WATER RESOURCES OF GREGG COUNTY, TEXAS

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Section on surface-water runoff by Seth D. Breeding

Prepared in cooperation with the United States Department of the Interior, Geological Survey

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Figure 1 - Geologic map of eight counties in northeast Texas.
2 - Map of Gregg County, Texas, showing water wells listed in this report.

FOREWORD

This report is concerned with the water resources of Gregg County, Texas, particularly the ground-water resources. It is based on an investigation made between August 1941 and January 1942 by the Texas State Board of Water Engineers in cooperation with the Geological Survey, United States Department of the Interior. It includes a section on surface water available in the county from the Sabine River and its tributaries, consisting essentially of analyses of run-off based on measurements of the river discharge made in co-operation with the Geological Survey at gaging stations near Longview and Gladewater.

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INTRODUCTION

Location and extent of area

Gregg County is in the timber and oil belt of northeast Texas. It is bounded on the north by Upshur County, on the east by Harrison County, on the south by Rusk County, and on the west by Smith County. The land surface is gently rolling to somewhat hilly and in general rises from east to west. The minimum elevation is about 250 feet above sea level; maximum about 550 feet. The county has an area of 312 square miles, and according to the 1940 census, had a population of 58,027, an average of 186 persons per square mile. The principal cities and their populations in 1940 are: Longview (county seat), 13,758; Kilgore, 6,708; Gladewater, 4,454; and Greggton, 2,000.

Economic development

The economic development of Gregg County is diversified. The county is in the heart of the East Texas oil field and in 1940 produced 77,156,000 barrels of oil from approximately 14,000 wells. The timber, consisting of loblolly, short-leaf yellow pine, and hardwood, supports a thriving lumber industry. Farming is practiced throughout the county, the principal farm crops being cotton, corn, grain-sorghums, peanuts, and sweet and irish potatoes. Beef cattle and hogs comprise the principal livestock raised for market.

Precipitation

According to records of the United States Weather Bureau the average annual precipitation at Longview during 53 years was 42.87 inches. In general the precipitation is highest in the winter and spring and lowest in the summer. Among the wettest years were 1890 with 60.92 inches; 1905 with 63.30 inches; 1919 with 56.13 inches; 1941 with 55.34 inches; and 1944 with 71.08 inches. The driest years include 1909 and 1910 with an average of 32.11 inches; 1917 with 29.28 inches; 1923, 1924, and 1925 with an average of 33.74 inches; and 1936 with 29.53 inches. The table on the following pages gives the U. S. Weather Bureau records of precipitation at Longview by months.

Precipitation in inches, 1889 to 1944 at Longview, Texas

Year	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Annual
1889	6.55	3.95	2.65	6.70	3.32	12.31	2.66	0.62	4.71	0.60	9.55	0.00	53.62
1890	5.59	12.85	4.67	8.00	5.43	3.04	2.42	0.41	3.87	6.50	3.79	4.35	60.92
1891	9.74	2.52	3.56	5.14	2.82	4.43	3.89	0.42	3.04	0.15	4.49	4.60	44.80
1892	4.21	3.12	4.06	3.74	3.97	6.77	2.27	5.03	1.97	3.30	6.15	5.27	49.86
1893	0.38	1.82	2.88	1.67	6.67	2.64	0.90	3.81	4.20	1.46	6.42	2.62	35.47
1894	4.44	3.40	7.07	4.25	1.24	2.62	5.50	6.34	2.06	0.21	1.60	3.66	42.39
1895	7.44	1.84	3.92	1.49	8.09	10.76	5.70	1.43	0.01	3.59	2.66	3.26	50.19
1896	8.18	5.22	2.82	2.09	2.42	3.41	3.78	1.08	3.30	6.66	2.15	2.55	43.66
1897	5.19	0.30	10.31	4.61	6.76	3.89	3.03	1.70	2.16	2.39	1.93	7.02	49.29
1898	9.42	2.86	3.30	1.24	1.69	5.21	1.17	3.01	3.77	1.94	3.60	2.55	39.76
1899	4.09	1.40	1.64	5.69	6.87	4.94	1.81	0.83	0.43	5.60	1.86	4.20	39.36
1900	3.39	3.05	7.37	6.60	5.98	3.27	3.13	1.28	5.01	3.78	1.48	2.01	46.35
1901	3.30	4.01	4.00	3.52	5.55	1.97	3.55	1.47	6.12	3.74	4.84	2.79	44.86
1902	2.52	2.63	3.59	3.44	2.03	4.50	7.83	0.09	5 05	2.53	10.71	4.00	48.92
1903	1.12	9.34	3.62	0.52	3.57	3.80	5.90	2.18	1.14	3.19	0.65	2.73	37.76
1904	0.47	2.92	2.04	6.23	4.82	6.55	4.67	2.28	2.37	0.22	2.30	5.80	40.67
1905	4.04	2.33	6.00	8.00	7.59	8.51	8.03	0.40	2.08	1.80	5.56	8.96	63.30
1906	2.52	2.28	7.91	1.51	3.44	3.60	5.88	5.17	3.47	4.23	1.34	7.03	48.38
1907	2.23	2.67	4.10	5.71	7.59	0.68	2.68	1.15	0.13	4.09	10.89	3 67	45.59
1908	2.57	5.79	2.62	4.96	10.30	2.05	2.46	3.52	3.86	0.14	1.91	3.02	43.20
1909	0.45	3.74	3.18	2.49	1.85	2.41	1.45	2.15	1.46	3.25	2.30	7.38	32.11
1910	1.76	3.99	1.67	4.89	5.93	1.89	2.41	0.72	0.71	1.09	1.88	5.17	32.11
1911	0.45	6.13	2.22	7.96	1.77	0.42	6.08	5.90	0.55	1.60	2.92	6.35	42.35
1912	2.31	2.03	8.08	6.57	2.02	4.35	2.11	15.28	0.26	0.81	1.26	4.32	49.40
1913	2.83	4.16	4.93	4.56	2.75	2.89	3.32	0.22	11.96	8.36	1.19	7.53	54.70
1914	1.79	3.88	4.67	5.29	6.10	0.09	1.19	9.31	1.62	1.56	4.75	9.16	49.41
1915	4.09	3.56	3.60	3.99	1.44	4.70	1.75	11.41	0.92	1.19	4.45	2.26	43.36
1916	5.64	0.18	1.22	5.80	5.34	3.31	2.13	0.92	2.66	3.35	3.69	1.67	35.91
1917	3.70	2.82	3.51	3.25	2.01	0.82	7.51	0.80	1.26	0.30	2.02	1.28	29.28
1918	3.12	0.67	2.00	7.64	1.28	2.43	0.10	2.84	2.79	2.56	6.67	2.04	34.14
1919	3.80	3.33	3.83	3.45	3.25	6.34	5.68	4.58	2.19	12.97	5.68	1.03	56.13
1920	5.27	1.91	4.87	4.09	5.75	4.07	4.51	5.28	1.41	4.71	4.53	3.75	50.15
1921	3.11	2.03	2.73	6.92	2.33	9.37	3.80	1.07	2.28	1.71	2.77	4.10	42.22
1922	4.49	5.96	8.71	8.40	3.33	2.77	3.82	3.66	0.45	0.67	2.60	1.12	45.98
1923	3.19	5.71	2.06	4.14	1.63	2.34	0.81	T	1.07	2.76	2.03	7.78	33.52
1924	5.12	3.50	3.40	3.37	7.64	0.67	0.00	0.90	1.52	0.50	2.53	4.32	33.47
1925	4.83	1.47	2.61	2.16	2.65	0.30	4.76	0.68	2.40	5.25	7.03	0.10	34.24
1926	4.04	0.74	9.42	2.70	3.43	3.56	4.69	1.11	1.18	1.38	1.59	8.30	42.44

Precipitation in inches, 1889 to 1944 at Longview, Texas
(continued)

Year	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Annual
1927	2.09	4.09	5.96	8.74	3.68	4.02	4.81	0.93	2.06	3.55	1.00	0.75	41.68
1928	1.10	2.50	3.30	7.05	1.25	3.90	2.24	0.00	0.75	4.90	1.95	7.20	36.14
1929	4.66	1.85	3.92	5.12	6.55	3.05	0.72	0.63	3.09	2.13	4.83	3.61	40.16
1930	3.93	5.28	2.25	1.40	9.23	0.86	0.08	1.46	1.51	7.18	5.73	3.58	42.49
1931	2.70	5.19	3.33	2.73	1.14	1.01	5.88	2.86	0.02	2.96	6.28	10.38	44.48
1932	9.63	6.74	4.01	2.51	1.86	3.67	0.94	0.71	1.46	1.23	3.51	6.16	42.43
1933	4.65	2.54	4.92	4.77	5.21	0.16	10.55	2.80	2.53	1.30	1.09	6.19	46.71
1934	3.55	2.74	7.30	5.50	1.67	0.71	1.61	0.72	2.06	0.29	5.82	2.84	34.81
1935	2.83	3.88	4.35	3.77	7.06	5.22	0.45	1.69	3.64	8.31	3.98	4.67	49.85
1936	0.60	0.40	1.05	1.27	7.29	0.47	7.47	1.05	1.04	2.21	2.18	4.50	29.53
1937	9.72	2.00	4.92	4.44	0.92	3.90	2.80	5.60	0.00	3.37	3.53	7.19	48.39
1938	3.95	1.55	1.96	3.72	2.63	4.49	3.73	2.27	1.34	0.70	6.15	2.99	35.48
1939	7.46	7.34	1.19	1.85	4.94	2.69	1.01	2.03	0.07	1.19	4.23	2.92	36.92
1940	1.32	3.51	4.83	5.47	4.19	4.15	2.48	3.73	1.15	2.42	8.96	7.94	50.15
1941	3.04	3.30	4.62	6.48	5.68	7.66	4.07	2.81	4.15	5.27	3.67	4.59	55.34
1942	2.26	0.81	3.50	8.62	4.02	----	4.05	8.71	3.10	1.35	1.03	----	-----
1943	----	----	2.89	1.68	6.28	1.45	0.65	1.16	4.51	3.63	0.79	4.45	-----
1944	5.75	7.44	5.33	12.82	16.43	2.62	0.01	2.79	0.60	0.58	6.08	10.63	71.08

Acknowledgments

The writer is indebted to the many persons too numerous to mention, who have contributed information for this report. The representatives of oil companies and the city officials of Longview, Kilgore, and Gladewater furnished well logs and other important well data. Information was obtained from maps compiled by members of the East Texas Geological Society, showing the thicknesses of geologic formations in northeastern Texas.

The work was done under the general direction of O. E. Meinzer, geologist in charge of the division of ground water in the Geological Survey, and this report was prepared under the supervision and with the assistance of W. N. White, engineer in charge of ground-water investigations in Texas.

GROUND WATER

OCCURRENCE AND MOVEMENT OF GROUND WATER

For discussions of the fundamental principles of the occurrence and movement of ground water, the reader is referred to papers by Meinzer and Wenzel 1/ .

Ground water is derived chiefly from water that falls as rain and snow. A part of the precipitation runs off in streams, a part is returned to the atmosphere by evaporation and transpiration through trees and other plants, and a part sinks to the zone of saturation in which the interstitial openings in the rocks are filled with water.

In most places ground water is slowly but steadily moving under the influence of gravity from areas of intake toward areas of discharge. In the more permeable rocks, such as coarse-grained sand, gravel, and porous limestone, the water moves with comparative freedom, although the movement is very slow. Such rocks are capable of yielding abundant supplies of water to wells. In less permeable rocks, such as shale or clay, molecular attraction and surface tension retard the movement of the water which may be almost infinitely slow. Such rocks yield little or no water to wells.

At the outcrop of water-bearing beds, the water is usually unconfined and does not rise in wells above the water table which is the upper surface of the zone of saturation and the level at which the water is first encountered.

The water table is not a level surface; it usually slopes in about the same direction as the slope of the land surface. It is generally high under areas of ground-water intake and low under areas of ground-water discharge. The land surface in places is lower than the water table in adjacent areas and in such localities some of the ground water emerges as springs. In some localities perched water accumulates above the main zone of saturation, especially during the winter and spring when the rates of evaporation and transpiration are low. Such supplies are usually small and are not dependable.

1/ Meinzer, O. E., The occurrence of ground water in the United States: U. S. Geol. Survey Water-Supply Paper 489, 1923; Outline of ground-water hydrology: U. S. Geol. Survey Water-Supply Paper 494, 1923; Outline of methods for estimating ground-water supplies: U. S. Geol. Survey Water-Supply Paper 638C, pp. 99-144, 1931.

Meinzer, O. E., and Wenzel, L. K., Physics of the Earth: vol. 9, Hydrology, pp. 385-478, McGraw-Hill, 1942.

Wenzel, L. K., Method for determining permeability of water-bearing materials: U. S. Geol. Survey Water-Supply Paper 887, 1942.

In areas down the dip of the water-bearing beds where the rocks are under cover and are confined between relatively impermeable strata, the water is usually under artesian pressure and will rise in wells above the level at which it is first encountered. If the altitude to which the water will rise is greater than the altitude of the land surface, flowing wells may be obtained.

The rocks underlying Gregg County to depths of about 1,000 feet consist chiefly of clays and shales interbedded with sands. The beds are inclined, the dip being westward and northwestward toward the center of the East Texas syncline. The general slope of the land surface, however, is in the opposite direction or toward the east and southeast. Hence, although artesian conditions are believed to occur at moderate depths in most parts of the county, in general they are not favorable for producing flowing wells; the land surface in most places is higher than the outcrops of the underlying artesian beds.

All wells are subject to water-level fluctuates of varying magnitude. These fluctuations are due to many different causes, but most of them are a manifestation of a change in the ratio between the rate of ground-water intake or recharge and the rate of loss or discharge. Most water-table wells are supplied in part from intake areas close at hand and respond with a moderate lag to changes in rainfall. In very shallow wells the water level may rise several feet after heavy rains and decline until the wells go dry during prolonged droughts. Artesian wells that draw from sand or sandstone at considerable distances from the outcrops of the water-bearing beds seldom are affected by seasonal or annual differences in rainfall, although they may respond somewhat to the effect of a series of wet or dry years. Fluctuations of artesian pressure in such wells and the accompanying rise and decline in water levels are usually due to withdrawals of ground water from the well itself or from other wells.

When a well is pumped the water level in the well declines and a hydraulic gradient is developed toward the well from all directions. This hydraulic gradient causes water to flow toward the well. Within limits the rate at which water will enter a well varies directly with the amount the water level is lowered. For example, if a pumped well in fairly permeable material will yield 200 gallons a minute when the water level is lowered 20 feet, it will yield about 100 gallons a minute when the water level is lowered 10 feet. This ratio between the draw-down and the yield of the well is called the specific capacity and may be expressed as yield in gallons a minute per foot of draw-down.

Heavy withdrawals of ground water are sure to be accompanied by a general lowering of the water table or artesian pressures, a cone of depression gradually spreading in all directions from the center of pumping until large areas may be affected. However, this is usually considered not very serious unless the rate of decline persists without a corresponding increase in the rate of pumping or unless the trend is such as to indicate that the sands may become unwatered or the pumping lift may eventually exceed the economic limit. In some areas beds carrying fresh water are overlain or underlain by beds carrying salty water and excessive pumping may lead to the invasion of salt water into the wells.

GEOLOGIC FORMATIONS AND THEIR WATER-BEARING PROPERTIES

Most of the information given in this section of the report is based on field investigations by the writer, maps compiled by the Federal Geological Survey and the East Texas Geological Society, and Bulletin 3232 of The University of Texas 2/ to which the reader is referred for more detailed descriptions of the rock formations.

Gregg County lies in the Gulf Coastal Plain of northeastern Texas. It is on the west flank of the Sabine uplift and extends westward into the East Texas syncline. Except for thin deposits of alluvium and terrace silts and sands of Quaternary age, all the rocks that crop out in the county belong to the Eocene series of Tertiary age. The outcropping formations or groups of formations, from older to younger, are as follows: Wilcox group (undifferentiated), and the Carrizo sand and Mount Selman formation (including the Reklaw and Queen City sand members) of the Claiborne group. The Wilcox group is underlain by the Midway group of the Paleocene series and by rocks of Cretaceous age. These older rocks do not appear at the surface in Gregg County but crop out on the opposite side of the East Texas syncline in Hopkins, Hunt, Kaufman, and other Counties.

The principal ground-water reservoirs in Gregg County occur in sands of the Wilcox group, in the Carrizo sand, and in the Queen City sand member of the Mount Selman formation.

The rocks underlying the county are briefly discussed below in the order of age from older to younger.

Cretaceous system

Upper Cretaceous (Gulf series)

The Upper Cretaceous rocks in northeast Texas consist of shale, marl, chalk, limestone, and sand and have been divided into the following formations or groups of formations which from oldest to youngest are: the Woodbine sand, Eagle Ford shale, Austin chalk, Taylor marl, and Navarro group.

The Woodbine sand, the source of most of the oil that is being produced in the East Texas field, is 3,000 feet or more below sea level in Gregg County and yields salty water. The Eagle Ford shale, Austin chalk, and Taylor marl are also very deep and probably contain salty water. The Navarro group, comprising the uppermost rocks of the Gulf series, has been divided into four formations which in ascending order are the Neylandville marl, Nacatoch sand, Corsicana marl, and Kemp clay.

According to interpretation of electrical logs of oil tests, the Nacatoch sand is encountered about 1,800 to 2,000 feet below the land surface in Gregg County and averages about 100 feet in thickness. No analyses of water from the Nacatoch sand in the county are available, but the electrical logs indicate that the water is salty. Moreover, the sand is known to yield brackish and salty water at shallower depths near the outcrops in Bowie, Titus, Franklin, Hopkins, and other Counties.

2/ Sellards, E. H., Adkins, W. S., and Plummer, F. B., The geology of Texas: vol. 1, Stratigraphy, Texas Univ. Bull 3232, pp. 480-665, 1932.

Tertiary system

Paleocene series

Midway group (undifferentiated)

The term Midway has been generally adopted by geologists for the Paleocene series in the Gulf Coastal Plain. The Midway is of marine origin and in northeast Texas, according to Plummer 2/, consists chiefly of clay, silt, glauconitic sand, and lentils of limestone. Deposition appears to have been continuous from Midway into Wilcox time, the sediments indicating a gradual transition from one group to the other. However, the contact is most frequently drawn where the marine silty clays of the Midway are overlain by fine-grained deltaic sands and non-marine deposits of the Wilcox. The Midway is a poor water bearer practically everywhere in Texas, and it is not likely to yield appreciable quantities of good water in Gregg County.

Eocene series

Wilcox group (undifferentiated)

The rocks of the Wilcox group in this area consist mostly of interbedded clay, sandy clay, sand, and lentils of lignite. The sands are medium to fine grained and consist mostly of quartz, but they contain some organic matter or dark-colored minerals and are often referred to as "salt and pepper" sands. The individual beds of sand, which in places are 50 feet or more in thickness, are lenticular and it is difficult to correlate them between wells, even wells that are only a fraction of a mile apart.

The rocks of the Wilcox group crop out along the Sabine River in the southeastern part of the county. A good exposure can be seen south of the Sabine-River bridge on the old Kilgore-Longview Highway. The top of the formation is encountered at depths ranging from a few feet to more than 100 feet below the land surface in the vicinity of Longview, from 200 to 250 feet near Gladewater, and, according to maps of the East Texas Geological Society, the rocks should be encountered between 300 and 400 feet in the southwestern part of the county where they reach a thickness of about 1,000 feet. According to the writer's interpretation of electrical logs and drillers' logs, the average thickness of the Wilcox group in Gregg County is about 900 feet.

Approximately 100 wells equipped with pumps of 3 horsepower or greater are listed in the Gregg County report for 1937. Most of these wells draw from sands in the Wilcox group. The yields of the wells range from a few gallons to 600 gallons a minute, depending largely on the methods of well construction and the size and type of pumping equipment. Many of the wells in the oil field are pumped by the air-lift method and yield only a few gallons a minute.

The dissolved minerals in water from wells in the Wilcox group, mostly sodium, bicarbonate, and chloride, range from about 500 to 2,500 parts per million. In general the lower sands yield more highly mineralized water than the upper sands.

2/ Op. cit.

Claiborne group

Carrizo sand 3/

The Carrizo sand lies unconformably on rocks of the Wilcox group and crops out in narrow belts on both sides of the Sabine River in the central and southeastern parts of the county. It varies considerably in thickness within short distances due in part to the uneven surface of the Wilcox group on which it was deposited, and in some places seems to be absent. A good exposure of the formation can be seen south of the river bridge on the old Kilgore-Longview Highway.

The Carrizo sand is for the most part a continental deposit which consists of fine-to medium-grained quartz sand with some yellowish clay and ferruginous cementing material. Although the sand grains of the Carrizo are coarser than those of the Wilcox group below and the Mount Selman formation above, in well logs it is difficult to distinguish the Carrizo sand from the sands above and below. According to the interpretation of drillers' logs and electrical logs the average thickness of the Carrizo sand in Gregg County probably does not exceed 30 feet.

In parts of south and east Texas large quantities of water of good quality are obtained from wells in the Carrizo sand for municipal and industrial purposes and for irrigation. In Gregg County, however, only a few wells draw water from this sand which is less important as an aquifer than the sands of the underlying Wilcox group. However, water from the Carrizo sand, as a rule, contains considerably less dissolved minerals than water from sands of the Wilcox group.

Mount Selman formation

In central and northeastern Texas the Mount Selman formation has been divided into 3 members which in ascending order are the Reklaw, Queen City sand, and Weches greensand. Only the Reklaw member and Queen City sand member are shown in Gregg County on the geologic map (see fig. 1).

Reklaw member - The Reklaw member of the Mount Selman formation lies conformably on the Carrizo sand and crops out in the central and southeastern parts of the county. It consists mostly of clay but contains some glauconitic sand, sandstone, and impure lignite. The outcrop is characterized by red clay soils. Locally in the outcrop areas the Reklaw yields water of good quality to shallow domestic wells, but down the dip where the member is under cover it yields rather highly mineralized water.

Queen City sand member - The outcrop areas of the Queen City sand member of the Mount Selman occupy most of the western and northern parts of the county. The sediments are chiefly of continental origin and consist mostly of light-gray cross-bedded medium-to fine-grained quartz sand interbedded with silt, clay, bentonite, greensand, and impure lignite. The member weathers into a light-colored sandy loam on the outcrop. It ranges in thickness from a few feet to possibly 300 feet, being thickest in the western part of the county. Many shallow dug wells in the outcrop yield fresh water in sufficient quantities for domestic use and for stock, but no deep wells are known to draw from the Queen City sand in Gregg County.

3/ The Carrizo sand of northeastern Texas, according to L. W. Stephenson of the Geological Survey, may not be the same age as the Carrizo sand of the type area in Dimmit County, southern Texas.

PRESENT DEVELOPMENT OF WATER SUPPLIES FROM WELLS

Ground water has had an important part in the economic development of Gregg County. Practically all the water used in the rural areas is obtained from dug wells less than 50 feet in depth. Such supplies can be obtained almost anywhere in the county. Until 1914 the city of Longview obtained its water supply from wells. The public and industrial supplies for the cities of Kilgore and Gladewater, and water used for drilling oil wells, for the operation of oil refineries, and for domestic purposes in the oil fields, are obtained from drilled wells that range from about 200 to 1,000 feet in depth. Records of about 100 wells were published in a mimeographed report which was released by the Texas Board of Water Engineers on February 15, 1937. Records of 90 wells, most of which have been drilled since 1936, are included in the tables in this report.

The position of the principal water-bearing sands and the development of ground water in different parts of the county are briefly discussed below.

Northwestern part of county in vicinity of Gladewater

The Queen City sand member of the Mount Selman formation, the Carrizo sand, and the Wilcox group underlie this part of the county.

Most of the rural water supplies are obtained from shallow dug wells in the outcrop of the Queen City sand member of the Mount Selman formation. The water supplies in the oil field, which covers most of the western half of the county, are obtained from wells that draw mostly from sands in the Wilcox group.

The city of Gladewater is supplied with about 300,000 gallons of water a day from well 75 in Upshur County, well 641 Gregg County, and a new well - city well 6 - which was completed after the map and tables in this report were prepared. Well 75 was drilled to a depth of 294 feet and is screened in a sand (probably Carrizo) from 208 to 254 feet. In a test made in April 1943 the well yielded 154 gallons a minute with a draw-down of 143 feet. Its specific capacity, (yield in gallons a minute per foot of drawdown) therefore, was about 1.1.

Well 641 was drilled to a depth of 279 feet and is screened in sands from 202 to 265 feet. It is reported to have yielded 124 gallons a minute with a drawdown of 130 feet when drilled, but in April 1943 the yield had declined to about 50 gallons a minute. The well is believed to be drawing from both the Carrizo sand and from sands in the Wilcox group.

City well 6, located near the elevated tank, was drilled in 1943 to a depth of 405 feet and is screened between 200 and 400 feet. The driller's log shows sand between 160 and 180 feet, 22 feet of sand (probably Carrizo) from 198 to 220 feet, and thin sands between 220 and 400 feet. In a test the yield was 140 gallons a minute and the pumping level was 310 feet below the land surface after 24 hours of continuous operation. The drawdown was approximately 150 feet and the specific capacity, therefore, was about 1.0.

Analyses of water from the city well in Upshur County (no. 75) showed 766 parts per million of dissolved solids with 238 parts per million of chloride in 1940, and 871 parts per million of dissolved solids with 282 parts per million of chloride in 1942. Well 641 Gregg County showed 687 parts per million of dissolved solids with 150 parts per million of chloride in 1942. (See tables). The analysis of water from city well 6 (not given in the table) shows 286 parts per million of dissolved solids with 63 parts of chloride.

Within a radius of 6 miles east and southeast from Gladewater, 13 wells (numbers 644,645,646,647,649,650, 651, 654, 655, 656, 658, 659, and 661), ranging in depth from 214 to 485 feet, yield from a few gallons to 230 gallons a minute; the water contains less than 100 parts per million of chloride and less than 700 parts dissolved solids. Four wells in the same area (numbers 265, 275, 290 and 411), ranging in depth from 807 to 1,008 feet, yield from a few gallons to 560 gallons a minute; the water contains from 650 to 1,170 parts per million of chloride and from 1,725 to 2,575 parts of dissolved solids.

The records show that in general, in the Gladewater area, water that is relatively low in dissolved solids and in the order of magnitude of 100 to 200 gallons a minute can be obtained from a well in the Carrizo sand and upper sands of the Wilcox group. More highly mineralized water in the order of magnitude of 500 gallons a minute can be obtained from a well in the lower sands of the Wilcox group. The base of the lowermost sands in the Wilcox group is about 1,000 to 1,100 feet below the land surface. No important supplies of ground water of good quality are to be expected in the underlying formations.

Northeastern part of county

This area is underlain by the Queen City sand member of the Mount Selman formation, Carrizo sand, and Wilcox group. The quality of water from sands at various depths differs materially. Five wells (numbers 62, 84A, 664, 667, and 668), ranging in depth from 148 to 394 feet, yield from a few gallons to 108 gallons a minute; the water contains less than 100 parts per million of chloride and less than 400 parts of dissolved solids. Wells 665 and 666, respectively 410 and 420 feet in depth, yield from 20 to 40 gallons a minute; the water contains about 550 parts per million of chloride and 1,150 parts of dissolved solids. Wells 30 and 112, respectively 812 and 811 feet in depth, yield about 150 gallons a minute; the water contains about 1,000 parts per million of chloride and 2,000 parts of dissolved solids.

Central part of county in vicinity of Greggton

Until about 1938 the town of Greggton was supplied with water from a well 290 feet in depth 4/. The water from this well contained 750 parts per million of chloride. Consequently the use of well water was discontinued and the town obtains its present supply from the Longview pipe line. (See p. 12).

Wells 285, 670, 672, and 674, ranging in depth from 250 to 964 feet and drawing from sands in the Wilcox group, yield from a few gallons to 200 gallons of water a minute containing from 660 to 785 parts per million of chloride and from 1,335 to 1,738 parts of dissolved solids.

Eastern part of county in vicinity of Longview

In 1908, according to Deussen 5/, the city of Longview obtained its water

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4/ See well 193, Gregg County report of February 15, 1937.

5/ Deussen, Alexander, Geology and underground waters of the southeastern part of the Texas Coastal Plain; U. S. Geol. Survey Water-Supply Paper 335, pp. 176-180, 1914.

supply (52 gallons a minute) from three shallow dug wells. About 1910 two deep wells were drilled by the city to meet the increased demand for water. The wells were between 400 and 600 feet in depth and drew from sands in the Wilcox group. The water is reported to have contained 1,000 parts per million of sodium chloride (common salt). The wells were abandoned in 1914 when Longview turned to the Sabine River for its water supply.

According to reports, the water of the Sabine River became so polluted with oil-field waste during periods of low flow in 1934 and 1935 that it was deemed advisable for the city to seek a source of water supply elsewhere. A study of the old Longview water wells and existing wells in the territory surrounding Longview convinced the city officials that it was not advisable to attempt to develop a water supply from wells. In 1936 a pipe line was constructed from the city to a diversion point on Big Sandy Creek near Big Sandy in Upshur County and since that time the stream water has been used.

The logs of two wells in Longview, numbers 680 and 681 (Deussen's numbers 365 and 367) are given in the tables of drillers' logs. The water from these wells, which was drawn from sands in the Wilcox group, is reported to have been used for the manufacture of ice but was unsuitable for locomotive boilers.

Well 503, two miles south of Longview, is 467 feet in depth. It draws from sands in the Wilcox group and is reported to yield about 100 gallons a minute. The water contains 940 parts per million of chloride and 2,028 parts of dissolved solids.

Well 678, two miles southwest of Longview, was drilled to a depth of 558 feet. Screens were set opposite several sands in the Wilcox group between 313 and 418 feet. The well is reported to yield 200 gallons a minute with a draw-down of 45 feet, indicating a specific capacity of about 4.4. The water contains 790 parts per million of chloride and 1,673 parts of dissolved solids.

Wells 178 and 607 near Longview, 348 and 378 feet in depth, respectively, yield small quantities of water that is not excessively mineralized.

A partial electrical log of well 677, an oil test about 3 miles southwest of Longview, shows that the base of the lowermost sands of the Wilcox group is about 875 feet below the surface.

A study of all available data indicates that no large supplies of ground water of good quality are to be expected in the vicinity of Longview.

Southwestern part of county in vicinity of Kilgore

Three municipally owned wells, numbers 468, 469, and 470, respectively 780, 875, and 906 feet in depth, supply the city of Kilgore with an average of about 500,000 gallons of water a day. The wells are equipped with deep-well turbine pumps driven by electric motors and yield 285, 350, and 600 gallons a minute, respectively.

According to the geologic map (fig. 1) the Carrizo sand crops out in the creek valley just east of Kilgore. In general the formation dips westward and should be encountered about 100 feet below the land surface in the vicinity of the city wells. Well 468 is screened between 607 and 755 feet; well 469 is screened from 773 to 873 feet; and well 470 is screened from 802 to 906 feet. Therefore, all three wells are believed to draw water exclusively from lower sands in the Wilcox group.

Water from the Kilgore city wells is rather highly mineralized; the chloride ranges from about 600 to 900 parts per million and the total dissolved solids range from 1,600 to 2,000 parts per million.

Well 471, about half a mile south of Kilgore, was drilled to a depth of 903 feet and screens were set at 380-436, 747-769, and 821-856 feet. It is equipped with a deep-well turbine pump driven by a 50-horsepower electric motor and is reported to yield 560 gallons a minute. The water is believed to be drawn chiefly from the sand between 380 and 436 feet, because it contains only 155 parts per million of chloride and 951 parts of dissolved solids, unlike the water from the deeper sands in the nearby city wells.

Well 476, located 1¼ miles west of Kilgore, was drilled to a depth of 500 feet and was cased to 450 feet. It is equipped with a deep-well turbine pump driven by a 10-horsepower electric motor and is reported to yield 200 gallons a minute. The water from this well is believed to come from both the Carrizo sand and the upper sands of the Wilcox group. It contains only 14 parts per million of chloride and 448 parts of dissolved solids.

Ten wells within a radius of 6 miles from Kilgore (numbers 682, 683, 688, 689, 693, 694, 698, 700, 701, and 703) are screened at various depths between about 200 and 450 feet. The yields range from a few gallons to 300 gallons a minute per well, and the water contains less than 25 parts per million of chloride and less than 600 parts of dissolved solids.

It is concluded from available data that moderate supplies of water which is relatively low in total dissolved solids can be obtained in the vicinity of Kilgore from the Carrizo sand and upper sands of the Wilcox group through properly constructed wells at depths of about 500 feet. Larger supplies of more highly mineralized water can be obtained from the lower sands in the Wilcox group. The base of the lowermost sands of the Wilcox group is about 1,000 feet below the surface and no important supplies of ground water of good quality are to be expected at greater depths.

Southeastern part of county

Only one deep well was recorded in this part of the county. Well 705 is 603 feet in depth and supplies water for the Gregg County Airport. The well is cased to 454 feet and is screened at 246-249, 311-331, 357-368, and 413-444 feet. It is equipped with a deep-well turbine pump driven by a 10-horsepower electric motor, and when completed it yielded 168 gallons a minute with a draw-down of 109 feet after 24 hours of pumping, representing a specific capacity of about 1.5. According to the geologic map the well is on the outcrop of the Reklaw member of the Mount Selman formation. It is believed that all the screens in well 705 are opposite sands in the Wilcox group. The analysis shows that the water contains 86 parts per million of chloride and 673 parts of dissolved solids.

SURFACE WATER

By

S. D. Breeding

Gregg County is drained by numerous small tributaries of Sabine River which flows in a southeasterly direction through the center of the county. Records of the daily flow of the river have been obtained at gaging stations near Longview during 1904-6, and 1924-32, and near Gladewater since October 1932. These records were collected by the U. S. Geological Survey in cooperation with the Texas Board of Water Engineers, and have been published annually in Geological Survey Water-Supply Papers which are obtainable from the Government Printing Office, Washington, D. C. Copies of the papers may be consulted at the Washington office of the Geological Survey and at the Austin offices of the Survey and Texas Board of Water Engineers.

Records of rainfall have been obtained at Longview since 1889 except for the years 1926-27 and 1942-43, when the records were incomplete. These records show a range in annual rainfall from a high of 71.08 inches in 1944 to a low of 29.28 inches in 1917. The average annual rainfall for the 53 complete years of record is 42.87 inches. The lowest recorded during 12 consecutive months was as follows: April 1917 to March 1918, 25.04 inches; July 1924 to June 1925, 24.46 inches; and March 1939 to February 1940, 26.95 inches.

The following table gives the average daily run off in acre-feet of Sabine River at the station near Gladewater during 9 years, and at the station near Longview during 12 years; the average daily runoff during the minimum 12 consecutive months; and the minimum runoff in one day at each station during period of record.

Run off of Sabine River near Gladewater and Longview, Texas

Station	Period of record Calendar yrs.	Average during period (acre-feet per day)	Average during minimum 12 consecutive months (acre-feet per day)	Minimum in 1 day (acre-feet)
Gladewater	1933-41	3,180	622	11
Longview	1904-06 1924-32	3,700	619	28

Based on the records given in part in the above table the annual runoff of Sabine River from an area of 3,013 miles, at the station near Longview, averaged 1,351,000 acre-feet during the 12 calendar years 1904-6 and 1924-32 (an acre-foot is the amount of water required to cover one acre to the depth of one foot and is equivalent to about 325,000 gallons). The smallest runoff during 12 consecutive months occurred from October 1924 to September 1925 and amounted to 226,000 acre-feet.

The annual runoff near Gladewater during the 9 calendar years 1933-41 averaged 1,161,000 acre-feet from an area of 2,846 square miles. The runoff during the 12 consecutive months of lowest flow occurred April 1939 to March 1940 and amounted to 227,500 acre-feet. In the six driest calendar years of record the daily runoff was less than 30 acre-feet (9,775,000 gallons) during the following number of days: 1925, 6 days; 1934, 18 days; 1936, 34 days; 1938, 30 days; 1939, 90 days; and 1940, 7 days. During periods of low flow the water is somewhat highly mineralized because of salt water contamination from oil fields upstream.

No records of the runoff from small streams in Gregg County are available.

SUMMARY

Gregg County is in the timber belt of northeastern Texas, and most of the western part of the county is occupied by the north-central part of the East Texas oil field.

The geologic formations or groups of formations discussed in the report include from older to younger: The rocks of Upper Cretaceous age; the Midway group of Paleocene age; and the Wilcox group, Carrizo sand, and Reklaw and Queen City sand members of the Mount Selman formation of Eocene age.

Throughout their occurrence in Gregg County the Upper Cretaceous rocks, consisting of clay, shale, marl, limestone, and sand are believed to contain salty water. The Cretaceous rocks are overlain by those of the Midway group, which are essentially non-water bearing clays and shales.

All the formations in Gregg County that contain important water-bearing sands lie above the Midway group and crop out within the county. The formations, listed in the order in which they crop out successively from the southeastern part of the county to the northwest are the Wilcox group, Carrizo sand, and Queen City sand member of the Mount Selman formation.

The land surface slopes southeastward, but the beds in the outcropping formations dip northwestward into the East Texas syncline. Therefore, persistent beds that crop out in the eastern and central parts of the county are encountered by wells at considerable depth below the surface in the northern and western parts of the county.

Wells yielding water in the order of magnitude of 500 gallons a minute and ranging from 700 to 1,000 feet in depth have been developed in most parts of the county. In general somewhat highly mineralized water is encountered below depths of 200 to 300 feet in the east-central part of the county, below 300 to 400 feet in the northwestern part, and below about 500 feet in the southwestern part. Wells of shallower depth yield water of better quality and in the order of magnitude of 50 to 200 gallons a minute. No important supplies of water are to be expected below the lowermost sands of the Wilcox group which occur about 700 feet below the surface in the eastern part of the county and about 1,000 to 1,100 feet in the western part.

Supplies of surface water are available from the Sabine River and some of its larger tributaries, but in order to obtain a dependable supply of good water of considerable magnitude storage will have to be provided. In some areas, if the requirements are not too high, it may be possible to use a combination of ground water and surface water.

Records of wells in Gregg County, Texas
All wells are drilled unless otherwise stated under remarks
(Supplemental to wells listed in report of Feb. 15, 1937)

Well	Distance from Longview	Owner (Lessor)	Driller	Date completed	Depth of well (ft.)	Diameter of well (in.)	Height of measuring point above ground (ft.)
30	7¾ miles northwest	Tide Water Associated Oil Co. (J.J.Flewellen)	Layne-Texas Co.	1931	812	6-5/8	--
62	7 miles northwest	Humble Oil and Refining Co. (G.W.Willingham)	do.	1931	390	10	0.5
84a	5½ miles north	Judson Grove School	--	1935	594	--	--
112	7 miles northwest	Magnolia Petroleum Co. (W. E. Jones)	Layne-Texas Co.	1931	811	8	--
178	¾ mile northeast	Dr. -- Hurst	--	1932	348	--	--

Well	Distance from Gladewater	Owner	Driller	Date completed	Depth of well (ft.)	Diameter of well (in.)	Height of measuring point above ground (ft.)
214	2 miles northeast	Humble Oil and Refining Co. (W.W.Holland)	Layne-Texas Co.	1931	1,084	9-7/8	--
258	In Gladewater	City of Gladewater No. 1	do.	1931	826	12½, 6-5/8	0.5
259	do.	City of Gladewater No. 2	do.	1931	388	12½	1.7
264	do.	City of Gladewater No. 3	do.	1933	213	10, 8¼	2.0
265	½ mile southwest	Sinclair-Prairie Oil Co. (W.H.York)	Conway Bros.	1932	807	8½	--
275	5½ miles east	Stanolind Oil and Gas Co. (L.E.Pearsons)	L. W. Little	1931	872	10, 6-5/8	2.0
285	7 miles east	Gulf Oil Corp. (M. Smith)	--	1931	964	6-5/8	--
290	5½ miles east	Tide Water Associated Oil Co. (E.M.Nettleton "A")	Mid-Kansas Oil Co.	1931	843	8¼, 6	--

a/ Plus (+) indicates water level is above ground.
b/ T, turbine; A, air, steam or natural gas lift; H, hand pump or bucket and rope; C, cylinder; G, gasoline; E, electric. Number indicates horsepower.

Chemical analyses of water from some of these wells are shown in a table of analyses on pages 41 to 47.

Well	Water level: Below measuring point (ft.) a/	Water level: Date of measurement	Method of lift b/	Use of water c/	Remarks
30	--	--	A,90	Ind	Cased to bottom. Screens at 452-497, 581-604, 702-746 and 768-789 feet. See log.
62	54.15	June 15, 1936	T,E, 30	D,Ind	Cased to bottom. Screens at 50-72, 153-175, 184-195 and 337-381 feet. Reported yield 108 gallons a minute with drawdown of 120 feet in 1936. See log.
84a	--	--	C,E	P	See log.
112	--	--	A,90	Ind	Cased to bottom. Screens at 497-518, 544-565, 602-620 and 747-789 feet. Estimated yield 150
178	--	--	C,E, 1½	Irr	Sand gallons a minute in 1936. See log, reported from 320 to 348 feet.

Well	Water level: Below measuring point (ft.) a/	Water level: Date of measurement	Method of lift b/	Use of water c/	Remarks
214	--	--	T,E, 60	D,Ind	See log.
258	178.02	June 10, 1938	None	N	Casing: 12½-inch to 294 feet and 6-5/8-inch to 629 feet. Screens at 316-333, 339-349, 355-375, 489-499 and 589-629 feet. Gravel-walled.
259	143.50	Apr. 4, 1940	T,E, 25	P	Cased to bottom. Screens at 173- 195, 206-216, and 312-354 feet. Gravel-walled. Reported yield 140 gallons a minute with draw-
264	71.99	July 12, 1940	None	N	Cas- down of 90 feet when drilled. See log. ing: 10-inch to 139 feet and 8-inch to 213 feet, perforated at 41-98, 140-162 and 191-211
265	--	--	C,A, 5	Ind	Cased to bottom. See log. feet. See log.
275	105.0	Apr. 6, 1936	A,G, 25	Ind	Casing: 10-inch to 82 feet; 6-5/8-inch from 0 to 872 feet. See log.
285	--	--	C,E, 10	D,Ind	Cased to bottom, perforated from 784 to 844 feet. Reported yield 200 gallons a minute.
290	--	--	None	N	Casing: 8¼-inch to 780 feet, See log. cemented; 6-inch perforated liner from 757 to 843 feet. See log.

c/ P, public supply; D, domestic; S, stock; Ind, industrial; Irr, irrigation; N, not used.

d/ Water level reported by driller or owner.

e/ Number under which well is listed in U. S. Geol. Survey Water-Supply Paper 335, Alexander Deussen, 1914.

* This well is located in Upshur County, and is recorded in the Upshur County report; however, it is included here because it is one of the several wells used by the City of Gladewater.

Records of wells in Gregg County--Continued

Well	Distance from Kilgore	Owner (Lessor)	Driller	Date completed	Depth of well (ft.)	Diameter of well (in.)	Height of measuring point above ground (ft.)
411	6¼ miles northwest	Sinclair-Prairie Oil Co. (M.T.Cole)	Layne-Texas Co.	1931	1,008	12½, 8¼	--
468	In Kilgore (City Park)	City of Kilgore No. 4	do.	1934	780	16, 10	--
469	In Kilgore	City of Kilgore No. 1	do.	1931	875	15½, 8¼	1.0
470	do.	City of Kilgore No. 3	do.	1934	906	10, 6-5/8	0.7
471	⅛ mile south	Humble Oil and Refining Co. (S.S.Laird "B")	do.	1931	908	16, 8½	--
476	1½ miles west	Shell Oil Co.,Inc. (W. W. Elder)	do.	1931	500	10	--

Well	Distance from Longview	Owner or Lessor	Driller	Date completed	Depth of well (ft.)	Diameter of well (in.)	Height of measuring point above ground (ft.)
503	2 miles south	D. H. Jones	Walter Meller	1934	467	6	--
525	6 miles southwest	Magnolia Pipe Line Co.	--	1931	218	--	--
531	4¾ miles southwest	Atlantic Pipe Line Co.	Walter Meller	1935	365	6	0
607	3 miles south	United Gas Public Service Co.	Layne-Texas Co.	1931	378	6	--

Well	Distance from Gladewater	Owner or Lessor	Driller	Date completed	Depth of well (ft.)	Diameter of well (in.)	Height of measuring point above ground (ft.)
640	In Gladewater City Park	City of Gladewater	Layne-Texas Co.	1937	765	--	--
* 75	1⅛ miles northwest (In Upshur County)	City of Gladewater No. 4	do.	1937	294	10¾	1.5
641	½ mile southwest	City of Gladewater No. 5	do.	1940	279	10¾, 8	2.0
642	1¾ miles northeast	Tide Water Associated Oil Co. (W. H. Richey)	Johnson and Sitton	1931	600	7, 5-3/16	--

Well	Water level: Below measuring point (ft.) a/	Water level: Date of measurement	Method of lift b/	Use of water c/	Remarks
411	d/ 60	Aug. 5, 1931	T,E, 60	Ind	Casing: 12½-inch to 844 feet and 8-inch screen from 846 to 1,003 feet. Reported yield 560 gallons a minute. See log.
468	111.0	Sept.14, 1934	T,E, 40	P	Casing: 16-inch to 607 feet, cemented; 10-inch from 0 to 777 feet. Screens at 607-625 and 665-755 feet.
469	156.04	Dec. 11, 1939	T,E, 30	P	Casing: 15½-inch to 373 feet and 8¼-inch to 873 feet. Screen from 773 to 873 feet. Water level reported to have been 87 feet below ground when drilled. See log.
	158.33	Nov. 26, 1940			
	162.81	Sept. 3, 1941			
470	150.76	Dec. 11, 1939	T,E, 25	P	Casing: 10-inch to 763 feet and 6-5/8-inch to 906 feet. Screen from 802 to 906 feet. Water level reported to have been 134 feet below ground in 1934. Temperature 80° F. See log.
	153.88	Nov. 26, 1940			
	157.78	Sept. 3, 1941			
471	d/ 76	Apr. 29, 1931	T,E, 50	D,S, Ind	Casing: 16-inch to 350 feet and 8¼-inch to 908 feet. Screens at 380-436, 747-769 and 821-865 feet. See log.
476	d/ 70	Apr. 13, 1936	T,E, 10	D,Ind	Cased to 450 feet. Reported yield 200 gallons a minute in 1933.

Well	Water level: Below measuring point (ft.) a/	Water level: Date of measurement	Method of lift b/	Use of water c/	Remarks
503	32	June 30, 1936	A,-	D	
525	--	--	A,-	D,Ind	Estimated yield 500 gallons a minute in 1936.
531	d/ 45	1935	C,E, 5	D	Fine-grained sand reported from 355 to 365 feet yield 15 gallons a minute.
607	--	--	A,-	Ind	See log.

Well	Water level: Below measuring point (ft.) a/	Water level: Date of measurement	Method of lift b/	Use of water c/	Remarks
640	--	--	None	N	City test well. Supply reported inadequate. See log.
675	80.44	Nov. 26, 1940	T,E, 25	P	Casing: 20-inch to 203 feet, cemented; 10¾-inch from 0 to 294 feet. Screen from 205 to 268 feet. Gravel-walled. Yield 185 gallons a minute with drawdown of 160 feet when drilled.
641	85.21	July 12, 1940	T,E, 15	P	Casing: 18-5/8-inch to 50 feet, cemented; 10¾-inch from 0 to 275 feet. Screen from 202 to 265 feet. Gravel-walled. Liner: 8-inch from 186 to 268 feet perforated. Yield 124 gallons a minute with drawdown of 130 feet when drilled. Temperature 74° F. See log.
642	--	--	--	--	Casing: 8¼-inch to 353 feet; 7-inch from 0 to 531 feet; 5-3/16-inch perforated from 513 to 600 feet. See log.

Records of wells in Gregg County--Continued

Well	Distance from Gladewater	Owner (Lessor)	Driller	Date completed	Depth of well (ft.)	Diameter of well (in.)	Height of measuring point above ground (ft.)
643	2¾ miles northeast	Gulf Oil Corp. (J. H. Bozeman)	R. L. Miles	1931	1,023	4	--
644	do.	J. H. Bozeman	Bill Boling	1938	400	6	0
645	2½ miles southeast	Gulf Oil Corp. (M. O. Sheppard)	H. L. Taylor	1937	304	4	0
646	do.	do.	Bill Boling	1941	305	4½	--
647	1¾ miles southeast	Gulf Oil Corp. (F. M. Fonville)	do.	1941	258	4½	--
648	3½ miles southeast	Gulf Oil Corp. (E. L. Walker)	do.	1942	104	4½	0.8
649	3½ miles southeast	E.P.Halliburton, Inc. (W.D.Lacy "B")	Dan Kerr	1937	485	6	0
650	5½ miles southeast	Gulf Oil Corp. (J. C. Judge)	H. L. Taylor	1940	302	4	--
651	5 miles southeast	Atlantic Ref. Co. (Martin Hays)	J. C. Boling	1938	340	4½	0
652	4½ miles southeast	Atlantic Ref. Co. (S. C. Fishburn)	Pilot Oil Co.	1933	214+	6	0
653	3¾ miles southeast	Superior Oil Co. (W. E. Pasture)	--	1932	512	8	0
654	5 miles southeast	Sinclair-Prairie Oil Co. No. 2 (D. Moore)	W. A. Meller	1934	476	8, 6	--
655	do.	Sinclair-Prairie Oil Co. No. 3 (D. Moore)	do.	1934	241	6	--
656	do.	Sinclair-Prairie Oil Co. No. 4 (D. Moore)	do.	1935	456	8½	--

Well	Distance from Greggton	Owner or Lessor	Driller	Date completed	Depth of well (ft.)	Diameter of well (in.)	Height of measuring point above ground (ft.)
657	3½ miles west	Tide Water Associated Oil Co. (E.M.Nettleton "A")	W. A. Meller	1936	457	10¾, 7	--
658	do.	Tide Water Associated Oil Co. No. 2 (E.M.Nettleton "A")	Layne-Texas Co.	1938	458	7	0
659	3 miles west	Texas-Empire Pipe Line Co. (E.M.Nettleton "A")	do.	--	375	6	0
660	2½ miles west	Atlantic Ref. Co. (T. B. Harris)	Boling and Boling	1938	362	5½, 4	--
661	3 miles northwest	Gulf Oil Corp. (Lacy-Snider)	Bill Boling	1941	228	4½	--

Well	Water level: Below measuring point (ft.) a/	Water level: Date of measurement	Method of lift b/	Use of water c/	Remarks
643	--	--	None	N	Cased to bottom, 180 feet perforated between 497 and 835 feet. Reported yield 230 gallons a minute of highly mineralized water. See log.
644	d/ 25	1938	C,A, 5	D	Reported sand from 360 to 400 feet, and yields 10 gallons a minute.
645	d/ 75	1937	C,E, ½	D	Cased to bottom, perforated from 284 to 304 feet. Estimated yield 3 gallons a minute. See
646	--	--	C,E, ½	D	Casing: 8-5/8-inch to 51 feet; 4½-inch log. from 0 to 295 feet, perforated from 278 to 295
647	--	--	C,E, ½	D	Casing: 8-5/8-inch to 63 feet. See log. feet; 4½-inch from 0 to 251 feet. Screen from
648	19.50	Jan. 22, 1942	C,E, ½	D	Casing: 8-5/8-inch 231 to 251 feet. See log. to 66 feet; 4½-inch from 0 to 104 feet, per-
649	d/ 25	1937	C,A, 11	Ind	Cased forated from 82 to 104 feet. See log. to bottom, two perforations 2 feet long at 450
650	--	--	C,E, 5	D	Cased to bottom. Reported feet. See log. yield 50 gallons a minute when drilled. See
651	d/ 125	1938	C,E, 3	D,S	Casing: 6-inch to 150 feet, cemented; log. 4½-inch from 0 to 340 feet, perforated from 310
652	d/ 70	1940	C,A, 5	D	Reported yield 4-inch to 340 feet. See log. pipe full 24 hours a day when drilled.
653	d/ 60	1932	A,-	D	Reported yield 85 gallons a minute when drilled.
654	--	--	A	Ind	Casing: 8-inch to 340 feet, cemented. Screen: 6-inch below 340 feet. Estimated yield 15 gal-
655	--	--	A	Ind	Casing: 8-inch to lons a minute. See log. 178 feet; 6-inch from 0 to 241 feet. Screen from 177 to 241 feet. Estimated yield 15 gal-
656	--	--	A	Ind	Casing: 8¼-inch lons a minute. See log. to 330 feet, cemented. Estimated yield 15 gallons a minute. See log.

Well	Water level: Below measuring point (ft.) a/	Water level: Date of measurement	Method of lift b/	Use of water c/	Remarks
657	--	--	None	N	Casing: 10¾-inch to 405 feet, cemented. Screen: 7-inch from 405 to 457 feet. Abandoned.
658	d/146	June 1938	T,E, 15	D,Ind	Casing: 13-inch to 356 feet, See log. cemented; 7-inch from 0 to 458 feet. Screen from 370 to 434 feet. Gravel-walled. Reported yield 100 gallons a minute when drilled. See
659	d/ 60	--	T,E, 5	Ind	Casing: 6-inch to 314 feet. Reported log. sand from 310 to 350 feet and yield 47 gallons
660	--	--	C,E, 3	D	Casing: 5½-inch to 250 feet and a minute. 4-inch to 350 feet. Reported yield 3 gallons
661	--	--	C,E, ½	D	Casing: 8-inch to 34 feet; 4½-inch a minute. from 0 to 221 feet, perforated from 199 to 221 feet. See log.

Records of wells in Gregg County--Continued

Well	Distance from Greggton	Owner (Lessor)	Driller	Date completed	Depth of well (ft.)	Diameter of well (in.)	Height of measuring point above ground (ft.)
662	3½ miles west	W. C. Turnbow	-- Adams	1934	390	10, 7	1.2
663	4 miles northwest	White Oak School No. 2	Layne-Texas Co.	1940	470	13-3/8, 7	1.5
664	4¾ miles north	Greggtex Gasoline Corp.	Bill Boling	1941	161	6¼	0
665	do.	do.	W. A. Meller	1934	410	6	0
666	do.	do.	do.	1934	420	6	--
667	8 miles north	Mabee Oil and Gas Co. (H.F.Whitehurst)	--	1932	320	8	--
668	2½ miles north	Leroy Ziegler	--	1937	148	6	--
669	1 mile northwest	H. C. Pederson	--	1937	20	36	--
670	In Greggton	Magnolia Petroleum Co.	Magnolia Petroleum Co.	1933	435	6-5/8	0
671	do.	do.	--	1931	425	6-5/8	--
672	do.	LeBus Rotary Tool Works	W. L. Little	1932	250	7	0
673	do.	Trinity Drilling Co.	--	1931	260	--	--
674	1¾ miles east	Royal Crown Bottling Co.	J. C. Boling	1940	350	6	0
675	do.	Jack Nesbitt	--	1931	150±	8	2.0
676	1½ miles southeast	Humble Oil and Refining Co. (E.B.Robertson)	--	--	300±	5	--
677	do.	Humble-Gulf (E.B.Robertson No.1)	Humble-Gulf	1937	10,284	--	--
678	2 miles southeast	Lone Star Gas Co.	Layne-Texas Co.	1941	423	7	0
679	3½ miles south	Humble Oil and Refining Co.	--	1937	300±	6	--
680	In Longview	R. G. Brown	--	1890	580	5	--
681	do.	Texas and Pacific Railway Co.	Texas and Pacific Railway Co.	1892	603	10	--

Well	Water level: Below measuring point (ft.) a/	Water level: Date of measurement	Method of lift b/	Use of water c/	Remarks
662	137.85	Sept.29, 1941	T,E, 15	Irr	Casing: 10-inch to 300 feet; 7-inch perforated from 300 to 390 feet. Reported sand from 320 to 390 feet and yield 40 gallons a minute.
663	172.08	Aug. 29, 1941	T,E, 7½	P	Casing: 13-3/8-inch to 360 feet, cemented; 7-inch from 315 to 470 feet. Gravel-walled. Yield 52 gallons a minute with drawdown of 103 feet when drilled. See log. Electrical log in files of the Texas State Board of Water Engineers shows thick sand from 100 to 220 feet and thin sands between 360 and 480 feet.
664	d/ 100	1941	T,E, 3	D	Cased to bottom. Reported yield 15 to 20 gallons a minute. See log.
665	d/ 100	1934	A	Ind	Casing: 6-inch to 390 feet. Reported yield 20 gallons a minute.
666	--	--	A	Ind	Cased to bottom. Reported yield 40 gallons a minute.
667	--	--	C,A	D	Cased to bottom. Reported yield 8 gallons a minute.
668	--	--	C,E, 1	D	Cased to bottom, perforated from 128 to 148 feet.
669	--	--	C,E, 1	D	Dug well.
670	d/ 75	1933	C,E, 5	P	Cased to bottom, perforated from 385 to 425 feet. Reported yield 3 gallons a minute.
671	--	--	None	N	Cased to bottom. Abandoned.
672	d/ 85	1932	C,E, 5	D,Ind	Cased to bottom. Reported yield 9 gallons a minute.
673	--	--	C,E	D	
674	d/ 80	1940	T,E, 3	Ind	Cased to bottom, perforated from 290 to 350 feet. Gravel-walled. Reported yield 60 gallons a minute.
675	84.47	Sept.10, 1941	C,E	N	Formerly supplied tourist courts.
676	--	--	A	Ind	Reported yield 60 gallons a minute.
677	--	--	--	--	Oil test. Electrical log from 486 to 1,900 feet in files of the Texas State Board of Water Engineers shows thin sands between 486 and 675 feet.
678	d/ 107	1941	T,A, 80	Ind	Casing: 13-3/8-inch to 302 feet, cemented; 7-inch from 0 to 423 feet. Screens at 313-338, 352-362, 371-381, 385-397, and 402-418 feet. Gravel-walled. Yield 200 gallons a minute with drawdown of 45 feet after 24 hours pumping. See log.
679	--	--	A	Ind	Reported yield 150 gallons a minute.
680	--	--	None	N	Water formerly used by ice factory; not suitable for boilers. Deussen No. 365 e/. See log.
681	--	--	None	N	Water formerly used for the manufacture of ice; not suitable for locomotives. Deussen No. 367 e/. See log.

Well	Water level: Below measuring point (ft.) a/	Water level: Date of measurement	Method of lift b/	Use of water c/	Remarks
682	--	--	C,E, 3	P	Cased to bottom, perforated from 384 to 407 feet. Estimated yield 10 gallons a minute,
683	--	--	C,E, 3	P	Cased to bottom. September 1941. See log. See log.
684	d/ 150	1937	C,-	D,Ind	
685	d/ 90	1937	C,E, 10	Ind	Cased to bottom. Reported yield 40 gallons a minute when drilled.
686	--	--	--	--	Oil test. Electrical log in files of Texas State Board of Water Engineers shows several
687	--	--	C,-	D,S, Ind	Cased to sands between 150 and 1,000 feet. bottom.
688	d/ 230	May 29, 1937	T,E, 25	D,Ind	Casing: 16-inch to 340 feet. Screen: 8-5/8-inch from 340 to 440 feet. Reported yield 300 gallons a minute with drawdown of 72 feet after
689	d/ 170	1938	T,E, 20	Ind	Casing: 13-3/8- 24 hours pumping. See log. inch to 260 feet; 7-inch from 0 to 437 feet. Screen from 354 to 437 feet. Gravel-walled. Reported yield 115 gallons a minute. See log.
690	--	--	None	N	See log.
691	--	--	--	--	Oil test. Electrical log in files of Texas State Board of Water Engineers shows several
692	--	--	--	--	Oil test. sands between 107 and 1,000 feet. Electrical log in files of Texas State Board of Water Engineers shows several sands between 100
693	--	--	C,E, 7½	D	Reported yield 23 gallons a and 1,000 feet. minute, January 1942.
694	d/ 40	1938	C,E, 3	D,S	Casing: 12-inch to 100 feet, cemented; 5½-inch from 0 to 271 feet, perforated from 233 to 271 feet. Reported yield 20 gallons a minute, Sep-
695	--	--	--	--	Oil test. Electrical log from tember 1941. 950 to 1,350 feet in files of Texas State Board of Water Engineers shows sand from 970 to 985
396	d/ 50	1933	C,A, 6	D	Cased to bottom, perforated from 367 to feet. 412 feet. Reported yield 7 gallons a minute.
697	134.52	Sept.25, 1941	T,E, 5	Ind	Cased to bottom. Reported yield 50 gallons a minute.
698	d/ 123	May 24, 1938	T,E, 15	Ind	Casing: 13-3/8-inch to 347 feet, cemented; 7-inch from 0 to 446 feet. Screens at 351-371 and 387-428 feet. Gravel-walled. Yield 105 gallons a minute with drawdown of 125 feet when
699	116.06	Sept.24, 1941	A,-	N	drilled. Temperature 74° F. See log.
700	d/ 90	1935	C,E, 2	P	
701	--	--	C,E, 3	D	Cased to bottom, perforated from 256 to 276 feet. Reported yield 30 gallons a minute. See
702	125.79	Oct. 21, 1941	A,-	N	Cased to bottom, perforated from 645 to log. 915 feet.

Records of wells in Gregg County--Continued

Well	Distance from Kilgore	Owner (Lessor)	Driller	Date completed	Depth of well (ft.)	Diameter of well (in.)	Height of measuring point above ground (ft.)
703	3 miles northeast	A. B. Spear	Layne-Texas Co.	1938	433	7	0
704	4½ miles northeast	Danville School	-- Leach	1936	19	96	0
705	9 miles east	Gregg County Air Port	Layne-Texas Co.	1941	603	16, 10	2.0

a/ Plus (+) indicates water level is above ground.
b/ T, turbine; A, air, steam or natural gas lift; H, hand pump or bucket and rope; C, cylinder; G, gasoline; E, electric. Number indicates horsepower.

Well	Water level: Below measuring point (ft.) a/	Water level: Date of measurement	Method of lift b/	Use of water c/	Remarks
703	d/ 117	July 3, 1938	T,E, 15	D,S, Irr	Casing: 13-3/8-inch to 348 feet, cemented; 6-5/8-inch from 0 to 425 feet. Screen from 355 to 413 feet. Gravel-walled. Yield 88 gallons a minute with drawdown of 173 feet when drilled. See log.
704	8.8	Sept. 2, 1941	C,E, 1	P	Dug well.
705	95.86	Aug. 29, 1941	T,E, 10	D,Ind	Casing: 16-inch to 307 feet, cemented; 10-inch from 0 to 454 feet. Screens at 246-249, 311-331, 357-368, and 413-444 feet. Yield 168 gallons a minute with drawdown of 109 feet after 24 hours pumping. See log. Electrical log in files of the Texas State Board of Water Engineers shows several sands between 55 and 500 feet.

c/ P, public supply; D, domestic; S, stock; Ind, industrial; N, not used.
d/ Water level reported by driller or owner.
e/ Number under which well is listed in U. S. Geol. Survey Water-Supply Paper 335, Alexander Deussen, 1914.
* This well is located in Upshur County, and is recorded in the Upshur County report; however, it is included here because it is one of the several wells used by the City of Gladewater.

Table of Drillers' Logs, Gregg County, Texas

Well 30

Tide Water Associated Oil Co. (J. J. Flewellen), 7¾ miles north of Longview. Layne-Texas Co., driller.

	Thickness (feet)	Depth (feet)
Sandy soil	3	3
Hard red clay and rock	6	9
Sandy yellow clay	35	44
Yellow sand and streaks of clay	45	89
Dark-brown sand	9	98
Rock	1	99
Brown sand, streaks of shale and boulders	39	138
Sandy green shale	24	162
Sandy brown shale and boulders	33	195
Rock	1	196
Sandy shale	37	233
Shale and streaks of sand	15	248
Rock	1	249
Shale and boulders, streaks of sand	28	277
Hard shale	26	303
Gray sand	12	315
Sandy gray shale	15	330
Gray sand	12	342
Sandy shale	22	364
Sandy streaks of shale	15	379
Fine-grained sand, streaks of shale	40	419
Sand and lignite	7	426
Sandy shale	21	447
Gray sand, good	20	467
Shale	7	474
Gray sand, good	28	502
Sand and shale	12	514
Shale and boulders	27	541
Sandy shale and boulders	38	579
Shale	10	589
Sand and gravel	10	599
Sandy shale	44	643
Sand and shale	22	665
Sand, streaks of shale	30	695
Gray sand	31	726
Rock	2	728
Sand	40	768
Boulders	3	771
Rock	3	774
Gray sand	38	812

Well 62

Humble Oil and Refining Co. (G. W. Willingham), 7 miles northwest of Longview. Layne-Texas Co., driller.

	Thickness (feet)	Depth (feet)
Clay	18	18
Sand, fair	28	46
Hard brown sand	25	71
Sandy shale, boulders	59	130
Brown sand	36	166
Shale and boulders	13	179
Coarse-grained white sand	16	195
Sandy shale and boulders	88	283
Shale and lignite	55	338
Black and grey sand	45	383
Sandy shale	7	390

Well 84a

Judson Grove School, 5¼ miles north of Longview.

	Thickness (feet)	Depth (feet)
Red beds	32	32
Water sand	6	38
Blue shale	97	135
Water sand	5	140
Blue shale	8	148
Lime and shell	2	150
Brown shale	60	210
Water sand	8	218
Brown shale	102	320
Water sand	6	326
Blue shale	46	372
Water sand	12	384
Blue shale	10	394

Well 112

Magnolia Petroleum Co. (W. E. Jones), 7 miles northwest of Longview. Layne-Texas Co., driller.

	Thickness (feet)	Depth (feet)
Sandy clay	15	15
Blue clay	18	33
Muddy sand	54	87
Shale and boulders	16	103
Sand with layers of shale	26	129
Shale and boulders	15	144
Brown sand	51	195
Shale and boulders	123	318
Shale	13	331

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Table of Drillers' Logs, Gregg County--Continued

	Thickness (feet)	Depth (feet)
Well 112--Continued		
Fine-grained grey sand	60	391
Sandy shale	31	422
Shale and boulders	77	499
Good sand	22	521
Shale	17	538
Good sand	30	568
Sandy shale	36	604
Sand, fair	19	623
Shale	31	654
Shale and lignite	98	752
Sand	49	801
Shale	10	811
Well 214		
Humble Oil and Refining Co. (W. W. Holland), 2 miles northeast of Gladewater.		
Clay and rock	15	15
Sand	60	75
Shale and boulders	98	173
Fine-grained white sand	18	191
Shale and boulders	104	295
Fine-grained sand	23	318
Shale and lignite	6	324
Sand	26	350
Hard shale and lignite	90	440
Sand	22	462
Shale and lignite	33	495
Record lost	35	530
Shale	8	538
Sand with layers of shale	45	583
Shale and lignite	24	607
Sandy shale	54	661
White sand	72	733
Shale and layers of sand	52	785
Shale and sand	10	795
Tough shale	42	837
Sand	12	849
Shale and boulders	49	898
Shale	48	946
Rock	2	948
Sand	4	952
Rock	3	955
Shale and boulders	39	994
Shale	90	1084
Well 258		
City of Gladewater No. 1 (Sam Kay), in Gladewater. Layne-Texas Co., driller.		
Soil	2	2
Boulders	1	3
Sandy clay	9	12
Sand	10	22
Red clay	4	26
Sticky shale	20	46
Fine-grained sand	15	61
Sticky shale	34	95
Fine-grained gray sand	47	142
Boulders	1	143
Shale and boulders	24	167
Sandy shale	16	183
Sticky lime	80	263
Sandy lime and boulders	10	273
Fine-grained sand and lignite	12	285
Shale and boulders	8	293
Shale and streaks of sand	34	327
Fine-grained gray sand and shale	54	381
Sticky shale	70	451
Hard shale and lignite	20	471
Sticky shale	8	479
Sandy shale	14	493
Hard sticky lime	67	560
Boulders	3	563
Sticky shale	14	577
Sand broken with shale	47	624
Sticky shale	45	669
Sandy lime	70	739
Fine-grained gray sand	10	749
Sticky lime	22	771
Boulders	1	772
Sand	12	784
Sticky shale	42	826
Well 259		
City of Gladewater No. 2, in Gladewater. Layne-Texas Co., driller.		
Rotary to surface	2	2
Soil	2	4
Sandy clay	5	9
Fine-grained sand and streaks of clay	80	89

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Table of Drillers' Logs, Gregg County--Continued

	Thickness (feet)	Depth (feet)
Well 259--Continued		
Green and white sand	36	125
Shale, lignite and boulders	46	171
Coarse-grained white sand	22	193
Shale and lignite	12	205
Good gray sand	16	221
Lignite and shale	41	262
Shale and boulders	16	278
Fine-grained muddy gray sand	38	316
Gray sand, broken	40	356
Shale and boulders	42	398
Shale and streaks of sand	50	448
Shale and sandy lime	83	531
Streaks of sand and shale	44	575
Shale, lignite, and boulders	19	594
Rock	2	596
Shale, lignite and boulders	73	669
Tough sticky shale	31	700
Sandy lime	25	725
Well 264		
City of Gladewater No. 3, in Gladewater. Layne-Texas Co., driller.		
Clay	13	13
Sand	16	29
Sandy shale and lignite	91	120
Shale	35	155
Sand with lignite	22	177
Shale	29	206
Sandy shale	20	226
Rock	5	231
Sandy shale	17	248
Rock	1	249
Sandy shale	31	280
Rock	1	281
Shale	152	433
Shale and boulders	50	483
Sand with layers of shale	20	503
Sandy shale and lignite	57	560
Well 265		
Sinclair-Prairie Oil Co. (W. H. York), ½ mile southwest of Gladewater. Conway Bros., driller.		
Soil	3	3
Sand	19	22
Quicksand	13	35
Blue shale	50	85
White sand	25	110
Lime	8	118
Gray shale	62	180
Brown shale	5	185
Sand	15	200
Brown shale	10	210
Blue shale	35	245
Water sand	20	265
Brown shale	20	285
Gray shale	40	325
Brown shale	25	350
Water sand	10	360
Brown shale	80	440
Water sand	40	480
Shale	135	615
Water sand	25	640
Shale	20	660
Water sand	30	690
Blue shale	22	712
Broken sand	10	722
Blue shale	53	775
Water sand	22	797
Broken sand	6	803
Blue shale	4	807
Well 275		
Stanolind Oil Co. (L. E. Pearsons), 5¼ miles east of Gladewater. L. W. Little, driller.		
Surface material	3	3
Red clay	8	11
Sandy clay	9	20
Sand	3	23
Sandy shale	24	47
Sand	7	54
Shale	13	67
Sand	1	68
Sand and shale	14	82
Lime	1	83
Sand	11	94
Lime	1	95
Sand	39	134
Shale	18	152

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Table of Drillers' Logs, Gregg County--Continued

	Thickness (feet)	Depth (feet)
Well 275--Continued		
Sand and lime	19	171
Sand and shale	25	196
Shale	23	219
Sand	50	269
Soft sand	31	300
Lime and hard sand	13	313
Shale	43	356
Sand	44	400
Shale	11	411
Sand	12	423
Shale	71	494
Sand	4	498
Shale	62	560
Sand	18	578
Shale	70	648
Sandy shale	82	730
Sand	12	742
Shale	43	785
Lime	3	788
Shale	28	816
Sand	12	828
Shale	17	845
Sand	11	856
Shale	4	860
Sand	10	870
Lime	2	872
Well 285		
Gulf Oil Corp. (M. Smith), 7 miles east of Gladewater.		
Surface clay	20	20
Sand	5	25
Shale	4	29
Rock	1	30
Packsand	15	45
Rock	1	46
Sandy shale	18	64
Sandy gumbo	5	69
Hard sand	11	80
Rock	1	81
Shale	39	120
Sand and boulders	18	138
Sandy shale	71	209
Sticky shale	18	227
Sand and lignite	30	257
Hard sand	26	283
Gumbo	4	287
Hard sand	42	329
Sandy shale	32	361
Shale	39	400
Rock	1	401
Sand and shale	39	440
Sand and shale	40	480
Gumbo	43	523
Hard rock	5	528
Gumbo	30	558
Shale and hard sand	32	590
Hard sand	34	624
White sand	34	658
Gray sand	100	758
White sand	30	788
Sandy gumbo	17	805
Rock	4	809
Hard sand	27	836
Sand	37	873
Sandy shale	20	893
Gumbo	67	960
Gumbo and lime	4	964
Well 290		
Tide Water Associated Oil Co. (E. M. Nettleton "A"), 5½ miles east of Gladewater. Mid-Kansas Oil Co., driller.		
Clay	10	10
Sand, shale and boulders	632	642
Rock	2	644
Sand and shale	136	780
Water sand	63	843
Well 411		
Sinclair-Prairie Oil Co. (M. T. Cole), 6¼ miles northwest of Kilgore. Layne-Texas Co., driller.		
Sand	91	91
Blue clay	44	135
Sand	19	154
Sand rock	2	156
Sand	14	170
Shale	17	187
Sand	31	218
Sticky lime	100	318
Sand	10	328
Sticky lime	4	332
Sand	32	364
Lignite	25	389
Sand	11	400
Lignite	18	418
Sand	36	454
Shale	69	523
Sand	11	534
Sticky lime	46	580

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Table of Drillers' Logs, Gregg County--Continued

	Thickness (feet)	Depth (feet)
Well 411--Continued		
Shale	8	588
Clay	14	602
Sand	14	616
Clay	1	617
Sand	16	633
Clay	4	637
Sand	12	649
Sticky lime	53	702
Sand	64	766
Lime	18	784
Shale	4	788
Lime	18	806
Sand	20	826
Lime	4	830
Sand	164	994
Clay	14	1008
Well 468		
City of Kilgore No. 4, in Kilgore City Park. Layne-Texas Co., driller.		
Red clay	16	16
Sand	10	26
Sandy shale	51	77
Rock	1	78
Sandy shale	38	116
Shale	41	157
Sandy shale	22	179
Shale, streaks of sand	51	230
Rock	1	231
Shale	8	239
Sandy shale	48	287
Fine-grained sand	16	303
Shale, streaks of sand	76	379
Shale	29	408
Sandy shale	199	607
Sand	20	627
Sand and shale	113	740
Sand	40	780

	Thickness (feet)	Depth (feet)
Well 469		
City of Kilgore No. 1, in Kilgore. Layne-Texas Co., driller.		
Surface material	1	1
Clay	6	7
Sandy clay	15	22
Shale and boulders	56	78
Shale, layers of sand	63	141
Shale	64	205
Sand	21	226
Shale	44	270
Shale, streaks of hard sand	56	326
Coarse-grained gray sand	18	344
Shale and lignite	89	433
Good sand	18	451
Shale	4	455
Sand	36	491
Shale, streaks of sand	87	578
Sand	28	606
Shale and boulders	35	641
Shale and lignite	76	717
Sticky shale	32	749
White sand, good	126	875
Well 470		
City of Kilgore No. 3, in Kilgore. Layne-Texas Co., driller.		
Surface soil	1	1
Clay	6	7
Sandy clay	12	19
Shale and layers of sand	15	34
Shale and boulders	41	75
Sand rock	2	77
Sand, boulders and shale	80	157
Shale and sand	66	223
Sandy shale	14	237
Shale, sand and lignite	286	523
Shale and boulders	52	575

(Continued on next page)

Table of Drillers' Logs, Gregg County--Continued

	Thickness (feet)	Depth (feet)
Well 470--Continued		
Sand	30	605
Shale and boulders	32	637
Shale, boulders, lignite	77	714
Sticky shale	15	729
Sand	9	738
Sticky shale	9	747
Sand	159	906
Well 471		
Humble Oil and Refining Co. (S. S. Laird "B"), ½ mile south of Kilgore. Layne-Texas Co., driller.		
Surface sand	3	3
Clay	15	18
Green sand	10	28
Shale and boulders	8	36
Green sand and boulders	27	63
Rock	2	65
Green sand	30	95
Lignite	4	99
Shale and sand	19	118
Shale, lignite, and boulders	76	194
Rock	4	198
Green sand and shale	31	229
Shale and lignite	28	257
Green sand	26	283
Shale and lignite	34	317
Fine-grained gray sand and lignite	79	396
Gray sand	38	434
Lignite and sand	46	480
Lignite	6	486
Shale and lignite	62	548
Rock	1	549
Sandy shale and boulders	37	586
Sticky shale	46	632
Rock	1	633
Sandy shale	58	691
Lignite	18	709
Shale and lignite	25	734
Rock	1	735
Shale	10	745
Sand and lignite	22	767
Lignite	17	784
Sand, lignite, and shale	66	850
Gray sand	12	862
Sand and shale	20	882
Shale	26	908

	Thickness (feet)	Depth (feet)
Well 607		
United Gas Public Service Co., 3 miles south of Longview. Layne-Texas Co., driller.		
Surface sand	3	3
Sandy yellow clay	34	37
Shale	13	50
Sandy shale	12	62
Rock	1	63
Shale	1	64
Rock	1	65
Shale	8	73
Rock	1	74
Shale	10	84
Sandy shale	21	105
Fine-grained white sand	11	116
Sandy shale and water sand	144	260
Sandy shale	37	297
Sand, streaks of shale	25	322
Sandy shale and lignite	30	352
Sandy shale	26	378
Well 640		
City of Gladewater (Test), in Gladewater City Park. Layne-Texas Co., driller.		
Red sandy clay	10	10
Fine-grained sand	5	15
Brown clay	12	27
Rock	1	28
Sand	21	49
Sand and lignite	92	141
Fine-grained white sand	22	163
Coarse-grained sand and lignite	10	173
Blue shale	12	185
Black shale	156	341
Shale	12	353
Rock	1	354
Sand	34	388
Shale	200	588
Brown shale and lignite	177	765

Table of Drillers' Logs, Gregg County--Continued

	Thickness (feet)	Depth (feet)
Well 75*		
City of Gladewater No. 4, 1½ miles northwest of Gladewater (in Upshur County). Layne-Texas Co., driller.		
Red clay	10	10
Sand	17	27
Rock	1	28
Black sand	26	54
Rock	1	55
Sand	16	71
Shale and lime	69	140
Shale	68	208
Sand	46	254
Shale	46	300
Blue shale	12	312
Sand	25	337
Blue shale	118	455
*This well is located in Upshur County and is recorded in the Upshur County report; however, it is included here because it is one of the several wells used by the City of Gladewater.		
Well 641		
City of Gladewater No. 5, ½ mile southwest of Gladewater. Layne-Texas Co., driller.		
Surface sand	3	3
Clay	10	13
Shale	121	134
Sand	24	158
Shale	50	208
Sand	60	268
Sandy shale	11	279
Well 642		
Tide Water Associated Oil Co. (W. H. Richey), 1¾ miles northeast of Gladewater. Johnson and Sitton, driller.		
Sand, clay, and shale	45	45
Water sand	15	60
Shale and shells	300	360
Water sand	15	375
Shale	149	524
Water sand	76	600

	Thickness (feet)	Depth (feet)
Well 643		
Gulf Oil Corp. (J. H. Bozeman), 2¾ miles northeast of Gladewater. R. L. Miles, driller.		
Surface sand	3	3
Red clay	7	10
Sandy clay	25	35
Sandy clay and gravel	66	101
Sand and gravel	59	160
Rock	1	161
Rock, sand, and gravel	74	235
Lignite	10	245
Fine-grained sand and gravel	54	299
Fine-grained sand	44	343
Fine-grained sand and gravel	131	474
Sand and boulders	65	539
Rock	2	541
Fine-grained sand	67	608
Coarse-grained water sand	42	650
Fine-grained sand	57	707
Sandy shale	10	717
Fine-grained sand	33	750
Sand and lignite	62	812
Rock	1	813
Fine-grained sand	17	830
Coarse-grained water sand and gravel	6	836
Sandy shale	187	1023
Well 645		
Gulf Oil Corp. (M. O. Sheppard), 2½ miles southeast of Gladewater. H. L. Taylor, driller.		
Surface soil	3	3
Red clay	12	15
Blue shale	10	25
Quicksand	15	40
Blue shale	12	52
Hard sand rock	3	55
Blue shale	12	67
Hard sand rock	2	69

(Continued on next page)

Table of Drillers' Logs, Gregg County--Continued

	Thickness (feet)	Depth (feet)
Well 645--Continued		
Sandy shale	14	83
Hard sand rock	3	86
Sandy shale	54	140
Blue shale	100	240
Gray sandy shale	21	261
Brown shale	22	283
Water sand	11	294
Sandy shale	10	304
Well 646		
Gulf Oil Corp. (M. O. Sheppard), 2½ miles southeast of Gladewater. Bill Boling, driller.		
Clay	31	31
Quicksand	14	45
Grey shale	30	75
Blue shale	20	95
Gray shale	105	200
Blue shale	25	225
Brown shale	40	265
Blue shale	15	280
Water sand	25	305
Well 647		
Gulf Oil Corp. (F. M. Fonville), 1¾ miles southeast of Gladewater. Bill Boling, driller.		
Surface sand	63	63
Lime and shell	1	64
Brown shale	8	72
Blue shale	24	96
Sandy gray shale	89	185
Blue shale	32	217
Water sand	28	245
Brown shale	13	258
Well 648		
Gulf Oil Corp. (E. L. Walker), 3¼ miles southeast of Gladewater. Bill Boling, driller.		
Sand	38	38
Black shale	28	66
Lime and shell	2	68
Blue shale	12	80
Water sand	19	99
Gray shale	5	104

	Thickness (feet)	Depth (feet)
Well 649		
Erle P. Halliburton, Inc. (W. D. Lacy "B"), 3½ miles southeast of Gladewater. Dan Kerr, driller.		
Surface clay	45	45
Red sand	20	65
Shale and sand	25	90
Sand rock	2	92
Sand and boulders	8	100
Gravel	26	126
Sandy shale	26	152
Rock	2	154
Shale	11	165
Shale and boulders	15	180
Water sand	85	265
Lignite	2	267
Sand rock	2	269
Lignite	2	271
Hard shale	43	314
Packsand	31	345
Brown shale	15	360
Sandy shale	22	382
Hard sand	23	405
Shale and boulders	33	438
Water sand	31	469
Sandy gravel	40	509
Packsand	10	519
Hard shale	28	547
Packsand	13	560
Hard shale	18	578
Sand	20	598
Hard shale	34	632
Brown shale	39	671
Water sand	52	723
Sandy shale	42	763
Well 650		
Gulf Oil Corp. (J. C. Judge), 5¼ miles southeast of Gladewater. H. L. Taylor, driller.		
Surface clay, sand and boulders	60	60
Sandy shale	17	77
Black shale and boulders	68	145
Shale and boulders	6	151
Sandy shale	83	234
Water sand	15	249
Coarse-grained water sand	7	256

(Continued on next page)

Table of Drillers' Logs, Gregg County--Continued

	Thickness (feet)	Depth (feet)
Well 650--Continued		
Fine-grained hard sand	19	275
Shale	3	278
Coarse-grained hard sand	16	294
Fine-grained hard sand	8	302
Well 651		
Atlantic Refining Co., 5 miles southeast of Gladewater. J. C. Boling, driller.		
Surface soil	150	150
Shale	138	288
Water sand	14	302
Shale	8	310
Water sand	15	325
Shale	15	340
Well 654		
Sinclair-Prairie Oil Co. No. 2 (D. Moore), 5 miles southeast of Gladewater. W. A. Meller, driller.		
Surface sand and clay	17	17
Surface sand	26	43
Sand	54	97
Gumbo and boulders	44	141
Shale	28	169
Water sand	55	224
Shale, gumbo and boulders	116	340
Water sand	11	351
Gumbo	15	366
Water sand	16	382
Gumbo	33	415
Water sand	8	423
Gumbo	14	437
Water sand	21	458
Gumbo	18	476
Well 655		
Sinclair-Prairie Oil Co. No. 3 (D. Moore), 5 miles southeast of Gladewater. W. A. Meller, driller.		
Surface clay	12	12
Surface sand	35	47
Shale and boulders	132	179
Water sand	55	234
Gumbo	7	241
Well 656		
Sinclair-Prairie Oil Co. No. 4 (D. Moore), 5 miles southeast of Gladewater. W. A. Meller, driller.		
Surface clay and sand	13	13
Surface sand	54	67
Sandy shale	51	118
Gumbo and boulders	68	186
Shale and gumbo	148	334
Water sand	19	353
Gumbo	18	371
Water sand	37	408
Gumbo and shale	48	456
Well 657		
Tide Water Associated Oil Co. (E. M. Nettleton "A"), 3½ miles west of Greggton. W. A. Meller, driller.		
Surface sand and clay	30	30
Surface sand	32	62
Rock	1	63
Sand and rock	18	81
Gumbo	4	85
Sand	37	122
Sandy shale	55	177
Gumbo	8	185
Rock	1	186
Gumbo	16	202
Sand and shale	68	270
Blue sand	52	322
Rock	1	323
Blue sand	82	405
Sand	38	443
Hard shale	7	450
Shale	7	457
Well sanded up, could not pull casing, another well drilled at camp.		
Well 658		
Tide Water Associated Oil Co. No. 2 (E. M. Nettleton "A"), 3½ miles west of Greggton. Layne-Texas Co., driller.		
Sandy clay	15	15
Sand	13	28
Rock	1	29
Sand	43	72
Rock	1	73
Hard sand	44	117
Shale	22	139

(Continued on next page)

Table of Drillers' Logs, Gregg County--Continued

	Thickness (feet)	Depth (feet)
Well 658--Continued		
Sand with shale breaks	23	162
Hard shale	44	206
Sandy shale	45	251
Shale and lignite	23	274
Good sand	22	296
Sandy shale	22	318
Sand rock	33	351
Rock	2	353
Shale	8	361
Good sand	80	441
Shale	17	458
Well 661		
Gulf Oil Corp. (Lacy-Snider), 3 miles northwest of Greggton. Bill Boling, driller.		
Clay	25	25
Quicksand	13	38
Black shale	16	54
Blue shale	26	80
Grey shale	25	105
Brown shale	15	120
Blue shale	58	178
Sandy lime	4	182
Brown shale	13	195
Water sand	25	220
Brown shale	8	228
Well 663		
White Oak School No. 2, 4 miles northwest of Greggton. Layne-Texas Co., driller.		
Soil and clay	13	13
Yellow sand	14	27
Shale	16	43
Sand	52	95
Rock	1	96
Sand and breaks of shale	23	119
Sandy shale and boulders	17	136
Rock	1	137
Sandy shale	24	161
Shale and lignite	36	197
Sandy lime and shale	24	221
Shale and boulders	18	239
Rock	1	240
Hard sand, lime and rock layers	27	267
Shale and lignite	69	336
Rock	1	337
Shale and lignite	27	364
Sand	18	382
Shale	2	384
Sandy shale	11	395
Rock	1	396
Shale and lignite	9	405
Rock	1	406
Fine-grained hard sand	30	436
Shale and lignite	13	449
Rock	1	450
Shale and lignite	19	469
Shale	15	484
Shale and lignite	72	556
Rock	2	558
Shale and lignite	11	569
Sand and sandy shale	28	597
Shale and lignite	25	622
Well 664		
Greggtex Gasoline Corp., 4¾ miles north of Greggton. Bill Boling, driller.		
Red clay	12	12
Yellow sand, 2 gallons a minute	43	55
Shale	60	115
Coarse-grained gray water sand	25	140
Shale	21	161
Well 678		
Lone Star Gas Co., 2 miles southeast of Greggton. Layne-Texas Co., driller.		
Soil	1	1
Red sand, clay and iron boulders	15	16
Dark-grey shale	2	18
Sharp grey sand	11	29
Shale and fine-grained gray sand	39	68
Grey sand with thin streaks of lignite	25	93
Grey sandy shale with layers of rock	20	113

(Continued on next page)

Table of Drillers' Logs, Gregg County--Continued

	Thickness (feet)	Depth (feet)
Well 678--Continued		
Hard shale and lignite	9	122
Sandy shale and lignite	5	127
Shely hard sand and lignite	9	136
Sandy shale and lignite	17	153
Grey sand	6	159
Grey shale	35	194
Sand and shale	63	257
Shale	5	262
Sand and shale	9	271
Sand, hard layers of boulders	4	275
Coarse-grained smooth gray sand	28	303
Sharp light-gray sand and layers of shale	25	328
Sharp sand and layers of shale	10	338
Shale and streaks of sand	6	344
Sand rock	3	347
Shale and sand breaks	8	355
Sand and streaks of shale	7	362
Shale	4	366
Clean sharp gray sand	15	381
Shale	2	383
Clean sharp gray sand	12	395
Gray sand, few thin streaks of shale and lignite	7	402
Clean sharp gray sand	20	422
Breaks of sand, shale and lignite	3	425
Gray sand	38	463
Fine-grained hard gray sand with streaks of shale	54	517
Fine-grained gray sand with thin layers of shale and lignite	26	543
Shale, sand breaks and lignite	15	558

	Thickness (feet)	Depth (feet)
Well 680 (Deussen No. 365 a/)		
R. G. Brown, in Longview.		
Mount Selman formation:		
Sand and clay	90	90
Wilcox formation:		
Lignite	10	100
Shale	2	102
Blue sand	150	252
Interstratified rock and clay	100	352
Grey water sand; water did not rise to surface; cased off	98	450
Clay (?)	?	
Water-bearing sand	?	580

a/ Number under which well is listed in U. S. Geol. Survey Water-Supply Paper 335, Alexander Deussen, 1914.

	Thickness (feet)	Depth (feet)
Well 681 (Deussen No. 367 a/)		
Texas and Pacific Railway Co., in Longview. Texas and Pacific Railway Co., driller.		
Mount Selman formation:		
Clay	35	35
Limestone (probably sandstone)	10	45
Wilcox formation:		
Shale	31	76
Sand rock	72	148
Black shale	8	156
Shale	44	200
Sand rock	20	220
Shale	25	245
Sand rock	24	269
Shale	76	345
Slate	25	370
Shale	110	480
Slate	11	491
Sand rock	19	510
Sand	12	522
Shale	45	567
Packsand	36	603

a/ Number under which well is listed in U. S. Geol. Survey Water-Supply Paper 335, Alexander Deusson, 1914.

Table of Drillers' Logs, Gregg County--Continued

	Thickness (feet)	Depth (feet)
Well 682		
Sabine School No. 3, 6½ miles northwest of Kilgore. O. B. Harris, driller.		
Shale	15	15
Quicksand	13	28
Sandy shale	42	70
Quicksand	32	102
Brown shale	23	125
Blue shale	17	142
Water sand	6	148
Brown shale	32	180
Blue shale	72	252
Water sand	8	260
Blue shale	135	395
Water sand	7	402
Brown shale	5	407
Well 683		
North Chapel Colored School, 4½ miles northwest of Kilgore. J. C. Boling, driller.		
Surface material	35	35
Quicksand	60	95
Shale	125	220
Water sand	15	235
Shale	20	255
Well 688		
Gulf Oil Corp. (M. E. Peterson), 2½ miles southwest of Kilgore (Rusk County). Layne-Texas Co., driller.		
Surface soil	4	4
Clay	3	7
Sand	15	22
Clay	32	54
Shale	5	59
Sand	8	67
Shale	33	100
Rock	2	102
Shale	16	118
Sand	18	136
Shale	4	140
Rock	1	141
Shale	13	154
Sandy shale	9	163
Rock	2	165
Shale and boulders	25	190
Shale and layers of sand	23	213
Hard shale	20	233
Shale and lignite	29	262
Sand	15	277
Sandy shale	8	285
Sand	16	301
Sandy shale	45	346
Sand	94	440
Well 689		
Tide Water Associated Oil Co. (Nat Bean "A"), 1¾ miles southwest of Kilgore (Rusk County). Layne-Texas Co., driller.		
Red clay	25	25
Rock	1	26
Gray sand	28	54
Rock	1	55
Soft brown shale	47	102
Soft gray shale and fine-grained sand	60	162
Soft gray shale	91	253
Fine-grained light-gray sand	39	292
Soft shale	5	297
Light-gray sand	55	352
Soft shale	7	359
Good water sand	10	369
Soft shale and thin layers of sand	28	397
Good water sand	16	413
Hard blue shale	24	437
Well 690		
Tide Water Associated Oil Co. (J. B. Watson), ¾ mile west of Kilgore. Fred Fiedler, driller.		
Sandy clay	38	38
Shale and gumbo	232	270
Shale and lignite	15	285
Sand and boulders	15	300
Blue gumbo	40	340
Rock	2	342
Sand, shale and lignite	58	400
Gray shale	65	465
Sandy shale	75	540
Blue shale	134	674
Sand and shale	41	715
Water sand	217	932
Well 698		
Tide Water Associated Oil Co. (M. G. Barton), 2¼ miles north of Kilgore. Layne-Texas Co., driller.		
Yellow clay	25	25

(Continued on next page)

Table of Drillers' Logs, Gregg County--Continued

	Thickness (feet)	Depth (feet)
Well 698--Continued		
Sand	3	28
Shale	43	71
Rock	2	73
Sandy shale	5	78
Rock	1	79
Sandy shale	16	95
Rock	1	96
Hard shale	251	347
Sand and breaks of shale	27	374
Shale	9	383
Sand and breaks of shale	49	432
Sandy shale	69	501
Sand	25	526
Sandy shale	43	569
Well 701		
M. B. Hughey, 3¾ miles north of Kilgore. Bill Boling, driller.		
Surface clay and shale	240	240
Sand	15	255
Shale	21	276
Well 703		
A. B. Spear, 3 miles northeast of Kilgore. Layne-Texas Co., driller.		
Red sandy clay	10	10
Red sand	3	13
Yellow clay	15	28
Rock	1	29
Sand	10	39
Rock	1	40
Sand	5	45
Rock	1	46
Sand	9	55
Rock	2	57
Sand	56	113
Shale	5	118
Lignite and shale	46	164
Hard shale	42	206
Sandy shale	14	220
Rock	1	221
Sand rock	9	230
Sandy shale	46	276
Good sand	45	321
Shale	30	351
Rock	1	352
Good sand	69	421
Shale	12	433

	Thickness (feet)	Depth (feet)
Well 705		
Gregg County Air Port, 9 miles east of Kilgore. Layne-Texas Co., driller.		
Red clay	12	12
Sandy clay	11	23
Gray sand	5	28
Gray shale	22	50
Rock	2	52
Hard shale and rock	4	56
Brown sand and lignite	17	73
Rock	2	75
Sand and lignite	3	78
Hard brown sand	9	87
Rock	1	88
Hard brown sand	8	96
Hard gray sand	17	113
Hard gray shale and streaks of sand	61	174
Gray shale and streaks of sand	33	207
Gray shale	42	249
Grey shale and streaks of sand	17	266
Rock	1	267
Gray shale and streaks of sand	39	306
Gray sand and streaks of shale, water	25	331
Shale	19	350
Gray sand, water	17	367
Gray shale and streaks of lignite	21	388
Sandy shale	7	395
Gray sand and streaks of shale	7	402
Shale	3	405
Grey sand and streaks of shale, water	37	442
Broken sand and shale	22	464
Gray sand	10	474
Rock	2	476
Sand and shale	14	490
Sandy shale and lignite	46	536
Shale and lignite	11	547
Sandy shale and lignite	5	552
Shale and lignite	8	560
Sandy shale and lignite	43	603

Partial analyses of water from wells in Gregg County, Texas

Analyzed at The University of Texas under the direction of Dr. E. P. Schoch, Director of the Bureau of Industrial Chemistry, and W. W. Hastings, Assistant Chemist. U. S. Department of the Interior, Geological Survey. Results are in parts per million. Well numbers correspond to numbers in table of well records.

Well	Owner (Lessor)	Depth of well (ft.)	Date of collection	Total dissolved solids	Calcium (Ca)	Magnesium (Mg)
30	Tide Water Associated Oil Co. (J. J. Flewellen)	812	Mar. 23, 1936	2,299	12	4
62	Humble Oil and Refining Co. (G. W. Willingham)	390	June 15, 1936	323	c/	4
84a	Judson Grove School	394	July 29, 1936	50	-	-
112	Magnolia Petroleum Co. (W. E. Jones)	811	Mar. 19, 1936	1,983	12	3
178	Dr. -- Hurst	348	June 1, 1936	128	28	26
214	Hunble Oil and Refining Co. (W. W. Holland)	1,084	Mar. 31, 1936	967	6	4
258	City of Gladewater No. 1	826	Apr. 27, 1936	1,199	5	6
259	City of Gladewater No. 2	388	do.	663	6	-
259	do.	388	--	-	-	-
264	City of Gladewater No. 3	213	Mar. 30, 1936	854	6	4
265	Sinclair Prairie Oil Co. (W. H. York)	807	Apr. 29, 1936	2,427	c/	-
275	Stanolind Oil and Gas Co. (L. E. Pearsons)	872	Apr. 6, 1936	2,575	5	9
285	Gulf Oil Corp. (M. Smith)	964	Oct. 7, 1941	1,738	c/	5.1
290	Tide Water Associated Oil Co. (E. M. Nettleton "A")	843	Mar. 27, 1936	1,725	c/	3
411	Sinclair-Prairie Oil Co. (M. T. Cole)	1,008	Apr. 29, 1936	1,981	-	4
468	City of Kilgore No. 4	780	Apr. 14, 1936	1,688	6	a/
468	do.	780	Oct. 8, 1941	1,595	c/	-
469	City of Kilgore No. 1	875	Apr. 14, 1936	1,683	6	4
469	do.	875	-	1,732	10	-
469	do.	-	-	-	-	-
469	do.	875	Oct. 3, 1941	1,777	-	3.9
470	City of Kilgore No. 3	906	Apr. 14, 1936	2,084	6	9
470	do.	906	Oct. 3, 1941	1,826	-	5.1
471	Humble Oil and Refining Co. (S. S. Laird "B")	908	Apr. 15, 1936	732	6	3
471	do.	908	-	951	15	3
471	do.	-	-	-	-	-
476	Shell Oil Co., Inc. (W.W.Elder)	500	Apr. 13, 1936	448	-	4
503	D. H. Jones	467	June 30, 1936	2,028	c/	4
525	Magnolia Pipe Line Co.	218	Apr. 24, 1936	536	c/	4
531	Atlantic Pipe Line Co.	365	do.	680	-	-
607	United Gas Public Service Co.	378	June 24, 1936	1,111	7	6
d/641	City of Gladewater No. 5	279	Jan. 22, 1942	687	11	a/
*75	City of Gladewater No. 4	294	Apr. 4, 1940	766	-	-
*75	do.	294	Jan. 22, 1942	871	32	6.1
644	J. H. Bozeman	400	Sept. 18, 1941	102	11	5.1
645	Gulf Oil Corp. (M. O. Sheppard)	304	Sept. 2, 1941	550	12	a/

a/ Less than 3 parts per million.
b/ Less than 20 parts per million.
c/ Less than 5 parts per million.

Well	Sodium and Potassium (Na + K) (calc.)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Total hardness as $CaCO_3$ (calc.)
30	872	360	-	1,234	-	-	47
62	120	159	19	98	-	-	27
84a	-	36	-	13	-	-	-
112	777	463	-	960	-	-	40
178	-	6	8	63	-	-	176
214	372	244	40	425	-	-	32
258	473	537	21	430	-	-	39
259	266	402	23	170	-	-	15
259	-	-	30	132	-	-	20
264	337	513	35	220	-	-	32
265	973	573	-	1,170	-	-	4
275	1,020	775	-	1,160	-	-	50
285	696	726	3	670	1.8	-	33
290	698	757	-	650	-	-	17
411	800	751	8	800	-	-	16
468	678	720	8	640	-	-	27
468	636	604	23	630	0.5	-	27
469	674	720	-	645	-	-	32
469	665	677	60	588	-	-	25
469	-	588	10	595	-	-	2
469	711	598	27	740	0.7	-	17
470	826	743	-	880	-	-	50
470	728	586	23	780	0.6	-	23
471	295	604	29	102	-	-	27
471	335	639	34	155	-	-	30
471	-	-	25	140	-	-	12
476	184	457	21	14	-	-	16
503	808	555	-	940	-	-	22
525	217	525	37	18	-	-	22
531	292	732	8	20	-	-	1
607	439	665	42	290	-	-	44
641	267	451	34	150	0.4	b/	37
*75	311	394	26	238	0	3.0	28
*75	311	427	30	282	0.2	b/	104
644	21	31	2	48	.3	b/	48
645	216	512	31	36	.6	b/	36

d/ Analyses of water from selected wells are given in milligram equivalents per liter on page 34.

* This well is located in Upshur County, and is recorded in the Upshur County report; however, it is included here because it is one of the several wells used by the City of Gladewater.

Partial analyses of water from wells in Gregg County--Continued

Well	Owner (Lessor)	Depth of well (ft.)	Date of collection	Total dissolved solids	Calcium (Ca)	Magnesium (Mg)
d/646	Gulf Oil Corp. (M. O. Sheppard)	305	Jan. 22, 1942	276	47	4.9
647	Gulf Oil Corp. (F. N. Fonville)	258	do.	488	6.0	7.3
d/649	E. P. Halliburton Inc. (W. D. Lacy "B")	485	do.	455	c/	a/
650	Gulf Oil Corp. (J. C. Judge)	302	Aug. 28, 1941	462	c/	a/
651	Atlantic Refining Co. (Martin Hays)	340	do.	505	c/	a/
652	Atlantic Refining Co. (S. C. Fishburn)	214+	Sept. 23, 1941	801	c/	a/
d/653	Superior Oil Co. (W. E. Pasture)	512	Sept. 18, 1941	815	c/	a/
654	Sinclair-Prairie Oil Co. No. 2 (D. Moore)	476	Aug. 27, 1941	667	8.4	3.9
655	Sinclair-Prairie Oil Co. No. 3 (D. Moore)	241	do.	469	c/	a/
656	Sinclair-Prairie Oil Co. No. 4 (D. Moore)	456	do.	669	c/	a/
d/658	Tide Water Associated Oil Co. No. 2 (E. M. Nettleton "A")	458	Aug. 28, 1941	538	8.4	a/
659	Texas-Empire Pipe Line Co. (E. M. Nettleton "A")	375	Oct. 21, 1941	680	7.2	3.4
660	Atlantic Refining Co. (P. B. Harris)	362	Sept. 17, 1941	630	6.0	a/
661	Gulf Oil Corp. (Lacy-Snider)	228	Jan. 22, 1942	475	11	a/
d/663	White Oak School No. 2	470	Aug. 29, 1941	706	c/	3.9
d/664	Greggtex Gasoline Corp.	161	Jan. 22, 1942	161	14	8.5
665	do.	410	do.	1,147	18	6.1
d/666	do.	420	do.	1,175	24	6.1
d/667	Mabee Oil and Gas Co. (H. F. Whitehurst)	320	Nov. 20, 1941	400	c/	a/
668	Leroy Ziegler	148	Sept. 19, 1941	183	21	12
669	H. C. Pederson	20	Aug. 29, 1941	22	c/	a/
d/670	Magnolia Petroleum Co.	425	Sept. 11, 1941	1,350	8.8	5.1
672	LeBus Rotary Tool Works	250	Sept. 10, 1941	1,335	20	3.9
674	Royal Crown Bottling Co.	350	do.	1,584	12	3.9
676	Humble Oil and Refining Co. (E. B. Robertson)	300±	Sept. 8, 1941	100	6.4	a/
d/678	Lone Star Gas Co.	423	Oct. 1, 1941	1,673	6.4	a/
679	Humble Oil and Refining Co.	300±	Sept. 8, 1941	723	c/	3.9
682	Sabine School No. 3	407	Sept. 11, 1941	376	c/	a/
d/683	North Chapel Colored School	255	do.	186	19	5.1
d/684	Midfield Oil Co. (Benson"A")	900±	Sept. 25, 1941	696	c/	a/
685	Danciger Oil and Refining Co. (McNeeley)	625	do.	368	12	a/
d/687	Jacob H. Wood	625	Sept. 3, 1941	411	8	a/
688	Gulf Oil Corp. (M. E. Peterson)	440	Aug. 28, 1941	359	8	a/
689	Tide Water Associated Oil Co. (Nat Bean "A")	437	Oct. 4, 1941	389	c/	a/
d/693	Malcom Crim	312	Jan. 21, 1942	424	c/	a/
694	Doug Godfrey	272	Sept. 3, 1941	461	c/	a/
696	Houston Oil Co. (J. S. Elder)	416	Jan. 19, 1942	1,950	117	60
d/698	Tide Water Associated Oil Co. (M. G. Barton)	569	Sept. 25, 1941	513	c/	a/
d/700	Hughey School	190	Sept. 11, 1941	456	c/	a/

Well	Sodium and Potassium (Na + K) (calc.)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Total hardness as $CaCO_3$ (calc.)
646	52	207	52	18	.2	b/	138
647	187	451	30	36	.1	b/	45
649	187	433	25	24	-	b/	11
650	185	445	31	20	-	b/	22
651	207	506	10	31	.9	b/	22
652	336	634	12	140	-	b/	1
653	336	610	18	158	-	b/	12
654	267	592	14	83	-	b/	37
655	189	397	27	52	.2	b/	16
656	279	604	14	74	.9	b/	10
658	213	506	31	34	-	b/	32
659	273	586	15	93	.2	b/	32
660	255	506	16	102	-	b/	21
661	187	482	15	22	.3	b/	36
663	291	580	12	113	.7	b/	17
664	37	122	20	21	.1	b/	70
665	429	250	20	550	.2	b/	69
666	433	250	26	562	.3	b/	84
667	165	293	8	80	.5	b/	5
668	29	37	27	76	-	b/	103
669	2.3	18	2	3.0	-	b/	16
670	520	262	27	660	-	b/	43
672	502	226	27	670	-	b/	67
674	615	336	2	785	-	b/	47
676	26	37	31	16	-	b/	27
678	662	427	2	790	.3	b/	27
679	297	616	5	110	1.2	b/	22
682	155	354	31	14	.4	b/	5
683	48	146	20	22	.1	b/	68
684	297	708	15	35	1.0	b/	1
685	134	305	35	34	.2	b/	42
687	163	421	23	8.0	-	b/	26
688	140	354	27	8.0	-	b/	26
689	158	372	38	6.0	-	b/	10
693	172	397	41	10	.4	b/	11
694	184	421	54	10	-	b/	16
696	443	250	1,104	102	.3	b/	537
698	207	506	35	15	-	b/	22
700	185	415	46	16	1.0	b/	11

Partial analyses of water from wells in Gregg County--Continued

Well	Owner (Lessor)	Depth of well (ft.)	Date of collection	Total dissolved solids	Calcium (Ca)	Magnesium (Mg)
701	M. B. Hughey	276	Sept. 11, 1941	502	c/	a/
703	A. B. Spear	433	Sept. 5, 1941	565	7.6	a/
d/704	Danville School	19	Sept. 2, 1941	102	12	9.7
d/705	Gregg County Air Port	603	do.	673	c/	5.1
**176	J. W. Johnson (H. W. Norvell)	20	Oct. 27, 1941	86	7.6	6.1
**481	Tide Water Associated Oil Co. (J. M. Blackman)	955	--	1,507	0.4	2.7

a/ Less than 2 parts per million.
b/ Less than 20 parts per million.
c/ Less than 5 parts per million.

Well	Sodium and Potassium (Na + K) (calc.)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Total hardness as $CaCO_3$ (calc.)
701	201	476	42	18	-	b/	22
703	231	573	31	13	.4	b/	20
704	8.5	37	46	8.0	.1	b/	71
705	272	549	38	86	.5	b/	23
176	8.7	6	3	14	0.1	b/	44
463	607	622	31	560	-	0	12

d/ Analyses of water from selected wells are given in milligram equivalents per liter on page 34.

* This well is in Upshur County, and is recorded in the Upshur County report; however, it is included here because it is one of the several wells used by the City of Gladewater.

** Well records in Gregg County publication for February 15, 1937.

Chemical Analyses--Continued

Results are in milligram equivalents per liter

Well	Owner (Lessor)	Depth of well (ft.)	Date of collection	Calcium (Ca)	Magnesium (Mg)	Sodium and Potassium (Na + K) (calc.)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Total hardness as $CaCO_3$ (calc.)
641	City of Gladewater No.5	279	Jan. 22, 1942	0.54	0.20	11.61	7.40	0.702	4.23	0.02	0	0.74
646	Gulf Oil Corp. (M. O. Sheppard)	305	do.	2.36	0.40	2.25	3.40	1.092	0.51	0.01	0	2.76
649	F. P. Halliburton	495	do.	0.12	0.10	8.12	7.10	0.52	0.68	-	0.04	0.22
653	Superior Oil Co. (S. C. Fishburn)	512	Sept.18, 1941	0.02	0.22	14.59	10.00	0.37	4.46	-	-	0.24
658	Tide Water Associated Oil Co. No. 2	458	Aug. 28, 1941	0.42	0.22	9.26	8.30	0.64	.96	-	-	0.64
663	White Oak School No. 2	470	Aug. 29, 1941	0.02	0.32	12.64	9.50	0.25	3.19	0.04	-	0.34
664	Greggtex Gasoline Corp.	161	Jan. 22, 1941	0.70	0.70	1.62	2.00	0.42	0.59	0.005	0	1.40
666	do.	420	do.	1.18	0.50	18.84	4.10	0.546	15.85	0.015	0	1.68
667	Mabee Oil and Gas Co.	320	Nov. 20, 1941	0.06	0.04	7.18	4.80	0.17	2.26	0.03	0.02	0.10
670	Magnolia Petroleum Co.	425	Sept.11, 1941	0.44	0.42	22.61	4.30	0.56	18.61	-	-	0.86
678	Lone Star Gas Co.	423	Oct. 1, 1941	0.32	0.22	28.78	7.00	0.04	22.28	0.015	-	0.54
683	North Chapel Colored School	255	Sept.11, 1941	0.94	0.42	2.08	2.40	0.42	0.62	0.005	-	1.36
687	Jacob H. Wood (McNeeley)	625	Sept. 3, 1941	0.40	0.12	7.09	6.90	0.48	.23	-	-	0.52
693	Malcom Crim	312	Jan. 21, 1942	0.12	0.10	7.46	6.50	0.858	0.28	0.02	0.02	0.22
698	Tide Water Associated Oil Co. (M.G.Barton)	569	Sept.25, 1941	0.22	0.22	9.00	8.30	0.72	0.42	-	-	0.44
700	Hughey School	190	Sept.11, 1941	0.10	0.12	8.04	6.80	0.96	0.45	0.05	-	0.22
704	Danville School	19	Sept. 2, 1941	0.62	0.80	0.37	0.60	0.96	.23	0.005	-	1.42
705	Gregg County Air Port	603	do.	0.04	0.42	11.80	9.00	0.80	2.43	0.03	-	0.46

Figure -1-

GEOLOGIC MAP OF EIGHT COUNTIES IN NORTHEAST TEXAS

SCALE
10 0 10 MILES

— LEGEND —

- Q — Alluvium
- Es — Sparta sand
- Ew — Weches greensand member } Mt. Selman formation
- Eqc — Queen City sand member } Mt. Selman formation
- Er — Reklaw member } Mt. Selman formation
- Ec — Carrizo sand
- Ewi — Wilcox group undifferentiated
- Ewp — Midway group "

Sulphur River
Talco
Ewp
Ewi
TITUS
MT. PLEASANT
Ec
Er
Eqc
CASS
Atlanta
MORRIS
DAINGERFIELD
Hughes Springs
LINDEN
Ew
Es
PITTSBURG
CAMP
Cypress Creek
MARION
JEFFERSON
GILMER
UPSHUR
Big Sandy
Sabine
Gladewater
LONGVIEW
Hallsville
Little Cypress Creek
Karnack
MARSHALL
HARRISON
Waskom
GREGG
Kilgore
River

From geologic map of Texas, U.S. Geological Survey, 1937.

—K—
9-16-42.

MAP OF GREGG COUNTY, TEXAS

SHOWING WATER WELLS LISTED IN THIS REPORT

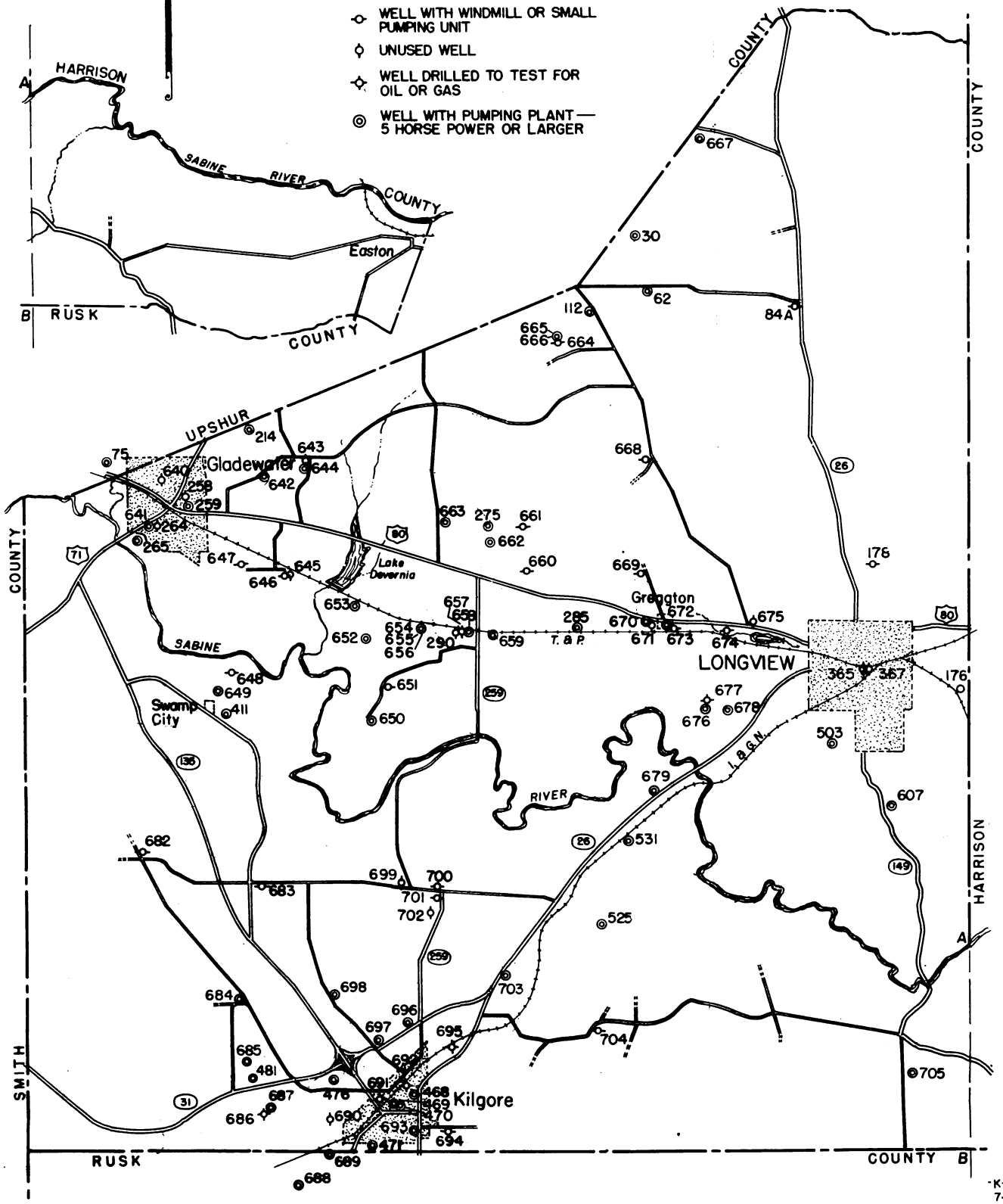
(SUPPLEMENTAL TO WELLS LISTED IN REPORT OF FEB. 15, 1937)

SCALE 0 1 2 3 4 MILES

TEXAS BOARD OF WATER ENGINEERS IN COOPERATION WITH U. S. GEOLOGICAL SURVEY

—EXPLANATION—

- WELL WITH WINDMILL OR SMALL PUMPING UNIT
- UNUSED WELL
- WELL DRILLED TO TEST FOR OIL OR GAS
- WELL WITH PUMPING PLANT— 5 HORSE POWER OR LARGER



-K-
7-2-42