies.

In 1968, about 11,200 acre-feet of ground water was pumped for municipal supply, industrial use, and irrigation; of the 11,200 acre-feet pumped, about 9,400 acre-feet was used to irrigate 6,823 acres.

Generally, the water from the Ogallala Formation and the Dockum Group is the least mineralized. The water from the Permian rocks is more highly mineralized and in some parts of the area, it is unfit for domestic use. The quality of the water in the alluvium depends upon the source of recharge.

The potential of the aquifers for further development could not be determined, but it seems highly probable that additional supplies of water could be developed from the alluvial deposits, the Ogallala Formation, and the Trujillo Formation.

GROUND-WATER RESOURCES OF MOTLEY AND NORTHEASTERN FLOYD COUNTIES, TEXAS

INTRODUCTION

Location and Extent of the Area

Motley County comprises an area of approximately 1,000 square miles along the southeastern margin of the Texas panhandle (Figure 1). Floyd County is adjacent to Motley County on the west. The northeastern part of Floyd County, an area of approximately 100 square miles, is included in the report area. Matador, the county seat of Motley County, is about 70 miles northeast of Lubbock and about 150 miles west of Wichita Falls, Texas.

Figure 1.—Location of Motley and Northeastern Floyd Counties

Purpose and Scope of the Investigation

The investigation of the ground-water resources of Motley and northeastern Floyd Counties began in June 1968 as a cooperative project of the U.S. Geological Survey and the Texas Water Development Board. The objectives of the study were to obtain basic data on the occurrence, location, and quality of the ground-water resources. Principal emphasis was placed upon those aquifers supplying water for municipal supply, industrial use, and irrigation.

The scope of the investigation included determination of the location and extent of the water-bearing formations, the chemical quality of the water they contain, the quantity of water being withdrawn and effects of the withdrawal on water levels, and the hydraulic characteristics of the aquifers.

The following items were included in the investigation:

1. A field inventory was made of 603 water wells and springs, including all public supply, irrigation, and industrial wells, and a representative number of domestic and livestock wells (Table 8). Locations of the wells and springs are shown on Figure 8.

2. Drillers' logs of approximately 100 wells were used in conjunction with other data to map the geologic units and to determine the thickness of the water-bearing units (Figure 3 and Table 1).

3. Analyses of samples from 371 wells and springs were used to determine the chemical quality of the water (Figure 6 and Table 10). Analyses of water from four wells were made to determine possible contamination from herbicides and pesticides.

4. A map showing the altitude of water levels in wells and springs (Figure 4 and Table 9) was constructed from water-level measurements. The altitude of wells and springs were determined from topographic maps prepared by the U.S. Geological Survey.

5. The quantities of water used for municipal supply, industry, and irrigation were inventoried.

Related Investigations

No detailed investigation of the water resources of this area had been made prior to this study. Broadhurst, Lang, and Shafer (1938) compiled records of wells and springs, drillers' logs, and water analyses, and prepared a

Table 1.—Lithologic Characteristics and Water-Bearing Properties of the Geologic Units

SYSTEM	SERIES	GROUP OR FORMATION		APPROX. MAX. THICKNESS (FT)	LITHOLOGY	WATER-BEARING PROPERTIES
Quaternary	Holocene and Pleistocene	Alluvium		254	Fluviatile terrace, channel, and plain deposits of clay, silt, sand, and gravel, with eolian silt and volcanic ash cover in many places.	Yields small to large quantities of fresh to moderately saline water to domestic, stock, irrigation, and public supply wells.
Tertiary	Pliocene	Ogallala Formation		100	Sand, silt, clay, gravel, and caliche. Sand, fine to coarse-grained quartz, silty in part, cemented locally by calcite and by silica, locally cross-bedded, various shades of brown, gray, and red. Minor silt and clay with caliche nodules, massive, white, gray, olive green, and maroon. Gravel, composed of pebbles and cobbles of quartz, quartzite, minor chert, igneous rock, metamorphic rock and limestone, in intraformational channel deposits and in basal conglomerate. Caliche, sandy, pisolitic, forms caprock.	Yields moderate to large quantities of fresh water to domestic, stock, industrial and irrigation wells and to springs.
	unconformity					
Triassic		Dockum Group	Trujillo Formation	80	Sandstone, fine to coarse-grained quartz, micaceous, silty, thin-bedded to massive, locally cross-bedded, indurated, gray, greenish gray, brownish red. Conglomerate of white, black, red, and yellow angular pebbles of feldspar, quartz, and granite, sandy; basal conglomerate where present, also contains petrified wood and slabs of shale, sandstone, and limestone.	Yields small to large quantities of fresh water to domestic, stock, industrial and irrigation wells and springs.
			Tecovas Formation	40	Clay and shale, sandy, silty, micaceous, locally calcareous, and lignitic, indistinctly bedded to massive, various shades of red, reddish brown, orange, green, gray, yellow, and purple.	Yields small quantities of fresh to slightly saline water to domestic and stock wells. Commonly forms aquiclude causing springs in outcrop area of Dockum Group.
	unconformity					
Permian	Ochoa Series			280	"Red bed" shale, siltstone, sandstone, gypsum, and dolomite, interbedded, mostly various shades of red. Shale, silty, abundant interbeds and veins of satinspar, evenly bedded, beds 2 to 4 inches thick, locally massive. Sandstone, fine grained, grains frosted, silty. A few gypsum and dolomite beds ½ to 3 feet thick.	Yields small quantities of fresh to moderately saline water to domestic, stock, and irrigation wells.
		Artesia Group		450	Sandstone, sand, shale, gypsum, and dolomite, interbedded. Sand and sandstone, fine-grained quartz, silty, thin bedded to massive, friable, orange brown, various shades of red mottled grayish green. Shale, sandy, in part, indistinctly bedded to massive, red. Gypsum, massive, in part banded, beds up to 12 feet thick, white, pink. Dolomite, thin, gray, discontinuous beds associated with gypsum.	Yields small to moderate quantities of slightly to very saline water to domestic and stock wells.

map showing the location of their data in Floyd County. Follett and Dante (1946) compiled similar data for Floyd County. Baker and others (1963) published the results of a ground-water reconnaissance investigation that included data in this area and surrounding counties. Miscellaneous inventories of wells, measurements of springs, and chemical analyses made by personnel of the U.S. Geological Survey are updated in this report.

A special effort was made during this investigation to check previously inventoried and sampled wells and springs to determine changes in the chemical quality of the ground water, the flow of springs, and water levels since 1937. Quality of surface water and streamflow data are published in numerous reports listed in the References.

Water-level inventories have been conducted annually by the High Plains Underground Water Conservation District No. 1 and the Texas Water Development Board in the part of Floyd County which is above the caprock escarpment that delineates the western boundary of the report area.

Economic Development

Approximately two-thirds of the area is sparsely populated ranch land. In 1960, Motley County had a population of 2,870. The 1970 county population was 2,092, of which 1,051 resided in Matador in the central part of the county. Roaring Springs, in the south-central part of the county, had a population of 299; and Flomot, in the northwestern corner of the county, had an estimated population of 100.

The economy of this area is basically agricultural, with most of the income being derived from the production of beef and breeding cattle, cotton, peanuts, and grain sorghum. Ground water is basic to this economy because much of the farmland and improved pastureland is irrigated.

Industrial development includes the production of oil and gas in the Roaring Springs oilfield and numerous gravel pits operated for the production of construction materials. Flomot and Roaring Springs are cotton ginning and shipping centers.

Physiography and Drainage

The principal topographic feature of Floyd and Motley Counties is the rugged northeastward-facing escarpment formed by the "caprock" of the Ogallala Formation. The "Breaks of the Plains", an extremely dissected erosional area, separates the Texas High Plains section of the Great Plain province from the Osage Plains section of the Central Lowlands province.

Erosional remnants of caprock, sandstone, and conglomerate form ridges and flat-topped buttes that are underlain by siltstone, shale, and dolomite. Altitudes vary from about 3,130 feet above mean sea level on the edge of the High Plains caprock to about 2,600 feet in the canyons.

The topography in the central part of Motley County is characterized by a broad, gently rolling, eastward-sloping, weathered plain broken by three major drainageways. Much of central Motley County is covered by alluvial sand and gravel interspersed with dunes and a veneer of windblown silt. The alluvial plain generally slopes from an altitude of 2,550 to 2,200 feet eastward at about 20 feet per mile. The eastern part of Motley County is characterized by moderately dissected "red beds" with "stairstep" weathering formed by the more resistant interlayers of dolomite and gypsum.

The report area is drained by the North Pease, Middle Pease, and the South Pease Rivers and their tributaries. The streams originate on the High Plains and flow east and northeast.

Much of the surface runoff is absorbed by alluvial channel, and terrace deposits; however, part of the flow passes downstream into the Pease and Red Rivers. Low-flow (base-flow) is measured at the following U.S. Geological Survey stream-gaging stations in the area:

STATION NO.	LOCATION	NORMAL BASE-FLOW (CUBIC FEET PER SECOND)
7-3075	Quitaque Creek near Quitaque (W. F. Sauls Ranch)	3.05
7-3077	Roaring Springs near Roaring Springs (below swimming pool)	1.38
Miscellaneous site	North Pease River at U.S. Hwy. 83 bridge, 18 miles north of Paducah	0.0
Miscellaneous site	Middle Pease River at U.S. Hwy. 83 bridge, 13.5 miles north of Paducah	0.0

Climate

The average annual precipitation in Motley County is about 21 inches. About two-thirds of this amount results from thunderstorms that occur during the 6-month period, April through September. Average annual mean temperature was 61°F (16°C) for the period of record 1931-60. Average temperatures for January and July were 26°F (-3°C) and 96°F (36°C) respectively; however, during any given year, the temperature may range from 0°F (-18°C) to about 105°F (41°C). Highest and lowest temperatures recorded at Matador are 112°F (44°C) and -4°F (-20°C) respectively.

The growing season is approximately 218 days, with the first killing frost occurring about November 7. The average annual gross lake-surface evaporation is about 75 inches (Kane, 1967), which is approximately 3½ times the average annual precipitation.

Well-Numbering System

Numbers assigned to wells and springs in this report conform to the Statewide well-numbering system adopted by the Texas Water Development Board. This system is based on division of the State into quadrangles formed by degrees of latitude and longitude (Figure 2). Each 1-degree quadrangle is given a number consisting of two digits, which are the first two digits of the well number. Each 1-degree quadrangle is divided into 7½-minute quadrangles which are given two-digit numbers from 01 to 64. These are the third and fourth digits of the well number. Each 7½-minute quadrangle is divided into 2½-minute quadrangles which are given a single digit number from 1 to 9. This is the fifth digit of the well number. Finally, each well within a 2½-minute quadrangle is given a two-digit number in the order in which it was inventoried, starting with 01. These are the last two digits of the well number.

In addition to the seven-digit well number, a two-letter prefix is used to identify the county. The prefix for Motley County is TW; the prefix for Floyd County is JW.

On the map showing the locations of wells and springs (Figure 8), only the last three digits of the well number are shown at each location. The second two digits are shown in the northwest corner of each 7½-minute quadrangle, and the first two digits are shown by the large block numerals 11, 12, 22, and 23.

Acknowledgments

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HYDROLOGIC CHARACTERISTICS OF THE GEOLOGIC UNITS

The areal distribution of the geologic units exposed in Floyd and Motley Counties is shown on the geologic map (Figure 3); the thickness, lithology, and hydrologic properties of the units are given in Table 1.

The most significant water-bearing units in northeastern Floyd County and Motley County are the alluvium of Quaternary age, the Ogallala Formation of Tertiary age, and the Dockum Group of Triassic age. Rocks of Permian age yield small amounts of slightly saline to very saline water which is usually undesirable for drinking. However, in most of eastern Motley County, the Permian rocks are the only source of ground water.

Artesia Group

The oldest rocks of Permian age that are pertinent to the ground-water resources of Floyd and Motley Counties are in the Artesia Group. In general, these rocks are roughly equivalent to those frequently referred to as the Cloud Chief Formation and the Whitehorse Group. The latter designation generally is applied to equivalent rocks north of the Amarillo Uplift, which is north of the report area.

Rocks of the Artesia Group consist of interbedded fine sand, silty to sandy shale, fine to coarse sandstone, gypsum, and dolomite. The group thickens to about 450 feet and dips about 25 feet per mile westward.

Small to moderate quantities of water, usually less than 100 gpm (gallons per minute) are obtained from wells tapping the Artesia Group. In and near the outcrop area of the group, the water is suitable for domestic use. Downdip and in localized areas of the outcrop, the water may be too mineralized for drinking but suitable for stock watering and irrigation.

Ochoa Series

Rocks in the report area commonly referred to as the Quartermaster Formation are designated simply as the Ochoa Series, undifferentiated, in this report. These rocks consist of "red bed" shale, siltstone, and sandstone with numerous interbeds and veins of satinspar (fibrous gypsum). A few 6-inch to 3-foot beds of gypsum and dolomite occur near the base. The contact between the Ochoa Series and the Artesia Group is difficult to determine, but in this report, the base of the Ochoa is considered to be a massive dolomitic gypsum bed about 25 feet thick, which some geologists call the "Claytonville Dolomite".

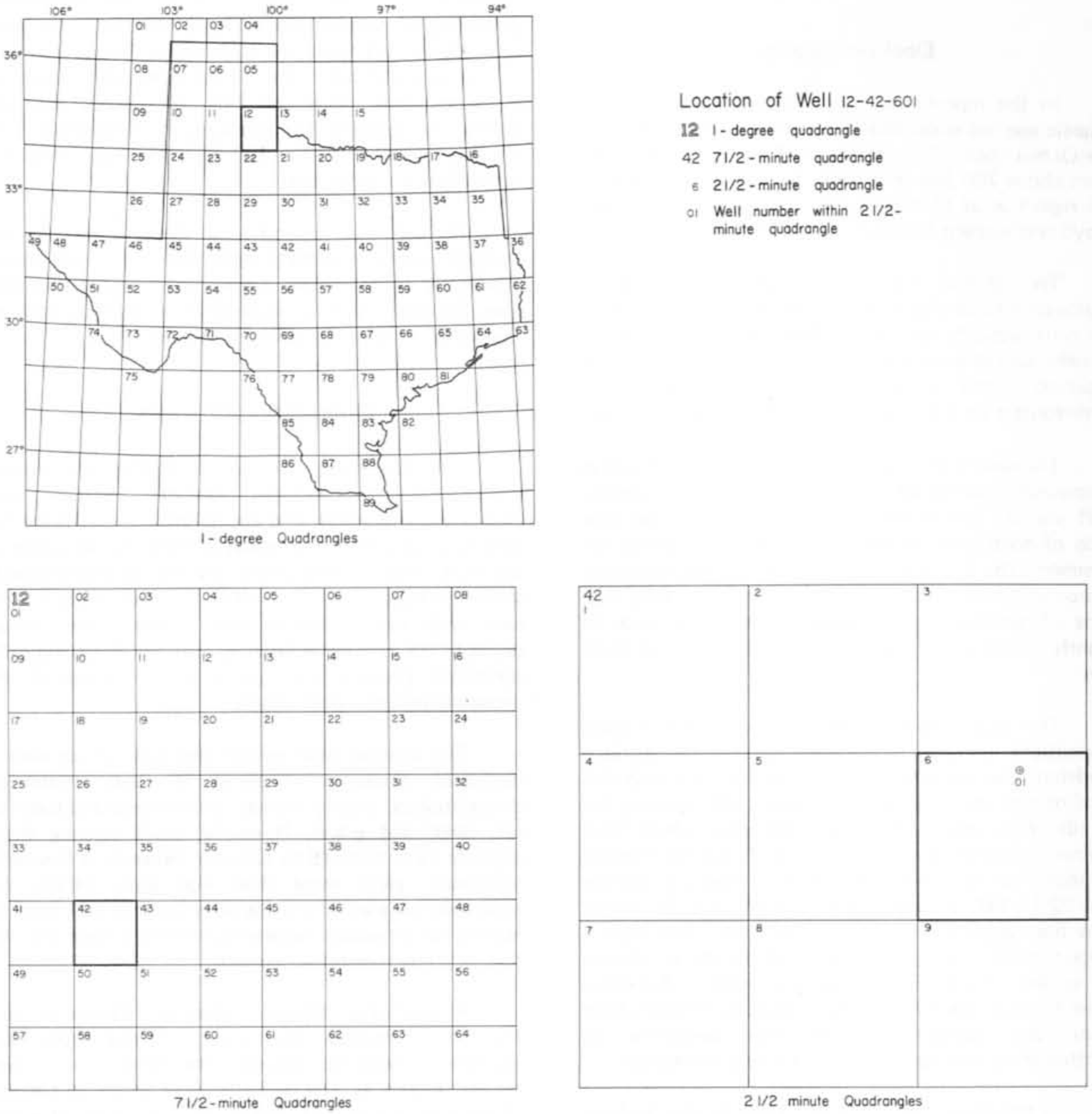


Figure 2
Well-Numbering System

The Ochoa rocks yield small quantities of water, generally less than 50 gpm, to wells for domestic supply, livestock use, and irrigation.

Dockum Group

In the report area, the Dockum Group of Late Triassic age lies unconformably on the eroded surface of the Ochoa rocks. The thickness of the Dockum ranges from about 760 feet in western Floyd County (beyond the report area) to 120 feet near its outcrop in eastern Floyd and western Motley Counties (Figure 3).

The general dip of the Dockum Group is southeastward at about 10 feet per mile, in contrast to the southwesterly dip of the underlying Permian rocks. Locally, an eastward dip of about 100 feet per mile was observed along a fault in Pole Canyon about three-fourths of a mile northwest of well JW-11-47-601.

The lower part of the Dockum Group (the Tecovas Formation) consists of varicolored shale, with maroon, buff yellow, and whitish gray predominating and thin beds of sandstone. Inclusions of limonized lignite are common. The Tecovas is for all practical purposes not a source of good quality water, although in places, thin beds of sandstone yield small quantities of fresh to slightly saline water principally for domestic and stock use.

The upper part of the Dockum (the Trujillo Formation) consists of several massive, crossbedded sandstone and conglomerate beds interlayered with thin beds of red and gray shale. Irrigation wells tapping the Trujillo Formation yield 300 to 700 gpm. Where these porous sediments are exposed in bluffs, springs flowing as much as 50 gpm are common. Roaring Springs (TW-22-10-104, Figures 5 and 8, and Table 8), whose flow has ranged from 374 to 1,540 gpm, issues from a thick section of conglomerate, which locally is referred to as the "Camp Springs Conglomerate". Numerous other springs, which flow lesser quantities of water, issue from the contact between the sandstone or conglomerate and the underlying Tecovas Formation.

In the table of well records (Table 8), the Dockum Group has not been differentiated because most drillers' logs lack sufficient lithologic detail to determine the source of the water being pumped. As a general rule, however, most wells that produce more than 30 gpm are completed in the Trujillo Formation. Also, wells tapping the Trujillo Formation usually yield water that is less mineralized than water in the Tecovas Formation.

Ogallala Formation

The Ogallala Formation of Tertiary age unconformably overlies beds of the Dockum Group. The Ogallala Formation consists of clay, silt, sand, gravel, and caliche. Pebbles and cobbles of quartz, quartzite, chert, granite, limestone, and petrified wood compose the fluviatile gravels and a basal conglomerate. The "caprock", in the upper part of the formation, consisting of several beds of hard resistant, cemented, caliche and marl forms the High Plains Escarpment that delineates the western limits of the study area (Figure 3). A wind-blown cover of fine silt, sand, and soil overlies the caprock. The thickness of the Ogallala along the escarpment is about 100 feet; however, only the basal 30 feet is saturated.

In the area adjacent to the escarpment, the Ogallala yields moderate quantities of fresh water principally for irrigation. Larger yields, more than 500 gpm, are obtained from some wells in the area that tap the Ogallala and the Trujillo Formation.

Quaternary Alluvium

The Quaternary alluvium in Motley and eastern Floyd Counties includes channel, terrace, and alluvial-plain deposits. The alluvial-plain deposits are the only large source of fresh water available for irrigation in the study area. In most places, the alluvial-plain deposits shown on Figure 3 are covered by a veneer of eolian silty sand with local dunes or dune ridges. These eolian deposits are non-water-bearing, but are hydrologically significant because they aid in local recharge of the underlying alluvial-plain deposits.

The channel and terrace deposits, which have a maximum thickness of about 50 feet, consist of discontinuous, poorly sorted, interlayered mixtures of silt, sand, and gravel. Normally, wells tapping these deposits yield from 15 to 120 gpm; however, a few wells reportedly yield more than 400 gpm. Where the water-bearing part of the deposits are thin and water is needed for irrigation, several low-yielding wells may be connected by a manifold system.

Alluvial-plain deposits, which are derived in part from the Ogallala Formation, extend from the escarpment eastward through the three major river valleys (Figure 3). The deposits cover about 25 percent of the report area, yet supply 70 percent of all water used. They grade downward from silt, fine sand, and volcanic ash to coarser sand and gravels interspersed with lenses of clay.

Maximum thicknesses generally occur near the western and central parts of the plain deposits, although buried hills and valleys in the underlying Permian formations cause many variations in thickness. Thinning normally occurs near the periphery of the sand-covered areas and stream valleys.

North of the North Pease River, the average thickness of the alluvium is about 110 feet. The maximum known thickness is 195 feet in well

TW-12-42-602. The average saturated thickness is about 70 feet. Between the North Pease River and Tom Ball Creek, the average thickness of alluvial-plain deposits is about 140 feet. The maximum reported thickness is 254 feet in well TW-12-49-503. The saturated thickness averages about 80 feet.

In the large alluvial plain south of the Middle Pease River, the maximum reported thickness of 130 feet occurs in the city of Matador wells; however, only about 40 feet is saturated. Eastward from Matador, the alluvium thins to less than 50 feet. Adjacent to the South Pease River and Dutchman Creek areas, the alluvial-plain deposits have an average thickness of about 50 feet and a maximum thickness of 196 feet. The saturated thickness ranges from about 40 to 70 feet in the Roaring Springs area.

GROUND-WATER HYDROLOGY

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

Occurrence of Ground Water

Generally, ground water in the study area is under water-table conditions, although locally, artesian pressure exists where the water is confined beneath lenticular beds of shale and clay of limited extent. Under water-table conditions, ground water is unconfined and does not rise in a well above the level (water table) at which it is encountered.

Artesian conditions occur downdip from the outcrop of an aquifer which is overlain by an impermeable stratum. A well penetrating an aquifer under artesian conditions becomes filled with water to a level that is proportionate to the hydrostatic pressure within the aquifer. If the hydrostatic pressure is great enough, water in a well may rise above the land surface causing the well to flow. No flowing wells were found in this study area; however, drillers' logs indicate that water levels in some wells in the Permian rocks are under local artesian head. Normally, the confining impermeable beds consist of shale and clay that directly overlie a water-bearing bed of gypsum, sandstone, dolomite, or silt. In some places, the water may be perched. This situation occurs when shallow water is separated from the main water-table body by unsaturated strata that are relatively impermeable.

Porosity, permeability, and transmissibility of the sediments may vary greatly even within the same geologic unit in a small local area. Usually, fine-grained materials such as fine sand, silt, clay, shale, and tuffs transmit less water per equal cross-sectional area under the same hydraulic conditions than coarser-grained sands and gravels. Other factors, such as cementation, solution cavities, and geologic structures (fractures and faults) affect permeability and transmissibility.

Recharge, Movement, and Discharge

Ground water in the study area originates from the infiltration of precipitation on the outcrops of the aquifers in the area or on the High Plains to the west and by seepage from streams and lakes. Most of the precipitation in the report area occurs in small amounts during the summer months when evaporation and transpiration losses are greatest. Consequently, direct infiltration of rainfall is limited to those periods when storms provide more than enough water to restore the soil-moisture content to field capacity.

The configuration of the water table (Figure 4) shows that part of the ground water in the area is derived from the High Plains west of the escarpment. Doubtlessly, some recharge occurs through infiltration of local rainfall, but because of the large contour interval used in construction of the map, such local contributions to the ground-water reservoir are not clearly shown. The east-trending nose in the water table in the vicinity of Roaring Springs indicates some recharge from rainfall on the permeable alluvial-plain deposits.

Occurrence of fresh water in areas that for the most part are underlain by sediments containing slightly to moderately saline water also indicates recharge from local precipitation. All of these local recharge areas coincide with the large alluvial plains shown in Figure 3.

The rate at which the aquifers are recharged could not be determined from the available data, but it varies depending upon soil conditions at the outcrop; on the duration, intensity, and amount of precipitation; on the degree of topographic slope; on the type and concentration of vegetation; and on the depth to the water table.

Initially, water percolates downward from the land surface to the zone of saturation (water table). Thereafter, ground water moves slowly through the aquifers from areas of recharge toward areas of discharge. Figure 4 shows that in a broad sense, the water moves eastward and toward the main drainageways.

The rate of movement is rarely uniform and is proportional to the hydraulic gradient and to the permeability of the material through which the water moves. Variable spacing of the water-table contours in Figure 4 indicates differential rates of movement and also defines the hydraulic gradients. The hydraulic gradients range from a maximum of 200 feet per mile in the northeastern part of Floyd County along the escarpment, to as little as 10 feet per mile in the High Plains immediately west of the escarpment and in the eastern part of Motley County. The steeper gradients occur in the vicinity of the escarpment where the transmissibility is less because of a thinner section of aquifer. Gradients are also steeper where there is a change in the permeability of the sediments. For example, where water moves from the Ogallala or Trujillo Formations into the less permeable Tecovas Formation or Permian rocks, the hydraulic gradients increase abruptly.

Ground water is discharged naturally from springs and seeps wherever the water table intersects the land surface and by evapotranspiration where the water table is within a few feet of the land surface. Most of the springs issue from the Ogallala Formation where it is in contact with the Dockum Group or from the beds of sandstone or conglomerate in the Trujillo Formation.

Ground water is discharged artificially through wells. In 1968, approximately 11,200 acre-feet of water, mostly for irrigation, was pumped from the aquifers underlying the report area.

Hydraulic Properties of the Aquifers

Aquifer tests are made to determine the coefficients of permeability, transmissibility, and storage, which reflect the capacity of an aquifer to transmit, yield, or store water.

Only a few aquifer tests were made during this investigation because of lack of suitable wells and because the tests would have interfered with pumping schedules.

One aquifer test was made in well TW-12-49-504, which penetrates 83 feet of saturated, unsorted, silty gravel in the alluvial-plain deposits. The coefficient of transmissibility, which is the rate of flow of water in gallons per day through a vertical strip of the aquifer 1 foot wide and extending the full saturated thickness under a unit hydraulic gradient, was 5,100 gpd (gallons per day) per foot. The field coefficient of permeability, which is the flow of water in gallons per day through a cross section of one square foot of the aquifer under unit hydraulic gradient, was 60 gpd per square foot. The specific capacity was 2.8 gpm per foot of drawdown after 9 hours of pumping at 130 gpm.

Another test was made in well TW-22-01-201, which penetrated 146 feet of saturated sandstone and conglomerate in the Dockum Group. The coefficients of the transmissibility and permeability were 11,700 gpd per foot and 80 gpd per square foot, respectively. The specific capacity was 7.1 gpm per foot of drawdown after 25 hours of pumping at 321 gpm.

The coefficients determined from these tests should be used with caution because the results define the properties only of that part of the aquifer near these wells. However, these tests are compatible with others previously made in Floyd County (Myers, 1969, p. 22-25).

Yields of wells also provide a general index of the ability of the aquifer to transmit water. Numerous measurements of yields and drawdowns made in wells in the various geologic units in the study area are given in Table 8. However, some wells, principally stock and domestic wells, are not pumped at their maximum capacity; therefore 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 750 gpm) were obtained from wells in the alluvial-plain deposits in the vicinity of Flomot and Roaring Springs. The average yield of irrigation wells tapping the alluvial-plain deposits or the Trujillo Formation was about 400 gpm. The Permian rocks and the alluvium in the terraces and flood plains yield considerably less water, usually not more than 100 gpm. Where yields are small (generally less than 50 gpm) wells are drilled in groups to provide sufficient water for irrigation.

The specific capacity of a well, which is the ratio of the yield in gallons per minute to the drawdown of the water level in feet, is useful in estimating the ability of the aquifer to transmit water. Other factors, such as the amount of saturated material open to the well, the manner in which the well is developed and maintained, and the length of time that the well has been pumped, affect the specific capacity.

Specific capacities ranged from less than 1 to as much as 350 gpm per foot of drawdown. Generally, specific capacities of wells in the Permian red beds and in the Tecovas Formation ranged between 1 and 4 gpm per foot of drawdown; those in the alluvium ranged from 3 to 25 gpm per foot of drawdown; and those in the Trujillo and the Ogallala Formations ranged from 6 to 15 gpm per foot of drawdown. The highest specific capacity, 350 gpm per foot of drawdown, was obtained from well TW-12-49-503, which taps a highly permeable gravel zone in the alluvial-plain deposit south of the North Pease River. Large specific capacities were obtained also for wells TW-12-49-703, TW-12-49-902, and TW-12-49-903, all of which penetrate cavernous dolomite or gypsum.

Fluctuations of Water Levels

Periodic water-level measurements have been made in a number of wells in the report area since 1937 (Tables 2, 3, 4, and 9). Few of the records are comparable because of the generally poor areal distribution and varying periods of record.

Table 2.—Water-Level Changes in Selected Wells Tapping the Permian Rocks

WELL NUMBER	CHANGE IN WATER LEVEL (FEET)	PERIOD OF RECORD
JW-11-48-401	+ 12.7	1937-68
JW-11-48-701	+ 12.5	1937-68
JW-11-56-201	+ 4.2	1937-68
JW-11-56-209	+ 10.5	1937-68
TW-12-44-501	- 3.1	1959-60
TW-12-50-901	- 1.0	1959-68
TW-12-51-401	* - 9.2	1961-68
TW-12-51-702	+ 18.3	1959-68
TW-12-58-801	- .5	1959-68
TW-12-58-802	+ 2.5	1959-68
TW-12-59-801	+ 48.5	1960-68
TW-12-59-901	- 6.8	1959-68
TW-22-03-101	- 3.5	1959-69
TW-22-03-501	* - 47.3	1966-69

* Based on reported water levels.

In spite of the large decline of the water table in the heavily irrigated part of the High Plains west of the report area, the flow of the larger springs that emerge from the Ogallala Formation, such as Roaring Springs (TW-22-10-104), has shown little apparent net change (Figure 5). The fluctuations in the flow of this spring reflect both the short-term effects from local precipitation and the long-term decline from regional pumping.

Records of measurements made during the 1930's and again during this investigation indicate an average decrease of about 25 percent in the flow of a number of smaller springs along the foot of the escarpment. Some of these measurements were made in the channels of creeks at varying distances below the mouth of the springs; therefore it seems likely that aggradation in these channels in recent years has resulted in an increase in the underflow rather than a decrease in the flow of the springs.

The most noteworthy example of the apparent decrease in springflow and decline in the water table was observed at Blue Hole Springs (JW-11-55-205) in Quitaque Creek channel. During the 1930's Blue Hole was a large deep flowing pool used for recreation. Since then, the depression has become an intermittent wet-weather puddle, clogged with sand, gravel, and debris. Springflow now emerges about one-fourth of a mile downstream in the channel.

Well Construction

Construction of a well depends upon its intended use. In recent years, many of the wells used to supply domestic and stock needs have been drilled and cased with 5- to 6-inch steel or plastic casing that extends from above the land surface to the bottom of the hole. In some wells, the lowest 10 to 20 feet of the casing is torch or mill slotted; in others, the water-bearing part of the formation is uncased if the formation is firm enough to prevent caving.

Domestic and stock wells generally are of small capacity (1 to 12 gpm) and are equipped with windmills, pump jacks, jet pumps, or submergible pumps. Despite the small yield of these wells, they still are vulnerable to sand troubles, and some may require periodic cleaning.

Most of the large-capacity wells constructed for municipal supply, industrial use, or irrigation, were drilled as straight-walled wells (not underreamed) 20 inches in diameter. Steel casing, 12 to 16 inches in diameter, was set to the bottom of the hole, and usually torch slotted for a 20- to 50-foot interval opposite the water-bearing sands. In many wells, however, the casing was slotted above the water table. Space between the casing and the wall of the hole was packed with gravel, but in most of the wells, little effort was made to relate the diameter of the gravel and sand grains to either the size or width of the slots or perforations.

The purpose of a well-sorted gravel is to reduce the amount of sand that enters the well by increasing the effective diameter of the well, thereby reducing the entrance velocity of the water. Wells are usually developed by pumping for 6 to 48 hours at a rate that lowers the water level to or near the intakes of the pump. In some parts of the study area, an irrigation-supply system consists of several small-diameter shallow wells connected by a manifold system to a centrifugal pump. However, water cannot be lifted more than about 25 feet by this method because of the limit of atmospheric pressure.

A problem common to wells in the Permian rocks is the pumping of large quantities of fine sand and silt, which frequently results in the loss of the well by collapse of the casing. According to the owner, well TW-12-44-703 yields about 400 gpm, which is more than when the well was drilled. The well pumped large quantities of sand until it developed a cavity that required more than 250 cubic yards of gravel for support. The development of a cavity results in an apparent increase in yield. In reality, the cavity serves as a collection or storage basin. When it has been drained by pumping at a high rate (generally one that exceeds the ability of the aquifer to transmit water) pumping must be stopped or reduced until the cavity refills.

Most irrigation, municipal, and industrial wells in the alluvium penetrate the full saturated thickness of the

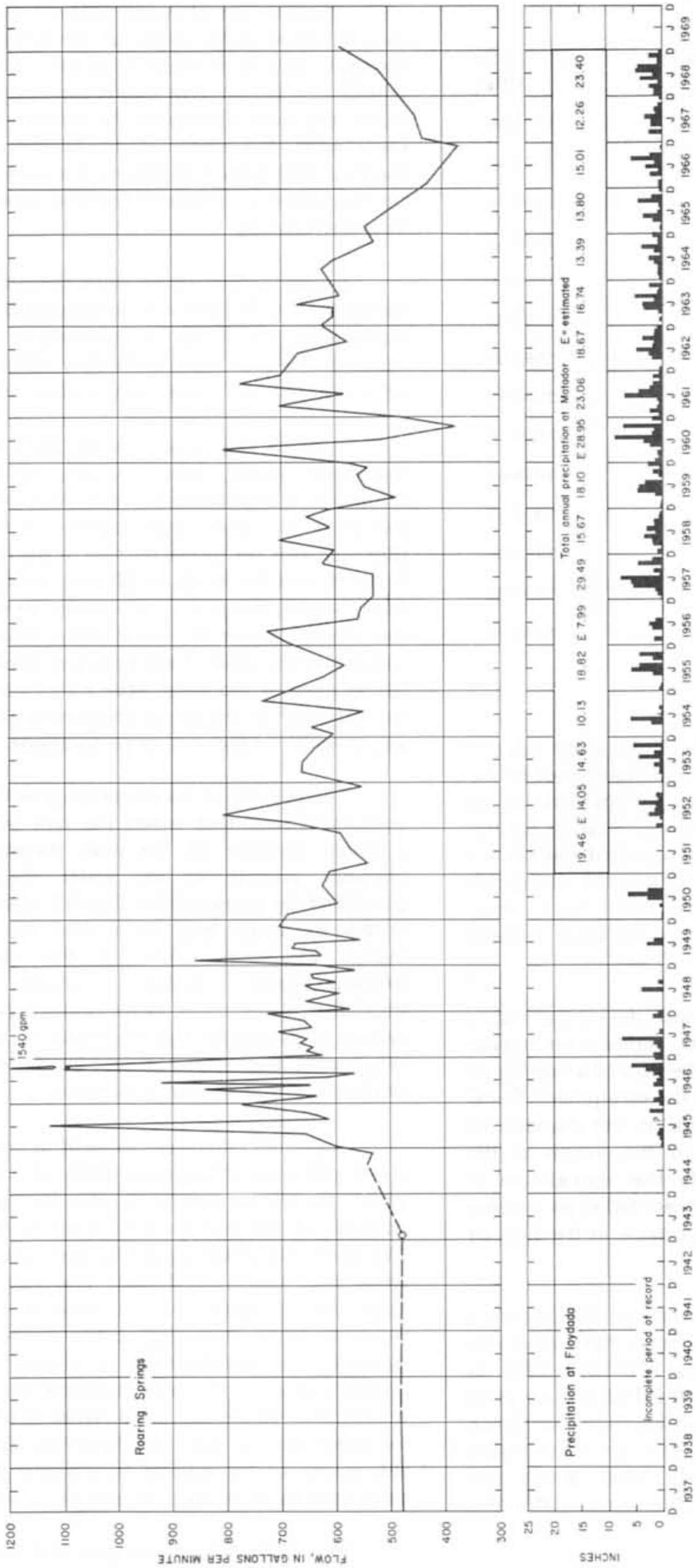


Figure 5

Hydrograph of Roaring Springs and Precipitation at Floydada, Texas 1937-69

Table 3.—Water-Level Changes in Selected Wells in the Alluvium

WELL NUMBER	CHANGE IN WATER LEVEL (FEET)	PERIOD OF RECORD	WELL NUMBER	CHANGE IN WATER LEVEL (FEET)	PERIOD OF RECORD
TW-11-48-601	- 18.3	1954-68	TW-12-50-101	+ 1.8	1959-68
TW-11-48-602	- .1	1960-68	TW-12-50-201	+ 1.9	1959-68
TW-11-48-603	- 2.3	1959-68	TW-12-50-203	- 7.5	1960-68
TW-11-48-604	- .5	1950-68	TW-12-57-502	- 10.9	1959-68
TW-11-48-605	- .6	1959-68	TW-12-57-601	- 2.9	1959-68
TW-11-48-608	- 2.0	1959-68	TW-12-58-803	* - 14.2	1928-68
TW-11-48-901	- 4.9	1959-68	TW-12-58-805	- 7.7	1947-68
TW-11-56-304	+ .6	1959-68	TW-22-01-906	- 2.6	1960-69
TW-11-56-309	- .2	1959-68	TW-22-01-907	- 2.5	1959-69
TW-12-41-401	- 3.8	1959-68	TW-22-02-501	+ .8	1959-69
TW-12-41-402	- 1.9	1959-68	TW-22-02-701	- 1.1	1959-69
TW-12-41-404	- .6	1959-68	TW-22-02-702	- 5.6	1959-69
TW-12-41-405	- 3.8	1959-68	TW-22-02-704	+ 7.9	1956-69
TW-12-41-407	- 5.9	1959-68	TW-22-02-705	- .8	1947-69
TW-12-41-409	- 2.2	1959-68	TW-22-02-706	- 6.4	1959-69
TW-12-41-410	- 1.8	1959-68	TW-22-02-801	- 1.4	1959-69
TW-12-41-414	- 1.1	1959-68	TW-22-02-802	+ .7	1959-69
TW-12-41-503	- 6.9	1959-68	TW-22-02-803	+ .2	1959-69
TW-12-41-801	* - 7.3	1964-68	TW-22-02-804	- 1.0	1957-69
TW-12-41-806	* + .6	1967-68	TW-22-02-806	- 3.6	1960-69
TW-12-42-602	+ 13.5	1959-68	TW-22-02-902	+ 3.5	1959-69
TW-12-49-102	- 4.6	1959-68	TW-22-02-903	- 1.3	1959-69
TW-12-49-201	- 6.5	1959-68	TW-22-03-701	+ 17.8	1959-69
TW-12-49-202	- 9.4	1959-68	TW-22-03-702	* + 2.4	1957-69
TW-12-49-301	+ 3.4	1959-68	TW-22-04-701	+ 1.3	1959-69
TW-12-49-302	- .4	1959-68	TW-22-10-102	- 1.6	1959-69
TW-12-49-303	+ .1	1959-68	TW-22-10-103	- 3.4	1959-69
TW-12-49-402	+ 7.9	1959-68	TW-22-10-105	+ .2	1959-69
TW-12-49-403	+ 9.1	1959-68	TW-22-11-201	+ 1.6	1959-69
TW-12-49-501	+ 2.9	1959-68			

* Based on reported water levels.

aquifer; therefore water yields can be increased only by improving well completion and development methods, or by drilling deeper into the red beds. Usually the chemical quality of the water will deteriorate with an increase in yield obtained from the red beds.

The effects of well interference and water-level declines can best be modified by adequate spacing, optimum completion techniques, and by alternating the pumping periods of adjacent wells.

Use of Ground Water

Nearly all the water used in Motley County and in the northeastern part of Floyd County is ground water. Less than 10 irrigation pumps are supplied from the surface-water reservoirs. During the 11-year period, 1958-68, the use of ground water for municipal supply, industrial use, and irrigation increased nearly four-fold from 2,980 acre-feet to 11,238 acre-feet (Table 5).

Table 4.—Water-Level Changes in Selected Wells Tapping the Dockum Group or the Ogallala Formation

WELL NUMBER	WATER-BEARING FORMATION	CHANGE IN WATER LEVEL (FEET)	PERIOD OF RECORD
JW-11-47-801	To.-Trd.	+ 4.7	1937-68
JW-11-55-901	To.-Trd.	- 22.3	1962-68
JW-11-56-503	Trd.	+ 9.8	1938-68
JW-11-56-701	Trd.	- 13.1	1938-68
JW-11-56-805	Trd.	- 3.2	1938-68
JW-11-64-101	To.	- 34.9	1962-68
JW-11-64-502	To.	- 8.7	1963-68
TW-22-01-904	Trd.	- .8	1959-69
TW-22-01-905	Trd.	- 1.3	1959-69
TW-22-09-301	Trd.	- 3.8	1959-69
TW-22-09-302	Trd.	- 3.6	1959-69
TW-22-09-303	Trd.	- .6	1959-69
JW-23-08-201	To.-Trd.	- 4.5	1962-67

To. - Tertiary Ogallala Formation
Trd. - Triassic Dockum Group

Use of ground water for municipal supply began in 1913 when the town of Roaring Springs dug a well (TW-22-02-705) in the alluvium of Dutchman Creek. Prior to that time, water was hauled from Roaring Springs (TW-22-10-104). The dug well is timber lined, 17 by 19 feet in cross section and 22 feet deep, with gallery pipes radiating into the alluvium. The well yields 285 gpm of good-quality water and is still the major source of water supply for the town. Two other wells (TW-22-02-711 and TW-22-02-712) have been drilled, but they are used only during emergencies.

The city of Matador is supplied water from five wells, all of which obtain good-quality water from the alluvium and the Ochoa rocks. These wells, which can yield a total of 565 gpm, produced 100,458,000 gallons of water in 1968. Two other wells that were drilled in 1928 have been abandoned because of low yields.

Flomot obtains its water supply from well TW-12-49-104 which taps the alluvial-plain deposits immediately north of Alamosa Creek. The well, 141 feet deep, yields about 70 gpm of very hard water that is high in fluoride content.

Water needs for industry in the report area are supplied by local municipal systems except for the processing of sand and gravel. The amount of ground water pumped during 1968 for these operations was 1,500 acre-feet, an increase of about 1,200 acre-feet since 1958.

The principal use of ground water is for irrigation, which began in the early 1950's. During 1958, 75 irrigation wells were used to pump 2,400 acre-feet of water. By 1968, the number of wells had increased to 190 and pumpage had increased to 9,400 acre-feet. Nearly all the irrigation development in the study area is in the western half of Motley County, principally in the vicinity of Flomot, Roaring Springs, and to a lesser extent, south of Whiteflat. Of the water pumped for irrigation, about 80 percent is from the alluvial deposits. Most of the remaining water used for irrigation is from the upper part of the Dockum Group (Trujillo Formation) and the Ogallala Formation just east of the escarpment; only a small amount of water is pumped for irrigation from the Permian rocks.

No reliable figures are available on the quantity of water used for domestic and stock purposes, but it probably is about 10 percent of the amount used for all other purposes. Generally, such supplies of water can be obtained in small to moderate quantities in all parts of the report area; however, in the outcrop area of the Permian rocks, the water commonly is too highly mineralized for use other than for irrigation and for livestock.

CHEMICAL QUALITY OF GROUND WATER

Relationship of Water Quality to Use

The major factor that determines the suitability of a water supply is the limitation imposed by the intended use of the water. Among the various criteria established

Table 5.—Use of Ground Water, 1958-68

	MUNICIPAL 1/		INDUSTRIAL 2/		IRRIGATION								
YEAR	GALLONS PER YEAR	ACRE-FEET PER YEAR	GALLONS PER YEAR	ACRE-FEET PER YEAR	GALLONS PER YEAR	ACRE-FEET PER YEAR	IRRIGATED ACREAGE	NUMBER OF WELLS IN USE	AVERAGE YIELD PER WELL (GPM)	AVERAGE NO. IRRIG. ACRES PER WELL	AVERAGE NO. DAYS WELLS OPERATE PER YEAR	AVG. IRRIG. WATER-DUTY PER ACRE (AC.FT./YR.)	TOTAL ANNUAL PUMPAGE (AC.FT.)
1958	87,877,800	370	*101,376,000	* 310	782,365,850	2,400	2,932	75	—	39	—	0.8	2,980
1964	103,047,530	320	*346,176,000	*1,060	1,315,782,300	4,000	3,915	82	—	48	—	1.1	5,380
1968	111,921,500	340	487,152,000	1,500	3,049,463,520	9,400	6,823	190	227	36	49	1.4	11,200
Primary water bearing units	Alluvium		Alluvium, Trujillo and Ogallala Formations		Alluvium, Trujillo and Ogallala Formations								

1/ Includes industrial usage supplied by municipal systems.
2/ Not serviced by municipal systems.
* Indicates estimated pumpage.

for water quality are: Bacterial content; chemical constituents; and physical characteristics such as temperature, odor, color, and turbidity.

In some parts of the report area, the need for larger yields than can be supplied by a single aquifer often necessitates the tapping of two or more aquifers. The quality of the water from such a well commonly is a blend of the different chemical characters of these water-bearing units. The chemical quality of the pumped water is generally 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 wells tapping the various aquifers are shown in Figure 6.

The chemical quality of the ground water is shown by 371 analyses of water samples from wells and springs (Table 10). The sulfate, chloride, nitrate, and sodium concentrations and the dissolved-solids content of samples of water from the various aquifers are shown on Figure 6.

A general classification of water based on dissolved-solids content, an indication of the chemical quality of water, is given in Table 6. Table 6 also gives the source, significance, and properties of the dissolved-mineral constituents.

The U.S. Public Health Service (1962) has established and periodically revises the standards for drinking water used on common carriers engaged in interstate commerce. The standards, which are designed to protect the traveling public, may be used to evaluate domestic and public water supplies. According to these standards, chemical constituents in a public water supply should not exceed the concentrations shown in the following table, except where more suitable supplies are not available.

SUBSTANCE	CONCENTRATION (MG/L)
Chloride (Cl)	250
Fluoride (F)	* 1.0
Iron (Fe)	0.3
Nitrate (NO_3)	45
Sulfate (SO_4)	250
Dissolved solids	500

* Based on the annual average of maximum daily air temperature of 73°F at Matador, Texas. The minimum desirable concentration is 0.7 mg/l.

According to the U.S. Salinity Laboratory staff (1954), some of the principal factors that determine the suitability of water for irrigation are the concentrations of dissolved salts, sodium, and boron. Sodium is a significant factor because a high SAR (sodium adsorption ratio) may cause the soil structure to break down. According to Wilcox (1955), water containing more than 2.5 me/l (milliequivalents per liter) RSC (residual sodium carbonate) is not suitable for irrigation; 1.25 to 2.5 me/l is marginal; and less than 1.25 me/l probably is safe.

Boron is essential to plant growth, although an excess is injurious to some plants. Concentrations of boron (Table 10) in water from all sources within the study area appear to be acceptable for irrigation according to the limitations given in Table 6.

Several factors other than the chemical quality are involved in determining the suitability of water for irrigation. The type of soil, adequacy of drainage, crops grown, climatic conditions, and the quantity of water used all have an important bearing on the continued productivity of irrigated land.

Permian Rocks

Water from the Permian rocks generally is too highly mineralized for use other than for livestock or irrigation. The sulfate content ranges from 11 to 4,330 mg/l (milligrams per liter) and averages about 2,000 mg/l. Chloride content ranges from 5.2 to 17,000 mg/l, although usually it is less than 1,500 mg/l. Where conditions are favorable for recharge from the alluvium or dune sand, the water in the Permian rocks is less mineralized and may be suitable for domestic supplies.

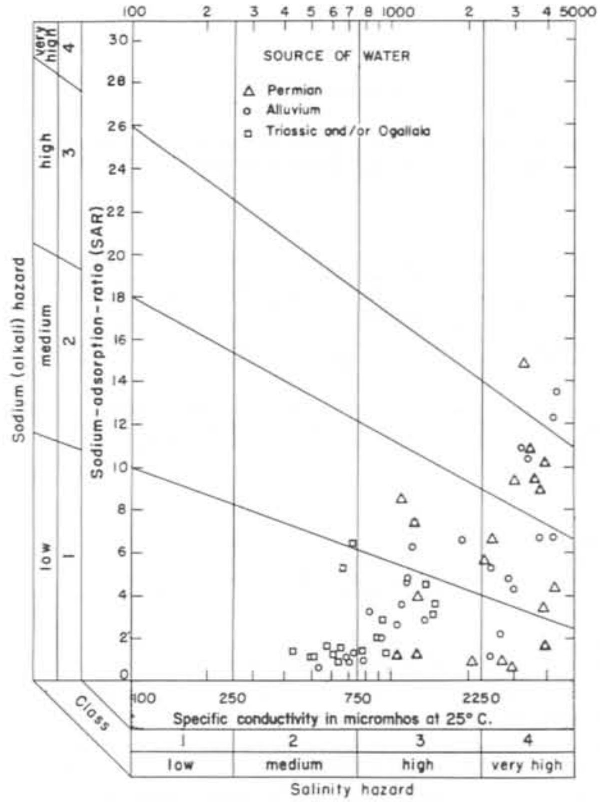
According to the diagram (Figure 7) for the classification of irrigation water (U.S. Salinity Laboratory staff, 1954), water from the Permian rocks generally is medium to very high in sodium hazard and very high in salinity hazard. Only nine wells that obtained water solely from Permian rocks were used for irrigation; the rest were used mainly for livestock, although a few were used for domestic needs when water of a better quality was unavailable.

Dockum Group and Ogallala Formation

The least mineralized water is obtained from the Ogallala Formation and the upper part of the Dockum Group (Trujillo Formation). Except for water from one well (TW-22-01-103), water from these units was suitable for drinking. 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 chloride and sulfate content are usually less than 50 mg/l each. This water meets the chemical standard established by the U.S. Public Health Service for drinking water although the fluoride in many samples exceeded the limit of 1.0 mg/l.

Table 6.–Source and Significance of Dissolved-Mineral Constituents and Properties of Water

CONSTITUENT OR PROPERTY	SOURCE OR CAUSE	SIGNIFICANCE
Silica (SiO_2)	Dissolved from practically all rocks and soils, commonly less than 30 mg/l. High concentrations, as much as 100 mg/l, generally occur in highly alkaline waters.	Forms hard scale in pipes and boilers. Carried over in steam of high pressure boilers to form deposits on blades of turbines. Inhibits deterioration of zeolite-type water softeners.
Iron (Fe)	Dissolved from practically all rocks and soils. May also be derived from iron pipes, pumps, and other equipment. More than 1 or 2 mg/l of iron in surface waters generally indicates acid wastes from mine drainage or other sources.	On exposure to air, iron in ground water oxidizes to reddish-brown precipitate. More than about 0.3 mg/l stains laundry and utensils reddish-brown. Objectionable for food processing, textile processing, beverages, ice manufacture, brewing, and other processes. U.S. Public Health Service (1962) drinking-water standards state that iron should not exceed 0.3 mg/l. Larger quantities cause unpleasant taste and favor growth of iron bacteria.
Calcium (Ca) and magnesium (Mg)	Dissolved from practically all soils and rocks, but especially from limestone, dolomite, and gypsum. Calcium and magnesium are found in large quantities in some brines. Magnesium is present in large quantities in sea water.	Cause most of the hardness and scale-forming properties of water; soap consuming (see hardness). Waters low in calcium and magnesium desired in electroplating, tanning, dyeing, and in textile manufacturing.
Sodium (Na) and potassium (K)	Dissolved from practically all rocks and soils. Found also in ancient brines, sea water, industrial brines, and sewage.	Large amounts, in combination with chloride, give a salty taste. Moderate quantities have little effect on the usefulness of water for most purposes. Sodium salts may cause foaming in steam boilers and a high sodium content may limit the use of water for irrigation.
Bicarbonate (HCO_3) and carbonate (CO_3)	Action of carbon dioxide in water on carbonate rocks such as limestone and dolomite.	Bicarbonate and carbonate produce alkalinity. Bicarbonates of calcium and magnesium decompose in steam boilers and hot water facilities to form scale and release corrosive carbon dioxide gas. In combination with calcium and magnesium, cause carbonate hardness.
Sulfate (SO_4)	Dissolved from rocks and soils containing gypsum, iron sulfides, and other sulfur compounds. Commonly present in mine waters and in some industrial wastes.	Sulfate in water containing calcium forms hard scale in steam boilers. In large amounts, sulfate in combination with other ions gives bitter taste to water. Some calcium sulfate is considered beneficial in the brewing process. U.S. Public Health Service (1962) drinking-water standards recommend that the sulfate content should not exceed 250 mg/l.
Chloride (Cl)	Dissolved from rocks and soils. Present in sewage and found in large amounts in ancient brines, sea water, and industrial brines.	In large amounts in combination with sodium, gives salty taste to drinking water. In large quantities, increases the corrosiveness of water. U.S. Public Health Service (1962) drinking-water standards recommend that the chloride content should not exceed 250 mg/l.
Fluoride (F)	Dissolved in small to minute quantities from most rocks and soils. Added to many waters by fluoridation of municipal supplies.	Fluoride in drinking water reduces the incidence of tooth decay when the water is consumed during the period of enamel calcification. However, it may cause mottling of the teeth, depending on the concentration of fluoride, the age of the child, amount of drinking water consumed, and susceptbility of the individual. (Maier, 1950)
Nitrate (NO_3)	Decaying organic matter, sewage, fertilizers, and nitrates in soil.	Concentration much greater than the local average may suggest pollution. U.S. Public Health Service (1962) drinking-water standards suggest a limit of 45 mg/l. Waters of high nitrate content have been reported to be the cause of methemoglobinemia (an often fatal disease in infants) and therefore should not be used in infant feeding. Nitrate has been shown to be helpful in reducing inter-crystalline cracking of boiler steel. It encourages growth of algae and other organisms which produce undesirable tastes and odors.
Dissolved solids	Chiefly mineral constituents dissolved from rocks and soils. Includes some water of crystallization.	U.S. Public Health Service (1962) drinking-water standards recommend that waters containing more than 500 mg/l dissolved solids not be used if other less mineralized supplies are available. Waters containing more than 1000 mg/l dissolved solids are unsuitable for many purposes.
Hardness as $CaCO_3$	In most waters nearly all the hardness is due to calcium and magnesium. All the metallic cations other than the alkali metals also cause hardness.	Consumes soap before a lather will form. Deposits soap curd on bathtubs. Hard water forms scale in boilers, water heaters, and pipes. Hardness equivalent to the bicarbonate and carbonate is called carbonate hardness. Any hardness in excess of this is called non-carbonate hardness. Waters of hardness as much as 60 ppm are considered soft; 61 to 120 mg/l, moderately hard; 121 to 180 mg/l, hard; more than 180 mg/l, very hard.
Specific conductance (micromhos at 25°C)	Mineral content of the water.	Indicates degree of mineralization. Specific conductance is a measure of the capacity of the water to conduct an electric current. Varies with concentration and degree of ionization of the constituents.
Hydrogen ion concentration (pH)	Acids, acid-generating salts, and free carbon dioxide lower the pH. Carbonates, bicarbonates, hydroxides, and phosphates, silicates, and borates raise the pH.	A pH of 7.0 indicates neutrality of a solution. Values higher than 7.0 denote increasing alkalinity; values lower than 7.0 indicate increasing acidity. pH is a measure of the activity of the hydrogen ions. Corrosiveness of water generally increases with decreasing pH. However, excessively alkaline waters may also attack metals.



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

Figure 7.—Classification of Irrigation Waters

Figure 7 shows that the water from either the Ogallala or Trujillo Formations is suitable for irrigation, being low in sodium hazard, and medium to high in salinity hazard.

Although little of the water in the Ogallala or Trujillo Formations is used for cooling, temperature of the water is an important property in considering its potential use. The temperature of the water in these aquifers generally was low, ranging between 14°C (57°F) and 17°C (62°F).

Alluvium

The chemical quality of the water in the alluvial deposits varies widely depending on the source of recharge. Where the alluvium overlies or adjoins Permian rocks or is recharged at least in part by streamflow, the water probably will be high in sulfate and chloride, with sulfate as the predominant anion. However, a water sample from one well (TW-12-58-301) in an alluvial terrace bounded by Permian rocks, contained 2,720 mg/l of chloride and 1,100 mg/l of sulfate. In a few places near the Roaring Springs oilfield (Figure 6), the chlorides also exceeded sulfate, which indicates possible contamination from the disposal of oilfield brine. In the heavily irrigated alluvial-plain deposits north of Quitaque Creek, where the alluvium is recharged at least in part from the direct infiltration of rainfall, the water is fairly low in mineralization and generally of the bicarbonate type.

Analyses of water from wells TW-12-41-406, TW-12-50-401, TW-12-57-604, and TW-22-02-704 show very little evidence that pesticides have contaminated the aquifers in Motley County. One well, TW-12-50-401, showed a trace of an insecticide, Lindane, of 0.01 μg/l (micrograms per liter) which is well below the recommended 56 μg/l permissible concentration. Studies made in other parts of the country reveal that most of the pesticides are adsorbed on colloidal particles in the soil. In fact, Scalf and others (1968) report that a major proportion of DDT (a chlorinated hydrocarbon) injected into the Ogallala aquifer near Amarillo, Texas (about 100 miles northwest of the study area) during recharge remained adsorbed to the material in the aquifer after pumping.

BRINE PRODUCTION AND DISPOSAL

The practice of disposing of oilfield brine through unlined surface pits is a potential hazard to the chemical quality of both surface and ground waters. Effective January 1, 1969, a Statewide "no-pit" order for brine disposal was issued by the Texas Railroad Commission. As a result of this order, most of the brine is now disposed of through injection wells.

Records of the Texas Water Commission and Texas Water Pollution Control Board (1963, p. 519 and 520) show that 174,684 barrels (7,336,728 gallons or about 22.5 acre-feet) of brine reportedly was produced in Motley County in 1961 (Table 7). Of this amount, 169,810 barrels (7,132,020 gallons or 21.9 acre-feet) or about 97.2 percent of the total, was disposed of through injection wells. The remaining 4,874 barrels of brine was disposed of in open pits.

Brine is produced and disposed of in the Roaring Springs oilfield immediately east of the town of Roaring Springs and in the Birnie field about 10 miles northwest of Matador. There is no production in northeastern Floyd County below the caprock.

Reports of brine contamination in the Roaring Springs West oilfield were not fully investigated. However, water analyses from a few irrigation wells in this area (Figure 6 and Table 10) indicate an unusually high chloride content in water from the alluvium. Analyses of water from well TW-22-02-801 show an increase in chloride from 349 to 586 mg/l (68 percent) for the period 1958 to 1968. Well TW-22-02-903 had a chloride content of 305 mg/l in 1955. Samples could not be obtained from well TW-22-02-806, which is within

200 feet of a tank battery leaking brine; however, the water was reported to be "salty".

Earthen tanks formerly used in these oilfields for disposal of brine have recently been replaced by injection wells. Although these pits no longer are used, the brine represents a potential source of contamination. Because of the slow rate of ground-water movement, any contamination resulting from brine infiltration may not be detected for many years.

Inadequately or improperly cased wells are potential sources of contamination of ground-water supplies. These wells, either production or injection, may leak brine into usable water zones. In abandoned wells, the casing may have been removed, leaving an uncemented or leaky drill hole as a conduit for contamination.

Abandoned "salty" irrigation wells and test holes are also a source of contamination. Seldom is a test hole or irrigation well that contains saline water plugged and cemented when abandoned or the casing removed. Surface cementing around all types of water wells helps to prevent chemical and bacterial contaminants from reaching the water.

Table 7.—Reported Brine Production and Disposal in 1961, Motley County, Texas

FIELD	DISPOSAL IN SURFACE PITS (BBL)	DISPOSAL IN INJECTION WELLS (BBL)	INJECTION ZONE BELOW LAND SURFACE (FT)	PRESSURE (PSI)	TOTAL BRINE PRODUCTION (BBL)
Roaring Springs East	300	6,360	2,454	600-800	6,660
Roaring Springs West	4,574	163,450	4,191-4,204	gravity	168,024
Birnie	—	—	—	—	—
County totals	4,874	169,810	—	—	174,684

RECOMMENDATIONS FOR ADDITIONAL STUDIES

Data collected during the present study were inadequate for a detailed evaluation of the potential of the aquifers. It seems highly probable that additional supplies of water could be developed, particularly from the alluvial-plain deposits, Ogallala Formation, and the Trujillo Formation. Whether this additional development would be adequate to meet the expected demands for water for irrigation would require studies related to: (1) The hydrologic properties of the aquifers; (2) the sources and particularly the rate of natural recharge and discharge; (3) the hydrologic relation between aquifers; (4) the quantity of water in storage; (5) the relation of chemical quality of the water to the geology; and (6) the effects of pumping on the Southern High Plains on the area east of the escarpment.

The periodic collection of basic data, such as changes in water levels, the quantity of water pumped, and the collection of water samples for chemical analyses are necessary to a detailed evaluation of the ground-water potential of the area. Mapping of the base of the alluvial deposits is needed to determine the relation between geology and the occurrence and movement of not only the fresh but also the slightly and moderately saline water. A realistic evaluation of the ground-water supply requires an adequate description of the hydrologic system and the geologic framework throughout the region. In effect, further studies should encompass hydrologic units considerably larger than those within the political boundaries of Motley County and the northeastern part of Floyd County.

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Table 8.--Records of Wells and Springs

Water level : Reported water levels given in feet; measured water levels given in feet and tenths.
Method of lift and type of power: C, cylinder or piston; Ct, centrifugal; J, jet; S, submergible; T, turbine. E, electric motor; G, gasoline or natural gas engine; H, hand; LP, butane or propane engine; W, windmill; N, none.
Use of water : D, domestic; Irr, irrigation; Ind, industrial; P, public supply; S, stock; U, unused.
Water-bearing unit : Qal, alluvial channel, terrace, and plain deposits; To, Ogallala Formation; Trd, Dockum Group; Po, Ochoa Series; Pa, Artesia Group.

WELL	OWNER	DATE COMPLETED	DEPTH OF WELL (FT)	CASING		WATER-BEARING UNIT	ALTITUDE OF LAND SURFACE (FT)	WATER LEVEL		WELL PERFORMANCE		SPECIFIC CONDUCTANCE (MICROMHOS AT 25° C)	METHOD OF LIFT	USE OF WATER	IRRIGATED ACRES (APPROXIMATE) 1968	REMARKS
				DIAMETER (IN.)	INTERVAL OPEN (FT)			BELOW LAND SURFACE DATUM (FT)	DATE OF MEASUREMENT	DRAWDOWN (FT)	DISCHARGE (GPM)					
JW-11-47-501	Lynn Welch	1962	202	14	--	Trd	3,170	197.2	Dec. 10, 1968	--	2	370	C,W	S	--	
* 502	Howard Brothers	--	Spring	--	--	To	2,880	--	--	--	--	650	Flows	S	--	Springs in North Fork of South Pole Creek. Flow estimated 9 gpm Oct. 13, 1938, and 15 gpm Nov. 19, 1968.
* 503	do.	--	Spring	--	--	To	2,880	--	--	--	--	660	Flows	S	--	Springs in North Pole Canyon. Flow estimated 3 gpm Oct. 25, 1938, and 5 gpm Nov. 19, 1968.
* 601	J.W. Taylor Estate	1950	92	4	--	Po	2,670	50.0	Nov. 19, 1968	--	6	920	S,E,1	D	--	
701	Ruby Higginbotham	1952	305	16	180-305	To,Trd	3,188	214.8 220.5 214.9	June 28, 1963 Feb. 12, 1964 Feb. 17, 1965	--	1,000	--	T,G,65	Irr	--	Discharge reported June 28, 1963. Texas Water Development Board observation well.
* 801	Mrs. Carouthers	before 1920	262	4	--	Trd,To	3,165	251.4 246.7	Dec. 29, 1937 Nov. 23, 1968	-- --	-- 3	-- 510	C,W	S	--	
802	Ursel Taylor	1946	218	6	--	Trd,To	3,163	199.1	do.	--	3	500	C,W	S	--	Well near edge of ''caprock''.
* 803	Howard Brothers	--	Spring	--	--	To	2,900	--	--	--	--	650	Flows	S	--	Springs in South Pole Creek. Flow estimated 15 gpm Oct. 13, 1938 and 18 gpm Nov. 19, 1938.
804	do.	--	Spring	--	--	To	2,900	--	--	--	--	--	Flows	S	--	Springs in tributary to Quitaque Creek. Flow estimated 100 gpm Nov. 4, 1938.
* 901	W.W. Merrell	1939	63	6	at 63	Trd	2,680	39.6	Nov. 20, 1968	--	3	600	C,W	S	--	Open end casing at 63 ft.
* 902	W.F. Sauls	--	Spring	--	--	Trd	2,880	--	--	--	--	630	Flows	S,P	--	Water falls in Gay Hollow. Flow estimated 50 gpm Oct. 14, 1938, measured 113 gpm Nov. 22, 1939, and 58 gpm Nov. 21, 1968.
* 903	Troy Taylor	--	Spring	--	--	To	2,900	--	--	--	--	--	Flows	S	--	Flow estimated 2 gpm Oct. 13, 1938.
904	Howard Brothers	--	Spring	--	--	To	2,860	--	--	--	--	--	Flows	S	--	Flow estimated ½ gpm Oct. 13, 1938.
* 48-401	Jack Merrell	before 1917	67	6	--	Po	2,612	36.9 24.2	Dec. 30, 1937 Nov. 19, 1968	-- --	-- 2	-- --	C,W	S	--	Well was 71 ft deep in 1937.
402	Mrs. J.A. Taylor	1956	98	12	62- 98	Qal,Trd	2,629	26.3	do.	--	80	--	N	U	--	Originally drilled to 102 ft. Triassic red siltstone at 95 ft. Unused for irrigation since 1963. Well pumped sand and silt. Discharge reported in 1963.
403	Jack Merrell	1956	68	12	50- 68	Qal	2,612	19.2	do.	--	55	--	T	Irr	--	Originally drilled to redbed at 70 ft. Usually irrigates 10 acres; however, not used in 1967 and 1968.
* 404	Mrs. J.A. Taylor	1929	50	6	--	Po	2,648	23.5	do.	--	3	--	C,W	U	--	Well 60 ft deep in 1937. Pumping level 43.0 ft Dec. 30, 1937.
* 501	A.D. Monk	1959	26	12	14- 26	Qal,Pa	2,467	10.2	Oct. 31, 1968	--	79	1,630	S,E,3	Irr	--	Combined acreage irrigated from 3 wells. Red bed at 24 ft.
502	do.	1961	19	10	9- 19	Qal,Pa	2,460	7.0	do.	--	25	1,650	Ct,E,1	Irr,S	15	Discharge reported. Red bed at 16 ft.
503	do.	1961	18	10	9- 18	Qal,Pa	2,460	7.4	do.	--	40	1,650	S,E,3	Irr	--	Originally drilled to 19 ft. Discharge estimated. Red bed at 16 ft.
*TW-11-48-601	Leonard W. Crowell	1954	154	12	--	Qal	2,459	32.0 50.3	Nov. 23, 1954 Oct. 31, 1968	52.0 --	280 --	-- --	T,G,55	Irr	50	Pumping level 85 ft after 47 hrs. Originally drilled to 155 ft. Red bed at 150 ft. 3/
* 602	do.	1959	96	12	--	Qal	2,439	35.3 35.4	Nov. 17, 1959 Oct. 31, 1968	--	220	--	T,G,55	Irr	60	Originally drilled to 120 ft. Discharge measured May 5, 1960. Red bed at 115 ft. 1/ 3/

See footnotes at end of table.

Table 8.--Records of Wells and Springs--Continued

WELL	OWNER	DATE COM-PLET-ED	DEPTH OF WELL (FT)	CASING: DIAM-ETER (IN.)	CASING: INTER-VAL OPEN (FT)	WATER-BEAR-ING UNIT	ALTITUDE OF LAND SURFACE (FT)	WATER LEVEL: BELOW LAND SURFACE DATUM (FT)	WATER LEVEL: DATE OF MEASUREMENT	WELL PERFORMANCE: DRAWDOWN (FT)	WELL PERFORMANCE: DISCHARGE (GPM)	SPECIFIC CONDUCTANCE (MICROMHOS AT 25° C)	METHOD OF LIFT	USE OF WATER	IRRI-GATED ACRES (APPROX-IMATE) 1968	REMARKS
TW-11-48-603	L. Vernon Cagle	1955	141	12	--	Qal	2,444	40.5 42.8	Nov. 17, 1959 June 21, 1968	--	220	--	T,G,55	Irr	25	Originally drilled to red bed at 142 ft. Discharge measured Aug. 24, 1960, pumping level 69.0 ft. Since 1964 when well caved, the discharge was reported about 185 gpm. 1/
604	Isom F. Reed	1950	88	12	70- 88	Qal	2,429	40 40.5	Mar. 1950 Oct. 31, 1968	-- --	137 --	600 --	T,E,5	Irr	15	Originally drilled to 90 ft. Discharge measured Apr. 5, 1960. 1/
605	do.	1954	125	12	--	Qal	2,428	43.5 44.1	Nov. 17, 1959 Oct. 31, 1968	--	-- 408	--	T,G,55	Irr	110	Red bed at 115 ft. Discharge measured 348 gpm Dec. 5, 1960. 1/
606	Leonard W. Crowell	1964	110	12	--	Qal	2,439	37.2	do.	--	300	--	T,G,55	Irr	50	Originally drilled to 114 ft. Discharge reported.
607	Kate Reed	1965	148	12	--	Qal	2,441	48.1 47.8	June 21, 1968 Oct. 31, 1968	-- --	235 --	720 --	T,G,55	Irr	79	
* 608	Isom F. Reed	1954	89	12	43- 89	Qal,Po	2,421	41.6 43.6	Nov. 17, 1959 Oct. 31, 1968	-- --	172 --	876 --	T,G,40	Irr	35	Originally drilled to 91 ft. Red bed at 86 ft. Pumping level 72.0 ft while pumping 172 gpm May 18, 1960. Open hole from 86 to 91 ft. 1/
*JW-11-48-701	Webb Taylor	1928	105	6	75-105	Po	2,579	79.7 67.2	Dec. 31, 1937 Nov. 18, 1968	-- 0.9	1/2 2	-- 1,140	C,W	S	--	Pumping level 96.9 ft Dec. 31, 1937. Pumping level 68.1 ft after 10 hrs. on Nov. 18, 1968.
702	do.	1927	10	26 ft.	8- 10	Qal	2,520	6.7	do.	--	100	930	Ct,E,7 1/2	Irr	20	Brick and timber gallery system extends into alluvium of Quitaque Creek.
* 703	Elmer W. Tibbetts	before 1925	47	6	--	Po	2,580	41.1	Nov. 20, 1968	--	3	1,520	C,E,1/3	S,D	--	Depth of well 49 ft and pumping level 46.4 ft Dec. 31, 1937.
704	do.	1964	47	8	--	Qal	2,582	26.8	do.	--	150	--	T,E,3	Ind	--	Supplies water for sand and gravel operations. Discharge estimated.
* 705	W.W. Merrill	1917	17	5	12- 17	Qal	2,591	12.0	Dec. 30, 1937	--	3	--	N	U	--	Casing and curbing now buried, replaced by well JW-11-48-706.
706	do.	1950	59	6	30- 59	Trd	2,615	35.1	Nov. 20, 1968	--	12	580	S,E,1/3	D	--	Originally drilled to 60 ft.
* 801	Mattie Cogdill	before 1937	81	4	--	Po	2,538	57.7	Oct. 31, 1968	--	2	2,200	C,W	S	--	Well 110 ft deep, pumping level 105.5 ft Dec. 31, 1937.
* 802	O.P. Clark	1965	100	8	--	Po	2,535	63.2	Nov. 5, 1968	--	80	3,000	S,E,5	Irr	--	Discharge estimated. Red bed reported at about 100 ft.
803	do.	1956	101	6	--	Po	2,529	62.8	do.	--	75	--	S,E,5	Irr	10	Discharge estimated. Combined irrigated acreage from 2 wells. Red bed reported at about 100 ft.
804	Jeff Sperry	1966	75	6	40- 65	Po	2,497	45.8	do.	--	2	1,190	C,W	S	--	3/
805	O.P. Clark	--	66	6	--	Po	2,526	40.4	Nov. 6, 1968	--	6	2,020	C,E,1/3	D	--	
* 806	J.T. Persons	before 1930	124	6	--	Po	2,578	48.0	Nov. 19, 1968	.6	2	2,010	C,W	S	--	Pumping level 48.6 ft after 8 hrs. Nov. 19, 1968. Well was 108 ft deep and uncased in 1937.
TW-11-48-901	James E. Monk	1956	38	11	20- 38	Qal	2,500	19.6 24.5	Nov. 17, 1959 Nov. 7, 1968	-- --	32 --	-- --	N	U	--	Discharge measured with pumping level at 39.0 ft on Aug. 24, 1960. Insufficient water for irrigation, abandoned in 1967. Originally drilled to red bed at 40 ft. 1/
902	do.	1963	48	8	28- 48	Qal	2,499	26.3	do.	--	70	2,100	S,E,3	Irr	12	Red bed at 35 ft.
903	Walter Merrill	1967	52	6	35- 52	Qal	2,408	25 20.6	Mar. 1967 Nov. 6, 1968	6 --	30 --	1,700 --	C,W	S	--	Drawdown and discharge reported after bailing 2 hrs. Mar. 17, 1967. Red bed at 51 ft. 3/
* 904	do.	1940's	82	6	--	Po	2,460	51.7	Nov. 6, 1968	--	3	2,200	C,W	S	--	
905	David Gilbert	1954	46	15	18- 46	Qal	2,490	16.6	Nov. 7, 1968	--	63	--	T,G,35	Irr	--	Originally drilled to 48 ft. Not used for irrigation in 1968, usually irrigates 14 acres.

See footnotes at end of table.

Table 8.--Records of Wells and Springs--Continued

WELL	OWNER	DATE COMPLETED	DEPTH OF WELL (FT)	CASING: DIAMETER (IN.)	CASING: INTERVAL OPEN (FT)	WATER-BEARING UNIT	ALTITUDE OF LAND SURFACE (FT)	WATER LEVEL: BELOW LAND SURFACE DATUM (FT)	WATER LEVEL: DATE OF MEASUREMENT	WELL PERFORMANCE: DRAWDOWN (FT)	WELL PERFORMANCE: DISCHARGE (GPM)	SPECIFIC CONDUCTANCE (MICROMHOS AT 25° C)	METHOD OF LIFT	USE OF WATER	IRRIGATED ACRES (APPROXIMATE) 1968	REMARKS
JW-11-55-201	J.P. Taylor	1956	300	16	200-300	Trd	3,183	242.5	Dec. 10, 1968	--	400	--	T,G,120	Irr	--	Discharge estimated. Well is on edge of ''caprock''.
* 202	David M. Cogdell	--	Spring	--	--	To,Trd	2,960	--	--	--	--	--	Flows	S	--	Flow estimated 10 gpm Nov. 4, 1938.
203	do.	--	Spring	--	--	To,Trd	2,960	--	--	--	--	--	Flows	S	--	Flow estimated 5 gpm Nov. 4, 1938.
204	J.P. Taylor	--	Spring	--	--	Trd	2,940	--	--	--	--	510	Flows	S	--	Flow estimated 100 gpm Nov. 4, 1938, and measured 193 gpm Dec. 10, 1968.
* 205	Howard Brothers	--	Spring	--	--	Trd	2,930	--	--	--	--	510	Flows	S	--	''Blue Hole Springs'' in Quitaque Creek. Flow estimated 225 gpm Nov. 4, 1938 and measured 202 gpm Dec. 10, 1968.
* 206	do.	--	Spring	--	--	Trd	2,940	--	--	--	--	510	Flows	S	--	Flow estimated 12 gpm Dec. 10, 1968.
207	David M. Cogdell	--	Spring	--	--	To	2,920	--	--	--	--	--	Flows	S	--	Flow estimated 8 gpm Nov. 4, 1938.
* 208	do.	--	Spring	--	--	To	2,910	--	--	--	--	--	Flows	S	--	Flow estimated 15 gpm Nov. 4, 1938.
209	do.	--	Spring	--	--	To	2,900	--	--	--	--	--	Flows	S	--	Flow estimated 5 gpm Nov. 4, 1938.
* 301	J.P. Taylor	1946	141	6	--	To,Trd	2,874	120.0	Nov. 21, 1968	--	2	490	C,W	S	--	
302	do.	1946	171	6	--	To,Trd	2,953	148.1	do.	--	3	520	C,W	S	--	
* 303	W.F. Sauls	--	Spring	--	--	To	2,870	--	--	--	--	580	Flows	S	--	Spring in South Turkey Creek. Flow estimated 50 gpm Oct. 14, 1938 and 19 gpm Nov. 21, 1968.
* 304	David M. Cogdell	--	Spring	--	--	To	2,880	--	--	--	--	--	Flows	S	--	Flow estimated 20 gpm Nov. 3, 1938.
601	do.	--	Spring	--	--	To	2,900	--	--	--	--	--	Flows	S	--	Flow estimated 15 gpm Nov. 1, 1938.
602	do.	--	Spring	--	--	To	2,940	--	--	--	--	--	Flows	S	--	Flow estimated 25 gpm Nov. 1, 1938.
603	do.	--	Spring	--	--	To	2,940	--	--	--	--	--	Flows	S	--	Flow estimated 75 gpm Nov. 1, 1938.
* 604	do.	--	Spring	--	--	To	2,940	--	--	--	--	--	Flows	S	--	Flow estimated 25 gpm Nov. 1, 1938.
605	do.	--	Spring	--	--	To	2,930	--	--	--	--	--	Flows	S	--	Do.
901	Gerald Lackey	1953	341	16	161-341	To,Trd	3,168	265.0 276.3	Jan. 17, 1962 Jan. 1969	--	350	--	T,G,150	Irr	--	Discharge reported. Triassic red bed at 338 ft. Texas Water Development Board observation well. Irrigated acreage is above caprock. 1/ 3/
56-101	William F. Sauls	1950	11	12	10- 11	Qal	2,625	6.0	Nov. 22, 1968	3	100	750	Ct,G,3	Irr	12	Originally dug to 16 ft. Discharge reported.
* 102	W.W. Merrell	--	Spring	--	--	Trd	2,610	--	--	--	--	--	Flows	S	--	Landowner reported that 1968 was the only time in over 40 years that ''Cold Spring'' did not flow. Flow estimated 10 gpm Dec. 30, 1937. No flow Nov. 21, 1968.
103	William F. Sauls	1944	78	5	50- 78	Trd	2,722	60.0	Nov. 21, 1968	--	3	550	C,W	S	--	Originally drilled to 90 ft.
* 104	do.	1944	114	5	74-114	Trd	2,830	88.8	Nov. 22, 1968	--	3	480	C,W	S	--	Permian red bed at 96 ft.
* 105	Mrs. Von Hall	--	Spring	--	--	Trd	2,800	--	--	--	--	550	Flows	S	--	''Dripping Springs'', flows from faulted sandstone and conglomerate in Smith Creek. Flow estimated 2 gpm July 16, 1938, and 10 gpm Nov. 21, 1968.
106	David M. Cogdell	1949	172	6	--	Trd	2,906	140.8	Nov. 22, 1968	--	3	640	C,W	S	--	
* 201	Aline Welch	1961	113	6	69-113	Po	2,621	51.0 46.8	Dec. 28, 1937 Nov. 8, 1968	-- --	-- 3	-- 1,170	C,W	S	--	Originally drilled to 120 ft. Replaces old well drilled to 69 ft in 1929. Permian red bed at 60 ft. Open hole 80-120 ft.
* 202	Losey D. Gilbert	1962	100	12	40-100	Qal	2,555	42.5	Nov. 7, 1968	--	508	2,590	T,G,116	Irr	100	3/
203	do.	1968	98	12	38- 98	Qal	2,556	44.9	do.	--	500	--	T,G,116	Irr	10	Discharge reported.
204	Virgil Skinner	1961	96	14	--	Qal	2,557	40.5	do.	--	275	--	T,G,116	Irr	55	Originally drilled to 100 ft.

See footnotes at end of table.

Table 8.--Records of Wells and Springs--Continued

WELL	OWNER	DATE COM-PLET-ED	DEPTH OF WELL (FT)	CASING: DIAM-ETER (IN.)	CASING: INTER-VAL OPEN (FT)	WATER-BEAR-ING UNIT	ALTITUDE OF LAND SURFACE (FT)	WATER LEVEL: BELOW LAND SURFACE DATUM (FT)	WATER LEVEL: DATE OF MEASUREMENT	WELL PERFORMANCE: DRAWDOWN (FT)	WELL PERFORMANCE: DISCHARGE (GPM)	SPECIFIC CONDUCTANCE (MICROMHOS AT 25° C)	METHOD OF LIFT	USE OF WATER	IRRI-GATED ACRES (APPROX-IMATE) 1968	REMARKS
JW-11-65-205	Virgil Skinner	1956	110	12	--	Qal	2,561	43.4	Nov. 7, 1968	--	300	--	T,G,45	Irr	60	
206	R.C. Smith Estate	1956	105	12	--	Qal	2,563	42.1	do.	--	302	--	T,G,116	Irr	--	Red bed at 100 ft. Well not operated in 1968; however, usually irrigates 50 acres.
207	Neva Smith	1965	103	12	--	Qal	2,561	41.4	Nov. 6, 1968	--	190	--	T,E	Irr	10	Discharge and irrigated acreage estimated.
208	R.C. Smith Estate	1966	106	12	66-106	Qal	2,563	40.4	Nov. 7, 1968	--	210	--	T,G,85	Irr	20	
209	Sebastian Skinner	before 1925	60	4	--	Po	2,581	52.3 41.8	Dec. 30, 1937 Nov. 8, 1968	-- --	-- --	-- --	C,W	U	--	
* 210	do.	1963	101	10	--	Qal	2,602	40.2	do.	41.7	175	1,550	S,E,7 1/2	Irr	35	Discharge and drawdown measured after pumping 2 hrs.
211	do.	1955	84	12	--	Qal	2,601	42.0	do.	--	--	--	N	U	--	Originally drilled to red bed at 100 ft. Irrigation discontinued because of broken casing at 80 to 85 ft.
212	Virgil Skinner	--	96	12	--	Po	2,605	40.9	do.	--	65	--	T,G,45	Irr	13	Pump breaks suction after 6 or 7 days of continuous operation.
213	do.	--	127	15	--	Po	2,611	44.0	do.	--	66	1,950	S,E,7 1/2	Irr	--	Well not operated in 1968, but usually irrigates 8.5 acres.
* 214	Mrs. Von Hall	--	Spring	--	--	Trd	2,820	--	--	--	--	--	Flows	S	--	Spring in Roberts Creek. Flow estimated 2 gpm July 16, 1938.
*TW-11-56-301	J.L. Spear	1961	64	10	--	Po	2,533	43.4	Nov. 6, 1968	8.4	20	4,000	S	Irr	3	Discharge and drawdown measured after pumping 2 hrs.
302	Truls D. Martin	1950	100	16	--	Qal,Po	2,566	45	June 1968	--	38	--	T,E,5	Irr	70	Water level estimated from nearby well TW-11-56-304. Discharge measured Aug. 24, 1960. Well depth reported. Manifold system of 5 wells. Irrigated acreage from 4 wells. Red bed at 76 ft.
303	do.	1950	80	16	--	Qal	2,569	46	do.	--	45	--	S,E,5	Irr	--	Water level estimated from nearby well TW-11-56-304. Discharge measured Aug. 24, 1960. Well depth reported. Red bed at 76 ft.
304	do.	1950	80	16	--	Qal	2,567	46.0 45.4	Nov. 19, 1959 June 24, 1968	-- --	144 --	-- --	T,E,5	Irr	--	Pumping level 59.3 ft and discharge measured Aug. 24, 1960. Depth of well reported. Red bed at 76 ft. 1/
305	do.	1950	80	16	--	Qal	2,565	45	do.	--	131	--	T,G,50	Irr	--	Discharge measured Aug. 24, 1960. Well depth reported. Water level estimated from nearby well TW-11-56-304. Red bed at 77 ft.
306	do.	1950	80	16	--	Qal	2,563	44	do.	--	124	--	T,E,5	Irr	--	Discharge measured Aug. 24, 1960. Water level estimated from well TW-11-56-304. Well depth reported.
307	do.	1950	80	24	--	Qal	2,599	53.7 51.0 50.4	Nov. 1959 Feb. 3, 1960 Dec. 5, 1960	-- -- --	40 -- --	-- -- --	S,E,5	Irr	7.5	Pumping level 68.5 ft and discharge measured Aug. 24, 1960. Red bed at 76 ft. Well depth reported.
308	do.	1950	80	16	--	Qal	2,602	51	Dec. 1960	--	25	--	N	U	--	Unused for irrigation since 1960. Well depth and discharge reported Nov. 10, 1959. Water level estimated from well TW-11-56-307.
* 309	Thomas W. Tippett	1956	99	12	--	Qal	2,518	64.1 64.3	Nov. 17, 1959 Nov. 7, 1968	-- 16.7	-- 79	-- 1,070	T,E,7 1/2	Irr	25	Discharge and drawdown measured after pumping (open flow) for 30 minutes Nov. 7, 1968. 1/
310	Harley Gunn	1950	71	--	--	Qal	2,558	48	June 1968	--	--	--	S,E,1/4	D	--	Water level estimated from nearby wells.
311	Robert T. Thomas, Jr.	1964	76	8	56- 76	Qal	2,548	50 52.5	Aug. 1964 Mar. 27, 1969	-- --	-- --	-- --	N	U	--	Red bed at 75 ft. Unused for irrigation since 1967. 3/
312	do.	1965	110	8	--	Qal	2,553	52	Aug. 1964	--	50	--	N	U	--	Water level and discharge reported. Unused for irrigation since 1967.
313	Charlie W. Starkey	1964	44	16	0- 44	Trd	2,578	16.0	Nov. 25, 1968	--	25	640	S,E,3	Irr	8	Manifold system. Yield and irrigated acres are combined totals for 3 wells.

See footnotes at end of table.

Table 8.--Records of Wells and Springs--Continued

WELL	OWNER	DATE COM-PLET-ED	DEPTH OF WELL (FT)	CASING: DIAM-ETER (IN.)	CASING: INTER-VAL OPEN (FT)	WATER-BEAR-ING UNIT	ALTITUDE OF LAND SURFACE (FT)	WATER LEVEL: BELOW LAND SURFACE DATUM (FT)	WATER LEVEL: DATE OF MEASUREMENT	WELL PERFORMANCE: DRAWDOWN (FT)	WELL PERFORMANCE: DISCHARGE (GPM)	SPECIFIC CONDUCTANCE (MICROMHOS AT 25° C)	METHOD OF LIFT	USE OF WATER	IRRI-GATED ACRES (APPROX-IMATE) 1968	REMARKS
TW-11-56-314	Charlie W. Starkey	1965	42	6	21- 42	Trd	2,578	16.1	Nov. 25, 1968	--	--	640	S,E,3/4	Irr	--	Manifold system. Yield and irrigated acres are combined totals for 3 wells.
315	do.	1964	44	16	0- 44	Trd	2,578	15.8	do.	--	--	640	S,E,3	Irr	--	Do.
JW-11-56-501	Bob McWilliams	1950	97	6	--	Trd	2,786	--	do.	--	--	--	C,W	U	--	Dry at 97 ft.
* 503	David M. Cogdell	1920's	309	4	--	Trd	3,114	279.8	do.	--	3	400	C,W	D	--	Pumping level 289.6 ft on Dec. 28, 1938.. Well is on edge of ''caprock'' area.
* 504	Mrs. Maude E. Hollums	--	Spring	--	--	Trd	2,680	--	--	--	--	--	Flows	S	--	Flow 6 gpm, Aug. 18, 1938.
* 505	Howard Brothers	--	Spring	--	--	Trd	2,720	--	--	--	--	--	Flows	S	--	Flow estimated 10 gpm Aug. 18, 1938 and 9 gpm Nov. 19, 1938.
* 506	do.	--	Spring	--	--	Trd	2,800	--	--	--	--	--	Flows	S	--	Flow estimated 3 gpm July 16, 1938.
*TW-11-56-601	Mrs. Aline Welch	1950	106	6	80-106	Trd	2,615	75.3	Nov. 25, 1968	--	3	860	C,W	S	--	Originally drilled to 120 ft.
602	Bob Williams	1950	110	5	--	Trd	2,718	69.9	do.	--	2	--	C,W	S	--	
*JW-11-56-701	Clifford Ware	1948	310	6	280-310	Trd	3,133	258.3 271.4	Dec. 2, 1938 Dec. 16, 1968	--	-- 6	-- 480	S,E,1 1/2	D	--	Replaces well at this site in 1938. Pumping level 259.8 Aug. 19, 1938.
702	David M. Cogdell	--	Spring	--	--	To	2,830	--	--	--	--	--	Flows	S	--	Flow estimated 75 gpm Dec. 2, 1938.
* 801	Mrs. Hope Fish	--	98	6	--	Trd	2,807	69.3	Dec. 11, 1968	--	3	310	C,W	S	--	
* 802	Hale Co. Concrete, Inc.	1965	205	16	135-205	To,Trd	2,975	145.5	Dec. 15, 1968	52	200	430	S,E,15	Ind	--	Pumping level at 198 ft after pumping 200 hrs. Supplies sand and gravel washer. Triassic red bed at 200 ft.
803	do.	1968	219	16	140-219	To,Trd	2,978	146.0	Dec. 16, 1968	--	300	430	S,E,25	Ind	--	Originally drilled to 220 ft. Discharge reported. Supplied sand and gravel washer. Triassic red bed at 210 ft.
804	do.	1963	203	12	133-203	To,Trd	2,975	146.0	do.	--	300	430	N	U	--	Discharge reported in 1965. Industrial well abandoned in 1965. Triassic redbed at 198 ft.
805	H.M. Bain	1968	178	6	--	Trd	2,940	104.5 107.7	Sept. 6, 1938 Dec. 16, 1968	-- --	-- 6	-- 490	S,E,1/2	S	--	Replaces old well at this location in 1938.
* 806	David M. Cogdell	--	Spring	--	--	To,Trd	2,820	--	--	--	--	--	Flows	S	--	Flow estimated 125 gpm, Aug. 19, 1938.
* 807	do.	--	Spring	--	--	Trd	2,740	--	--	--	--	--	Flows	S	--	Flow estimated 15 gpm, Aug. 19, 1938.
* 808	G.B. Bostick	--	Spring	--	--	To	2,850	--	--	--	--	--	Flows	S	--	Flow estimated 1 gpm, Sept. 6, 1938.
809	J.F. Fish	--	Spring	--	--	Trd	2,680	--	--	--	--	--	Flows	S	--	Flow estimated ½ gpm, Sept. 6, 1938.
TW-11-56-901	Mrs. Hope Fish	1956	112	6	--	Po	2,553	103.4	Dec. 11, 1968	--	2	950	C,W	S	--	Reportedly drilled to 120 ft originally.
* 902	do.	--	30	6	--	Po	2,523	27.0	Dec. 10, 1968	--	4	6,000	C,W	S	--	Well adjacent to North Pease River channel.
JW-11-64-101	Vance Campbell	1957	316	16	192-316	To	3,117	210 234.7	Mar. 30, 1957 Jan. 1969	--	130	--	S,E	Irr	--	Discharge reported 1963. Triassic redbed at 316 ft. Texas Water Development Board observation well on edge of ''caprock'' area. 1/ 3/
102	R.W. Overstreet	1962	190	8	--	To	2,990	152.7	Dec. 14, 1968	--	120	--	N	U	--	Originally used for gravel washer operation. Unused since 1964 when discharge was reported.
103	do.	1962	195	6	--	To	2,997	151.7	do.	--	100	--	N	U	--	Do.
* 201	do.	before 1925	20	4	--	Trd	2,830	--	--	--	--	--	N	U	--	Dry at 20 ft. Originally drilled to 45 ft. Open hole 20 to 45 ft.
* 202	do.	1944	65	6	45- 65	Trd	2,845	50.2	Dec. 13, 1968	--	12	800	J,E,3/4	D	--	Replaces well JW-11-64-201.
* 203	do.	--	Spring	--	--	Trd	2,785	--	--	--	--	800	Artesian	S	--	Flow estimated 40 gpm, Aug. 26, 1938; 45 gpm Dec. 13, 1968. Upper most spring area on North Pease River.

See footnotes at end of table.

Table 8.--Records of Wells and Springs--Continued

WELL	OWNER	DATE COMPLETED	DEPTH OF WELL (FT)	CASING: DIAMETER (IN.)	CASING: INTERVAL OPEN (FT)	WATER-BEARING UNIT	ALTITUDE OF LAND SURFACE (FT)	WATER LEVEL: BELOW LAND SURFACE DATUM (FT)	WATER LEVEL: DATE OF MEASUREMENT	WELL PERFORMANCE: DRAWDOWN (FT)	WELL PERFORMANCE: DISCHARGE (GPM)	SPECIFIC CONDUCTANCE (MICROMHOS AT 25° C)	METHOD OF LIFT	USE OF WATER	IRRIGATED ACRES (APPROXIMATE) 1968	REMARKS
JW-11-64-204	R.W. Overstreet	--	Spring	--	--	Trd	2,790	--	--	--	--	--	Flows	S	--	Flow estimated 20 gpm, Aug. 26, 1938; 5 gpm Dec. 13, 1968.
* 205	do.	--	Spring	--	--	To,Trd	2,800	--	--	--	--	950	Flows	S	--	Flow estimated 25 gpm, Aug. 26, 1938; 35 gpm measured Dec. 13, 1968. Oily film on water surface.
206	do.	--	Spring	--	--	Trd	2,770	--	--	--	--	--	Flows	S	--	Flow estimated 15 gpm, Aug. 26, 1938; 10 gpm estimated Dec. 13, 1968.
* 207	do.	--	Spring	--	--	Trd	2,720	--	--	--	--	2,010	Flows	S,P	--	''Watercress Pool'' springs. Flow estimated 150 gpm Aug. 26, 1938; measured 176 gpm Nov. 18, 1938; measured 115 gpm Dec. 13, 1968. Includes flow from springs JW-11-64-203-207.
208	do.	--	Spring	--	--	To,Trd	2,790	--	--	--	--	1,500	Flows	S	--	Flow estimated 100 gpm Oct. 1, 1937; measured 103 gpm Nov. 18, 1938, 127 gpm Mar. 31, 1939, 147 gpm Dec. 14, 1968. Measurements 0.5 mile below springs. Include flow from several small springs along canyon.
* 209	do.	1920's	108	4	--	Trd	2,878	90 73.6	Oct. 1937 Dec. 14, 1968	--	--	--	C,W	S	--	
210	do.	--	Spring	--	--	To	2,845	--	--	--	--	--	Flows	S	--	Flow estimated 40 gpm Oct. 1, 1937 and 35 gpm Dec. 14, 1968.
* 211	H.M. Bain	1965	100	12	--	Trd	2,870	48.3	Dec. 14, 1968	--	306	390	T,E,25	Irr	54	
* 212	do.	1920's	55	4	--	Trd,Qal	2,832	8.1	do.	--	8	670	C,E,1/2	D,S	--	
* 213	do.	--	Spring	--	--	Trd	2,800	--	--	--	--	450	Flows	S	--	''Mud Spring.'' Flow estimated 5-10 gpm Aug. 24, 1938 and 15 gpm Dec. 14, 1968.
214	do.	--	Spring	--	--	Qal	2,815	--	--	--	--	670	Flows	S	--	Flow estimated 1 gpm Aug. 24, 1968 and 12 gpm Dec. 14, 1968.
215	do.	--	Spring	--	--	To	2,815	--	--	--	--	600	Flows	S	--	Flow estimated 25 gpm Aug. 24, 1938, and 40 gpm Dec. 14, 1968.
216	do.	--	Spring	--	--	To,Trd	2,730	--	--	--	--	600	Flows	S	--	Flow estimated 100 gpm Aug. 24, 1938; measured 106 gpm Nov. 18, 1938. Estimated 125 gpm Dec. 14, 1968 approximately 0.7 miles below spring JW-11-64-213 which includes flow from 213, 214, 215, and other springs along canyon.
TW-11-64-301	A.T. Swepston	1950	185	8	--	Trd	2,946	170.8	Dec. 12, 1968	--	3	640	C,W	S	--	
* 302	Guy Garrison	1948	194	6	--	Trd,Po	2,785	147.5	do.	--	3	1,470	C,W	S	--	Originally drilled to 200 ft.
303	do.	1952	97	6	--	Trd	2,789	80.3	do.	--	2	900	C,W	S	--	Originally drilled to 100 ft.
JW-11-64-502	C.M. Lewis	1955	330	6	270-330	To	3,104	263.7 264.5	June 16, 1963 Jan. 1969	-- --	20 --	-- --	S,E,1 1/2	S	--	Discharge and depth reported June 16, 1963. Texas Water Development Board observation well on edge of ''caprock'' area. 1/
503	Charlie Lewis	--	136	6	--	Trd	2,925	109.4	Dec. 14, 1968	--	3	--	C,W	S	--	
*TW-11-64-601	J.M. Hill, Jr.	before 1951	69	6	--	Trd	2,790	53.5	Sept. 24, 1968	--	3	750	C,W	S	--	
602	W.E. Burleson	--	Spring	--	--	Trd	2,680	--	--	--	--	1,320	Flows	S,Irr	20	Springs in Boggy Creek. Flow estimated 75 gpm Aug. 29, 1938, and Oct. 10, 1968. Dam completed at this site in Oct. 1968.
603	do.	1963 or 1964	115	6	--	Trd,Po	2,784	73.1	Oct. 10, 1968	0	4	830	C,W	S	--	
* 604	do.	--	Spring	--	--	To,Trd	2,885	--	--	--	--	--	Flows	S	--	Springs on North Fork of Boggy Creek. Flow estimated 140 gpm Aug. 29, 1938 and Oct. 10, 1968.
JW-11-64-801	Hammond Estate	1932	300	6	--	To,Trd	3,103	257.4	Jan. 28, 1938	--	--	--	C,W	S	--	
802	Hardin J. Cage	1957	298	6	260-298	Trd	3,088	267.7	Dec. 16, 1968	--	8	--	S,E,1 1/2	D	--	Originally drilled to Triassic red bed at 300 ft.

See footnotes at end of table.

Table 8.--Records of Wells and Springs--Continued

WELL	OWNER	DATE COM-PLET-ED	DEPTH OF WELL (FT)	CASING: DIAM-ETER (IN.)	CASING: INTER-VAL OPEN (FT)	WATER-BEAR-ING UNIT	ALTITUDE OF LAND SURFACE (FT)	WATER LEVEL: BELOW LAND SURFACE DATUM (FT)	WATER LEVEL: DATE OF MEASUREMENT	WELL PERFORMANCE: DRAWDOWN (FT)	WELL PERFORMANCE: DISCHARGE (GPM)	SPECIFIC CONDUCTANCE (MICROMHOS AT 25° C)	METHOD OF LIFT	USE OF WATER	IRRI-GATED ACRES (APPROX-IMATE) 1968	REMARKS
*TW-11-64-901	W.E. Burleson	1965	200	5	--	To,Trd	2,949	167.4	Oct. 10, 1968	--	3	430	C,W	S	--	
902	do.	1918	47	6	--	Po	2,762	21.5	do.	0	3	1,130	C,W	D,S	--	Mott Camp well. Discharge and drawdown measured after pumping about 15 hrs.
903	Leo R. Thrasher	1956	188	12	130-188	To,Trd	2,935	154.1	Dec. 16, 1968	--	100	550	S,E,15	Ind	--	Supplies water for sand and gravel washer. Originally drilled to 190 ft. Discharge reported.
904	do.	1958	170	12	100-170	Trd,To	2,895	80 99.2	Nov. 1959 Dec. 16, 1968	-- --	133 --	-- --	N	U	--	Originally drilled to red bed at 185 ft. Discharge measured Apr. 26, 1960. Industrial well unused since 1965.
905	do.	1958	70	12	30- 70	Qal	2,801	21.5	Dec. 17, 1968	--	400	--	T,G,180	Irr	--	Discharge reported in 1959. Red bed at 70 ft. Well unused since 1959.
906	do.	1965	54	12	20- 54	Qal,To	2,797	20.2	do.	--	400	--	T,G,90	Irr	--	Discharge reported in 1965. Originally drilled to 55 ft. Unused since 1965.
907	do.	1950's	410	6	--	Trd,To	2,952	150	Dec. 1968	--	4	--	C,W	S	--	Water level reported. Discharge estimated.
* 908	W.E. Burleson	--	Spring	--	--	Qal,To, Trd	2,785	--	--	--	--	1,920	Flows	S	--	''Mott Camp'' springs in Mott Creek. Flow estimated 10 gpm Aug. 30, 1938 and Oct. 10, 1968. Flow increases to about 85 gpm downstream.
909	do.	--	Spring	--	--	To,Trd	2,755	--	--	--	--	530	Flows	S	--	Spring in Halls Creek. Flow estimated 10 gpm Aug. 30, 1938, 30 gpm Oct. 10, 1968.
* 910	do.	--	Spring	--	--	To,Trd	2,765	--	--	--	--	530	Flows	S	--	Spring in Chimney Creek. Flow estimated 20 gpm Aug. 30, 1938, 40 gpm Oct. 10, 1968.
12-41-401	Doyle Tiffin	1956	122	12	--	Qal	2,432	48.1 51.9	Nov. 18, 1959 Oct. 29, 1968	-- --	152 --	-- --	T,G,55	Irr	150	Discharge and pumping level 62.5 ft measured Aug. 24, 1960. 1/
* 402	Von D. Tiffin	1954	137	14	80-137	Qal	2,425	47.5 49.4	Nov. 17, 1959 Oct. 24, 1968	-- --	304 --	-- --	T,G,120	Irr	80	Discharge measured May 19, 1960. Originally drilled to red bed at 140 ft. 1/
403	L. Vernon Cagle	1962	117	12	83-117	Qal	2,439	52.8	Oct. 29, 1968	--	430	--	T,G,55	Irr	85	Red bed at 117 ft.
404	Von D. Tiffin	1954	140	16	80-140	Qal	2,411	44.6 45.2	Nov. 17, 1959 Oct. 24, 1968	--	304	--	T,G,60	Irr	60	Discharge measured May 19, 1960. Originally drilled to 145 ft. 1/ 3/
405	W.E. Helms	1955	157	14	88-157	Qal	2,422	44.3 48.1	Nov. 18, 1959 Oct. 25, 1968	-- --	384 --	-- --	T,G,70	Irr	90	Discharge measured Apr. 25, 1960. Red bed at 156 ft. 1/
* 406	do.	1963	112	14	82-112	Qal,Po	2,430	48.8	do.	--	350	480	T,G,60	Irr	80	Red bed at 103 ft. 2/ 3/
407	do.	1957	135	12	102-132	Qal	2,410	30.8 36.7	Nov. 18, 1959 Oct. 25, 1968	-- --	397 --	-- --	T,G,45	Irr	50	Depth reported Oct. 25, 1968. Discharge measured Aug. 24, 1960. Test hole drilled to red bed at 154 ft.
408	Willie C. Meyer	1956	106	12	--	Qal	2,392	27.4 27.0 24.5	Nov. 18, 1959 Feb. 3, 1960 Dec. 5, 1960	-- -- --	101 -- --	-- -- --	N	U	--	Discharge measured Aug. 11, 1960. Red bed at 106 ft. Well replaced by TW-12-41-418.
409	George Reed	1958	105	13	--	Qal,Po	2,406	39.1 41.3	Nov. 17, 1959 June 10, 1968	-- --	78 --	-- --	T,E,15	Irr	30	Discharge measured Apr. 25, 1960. Red bed at 100 ft. 1/
410	do.	1955	97	12	--	Qal	2,410	40.6 42.4	Nov. 17, 1959 June 11, 1968	-- --	133 --	-- --	T,G,80	Irr	30	Pumping level 58.7 ft, discharge measured Apr. 25, 1960. Red bed at 95 ft. 1/
* 411	Blye Shannon	1962	152	12	18-152	Qal	2,422	45	Oct. 1968	--	420	770	T,G,50	Irr	65	Water level estimated from nearby wells. Red bed at 152 ft. Reported maximum yield about 500 gpm.
412	Silas C. Brown	1954	140	12	--	Qal	2,418	40 44	Nov. 1959 Oct. 1968	-- --	433 --	-- --	T,G,80	Irr	70	Water levels reported. Discharge measured Aug. 11, 1960. Red bed at 140 ft.
413	do.	1962	178	12	--	Qal	2,417	44.2	do.	--	496	--	T,G,80	Irr	70	Originally drilled to 180 ft.
414	E.J. Browning	1955	72	12	--	Qal	2,388	37.8 38.9	Nov. 18, 1959 Oct. 23, 1968	-- --	216 --	-- --	T,G,80	Irr	5	Pumping level 62.1 ft, discharge measured May 19, 1960. Reported pump tested at 325 gpm in 1956. Irrigated 90 acres 1967. Drilled to red bed at 80 ft. 1/

See footnotes at end of table.

Table 8.--Records of Wells and Springs--Continued

WELL	OWNER	DATE COM-PLET-ED	DEPTH OF WELL (FT)	CASING: DIAM-ETER (IN.)	CASING: INTER-VAL OPEN (FT)	WATER-BEAR-ING UNIT	ALTITUDE OF LAND SURFACE (FT)	WATER LEVEL: BELOW LAND SURFACE DATUM (FT)	WATER LEVEL: DATE OF MEASUREMENT	WELL PERFORMANCE: DRAWDOWN (FT)	WELL PERFORMANCE: DISCHARGE (GPM)	SPECIFIC CONDUCTANCE (MICROMHOS AT 25° C)	METHOD OF LIFT	USE OF WATER	IRRI-GATED ACRES (APPROX-IMATE) 1968	REMARKS
TW-12-41-415	George Reed	1965	103	12	--	Qal	2,405	43.5 44.0	June 11, 1968 Oct. 23, 1968	-- --	-- 77	-- 800	T,E,15	Irr	25	Red bed at 103 ft.
416	Isom F. Reed	1966	156	7	136-156	Qal	2,433	--	Oct. 25, 1968	--	73	--	S,E,5	Irr	15	Depth and water level reported. Red bed at 156 ft.
* 417	Willie C. Meyer	1966	132	12	40-128	Qal	2,411	46.6	do.	--	540	650	T,G,80	Irr	130	Discharge measured Nov. 22, 1968 after pumping 4 days. Red bed at 127 ft.
* 418	do.	1966	117	12	35-112	Qal	2,395	37.4 29.4	June 10, 1968 Oct. 28, 1968	-- --	-- 450	-- 750	T,G,60	Irr	43	Red bed at 106 ft. Replaces well TW-12-41-408.
* 419	Von D. Tiffin	1958	140	10	110-140	Qal	2,413	45	Oct. 1968	--	200	--	T,G,80	Irr	30	Discharge and water level reported. Red bed at 138 ft.
420	Doyle Tiffin	1969	128	16	68-128	Qal	2,430	50.7	Mar. 27, 1969	35.7	323	620	T,G,80	Irr	--	Discharge and drawdown measured after pumping 3 hrs. Red bed at 124 ft. Replaces well TW-12-41-401 which will be discontinued because of silt problems. Well may yield about 500 gpm after fully developed. 3/
501	Pat Veazey	1968	93	14	--	Qal	2,358	60 54.2	Feb. 1968 Oct. 21, 1968	-- --	-- 250	-- --	N	U	--	Irrigation pump to be installed. Discharge and water level reported. Originally drilled to 125 ft. Red bed at 123 ft. 3/
502	Mary E. Clay	1957	97	12	--	Qal	2,358	53.5	Oct. 22, 1968	--	342	--	T,G,80	Irr	120	Discharge measured May 19, 1960. Irrigated acres include those irrigated from well TW-12-41-503. Reported drilled to red bed at 97 ft.
503	do.	1959	88	12	--	Qal	2,357	47.9 54.8	Nov. 19, 1959 Oct. 21, 1968	-- --	294 --	-- --	T,G,80	Irr	--	Discharge measured May 19, 1960. Red bed at 88 ft. 1/
* 504	do.	1964	116	12	--	Qal	2,367	56.2	Oct. 22, 1968	--	400	--	T,G,80	Irr	70	Discharge reported. Originally drilled to 130 ft.
505	do.	1968	175	12	--	Qal	2,356	61.2	Oct. 21, 1968	--	400	--	T,G	Irr	50	Discharge reported. Red bed about 170 ft.
* 506	do.	1966	65	12	--	Qal	2,372	27.2 26.2	June 12, 1968 Oct. 22, 1968	-- --	-- 100	-- 480	T,E,7 1/2	Irr	10	Discharge reported.
507	Mrs. T.R. Fuston	1965	160	12	130-160	Qal	2,370	58.0	Oct. 29, 1968	--	484	--	T,G,125	Irr	80	Red bed reported at 160 ft.
* 508	Joe Ike Clay	1964	200	12	--	Qal	2,365	52.3	June 13, 1968	--	423	--	T,G,80	Irr	80	Depth reported.
* 509	Billy Shannon	1962	135	12	95-135	Qal	2,366	57.8	Oct. 29, 1968	--	540	670	T,G,80	Irr	80	Reportedly drilled to red bed at 135 ft.
510	do.	1964	164	12	150-164	Qal	2,366	64.0	do.	--	750	--	T,G,55	Irr	110	Originally drilled to 170 ft.
511	Bobby Clay	1964	131	12	--	Qal	2,373	58.9	do.	--	500	--	T,G,80	Irr	79	Discharge reported. Red bed about 131 ft.
601	E.L. Browning	before 1900	103	5	--	Qal	2,338	60.0 61.3	June 13, 1968 Oct. 21, 1968	-- --	-- 3	-- 570	C,E,1/3	S	--	
* 602	do.	1961	153	12	70-153	Qal	2,335	67.1 69.1	June 13, 1968 Oct. 21, 1968	-- --	-- 340	-- 770	T,G,80	Irr	60	Red bed at 153 ft.
603	Ellis Currie	--	73	4	--	Pa	2,327	47.6	July 23, 1968	3.3	3	2,800	C,W	S	--	
* 604	E.L. Browning	1968	182	12	142-182	Qal	2,335	69.6	Oct. 21, 1968	--	550	650	T,G,116	Irr	30	Red bed at 180 ft.
* 701	George Reed	1956	92	12	--	Qal	2,389	47.2	June 11, 1968	--	64	800	T,G,80	Irr	22	Discharge measured Apr. 5, 1960. Red bed at 90 ft.
* 702	Von D. Tiffin	1965	69	12	54- 69	Qal	2,371	23.1 23.7	June 12, 1968 Oct. 24, 1968	-- --	-- 135	-- 1,000	T,G,60	Irr	--	Irrigated 20 acres in 1967. Well unused in 1968. Originally drilled to red bed at 70 ft.
* 703	Jess M. Browning	1962	49	12	20- 49	Qal	2,317	14.5	Oct. 23, 1968	--	260	800	T,G,80	Irr	40	Red bed at 50 ft.
704	do.	1962	36	12	--	Qal	2,315	13.0	do.	--	150	--	S,E,5	Irr	--	Discharge reported in 1966 when last used. Red bed reported about 50 ft.
705	C.D. Ham	1930's	96	6	--	Po	2,449	67.2	Oct. 24, 1968	--	3	1,320	C,W	S	--	

See footnotes at end of table.

Table 8.--Records of Wells and Springs--Continued

WELL	OWNER	DATE COMPLETED	DEPTH OF WELL (FT)	CASING: DIAMETER (IN.)	CASING: INTERVAL OPEN (FT)	WATER-BEARING UNIT	ALTITUDE OF LAND SURFACE (FT)	WATER LEVEL: BELOW LAND SURFACE DATUM (FT)	WATER LEVEL: DATE OF MEASUREMENT	WELL PERFORMANCE: DRAWDOWN (FT)	WELL PERFORMANCE: DISCHARGE (GPM)	SPECIFIC CONDUCTANCE (MICROMHOS AT 25° C)	METHOD OF LIFT	USE OF WATER	IRRIGATED ACRES (APPROXIMATE) 1968	REMARKS
*TW-12-41-801	Orlin Stark	1964	50	10	34- 49	Qal	2,335	30 37.3	Nov. 1964 June 28, 1968	--	100	--	S,E,3	Irr	65	Test pumped at 100 gpm when drilled Nov. 7, 1964. Normal combined yield of 4 wells reported about 450 gpm. Irrigated acres include those for wells TW-12-41-801, 802, 803 and 804. Red bed at 47 ft. 3/
802	do.	1964	60	10	38- 60	Qal	2,338	30 44.9	Oct. 1964 June 28, 1968	-- --	160 --	-- --	S,E,5	Irr	--	Test pumped 160 gpm when drilled Oct. 29, 1964. Red bed at 60 ft. 3/
803	do.	1964	75	12	48- 74	Qal	2,359	30 62.5	Nov. 1964 June 28, 1968	-- --	120 --	-- --	S,E,5	Irr	--	Test pumped 120 gpm when drilled Nov. 2, 1964. Red bed at 65 ft. 3/
804	do.	1964	78	10	57- 78	Qal	2,350	30 50.7	Oct. 1964 June 28, 1968	--	120	--	S,E,5	Irr	--	Test pumped 120 gpm when drilled Oct. 27, 1964. Red bed at 75 ft. 3/
805	do.	1964	67	10	41- 67	Qal	2,355	30	Oct. 1964	--	--	--	N	U	--	Red bed at 67 ft. Well reportedly bailed dry, then abandoned. 3/
* 806	Ray Cruse	1967	23	6	6- 18	Qal	2,270	5.2 4.6	Apr. 1967 Oct. 24, 1968	-- --	180 --	-- 2,000	Ct,E,7 1/2	I,S	30	Manifold system of 5 wells. Reportedly pump tested at 180 gpm when drilled in April 1967. Red bed at 20 ft.
807	Howard Rogers	1952	137	6	5-137	Po	2,396	75.0	Oct. 24, 1968	--	6	2,950	S,E,3/4	S	--	
* 901	Walter T. Ross	1967	33	12	15- 30	Qal,Pa	2,207	10 5.5	Apr. 1967 July 24, 1968	-- 9.9	-- 90	-- 2,100	T,E,5	Irr	20	Discharge and drawdown measured after ½ hr. pumping. Well in alluvial terrace of Quitaque Creek. Red bed at 30 ft. Originally drilled to 35 ft. 3/
* 902	do.	1950's	149	6	--	Pa	2,296	92.8	July 23, 1968	--	3	5,200	C,W	S	--	
903	do.	1950's	35	6	--	Qal,Pa	2,213	15.5	July 24, 1968	--	3	2,000	C,W	S	--	
* 42-401	W.J. Lewis Estate	1930's	118	5	--	Pa	2,246	75.5	July 19, 1968	--	3	2,450	C,W	S	--	
* 501	do.	1930's	165	8	--	Pa	2,232	124.0	do.	1.2	4	2,400	C,W	S	--	Discharge and drawdown measured after pumping about 3 hrs.
601	W.B. Mullin	1956	145	12	--	Qal,Po	2,164	90 90	Nov. 1959 July 1968	-- --	-- 90	-- 2,350	T,G,45	Irr	40	Acreage irrigated and discharge reported is in conjunction with well TW-12-42-604. Measured discharge from both wells 180 gpm July 23, 1968. Depth reported. Red bed at 140 ft.
602	do.	1954	205	14	--	Qal,Po	2,190	130.9 130.6 117.4	Nov. 23, 1959 Dec. 6, 1960 July 23, 1968	-- -- --	-- -- --	-- -- --	N	U	--	Depth reported. In 1963 casing collapsed, bailer stuck at 98 ft, unused since. Red bed at 195 ft. 3/
603	do.	1964	150	13	--	Qal,Po	2,190	117.9	July 23, 1968	--	--	--	N	U	--	Unused irrigation well. 3/
* 604	do.	1960	180	14	30-180	Po,Pa	2,175	112	July 1968	35	90	2,530	T,G,45	Irr	--	Discharge and drawdown measured after pumping about 72 hrs. July 23, 1968. Static water level reported. See remarks for TW-12-42-601.
605	Daisy P. Carter	1900's	13	9	--	Qal	2,073	7.1	July 23, 1968	--	2	2,620	C,W	S	--	
* 701	W.H. Montgomery	1936	105	4	80-105	Qal	2,272	55.7	July 19, 1968	--	5	3,250	C,E,1/3	D,S	--	Originally drilled to red bed at 162 ft. Open hole 120-162 ft.
801	W.J. Lewis Estate	--	139	6	--	Pa	2,148	88.4	July 16, 1968	14.1	4	2,380	C,W	S	--	Discharge and drawdown measured after pumping about 10 hrs. July 16, 1968.
* 802	do.	1930's	151	6	--	Pa	2,258	137.8	July 19, 1968	--	6	2,500	C,W	S	--	
* 901	do.	1932	217	6	--	Pa	2,208	175.8	July 17, 1968	9.0	5	2,330	C,W	S	--	Discharge and drawdown measured after pumping for 4 hrs. July 17, 1968.
902	do.	1930's	205	8	--	Pa	2,222	154.4	do.	--	3	--	C,W	S	--	
903	do.	1935	199	6	--	Pa	2,207	157.6	do.	2.0	4	2,500	C,W	S	--	Discharge and drawdown measured after pumping 12 hrs. July 17, 1968.
43-401	do.	--	18	4	--	Pa	2,010	7.2	July 16, 1968	--	3	2,800	C,W	D,S	--	Well in floodplain of Turkey Creek. Pump equipped with auxiliary 4 hp gasoline engine.

See footnotes at end of table.

Table 8.--Records of Wells and Springs--Continued

WELL	OWNER	DATE COMPLETED	DEPTH OF WELL (FT)	CASING: DIAMETER (IN.)	CASING: INTERVAL OPEN (FT)	WATER-BEARING UNIT	ALTITUDE OF LAND SURFACE (FT)	WATER LEVEL: BELOW LAND SURFACE DATUM (FT)	WATER LEVEL: DATE OF MEASUREMENT	WELL PERFORMANCE: DRAWDOWN (FT)	WELL PERFORMANCE: DISCHARGE (GPM)	SPECIFIC CONDUCTANCE (MICROMHOS AT 25° C)	METHOD OF LIFT	USE OF WATER	IRRIGATED ACRES (APPROXIMATE) 1968	REMARKS
*TW-12-43-501	W.J. Lewis Estate	--	209	6	--	Pa	2,090	183.9	July 16, 1968	3.5	2	2,650	C,W	S	--	Discharge and drawdown measured after pumping about 4 hrs. July 16, 1968.
* 601	E.M. Timmons	1950	54	4	--	Pa	1,882	35.1	July 15, 1968	1.2	3	5,050	C,W	S	--	Discharge and drawdown measured after pumping about 3 hrs. July 15, 1968. Originally drilled to 73 ft. Bailed over 10 gpm when drilled. 3/
602	do.	1950	168	4	--	Pa	2,001	127.0	do.	3.1	3	2,850	C,W	S	--	Discharge and drawdown measured after pumping 4 hours July 15, 1968. Originally drilled to 183 ft. Well bailed at 10 gpm when drilled. 3/
* 701	W.J. Lewis Estate	1932	168	6	--	Pa	2,087	128.8	July 16, 1968	5.2	3	2,500	C,W	S	--	Discharge and drawdown measured after pumping about 10 hrs. July 16, 1968. Pump is equipped with auxiliary 3 hp gasoline engine.
702	do.	1936	170	6	--	Pa	2,169	150	July 1968	--	--	--	C,W	S	--	Depth and water level reported.
* 801	do.	--	30	6	--	Pa	1,928	7.7	July 16, 1968	.9	3	8,400	C,W	S	--	Discharge and drawdown measured after pumping for about 5 hrs. July 16, 1968.
802	do.	--	38	6	--	Pa	1,954	25.0	do.	3.9	4	3,150	C,W	S	--	Discharge and drawdown measured after pumping about 6 hrs. July 16, 1968. Well in floodplain of Turkey Creek.
901	A.B. Simpson	1967	118	6	105-118	Pa	1,955	39 37.2	Aug. 17, 1967 June 28, 1968	-- 1.6	-- 4	-- 2,580	C,W	S	--	Discharge and drawdown measured after pumping 11 hrs. Originally drilled to 123 ft. 3/
* 902	Mrs. T. Boon Simpson	1964	53	12	32- 52	Qal	1,873	3.8	July 11, 1968	--	400	2,700	C,W	S	--	Discharge reported from pump test when drilled Jan. 20, 1964. Originally for irrigation use.
* 44-401	do.	1945	215	6	--	Pa	1,985	120.1	do.	--	20	2,700	S,E,1 3/4	D,S	--	
* 402	do.	1940's	38	6	20- 38	Qal	1,843	--	--	--	3	2,750	C,W	S	--	Pumping level at 29.3 ft on July 11, 1968. Originally drilled to 40 ft.
403	Mrs. Faye Timmons	1967	190	6	--	Pa	1,925	88 90.8	Aug. 30, 1967 July 12, 1968	-- --	-- 3	-- 2,500	C,W	S	--	Red bed at 24 ft. 3/
501	Hal Courtney	1954	126	6	--	Pa	1,887	67.6 70.7	Nov. 24, 1959 Dec. 2, 1960	-- --	-- 2	-- 2,450	C,W	S	--	Pumping level at 77.6 ft July 15, 1968.
502	do.	--	190	6	--	Pa	1,961	122.5	July 11, 1968	4.0	4	2,580	C,W	D,S	--	
503	W.T. Moore	1949	125	6	--	Pa	1,865	51.9	do.	--	4	2,600	C,W, & Artesian	S	--	Originally drilled to 170 ft. After penetrating dolomite bed at 129 ft the water level rose to about 50 ft. Bailed 40 gpm when drilled.
504	B.F. Simpson	--	10	39	--	Qal	1,830	5.9	July 12, 1968	--	20	2,600	C,W	S	--	Yield estimated. Well in floodplain of Bitter Lake Creek.
* 601	Allan L. Thomas	1916	118	5	--	Pa	1,870	101.3	do.	15	10	2,700	S,E,1/2	D,S	--	Discharge and drawdown measured after pumping 1 hr.
701	E.M. Timmons	1966	255	6	--	Pa	2,065	98.3	July 10, 1968	--	30	2,580	S,E,1 1/2	D,S	--	Bailed at 30 gpm July 1968 when well was reworked.
702	Grady Timmons	1956	230	6	235-230	Pa	2,065	138.9	July 11, 1968	--	3	2,650	C,W	S	--	Originally drilled to 255 ft.
* 703	Billy Paul Simpson	1964	315	12	over 100 ft at bottom	Pa	2,071	128.4	July 12, 1968	--	400	2,700	T,D,55	Irr	55 *	Discharge reported.
* 801	W. Duke Lipscomb	--	182	5	--	Pa	2,015	141.1	July 10, 1968	--	3	2,600	C,W	S	--	
802	do.	--	247	6	--	Pa	2,083	185.1	do.	--	3	2,800	C,W	S	--	
803	Claude McDonald	1960	114	6	85-114	Pa	1,915	39.5	July 11, 1968	--	--	2,500	C,W	S	--	Main water was found in gypsum and dolomite bed at 80 ft. Bailed at 30 gpm when drilled.
804	Ella G. Laird	1959	241	6	--	Pa	2,016	155.3	July 12, 1968	--	3	3,000	C,W	S	--	

See footnotes at end of table.

Table 8.--Records of Wells and Springs--Continued

WELL	OWNER	DATE COM-PLET-ED	DEPTH OF WELL (FT)	CASING		WATER-BEAR-ING UNIT	ALTITUDE OF LAND SURFACE (FT)	WATER LEVEL		WELL PERFORMANCE		SPECIFIC CONDUCTANCE (MICROMHOS AT 25° C)	METHOD OF LIFT	USE OF WATER	IRRI-GATED ACRES (APPROX-IMATE) 1968	REMARKS
				DIAM-ETER (IN.)	INTER-VAL OPEN (FT)			BELOW LAND SURFACE DATUM (FT)	DATE OF MEASUREMENT	DRAWDOWN (FT)	DISCHARGE (GPM)					
TW-12-44-901	W. Duke Lipscomb	--	61	5	--	Pa	1,890	25.7	July 10, 1968	--	3	2,600	C,W	S	--	
902	Clem Timmons	--	171	6	--	Pa	1,965	122.0	July 12, 1968	--	5	2,500	C,E,3/4	D	--	
* 49-101	W.H. Webb	1956	113	12	--	Qal	2,491	80.5 78.9 77.1	Nov. 17, 1959 Feb. 3, 1960 Dec. 5, 1960	-- -- --	82 -- --	2,150 -- --	S,E,5	Irr	36	Discharge measured Aug. 24, 1960. Depth reported. Pumping level 90.0 ft and field conductance measured after pumping about 20 hrs. Sept. 11, 1968. Wells 101 and 103 on manifold system. Irrigated acres includes both wells. Red bed at 113 ft.
* 102	Mrs. M.C. Washington	1957	140	14	--	Qal	2,487	91.8 96.4	Nov. 17, 1959 June 24, 1968	-- --	-- --	-- --	S,E,7 1/2	Irr	56	Pumping level 119.4 ft while pumping 154 gpm Aug. 24, 1960. Red bed at 140 ft. 1/
103	W.H. Webb	1957	131	12	--	Qal	2,491	80.4 78.7 76.8	Nov. 17, 1959 Feb. 3, 1960 Dec. 5, 1960	-- -- --	-- -- --	2,100 -- --	S,E,7 1/2	Irr	--	Discharge measured 37 gpm Aug. 24, 1960. Pumping level 97.5 and field conductance measured while pumping a reported 90 gpm Sept. 11, 1968. Acres irrigated included with well TW-12-49-101. Red bed at 130 ft. Well cleaned June 1968.
* 104	City of Flomot	1964	141	10	--	Qal	2,481	80.9	Sept. 11, 1968	--	70	1,360	S,E,7 1/2	P,Ind	--	Discharge reported 1968. Supplies water to approximately 60 connections.
* 105	George B. Bowles	--	--	12	--	Qal	2,436	103.1	do.	--	70	1,580	T,E,10	Irr	25	
106	Ronald L. Clay	1964	145	12	130-145	Qal	2,404	79.4	Sept. 12, 1968	--	60	--	N	U	--	Originally drilled to red bed at 160 ft. Irrigated 7 acres in 1966. Well caved in. Original yield reported 120 gpm but now about 60 gpm.
* 107	Mrs. M.C. Washington	1958	140	12	--	Qal	2,479	--	--	--	--	1,100	S,E,5	D	--	Discharge reported 70 gpm in summer 1965 when used for irrigation. Now converted to domestic use. Depth reported.
* 108	Hunter and Hunter Gin Co.	1940's	88	42	--	Po	2,450	75	Sept. 1968	--	5	--	C,W	Ind	--	Discharge reported 20 gpm in 1965 when used to supply cotton gin. Now used only for moisturizing cotton and emergency fire fighting supply.
* 201	Wade Martin	1958	220	14	--	Qal,Po	2,379	70.0 70.1 76.5	Nov. 19, 1959 Feb. 3, 1960 June 25, 1968	-- -- --	-- -- 55	-- -- --	S,E,5	Irr	20	Discharge measured 34 gpm Apr. 4, 1960. Red bed at 150 ft.
* 202	Zollie C. George	1955	160	12	--	Qal,Po	2,372	62.2 71.6	Nov. 19, 1959 June 25, 1968	-- --	119 --	-- --	N	U	--	Discharge measured May 19, 1960. Irrigation well was acidized in 1963; reportedly yield decreased. Unused since 1966. Red bed at 153 ft. 1/
203	O.D. Calvert	1967	145	6	90-141	Qal,Po	2,382	70 82.6	Dec. 1967 Sept. 10, 1968	-- --	100 12	-- 5,050	S,E,1/3	S	--	Red bed at 125 ft. Reportedly bailed 100 gpm when drilled. 3/
* 204	Wade Martin	1961	175	12	--	Qal,Po	2,391	98.5	June 25, 1968	--	270	--	T,E,30	Irr	60	
* 205	Wendell Morris	1963	170	14	--	Qal,Po	2,391	86.9	Sept. 11, 1968	--	295	--	T,E,30	Irr	50	Red bed estimated at 150 ft.
* 206	Zollie C. George	1961	177	12	--	Qal,Po	2,383	80	Sept. 1968	--	288	3,700	T,E,30	Irr	55	Water level estimated from nearby wells. Reported pumping test of 575 gpm when drilled. Acres include those irrigated from wells TW-12-49-206 and 207 on underground system. Red bed reported at 170 ft.
* 207	do.	1955	155	12	--	Qal	2,377	72.2	June 25, 1968	--	63	2,290	T,E,40	Irr	--	On underground system with well TW-12-49-206.
* 208	Allie Spray	1967	189	12	128-188	Qal,Po	2,355	31	Apr. 1967	90	400	--	T,E,40	Irr	34	Reported water level, drawdown and discharge from 6 hour pumping test. Red bed at 180 ft. 3/
* 209	Walter T. Ross	1960	96	6	--	Qal,Po	2,350	72.6	July 24, 1968	.2	3	4,000	C,W	S	--	Originally drilled to 140 ft.
210	J.C. Franks	1960	149	6	--	Qal,Po	2,379	84.1	Oct. 24, 1968	--	10	--	N	U	--	Discharge reported when drilled Jan. 13, 1960. 3/

See footnotes at end of table.

Table 8.--Records of Wells and Springs--Continued

WELL	OWNER	DATE COM-PLET-ED	DEPTH OF WELL (FT)	CASING: DIAM-ETER (IN.)	CASING: INTER-VAL OPEN (FT)	WATER-BEAR-ING UNIT	ALTITUDE OF LAND SURFACE (FT)	WATER LEVEL: BELOW LAND SURFACE DATUM (FT)	WATER LEVEL: DATE OF MEASUREMENT	WELL PERFORMANCE: DRAWDOWN (FT)	WELL PERFORMANCE: DISCHARGE (GPM)	SPECIFIC CONDUCTANCE (MICROMHOS AT 25° C)	METHOD OF LIFT	USE OF WATER	IRRI-GATED ACRES (APPROX-IMATE) 1968	REMARKS
* TW-12-49-301	Molly Burleson	1955	104	12	--	Po	2,312	66.8 63.4	Nov. 18, 1959 July 24, 1968	-- --	-- 3	-- 1,000	C,W	S	--	Originally drilled to 114 ft. Well originally used for irrigation but low yield required conversion to windmill. Red bed estimated at 3 ft. 1/
* 302	Mary E. Barton	1957	107	15	--	Qal	2,266	32.4 32.8	Nov. 18, 1959 July 24, 1968	-- --	-- 300	-- --	T,G,55	Irr	25	Discharge reported. Red bed reported at 110 ft. 1/
* 303	do.	1957	93	12	--	Qal	2,252	21.1 21.0	Nov. 18, 1959 July 24, 1968	-- --	392 --	-- 4,100	T,G,55	Irr	30	Originally drilled to red bed at 100 ft. Pumping level 39.0 ft, discharge measured Aug. 19, 1960. 1/
* 304	France B. Barton	1957	100	15	--	Qal	2,235	11.7	do.	--	214	--	T,G,55	Irr	48	Red bed reported about 100 ft.
* 305	Clovis H. Murphey	--	Spring	--	--	Qal	2,280	--	--	--	--	1,200	Flows	S	--	Flow estimated 24 gpm July 24, 1968. Several small springs and seeps along contact of Permian Artesia Group and Quaternary alluvium.
* 306	Herbert C. Stevens	--	34	12	--	Qal	2,182	5.5	July 24, 1968	--	384	--	T,G,116	Irr	37	Well TW-12-49-307 pumped into well TW-12-49-306. Irrigated acres include both wells. Discharge reported June 28, 1967. Red bed reported about 35 ft.
307	do.	--	34	12	--	Qal	2,182	8.2	do.	--	--	--	S,E,1/2 S,E,3	S Irr	-- --	Well has 2 submergible pumps.
* 308	Mary E. Barton	1965	78	12	--	Qal,Po	2,256	20	Sept. 1968	--	350	3,500	T,G,55	Irr	25	Water level estimated from nearby wells.
* 401	Joe F. Smith Estate	1962	150	12	110-150	Qal	2,411	62.2	June 26, 1968	--	308	--	T,G,116	Irr	75	Discharge measured Sept. 12, 1968. Owner reports well capable of yielding about 500 gpm. Red bed reported at 150 ft.
402	Crable C. Jones	1959	155	16	127-155	Qal,Po	2,468	68.6 67.0 60.7	Nov. 19, 1959 Dec. 6, 1960 June 26, 1968	--	43	--	T,G,116	Irr	--	Discharge measured Aug. 24, 1960. Well not pumped during 1968. Usually irrigates 60 acres including those fed by well TW-12-49-403. Red bed at 127 ft. 3/
403	do.	1956	120	16	--	Qal,Po	2,468	68.1 66.2 59.0	Nov. 19, 1959 Dec. 6, 1960 Sept. 12, 1968	--	139	--	T,G,116	Irr	--	Discharge measured Aug. 24, 1960. Well not used in 1968. Red bed at 112 ft. 3/
404	Robert Dorsey	--	88	5	--	Po	2,502	74.9	Sept. 13, 1968	--	3	2,190	C,W	S	--	
501	Johnny Barton	1956	173	12	--	Qal	2,446	91.6 88.7	Nov. 19, 1959 Sept. 13, 1968	--	--	--	T,G,116	Irr	56	Pumping level 150.5 ft; discharge 168 gpm Aug. 24, 1960. Reportedly yields 260 gpm on 1st day of pumping each season then declines to about 175 gpm. Red bed at 173 ft. 1/
* 502	Furman Vinson	1965	100	12	58- 91	Qal	2,359	60.0	June 28, 1968	--	40	1,498	S,E,5	Irr	37	Discharge estimated. Combined reported discharge about 100 gpm for 3 wells. Irrigated acres include those fed by wells TW-12-49-508 and 509. Red bed at 91 ft. 3/
* 503	Millard C. Jones	1967	204	16	40-204	Qal	2,408	68.4	Sept. 12, 1968	0.5	320	1,220	T,E,30	Irr	44	Originally drilled and cased to red bed at 254 ft, caved in to 204 ft. 3/
* 504	Crable C. Jones	1967	138	10	100-138	Qal	2,462	56.6	do.	46.1	130	1,580	S,E,7 1/2	Irr	20	Originally drilled to red bed at 145 ft. Coefficient of transmissibility 5,100 gpd/ft; Coefficient of permeability 60 gpd/ft.[2] 3/
505	Furman Vinson	1965	119	12	63-119	Qal,Po	2,389	60.1	Sept. 18, 1968	--	65	1,090	S,E,7 1/2	Irr	24	Originally drilled to 140 ft. Cased to 130 ft, slotted 63-123 ft, open hole 130-140 ft. Discharge estimated. Red bed at 123.5 ft. 3/
506	do.	1967	147	10	67-147	Qal,Po	2,397	--	--	--	40	--	N	U	--	Originally drilled to 177 ft. Reportedly bailed at 40 gpm April 1967. Cased to 147 ft; open hole 147 to 177 ft. Red bed at 147 ft. 3/

See footnotes at end of table.

Table 8.--Records of Wells and Springs--Continued

WELL	OWNER	DATE COM-PLET-ED	DEPTH OF WELL (FT)	CASING		WATER-BEAR-ING UNIT	ALTITUDE OF LAND SURFACE (FT)	WATER LEVEL		WELL PERFORMANCE		SPECIFIC CONDUCTANCE (MICROMHOS AT 25° C)	METHOD OF LIFT	USE OF WATER	IRRI-GATED ACRES (APPROX-IMATE) 1968	REMARKS
				DIAM-ETER (IN.)	INTER-VAL OPEN (FT)			BELOW LAND SURFACE DATUM (FT)	DATE OF MEASUREMENT	DRAWDOWN (FT)	DISCHARGE (GPM)					
TW-12-49-507	Furman Vinson	1967	123	10	83-123	Qal	2,371	--	--	--	125	--	S,E,7 1/2	Irr	37	Discharge reported. Owner reported well capable of yielding about 150 gpm Sept. 18, 1968. Red bed at 118 ft. 3/
508	do.	1965	85	6	55- 85	Qal	2,358	--	--	--	20	--	S,E,1	Irr	--	Discharge estimated Sept. 18, 1968. Red bed reported at 85 ft.
509	do.	1967	96	10	56- 96	Qal,Po	2,364	--	--	--	40	--	S,E,3	Irr	--	Discharge estimated Sept. 18, 1968. Red bed reported at 90 ft. 3/
* 601	Wilson Barton	1924	154	5	--	Po	2,376	122.0	Oct. 9, 1968	--	3	2,200	C,W	S	--	Originally drilled to 165 ft.
* 701	Claudia Matney	1966	121	6	85-121	Po	2,509	60.3	Sept. 13, 1968	--	12	4,700	S,E,1/2	S	--	Originally drilled to 125 ft.
702	Leonard W. Crowell	before 1940	23	4	--	Qal,Po	2,447	5.5	do.	--	3	--	C,W	U	--	Discharge estimated.
* 703	Claudia Matney	1966	120	12	80-120	Pa,Po	2,452	14.7	do.	--	440	--	T,G,200	Irr	--	Discharge reported in 1967 when last used. Gypsum cavity at about 100 ft. Water highly mineralized.
801	J.C. Burleson	--	166	7	--	Po	2,434	155.2	Sept. 19, 1968	--	3	2,500	C,W	S,D	--	
* 802	Frank M. Eiring	1965	31	14	--	Po	2,400	16.9	do.	--	5	400	C,W	S	--	
* 901	Tommy Edwards	1965	210	12	--	Pa	2,434	156.4	Sept. 20, 1968	--	300	--	T,G,116	Irr	25	Discharge reported.
* 902	Frank M. Eiring	1965	230	12	150-230	Pa	2,437	166.1	Sept. 19, 1968	2	600	--	T,G,200	Irr	--	Discharge and drawdown reported when well drilled. Not operated in 1968 but usually irrigates 100 acres from 2 wells. Yield from wells TW-12-49-902 and 903 reportedly metered 985 gpm when drilled. Three to five foot cavity in Claytonville gypsum at about 220 to 225 ft.
* 903	do.	1966	220	12	140-220	Pa	2,436	166	Sept. 1968	49	700	--	T,G,200	Irr	--	Discharge and drawdown reported when well drilled. Water level estimated from well TW-12-49-902. See remarks for TW-12-49-902.
904	Ralph H. Stapleton	1962	39	12	20- 39	Qal	2,322	36.2	Sept. 19, 1968	--	50	2,600	Ct,E,3/4 S,E,1/2	Irr D,S	1	Discharge reported. Originally drilled to red bed at 40 ft. Two pumps in well. Irrigates orchard and supplies water for 2 houses and livestock. 3/
* 905	Jake E. Edwards	--	--	14	--	Qal	2,404	88.3 85.2	June 26, 1968 Sept. 19, 1968	-- --	160 --	-- --	T,G,116	Irr	46	Discharge reported in 1968.
* 906	James Malcolm Jameson	1950	128	12 ±	110-128	Po	2,385	97.2	Sept. 19, 1968	--	15	900	S,E,1	D,S	--	Originally drilled to 130 ft. Reportedly test pumped 65 gpm in 1967.
* 50-101	J.W. Pritchett	1959	185	14	125-185	Qal	2,267	95.3 93.5	Nov. 20, 1959 June 27, 1968	-- --	-- 330	-- --	T,G,200	Irr	80	Yield reportedly metered 480 gpm when drilled. Measured discharge 203 gpm Apr. 25, 1960 and 330 gpm June 27, 1968. Depth reported. Red bed reported at 183 ft. 1/
* 102	do.	1957	186	12	127-186	Qal	2,265	92.0	Sept. 26, 1968	3.5	39	1,250	S,E,7 1/2	Irr	20	Originally drilled to 187 ft. Discharge and drawdown measured after pumping about 6 hrs. Sept. 26, 1968. Discharge measured 105 gpm Aug. 11, 1960. Red bed at 185 ft. 2/
103	Quitaque Sand and Gravel Co.	1965	39	12	19- 39	Qal	2,186	18.8	July 24, 1968	--	90	3,200	S,E,7 1/2	Ind	--	Discharge estimated. Water from well TW-12-50-104 pumped into TW-12-50-103 then re-pumped to gravel washer. Estimated combined yield 140 gpm from both wells. Red bed at 38 ft.
104	do.	1965	36	6	18- 36	Qal	2,185	17.7	do.	--	50	3,200	S,E,3/4	Ind	--	Originally drilled to 38 ft. See remarks well TW-12-50-103.
* 105	J.W. Pritchett	1965	200	14	120-200	Qal,Po	2,260	94 95.6	Feb. 1965 Sept. 26, 1968	-- --	-- 480	-- --	T,G,200	Irr	40	Reported discharge 480 gpm when drilled. Red bed at 185 ft. 3/
* 201	C.M. Barton, Jr.	1955	200	16	--	Qal	2,242	102.3 100.4	Nov. 20, 1959 June 27, 1968	-- --	-- --	-- 1,800	T,G,116	Irr	75	Measured discharge 206 gpm Apr. 25, 1960. Pumping level 119.7 ft after pumping 203 gpm for 2 hours Sept. 26, 1968. Red bed at 195 ft. 1/ 3/

See footnotes at end of table.

Table 8.--Records of Wells and Springs--Continued

WELL	OWNER	DATE COMPLETED	DEPTH OF WELL (FT)	CASING: DIAMETER (IN.)	CASING: INTERVAL OPEN (FT)	WATER-BEARING UNIT	ALTITUDE OF LAND SURFACE (FT)	WATER LEVEL: BELOW LAND SURFACE DATUM (FT)	WATER LEVEL: DATE OF MEASUREMENT	WELL PERFORMANCE: DRAWDOWN (FT)	WELL PERFORMANCE: DISCHARGE (GPM)	SPECIFIC CONDUCTANCE (MICROMHOS AT 25° C)	METHOD OF LIFT	USE OF WATER	IRRIGATED ACRES (APPROXIMATE) 1968	REMARKS
* TW-12-50-202	Ronald L. Clay	--	over 110	14	--	Qal,Pa	2,189	49.4	June 27, 1968	--	--	2,150	T,G,80	Irr	34	Pumping level 106.4 ft after pumping 50 gpm for about 10 hrs. Sept. 26, 1968.
* 203	Bill Lane	1960	258	12	--	Qal	2,192	78 85.5	1960 Sept. 26, 1968	-- --	-- --	-- --	N	U	--	Red bed at 137 ft. Originally used for irrigation. 3/
204	Charlie M. Barton, Sr.	1967	110	--	110	Pa	2,236	--	--	--	--	--	N	U	--	Red bed at 50 ft. Test hole for irrigation water. Well dry. 3/
205	do.	1967	146	--	146	Pa	2,220	--	--	--	--	--	N	U	--	Red bed at 57 ft. Test hole for irrigation water. 3/
206	do.	1967	80	--	80	Pa	2,218	--	--	--	--	--	N	U	--	Red bed at 50 ft. Test hole for irrigation water. 3/
207	do.	1967	110	--	110	Pa	2,209	--	--	--	--	--	N	U	--	Red bed at 80 ft. Test hole for irrigation water. 3/
208	Clay Hart	1966	143	6	--	Qal,Pa	2,206	50	June 1966	--	3	--	C,W	S	--	Red bed reported at 120 ft.
209	do.	1966	40	6	--	Qal,Po	2,146	18	do.	--	3	--	C,W	S	--	Red bed reported at 35 ft.
* 301	George B. Bowles	--	106	6	--	Pa	2,152	67.3	Sept. 27, 1968	--	3	2,050	C,W	S	--	Well in sand dunes area.
* 401	France B. Barton	1964	115	8	--	Qal	2,299	87.6	Mar. 27, 1969	--	73	1,780	S,E,7 1/2	Irr	30	Pumping level 100.2 feet after pumping 73 gpm for about 72 hrs. Sept. 26, 1968. 2/
402	E.D. Whitaker	--	151	5	--	Pa	2,295	102.3	Sept. 27, 1968	--	3	2,720	C,W	S	--	
* 403	Lucretia Grundy	--	52	6	--	Pa	2,160	15.2	do.	--	5	4,050	C,W	S	--	
501	Carl Cooper	1940's	161	6	--	Pa	2,238	95.7	do.	--	3	2,400	C,W	S	--	
502	E.A. Day	1965	28	12	--	Pa,Qal	2,098	4.8	Oct. 8, 1968	--	--	2,750	N	U	--	Originally used for irrigation.
503	do.	1965	32	12	--	Pa,Qal	2,097	4.2	do.	--	--	2,750	N	U	--	Do.
* 601	M.A. Musselman	1930's	20	40	--	Pa	2,039	17.8	do.	--	5	3,500	C,W	S	--	
602	do.	--	166	6	--	Pa	2,198	136.4	do.	--	2	4,700	C,W	S	--	
* 701	Farris Fish	--	42	36	--	Po	2,275	31.3	Sept. 27, 1968	0	4	3,200	C,W	S	--	
702	Vernon Higginbotham	1965	288	6	283-288	Po	2,350	187.3	Oct. 8, 1968	10.3	2	2,830	C,E,1/2	S	--	Originally drilled to 300 ft. Discharge and drawdown measured after pumping about 18 hrs. Oct. 19, 1969.
* 801	Mrs. Curtis Graham and Jody Graham	1965	26	6	--	Po,Pa	2,260	20.6	do.	--	13	2,780	J,E,1/2	S,D	--	Reportedly bailed at 20 to 30 gpm when drilled. Originally intended for irrigation use.
* 901	M.A. Musselman	1930's	203	6	--	Pa	2,303	169.9 175.3 170.9	Nov. 24, 1959 Dec. 7, 1960 Oct. 8, 1968	-- -- --	-- -- 4	-- -- 5,500	C,W	S	--	
902	do.	1962	198	6	--	Pa	2,294	180.2	Oct. 9, 1968	--	3	5,200	C,W	S	--	Originally drilled to 308 ft, cased to 200 ft.
903	do.	1959	133	6	--	Pa	2,168	79.5	do.	21.4	2	4,400	C,W	S	--	Discharge and drawdown measured after pumping 15 hrs.
* 51-101	Elbert Seigler	1959	78	6	--	Pa	2,028	40	July 1968	--	2	2,400	C,W	S	--	
201	George Seigler	1946	102	4	--	Pa	2,043	65.1	do.	--	3	2,800	C,W	S	--	Originally drilled to 116 ft.
* 202	do.	1960	48	6	--	Pa	1,971	28.7	do.	--	3	11,000	C,W	S	--	
203	do.	1962	66	4	--	Pa	1,980	44.4	do.	--	3	4,750	C,W	S	--	
204	do.	1926	14	12	--	Qal	1,955	12.0	do.	--	3	8,100	C,W	S	--	
301	Marvin H. Leary	1920	194	4	--	Pa	2,114	--	--	--	4	2,650	C,W	S	--	Pumping level at 114.6 June 28, 1968. Originally drilled to about 200 ft.
302	E.M. Timmons	1962	256	6	--	Pa	2,130	215.6	June 28, 1968	8.7	4	2,520	C,W	S	--	Discharge and drawdown measured after pumping 10 hrs.

See footnotes at end of table.

Table 8.--Records of Wells and Springs--Continued

WELL	OWNER	DATE COM-PLET-ED	DEPTH OF WELL (FT)	CASING: DIAM-ETER (IN.)	CASING: INTER-VAL OPEN (FT)	WATER-BEAR-ING UNIT	ALTITUDE OF LAND SURFACE (FT)	WATER LEVEL: BELOW LAND SURFACE DATUM (FT)	WATER LEVEL: DATE OF MEASUREMENT	WELL PERFORMANCE: DRAWDOWN (FT)	WELL PERFORMANCE: DISCHARGE (GPM)	SPECIFIC CONDUCTANCE (MICROMHOS AT 25° C)	METHOD OF LIFT	USE OF WATER	IRRI-GATED ACRES (APPROX-IMATE) 1968	REMARKS
*TW-12-51-303	A.B. Simpson	1937	174	6	160-174	Pa	2,099	155.1	June 28, 1968	14.1	4	2,780	C,W	D,S	--	Originally drilled to 180 ft. Discharge and drawdown measured after pumping 12 hrs.
* 401	Eldred Seigler	--	304	6	180-304	Pa	2,182	180 189.2	Apr. 1961 July 9, 1968	-- --	-- 3	-- 7,700	C,W	S	--	Originally drilled to 310 ft.
402	H.G. and Bill Flowers	1962	156	6	--	Pa	2,119	74.5	July 8, 1968	--	4	2,850	C,W	S	--	
* 403	Eldred Seigler	1943	22	6	--	Qal	2,012	4.4	July 10, 1968	--	7	2,900	C,G,3	S	--	Originally drilled to 25 ft. Open end casing. Well in floodplain of Hornica Creek.
* 501	H.G. Flowers	--	204	6	--	Pa	2,125	120.3	July 9, 1968	--	4	2,900	C,W	S	--	
502	do.	1966	402	6	--	Pa	2,146	182.9	July 10, 1968	--	5	2,800	C,W	S	--	
601	George G. Adams	--	139	6	--	Pa	2,003	101.4	June 28, 1968	14.4	6	3,400	C,W	S	--	Discharge and drawdown measured after pumping 8 hrs.
* 602	T.W. and Walter Taylor	1962	177	6	--	Pa	1,995	68.2	do.	2.0	8	3,450	C,W	S	--	Discharge and drawdown measured after pumping 9 hrs.
* 701	M.A. Musselman	1962	269	6	--	Pa	2,267	156.0	June 12, 1968	--	2	2,700	C,W	S	--	Originally drilled to 308 ft.
702	H.G. Flowers and M.A. Musselman	1936	319	6	--	Pa	2,307	280.1 286.0 261.8	Nov. 24, 1959 Dec. 7, 1960 July 8, 1968	-- -- --	-- -- 5	-- -- 3,200	C,W	S	--	Originally drilled to 345 ft.
* 801	Coyal L. Francis	1923	57	20	--	Pa	2,236	42.4	June 25, 1968	7.1	4	5,200	C,W	S	--	Discharge and drawdown measured after pumping 8 hrs. Originally an old plugged oil well which was cleaned out to a depth of 65 ft about 1965.
802	George G. Adams	--	271	6	--	Pa	2,087	176.6	July 9, 1968	--	6	4,600	C,W	S	--	
* 901	do.	--	293	6	--	Pa	2,129	181.0	June 28, 1968	15.5	7	47,500	C,W	S	--	Discharge and drawdown measured after pumping 4 hrs.
902	Coyal L. Francis	--	248	6	--	Pa	2,112	139.7	do.	--	7	3,800	C,W	S	--	
903	George C. Adams	1960	316	6	--	Pa	2,169	229.8	do.	--	6	9,800	S,E,3/4	D	--	
* 52-101	M.L. and C.L. Leary	1930's	222	4	--	Pa	2,100	174.1	June 27, 1968	17.3	3	2,600	C,G,2 1/2	S	--	Four inch casing inside of rusted 5½ inch casing. Discharge and drawdown measured after pumping ½ hr.
102	T.W. and Walter Taylor	--	326	5	--	Pa	2,161	194.4	do.	10.6	4	2,850	C,W	S	--	Discharge and drawdown measured after pumping 12 hrs.
201	J.P. and Ursel Taylor	--	254	5	--	Pa	2,115	232.2	do.	1.8	4	2,650	C,W	S	--	Discharge and drawdown measured after pumping 7 hrs.
* 301	do.	--	168	6	--	Pa	1,958	90.0	do.	3.1	5	2,700	C,W	S	--	Discharge and drawdown measured after pumping 8 hrs.
401	T.W. and Walter Taylor	--	155	6	--	Pa	1,977	88.2	do.	--	6	2,600	C,W	S	--	
* 402	do.	--	99	5	--	Pa	1,942	48.0	do.	--	7	3,200	C,W	S	--	
* 501	J.P. and Ursel Taylor	--	70	5	--	Pa	1,930	56.9	do.	--	7	2,900	C,W	S	--	
502	do.	--	127	6	--	Pa	2,001	110.1	do.	2.3	6	2,650	C,W	S	--	Discharge and drawdown measured after pumping 6 hrs.
601	do.	--	168	5	--	Pa	1,983	140.1	do.	3.3	7	2,680	C,W	S	--	Discharge and drawdown measured after pumping 10 hrs.
701	George G. Adams	--	278	5	--	Pa	2,161	228.8	June 26, 1968	0	5	4,500	C,W	S	--	
* 801	do.	--	248	6	--	Pa	1,990	98.0	do.	--	7	3,050	C,W	S	--	
* 802	Randall Merrill	1967	29	6	--	Qal	1,884	5.8	do.	11	350	4,500	Ct,LP,55	Irr	50	Seven well manifold system. Combined yield reported summer 1967 about 750 gpm for 50 hrs. then diminishing to about 350 gpm. 3/

See footnotes at end of table.

Table 8.--Records of Wells and Springs--Continued

WELL	OWNER	DATE COM-PLET-ED	DEPTH OF WELL (FT)	CASING		WATER-BEAR-ING UNIT	ALTITUDE OF LAND SURFACE (FT)	WATER LEVEL		WELL PERFORMANCE		SPECIFIC CONDUCTANCE (MICROMHOS AT 25° C)	METHOD OF LIFT	USE OF WATER	IRRI-GATED ACRES (APPROX-IMATE) 1968	REMARKS
				DIAM-ETER (IN.)	INTER-VAL OPEN (FT)			BELOW LAND SURFACE DATUM (FT)	DATE OF MEASUREMENT	DRAWDOWN (FT)	DISCHARGE (GPM)					
TW-12-52-901	George G. Adams	--	240	6	--	Pa	2,033	187.0	June 25, 1968	12.4	7	2,600	C,W	S	--	Discharge and drawdown measured after pumping 3 hrs.
* 902	do.	--	236	6	--	Pa	2,005	159.0	do.	8.7	6	2,680	C,W	S	--	Do.
57-101	J.M. Hill, Jr.	1915	135	4	--	Trd,Po	2,758	85.0	Sept. 24, 1968	--	4	1,050	C,G,4	S	--	
102	Ollie E. Birnie	1963	150	6	130-150	Po	2,633	72.7	Sept. 25, 1968	--	3	--	C,W	S	--	
* 103	do.	1939	41	6	20- 41	Po	2,660	25.9	do.	--	12	2,660	S,E,3/4	D	--	
104	do.	1959	200	--	--	Po	2,529	144	May 1959	--	--	--	N	U	--	Seismic test hole. 3/
105	do.	1954	200	--	--	Po	2,600	--	--	--	--	--	N	U	--	Do. 3/
106	do.	1959	220	--	--	Po	2,635	97	May 1959	--	--	--	N	U	--	Do. 3/
107	do.	1959	200	--	--	Po	2,594	45	do.	--	--	--	N	U	--	Do. 3/
201	S.E. Robbins	--	56	12	--	Qal	2,548	31.8	Sept. 25, 1968	--	10	520	S,E,1/2	D	--	Originally used for irrigation. Discharge estimated.
* 202	Frank M. Eiring	--	179	6	--	Po	2,563	116.0	do.	--	2	6,300	C,W	S	--	
301	Charles P. Martin	1965	39	6	34- 39	Qal	2,548	27.0	Sept. 20, 1968	--	3	1,050	C,E,1/2	S	--	Originally drilled to 40 ft.
* 302	Stuart Dixon	1964	40	12	--	Qal	2,494	45	Sept. 1968	--	30	--	S,E,3	Irr,S	--	Discharge reported about 90 gpm for about 10 days, decreasing to about 30 gpm, thereafter. Manifold system of 3 wells. Unused since 1967 when 30 acres were irrigated.
* 303	Frank M. Eiring	before 1906	113	6	--	Po	2,462	69.7	Sept. 25, 1968	--	12	1,360	S,E,1/2	S	--	
* 304	Lawrence Ludeman	before 1910	131	8	--	Qal,Po	2,387	29.7	do.	--	4	2,800	C,W	D	--	
* 401	J.M. Hill, Jr.	1961	61	12	--	Qal,Po	2,564	9.8	Sept. 24, 1968	--	340	1,790	T,D,40	Irr	50	Originally drilled to 62 ft. Reportedly will yield about 500 gpm for a few days then diminishing to 300 to 350 gpm. Permian red bed at 60 ft.
* 501	Alfred L. Cooper	1964	55	12	49- 55	Qal	2,524	36.7	Sept. 20, 1968	14	84	700	T,G,116	Irr	26	Reported drawdown after 8 hrs. pumping. Red bed at 54 ft. 3/
* 502	Agle L. Spray	1958	47	12	36- 47	Qal,Po	2,525	27.3 38.2	Nov. 20, 1959 Sept. 20, 1968	-- --	-- 25	-- --	N	U	--	Originally drilled to Permian red bed at 55 ft. Yield reported about 125 gpm prior to 1964, has since decreased. 1/
503	do.	1957	48	12	37- 48	Qal	2,525	38	Sept. 1968	--	97	--	T,E,7 1/2	Irr	2	Normally irrigates 12 acres bermuda pasture. Discharge measured Apr. 26, 1960. Red bed at 48 ft. Originally drilled to 50 ft.
504	do.	1963	38	12	28- 38	Qal	2,519	25	do.	--	40	--	Ct,E,1	Irr	--	Discharge reported. Red bed at 38 ft. Not used in 1968, normally irrigates 6 acres. 3/
505	H.M. Bain	1968	60	6	--	Po,Qal	2,567	18.7	Sept. 24, 1968	--	20	--	S,E	S	--	Pump to be installed. Discharge reported.
* 506	Stuart Dixon	1962	20	12	--	Qal	2,500	--	Mar. 28, 1969	--	30	--	S,E,3	Irr,D	--	Manifold system of 3 wells. Not used in 1968, normally irrigates 15 acres. Discharge reported.
* 507	do.	1963	20	12	--	Qal	2,517	--	do.	--	50	--	S,E,3	Irr	--	Manifold system of 3 wells. Well not used in 1968, normally irrigates 30 acres.
601	Stella Tilson	1955	68	12	--	Qal,Po	2,446	35.7 34.2 38.6	Nov. 23, 1959 Dec. 6, 1960 June 11, 1968	-- -- --	-- -- 100	-- -- --	T,E,5	Irr	15	Discharge reported.
602	do.	1953?	45	14	--	Qal	2,440	37.5	Sept. 25, 1968	--	--	--	N	U	--	
603	Ben Edwards	1962	59	6	25- 59	Qal	2,457	39.9	Sept. 19, 1968	--	40	--	S,E,3	Irr	--	Well unused since 1967 when irrigated 3 acres. Red bed at 57 ft.
* 604	Marvin Dixon	1963	58	12	--	Qal	2,502	41.2	Sept. 20, 1968	--	60	650	S,E,7 1/2	Irr,S	15	Red bed at 57 ft. 2/

See footnotes at end of table.

Table 8.--Records of Wells and Springs--Continued

WELL	OWNER	DATE COM-PLET-ED	DEPTH OF WELL (FT)	CASING: DIAM-ETER (IN.)	CASING: INTER-VAL OPEN (FT)	WATER-BEAR-ING UNIT	ALTITUDE OF LAND SURFACE (FT)	WATER LEVEL: BELOW LAND SURFACE DATUM (FT)	WATER LEVEL: DATE OF MEASUREMENT	WELL PERFORMANCE: DRAWDOWN (FT)	WELL PERFORMANCE: DISCHARGE (GPM)	SPECIFIC CONDUCTANCE (MICROMHOS AT 25° C)	METHOD OF LIFT	USE OF WATER	IRRI-GATED ACRES (APPROX-IMATE) 1968	REMARKS
*TW-12-57-701	W.E. Burleson	--	178	5	--	Po,Trd	2,896	161.1	Oct. 11, 1968	4.0	3	3,200	C,W	S	--	Discharge and drawdown measured after pumping 8 hrs.
702	L. Bundy Campbell	1960	221	5	--	Po,Trd	2,803	110.2	do.	--	2	3,000	C,W	S	--	Originally drilled to 250 ft. [3]
* 703	W.E. Burleson	--	120	5	--	To,Trd	2,824	91.3	do.	--	5	430	C,G,2 1/2	S	--	Windmill equipped with auxiliary engine.
801	Harry H. Campbell	--	147	6	--	Po	2,740	118.7	do.	--	--	--	N	U	--	
* 802	L. Bundy Campbell	--	55	6	--	Po	2,505	23.5	do.	.5	4	3,500	C,W	S	--	Discharge and drawdown measured after pumping 15 hrs.
803	do.	--	Spring	--	--	Trd	2,640	--	--	--	--	2,700	Flows	S	--	Flow measured 20 gpm Oct. 11, 1968. Springs near head of Salt Creek.
58-101	F.F. Springer	1929?	40	6	--	Qal,Po	2,356	8.2	June 6, 1968	--	4	500	C,W	S	--	Well adjacent to large surface water pond.
102	W.H. Berryman	--	70	7	--	Po	2,327	11.2	do.	--	3	4,300	C,W	S	--	
201	C.J. Cochran	--	41	7	--	Po	2,285	32.0	do.	--	6	4,250	C,W	S	--	
* 202	Virgile Cooper	1963	74	12	54- 74	Qal,Po	2,280	8.2	do.	--	307	3,370	T,G,220	Irr	70	Red bed at about 70 ft. Well in alluvial terrace of Middle Pease River.
* 301	Buck Wayburn	1962	118	6	80-118	Qal,Pa	2,194	10.1	June 7, 1968	0	11	10,200	C,W	S	--	Well penetrates 90 ft of channel alluvium. Gypsum bed at 90 ft. Originally drilled to 120 ft.
* 302	H.R. Jameson	--	81	5	--	Pa	2,269	56.0	do.	--	3	7,500	C,W	S	--	Well penetrates alluvial terrace.
* 401	Matador Cattle Co.	1966	331	6	318-331	Pa	2,485	230 225.1	Nov. 1966 June 5, 1968	-- --	20 --	-- --	C,W	S	--	Reportedly bailed at 20 gpm when drilled. Used very little because of silt and salty taste. Originally drilled to 333 ft. [3]
402	W.M. Smith	--	57	18	--	Po,Pe	2,355	28.2	June 6, 1968	0	3	4,250	C,W	S	--	
403	W.E. Burleson	1967	95	6	82- 95	Po	2,378	42 58.6	Sept. 1967 June 6, 1968	35 1.5	20 3	-- 2,700	C,W	S	--	Reported bailed at 20 gpm, 35 ft drawdown after 12 hrs. when drilled Sept. 25, 1967. Discharge and drawdown measured after pumping 6 hrs. June 6, 1968. Originally drilled to 97 ft. [3]
* 501	Jack Parnell	early 1950's	67	6	50- 67	Po	2,324	45.1	June 7, 1968	--	2	2,500	C,W	S	--	Originally drilled to 70 ft. Pumping level at 71.3 ft discharge 6 gpm, measured Nov. 8, 1939. Replaces old well drilled Nov. 1934 to 75 ft at this site.
* 502	do.	1960	262	6	230-262	Pa,Po	2,344	139.5	do.	10.0	3	7,600	C,W	S	--	Discharge and drawdown measured after pumping 10 hrs. Originally drilled to 270 ft.
503	do.	1961	236	6	220-236	Pa,Po	2,332	133.8	do.	5.6	4	7,600	C,G,3 1/2	S	--	Discharge and drawdown measured after pumping 8 hrs. Windmill equipped with auxiliary engine. Originally drilled to 240 ft.
601	do.	1960	252	6	235-252	Pa,Po	2,322	141.1	do.	9.9	4	6,500	C,W	S	--	Discharge and drawdown measured after pumping 15 hrs. Originally drilled to 256 ft.
* 602	Ward Rattan	before 1911	48	6	--	Po,Qal	2,237	32.0	June 13, 1968	--	3	1,600	C,W	S	--	Red bed at about 20 ft.
* 701	W.E. Burleson	1939	176	6	127-176	Po,Pa	2,391	79 105.6	Nov. 1939 June 5, 1968	-- 14.2	-- 3	-- 1,650	C,W	S	--	Originally drilled to 200 ft. Pumping level at 154.2 ft while pumping 3 gpm Nov. 8, 1939. Discharge and drawdown measured after pumping 6 hrs. June 5, 1968.
702	E.D. Lawrence	about 1930	65	4	--	Po	2,428	63.1 61.2	June 15, 1937 June 6, 1968	-- --	-- 3	-- 2,250	C,E,1/3	D	--	Originally drilled to 71 ft.
703	Matador Cattle Co.	--	Spring	--	--	Trd	2,525	--	--	--	--	1,250	Flows	D,S	--	Springs emerge along Triassic-Permian contact. Flow measured 37 gpm June 5, 1968. Flow includes 5 gpm from TW-22-01-303.
704	do.	1966	99	--	--	Pa	2,495	230	Nov. 1966	30	20	--	N	U	--	Drawdown, discharge, and water level reported after bailing 10 hrs. Test hole originally drilled to 335 ft. [3]

See footnotes at end of table.

Table 8.--Records of Wells and Springs--Continued

WELL	OWNER	DATE COM-PLET-ED	DEPTH OF WELL (FT)	CASING: DIAM-ETER (IN.)	CASING: INTER-VAL OPEN (FT)	WATER-BEAR-ING UNIT	ALTITUDE OF LAND SURFACE (FT)	WATER LEVEL: BELOW LAND SURFACE DATUM (FT)	WATER LEVEL: DATE OF MEASUREMENT	WELL PERFORMANCE: DRAWDOWN (FT)	WELL PERFORMANCE: DISCHARGE (GPM)	SPECIFIC CONDUCTANCE (MICROMHOS AT 25° C)	METHOD OF LIFT	USE OF WATER	IRRI-GATED ACRES (APPROX-IMATE) 1968	REMARKS
TW-12-58-801	A.B. Fulkerson	before 1930	73	6	--	Po	2,380	64.6 63.6 65.1	Nov. 5, 1959 Dec. 7, 1960 June 10, 1968	-- -- --	-- -- 3	-- -- 1,380	C,W	D	--	
802	Mrs. T.E. Cammock	1948	64	6	--	Po	2,330	36.7 31.4 34.2	Nov. 15, 1959 Dec. 7, 1960 June 10, 1968	-- -- --	-- -- 5	-- -- 1,400	C,E,1/2	S	--	
* 803	City of Matador	1953	125	12	--	Po,Qal	2,358	72 86.2	June 12, 1928 June 11, 1968	-- 24.6	-- 110	-- 1,600	T,E,7 1/2	P	--	Drawdown 7 ft discharge 160 gpm after pumping 18 hrs, May 1947. Drawdown measured, discharge estimated June 11, 1968, after pumping 43 minutes. Originally drilled to 128 ft. Permian red bed at 129 ft. Log, 1928 and 1947 water levels are from old well 30 ft north, 277 ft deep; drilled in 1928. 1/ 3/
* 804	do.	1939	293	12	--	Po,Qal	2,365	85	Mar. 1945	16	135	2,600	T,E,10	P	--	Pumping levels 96.9 ft Sept. 16, 1947; 100.1 ft June 11, 1968. Drawdown and discharge reported June 11, 1968.
* 805	do.	1945	147	12	57-147	Qal,Po	2,357	77.7 85.4	Sept. 16, 1947 June 11, 1968	-- --	-- 100	-- 1,450	T,E,10	P	--	Discharge reported. Originally drilled to 148 ft. Open hole 117 ft to 148 ft. 3/
* 806	do.	1966	125	12	90-125	Qal,Po	2,367	85 88.4	July 1966 June 10, 1968	120 15.8	185 120	-- 1,460	S,E,5	P	--	Drawdown and discharge reported from pump test when drilled July 29, 1966. Drawdown and discharge measured after pumping 10 hrs. June 10, 1968. Red bed at 122 ft. 3/
* 807	do.	1953	131	12	--	Qal,Po	2,355	89.0	June 11, 1968	12.2	100	1,460	T,15	P	--	Drawdown measured, discharge estimated after pumping 1 hr. Red bed reported at 130 ft.
808	Jack Luckett	--	73	3	--	Po,Qal	2,311	65.8	June 7, 1968	1.0	2	1,300	C,W	S	--	Discharge and drawdown measured after pumping 8 hrs.
809	Nelson B. McMahan	1965	100	6	80-100	Qal	2,385	67.1	June 11, 1968	--	50	--	S,E,1	D,Irr	3	Discharge reported from bailing test when drilled. Not used since 1967 when 3 acres were irrigated. Red bed at 100 ft.
810	Glen Brotherton	--	95	6	--	Qal	2,387	65	Sept. 1968	--	23	980	S,E,3	Irr	7	Well re-worked in 1963.
811	L. Rattan	1967	80	6	62- 80	Qal,Pa	2,321	60 56.5	Nov. 1967 June 14, 1968	20 --	15 --	-- 3,550	C,W	S	--	Discharge, drawdown and water level reported from bailing test when drilled in 1967. Red bed at 75 ft. 3/
812	Kirby Campbell	before 1945	107	4	--	Pa	2,393	42.9	June 6, 1968	--	2	4,300	C,W	S	--	
901	Elbert Reeves	1937	45	6	--	Pa	2,242	32.4	June 7, 1968	--	3	3,520	C,W	D	--	
902	do.	1940	29	6	--	Po,Pa	2,222	17.2	do.	.1	3	2,900	C,W	S	--	Originally drilled to 35 ft. Discharge and drawdown measured after pumping 8 hrs.
903	Earl R. Thompson	--	75	8	14- 75	Po,Pa	2,320	31.9	June 13, 1968	--	10	3,200	J,E,3/4	D	--	Well reworked in 1965. Originally drilled to 80 ft.
* 904	Elbert Reeves	1963	35	6	25- 35	Pa	2,232	17.9	June 24, 1968	--	80	3,800	S,E,2 1/2	D,Irr	10	Red bed at 30 ft. Unused for irrigation since 1966. Owner reportes that water quality apparently is improving since large stock dam was built about 3/4 mile upstream.
* 905	Bobby Jameson	--	Spring	--	--	Trd,Po	2,270	--	--	--	--	--	Flows	Irr,P	20	Springs and wells inundated when dam was constructed. Presently irrigates from lake. Sample from spring in 1965.
* 59-101	Jinks Wilson	1959	208	6	160-208	Pa	2,223	143.5	June 12, 1968	--	3	6,500	C,W	S	--	Originally drilled to 210 ft.
102	do.	1959	168	6	--	Pa	2,203	135.2	do.	--	3	2,800	C,W	S	--	
103	do.	1959	158	6	--	Pa	2,256	121.6	do.	0	3	2,850	C,W	S	--	Originally drilled to 160 ft.
201	do.	1930	8	36	--	Qal	2,111	3.7	do.	0	5	4,300	C,W	S	--	Well in flood plain of Middle Pease River.

See footnotes at end of table.

Table 8.--Records of Wells and Springs--Continued

WELL	OWNER	DATE COMPLETED	DEPTH OF WELL (FT)	CASING: DIAMETER (IN.)	CASING: INTERVAL OPEN (FT)	WATER-BEARING UNIT	ALTITUDE OF LAND SURFACE (FT)	WATER LEVEL: BELOW LAND SURFACE DATUM (FT)	WATER LEVEL: DATE OF MEASUREMENT	WELL PERFORMANCE: DRAWDOWN (FT)	WELL PERFORMANCE: DISCHARGE (GPM)	SPECIFIC CONDUCTANCE (MICROMHOS AT 25° C)	METHOD OF LIFT	USE OF WATER	IRRIGATED ACRES (APPROXIMATE) 1968	REMARKS
TW-12-59-202	Coyal L. Francis	--	over 300	6	--	Pa	2,250	222.2	June 12, 1968	9.3	5	3,950	C,W	S	--	Discharge and drawdown measured after pumping 1 hr.
* 203	do.	--	248	6	--	Pa	2,219	211.0	do.	5.2	3	2,950	C,W	S	--	Discharge and drawdown measured after pumping 6 hrs.
301	do.	--	124	6	--	Pa	2,110	114.4	do.	--	3	4,100	C,W	S	--	
* 302	do.	--	192	5	--	Pa	2,155	172.4	June 25, 1968	2.7	5	3,120	C,W	S	--	Discharge and drawdown measured after pump- 9 hrs.
* 401	J.T. Martin	1950	300	6	--	Pa	2,308	166.3	June 12, 1968	--	4	2,800	C,W	S	--	
402	Ward Rattan	before 1911	70	8	--	Pa	2,195	44.3	June 13, 1968	1.4	2	3,000	C,W	S	--	Discharge and drawdown measured after pumping 3 hrs.
501	Coyal L. Francis	--	17	6	--	Qal	2,074	8.8	June 12, 1968	1.2	4	4,150	C,W	S	--	Discharge and drawdown measured after pumping 1 hr. Well in floodplain of Middle Pease River.
502	W.F. Campbell	--	212	6	--	Pa	2,229	133.3	June 13, 1968	--	3	--	C,W	S	--	
503	E.G. Bates	1949	130	6	--	Pa	2,100	75.8	do.	5.6	3	4,200	C,W	S	--	Discharge and drawdown measured after pumping 12 hrs.
504	Coyal L. Francis	1962	190	6	--	Pa	2,165	--	--	--	--	--	C,W	S	--	3/
601	George G. Adams	--	--	6	--	Pa	2,059	--	--	--	5	3,800	C,W	S	--	
* 602	do.	--	13	6	--	Pa	2,021	7.3	June 19, 1968	--	4	4,300	C,W	S	--	
701	J.D. Lawrence	--	59	6	--	Pa	2,282	39.3	June 13, 1968	2.2	3	4,300	C,W	S	--	Discharge and drawdown measured after pumping 6 hrs.
* 702	Doris Jones	1960	92	6	--	Pa	2,182	69.8	do.	11.6	2	4,400	C,W	S	--	Test hole originally drilled to 227 ft. Discharge and drawdown measured after pumping 10 hrs. 3/
801	James E. Russell	before 1959	155	6	--	Pa	2,253	142.1 146.6 98.1	Nov. 27, 1959 Dec. 7, 1960 June 12, 1968	-- -- --	-- -- 3	-- -- --	C,W	S	--	Water level of Nov. 27, 1959 may have been affected by recent pumping. Discharge estimated June 12, 1968.
* 802	W.F. Campbell	--	41	6	--	Pa	2,264	23.1	June 13, 1968	--	2	2,020	C,W	S	--	
803	Coyal L. Francis	1962	133	6	115-133	Pa	2,190	36.2	June 29, 1968	--	10	2,900	C,E,1	D	--	Originally drilled to 135 ft. 3/
804	do.	1962	240	6	--	Pa	2,228	--	--	--	3	--	C,W	S	--	3/
* 901	George G. Adams	before 1959	131	5	--	Pa	2,127	105.5 112.6 112.3	Nov. 27, 1959 Dec. 7, 1960 June 14, 1968	-- -- --	-- -- 2	-- -- 3,750	C,W	S	--	
902	do.	--	64	6	--	Qal,Pa	2,136	22.4	do.	--	5	2,350	C,W	S	--	
903	do.	--	132	6	--	Pa	2,174	115.7	do.	6.1	2	3,200	C,W	S	--	Discharge and drawdown measured after pumping 15 hrs.
904	Texas Highway Department	1967	244	6	114-244	Po,Pa	2,175	94.5	Feb. 28, 1969	25.0	30	2,500	None	P	--	Discharge and drawdown reported after 4 hr. bailing test. Originally drilled to 255 ft. Top Claytonville gypsum at 123 ft. Highway roadside park well. 3/
60-101	George G. Adams	--	112	6	--	Pa	2,003	71.7	June 26, 1968	.8	5	3,600	C,W	S	--	Discharge and drawdown measured after pumping 4 hrs.
* 102	do.	--	170	6	--	Pa	2,102	165.2	do.	1.1	5	7,000	C,W	S	--	Discharge and drawdown measured after pumping 1 hr.
103	do.	--	29	12	--	Qal	1,978	12.4	do.	0	7	5,900	C,W	S	--	Well in floodplain of Middle Pease River.
* 201	James J. Cooper	--	79	4	--	Pa	1,967	54.5	June 20, 1968	--	2	3,630	C,W	S	--	
202	George G. Adams	1964	48	6	--	Pa	1,967	28.2	do.	2.2	4	2,830	C,W	S	--	Discharge and drawdown measured after pumping 10 hrs.

See footnotes at end of table.

Table 8.--Records of Wells and Springs--Continued

WELL	OWNER	DATE COM-PLET-ED	DEPTH OF WELL (FT)	CASING: DIAM-ETER (IN.)	CASING: INTER-VAL OPEN (FT)	WATER-BEAR-ING UNIT	ALTITUDE OF LAND SURFACE (FT)	WATER LEVEL: BELOW LAND SURFACE DATUM (FT)	WATER LEVEL: DATE OF MEASUREMENT	WELL PERFORMANCE: DRAWDOWN (FT)	WELL PERFORMANCE: DISCHARGE (GPM)	SPECIFIC CONDUCTANCE (MICROMHOS AT 25° C)	METHOD OF LIFT	USE OF WATER	IRRI-GATED ACRES (APPROX-IMATE) 1968	REMARKS
*TW-12-60-301	George G. Adams	--	301	6	--	Pa	2,040	167.5	June 20, 1968	--	4	2,600	C,W	S	--	
* 401	do.	--	250	6	--	Pa	2,083	122.8	June 19, 1968	--	6	2,700	C,W	S	--	
501	do.	--	118	6	--	Pa	2,014	69.3	June 20, 1968	2.9	7	2,600	C,W	S	--	Discharge and drawdown measured after pumping 12 hrs.
502	do.	1967	203	6	--	Pa	2,090	136.8	June 21, 1968	--	4	2,900	C,W	S	--	
* 503	do.	--	282	6	--	Pa	2,196	275.1	do.	--	3	3,600	C,W	S	--	
601	do.	--	203	6	--	Pa	2,093	191.0	June 20, 1968	1.7	3	2,700	C,W	S	--	Discharge and drawdown measured after pumping 10 hrs.
* 701	do.	--	173	6	--	Pa	2,112	118.2	June 25, 1968	14.6	6	12,800	C,W	S	--	Discharge and drawdown measured after pumping 6 hrs.
* 801	do.	--	327	6	--	Pa	2,143	201.7	June 21, 1968	--	3	12,700	C,W	S	--	
901	do.	--	116	4	--	Pa	1,960	61.6	do.	--	3	2,900	C,W	S	--	
902	Mrs. U.L. Wilie	before 1959	56	6	--	Pa,Qal	1,910	21.5 21.0 22.1	Nov. 27, 1959 Dec. 7, 1960 Mar. 25, 1969	-- -- 7.8	-- -- 3	-- -- 2,650	C,W	S	--	Discharge and drawdown measured after pumping 8 hrs.
22-01-101	Caprock Sand and Gravel Co.	1959	200	8	--	Trd,To	2,490	--	--	--	77	--	N	U	--	Wells TW-22-01-101 through 104 were used originally for sand and gravel washing operation.
102	do.	1958	375	8	--	Trd,To	2,490	187	Nov. 1959	--	50	--	N	U	--	Do.
* 103	do.	1958	350	8	--	Trd,To	2,490	--	--	--	27	--	N	U	--	Do.
104	do.	1959	350	8	--	Trd,To	2,490	--	--	--	73	--	N	U	--	Do.
105	Harold H. Campbell	1936	160	6	140-160	Trd	2,850	103.2	Dec. 17, 1968	--	4	330	C,W	S	--	East Mott windmill.
201	Herring Sand and Gravel Co.	1966	300	12	200-282 287-300	Trd	2,855	145 153.5	Nov. 1966 Oct. 26, 1968	-- 36.9	-- 321	-- 800	T,E,50	Ind	--	Discharge and drawdown measured after pumping 25 hrs. Water used for sand and gravel washing operation. Pumping level 193.9 ft discharge 350 gpm on Oct. 9, 1968. Coefficient of transmissibility 11,700 gpd/ft. Coefficient of permeability 80 gpd/ft.[2] 3/
202	Mrs. U.L. Wylie	1906	87	5	--	To	2,788	76.1 34.0	Nov. 7, 1939 Oct. 10, 1968	-- --	-- 4	-- 510	C,W	S	--	Rise in water level due to large ponds immediately upstream which retain gravel-quarry wash water from well TW-22-01-202 and local surface runoff.
203	Curtis Martin	about 1960	136	6	116-136	Trd	2,800	80.2	Dec. 17, 1968	--	60	370	S,E,5	Irr,S	8	
* 204	W.E. Burleson	1966	300	6	283-298	Trd,Po	2,922	185 189.2	June 1966 Oct. 11, 1968	-- 2.2	25 4	-- 1,200	C,W	S	--	Originally drilled to 303 ft. Base of Ogallala at 125 ft. Base of Triassic at 299 ft. Open hole below 298 ft. Bailed at 25 gpm for 6 hrs. when drilled. Discharge and drawdown measured after pumping 15 hrs. Oct. 11, 1968. 3/
* 205	Billy Wasson	1949	111	6	--	Trd	2,778	82.8	Dec. 20, 1968	--	3	410	C,W	S	--	
301	Matador Cattle Co.	1938	123	5	--	Trd	2,758	54.4	Oct. 9, 1968	--	4	500	C,W	S	--	Originally drilled to 134 ft. Pumping level at 95.6 ft Nov. 7, 1939.
* 302	do.	1967	303	6	290-303	Trd	2,758	180 263.7	June 1967 Dec. 20, 1968	110 --	6 4	-- 600	C,W	S	--	Originally drilled to 305 ft. Reported discharge and drawdown from 4 hr. bailing test June 30, 1967. 3/
* 303	do.	--	Spring	--	--	Trd	2,575	--	--	--	--	850	Flows	S	--	Springs in Long's Branch of Ballard Creek. Flow estimated 20-25 gpm Sept. 17, 1938; 5 gpm June 5, 1968, and 20 gpm Dec. 20, 1968.
* 401	Harold H. Campbell	1938	103	6	--	Trd	2,809	42.9 45.3	Nov. 1, 1939 Dec. 17, 1968	54.2 --	2.5 4	-- 340	C,W	S	--	Replaces old well drilled to 300 ft in 1920, which produced from the Ochoa Series. Reported 110 ft deep in 1938.

See footnotes at end of table.

Table 8.--Records of Wells and Springs--Continued

WELL	OWNER	DATE COM-PLET-ED	DEPTH OF WELL (FT)	CASING: DIAM-ETER (IN.)	CASING: INTER-VAL OPEN (FT)	WATER-BEAR-ING UNIT	ALTITUDE OF LAND SURFACE (FT)	WATER LEVEL: BELOW LAND SURFACE DATUM (FT)	WATER LEVEL: DATE OF MEASUREMENT	WELL PERFORMANCE: DRAWDOWN (FT)	WELL PERFORMANCE: DISCHARGE (GPM)	SPECIFIC CONDUCTANCE (MICROMHOS AT 25° C)	METHOD OF LIFT	USE OF WATER	IRRI-GATED ACRES (APPROX-IMATE) 1968	REMARKS
*TW-22-01-402	Matador Cattle Co.	1929	72	8	--	Trd	2,811	59.5 63.8	Oct. 25, 1939 Dec. 19, 1968	-- --	5 4	-- 470	C,W	S	--	Depth measured at 76 ft in 1939.
* 501	Curtis Martin	1950	36	4	26- 36	Trd	2,721	28 26.3	Nov. 1939 Dec. 18, 1968	-- --	-- 4	-- 590	C,W	S	--	Replaces old well drilled about 1900 which caved in.
* 502	do.	--	Spring	--	--	Qal,To, Trd	2,708	--	--	--	--	550	Flows	S	--	Flow estimated 5-10 gpm Sept. 17, 1938; 8-12 gpm Dec. 18, 1968. Springs at junction of Spring Creek with Dutchman Creek. Flow increased to about 100 gpm 1/4 mile downstream.
* 503	Matador Cattle Co.	--	Spring	--	--	To,Trd	2,698	--	--	--	--	--	Flows	S	--	Flow estimated 35-40 gpm Sept. 9, 1938 and Dec. 18, 1968.
* 504	Curtis Martin	--	Spring	--	--	Trd	2,660	--	--	--	--	--	Flows	S	--	Flow estimated 10-15 gpm Sept. 9, 1938 and Dec. 18, 1968.
* 601	Matador Cattle Co.	1931	130	5	20-130	Po,Trd	2,552	11.5 15.8	Oct. 23, 1939 Jan. 29, 1969	-- --	-- 3	-- 1,070	C,W	D,S	--	Depth measured 135 ft in 1939. Trujillo conglomerate at 13 ft. Dutchman Camp well.
* 701	do.	--	180	6	--	Trd	2,812	129.3	Dec. 19, 1968	--	4	370	C,W	S	--	
* 801	J.E. Norris Co.	1967	106	8	87-106	Trd	2,777	82.8 85.0	Oct. 26, 1939 Dec. 19, 1968	-- --	-- 4	-- 340	C,W	S	--	Originally drilled to 107 ft. Replaces old well 20 ft south drilled to 112 ft in 1930.
901	Charles L. Long	1956	111	12	--	Qal,Trd	2,690	50 61.4	1956 Jan. 28, 1969	-- --	-- --	-- --	N	Ind	--	Originally drilled to 120 ft. Red bed at 110 ft. Originally used for irrigation. During 1957 surface runoff from field and small pond overflowed into well causing adjacent area to collapse. Runoff now drains into collapsed area. 1/
* 902	do.	1955	68	12	--	Trd,Qal	2,669	41.0 43.6	Nov. 2, 1959 Jan. 28, 1969	-- --	170 --	-- 550	T,G,116	Irr	45	Originally drilled to 70 ft. Penetrates Trujillo conglomerate. Replaces old well drilled to 60 ft in 1927. Discharge measured Dec. 1, 1960. 1/
* 903	do.	1959	78	12	--	Trd,Qal	2,659	36.3 39.0	Nov. 2, 1959 Jan. 29, 1969	-- --	153 --	-- --	T,G,116	Irr	25	Originally drilled to 80 ft. Penetrates Trujillo conglomerate. Pumping level 63.7 ft, discharge 153 gpm May 20, 1960. 1/
904	Billy B. Hand	1958	86	12	--	Trd	2,670	67.8 68.6	Nov. 3, 1959 Jan. 23, 1969	-- --	80 --	-- --	N	U	--	Originally drilled to 120 ft. Used for irrigation until 1959 when discontinued because of silt problems. Discharge reported. 1/
905	H. Caldwell Smith	1957	158	14	113-158	Trd	2,670	86.6 87.9	Nov. 3, 1959 Jan. 23, 1969	-- --	117 --	-- --	T,G,40	Irr	--	Trujillo conglomerate at 80 ft. Discharge measured Aug. 11, 1960. Reported maximum yield 250 gpm. Unused since 1966. 1/
906	do.	1960	85	12	--	Qal	2,598	32.3 34.9	Dec. 1, 1960 Jan. 23, 1969	-- --	-- 120	-- --	T,E,5	Irr	60	Reportedly test-pumped 120 gpm when drilled. Red bed at 86 ft. Irrigated acres include those for TW-22-01-907.
907	do.	1955	80	12	--	Qal	2,597	30.9 33.4	Nov. 3, 1959 Jan. 23, 1969	-- --	94 --	-- --	T,G,40	Irr	--	Reportedly test pumped 165 gpm when drilled. Pumping level 46.0 ft while pumping 94 gpm May 20, 1960. Red bed at 84 ft. Unused in 1968. 1/
908	do.	1965	160	12	90-160	Trd	2,650	67.0	do.	2	700	--	T	Irr	--	Discharge and drawdown reported from pumping test when drilled. Irrigated 65 acres in 1967, well not operated in 1968.
909	Charles L. Long	1963	120	12	--	Trd	2,692	63.8	Jan. 28, 1969	--	120	--	T,G,40	Irr	20	Reportedly test-pumped at 140 gpm when drilled. Replaces well TW-22-01-901.
* 910	Carlie Long	1968	75	12	60- 75	Trd	2,640	30.9	do.	--	85	1,420	S,E,3	Irr	--	Manifold system of 3 wells. Reported combined yield of 251 gpm when drilled. Will irrigate 54 acres when needed.
* 911	do.	1968	75	12	50- 75	Trd	2,637	29	Oct. 1968	--	76	--	S,E,3	Irr	--	East well of 3.
* 912	do.	1968	75	12	60- 75	Trd	2,644	31.3 32	Oct. 27, 1939 Oct. 1968	-- --	-- 90	-- --	S,E,3	Irr	--	West well of 3. Replaces stock well drilled to 43 ft in 1925.

See footnotes at end of table.

WELL	OWNER	DATE COMPLETED	DEPTH OF WELL (FT)	CASING: DIAMETER (IN.)	CASING: INTERVAL OPEN (FT)	WATER-BEARING UNIT	ALTITUDE OF LAND SURFACE (FT)	WATER LEVEL: BELOW LAND SURFACE DATUM (FT)	WATER LEVEL: DATE OF MEASUREMENT	WELL PERFORMANCE: DRAWDOWN (FT)	WELL PERFORMANCE: DISCHARGE (GPM)	SPECIFIC CONDUCTANCE (MICROMHOS AT 25° C)	METHOD OF LIFT	USE OF WATER	IRRIGATED ACRES (APPROXIMATE) 1968	REMARKS
TW-22-02-101	Matador Cattle Co.	before 1930	71	5	--	Trd	2,588	40.8	Oct. 23, 1939	--	--	--	C,W	S	--	
* 102	do.	--	Spring	--	--	Trd	2,461	--	--	--	--	--	Flows	D,S	--	''Ballard Springs'' on Ballard Creek. Flow estimated 15 gpm Nov. 8, 1939 and June 5, 1968.
103	do.	early 1900's	26	72	--	Trd,Qal	2,456	13.0	Nov. 2, 1939	--	--	--	None	U	--	
* 201	Farris Fish	1964	47	6	37- 47	Trd	2,425	18.4	Feb. 12, 1969	--	75	650	S,E,3	S,Irr	0	Reportedly bailed at 75 gpm. Not used for irrigation since 1964. Used for filling stock pond. Permian red bed at 47 ft.
* 301	Mrs. Paul Patton	1940's	83	6	--	Po	2,320	20.0	Feb. 11, 1969	--	3	4,500	C,W	D,S	--	
* 401	Matador Cattle Co.	1967	300	6	260-275	Po	2,609	196.6	Jan. 29, 1969	77.5	5	3,250	C,W	S	--	Originally drilled to 305 ft. Open hole below 275 ft. Drawdown and discharge measured after pumping 4 hrs. 3/
501	J.R. Anstead	1949	30	12	--	Qal	2,495	7.8 7.0	Nov. 5, 1959 Jan. 29, 1969	-- --	133 --	-- --	Ct,G,30	Irr	30	Manifold system of 5 wells. Discharge measured Dec. 1, 1960. Red bed at 30 ft. 1/
502	Thurmond F. Watson	1964	58	12	46- 58	Qal	2,504	28.0	Feb. 12, 1969	--	353	1,200	T,G,115	Irr	60	Red bed at 57 ft.
601	Matador Cattle Co.	--	270	6	--	Po	2,412	124.0	do.	--	3	2,180	C,W	S	--	
701	L.F. Nipp Estate	1956	29	10	--	Qal	2,464	9.5 10.6	Nov. 2, 1959 Jan. 29, 1969	-- --	105 --	-- --	T,G,80	Irr	9	Originally drilled to 33 ft. Well in Dutchman Creek floodplain. Pumping level 17.1 ft while pumping 105 gpm May 20, 1960. Red bed at 28 ft. 1/
702	Melton S. Thacker	1955	68	12	48- 68	Qal	2,519	14.8 -- 20.4	Nov. 2, 1959 -- Jan. 30, 1969	-- -- --	291 -- 583	-- -- --	T,G,40	Irr	38	Underground irrigation system connected with TW-22-02-703. Drilled to red bed at 69 ft. 1/
703	do.	1959	70	12	--	Qal	2,524	23.8	do.	--	210	--	T,G,60	Irr	54	Red bed at 65 ft.
* 704	Claudia Matney	1955	56	12	--	Qal	2,451	19.0 11.1	Jan. 5, 1956 Feb. 4, 1969	22.0 --	490 400	-- 2,450	T,G,80	Irr	100	Discharge and drawdown measured after pumping 49 hrs. Jan. 7, 1956. Pumping level 33.4 ft after pumping 345 gpm, Apr. 26, 1960. Normally runs at about 400 gpm. Red bed at 50 ft. 1/ 2/ 3/
* 705	City of Roaring Springs	1913	22	17 x 19 ft	18- 22	Qal	2,478	14.5 15.3	Sept. 16, 1947 Jan. 30, 1969	1.6 3.1	-- 285	-- --	T,E,10 T,E,15	P,S	--	Drawdown measured after pumping 3 hrs. Jan. 30, 1969. Gallery system in alluvium of Dutchman Creek. Originally dug to red bed at 24 ft. 3/
* 706	W.H. Marshall	1956	90	12	--	Qal	2,590	37.9 44.3	Nov. 2, 1959 Jan. 23, 1969	-- --	86 --	-- 850	T,E,7 1/2	Irr	22	Pumping level 65.0 ft after pumping 86 gpm Aug. 11, 1960. Irrigated acres include those irrigated from well TW-22-02-707. 5
707	do.	1964	101	12	--	Qal	2,596	47.9	do.	--	30	840	S,E,1	Irr	--	Red bed at 100 ft.
708	J.W. Johnson	1965	24	6	5- 24	Qal	2,467	5.9	Jan. 29, 1969	12	90	--	Ct,G,4 1/2	Irr	3	Discharge and drawdown measured after pumping 4 hrs. Well in floodplain of Dutchman Creek. Drilled to red bed at 25 ft.
709	J.A. Irwin	1968	45	12	--	Qal	2,480	15.6	Jan. 30, 1969	--	285	--	S,E,3	Irr	15	Reportedly bailed at 285 gpm when drilled. Another 12 in. well about 200 ft north is connected to this well. Reported yield about 50 gpm Jan. 30, 1969. Red bed at 45 ft.
710	Charlie R. Long	1960	46	12	--	Trd,Qal	2,521	23.8	do.	--	115	--	T,G,35	Irr	9	Triassic red bed at 20 ft. Discharge estimated.
711	City of Roaring Springs	1959	24	14	--	Qal	2,474	10.6	do.	--	60	--	C,E,1 1/2	P,S	--	Discharge estimated. Used as auxiliary supply, pumped into TW-22-02-705.
* 712	do.	1963	70	8	20- 60	Qal,Po	2,507	16.1	do.	--	200	1,080	T,E,10	Ind	--	Red bed at 58 ft. Discharge reported.
* 801	J.A. Hamilton Estate	1958	142	14	81-140	Qal	2,459	48.3 49.7	Nov. 3, 1959 Feb. 5, 1969	-- --	588 --	-- 2,700	T,G,230	Irr	122	Discharge measured Dec. 1, 1960. Red bed at 140 ft. 1/ 3/

See footnotes at end of table.

Table 8.--Records of Wells and Springs--Continued

WELL	OWNER	DATE COM-PLET-ED	DEPTH OF WELL (FT)	CASING		WATER-BEAR-ING UNIT	ALTITUDE OF LAND SURFACE (FT)	WATER LEVEL		WELL PERFORMANCE		SPECIFIC CONDUCTANCE (MICROMHOS AT 25° C)	METHOD OF LIFT	USE OF WATER	IRRI-GATED ACRES (APPROX-IMATE) 1968	REMARKS
				DIAM-ETER (IN.)	INTER-VAL OPEN (FT)			BELOW LAND SURFACE DATUM (FT)	DATE OF MEASUREMENT	DRAWDOWN (FT)	DISCHARGE (GPM)					
*TW-22-02-802	Polk M. Cooper	1955	49	12	35- 49	Qal	2,407	5.1 4.4	Nov. 3, 1959 Feb. 6, 1969	-- --	241 --	-- 1,400	T,G,80	Irr	60	Pumping level 15.5 ft while pumping 241 gpm Aug. 11, 1960. Drilled to red bed at 50 ft. 1/
803	Dean McInroe	1956	80	14	47- 80	Qal	2,435	43.9 43.7	Nov. 3, 1959 Feb. 5, 1969	-- --	302 344	-- --	T,G,150	Irr	40	Pumping level 55.2 ft while pumping 302 gpm May 20, 1960. Originally drilled to 82 ft. Red bed at 80 ft. 1/
* 804	Mrs. G.C. Sanders	1957	70	12	55- 70	Qal,Po	2,397	12.0 13.0	Sept. 2, 1957 Feb. 6, 1969	20.0 --	420 --	-- --	T,G,110	Irr	70	Pumping level 27.6 ft while pumping 377 gpm Apr. 26, 1960. Discharges and drawdowns measured after pumping 50 hrs. Sept. 2, 1957, and 2 hrs. Feb. 6, 1969. Red bed at 64 ft. 1/ 3/
805	do.	1962	44	6	--	Qal	2,440	14.5	Jan. 30, 1969	--	138	--	Ct,G,35	Irr,S	8	Originally drilled to red bed at 54 ft.
* 806	do.	1960	139	14	100-139	Qal	2,471	45.9 43.6 49.5	Apr. 6, 1960 Dec. 1, 1960 Feb. 5, 1969	-- -- --	-- 326 384	-- -- 1,100	T,G,85	Irr	44	Originally drilled to 140 ft.
807	Ned Shanks	1965	--	12	--	Qal	2,519	33.7	Feb. 12, 1969	--	400	--	T,G,220	Irr	--	Unused since 1966. Discharge reported for 1966.
901	J.F. Bridges	1958	89	12	--	Qal	2,498	37.7 37.8 36.0	Nov. 5, 1959 Feb. 1, 1960 Dec. 1, 1960	-- -- --	77 -- --	-- -- --	None	U	--	Well unused since 1963. Pumping level 58.2 ft after pumping 77 gpm, Aug. 25, 1960. Drilled to red bed at 89 ft.
902	Avery Payne	1954	168	12	144-168	Qal	2,539	76.9 73.4	Nov. 4, 1959 Feb. 6, 1969	-- --	222 --	-- --	T,G	Irr, Ind	--	Originally drilled to red bed at 169 ft. Discharge measured Aug. 25, 1960. Usually irrigates 55 acres and supplies drilling water for oil field use. Not operated since 1967. 1/ 3/
* 903	do.	1955	191	12	139-191	Qal	2,542	81.3 82.6	Nov. 4, 1959 Feb. 6, 1969	-- 120	160 484	-- --	T,G,115	Irr	--	Pumping level 100.2 ft while pumping 160 gpm Aug. 25, 1960. Reported discharge and drawdown Feb. 6, 1969. Originally drilled to red bed at 192 ft. Well unused since 1967 when irrigated 85 acres. 1/ 3/
* 904	J.F. Bridges	1965	59	12	45- 59	Qal	2,490	20.8	Feb. 6, 1969	25.4	111	1,120	S,E,7 1/2	Irr	40	Drawdown and discharge measured after pumping 1 hr. Originally drilled to red at 60 ft.
03-101	Mrs. J.W. Stafford	1940's	72	6	--	Po	2,292	54.1 53.6 57.6	Nov. 27, 1959 Dec. 7, 1960 Feb. 25, 1969	-- -- --	-- -- 3	-- -- --	C,W	U	--	Discharge reported.
102	J.C. Russell	--	204	5	--	Po	2,270	150.6	do.	9.3	3	2,500	C,W	S	--	Drawdown and discharge measured after pumping 14 hrs.
103	Matador Cattle Co.	1967	277	6	265-277	Pa	2,281	159.6	Mar. 26, 1969	--	20	2,750	C,W	S	--	Reportedly bailed 20 gpm when drilled. Red bed at 20 ft. Originally drilled to 278 ft. 3/
* 201	Mrs. Vance Gilbreath	1964	62	12	32- 62	Po	2,235	26.2	Feb. 25, 1969	--	70	1,970	S,E,3	Irr,D	20	
* 301	L.C. Harp	1952	50	6	--	Po	2,202	32.1	Feb. 28, 1969	--	3	1,720	C,W	S	--	
* 401	Matador Cattle Co.	--	300 +	6	--	Po	2,388	192.1	Feb. 12, 1969	--	4	3,200	C,W	S	--	
501	do.	1966	290	6	283-290	Pa	2,325	190 237.3	Sept. 1966 Feb. 26, 1969	40 --	25 5	-- 2,400	C,W	S	--	Originally drilled to 320 ft. Slotted casing from 283 ft to 297 ft, open hole 297 ft to 320 ft. Reportedly bailed 25 gpm when drilled. 3/
* 701	James M. Jameson	1955	196	12	--	Qal	2,461	158.5 140.7	Nov. 4, 1959 Feb. 26, 1969	-- --	166 320	-- --	T,D,60	Irr	50	Present yield reportedly greater than when drilled. Pumping level 173.0 ft while pumping 166 gpm May 20, 1960. Red bed at 196 ft. 1/
702	Claude Stearns	1957	79	6	--	Qal	2,507	52 49.6	Nov. 1957 Feb. 6, 1969	-- --	-- 12	-- 750	S,E,1	D,S	--	Red bed at 78 ft.

See footnotes at end of table.

Table 8.--Records of Wells and Springs--Continued

WELL	OWNER	DATE COMPLETED	DEPTH OF WELL (FT)	CASING: DIAMETER (IN.)	CASING: INTERVAL OPEN (FT)	WATER-BEARING UNIT	ALTITUDE OF LAND SURFACE (FT)	WATER LEVEL: BELOW LAND SURFACE DATUM (FT)	WATER LEVEL: DATE OF MEASUREMENT	WELL PERFORMANCE: DRAWDOWN (FT)	WELL PERFORMANCE: DISCHARGE (GPM)	SPECIFIC CONDUCTANCE (MICROMHOS AT 25° C)	METHOD OF LIFT	USE OF WATER	IRRIGATED ACRES (APPROXIMATE) 1968	REMARKS
TW-22-03-801	Heath M. Robinson	1960	85	12	--	Qal	2,203	17.6 17.1	Dec. 1, 1960 Feb. 27, 1969	-- --	282 --	-- 1,180	None	U	--	Originally drilled to 93 ft. Pumping level 43.3 ft while pumping 282 gpm Aug. 25, 1960. Irrigation use discontinued in 1966 after being replaced by TW-22-03-802.
802	do.	1966	85	12	--	Qal	2,197	12.2	Feb. 27, 1969	--	292	2,200	T,G,90	Irr	100	
803	Matador Cattle Co.	--	226	6	--	Po,Pa	2,355	173.0	Feb. 26, 1969	10.2	5	2,680	C,W	S	--	Drawdown and discharge measured after pumping 20 hrs.
901	Mrs. Carl M. Bird	1947	178	6	--	Po	2,272	--	--	--	3	2,420	C,W	S	--	Pumping level 148.5 ft after pumping 3 gpm, Feb. 27, 1969.
* 902	Matador Cattle Co.	--	191	6	--	Pa	2,209	135.8	Feb. 27, 1969	--	4	2,850	C,W	S	--	
* 04-101	Swenson Brothers Estate	--	96	5	--	Pa	2,044	63.0	Mar. 26, 1969	--	3	2,000	C,W	S	--	
201	do.	--	75	6	--	Pa	2,076	44.5	do.	--	3	1,950	C,W	S	--	
* 301	do.	--	76	6	--	Pa	1,943	24.4	do.	--	3	4,300	C,W	S	--	
501	do.	--	72	6	--	Pa	2,032	45.7	Feb. 28, 1969	--	3	2,350	C,W	S	--	
701	Gus Bird	1956	72	12	--	Qal	2,126	12.2 10.9	Nov. 11, 1959 Feb. 27, 1969	-- --	-- 384	-- --	T,G,85	Irr	--	Well in alluvial terrace of Tongue River. Maximum yield reported about 500 gpm. Unused since 1967 when irrigated 60 acres. Red bed about 73 ft. 1/
* 702	Matador Cattle Co.	1940's	171	5	--	Pa	2,195	167.9	Feb. 28, 1969	--	4	2,500	C,W	S	--	
801	Mary E. Clary	--	9	36	--	Qal	2,079	5.9	do.	0	4	2,850	C,W	S	--	Well in floodplain of Tongue River.
* 901	Swenson Brothers Estate	--	15	30	--	Qal	2,040	11.2	Mar. 26, 1969	--	3	2,300	C,W	S	--	Do.
09-101	Matador Cattle Co.	1947	71	6	--	Trd	2,715	39.7	Jan. 22, 1969	--	4	530	C,W	D,S	--	
* 102	do.	--	Spring	--	--	Qal	2,664	--	--	--	--	580	Flows	S	--	Flow estimated 10 gpm Sept. 13, 1938, measured 25 gpm Jan. 22, 1969. Rustler Creek springs near Wolf Creek Camp. Flow increases 1/2 mile downstream, estimated 300 gpm Sept. 13, 1938, measured 470 gpm Apr. 1, 1939, and 485 gpm Jan. 22, 1969.
* 103	do.	--	Spring	--	--	Qal,To,Trd	2,687	--	--	--	--	650	Flows	S	--	Flows estimated 30 gpm Sept. 13, 1938, 40 gpm Jan. 22, 1969. Flow increased to 202 gpm 0.5 mile below this upper most spring on Tongue River Jan. 22, 1969.
* 104	do.	--	Spring	--	--	To,Trd	2,685	--	--	--	--	--	Flows	S	--	Unnamed tributary to Tongue River. Flow estimated 40 gpm Sept. 13, 1938; 45 gpm Jan. 22, 1969.
* 201	do.	1961	43	6	--	Po	2,571	17.4	Jan. 22, 1969	--	3	950	C,W	S	--	
* 203	do.	--	Spring	--	--	To,Trd	2,640	--	--	--	--	--	Flows	S	--	Panther Canyon Springs. Flow estimated 3 gpm Oct. 12, 1938; 5 gpm Jan. 22, 1969.
* 301	Billy B. Hand	1955	130	12	90-130	Trd	2,634	59.0 62.8	Nov. 3, 1959 Jan. 23, 1969	-- --	423 --	-- --	T,G,115	Irr	60	Reportedly pump tested at 350 gpm when drilled. Discharge measured Apr. 23, 1960.
302	do.	1956	143	12	--	Trd	2,633	58.8 62.4	Nov. 3, 1959 Jan. 23, 1969	-- --	250 --	-- --	T	U	--	Camp Springs Conglomerate from 40 ft to 143 ft. Well unused since 1963 when discharge was reported. Replaced by well TW-22-09-301. 1/ 3/
303	do.	1955	58	14 & 12	--	Trd	2,618	47.6 48.2	Nov. 3, 1959 Jan. 23, 1969	-- --	150 --	-- --	T	U	--	Camp Springs Conglomerate from 30 to 58 ft. Well unused since 1963. Discharge reported Feb. 1, 1960. 1/
* 304	do.	1958	141	12	--	Trd	2,618	48.2	do.	--	440	--	T,G,115	Irr	90	Camp Springs Conglomerate from 30 to 142 ft. Originally drilled to 142 ft. Discharge 263 gpm May 20, 1960. 3/
305	do.	--	148	6	--	Trd,Po	2,639	60.0	Jan. 22, 1969	--	3	750	C,W	S	--	

See footnotes at end of table.

Table 8.--Records of Wells and Springs--Continued

WELL	OWNER	DATE COM-PLET-ED	DEPTH OF WELL (FT)	CASING: DIAM-ETER (IN.)	CASING: INTER-VAL OPEN (FT)	WATER-BEAR-ING UNIT	ALTITUDE OF LAND SURFACE (FT)	WATER LEVEL: BELOW LAND SURFACE DATUM (FT)	WATER LEVEL: DATE OF MEASUREMENT	WELL PERFORMANCE: DRAWDOWN (FT)	WELL PERFORMANCE: DISCHARGE (GPM)	SPECIFIC CONDUCTANCE (MICROMHOS AT 25° C)	METHOD OF LIFT	USE OF WATER	IRRI-GATED ACRES (APPROX-IMATE) 1968	REMARKS
TW-22-10-101	W.H. Marshall	1965	82	8	--	Qal	2,582	44.1	Jan. 23, 1969	--	60	--	None	U	--	Discharge reported. Red bed at 80 ft. 3/
102	do.	1957	77	12	--	Qal,Trd	2,585	45.2 46.8	Nov. 2, 1959 Jan. 23, 1969	-- --	69 --	-- --	S,E,5	Irr	10	Camp Springs Conglomerate from 74 to 76 ft. Discharge measured Aug. 11, 1960. 1/
103	do.	1959	60	12	--	Qal	2,584	43.8 47.2	Nov. 2, 1959 Jan. 23, 1969	-- --	30 --	-- --	J,E,1 1/2	D	--	Discharge reported. Well used for irrigation in 1959. Converted to domestic use in 1960. Red bed at 60 ft. 1/
* 104	Matador Cattle Co.	--	Spring	--	--	Trd	2,480	--	--	--	--	See Table 10	Flows	P,D	--	''Roaring Spring'' used for swimming pool and recreation area. Flow measured regularly since 1937. Discharge measured 480 gpm Jan. 18, 1937; 592 gpm Jan. 8, 1969. USGS Partial Record Station 7-3077. See Figure 5.
105	Billy L. Peacock	1954	21	16	12- 21	Qal	2,446	10.2 10.0	Nov. 16, 1959 Jan. 31, 1969	-- --	-- 200	-- --	Ct,G,35	Irr	23	Manifold system of 5 wells in alluvial terrace adjacent to Tongue River. Combined discharge reported in 1968. All except the southernmost well have 6 in. casings. Originally drilled to red bed at 24 ft. 1/
201	Ben Davidson	--	15	6	--	Po	2,441	3.3	Feb. 5, 1969	--	3	1,530	C,W	D,S	--	
202	Ed Janes	1969	48	20	--	Trd	2,530	33.0	Jan. 31, 1969	--	40	--	N	U	--	Discharge by bailer test Jan. 31, 1969. Irrigation well test hole. Camp Springs Conglomerate at 48 ft.
203	G.E. Thacker	1966	45	8	--	Trd	2,530	33.0	do.	--	10	--	S,E,1/3	D,S	--	Discharge reported. Camp Springs Conglomerate at 45 ft.
* 301	Ralph C. Jones	1966	60	8	14- 19 45- 60	Qal,Po	2,329	5.9	Feb. 4, 1969	50	135	2,800	S,E,7 1/2	Irr	20	Originally drilled to red bed at 65 ft. Pump breaks suction at about 150 gpm. Drawdowns estimated from depth to bowls.
302	Clark Forbis	--	Spring	--	--	Po	2,318	--	Feb. 5, 1969	--	7	3,200	Flows	S	--	Uppermost springs on Fishhole Creek.
303	Donald Hughes	1964	48	12	--	Qal	2,353	4.6	Feb. 6, 1969	--	480	--	T,G,220	Irr	65	Red bed at 48 ft.
11-101	E.E. Moss and Sons	1959	90	12	--	Qal	2,265	30 17.0	July 1960 Feb. 26, 1969	-- --	320 --	-- --	T,G,55	Irr	--	Unused since 1965 when irrigated 26 acres. Well in alluvial terrace of Tongue River. Red bed at 90 ft.
102	do.	1962	59	12	--	Qal	2,273	9.6	do.	--	60	2,700	T,G,55	Irr	22	Well is alluvial terrace of Sanders Hollow. Red bed at 59 ft. Discharge estimated.
103	Assembly of God Church	1964	60	6	--	Qal	2,561	15.6	Feb. 27, 1969	--	40	2,580	S,E,1 1/2	P,S	--	Supplies water for large youth camp and swimming pool. Discharge reported.
* 201	Heath M. Robinson	1959	95	12	--	Qal	2,238	24.9 23.2 23.3	Nov. 4, 1959 Feb. 1, 1960 Feb. 26, 1969	-- -- --	-- -- 320	-- -- --	T,G,80	Irr	50	Alluvial terrace and sand dune area adjacent to Tongue River.
202	do.	1967	102	12	--	Qal,Trd	2,223	17 15.4	Mar. 1967 Feb. 26, 1969	85 --	700 --	2,700 --	T,G,55	Irr	--	Originally drilled to 105 ft. Drawdown and discharge reported from 20 hr. pumping test Mar. 1, 1967. Well unused since 1967 when irrigated 135 acres. Triassic conglomerate from 90-92 ft. Red bed at 92 ft. 3/
203	do.	1964	27	12	--	Qal	2,239	8.2	Feb. 27, 1969	--	250	2,700	C,E,3	Irr,S	--	Discharge reported. Used to fill stock pond. Will be used for irrigation as land is cleared.
204	do.	1960	61	12	--	Qal	2,230	21.6	do.	--	360	2,400	T,G,55	Irr	--	Red bed at 60 ft. Well unused since 1966 when irrigated 45 acres.
* 301	Mrs. Carl M. Bird	1948	320	6	--	Po	2,314	--	--	--	3	2,280	C,W	S	--	Pumping level at 195.7 ft Feb. 27, 1969.
302	do.	--	265	6	--	Po	2,338	207.4	Feb. 27, 1969	--	3	1,950	C,W	S	--	Well penetrates alluvial terrace overlying Permian.
12-201	Mrs. J.A. Hollar Estate	--	246	6	--	Pa	2,209	163.0	Mar. 26, 1969	--	3	2,100	C,W	S	--	
* 202	Mack Read	1948	105	6	at 10	Po	2,252	103.1	do.	--	2	1,550	C,W	D	--	Open end casing. Originally drilled to 107 ft.

See footnotes at end of table.

Table 8.--Records of Wells and Springs--Continued

WELL	OWNER	DATE COMPLETED	DEPTH OF WELL (FT)	CASING: DIAMETER (IN.)	CASING: INTERVAL OPEN (FT)	WATER-BEARING UNIT	ALTITUDE OF LAND SURFACE (FT)	WATER LEVEL: BELOW LAND SURFACE DATUM (FT)	WATER LEVEL: DATE OF MEASUREMENT	WELL PERFORMANCE: DRAWDOWN (FT)	WELL PERFORMANCE: DISCHARGE (GPM)	SPECIFIC CONDUCTANCE (MICROMHOS AT 25° C)	METHOD OF LIFT	USE OF WATER	IRRIGATED ACRES (APPROXIMATE) 1968	REMARKS
TW-22-12-301	Mrs. J.A. Hollar Estate	1953	123	6	--	Pa	2,138	99.6	Mar. 26, 1969	--	--	--	C,W	D,S	--	
JW-23-08-201	J.C. Martin	1954	355	16	250-355	To,Trd	3,086	240 266.2	June 1954 Jan. 9, 1967	--	500	--	T,G,150	Irr	--	Originally drilled to 360 ft. Texas Water Development Board observation well on caprock near edge of escarpment. Discharge reported. Triassic red bed at 340 ft. 1/ 3/
TW-23-08-301	Texas Highway Department	1967	375	6	360-374	Trd,To	3,054	235	June 1967	0	25	--	None	U	--	Discharge and drawdown reported from 16 hr. bailing test when drilled. Well to be used for highway roadside park. 3/
* 302	Harold H. Campbell	1924	294	5	--	Trd	2,939	139.2 139.6 146.6	June 15, 1937 Nov. 1, 1939 Dec. 17, 1968	-- 0.7 --	-- 4 2	-- -- 400	C,W	S	--	Discharge and drawdown measured in 1939. Originally drilled to 320 ft.
* 601	Hal Vance Campbell	about 1900	178	6 to 150 4 1/2 to 400	150-178	Trd	2,919	113.1 125.4	Oct. 31, 1939 Dec. 17, 1968	-- --	-- 3	-- 450	C,W	S	--	Deepened to 400 ft about 1920. Depth measured 304 ft in 1939.
* 602	Harold H. Campbell	1910	81	4	about 70- 80	Trd	2,866	65 71.7	Oct. 1939 Dec. 17, 1968	-- --	-- 3	-- 360	C,W	S	--	Well has 6 in. liner.
603	Matador Cattle Co.	--	187	6	--	Trd	2,941	159.9	Dec. 19, 1968	--	4	510	C,W	S	--	
* 604	Harold H. Campbell	1939	282	6	--	Trd,To	3,032	233.1 231.3 246.6	Nov. 26, 1938 Oct. 24, 1939 Jan. 21, 1969	-- -- --	-- -- 4	-- -- 460	C,W	S	--	Replaces old 4 in. well drilled to 410 ft in 1914. New well originally drilled to 300 ft. Both 1914 and 1939 wells sampled Nov. 1, 1939.
* 901	Matador Cattle Co.	1966	228	6	--	Trd,To	2,943	140 167.4	July 1966 Dec. 19, 1968	30 --	20 5	-- 460	C,W	S	--	Discharge and drawdown reported from 12 hr. bailing test when drilled. Originally drilled to 245 ft. Red bed at 240 ft. 3/
16-301	do.	1953	293	6	--	Trd,To	3,034	274.3	Jan. 21, 1969	--	4	480	C,W	S	--	Well on caprock near edge of escarpment.

* Chemical analysis of water given in Table 10.
1/ Additional water levels given in Table 9.
2/ Pesticide analysis available in files of U.S. Geological Survey or Texas Water Development Board.
3/ Drillers' logs available in files of U.S. Geological Survey or Texas Water Development Board.

Table 9.—Water Levels in Wells

DATE	WATER LEVEL
Well: TW-11-48-602	
Owner: Leonard W. Crowell	
Nov. 17, 1959	35.3
Feb. 3, 1960	35.0
Dec. 5, 1960	32.5
June 21, 1968	38.0
Oct. 31, 1968	35.4
Well: TW-11-48-603	
Owner: L. Vernon Cagle	
Nov. 17, 1959	40.5
Feb. 3, 1960	40.2
Dec. 5, 1960	37.9
June 21, 1968	42.8
Well: TW-11-48-604	
Owner: Isom F. Reed	
Mar. 1950	40
Nov. 17, 1959	39.4
Feb. 2, 1960	39.1
Dec. 5, 1960	37.0
June 21, 1968	41.0
Oct. 31, 1968	40.5
Well: TW-11-48-605	
Owner: Isom F. Reed	
Nov. 17, 1959	43.5
Feb. 3, 1960	42.7
Dec. 5, 1960	40.8
Oct. 31, 1968	44.1
Well: TW-11-48-608	
Owner: Isom F. Reed	
Nov. 17, 1959	41.6
Feb. 3, 1960	41.0
Dec. 5, 1960	39.1
June 21, 1968	44.5
Oct. 31, 1968	43.6
Well: TW-11-48-901	
Owner: James E. Monk	
Nov. 17, 1959	19.6
Feb. 3, 1960	19.6

DATE	WATER LEVEL
Well: TW-11-48-901—Cont'd.	
Dec. 5, 1960	17.1
Nov. 7, 1968	24.5
Well: TW-11-55-901	
Owner: Gerald Lackey	
Jan. 17, 1962	265.0
Jan. 28, 1963	267.2
Jan. 21, 1964	267.2
Feb. 17, 1965	269.1
Feb. 1, 1966	271.3
Jan. 10, 1967	284.0
Jan. 5, 1968	287.3
Jan. 1969	276.3
Well: TW-11-56-304	
Owner: Trula D. Martin	
Nov. 19, 1959	46.0
Feb. 3, 1960	45.0
Dec. 5, 1960	43.4
June 24, 1968	45.4
Well: TW-11-56-309	
Owner: Thomas W. Tippett	
Nov. 17, 1959	64.1
Feb. 3, 1960	63.8
Dec. 5, 1960	63.6
Nov. 7, 1968	64.3
Well: JW-11-64-101	
Owner: Vance Campbell	
Mar. 30, 1957	210
Jan. 18, 1962	210.2
Jan. 28, 1963	210.3
Jan. 21, 1964	217.5
Feb. 17, 1965	221.4
Feb. 1, 1966	223.0
Jan. 9, 1967	230.6
Jan. 5, 1968	244.9
Jan. 1969	234.7

DATE	WATER LEVEL
Well: JW-11-64-502	
Owner: C. M. Lewis	
June 16, 1963	263.7
Jan. 25, 1964	263.8
Feb. 17, 1965	264.0
Feb. 1, 1966	264.3
Jan. 9, 1967	264.3
Jan. 5, 1968	272.4
Jan. 1969	264.5
Well: TW-12-41-401	
Owner: Doyle Tiffin	
Nov. 18, 1959	48.1
Feb. 3, 1960	47.7
Dec. 5, 1960	46.3
Oct. 29, 1968	51.9
Well: TW-12-41-402	
Owner: Von D. Tiffin	
Nov. 17, 1959	47.5
Feb. 3, 1960	46.8
Dec. 5, 1960	45.0
June 10, 1968	48.3
Oct. 24, 1968	49.4
Well: TW-12-41-404	
Owner: Von D. Tiffin	
Nov. 17, 1959	44.6
Feb. 3, 1960	42.2
Dec. 5, 1960	40.4
June 10, 1968	48.2
Oct. 24, 1968	45.2
Well: TW-12-41-405	
Owner: W. E. Helms	
Nov. 18, 1959	44.3
Feb. 3, 1960	43.6
Dec. 5, 1960	41.5
June 10, 1968	47.0
Oct. 25, 1968	48.1

Table 9.—Water Levels in Wells—Continued

DATE	WATER LEVEL
Well: TW-12-41-407	
Owner: W. E. Helms	
Nov. 18, 1959	30.8
Mar. 3, 1960	32.0
Dec. 5, 1960	29.6
June 11, 1968	35.7
Oct. 25, 1968	36.7
Well: TW-12-41-409	
Owner: George Reed	
Nov. 17, 1959	39.1
Feb. 3, 1960	38.3
Dec. 5, 1960	36.5
June 10, 1968	41.3
Well: TW-12-41-410	
Owner: George Reed	
Nov. 17, 1959	40.6
Feb. 3, 1960	40.2
Dec. 5, 1960	37.6
June 11, 1968	42.4
Well: TW-12-41-414	
Owner: E. J. Browning	
Nov. 18, 1959	37.8
Feb. 3, 1960	37.4
Dec. 2, 1960	35.3
June 10, 1968	44.1
Oct. 23, 1968	38.9
Well: TW-12-41-503	
Owner: Mary E. Clay	
Nov. 19, 1959	47.9
Feb. 3, 1960	47.4
Dec. 6, 1960	46.4
June 12, 1968	54.3
Oct. 21, 1968	54.8
Well: TW-12-49-102	
Owner: Mrs. M. C. Washington	
Nov. 17, 1959	91.8
Feb. 3, 1960	90.2
Dec. 5, 1960	88.7
June 24, 1968	96.4

DATE	WATER LEVEL
Well: TW-12-49-202	
Owner: Zollie C. George	
Nov. 19, 1959	62.2
Feb. 3, 1960	59.5
Dec. 6, 1960	57.6
June 25, 1968	71.6
Well: TW-12-49-301	
Owner: Molly Burleson	
Nov. 18, 1959	66.8
Feb. 3, 1960	61.1
Dec. 6, 1960	61.4
July 24, 1968	63.4
Well: TW-12-49-302	
Owner: Mary E. Barton	
Nov. 18, 1959	32.4
Feb. 3, 1960	32.6
Dec. 6, 1960	30.6
July 24, 1968	32.8
Well: TW-12-49-303	
Owner: Mary E. Barton	
Nov. 18, 1959	21.1
Feb. 3, 1960	20.4
Dec. 6, 1960	19.3
July 24, 1968	21.0
Well: TW-12-49-501	
Owner: Johnny Barton	
Nov. 19, 1959	91.6
Dec. 3, 1960	89.5
Dec. 6, 1960	88.9
Sept. 13, 1968	88.7
Well: TW-12-50-101	
Owner: J. W. Pritchett	
Nov. 20, 1959	95.3
Feb. 3, 1960	93.4
Dec. 6, 1960	94.0
June 27, 1968	93.5
Well: TW-12-50-201	
Owner: C. M. Barton, Jr.	
Nov. 20, 1959	102.3

DATE	WATER LEVEL
Well: TW-12-50-201—Cont'd.	
Feb. 3, 1960	101.5
Dec. 6, 1960	101.3
June 27, 1968	100.4
Well: TW-12-57-502	
Owner: Agle L. Spray	
Nov. 20, 1959	27.3
Apr. 26, 1960	28.5
Dec. 6, 1960	25.7
Summer 1967	44
Sept. 20, 1968	38.2
Well: TW-12-58-803	
Owner: City of Matador	
June 12, 1928	72
June 15, 1937	82.5
May 1947	78
June 11, 1968	86.2
Well: TW-22-01-901	
Owner: Charles L. Long	
1956	50
Nov. 2, 1959	30.0
Feb. 1, 1960	28.0
Dec. 1, 1960	57.4
Jan. 28, 1969	61.4
Well: TW-22-01-902	
Owner: Charles L. Long	
Nov. 2, 1959	41.0
Feb. 1, 1960	40.7
Dec. 1, 1960	40.8
Jan. 28, 1969	43.6
Well: TW-22-01-903	
Owner: Charles L. Long	
Nov. 2, 1959	36.3
Feb. 1, 1960	36.3
Dec. 1, 1960	35.6
Jan. 29, 1969	39.0
Well: TW-22-01-904	
Owner: Billy B. Hand	
Nov. 3, 1959	67.8

Table 9.—Water Levels in Wells—Continued

DATE		WATER LEVEL
Well: TW-22-01-904—Cont'd.		
Feb.	1, 1960	67.8
Dec.	1, 1960	66.5
Jan.	23, 1969	68.6
Well: TW-22-01-905		
Owner: H. Caldwell Smith		
Nov.	3, 1959	86.6
Feb.	1, 1960	87.0
Dec.	1, 1960	86.4
Jan.	23, 1969	87.9
Well: TW-22-01-907		
Owner: H. Caldwell Smith		
Nov.	3, 1959	30.9
Feb.	1, 1960	29.6
Dec.	1, 1960	29.7
Jan.	23, 1969	33.4
Well: TW-22-02-501		
Owner: J. R. Anstead		
Nov.	5, 1959	7.8
Feb.	1, 1960	5.2
Dec.	1, 1960	3.4
Jan.	29, 1969	7.0
Well: TW-22-02-701		
Owner: L. F. Nipp Estate		
Nov.	2, 1959	9.5
Feb.	1, 1960	7.2
Dec.	6, 1960	7.5
Jan.	29, 1969	10.6
Well: TW-22-02-702		
Owner: Melton S. Thacker		
Nov.	2, 1959	14.8
Feb.	1, 1960	14.2
Dec.	1, 1960	12.6
Jan.	30, 1969	20.4
Well: TW-22-02-704		
Owner: Claudia Matney		
Jan.	5, 1956	19.0

DATE		WATER LEVEL
Well: TW-22-02-704—Cont'd.		
Nov.	3, 1959	10.4
Feb.	1, 1960	7.8
Dec.	1, 1960	6.4
Feb.	4, 1969	11.1
Well: TW-22-02-706		
Owner: W. H. Marshall		
Nov.	2, 1959	37.9
Feb.	1, 1960	37.6
Dec.	1, 1960	37.0
Jan.	23, 1969	44.3
Well: TW-22-02-801		
Owner: J. A. Hamilton Estate		
Nov.	3, 1959	48.3
Feb.	1, 1960	47.9
Dec.	1, 1960	46.7
Feb.	5, 1969	49.7
Well: TW-22-02-802		
Owner: Polk M. Cooper		
Nov.	3, 1959	5.1
Feb.	1, 1960	4.4
Dec.	1, 1960	4.5
Feb.	6, 1969	4.4
Well: TW-22-02-803		
Owner: Dean McInroe		
Nov.	3, 1959	43.9
Feb.	1, 1960	43.0
Dec.	1, 1960	42.3
Feb.	5, 1969	43.7
Well: TW-22-02-804		
Owner: Mrs. G. C. Sanders		
Sept.	2, 1957	12.0
Nov.	3, 1959	13.7
Dec.	1, 1960	12.4
Dec.	1, 1960	12.5
Feb.	6, 1969	13.0

DATE		WATER LEVEL
Well: TW-22-02-902		
Owner: Avery Payne		
Nov.	4, 1959	76.9
Feb.	1, 1960	76.8
Dec.	1, 1960	75.9
Feb.	6, 1969	73.4
Well: TW-22-02-903		
Owner: Avery Payne		
Nov.	4, 1959	81.3
Feb.	1, 1960	81.2
Dec.	1, 1960	80.5
Feb.	6, 1969	82.6
Well: TW-22-03-701		
Owner: James M. Jameson		
Nov.	4, 1959	158.5
Feb.	1, 1960	156.0
Dec.	1, 1960	155.8
Feb.	26, 1969	140.7
Well: TW-22-04-701		
Owner: Gus Bird		
Nov.	11, 1959	12.2
Feb.	1, 1960	10.8
Dec.	1, 1960	11.3
Feb.	27, 1969	10.9
Well: TW-22-09-302		
Owner: Billy B. Hand		
Nov.	3, 1959	58.8
Feb.	1, 1960	58.5
Dec.	1, 1960	60.8
Jan.	23, 1969	62.4
Well: TW-22-09-303		
Owner: Billy B. Hand		
Nov.	3, 1959	47.6
Feb.	1, 1960	47.5
Dec.	1, 1960	47.7
Jan.	23, 1969	48.2

Table 9.—Water Levels in Wells—Continued

DATE		WATER LEVEL
Well: TW-22-10-102		
Owner: W. H. Marshall		
Nov.	2, 1959	45.2
Feb.	1, 1960	44.6
Dec.	1, 1960	43.6
Jan.	23, 1969	46.8
Well: TW-22-10-103		
Owner: W. H. Marshall		
Nov.	2, 1959	43.8
Feb.	1, 1960	43.2

DATE		WATER LEVEL
Well: TW-22-10-103—Cont'd.		
Dec.	1, 1960	42.2
Jan.	23, 1969	47.2
Well: TW-22-10-105		
Owner: Billy L. Peacock		
Nov.	16, 1959	10.2
Feb.	1, 1960	9.4
Dec.	1, 1960	9.4
Jan.	31, 1969	10.0

DATE		WATER LEVEL
Well: JW-23-08-201		
Owner: J. C. Martin		
June	1954	240
Jan.	17, 1962	260.7
Jan.	29, 1963	264.9
Jan.	25, 1964	263.6
Feb.	17, 1965	264.0
Jan.	31, 1966	262.0
Jan.	9, 1967	266.2

Table 10.--Chemical Analyses of Water from Wells and Springs in Floyd and Motley Counties

(Analyses given are in milligrams per liter except specific conductance, pH, SAR, RSC, temperature and percent sodium.)
Water-bearing units: Qal, alluvial channel, terrace and plain deposits; To, Ogallala Formation; Trd, Dockum Group; Po, Ochoa Series; Pa, Artesia Group.

WELL	SAMPLING DEPTH OR DEPTH OF WELL (FEET)	DATE OF COLLECTION	WATER-BEARING UNIT	SILICA (SiO_2)	IRON (Fe)	CALCIUM (Ca)	MAGNESIUM (Mg)	SODIUM AND POTASSIUM		BICARBONATE (HCO_3)	SULFATE (SO_4)	CHLORIDE (Cl)	FLUORIDE (F)	NITRATE (NO_3)	DISSOLVED SOLIDS	HARDNESS AS $CaCO_3$	PERCENT SODIUM	SODIUM ADSORPTION RATIO (SAR)	RESIDUAL SODIUM CARBONATE (RSC)	SPECIFIC CONDUCTANCE (MICROMHOS AT 25° C)	pH	TEMPERATURE °C
								Na	K													
JW-11-47-502	Spring	Oct. 13, 1938	To	--	--	--	--	--		287	32	16	--	< 20	305	--	--	--	--	--	--	--
a/ 503	Spring	Oct. 25, 1938	To	--	--	65	23	* 30		317	28	24	--	< 20	326	259	--	--	--	--	--	--
a/ 601	92	Nov. 23, 1968	Po	14	--	21	11	199	3.9	360	136	72	1.5	5.3	641	98	81	8.7	3.95	1,040	7.7	18
a/ 801	262	Dec. 29, 1937	Trd, To	--	--	42	33	* 35		305	39	17	--	< 20	316	240	--	--	--	--	--	--
a/ 801	262	Nov. 23, 1968	Trd, To	--	--	32	35	--		324	37	14	--	--	--	224	--	--	.83	599	8.0	18
a/ 803	Spring	Oct. 13, 1938	To	--	--	37	26	* 33		262	26	14	4.4	< 20	269	201	--	--	--	--	--	--
a/ 901	63	Nov. 20, 1968	Trd	--	--	47	30	--		400	54	22	--	--	--	241	--	--	1.74	767	7.8	18
902	Spring	Oct. 14, 1938	Trd	--	--	--	--	--		348	40	18	--	< 20	370	--	--	--	--	--	--	--
a/ 902	Spring	Nov. 21, 1968	Trd	50	--	50	43	57	7.7	444	35	16	6.4	.2	483	302	28	1.4	1.24	757	8.2	11
903	Spring	Oct. 13, 1938	To	--	--	--	--	--		342	48	20	3.8	< 20	387	--	--	--	--	--	--	--
48-401	67	Dec. 30, 1937	Po	--	--	28	46	* 593		488	561	400	--	--	1,868	259	--	--	--	--	--	--
404	50	do.	Po	--	--	--	--	--		409	107	73	--	< 20	601	--	--	--	--	--	--	--
a/ 501	26	Oct. 31, 1968	Qal, Po	23	--	99	51	289	6.2	342	302	345	4.8	.7	1,290	457	57	5.9	.00	2,270	7.5	19
a/ b/ TW-11-48-601	154	Oct. 28, 1963	Qal	--	--	50	32	72	--	246	54	99	--	--	559	255	--	--	--	--	--	--
b/ 602	96	do.	Qal	--	--	76	24	46	--	282	77	54	--	--	559	288	25.7	1.2	--	--	--	--
a/ b/ 608	89	May 19, 1960	Qal, Po	35	--	38	23	119	3.6	284	55	84	--	45	556	190	57	3.7	--	876	7.4	19
JW-11-48-701	105	Dec. 31, 1937	Po	--	--	79	44	* 236		372	439	90	--	< 20	1,071	377	--	--	--	--	--	--
a/ 703	47	do.	Po	--	--	25	48	* 230		451	139	142	--	36	862	260	--	--	--	--	--	--
705	17	Dec. 30, 1937	Qal	--	--	--	--	--		421	11	22	--	< 20	395	--	--	--	--	--	--	--
801	81	Dec. 31, 1937	Po	--	--	88	34	* 234		195	518	120	--	< 20	1,090	361	--	--	--	--	--	--
a/ 802	100	Nov. 20, 1968	Po	--	--	298	125	--		242	930	502	--	--	--	1,260	--	--	.00	3,450	7.2	18
806	108	Dec. 30, 1937	Po	--	--	162	120	* 303		146	928	340	--	< 20	1,929	899	--	--	--	--	--	--
a/ 904	82	Nov. 6, 1968	Po	--	--	258	120	--		196	700	405	--	--	--	1,140	--	--	.00	2,690	7.4	18
55-202	Spring	Nov. 4, 1938	To, Trd	--	--	--	--	--		318	24	22	--	.25	--	--	--	--	--	--	--	--
a/ 205	Spring	Dec. 10, 1968	Trd	49	--	43	38	34	6.9	348	36	16	3.4	.01	397	264	21	.9	.42	624	7.7	7
206	Spring	Dec. 28, 1937	Trd	--	--	48	41	* 19		336	36	15	--	< 20	324	291	--	--	--	--	--	--
a/ c/ 208	Spring	Nov. 4, 1938	To	--	--	59	34	* 30		360	25	16	--	--	344	286	--	--	--	--	--	--
a/ 301	141	Nov. 21, 1968	To, Trd	--	--	53	29	--		296	37	25	--	--	--	252	--	--	.00	608	8.0	18
303	Spring	Oct. 14, 1938	To	--	--	47	39	* 36		354	32	16	4.0	< 20	348	279	--	--	--	--	--	--
304	Spring	Nov. 3, 1938	To	--	--	53	33	* 36		344	32	16	2.9	.50	343	268	--	--	--	--	--	--
a/ 604	Spring	Nov. 1, 1938	To	--	--	42	34	* 46		330	36	20	2.9	.25	344	244	--	--	--	--	--	--
56-102	Spring	Dec. 30, 1937	Trd	--	--	37	27	* 67		317	57	20	--	< 20	364	202	--	--	--	--	--	--
a/ 104	114	Nov. 22, 1968	Trd	30	--	37	28	50	7.7	312	34	22	2.5	1.42	366	208	33	1.5	.96	596	7.7	18
a/ 105	Spring	July 16, 1938	Trd	--	--	30	19	* 40		189	35	29	2.2	< 20	248	152	--	--	--	--	--	--
105	Spring	Nov. 21, 1968	Trd	--	--	67	20	--		324	21	26	--	--	--	250	--	--	.32	597	7.6	14
201	69	Dec. 28, 1937	Po	--	--	--	--	--		317	68	44	--	26	459	--	--	--	--	--	--	--
a/ b/ 202	40-100	Apr. 23, 1964	Qal	--	--	96	68	294	4	342	466	266	--	--	1,607	519	54.9	5.6	--	2,593	7.6	--
a/ 210	101	Nov. 8, 1968	Qal	--	--	108	61	--		320	321	232	--	--	--	520	--	--	.0	1,960	7.4	18
a/ 214	Spring	July 16, 1938	Trd	--	--	38	21	* 38		244	31	20	2.4	< 20	270	183	--	--	--	--	--	--
a/ b/ TW-11-56-301	64	Apr. 9, 1962	Po	--	--	637	362	* 308		49	1,547	1,439	--	--	4,384	3,082	--	--	--	--	7.7	--
a/ JW-11-56-309	99	Nov. 7, 1968	Qal	38	--	58	34	155	1.6	310	152	106	3.7	36	756	284	54	4.0	.0	1,180	7.7	18
a/ 503	299+	Dec. 28, 1937	Trd	--	--	64	18	* 22		287	25	16	--	< 20	286	236	--	--	--	--	--	--
504	Spring	Aug. 18, 1938	Trd	--	--	47	22	* 49		311	31	21	--	< 20	323	209	--	--	--	--	--	--

See footnotes at end of table.

Table 10.--Chemical Analyses of Water From Wells and Springs in Motley and Floyd Counties--Continued

WELL	SAMPLING DEPTH OR DEPTH OF WELL (FEET)	DATE OF COLLECTION	WATER-BEARING UNIT	SILICA (SiO_2)	IRON (Fe)	CAL-CIUM (Ca)	MAGNE-SIUM (Mg)	SODIUM AND POTASSIUM Na	SODIUM AND POTASSIUM K	BICAR-BONATE (HCO_3)	SUL-FATE (SO_4)	CHLO-RIDE (Cl)	FLUO-RIDE (F)	NITRATE (NO_3)	DIS-SOLVED SOLIDS	HARD-NESS AS $CaCO_3$	PERCENT SODIUM	SODIUM ADSORP-TION RATIO (SAR)	RESIDUAL SODIUM CARBONATE (RSC)	SPECIFIC CONDUCTANCE (MICROMHOS AT 25° C)	pH	TEM-PERA-TURE °C
JW-11-56-505	Spring	Aug. 18, 1938	Trd	--	--	50	18	* 8		256	27	18	--	< 20	247	246	--	--	--	--	--	--
a/ 506	Spring	July 16, 1938	Trd	--	--	--	--	--		189	35	24	--	< 20	242	--	--	--	--	--	--	--
a/ TW-11-56-601	80-100	Nov. 25, 1968	Trd	--	--	40	19	--		352	54	62	--	--	--	178	--	--	2.21	811	8.0	19
a/ JW-11-56-701	300	Aug. 19, 1938	Trd	--	--	50	26	* 29		268	35	21	2.9	< 20	296	231	--	--	--	--	--	--
a/ 801	98	Dec. 11, 1968	Trd	--	--	40	8.4	--		194	10	14	--	--	--	134	--	--	.49	359	7.4	18
a/ 802	135-205	Dec. 16, 1968	To,Trd	39	--	44	24	34	6.0	276	28	20	2.4	3.0	336	208	26	1.0	.35	541	7.6	18
806	Spring	Aug. 19, 1938	To,Trd	--	--	42	19	* 46		256	35	21	2.5	< 20	292	182	--	--	--	--	--	--
a/ 807	Spring	do.	Trd	--	--	--	--	--		262	27	17	1.9	< 20	284	--	--	--	--	--	--	--
808	Spring	Sept. 6, 1938	To	--	--	--	--	--		256	18	16	--	< 20	260	--	--	--	--	--	--	--
a/ TW-11-56-902	30	Dec. 10, 1968	Po	21	--	111	79	1,710	12	304	349	2,640	1.8	4.5	5,080	602	86	30	.00	9,020	7.7	18
JW-11-64-201	20	Jan. 25, 1938	Trd	--	--	37	19	* 40		256	26	16	--	< 20	264	172	--	--	--	--	--	--
a/ 202	±45-65	Dec. 13, 1968	Trd	32	--	47	23	111	6.3	274	33	145	1.7	1.2	535	212	52	3.3	.25	937	7.6	19
203	Spring	Jan. 27, 1938	Trd	--	--	56	17	* 100		293	39	105	--	< 20	461	211	--	--	--	--	--	--
205	Spring	Aug. 26, 1938	To,Trd	--	--	48	18	* 296		256	69	390	--	2.0	949	191	--	--	--	--	--	--
c/ 207	Spring	do.	Trd	--	--	89	31	*1,873		293	327	2,720	1.9	--	5,186	349	--	--	--	--	--	--
a/ 207	Spring	Dec. 13, 1968	Trd	--	--	58	24	--		318	98	615	--	--	--	243	--	--	.35	2,610	7.9	7
c/ 209	108	Aug. 24, 1938	Trd	--	--	40	16	* 233		293	2	260	--	< 20	755	165	--	--	--	--	--	--
a/ 211	100	Dec. 14, 1968	Trd	--	--	46	20	--		252	19	17	--	--	--	197	--	--	.19	472	7.5	19
c/ 212	55	Aug. 24, 1938	Trd,Qal	--	--	--	--	--		195	20	14	--	< 20	210	--	--	--	--	--	--	--
213	Spring	do.	Trd	--	--	--	--	--		268	24	39	--	< 20	315	--	--	--	--	--	--	--
a/ TW-11-64-302	194	Dec. 12, 1968	Trd,Po	20	--	68	8.6	358	1.9	304	62	480	.6	9.3	1,160	205	79	11	.88	2,130	7.6	18
a/ 601	69	Sept. 24, 1968	Trd	--	--	48	14	--		280	31	133	--	--	--	178	--	--	1.04	910	7.6	18
a/ c/ 604	Spring	Aug. 29, 1938	To,Trd	--	--	54	19	* 50		256	17	63	1.3	< 20	330	212	--	--	--	--	--	--
a/ 901	200	Oct. 10, 1968	To,Trd	31	--	32	20	44	4.6	242	32	20	2.0	1.2	305	162	36	1.5	.72	502	7.4	18
a/ c/ 908	Spring	Aug. 30, 1938	Qal,To,Trd	--	--	55	23	* 110		281	32	146	1.8	< 20	506	234	--	--	--	--	--	--
c/ 908	Spring	do.	Qal,To,Trd	--	--	--	--	--		226	20	20	--	< 20	245	--	--	--	--	--	--	--
c/ 910	Spring	Aug. 29, 1938	To,Trd	--	--	47	16	* 29		238	14	27	--	< 20	250	185	--	--	--	--	--	--
b/ 12-41-402	80-137	Nov. 30, 1964	Qal	--	--	56	24	168	0	244	187	167	--	--	836	239	60.3	4.7	--	1,348	7.6	--
a/ 406	82-112	Oct. 25, 1968	Qal,Po	23	--	61	20	26	1.8	232	38	18	.9	52	355	234	19	.7	.00	542	7.8	18
b/ 411	18-152	Dec. 11, 1964	Qal	--	--	66	21	32	0	195	67	99	--	--	482	251	21.9	.9	--	778	7.5	--
a/ b/ 417	40-128	May 9, 1966	Qal	--	--	62	29	41	0	195	60	50	--	--	432	274	24.6	1.1	--	697	7.6	--
b/ 418	35-112	May 6, 1966	Qal	--	--	62	26	53	0	195	82	57	--	--	464	262	30.7	1.4	--	749	7.6	--
b/ 419	110-140	Nov. 30, 1964	Qal	--	--	50	27	168	0	268	187	167	--	--	836	236	50.8	4.8	--	1,348	7.6	--
b/ 504	116	Dec. 7, 1964	Qal	--	--	96	26	23	0	171	48	135	--	--	464	347	12.7	.5	--	749	7.4	--
a/ 506	65	Oct. 22, 1968	Qal	--	--	66	14	--		254	50	7.1	--	--	--	222	--	--	.00	550	7.5	18
b/ 508	200	Dec. 7, 1964	Qal	--	--	96	23	25	0	171	48	135	--	--	448	334	14.1	.6	--	722	7.5	--
a/ b/ 509	95-135	Dec. 11, 1964	Qal	--	--	62	24	39	0	171	57	99	--	--	418	254	25	1.1	--	674	7.5	--
b/ 602	70-153	May 28, 1968	Qal	--	--	104	28.1	36.8	3.9	244	148.8	39	--	--	482	375	17.4	.8	--	778	7.5	--
a/ 604	142-182	Oct. 23, 1968	Qal	30	--	96	31	30	1.7	242	146	18	.7	66	538	367	15	.7	.00	796	7.8	18
b/ 701	92	Apr. 29, 1963	Qal	--	--	78	28	55	0	305	38	71	--	--	355	310	27.9	1.4	--	868	7.1	--
b/ 702	54-69	Mar. 24, 1965	Qal	--	--	48	24	115	0	195	187	64	--	--	627	219	53.2	3.4	--	1,011	7.7	--
a/ b/ 703	20-49	June 11, 1964	Qal	--	--	50	28	67	4	288	29	67	--	--	545	240	37.2	1.9	--	879	7.8	--
a/ b/ 1/ 801	34-49	Feb. 23, 1967	Qal	--	--	176	100	105.8	3.5	244	604.8	63.9	--	--	896	851	21.2	1.6	--	1,444	6.9	--
806	6-18	Oct. 24, 1968	Qal	32	--	275	83	204	16	292	952	195	3.4	2.0	1,910	1,030	30	2.8	.00	2,730	7.3	18

See footnotes at end of table.

Table 10.--Chemical Analyses of Water From Wells and Springs in Motley and Floyd Counties--Continued

WELL	SAMPLING DEPTH OR DEPTH OF WELL (FEET)	DATE OF COLLECTION	WATER-BEARING UNIT	SILICA (SiO_2)	IRON (Fe)	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)	DISSOLVED SOLIDS	HARDNESS AS $CaCO_3$	PERCENT SODIUM	SODIUM ADSORPTION RATIO (SAR)	RESIDUAL SODIUM CARBONATE (RSC)	SPECIFIC CONDUCTANCE (MICROMHOS AT 25° C)	pH	TEMPERATURE °C
TW-12-41-901	15-30	July 24, 1968	Qal, Pa	--	--	310	90	--		191	1,190	38	--	--	--	1,140	--	--	0.00	2,270	7.4	18
a/ 902	149	July 23, 1968	Pa	7.9	--	460	695	437	10	207	4,330	202	--	3.4	6,250	4,010	19	3.0	.00	6,290	6.9	18
a/ 42-401	118	July 19, 1968	Pa	--	--	530	114	--		84	1,680	55	--	--	--	1,790	--	--	.00	2,780	7.3	18
a/ 501	165	do.	Pa	--	--	590	88	--		58	1,650	78	--	--	--	1,830	--	--	.00	2,730	7.0	19
a/ 604	30-180	July 23, 1968	Po, Pa	37	--	510	84	* 76		162	1,180	265	0.4	59	2,290	1,620	9	.8	.00	2,870	7.3	19
701	80-105	July 19, 1968	Qal	--	--	550	204	--		180	1,460	348	--	--	--	2,210	--	--	.00	3,740	7.5	18
a/ 802	151	do.	Pa	--	--	560	111	--		82	1,720	56	--	--	--	1,850	--	--	.00	2,800	7.3	18
a/ 901	217	July 17, 1968	Pa	--	--	585	71	--		42	1,670	29	--	--	--	1,750	--	--	.00	2,620	7.5	19
a/ 43-501	209	July 16, 1968	Pa	--	--	570	138	--		50	1,860	80	--	--	--	1,990	--	--	.00	2,990	7.2	19
a/ 601	54	July 15, 1968	Pa	13	--	645	171	* 604		92	2,130	940	.5	7.2	4,560	2,310	36	5.5	.00	5,810	7.3	18
a/ 701	168	July 16, 1968	Pa	--	--	620	89	--		32	1,760	80	--	--	--	1,910	--	--	.00	2,820	7.6	18
a/ 801	30	do.	Pa	17	--	620	157	*1,240		132	1,820	2,050	.5	--	5,970	2,190	55	12	.00	8,550	7.0	18
a/ b/ 902	32-52	May 17, 1962	Qal	--	--	760	16	* 26		190	1,584	153	--	--	2,729	1,964	--	--	--	3,220	7.2	--
b/ 902	32-52	Feb. 16, 1964	Qal	--	--	488	99	64	0	171	1,363	128	--	--	1,607	1,626	7.9	.7	--	2,593	7.5	--
a/ 44-401	215	July 11, 1968	Pa	--	--	620	122	--		74	1,780	132	--	--	--	2,050	--	--	.00	3,030	7.3	18
b/ 402	20-38	May 17, 1962	Qal	--	--	518	48	* 138		336	1,243	160	--	--	2,443	1,491	--	--	--	3,220	7.1	--
a/ 601	118	July 12, 1968	Pa	18	--	580	136	* 57		86	1,840	98	.6	5.7	2,780	2,010	6.0	.6	.00	3,030	7.3	19
a/ b/ 703	±215-315	May 12, 1967	Pa	--	--	550	151.3	48.3	3.9	91.5	1,881.6	42.6	--	--	1,650	1,996	5.0	.5	--	2,661	6.5	--
a/ 801	182	July 10, 1968	Pa	17	--	580	135	* 20		101	1,830	36	.3	7.5	2,680	2,000	2.0	.2	.00	2,890	7.4	18
b/ 49-101	113	Mar. 5, 1956	Qal	--	--	119	100	* 229		281	312	461	--	--	1,502	710	--	--	--	--	--	--
101	113	Sept. 11, 1968	Qal	--	--	170	112	--		237	390	438	--	--	--	884	--	--	.00	2,450	7.2	19
b/ 102	140	Apr. 14, 1965	Qal	--	--	154	67	159	4	268	432	213	--	--	1,393	660	34.3	2.7	--	2,247	7.0	--
a/ 1/ 104	141	Oct. 26, 1964	Qal	--	< 0.2	83	34	* 124		275	164	123	3.3	63	870	346	--	--	--	1,362	7.7	--
a/ 105	--	Sept. 11, 1968	Qal	--	--	116	51	--		296	106	292	--	3.6	--	500	--	--	.00	1,780	7.5	19
b/ 107	140	Apr. 14, 1965	Qal	--	--	70	38	122	4	195	240	106	--	--	738	331	44.2	2.9	--	1,190	7.3	--
a/ 1/ 108	88	Aug. 29, 1963	Po	--	.15	183	80	* 218		443	486	265	.4	76	1,750	790	--	--	--	2,970	7.1	--
a/ b/ 201	220	Feb. 21, 1963	Qal, Po	--	--	92	71	260	8	207	187	458	--	--	1,543	522	51.8	4.9	--	2,411	8.1	--
b/ 202	160	Jan. 14, 1963	Qal, Po	--	--	152	115	329	12	238	312	788	--	--	2,099	853	45.3	4.9	--	3,333	7.4	--
a/ b/ 204	175	Mar. 21, 1963	Qal, Po	--	--	632	182	644	12	171	2,093	934	--	--	4,629	2,327	37.4	5.8	--	7,233	7.8	--
b/ 205	170	Mar. 3, 1964	Qal, Po	--	--	56	21	55	0	287	19	53	--	--	512	226	34.8	1.6	--	825	7.7	--
b/ 206	177	Jan. 14, 1963	Qal, Po	--	--	112	76	575	4	342	966	302	--	--	2,520	592	67.7	10	--	4,000	7.5	--
b/ 206	177	Aug. 14, 1963	Qal, Po	--	--	112	62	580	12	342	312	923	--	--	2,508	535	69.6	10.9	--	4,044	7.1	--
206	177	Sept. 11, 1968	Qal, Po	--	--	132	112	--		364	328	1,240	--	--	--	790	--	--	.00	4,690	7.4	19
b/ 207	155	Apr. 9, 1964	Qal	--	--	110	96	196	4	238	235	501	--	--	1,425	670	38.9	3.3	--	2,298	7.2	--
b/ 208	128-188	Apr. 27, 1967	Qal, Po	--	--	270	54.9	130.5	7.8	305	336	656.7	--	--	4,180	900	74.6	17.8	--	6,741	7.4	--
a/ b/ 209	96	Feb. 22, 1960	Qal, Po	--	--	662	174	* 253		114	1,825	658	--	--	3,686	2,380	--	--	--	--	--	--
b/ 301	104	Apr. 20, 1955	Po	--	--	124	--	* 348		281	47	559	--	--	1,359	--	--	--	--	--	7.65	--
b/ 302	107	do.	Qal	--	--	192	--	* 342		284	184	568	--	--	1,570	--	--	--	--	--	7.4	--
b/ 303	93	Apr. 28, 1958	Qal	--	--	95	35	* 817		323	210	1,185	--	--	2,665	376	--	--	--	--	--	--
b/ 303	93	Feb. 2, 1968	Qal	--	--	198	23.2	713	3.9	274.5	201.6	351.4	--	--	2,508	590	72.3	12.8	--	4,044	7.4	--
b/ 304	100	Sept. 7, 1965	Qal	--	--	98	40	517	4	488	537	397	--	--	2,161	409	73	11.1	--	3,486	7.1	--
305	Spring	July 24, 1968	Qal	--	--	112	70	--		242	288	84	--	--	--	568	--	--	.00	1,280	7.5	18
a/ b/ 306	34	June 28, 1967	Qal	--	--	250	103.7	184	7.8	170.8	584	67.4	--	--	1,393	1,051	27.4	2.5	--	2,247	7.2	--
a/ 308	78	Sept. 12, 1968	Qal, Po	24	--	120	50	738	7.2	310	252	1,140	--	26	2,510	505	76	14	.00	4,310	6.9	18

See footnotes at end of table.

Table 10.--Chemical Analyses of Water From Wells and Springs in Motley and Floyd Counties--Continued

WELL	SAMPLING DEPTH OR DEPTH OF WELL (FEET)	DATE OF COLLECTION	WATER-BEARING UNIT	SILICA (SiO_2)	IRON (Fe)	CAL-CIUM (Ca)	MAGNE-SIUM (Mg)	SODIUM AND POTASSIUM		BICAR-BONATE (HCO_3)	SUL-FATE (SO_4)	CHLO-RIDE (Cl)	FLUO-RIDE (F)	NITRATE (NO_3)	DIS-SOLVED SOLIDS	HARD-NESS AS $CaCO_3$	PERCENT SODIUM	SODIUM ADSORP-TION RATIO (SAR)	RESIDUAL SODIUM CARBONATE (RSC)	SPECIFIC CONDUCTANCE (MICROMHOS AT 25° C)	pH	TEM-PERA-TURE °C
								Na	K													
b/ TW-12-49-401	110-150	Mar. 4, 1963	Qal	--	--	68	19	242	4	274	48	316	--	--	1,157	248	67.3	7	--	1,808	7.2	--
b/ 502	58-91	May 26, 1967	Qal	--	--	84	41.5	154.1	3.9	183	52.8	99.4	--	--	929	380	46.5	3.4	--	1,498	7	--
a/ 503	40-204	Sept. 12, 1968	Qal	23	--	50	18	203	3.2	252	69	232	1.2	48	771	199	69	6.3	0.15	1,310	7.3	19
a/ 504	100-138	May 28, 1968	Qal	--	--	132	103.7	124.2	3.9	160	1,580	273.4	--	--	1,091	756	26.2	2	--	1,759	7.4	--
a/ 504	100-138	Sept. 12, 1968	Qal	--	--	132	107	--		292	424	198	--	--	--	770	--	--	.00	1,780	7.3	19
a/ 601	154	Oct. 9, 1968	Po	--	--	540	91	--		305	268.8	45	--	--	--	1,720	--	--	.00	2,850	7.2	18
a/ 701	85-121	Sept. 13, 1968	Po	10	--	680	166	632	6.8	136	1,980	1,100	--	36	4,680	2,380	37	5.6	.00	6,130	6.5	19
b/ 703	80-120	Aug. 13, 1965	Pa, Po	--	--	660	301	1,511	48	349	3,628	1,193	--	--	7,376	2,887	52.7	12.2	--	11,896	7.1	--
a/ 802	31	Dec. 12, 1968	Po	22	--	72	16	--		280	11	5.2	--	23	--	246	--	--	.00	514	7.5	18
a/ b/ 901	210	Oct. 19, 1964	Pa	--	--	256	126	64	4	146	888	199	--	--	1,607	1,158	10.8	.8	--	2,593	7.9	--
b/ 902	150-230	do.	Pa	--	--	114	54	90	0	171	221	199	--	--	865	507	27.9	1.7	--	1,395	7.9	--
b/ 903	140-220	Aug. 30, 1965	Pa	--	--	74	40	60	0	146	216	71	--	--	597	349	27.8	1.4	--	963	7.5	--
a/ b/ 905	--	Nov. 10, 1965	Qal	--	--	142	67	51	0	305	302	124	--	--	929	630	13.9	.8	--	1,498	7.4	--
a/ 906	±110-128	Sept. 19, 1968	Po	22	--	97	47	56	3.7	276	230	57	.4	9.6	659	436	22	1.2	.00	1,000	7.6	19
b/ 50-101	125-185	Mar. 22, 1961	Qal	--	--	79	26	* 380		250	276	427	--	--	1,459	308	--	--	--	--	--	--
b/ 101	125-185	Jan. 17, 1964	Qal	--	--	130	26	117	4	189	283	121	--	--	836	432	37	2.5	--	1,348	8.5	--
b/ 102	127-186	July 3, 1960	Qal	--	--	82	28	* 348		223	262	440	--	--	1,383	320	--	--	--	--	--	--
a/ b/ 105	120-200	Mar. 16, 1965	Qal, Po	--	--	58	29	335	4	244	465	195	--	--	1,393	264	72.9	8.9	--	2,247	7.6	--
b/ 201	200	Apr. 11, 1955	Qal	--	--	144	58	* 208		244	361	337	--	--	1,352	599	--	--	--	--	--	--
a/ 202	110+	Sept. 26, 1968	Qal, Pa	34	--	460	65	83	2.3	158	1,220	132	.5	14	2,090	1,420	11	1.0	.00	2,460	7.1	19
b/ 203	258	Oct. 27, 1959	Qal	--	--	117	40	0		297	60	106	--	--	619	4,554	--	--	--	--	--	--
a/ 301	106	Sept. 27, 1968	Pa	--	--	500	39	--		158	1,310	19	--	--	--	1,410	--	--	.00	2,490	7.3	19
a/ 401	115	Sept. 26, 1968	Qal	--	--	112	30	--		274	319	360	--	--	--	403	--	--	.00	2,290	7.4	19
b/ 401	115	Apr. 5, 1965	Qal	--	--	124	40	198	4	220	480	195	--	--	1,279	474	47.2	3.9	--	2,063	7.1	--
a/ 403	52	Sept. 27, 1968	Pa	--	--	502	152	--		120	2,840	315	--	--	--	1,880	--	--	.00	5,590	7.3	18
a/ 601	20	Oct. 8, 1968	Pa	--	--	560	250	--		200	2,530	315	--	--	--	2,420	--	--	.00	4,810	7.1	18
a/ 701	42	Sept. 27, 1968	Po	--	--	602	180	--		298	2,020	276	--	--	--	2,240	--	--	.00	4,270	7.2	18
a/ 801	26	Mar. 7, 1965	Po, Pa	--	--	550	215	106	0	220	2,083	82	--	--	2,726	2,258	9.3	1.0	--	4,396	6.9	--
a/ 801	26	Oct. 8, 1968	Po, Pa	44	--	575	198	126	2.1	238	2,090	93	1.4	59	3,310	2,250	11	1.2	.00	3,780	7.3	18
a/ 901	203	do.	Pa	12	--	775	202	782	8.2	42	1,930	1,730	1.2	8.2	5,470	2,760	38	6.5	.00	8,150	6.5	19
a/ 51-101	78	Dec. 26, 1963	Pa	25	--	124	46	* 357		230	536	372	1.2	1.8	1,580	498	61	7.0	.00	2,450	7.7	--
a/ 202	48	July 9, 1968	Pa	16	--	780	236	* 1,590		140	2,290	2,750	.8	--	7,730	2,920	54	13	.00	12,600	7.5	19
a/ 303	160-174	June 28, 1968	Pa	16	--	580	125	* 79		58	1,840	116	.3	5.8	2,790	1,960	8	.8	.00	3,030	7.4	18
a/ 401	180-310	Apr. 13, 1961	Pa	13	--	560	321	* 1,050		48	3,000	1,310	--	.5	6,280	2,720	46	8.8	--	7,710	7.1	21
a/ 403	22	Dec. 26, 1963	Qal	25	--	242	101	* 523		256	848	750	1.8	1.2	2,620	1,020	53	7.1	.00	3,890	8.1	--
a/ 501	204	July 9, 1968	Pa	--	--	550	220	--		55	2,180	44	--	--	--	2,280	--	--	.00	3,280	7.2	19
a/ 602	177	July 10, 1968	Pa	--	--	540	332	--		218	2,520	89	--	--	--	2,710	--	--	.00	3,930	7.8	19
a/ 701	269	Oct. 9, 1968	Pa	--	--	560	177	--		186	2,190	80	--	--	--	2,120	--	--	.00	3,710	7.2	18
a/ 801	57	June 25, 1968	Pa	56	--	828	224	* 207		248	1,580	1,120	.2	12	4,150	2,990	13	1.6	--	5,530	7.4	19
a/ 901	293	June 28, 1968	Pa	7.8	--	1,100	212	*11,400		36	4,230	17,000	--	--	34,000	3,620	87	--	.00	54,600	7.2	18
a/ 52-101	222	June 27, 1968	Pa	--	--	--	--	--		24	1,900	24	--	--	--	1,920	--	--	.00	2,820	6.7	18
a/ 301	168	do.	Pa	17	--	550	145	* 88		80	1,990	14	.3	3.9	2,850	1,970	9	.9	.00	2,920	7.0	18
a/ 402	99	do.	Pa	20	--	620	154	* 147		44	2,230	98	.4	5.5	3,300	2,180	13	1.4	.00	3,540	8.0	19
a/ 501	70	do.	Pa	--	--	--	--	--		172	2,000	72	--	--	--	2,090	--	--	.00	3,230	7.4	19

See footnotes at end of table.

Table 10.--Chemical Analyses of Water From Wells and Springs in Motley and Floyd Counties--Continued

WELL	SAMPLING DEPTH OR DEPTH OF WELL (FEET)	DATE OF COLLECTION	WATER-BEARING UNIT	SILICA (SiO_2)	IRON (Fe)	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)	DISSOLVED SOLIDS	HARDNESS AS $CaCO_3$	PERCENT SODIUM	SODIUM ADSORPTION RATIO (SAR)	RESIDUAL SODIUM CARBONATE (RSC)	SPECIFIC CONDUCTANCE (MICROMHOS AT 25° C)	pH	TEMPERATURE °C
a/ TW-12-52-801	248	June 27, 1968	Pa	--	--	--	--	--		52	1,890	210	--	--	--	2,040	--	--	0.00	3,380	7.3	18
a/ b/ 802	29	Aug. 9, 1967	Qal	--	--	380	134.2	644	7.8	610	672	585.7	--	--	2,726	1,501	48.1	7.2	--	4,396	7.4	--
a/ 902	236	June 25, 1968	Pa	17	--	560	105	* 99		60	1,870	31	0.5	3.6	2,770	1,830	11	1.0	.00	2,850	7.3	19
a/ 57-103	20-41	Sept. 25, 1968	Po	27	--	82	23	588	2.2	632	170	550	--	115	1,870	299	81	15.0	4.38	3,110	7.7	19
a/ b/ 202	179	Oct. 19, 1964	Po	--	--	546	132	656	4	73	1,819	1,001	--	--	4,324	1,907	42.7	6.5	--	6,974	7.3	--
b/ 302	40	Nov. 16, 1964	Qal	--	--	72	24	115	0	244	154	99	--	--	738	278	47.2	3.0	--	1,190	7.7	--
a/ 303	113	Sept. 25, 1968	Po	--	--	122	68	--		312	122	205	--	--	--	384	--	--	.00	1,480	7.4	19
a/ 304	131	do.	Qal, Po	21	--	420	225	* 178		254	1,780	198	.4	22	2,970	1,970	16	1.7	.00	3,720	7.3	19
a/ 401	61	Sept. 24, 1968	Qal, Po	--	--	68	21	--		314	81	452	--	--	--	256	--	--	.03	2,050	7.5	18
a/ 501	49-55	do.	Qal	25	--	55	31	64	2.1	368	35	40	1.2	14	449	264	34	1.7	.74	739	7.9	19
b/ 502	36-47	Nov. 27, 1956	Qal, Po	--	--	56	41	* 44		427	22	21	--	--	611	307	--	--	--	--	--	--
a/ b/ 506	20	Nov. 16, 1964	Qal	--	--	60	29	140	0	293	96	135	--	--	697	269	53.0	3.7	--	1,124	7.6	--
b/ 507	20	do.	Qal	--	--	80	23	87	0	244	48	135	--	--	545	294	39.2	2.2	--	879	7.8	--
a/ 604	58	Sept. 24, 1968	Qal	--	--	31	12	--		358	50	14	--	--	--	127	--	--	3.33	734	7.8	19
a/ 701	178	Oct. 11, 1968	Po, Trd	--	--	44	18	--		274	117	920	--	--	--	184	--	--	.81	3,700	7.5	18
a/ 703	120	do.	To, Trd	--	--	59	7.2	--		206	12	48	--	--	--	177	--	--	.00	487	7.4	18
a/ 802	55	do.	Po	--	--	100	51	--		496	165	1,100	--	--	--	460	--	--	.00	4,700	7.3	18
b/ 58-202	54-74	Nov. 6, 1964	Qal, Po	--	--	110	48	575	4	195	235	934	--	--	2,161	472	72.5	11.5	--	3,486	7.6	--
b/ 202	54-74	Sept. 15, 1965	Qal, Po	--	--	88	40	518	4	366	605	387	--	--	2,089	384	74.2	11.5	--	3,370	7.2	--
a/ b/ 202	54-74	Sept. 18, 1967	Qal, Po	--	--	176	71.9	598	7.8	183	705.6	298.2	--	--	2,411	735	63.6	9.5	--	3,889	7.2	--
a/ 301	80-118	June 25, 1968	Qal, Pa	34	--	455	125	* 1,650		304	1,100	2,720	--	--	6,230	1,650	69	--	.00	11,200	7.6	16
a/ b/ 302	81	May 18, 1967	Pa	--	--	122	46.4	632.3	3.9	244	715.2	1,122.5	--	--	1,959	496	66.7	8.9	--	3,160	7.2	--
a/ b/ 401	318-333	Aug. 15, 1966	Pa	--	--	584	154	160	8	183	2,880	266	--	--	2,505	2,092	32.3	4.4	--	4,044	7.3	--
501	67	Nov. 8, 1939	Po	--	--	--	--	--		--	1,600	59	--	21	--	--	--	--	--	--	--	18
a/ 502	230-262	June 7, 1968	Pa, Po	--	--	565	107	--		43	2,600	1,360	--	--	--	1,850	--	--	.00	7,950	7.0	--
a/ 602	48	June 13, 1968	Po, Qal	25	--	211	47	93	1.9	207	552	113	.5	19	1,160	720	22	1.5	.00	1,670	7.3	18
701	127-176	Nov. 8, 1939	Po, Pa	--	--	527	173	* 1,072		76	3,021	815	.3	1	--	2,027	53	--	--	--	--	20
1/ 803	125	May 26, 1942	Po, Qal	35	0.32	113	32	* 144		354	136	185	< .4	44	912	414	--	--	--	--	7.3	--
803	125	Mar. 7, 1945	Po, Qal	25	.05	127	35	142	7.8	354	139	204	.5	70	925	461	--	--	--	--	7.0	--
1/ 803	125	June 29, 1953	Po, Qal	36	.34	110	29	* 135		348	116	167	.5	55	863	394	--	--	--	--	7.5	--
1/ 1/ 803	125	Aug. 13, 1956	Po, Qal	--	.02	103	28	* 164		378	139	174	.6	33	792	375	--	--	--	--	7.3	--
1/ 1/ 803	125	Jan. 22, 1958	Po, Qal	--	.12	108	36	176	--	383	155	221	.5	35	1,176	445	--	--	--	1,960	6.9	--
1/ 1/ 803	125	Sept. 28, 1959	Po, Qal	--	2.0	166	30	188	--	465	200	225	.2	35	1,320	538	--	--	--	2,200	7.0	--
k/ 803	125	July 3, 1961	Po, Qal	--	.04	95	30	* 154		381	114	156	.4	48	882	363	--	--	--	1,470	7.2	--
1/ 803	125	June 2, 1962	Po, Qal	--	.06	113	34	* 169		381	160	196	.3	49	1,176	425	--	--	--	1,960	7.1	--
1/ 803	125	Apr. 13, 1964	Po, Qal	--	< .02	99	30	* 151		395	129	160	.8	39	1,000	373	--	--	--	1,592	7.4	--
1/ 803	125	Oct. 27, 1965	Po, Qal	--	.35	114	24	* 155		394	141	147	.8	53	1,030	384	--	--	--	1,584	7.3	--
1/ 803	125	Feb. 15, 1968	Qal, Po	--	.04	155	42	* 285		399	281	348	.7	59	1,570	560	--	--	--	2,720	7.3	--
1/ 804	293	May 28, 1942	Qal, Po	44	.64	82	26	* 151		415	111	131	.6	14.6	787	312	--	--	--	--	7.4	--
804	293	Mar. 7, 1945	Qal, Po	23	.05	69	20	145	5.3	392	92	102	.9	16	685	254	--	--	--	1,100	7.2	18
1/ 804	293	Sept. 28, 1959	Qal, Po	--	.3	92	28	159	--	376	138	148	.6	37	960	345	--	--	--	1,600	7.3	--
1/ 804	293	Apr. 13, 1964	Qal, Po	--	.1	99	23	* 141		384	112	137	1.1	35	930	341	--	--	--	1,434	8.3	--
1/ 804	293	Oct. 27, 1965	Qal, Po	--	1.04	102	28	* 144		386	136	128	.8	51	980	368	--	--	--	1,480	7.4	--
a/ 1/ 804	293	Feb. 15, 1968	Qal, Po	--	3.90	151	44	* 276		397	274	348	.7	63	1,550	560	--	--	--	2,672	7.5	--

See footnotes at end of table.

Table 10.--Chemical Analyses of Water From Wells and Springs in Motley and Floyd Counties--Continued

WELL	SAMPLING DEPTH OR DEPTH OF WELL (FEET)	DATE OF COLLECTION	WATER-BEARING UNIT	SILICA (SiO_2)	IRON (Fe)	CAL-CIUM (Ca)	MAGNE-SIUM (Mg)	SODIUM AND POTASSIUM		BICAR-BONATE (HCO_3)	SUL-FATE (SO_4)	CHLO-RIDE (Cl)	FLUO-RIDE (F)	NITRATE (NO_3)	DIS-SOLVED SOLIDS	HARD-NESS AS $CaCO_3$	PERCENT SODIUM	SODIUM ADSORP-TION RATIO (SAR)	RESIDUAL SODIUM CARBONATE (RSC)	SPECIFIC CONDUCTANCE (MICROMHOS AT 25° C)	pH	TEM-PERA-TURE °C
								Na	K													
TW-12-58-805	57-147	Mar. 7, 1945	Qal,Po	25	0.05	127	35	142	7.8	354	139	204	0.5	70	1,010	461	--	--	--	1,550	7.0	--
1/ 805	57-147	Sept. 8, 1945	Qal,Po	26	.13	74	22	* 139		372	90	114	.8	22	656	275	--	--	--	--	7.2	--
1/ 805	57-147	May 6, 1946	Qal,Po	46	--	140	37	165	--	360	154	217	1.0	124	1,123	502	--	--	--	--	7.3	--
805	57-147	Sept. 16, 1947	Qal,Po	20	.06	97	25	126	10	370	110	138	.8	21	749	343	--	--	--	1,220	7.8	23
1/ 805	57-147	Sept. 28, 1959	Qal,Po	--	.46	85	25	156	--	382	118	140	.6	27	930	318	--	--	--	1,350	7.3	--
1/ 805	57-147	Apr. 13, 1964	Qal,Po	--	.22	102	24	* 148		384	116	148	.9	39	960	353	--	--	--	1,482	7.4	--
1/ 805	57-147	Oct. 27, 1965	Qal,Po	--	< .02	101	27	* 149		389	131	129	.9	53	980	361	--	--	--	1,446	7.3	--
1/ 806	90-125	Feb. 15, 1968	Qal,Po	--	.02	89	25	* 164		400	119	153	.8	25	980	326	--	--	--	1,503	7.9	--
1/ 807	131	Sept. 28, 1959	Qal,Po	--	1.7	102	30	132	--	353	100	156	.4	47	960	378	--	--	--	1,600	7.2	--
1/ 807	131	Apr. 13, 1964	Qal,Po	--	.06	99	26	148	--	384	117	147	.9	39	960	355	--	--	--	1,482	7.5	--
1/ a/ 807	131	Oct. 27, 1965	Qal,Po	--	< .02	95	27	* 148		388	134	133	.8	54	980	349	--	--	--	1,446	8.0	--
1/ 807	131	Feb. 15, 1968	Qal,Po	--	.16	150	41	* 245		393	257	312	.8	66	1,460	540	--	--	--	2,480	7.4	--
a/ 904	25-35	June 24, 1968	Pa	--	--	--	--	--		204	1,470	650	--	--	--	2,360	--	--	0.00	4,140	7.5	18
b/ 905	Spring (inundated)	May 10, 1965	Trd,Po	--	--	428	161	474	8	183	2,016	390	--	--	3,687	1,731	37.2	4.9	--	5,948	7.4	--
59-101	±160-208	June 12, 1968	Pa	10	--	960	242	330	8.8	28	1,680	1,680	--	5.0	4,930	3,390	17	2.5	.00	6,880	6.3	19
203	248	do.	Pa	--	--	575	132	--		30	1,920	94	--	--	--	1,980	--	--	.00	3,140	7.1	19
302	192	June 25 1968	Pa	--	--	--	--	--		38	2,250	27	--	--	--	2,180	--	--	.00	3,370	7.1	19
401	300	June 12, 1968	Pa	--	--	600	82	--		30	1,750	130	--	--	--	1,830	--	--	.00	3,000	6.8	19
602	13	June 19, 1968	Pa	27	--	520	184	* 567		272	2,260	500	.6	7.7	4,200	2,050	38	5.4	.00	4,530	7.8	18
702	92	June 13, 1968	Pa	--	--	525	420	--		57	3,000	235	--	--	--	3,040	--	--	.00	4,810	7.2	19
802	41	do.	Pa	43	--	408	72	* 30		340	1,020	11	.4	28	1,780	1,310	5	.4	.00	2,050	7.6	17
901	131	June 14, 1968	Pa	--	--	--	--	--		72	2,420	172	--	--	--	2,590	--	--	.00	4,000	7.6	18
60-102	170	June 26, 1968	Pa	9.6	--	670	165	* 980		32	2,260	1,490	--	2.8	5,590	2,350	48	8.8	.00	7,560	7.1	18
201	79	June 19, 1968	Pa	--	--	--	--	--		150	1,700	408	--	--	--	1,950	--	--	.00	4,520	7.8	18
301	301	June 20, 1968	Pa	20	--	560	114	* 37		80	1,750	37	.7	6.5	2,560	1,870	4	.4	.00	2,740	7.7	19
401	250	June 25, 1968	Pa	--	--	--	--	--		43	1,780	83	--	--	--	1,900	--	--	.00	2,870	7.2	18
503	282	June 21, 1968	Pa	15	--	565	117	* 270		36	2,010	250	.2	3.7	3,250	1,890	24	2.7	.00	3,720	7.2	19
701	173	June 25, 1968	Pa	10	--	660	302	* 2,210		49	3,260	3,020	--	--	9,490	2,890	62	--	.00	14,600	7.2	19
801	327	June 21, 1968	Pa	12	--	702	197	* 2,210		40	2,880	3,080	--	--	9,100	2,560	65	--	.00	14,400	7.2	19
22-01-103	350	May 19, 1960	Trd,To	31	--	212	80	* 216		210	54	775	.9	6.3	1,980	858	35	3.2	--	2,770	6.8	19
204	283-298	Oct. 11, 1968	Trd,Po	14	--	44	17	222	5.2	350	83	214	1.7	1.5	774	180	72	7.2	2.14	1,370	7.7	19
205	111	Dec. 20, 1968	Trd	--	--	63	7.3	--		262	20	15	--	2.8	--	187	--	--	.55	486	7.7	18
302	290-303	do.	Trd	17	--	18	8.4	142	1.9	304	64	56	.7	1.2	458	80	79	6.9	3.39	748	8.2	18
c/ 303	Spring	Sept. 17, 1938	Trd	--	--	--	--	--		250	44	74	--	< 20	383	--	--	--	--	--	--	--
c/ 303	Spring	Mar. 16, 1956	Trd	26	--	18	11	* 109		184	51	86	--	.4	391	90	72	5.0	--	654	8.2	--
401	103	Aug. 30, 1938	Trd	--	--	44	17	13	--	220	15	10	--	< 20	207	181	--	--	--	--	--	--
401	103	Oct. 31, 1939	Po	--	--	20	15	284	--	427	100	190	1.6	1.5	--	109	--	--	--	--	--	--
401	103	Dec. 17, 1968	Trd	--	--	26	16	--		208	16	20	--	--	298	131	--	--	.80	414	7.7	18
402	72	Oct. 25, 1939	Trd	--	--	48	26	40	--	305	24	20	2.6	2.8	313	226	--	--	--	--	--	19
501	36	Nov. 1, 1939	Trd	--	--	--	--	* 36		270	28	30	--	4.3	318	219	--	--	--	--	--	18
502	Spring	Sept. 17, 1938	Qal,To,Trd	--	--	--	--	--		262	28	21	--	< 20	288	--	--	--	--	--	--	--
502	Spring	Dec. 18, 1968	Qal,To,Trd	29	--	66	23	45	4.7	362	26	27	.9	.0	400	259	27	1.2	.75	656	8.0	01
c/ 503	Spring	Sept. 9, 1938	To,Trd	--	--	28	20	35	1.4	214	21	19	1.9	< 20	230	152	--	--	--	--	--	--

See footnotes at end of table.

Table 10.--Chemical Analyses of Water From Wells and Springs in Motley and Floyd Counties--Continued

WELL	SAMPLING DEPTH OR DEPTH OF WELL (FEET)	DATE OF COLLECTION	WATER-BEARING UNIT	SILICA (SiO_2)	IRON (Fe)	CAL-CIUM (Ca)	MAGNE-SIUM (Mg)	SODIUM AND POTASSIUM Na	SODIUM AND POTASSIUM K	BICAR-BONATE (HCO_3)	SUL-FATE (SO_4)	CHLO-RIDE (Cl)	FLUO-RIDE (F)	NITRATE (NO_3)	DIS-SOLVED SOLIDS	HARD-NESS AS $CaCO_3$	PERCENT SODIUM	SODIUM ADSORP-TION RATIO (SAR)	RESIDUAL SODIUM CARBONATE (RSC)	SPECIFIC CONDUCTANCE (MICROMHOS AT 25° C)	pH	TEM-PERA-TURE °C
c/ TW-22-01-504	Spring	Sept. 9, 1938	Trd	--	--	--	--	--		268	21	24	--	< 20	287	--	--	--	--	--	--	--
601	130	Oct. 23, 1939	Po, Trd	--	--	30	16	175	--	366	94	82	1.6	4.0	583	140	--	--	--	--	--	--
601	130	Jan. 29, 1969	Po, Trd	--	--	52	25	--		392	140	142	--	--	--	232	--	--	1.77	1,340	7.9	19
701	180	Dec. 19, 1968	Trd	32	--	48	14	23	3.0	232	18	16	.8	1.6	270	177	22	0.8	.26	445	8.1	18
801	106	Oct. 28, 1939	Trd	--	--	46	16	25	--	244	10	14	1.1	1.8	236	180	--	--	--	--	--	--
801	87-106	Dec. 19, 1968	Trd	--	--	48	13	--		232	12	5.6	--	--	--	173	--	--	.34	400	7.6	18
902	60	Nov. 7, 1939	Trd, Qal	--	--	--	--	--		--	34	18	--	84	--	--	--	--	--	--	--	--
b/ 902	68	Nov. 30, 1964	Trd, Qal	--	--	64	24	41	4	171	48	99	--	--	448	258	25.4	1.1	--	722	7.4	--
b/ 903	78	do.	Trd, Qal	--	--	64	15	74	4	220	48	135	--	--	545	222	41.6	2.2	--	879	7.5	--
b/ 910	60-75	Oct. 14, 1968	Trd	--	--	150	35.4	220.8	7.8	427	57.6	248.5	--	--	1,049	520	47.5	4.2	--	1,685	6.8	--
910	60-75	Jan. 28, 1969	Trd	40	--	161	19	193	6.7	322	260	221	.4	83	1,140	480	46	3.8	.00	1,750	7.2	18
b/ 911	50-75	Oct. 14, 1969	Trd	--	--	240	28.1	66.7	3.9	256.2	48	234.3	--	--	965	715	16.8	1.1	--	1,555	7.3	--
912	43	Oct. 26, 1939	Trd	--	--	116	10	20	--	311	16	20	.1	93	428	331	--	--	--	--	--	18
b/ 912	60-75	Oct. 14, 1968	Trd	--	--	130	19.5	227.7	3.9	427	48	213	--	--	965	405	54.7	4.9	--	1,555	7.3	--
02-102	Spring	Nov. 8, 1939	Trd	--	--	--	--	--		--	61	90	--	--	--	--	--	--	--	--	--	--
201	37-47	Feb. 12, 1969	Trd	--	--	76	18	--		384	46	27	--	--	--	264	--	--	1.02	840	7.8	19
301	83	Feb. 11, 1969	Po	21	--	760	374	520	3.6	174	2,290	1,400	--	130	5,580	3,430	25	3.9	.00	7,220	7.1	18
401	260-275	Jan. 29, 1969	Po	7.9	--	395	85	--		136	3,080	435	--	--	--	1,340	--	--	.00	6,400	--	19
b/ 704	56	May 15, 1967	Qal	--	--	98	97.6	324.3	7.8	305	249.6	106.5	--	--	1,567	646	51.8	5.5	--	2,528	7.3	--
705	18-22	Oct. 28, 1939	Qal	--	--	40	23	* 73		298	45	39	2.0	.9	--	194	--	--	--	--	--	--
705	18-22	Sept. 16, 1947	Qal	14	0.02	49	43	51	7.2	312	68	60	2.4	1.2	470	300	--	--	--	783	7.6	21
705	18-22	Dec. 16, 1947	Qal	18	.04	80	31	41	5.3	322	67	60	2.0	.8	474	327	23	--	--	799	7.5	--
1/ 705	18-22	June 23 1964	Qal	21	.06	48	24	* 95		329	82	50	1.8	4.4	455	219	--	--	--	--	--	--
1/ 705	18-22	May 3, 1955	Qal	22	1	25	33	* 85		287	65	57	2.4	2.2	445	198	--	--	--	--	7.9	--
1/ 705	18-22	Aug. 15, 1956	Qal	--	.08	24	23	* 56		250	2	46	2.0	1.6	349	175	--	--	--	--	7.5	--
1/ 705	18-22	July 28, 1958	Qal	--	.04	48	25	* 73		282	65	54	1.8	1.8	432	226	--	--	--	720	7.6	--
1/ 705	18-22	Apr. 9, 1962	Qal	--	.05	56	26	* 79		295	73	61	1.6	< .4	489	250	--	--	--	815	7.8	--
706	90	Jan. 23, 1969	Qal	--	--	43	25	--		436	102	86	--	28	--	210	--	--	2.94	1,140	7.5	19
1/ 712	20-60	Dec. 4, 1963	Qal, Po	--	.04	119	33	* 195		440	219	178	.9	31	1,220	435	--	--	--	1,925	7.4	--
1/ 712	20-60	July 8, 1964	Qal, Po	--	.05	116	31	* 187		426	180	169	.9	42	1,150	420	--	--	--	1,881	7.4	--
1/ 712	20-60	Mar. 22, 1965	Qal, Po	--	< .02	110	30	* 171		420	161	155	.7	56	1,100	400	--	--	--	1,688	7.4	--
712	20-60	Jan. 30, 1969	Qal, Po	35	--	76	28	138	5	346	131	116	1.1	26	726	304	49	3.4	.00	1,170	7.8	16
b/ 801	81-140	Feb. 24, 1958	Qal	--	--	127	120	* 227		329	521	349	--	--	4,420	1,096	--	--	--	--	--	--
b/ 801	81-140	July 3, 1959	Qal	--	--	202	29	* 306		305	508	362	--	--	1,712	625	--	--	--	--	--	--
b/ 801	81-140	Aug. 5, 1968	Qal	--	--	184	87.8	276	7.8	195.2	153.6	585.8	--	--	1,694	821	41.9	4.2	--	2,733	7.5	--
b/ 802	35-49	Nov. 12, 1964	Qal	--	--	118	51	108	0	244	269	149	--	--	896	504	31.8	2.1	--	1,444	7.3	--
804	55-70	Feb. 6, 1969	Qal, Po	--	--	119	27	--		364	192	153	--	--	--	408	--	--	.00	1,360	7.4	18
b/ 806	100-139	May 12, 1960	Qal	--	--	138	20	* 114		305	221	142	--	--	940	427	36.8	2.4	--	1,130	--	--
b/ 903	139-191	Mar. 21, 1955	Qal	--	--	348	33	* 56		366	380	305	--	--	1,488	101	--	--	--	--	--	--
904	45-59	Feb. 6, 1969	Qal	--	--	66	13	--		360	134	100	--	--	--	218	--	--	1.54	1,210	7.6	19
03-201	32-62	Feb. 25, 1969	Po	--	--	585	87	--		274	1,520	62	--	--	--	1,820	--	--	.00	2,720	7.3	18
b/ 301	50	Apr. 2, 1964	Po	--	--	536	239	345	0	171	1,829	685	--	--	2,985	2,321	24.4	3.1	--	4,815	7.7	--
401	300+	Feb. 12, 1969	Po	16	--	600	220	* 387		106	2,360	492	1.0	3.1	4,130	2,400	26	3.4	.00	4,650	7.2	19
701	196	May 20, 1960	Qal	32	--	146	26	33	3.6	288	64	150	--	40	637	472	13	.7	--	976	7.0	19

See footnotes at end of table.

Table 10.--Chemical Analyses of Water From Wells and Springs in Motley and Floyd Counties--Continued

WELL	SAMPLING DEPTH OR DEPTH OF WELL (FEET)	DATE OF COLLECTION	WATER-BEARING UNIT	SILICA (SiO_2)	IRON (Fe)	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)	DISSOLVED SOLIDS	HARDNESS AS $CaCO_3$	PERCENT SODIUM	SODIUM ADSORPTION RATIO (SAR)	RESIDUAL SODIUM CARBONATE (RSC)	SPECIFIC CONDUCTANCE (MICROMHOS AT 25° C)	pH	TEMPERATURE °C
TW-22-03-902	191	Feb. 27, 1969	Pa	36	--	585	192	* 351		223	2,310	295	0.8	4.8	3,890	2,250	25	3.2	0.00	4,270	7.4	19
04-101	96	Mar. 26, 1969	Pa	--	--	600	112	--		174	1,780	31	--	--	--	1,960	--	--	.00	2,770	7.3	18
301	76	do.	Pa	9.5	--	636	344	* 612		200	2,510	1,090	.7	22	5,320	3,000	31	4.9	.00	6,670	7.6	18
702	171	Feb. 28, 1969	Pa	--	--	552	187	--		36	2,370	75	--	--	--	2,150	--	--	.00	3,430	7.1	18
901	15	Mar. 26, 1969	Qal	--	--	378	138	--		130	1,600	180	--	--	--	1,510	--	--	.00	3,110	7.4	18
a/ 09-102	Spring	Sept. 13, 1938	Qal	--	--	--	--	--		305	26	25	--	< 20	326	--	--	--	--	--	--	--
a/ 102	Spring	Jan. 22, 1969	Qal	--	--	32	30	--		348	39	59	--	< .1	--	253	--	--	.64	768	8.1	14
103	Spring	Sept. 13, 1938	Qal,To,Trd	--	--	59	22	66	--	354	28	44	--	< 20	--	239	--	--	--	--	--	--
a/ 104	Spring	do.	To,Trd	--	--	--	--	--		317	32	46	--	< 20	377	--	--	--	--	--	--	--
201	43	Jan. 22, 1969	Po	30	--	60	31	148	5.9	368	104	141	1.3	1.0	703	277	53	3.9	.49	1,170	7.6	18
a/ 203	Spring	Oct. 12, 1938	To,Trd	--	--	38	12	* 67		287	24	20	.8	.5	302	142	--	--	--	--	--	--
b/ 301	90-130	Dec. 15, 1964	Trd	--	--	72	31	62	8	244	82	121	--	--	557	307	30	1.5	--	899	7.6	--
b/ 304	141	do.	Trd	--	--	78	24	60	4	146	173	110	--	--	345	294	30.6	1.5	--	879	8.0	--
a/ 10-104	Spring	Sept. 12, 1938	Trd	--	--	84	25	* 57		329	48	69	1.3	20	465	310	--	--	--	--	--	--
104	Spring	May 16, 1952	Trd	68	--	--	--	* 83		138	78	97	--	23	498	170	51	2.8	--	749	8.1	--
104	Spring	June 10, 1953	Trd	44	--	77	31	* 73		294	77	95	--	28	570	320	33	1.8	--	960	7.9	--
104	Spring	Jan. 20, 1954	Trd	43	--	--	--	--		--	76	95	--	9.2	--	--	--	--	--	948	--	--
104	Spring	Jan. 18, 1955	Trd	49	--	--	31	--		--	77	96	--	26	--	--	--	--	--	966	--	--
104	Spring	Jan. 19, 1956	Trd	38	--	78	29	* 75		303	76	92	--	25	580	314	34	1.8	--	956	8.2	--
104	Spring	Jan. 28, 1958	Trd	64	--	--	28	79	8	--	74	85	--	28	--	--	--	--	--	869	--	--
104	Spring	Apr. 16, 1958	Trd	--	--	--	--	--		180	--	73	--	--	--	205	--	--	--	919	8.2	--
104	Spring	Mar. 20, 1959	Trd	--	--	82	27	* 66		318	75	85	--	--	--	316	31	1.6	--	956	7.7	--
104	Spring	June 18, 1959	--	--	--	--	--	79	8.2	--	76	84	--	--	--	--	--	--	--	853	--	--
104	Spring	May 20, 1960	Trd	34	--	79	30	* 74		315	77	83	1.4	29	577	320	34	1.8	--	933	7.1	18
104	Spring	Aug. 9, 1962	Trd	34	--	81	28	* 75		317	75	79	1.3	32	561	317	34	1.8	--	900	7.4	--
301	14-19 and 45-60	Feb. 4, 1969	Qal,Po	38	--	605	187	* 217		162	2,020	338	.5	44	3,530	2,280	17	2.0	.00	3,960	7.5	19
11-201	95	Feb. 26, 1969	Qal	--	--	492	130	--		210	1,790	108	--	--	--	1,760	--	--	.00	3,140	7.4	19
301	320	Feb. 27, 1969	Po	--	--	602	124	--		91	1,530	318	--	--	--	2,010	--	--	.00	3,280	7.1	19
12-202	105	Mar. 26, 1969	Po	72	--	190	109	* 46		262	218	362	.4	86	1,210	922	10	.7	.00	2,030	7.4	18
23-08-302	294	Oct. 31, 1939	Trd	--	--	--	--	* 39		223	30	21	1.2	2.0	287	183	--	--	--	--	--	19
601	178	do.	Trd	--	--	40	26	* 46		299	32	14	2.5	3.4	311	206	--	--	--	--	--	--
601	178	Dec. 17, 1968	Trd	29	--	45	22	35	6	292	24	14	2.0	6.0	328	207	26	1.1	.65	538	7.6	18
602	81	Oct. 31, 1939	Trd	--	--	48	16	17	--	244	9	6	.4	5	221	185	--	--	--	--	--	18
(old well) 604	410	Nov. 1, 1939	Trd,To	--	--	39	33	53	--	333	41	17	--	2.9	354	233	--	--	--	--	--	19
(new well) 604	300	do.	Trd,To	--	--	34	33	43	--	311	22	18	2.9	3.5	309	220	--	--	--	--	--	18
901	228-243	Dec. 19, 1968	Trd,To	--	--	46	25	--		274	29	23	--	--	--	218	--	--	.13	550	7.7	18
16-301	293	Jan. 21, 1969	Trd,To	39	--	48	31	35	7.7	316	35	21	.8	4.6	377	248	23	1.0	.23	614	7.5	18

a/ Indicates analysis given on Figure 6 (chemical quality of ground-water map).
b/ Analysis made by Texas Agricultural Extension Service, Texas A&M University, College Station, Texas.
c/ Analysis made by Bureau of Industrial Chemistry, University of Texas, Austin, Texas.
d/ Sample taken 3/4 mile downstream from USGS partial-record streamflow gaging station PR-7-3075.
e/ Analysis of composites of daily samples during November and December 1945 with individual samples on one day each month from January to November 1946, collected at road crossing about 4 miles below gaging station about 3/4 mile upstream from W. F. Saul's ranch house and about 1 mile downstream from Wilson Creek.
f/ Includes equivalent of 7 milligrams per liter carbonate (CO_3).
g/ Includes equivalent of 15 milligrams per liter carbonate (CO_3).
h/ Analysis made by Midwestern University, Wichita Falls, Texas.
i/ Analysis made by Texas State Department of Health Laboratories, Austin, Texas.
j/ Composite sample of wells TW-12-58-803, 804, 805, 807.
k/ Composite sample of wells TW-12-58-803, 805.
l/ Composite sample of wells TW-12-41-801, 802, 803, 804.
m/ Contains 0.02 boron.
* Sodium and potassium calculated as sodium (Na).