

Texas Board of Water Engineers

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GROUND WATER RESOURCES OF THE AREA SOUTHWEST OF AMARILLO, TEXAS

By

W. H. Alexander, Jr. and J. H. Dante

Prepared in cooperation between the Geological Survey, U. S. Department
of the Interior, the Texas State Board of Water Engineers and
the City of Amarillo

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The present public water supply of the City of Amarillo, all of which is obtained from wells, is not adequate to take care of the needs of the city during periods of peak demand. To meet this situation and to provide for still greater needs in the future the city is planning to explore new territory for an additional supply of ground water. In this connection the Texas State Board of Water Engineers and the Geological Survey, U. S. Department of the Interior, have been requested by the city authorities to investigate the ground-water resources in an area of several hundred square miles in northwestern Randall County and adjacent territory in Potter, Oldham, and Deaf Smith Counties (see map).

This report is based in part on studies made in the spring and summer of 1946, in response to the city's request, and in part on data collected by the Board of Water Engineers and the Geological Survey in 1937 and 1942. It contains records of 239 wells, of which 27 are used by the city of Amarillo, 72 for irrigation, 3 for industrial purposes, 83 principally for domestic purposes and stock, 28 are not used, and 26 were drilled as test wells. It also includes drillers' logs of 45 wells, chemical analyses of water from 45 wells, measured or estimated yields of the more productive wells, records of pumpage by the city of Amarillo from 1928 to 1944, and depth to water in most of the wells.

SOURCE OF GROUND WATER

Thickness and character of Ogallala deposits

The area covered by this report lies on the High Plains of Texas near the northern extremity of the South Plains or Llano Estacado. Most of the usable ground water in the area occurs in sands and gravels of the Ogallala formation which appears at or near the surface and lies on an uneven floor of Triassic "red beds". The "red beds" are exposed to the north and northwest of the area in the breaks of the Canadian River, and to the southeast of it in Palo Duro Canyon.

The Ogallala deposits consist principally of eroded material from high areas to the west and northwest brought in and deposited by streams. They consist of sand, silt, gravel, and clay, which in some places are cemented by calcareous material. In common with most stream deposits, the thickness and gradation of the water-bearing sands and gravels in the Ogallala varies widely from place to place. In some places the saturated portion of the formation consists chiefly of good water-bearing sand and gravel but in other places it

consists dominantly of fine sands, silts or clays. Because of these irregularities, the best location for production wells can be determined only by test drilling.

Twenty-four of the wells listed in the tables are reported to have been drilled through the Ogallala formation to the Triassic "red beds", and to have penetrated from 220 to 310 feet of Ogallala deposits. Based on these figures and water level measurements made in part before heavy pumping was started, the thickness of the zone of saturation in the Ogallala beds in 19 of the wells was estimated to range from 67 to 166 feet.

Pumpage

City of Amarillo - The first large-scale pumping in the area took place when Amarillo developed its Palo Duro well field about 16 miles southwest of the city. This development consists of a reservoir and 10 wells (nos. 51 to 60), and a 30-inch pipe line for conveying water to the city (see map). The reservoir is formed by a dam about 40 feet in height on Palo Duro Creek and is said to have a capacity of about 5,000 acre-feet, or about 1,630,000,000 gallons. The reservoir, wells, and pipe line were completed in 1927, but the reservoir did not fill until 1931, and it is said to have reached a level above the spillway only twice. No water is diverted from the reservoir, its function being to replenish the sands and gravels from which the adjoining wells are supplied. The wells are near the reservoir, part of them being immediately below the dam and the others along the shores of the reservoir not far upstream from the dam. The most distant well is about one-fourth mile from the north shore. According to records of several pumping tests made in the first seven months of operation, the wells had a yield ranging from 460 to about 700 gallons a minute each.

In 1931 five wells (nos. 71 to 75) were drilled about 5 miles southwest of the city in what is now known as the McDonald well field. Four of these wells are located along the pipe line at intervals of about 2,000 feet. The fifth well is about 2,000 feet west of the pipe line. According to tests made by the city, the yield of these wells is about 750 gallons a minute each.

Between 1943 and 1945, 12 new wells were drilled along the pipe line, one (no. 77) between the McDonald well field and the city and the others (nos. 61 to 70 and 76) between the McDonald and Palo Duro well fields. According to tests made by the city, these wells yield from 700 to 1,340 gallons a minute each and five of them yield more than 1,000 gallons a minute each.

The pumpage from the Palo Duro and McDonald well fields from 1928-29 to 1943-44 is given in the following table:

Pumpage by the City of Amarillo, Texas
(From city records for fiscal years 1928 through 1944)

Fiscal year	Number customers	Total production (gallons)	Falo Duro production (gallons)	Percent of total	McDonald production (gallons)	Percent of total
1928-1929	8,873	1,005,910,000	1,005,910,000	100.00	None	
1929-1930	8,962	1,142,090,000	1,142,090,000	100.00	None	
1930-1931	9,219	1,269,294,000	1,269,294,000	100.00	None	
1931-1932	8,910	1,372,162,000	659,212,000	48.04	712,950,000	51.96
1932-1933	8,692	1,215,100,000	362,875,000	29.86	852,225,000	70.14
1933-1934	9,121	1,387,550,000	770,295,000	55.51	617,255,000	44.49
1934-1935	9,279	1,470,900,000	1,184,930,000	80.56	285,970,000	19.44
1935-1936	9,291	1,432,308,000	1,432,308,000	100.00	None	
1936-1937	9,461	1,528,198,000	1,237,798,000	81.00	290,400,000	19.00
1937-1938	9,739	1,677,497,000	1,576,847,000	94.00	100,650,000	6.00
1938-1939	10,094	1,691,572,000	1,657,741,000	98.00	33,831,000	2.00
1939-1940	10,532	1,959,690,000	1,881,303,000	96.00	78,387,000	4.00
1940-1941	11,112	1,950,876,000	973,671,000	49.9	977,205,000	50.10
1941-1942	11,711	1,807,960,000	1,536,404,408	84.98	271,555,592	15.02
1942-1943	12,133	2,485,386,000	1,854,346,495	74.61	631,039,505	25.39
1943-1944	12,502	2,602,800,000	1,425,293,280	54.76	1,177,506,720	45.24

As shown by the table pumpage by the city increased from 1,005,910,000 gallons a year in 1928-1929 to 2,602,800,000 gallons a year in 1943-1944, or from an average of 2,700,000 a day to an average of 7,100,000 gallons a day. Records of the city pumpage from April 1944 to date are not at hand. In the summer of 1946 the peak demand is said to have been more than 19,000,000 gallons a day.

Irrigation - Irrigation from wells in the area is said to have been started about 13 years ago by W. D. Muncoy, a local well driller. In 1940 the irrigation wells in the area numbered 24 and in the spring of 1946 the number had reached 72. In the spring of 1946 the pump discharge from 13 of these wells was measured and found to range from 150 to 1,140 gallons a minute. No accurate information is at hand as to the total number of acres irrigated nor as to the total amount of water pumped for irrigation. In the South Plains as a whole it is estimated that the pumpage averages about 100 acre-feet per well. On this basis the total pumpage from the 72 irrigation wells in the area would amount to 7,200 acre-feet or an average of about 6,500,000 gallons a day throughout the year.

Fluctuation of water levels in wells

For several years measurements of water levels in three wells, nos. 83a, 124, and 149, in the eastern part of the area, have been made periodically by the Texas State Board of Water Engineers and the Geological Survey. Wells 83a and 124, comparatively remote from heavy pumping, show practically no decline in water levels since 1938. Well 149, however, near an area of heavy irrigation pumping and only about $1\frac{1}{2}$ miles from the center of the McDonald field, shows a net decline of 3.7 feet between the spring measurements in 1938 and 1946, of which 2.3 feet occurred between 1943 and 1946. Measurements made by the City indicate that a considerable decline in water levels has occurred in

some of the City wells. These measurements, however, were made under varying conditions of pumping and shutdown, both in the well itself and in neighboring wells, and cannot be accurately evaluated.

Quality of water

The analyses of water from 45 wells drawing water from the Ogallala are given in the tables of analyses of water in this report. The results of the analyses show a fair degree of uniformity in the chemical character of the water throughout the area. The total dissolved solids in the 45 samples ranged from 200 to 437 parts per million. The water is all of good quality except that the total hardness (averaging about 250 parts per million) and the fluorides (3 analyses averaging 3.2 parts per million) are high.

Summary

This report consists primarily of records of wells, and pumpage from wells, in an area of several hundred square miles on the Texas High Plains, south, southwest and west of Amarillo. The withdrawals of ground water from this area for the public supply of Amarillo increased from an average of 2,700,000 gallons a day in 1928-29 to an average of 7,100,000 gallons a day in 1943-44, and they are believed to have been still greater in 1944-45 and 1945-46. From 1940 to 1946 the number of irrigation wells in the area increased from 24 to 72 and it is estimated that the total pumpage for irrigation now amounts to about 7,200 acre-feet a year, which is the equivalent of an average of about 6,500,000 gallons a day throughout the year. Most of the pumping for both public supply and irrigation is in the eastern part of the area. In the central and western parts ground-water development is limited to a few scattered irrigation and ranch wells.

In the eastern part of the area two observation wells that are comparatively remote from heavy pumping show practically no decline in water levels from 1938 to 1946, and one well near heavy pumping shows a net decline of 3.7 feet during the same period, of which 2.3 feet occurred between 1943 and 1946. Measurements made by the city indicate that a considerable decline of water levels has occurred in some of the city wells but these records cannot be accurately evaluated because they were made under varying conditions of pumping and shut down.

It is understood that if additional development is made by the City in this general direction the practically unexplored territory to the west of the area of heavy pumping probably will be selected. Comparatively little is known regarding ground-water conditions in that territory. The data that are available indicate that a large supply of ground water may be available, but the Ogallala formation practically everywhere varies materially in character and thickness. In some places the saturated portion of the formation may consist chiefly of good water-bearing sand and gravel while in others fine sands, silts, or clays may predominate. Because of these probable irregularities test drilling and pumping are needed in order to determine the best location for production wells.

Records of wells in the Amarillo area, (Randall County)
All wells are drilled unless noted in the remarks column

Well	Distance from Canyon	Owner	Driller	Date completed	Depth of well (ft.)	Diameter of well (in.)	Height of measuring point above ground (ft.) ^{a/}
1	15 miles northwest	R. Kimball	Tom Muncey	1946	300	10	--
2	15½ miles northwest	H. R. Gwyn	E. Gatlin	1946	245	16	2.0
3	14½ miles northwest	L. A. Pierce	-- Brazil	--	245	--	--
4	14 miles northwest	do.	do.	--	238	--	--
5	13½ miles northwest	do.	-- Turrentine	--	250	--	--
6	12 miles northwest	Jesse Pierce	do.	--	216	--	--
7	14 miles northwest	L. A. Pierce	-- Brazil	--	154	--	--
8	13 miles northwest	do.	do.	--	151	--	--
9	12½ miles northwest	do.	-- Turrentine	--	234	--	--
10	11½ miles northwest	T. B. Slaughter	do.	--	215	--	--
11	12 miles west	do.	-- Brazil	--	173	--	--
12	12½ miles west	do.	do.	--	91	--	--
13	11½ miles west	do.	-- Turrentine	--	211	--	--
14	10 miles northwest	-- Word	do.	--	153	--	--
15	9½ miles west	do.	-- Brazil	--	95	--	--
16	8 miles northwest	do.	do.	--	140	--	--
17	6½ miles northwest	do.	do.	--	197	--	--
18	6 miles northwest	do.	do.	--	145	--	--
19	6½ miles northwest	do.	do.	--	167	--	--
20	do.	do.	do.	--	117	--	--
21	do.	do.	do.	--	158	--	--
22	do.	do.	do.	--	110	--	--

a/ Measuring point was usually top of casing, top of wood pipe clamp, top of concrete pump foundation, or top of air-line hole in pump base.

b/ T, turbine; Cf, centrifugal; C, cylinder; E, electric; G, gasoline; Ng, natural gas; O, diesel or semi-diesel; W, windmill; H, hand; number indicates horsepower.

Chemical analyses of water from many of these wells are given in the table of analyses

Well	Below land surface (ft.)	Date of measurement	Method of use	Remarks
1	134.0	Mar. 1946	T, G, Irr	Cased to 250 feet. Pump set at 150 feet. Measured yield, 775 gallons a minute on May 3, 1946. Temperature 62° F. "Red Cased to 234 feet. "beds" at 300 feet. Pump set at 224 feet, 8 1/4-inch column. Measured yield, 1,140 gallons a minute, pumping level 158 feet after pumping 4 hours on May 2, 1946. Temperature 62° F.
2	139.3	May 2, 1946	T, G, Irr	95
3	111.0			Test well 23, City of Amarillo. See log.
4	118.0			Test well 25, City of Amarillo. See log.
5	115.0			Test well 24, City of Amarillo. Red clay reported at 238 feet. See log.
6	118.0			Test well 12, City of Amarillo. See log.
7	105.0			Test well 4, City of Amarillo. See log.
8	60.0			Test well 17, City of Amarillo. See log.
9	110.0			Test well 3, City of Amarillo. See log.
10	108.0			Test well 16, City of Amarillo. See log.
11	60.0			Test well 10, City of Amarillo. See log.
12	14.0			Test well 15, City of Amarillo. See log.
13	98.0			Test well 27, City of Amarillo. See log.
14	94.0			Test well 26, City of Amarillo. See log.
15	13.0			Test well 28, City of Amarillo. See log.
16	81.0			Test well 25, City of Amarillo. Red clay reported at 135 feet. See log.
17	78.0			Test well 32, City of Amarillo. See log.
18	65.0			Test well 30, City of Amarillo. Red clay reported at 122 feet. See log.
19	91.0			Test well 31, City of Amarillo. See log.
20	18.0			Test well 34, City of Amarillo. See log.
21	35.0			Test well 35, City of Amarillo. See log.
22	12.0			Test well 29, City of Amarillo. See log.

c/ Irr, irrigation; P, public supply; D, domestic; S, stock; N, not used.
 q/ Water level reported.

Records of wells in the Amarillo area, (Randall County) -- Continued

Well	Distance from Canyon	Owner	Driller	Date completed	Depth of well (ft.)	Diameter of well (in.)	Height of measuring point above ground (ft.) a/
23	6½ miles northwest	City of Amarillo	H. H. Heiskell	1946	146	12	--
24	7 miles northwest	-- Word	-- Brazil	--	140	--	--
25	8 miles northwest	do.	do.	--	134	--	--
26	10 miles northwest	-- Belles	Leo McDade	--	190	--	--
27	6 miles northwest	R. J. Metcalf	--	--	128	4	0.0
28	7¼ miles northwest	E. Frisch	-- Bishop	1943	170	16	--
29	7½ miles northwest	do.	--	1942	165	--	--
30	do.	do.	--	1942	174	--	--
31	8¾ miles northwest	A. Friemel	-- McDade	1940	190	12	--
32	11½ miles northwest	K. Pond	-- Winget	1946	220	16	1.0
33	13 miles northwest	R. L. Pond	--	--	118	5	0.5
34	10½ miles northwest	Dr. T. L. Montgomery	--	1938	208	16	4.0
35	10 miles northwest	C. H. Woods	-- McDade	1941	215	18	1.0
36	10½ miles northwest	Ralph Ruthart	--	1896	120	6	--
36a	do.	Chas. Wilmering	--	Old	170	--	0.5
37	11½ miles northwest	S. D. McKay	--	1931	160	5	--
37a	12½ miles northwest	Fred Fegal	--	1941	200	6	1.0
38	9½ miles northwest	A. E. Whitehead	--	Old	110	6	--
39	8½ miles northwest	Wm. Clifford	--	--	165	6	--
40	10½ miles northwest	R. C. Vincent	--	--	150	6	--
41	14 miles northwest	J. J. Boling	--	Old	160- 180	6	4.5
42	15 miles northwest	L. E. Mason	Tom Muncy	1945	212	4	--

Well	WATER LEVEL		Method of lift b/	Use of water c/	Remarks
	Below land surface (ft.)	Date of measurement			
23	--	--	--	--	Test well. Cased to 138 feet. Reported yield, 200 gallons a minute. Red shale
24	32.0	d/	--	--	Test well reported at 140 feet. See log. well 36, City of Amarillo. Red clay re-
25	52.0	d/	--	--	Test well reported at 133 feet. See log. 37, City of Amarillo. Red clay reported
26	135.0	d/	--	--	Test well 1, City of Amarillo. Red clay reported at 130 feet. See log. of Amarillo. Red clay reported at 180
27	103.1 114.6 115.3 117.5	June 16, 1937 June 24, 1943 Feb. 21, 1944 Mar. 1, 1946	C,W	D,S	One mile south of Palo Duro well field. feet. See log.
28	124.0	d/	T,G, 95	Irr	Cased to 170 feet. Measured yield, 970 gallons a minute, and pumping level 144 feet, after pumping 4 hours on May 6, 1946. "Red beds" reported at 170 feet.
29	--	--	--	--	Insufficient water for irrigation. "Red beds" reported at 165 feet.
30	--	--	--	--	Insufficient water for irrigation. "Red beds" reported at 174 feet.
31	110.0	Nov. 1940	T,G, 50	Irr	Steel casing. Pump set at 150 feet, 8-inch column. Reported yield, 300 gal-
32	109.6	May 6, 1946	T,G, 90	Irr	Cased to 220 feet. Pump set at 144 feet, 8 $\frac{1}{4}$ -inch column. Measured yield, 955 gallons a minute, June 10, 1946. "Red beds" reported at
33	99.3	May 18, 1937	C,W	D,S	220 feet.
34	147.9	May 6, 1946	T,E, 50	Irr	Cased to 208 feet. Measured yield, 625 gallons a minute, June 11, 1946.
35	132.9	Mar. 18, 1943	T,G, 80	Irr	Cased to 215 feet. Pump set at 170 feet, 10-inch column. Measured yield, 850 gallons a minute, and pumping level 154.6 feet after pumping 3 hours on May 6, 1946.
36	100	d/	C,W	D,S	Temperature 62° F.
36a	148.8	July 26, 1946	C,W	D,S, Irr	Irrigates one-acre garden and orchard.
37	130	d/	C,W	D,S, Irr	Irrigates one-acre garden and trees.
37a	142.6	July 25, 1946	C,W	D,S	
38	96	d/	C,W	D,S	Poor well. Reported not deep enough. Pump set on bottom.
39	125	d/	C,W	D,S	Cased 20 feet at top, rest of hole open. Reported will water ten head of stock in strong wind. Wells nearby reported to
40	89.7	July 24, 1946	C,W	D,S	have very little water,
41	125.5	do.	C,W	D,S, Irr	Irrigates one-half acre garden,
42	160	d/	C,W	D,S	

Records of wells in the Amarillo area (Randall County) -- Continued

Well	Distance from Canyon	Owner	Driller	Date completed	Depth of well	Diameter of well (in.)	Height of measuring point above ground (ft.) a/
43	14½ miles northwest	H. T. Neeley	--	1939	150+	6	1.0
44	16½ miles northwest	A. Bedenke	--	1910	200+	4	2.0
45	do.	Geo. E. Mason	--	--	205	--	--
46	16 miles northwest	T. C. Jones	-- Bible	1939	160-170	6	--
47	17 miles northwest	Carl B. Fuqua	-- O'Connor	1946	180	4	--
48	16½ miles northwest	G. H. Cook	Leo McDade	1915	236	4	--
49	16 miles northwest	L. M. Walton	Frank Tye	1945	200	6	3.0
50	15½ miles northwest	Amarillo Experimental Station	--	--	176	6	2.0
50a	14½ miles northwest	M. L. Kelly	--	Old	180	6	--
50b	14 miles northwest	Mrs. Eva Davis	--	--	182	4	1.3
50c	12 miles northwest	C. A. Elder	--	1892	160	6	--
50d	do.	L. T. Campbell	-- Muncy	1942	170	6	--
51	7 miles northwest	City of Amarillo	--	1927	200	10	--
52	6¾ miles northwest	City of Amarillo Palo Duro No. 2	--	1927	200	10	--
53	7¼ miles northwest	City of Amarillo Palo Duro No. 3	--	1927	200	10	--
54	7 miles northwest	City of Amarillo Palo Duro No. 4	--	1927	200	10	--
55	7¼ miles northwest	City of Amarillo Palo Duro No. 5	--	1927	200	10	--
56	7 miles northwest	City of Amarillo Palo Duro No. 6	--	1927	200	10	--
57	7½ miles northwest	City of Amarillo Palo Duro No. 7	--	1927	200	10	--

Well	WATER Below land surface (ft.)	LEVEL Date of measurement	Method of lift b/ c/	Use of water c/ e/	Remarks
43	101.5	July 24, 1946	C,W	S	
44	157.8	do.	C,W	D	
45	166	q/	C,W	D,S, Irr	Irrigates one-half-acre garden.
46	154	q/	C,W	D,S	
47	145	q/	C,W	D,S, Irr	Irrigates one-half-acre garden.
48	151	q/	C,W	D,S, Irr	Irrigates one-tenth-acre garden and orchard.
49	155	July 20, 1946	C,W	S	
50	135	do.	C,W	S	
50a	135	q/	C,W	D,S	Reported strong well. Irrigates one-half-acre garden.
50b	167.7	July 25, 1946	C,W	D,S	
50c	160	q/	C,G, 3	D,S	
50d	144	q/	C,W	S,Irr	Irrigates one-acre garden.
51	--	--	T,E	P	Gravel-walled well. Cased to 200 feet. Pump set at 130 feet.
52	--	--	T,E	P	Do.
53	61.0 105.0	Jan. 1943 Aug. 1945	T,E	P	Gravel-walled well. Cased to 200 feet. Pump set at 130 feet. Measured yield, 720 gallons a minute, Jan. 30, 1942.
54	61.0 119.0	Jan. 1943 Aug. 1945	T,E, --	P	Gravel-walled well. Cased to 200 feet. Pump set at 130 feet. Measured yield, 594 gallons a minute, Jan. 30, 1942. Reported pumping level, 95 feet, Jan. 1943; 130 feet, Aug. 1945.
55	35.0 105.0	Jan. 1943 Aug. 1945	T,E	P	Gravel-walled well. Cased to 200 feet. Pump set at 130 feet. Measured yield, 454 gallons a minute, Jan. 30, 1942. Reported pumping level, 70 feet, Jan. 1943
56	88.0 121.0	Jan. 1943 Aug. 1945	T,E	P	Gravel-walled well. Cased to 200 feet. Pump set at 130 feet. Measured yield, 751 gallons a minute, Jan. 30, 1942. Reported pumping level, 100 feet, Jan. 1943; 128 feet, Aug. 1945.
57	38.0 107.0	Jan. 1943 Aug. 1945	T,E	P	Gravel-walled well. Cased to 200 feet. Pump set at 130 feet. Measured yield, 860 gallons a minute, Jan. 30, 1942. Reported pumping level, 52 feet, Jan. 1942; 114 feet, Aug. 1945.

Records of wells in the Amarillo area (Randall County) -- Continued

Well	Distance from Canyon	Owner	Driller	Date completed	Depth of well (ft.)	Diameter of well (in.)	Height of measuring point above ground (ft.) a/
58	7 $\frac{1}{4}$ miles northwest	City of Amarillo Palo Duro No. 8	--	1927	200	10	--
59	do.	City of Amarillo Palo Duro No. 9	--	1927	200	10	--
60	7 $\frac{1}{2}$ miles northwest	City of Amarillo Palo Duro No. 10	--	1927	200	10	--
61	8 miles northwest	City of Amarillo Greely No. 3	H. H. Heiskell	1944	283	16	--
62	do.	City of Amarillo Greely No. 2	do.	1944	264	16	--
62a	6 $\frac{1}{2}$ miles northwest	A. M. Olson	D. L. McDonald	1946	260	16	--
63	8 miles northwest	City of Amarillo Greely No. 5	H. H. Heiskell	1946	262	16	--
64	8 $\frac{1}{4}$ miles northwest	City of Amarillo Greely No. 1	do.	1944	313	16	--
65	do.	City of Amarillo Greely No. 4	do.	1946	305	16	--
66	8 $\frac{3}{4}$ miles north	City of Amarillo Bush	do.	1944	260	16	--
67	9 miles north	City of Amarillo Bush No. 5	do.	1943	263	16	--
68	9 $\frac{1}{2}$ miles north	City of Amarillo Bush No. 4	do.	1943	305	16	--

Well	WATER LEVEL		Method of lift	Use of water	Remarks
	Below land surface (ft.)	Date of measurement			
58	61.0 123.0	Jan. 1943 Aug. 1945	T,E	P	Gravel-walled well. Cased to 200 feet. Pump set at 130 feet. Measured yield, 828 gallons a minute, Jan. 30, 1942. Reported pumping level, 86 feet, Jan.
59	--	--	T,E	P	Gravel-walled well. Cased to 200 feet. Pump set at 130 feet. Measured yield, 598 gallons a minute, Jan. 30, 1942. Reported pumping level, 86 feet, Jan. 1943; 130 feet, Aug. 1945.
60	--	--	T,E	P	Gravel-walled well. Cased to 200 feet. Pump set at 130 feet. Measured yield, 450 gallons a minute, Jan. 30, 1942.
61	135.0 167.0	Apr. 1945 May 1946	T,E, 60	P	Gravel-walled well, 36-inch diameter. Cased to 278 feet. Pump set at 200 feet. Pumping level, 156 feet, April 1945; 187 feet, May 1946. Red shale reported at 279 feet. See log.
62	106.0 136.0	May 12, 1946 May 1946	T,E	P	Gravel-walled well, 36-inch diameter. Cased to 264 feet. Pump set at 180 feet. Measured yield, 1,115 gallons a minute and drawdown 35 feet on May 13, 1944 after pumping 48 hours. Pumping level, 158 feet, May 1946. See log.
62a	--	--	None	Irr	Well just drilled. Hit "red beds" at 257 feet. See log. 1946. See log.
63	126.0	Apr. 1, 1946	T,E	P	Gravel-walled well, 36-inch diameter. Cased to 256 feet. Measured yield, 1,340 gallons a minute and drawdown 44 feet on April 2, 1946 after pumping 48 hours. Red rock reported at 262 feet. See log.
64	120.0 141.0	July 1944 May 1946	T,E, 50	P	Gravel-walled well, 36-inch diameter. Cased to 303 feet. Pump set at 220 feet. Pumping level 189 feet, July 1944; 212 feet, May 1946. See log.
65	--	--	T,E	P	Gravel-walled well, 36-inch diameter. Cased to 278 feet. "Red beds" reported at 295 feet. See log.
66	135.0 162.0	May 4, 1944 May 1946	T,E, 60	P	Gravel-walled well, 36-inch diameter. Cased to 260 feet. Pump set at 190 feet. Measured yield, 1,060 gallons a minute and drawdown 24 feet on May 5, 1944 after pumping 48 hours. Pumping level, 182 feet, May 1946. Red shale reported at 247 feet. See log.
67	137.0 169.0	Apr. 23, 1943 May 1946	T,E, 50	P	Gravel-walled well, 36-inch diameter. Cased to 254 feet. Pump set at 195 feet. Measured yield, 1,090 gallons a minute and drawdown 18.5 feet on April 24, 1943, after pumping 48 hours. Pumping level, 192 feet, May 1946. Red and blue shale reported at 250 feet. See log.
68	141.0 185.0	May 9, 1943 May 1946	T,E, 60	P	Gravel-walled well, 36-inch diameter. Cased to 305 feet. Pump set at 195 feet. Measured yield, 880 gallons a minute and drawdown 49 feet on May 10, 1943, after pumping 48 hours. Pumping level, 205 feet, May 1946. "Red beds" reported at 297 feet. See log.

Records of wells in the Amarillo area (Randall County) -- Continued

Well	Distance from Canyon	Owner	Driller	Date completed	Depth of well (ft.)	Diameter of well (in.)	Height of measuring point above ground (ft.) a/
69	9 $\frac{3}{4}$ miles north	City of Amarillo Bush No. 3	H. H. Heiskell	1944	239	16	--
70	10 $\frac{1}{4}$ miles north	City of Amarillo Bush No. 2	do.	1944	250	16	--
71	12 $\frac{1}{2}$ miles north	City of Amarillo McDonald No. 1	D. L. McDonald	1929	270	18	--
72	12 miles north	City of Amarillo McDonald No. 2	do.	1929	270	18	--
73	11 $\frac{3}{4}$ miles north	City of Amarillo McDonald No. 3	do.	1929	270	18	--
74	11 $\frac{1}{4}$ miles north	City of Amarillo McDonald No. 4	do.	1929	322	18	--
75	12 $\frac{1}{2}$ miles north	City of Amarillo McDonald No. 5	do.	1929	336	18	--
76	10 $\frac{1}{8}$ miles north	City of Amarillo Bush No. 1	H. H. Heiskell	1943	296	16	--
77	13 $\frac{1}{2}$ miles north	City of Amarillo Brinkman No. 1	do.	1944	277	16	--

Well	WATER	LEVEL	Method of lift b/	Use of water c/	Remarks
	Below land surface (ft.)	Date of measurement			
69	132.0 160.0	Apr. 22, 1944 May 1946	T,E, 60	P	Gravel-walled well, 36-inch diameter. Cased to 236 feet. Pump set at 220 feet. Measured yield 720 gallons a minute and drawdown 49 feet on April 23, 1944, after pumping 26 hours. Pumping level, 200 feet, May 1946. "Red beds" reported at 230 feet. See log.
70	153.0 175.0	June 1945 May 1946	T,E, 75	P	Gravel-walled well, 36-inch diameter. Cased to 231 feet. Pump set at 180 feet. Measured yield, 1,100 gallons a minute and drawdown 33 feet on April 13, 1944, after pumping 24 hours. Pumping level, 180 feet, June 1945; 190 feet, May 1946. See log.
71	162.0 220.0	July 30, 1931 May 1946	T,E, 75	P	Gravel-walled well, 36-inch diameter. Cased to 267 feet. Pump set at 240 feet. Measured yield, 750 gallons a minute and drawdown 42 feet on Sept. 1 1931. Pumping level, 240 feet, May 1946. Red clay reported at 259 feet. See log.
72	160.0 225.0	Aug. 24, 1929 May 1946	T,E, 75	P	Gravel-walled well, 36-inch diameter. Cased to 260 feet. Pump set at 240 feet. Measured yield, 750 gallons a minute on July 22, 1931, drawdown not given. Pumping level, 240 feet, May 1946. Red clay reported at 257 feet. See log.
73	156.0 223.0	Aug. 13, 1929 May 1946	T,E, 75	P	Gravel-walled well, 36-inch diameter. Cased to 270 feet. Pump set at 240 feet. Measured yield, 750 gallons a minute, and drawdown 37 feet on July 19, 1931. Pumping level, 230 feet, May 1946. See log.
74	162.0 218.0	Aug. 1, 1931 May 1946	T,E, 75	P	Gravel-walled well, 36-inch diameter. Cased to 270 feet. Pump set at 240 feet. Measured yield, 750 gallons a minute, and drawdown 46 feet on Sept. 2, 1931. Pumping level, 229 feet, May 1946. Red clay reported at 265 feet. See log.
75	163.0 213.0	Aug. 1, 1931 May 1946	T,E, 75	P	Gravel-walled well, 36-inch diameter. Cased to 289 feet. Pump set at 240 feet. Measured yield, 750 gallons a minute, and drawdown 44 feet, Sept. 2, 1931. Pumping level, 239 feet, May 1946. "Red beds" reported at 326 feet. See log.
76	150.0 188.0	May 25, 1943 May 1946	T,E, 60	P	Gravel-walled well, 36-inch diameter. Cased to 258 feet. Pump set at 195 feet. Measured yield, 880 gallons a minute, and drawdown 36 feet on May 26, 1943, after pumping 48 hours. Pumping level, 198 feet, May 1946. Red and blue shale reported at 260 feet. See log.
77	170.0 190.0	Jan. 1945 May 1946	T,E, 50	P	Gravel-walled well, 36-inch diameter. Cased to 267 feet. Pump set at 220 feet. Measured yield, 700 gallons a minute, and drawdown 50 feet on April 12, 1943, after pumping 24 hours. Pumping level, 210 feet, May 1946. "Red beds" reported at 256 feet. See log.

Records of wells in the Amarillo area, (Randall County) -- Continued

Well	Distance from Canyon	Owner	Driller	Date completed	Depth of well (ft.)	Diameter of well (in.)	Height of measuring point above ground (ft.) a/
78	13½ miles northeast	W. O. Gilbert	Frank Tye	1945	203	6	--
121	4¾ miles northwest	C. C. Reid	-- McDade	1940	200	16	1.0
121a	5 miles northwest	G. W. Cox	E. H. Scott	1946	--	16	--
122	3½ miles north	-- Oferell	--	--	112	--	0.1
123	4¼ miles north	M. H. Rockwell	-- Muncey	1940	206	16	--
124	4¾ miles north	C. H. Ray	--	--	115	5	1.0
125	5½ miles north	J. C. Pipkin	--	--	--	6	--
126	6½ miles north	Dr. R. A. Duncan	--	1936	200	16	--
127	do.	L. M. Fischer	-- Muncey	1937	212	16	--
127a	5½ miles north	Grady Hazelwood	Johnson Pump Co.	1946	217	16	--
128	5¾ miles north	Albert Byers	--	1938	168	16	--
129	6 miles north	J. E. Dickinson	--	1908	149	--	0.3
130	6¼ miles north	J. B. Latham	-- Muncey	1940	210	16	--
131	6 miles north	do.	do.	1892	148	--	--
132	9¼ miles north	Boyd Elliott	--	--	160	12	0.2
133	9½ miles north	E. B. Dugger	-- Whitman	1936	212	18	--
133a	10 miles northwest	Mrs. Theo. Combest	--	1905	140	--	--
134	10½ miles north	D. Menke	-- Whitman	1936	212	18	--
134a	11½ miles northwest	Ervin Podzemmy	--	1922	130*	4	--
135	13¼ miles north	O. L. Taylor	-- Muncey	1943	278	16	5.0
136	13¼ miles north	E. Greathouse	do.	1942	240	16	5.0
137	do.	-- O'Brien	--	--	150	--	--
138	13 miles north	John Menke	Joe Connor	1923	183	5	0.8
139	12 miles north	Mrs. F. Vassett	--	1910	200	5	--

Well	WATER LEVEL		Method of lift b/	Use of water c/	Remarks
	Below land surface (ft.)	Date of measurement			
78	--	--	T,E, 15	D,Irr	Capacity about 190 gallons a minute. Irrigates about 20 acres and trees
121	115.7	Mar. 18, 1943	T,G	Irr	Steel casing. Pump set at around home. 150 feet, 8-inch column. Yield reported
121a	--	--	None	Irr	Well being 850 gallons a minute. drilled when visited.
122	100.2 104.7	June 11, 1937 Mar. 1, 1946	C,W	S	
123	106.0	Nov. 1940	T,G	Irr	Cased to 206 feet. Pump set at 140 feet. Yield reported, 850 gallons a minute.
124	106.8 107.6	June 11, 1937 Mar. 1, 1946	C,W	S	
125	--	--	C,W	N	Well was dry at 73 feet on May 18, 1937.
126	120.0	d/	T,G, 60	Irr	Steel casing. Yield reported, 700 gallons a minute.
127	125.0	d/	T,E, 50	Irr	Steel casing Pump set at 160 feet, 8-inch column. Yield reported, 800 gal-
127a	--	--	T,G	Irr	lons a minute.
128	--	--	T,E, 50	Irr	Steel casing. Yield reported, 900 gal-
129	136.5	June 11, 1937	C,W	D,S	Measured yield, 7½ gallons a minute on June 11, 1937.
130	138.0	d/	T,G	Irr	Steel casing. Yield reported, 800 gal-
131	131.0	d/	C,W	D,S	Reported strong supply.
132	140.0	Apr. 21, 1938	C,W	N	
133	142.0	d/	T,E, 40	Irr	Steel casing. Yield reported, 800 gal-
133a	120	d/	C,W	D,S	Irrigates small garden.
134	140.0	d/	T,E, 40	Irr	Cased to 212 feet. Pump set at 160 feet, 8-inch column. Yield reported, 800 gal-
134a	115	d/	C,W	D,S	lons a minute.
135	171.4	May 10, 1946	T,E, 100	Irr	Cased to 278 feet. Pump set at 228 feet, 9-inch column. Measured yield, 1,100 gallons a minute, June 10, 1946. Temperature 63° F. "Red beds" reported at
136	173.3	Apr. 29, 1946	T,G, 110	Irr	Cased to 240 feet. Pump 278 feet. set at 230 feet, 9-inch column. Measured yield, 670 gallons a minute, on May 7, 1946, after pumping 7 days. "Red beds"
137	--	--	C,W	D,S	Reported weak reported at 240 feet. supply.
138	153.7	Aug 17, 1937	C,W	D,S	Cased to 183 feet.
139	--	--	C,W	D,S	

Records of wells in the Amarillo area, (Randall County) -- Continued

Well	Distance from Canyon	Owner	Driller	Date completed	Depth of well (ft.)	Diameter of well (in.)	Height of measuring point above ground (ft.) a/
140	11 $\frac{1}{4}$ miles north	J. J. Gordon	--	--	295	--	--
140a	11 $\frac{1}{2}$ miles north	M. J. Michaelias	--	Old	200+	6	--
141	10 $\frac{3}{4}$ miles north	J. J. Gordon	--	--	295	--	--
142	11 $\frac{3}{4}$ miles north	-- Gamblen	J. Muncey	1946	260	10	--
143	12 $\frac{1}{4}$ miles north	C. S. Lambie	D. L. McDonald	1943	250	16	--
144	12 miles north	do.	do.	1946	250	16	--
145	11 $\frac{3}{4}$ miles north	do.	do.	1946	250	16	--
146	11 $\frac{1}{2}$ miles north	D. Ozee	--	1938	212	--	--
147	12 miles north	D. Arden	--	1935	202	--	--
148	10 $\frac{1}{2}$ miles north	J. E. Bowman	Leo Koger	1941	209	12	2.5
149	10 $\frac{1}{4}$ miles north	W. H. Fuqua	--	--	160	5	0.5
150	9 $\frac{1}{2}$ miles north	J. E. Bowman	J. Muncey	1946	240	--	--
151	9 $\frac{1}{4}$ miles north	Chas. Austin	--	1940	246	--	--
152	9 $\frac{3}{4}$ miles north	L. A. Decker	W. D. Muncey	1946	240	16	--
154	10 $\frac{1}{2}$ miles northeast	Bowman Nursery	Frank Tye	1943	200	12	--
155	do.	Ross Larson	do.	1945	210	--	--
156	11 miles northeast	C. S. Pryor	-- Muncy	1943	220	8	--
157	do.	Joe Kapelus	W. L. Muncy	1944	235	10	--
158	do.	Myers Poultry Farm	do.	Old	160+	--	--
159	do.	Raymond Wright	do.	--	156	8	--
160	11 $\frac{1}{2}$ miles northeast	C. B. Adams	Frank Tye	1945	252	10	1.0
301	14 $\frac{1}{2}$ miles north	S. Polland	--	1912	300	--	0.5
302	14 $\frac{3}{4}$ miles north	Llano Cemetery	D. L. McDonald	1933	290	18, 10	--
303	13 $\frac{1}{2}$ miles northeast	-- Nunn	--	--	203	4 $\frac{1}{2}$	0.0
304	12 $\frac{1}{2}$ miles northeast	R. T. Beaman	--	--	187	6	--

Well	WATER LEVEL		Method of lift b/	Use of water c/	Remarks
	Below land surface (ft.)	Date of measurement			
140	--	--	None	N	Seismograph test hole. "Red beds" reported at 295 feet.
140a	150	d/	C,W	D,S	
141	--	--	None	N	Seismograph test hole. "Red beds" reported at 295 feet.
142	165.0	May 1946	T,E	Irr	Cased to 260 feet.
143	140.0	d/	T,E, 45	Irr	Cased to 250 feet. Pump set at 190 feet. Yield reported, 500 gallons a minute.
144	140.0	d/	T,E, 40	Irr	Cased to 250 feet. Pump set at 210 feet. Yield reported, 500 gallons a minute.
145	140.0	d/	T,E, 40	Irr	Do.
146	140.0	d/	T,E, 50	Irr	Steel casing. Yield reported, 500 gallons a minute.
147	140.0	d/	T,E	Irr	Steel casing. Yield reported, 200 gallons a minute.
148	147.1	Feb. 19, 1942	T,E	Irr	Cased to 209 feet. Pump set at 160 feet.
149	143.8 147.1	July 24, 1937 Mar. 1, 1946	None	N	Steel casing. McDonald Well Field, 1.5 miles north.
150	140.0	d/	T,E	Irr	Cased to 240 feet.
151	138.0	d/	T,G, 35	Irr	Steel casing. Yield reported, 400 gallons a minute.
152	130.0	d/	T,E, 75	Irr	Cased to 240 feet. Yield reported, 1,000 gallons a minute. "Red beds" reported at 233 feet.
154	140	d/	T,E, 25	Irr	Irrigates about 60 acres trees, shrubs, and crops. Reported yield, 500 gallons a minute.
155	--	--	T,E, 10	D,Irr	Irrigates 7 acres. Reported yield about 1,000 gallons a minute.
156	157	d/	T,E, 15	Irr	
157	165	d/	T,E, 10	Irr	Irrigates 33 acres and orchard of 756 trees. Reported yield 250 gallons a minute.
158	100	d/	T,E, 25	S,Irr	Waters 27,000 chickens. Irrigates 23 acres corn, asparagus, spinach, potatoes and other truck.
159	--	--	T,E	Irr	
160	164.3	July 22, 1946	None	N	Drilled for irrigation. Pump not yet set.
301	207.3	Aug. 6, 1937	None	N	
302	210.0	d/	T,E, 20	Irr	Cased to 281 feet. Pump set at 260 feet. Yield reported, 150 gallons a minute. "Red beds" reported at 278 feet. See log.
303	189.8	May 21, 1937	C,W	D,S	Reported strong supply.
304	180.0	d/	C,W	D,S	Cased to 187 feet. Reported strong supply.

Records of wells in the Amarillo area, (Randall County) -- Continued

Well	Distance from Canyon	Owner	Driller	Date completed	Depth of well (ft.)	Diameter of well (in.)	Height of measuring point above ground (ft.) a/
310	8 miles east	R. P. Boehning	--	--	176	--	--
311	7½ miles northeast	Ben W. Moore	--	--	181	6	0.2
312	7 miles northeast	E. S. Burgess	--	--	146	4½	1.7
313	6 miles northeast	do.	--	--	160	6	--
314	7 miles northeast	W. F. Boehning	--	--	180	4½	0.2
315	5½ miles northeast	Carl Overton	--	--	180	4½	1.0
316	do.	T. C. Jennings	-- Hall	1909	181	--	1.0
317	5 miles north	W. C. Angel	W. C. Muncey	1944	200	16	1.5
318	8¼ miles north	Mrs. E. M. Elliott	--	--	180	18	1.0
319	9¼ miles north	B. H. Hales	W. D. Muncey	1940	210	--	--
320	8¾ miles north	Fred Stanley	do.	1937	215	--	--
321	8½ miles north	do.	do.	1939	202	--	--
322	9 miles north	W. Blackburn	do.	1938	190	--	1.1
323	10 miles north	do.	do.	1937	180	--	1.1
324	11¾ miles north	-- Ross	--	--	217	--	--
325	11½ miles north	John McCarty	W. D. Muncey	1935	195	--	--
326	11¼ miles north	E. C. Zion	--	1942	184	--	--
327	do.	C. Watkins	--	1936	180	--	--
328	11 miles north	Paul Sander	--	1936	180	--	--
329	11 miles northeast	J. L. Keeney	--	--	--	--	--
330	10½ miles northeast	M. T. Johnson	W. D. Muncy	1937	228	12	--
331	do.	J. L. Dixon	J. L. Dixon	1935	--	4	--
332	10 miles northeast	M. T. Johnson	W. D. Muncy	1939	225	12	--
333	9 miles northeast	Elmer McCullough	--	1943	210	12	--

a/ Measuring point was usually top of casing, top of wood pipe clamp, top of concrete pump foundation, or top of air-line hole in pump base.

b/ T, turbine; Cf, centrifugal; C, cylinder; E, electric; G, gas line; Ng, natural gas; O, diesel or semi-diesel; W, windmill; H, hand. Number indicates horsepower.

Well	WATER	LEVEL	Method of lift	Use of water	Remarks
	Below land surface (ft.)	Date of measurement			
310	--	--	C,W	D,S	Strong supply reported.
311	167.8	May 20, 1937	C,W	N	Cased to 181 feet.
312	134.7	Apr. 24, 1937	C,W	D,S	
313	--	--	C,W	D,S	
314	171.8	May 2, 1937	C,W	D,S	Cased to 180 feet. Measured yield, 2 gallons a minute, May 2, 1937.
315	130.9	May 20, 1937	C,W	N	
316	166.0	Apr. 24, 1937	C,W	D,S	Strong supply reported.
317	111.6	June 12, 1946	T,G, 35	Irr	Cased to 200 feet. Yield reported, 700 gallons a minute.
318	139.9	Mar. 19, 1943	None	N	Insufficient water for irrigation.
319	142.0	<u>d/</u>	T,G	Irr	Yield reported, 800 gallons a minute.
320	135.0	<u>d/</u>	T,G, 60	Irr	Yield reported, 900 gallons a minute.
321	120.0	<u>d/</u>	T,E	Irr	Yield reported, 400 gallons a minute.
322	106.9	Mar. 19, 1943	T,G	Irr	Yield reported, 1,000 gallons a minute.
323	117.5	do.	T,G, 40	Irr	Yield reported, 400 gallons a minute.
324	130.0	<u>d/</u>	T,G	Irr	Yield reported, 600 gallons a minute.
325	110.0	<u>d/</u>	T,G	Irr	Yield reported, 500 gallons a minute.
326	108.0	<u>d/</u>	T,E, 30	Irr	Do.
327	100.0	<u>d/</u>	T,G, --	Irr	Yield reported, 400 gallons a minute.
328	100.0	<u>d/</u>	T,G, --	Irr	Do.
329	--	--	T,Ng	Irr	
330	138	<u>d/</u>	T,E, 40	Irr	Water sand at 160 feet. Reported yield, 700 gallons a minute. Went to "red beds"
331	135	<u>d/</u>	C,-	D,S	Irrigates garden.
332	138	<u>d/</u>	T,O	Irr	Irrigates 120 acres. Reported yield, 750 gallons a minute. Hit "red beds" at
333	--	--	T,E	Irr	Reported yield 750-800 gallons a minute. Hit "red beds" at 224 feet. Hit "red beds" at 210 feet.

c/ Irr, irrigation; P, public supply; D, domestic; S, stock; N, not used.
d/ Water level reported.

Records of wells in the Amarillo area, (Potter County)
All wells are drilled unless noted in the remarks column

Well	Distance from Amarillo	Owner	Driller	Date completed	Depth of well (ft.)	Diameter of well (in.)	Height of measuring point above ground (ft.) a/
275	3 $\frac{3}{4}$ miles west	-- Sapp	--	--	183	4	0.8
278	5 miles west	G. Canode	--	--	177	4	0.5
279	dc.	Bush Estate	--	--	167	4	1.0
280	6 miles west	dc.	--	1907	185	4	--
282	dc.	H. T. Neeley	Joe Conner	1915	200	4	--
283	6 $\frac{1}{2}$ miles west	U. S. Government	D. J. Muncey	1928	255	10	--
286	8 $\frac{1}{2}$ miles west	Bush Estate	--	--	183	4	--
342	13 $\frac{1}{2}$ miles west	W. L. Campbell	--	1902	200	4	--
343	11 $\frac{1}{2}$ miles west	John Blessen	Joe Conner	1928	213	4	1.0
346	10 $\frac{1}{2}$ miles west	W. J. Hill	Chas. Tulles	1905	195	4	--
347	dc.	Bush Estate	--	--	200	4	1.0
348	10 miles west	Geo. Menke	J. Muncey	1937	266	10	1.2
349	dc.	Joe Gray	T. O. Muncey	1928	200	5 $\frac{1}{2}$	--
350	11 miles west	Geo. Menke	--	1924	188	4	1.0
352	dc.	Bush Estate	--	--	200	6	1.0
353	11 $\frac{1}{2}$ miles west	H. J. Blessen	--	1911	184	4	1.3
354	12 $\frac{1}{2}$ miles west	Cletus Rea	Lec McDade	1933	205	6	1.4
355	dc.	C. R. I. & G. Ry. Co.	--	1919	200	12	--
357	13 miles west	Bush Estate	--	1915	210	6	--
358	dc.	U. S. Government	--	--	200	4	1.0
361	15 $\frac{1}{2}$ miles west	A. C. Seitz	--	--	200	4	0.3
363	16 $\frac{1}{2}$ miles west	J. F. Travelstead	--	--	200	4	2.3
364	17 miles west	J. L. Nunn	--	1908	220	4	--
365	17 $\frac{1}{2}$ miles west	J. L. Travelstead	--	--	200	4	0.3
366	18 miles west	J. M. Beasley	Joe Conner	1918	200	4	0.5

Well	WATER LEVEL		Method of lift	Use of water	Remarks
	Below land surface (ft.)	Date of measurement			
275	162.7	Apr. 30, 1937	C,W	D,S	Strong supply reported.
278	131.9	do.	C,W	S	
279	140.8	Apr. 29, 1937	C,W	D,S	Weak supply reported. Temperature 63°F.
280	140.0	d/	C,W	D,S	Strong supply reported.
282	180.0	d/	C,W	D,S	Estimated yield $2\frac{1}{2}$ gallons a minute.
283	162.6 162.0 163.4	Apr. 5, 1937 Nov. 10, 1938 June 11, 1946	T,E, 25	Ind	Cased to 255 feet. Yield reported, 362 gallons a minute, with a drawdown of 8 feet, 15 minutes after the pump is
286	--	--	C,W	D,S	Weak supply started. See log reported.
342	180.0	d/	C,W	D,S	Cased to 200 feet. Estimated yield, 2 gallons a minute. Owner reports water
343	193.8	Apr. 10, 1937	C,W	D,S	Estimated yield, 4 gallons a minute. from gravel.
346	150.0	d/	C,W	D,S	Cased to 180 feet.
347	174.5	Apr. 3, 1937	C,W	D,S	
348	169.2	Apr. 27, 1937	T,E, 40	D,Irr	Cased to 266 feet. Measured yield, 315 gallons a minute on June 4, 1946, after pumping for one month. "Red beds" re-
349	140.0	d/ 1928	C,W	D,S	Cased to 190 feet. reported at 266 feet. Owner reports water from gravel, 140 to
350	172.5	Apr. 3, 1937	C,W	D,S	Strong supply reported. 160 feet.
352	139.6	Apr. 28, 1937	--	N	
353	163.2	Apr. 8, 1937	C,W	D,S, Irr	Supplies 40 head of stock, irrigates 90 trees.
354	184.2	Mar. 30, 1937	C,W	D,S, Irr	Cased to 200 feet. Yield reported, 4 gallons a minute. Irrigates small garden
355	160.0	d/	C,O 15	P,Ind	Cased to 200 feet. Yield reported, 60 gallons a minute.
357	195.0	d/	C,W	D,S, Irr	Cased to 200 feet. Yield reported, 3 gallons a minute.
358	194.1	Apr. 10, 1937	C,W	D,S	
361	174.7	Apr. 21, 1937	C,W	D,S	
363	183.6	Apr. 19, 1937	C,W	S	
364	--	--	C,W	D,S	Strong supply reported.
365	191.1	Apr. 21, 1937	C,W	N	
366	191.0	Apr. 27, 1937	C,W	D,S	Strong supply reported.

Records of wells in the Amarillo area, (Potter County) -- Continued

Well	Distance from Amarillo	Owner	Driller	Date completed	Depth of well (ft.)	Diameter of well (in.)	Height of measuring point above ground (ft.) a/
367	18 miles west	J. M. Beasley	--	1922	200	4	--
368	4 miles west	O. T. Stewart	-- Tye	1946	285	10	--
369	5½ miles west	E. Greathouse	-- Muncey	1940	240	16	--
370	6¼ miles west	U. S. Government Owner's No. 2	do.	--	255	10	--
371	13½ miles west	Amarillo Experimental Station	-- Ellis	1938	300	15	2.0
372	17½ miles west	R. C. Sampson	W. Muncey	1942	310	16	--

Well	WATER	LEVEL	Method of lift <u>b/</u>	Use of water <u>c/</u>	Remarks
	Below land surface (ft.)	Date of measurement			
367	--	--	C,W	D,S	Cased to 200 feet. Yield reported, 2 gallons a minute.
368	185.0	<u>d/</u>	T,E, 25	Irr	Cased to 285 feet. Pump set at 190 feet. Estimated yield, 150 gallons a minute.
369	173.0	<u>d/</u>	T,Ng, 110	Irr	Cased to 240 feet. Measured yield, 820 gallons a minute on May 7, 1946, after pumping continuously for 7 days. "Red
370	163.0	<u>d/</u>	T,E, 25	Ind	Cased to 255 feet. "beds" reported at 240 feet.
371	177.0	May 31, 1946	T,E, 40	Irr	Cased to 300 feet. Yield reported, 400 gallons a minute. Pumping level, 188 feet on June 4, 1946, after pumping one
372	200.0	<u>d/</u>	T,E, 60	Irr	Cased to 310 feet. Pump set at hour. 235 feet. Yield reported, 975 gallons a minute in 1943. "Red beds" reported at 310 feet.

Records of wells in the Amarillo area, (Deaf Smith County), Texas
All wells are drilled unless noted in the remarks column

Well	Distance from Hereford	Owner	Driller	Date completed	Depth of well (ft.)	Diameter of well (in.)	Height of measuring point above ground (ft.) a/
112	24½ miles north	Ed. Spruell	--	Old	88+	4½	--
114	27 miles northeast	E. T. Allred	--	Old	--	4	--
115	25½ miles northeast	H. E. Floyd	--	1915	170	4	0.3
116	25 miles northeast	do.	--	Old	--	4	--
117	do.	C. L. Garrison	--	Old	159	4½	1.0
118	do.	J. C. Allred	--	Old	--	--	--
119	24 miles northeast	L. C. Moore	--	Old	--	--	--
120	22 miles northeast	G. L. Muse	--	Old	--	--	--
121	do.	N. L. Barnes	--	Old	139	4	1.3
122	do.	W. M. Grabbe	Bud Gibbons	1937	200	13	1.0
123	18½ miles northeast	C. Hodges	--	--	Spring	--	--
124	20½ miles northeast	G. L. Muse	--	Old	40	--	--
125	21½ miles northeast	R. L. Campbell	--	--	--	--	--
126	do.	do.	--	Old	--	--	--
127	18 miles northeast	Federal Life Insurance Co.	--	--	81+	--	0.5
128	do.	M. H. Byrum	--	--	30+	5	0.8
129	20½ miles north	G. P. Fine	--	Old	--	--	--
166	16½ miles northeast	J. M. White	J. Mauk	1937	200	14½	1.5
167	17½ miles northeast	Daniels Public School	--	--	110	--	1.0
172	23 miles north	B. C. D. Bynum	--	1940	350	16	--
173	21½ miles northeast	R. L. Campbell	Bud Gibbons	1941	251	16	1.0
174	do.	W. T. Smith	Plains Land Roller Co.	1946	185	16	--
175	22 miles northeast	O. K. Higgins	William Stoker	1941	200	16	1.0
176	20½ miles northeast	do.	-- Muncey	1939	150	26	1.0

Well	WATER LEVEL		Method of lift b/	Use of water c/	Remarks
	Below land surface (ft.)	Date of measurement			
112	--	--	None	N	Obstructed at 88 feet.
114	--	--	None	N	Obstructed at 30 feet.
115	143.1	June 21, 1938	C,W	D,S	Steel casing. Estimated yield, 3 gallons a minute.
116	--	--	None	N	Filled to surface with dirt.
117	142.2	June 3, 1938	C,W	D,S	Steel casing. Estimated yield, 3 gallons a minute.
118	--	--	None	N	No casing.
119	--	--	C,W	D,S	Estimated yield, 3 gallons a minute.
120	--	--	C,W	S	Do.
121	114.8	June 3, 1938	C,W	N	Steel casing.
122	110.0	Dec. 4, 1937	T,G, 50	Irr	Cased to 200 feet. Pump set at 150 feet 8-5/8-inch column. Measured yield, 550 gallons a minute, and pumping level, 149 feet after pumping 5 hours on June. 11, 1946.
123	--	--	Flows	S	Estimated yield, 20 gallons a minute.
124	25.0	d/	C,W	S	No casing. Depth reported. Estimated yield, 5 gallons a minute. Obstructed at
125	--	--	C,W	D,S	Estimated yield, 4 gallons a minute. 23 feet.
126	--	--	C,W	D,S, Irr	Estimated yield, 1 gallon a minute. Irrigates vegetable garden.
127	73.5 73.6	Nov. 28, 1937 Feb. 9, 1943	C,W	N	Located 0.2 mile north of Palo Duro Draw.
128	24.1 24.7	Nov. 28, 1937 Feb. 19, 1944	C,W	S	Located in Palo Duro Draw.
129	--	--	C,W	N	Filled to surface with dirt.
166	95.9	Nov. 26, 1937	T,G, 50	Irr	Cased to 200 feet. Pump set at 140 feet. Estimated yield, 800 gallons a minute.
167	87.7	Dec. 4, 1937	C,W	P	Water in fine-grained red sand.
172	140.0	d/	T,G, 100	Irr	Cased to 350 feet. Pump set at 180 feet, 10-inch column.
173	127.8	Mar. 8, 1946	T,G, 100	Irr	Cased to 251 feet. Pump set at 170 feet, 8-5/8-inch column. See log.
174	128.0	do.	T,G	--	Cased to 185 feet. Well not completed when visited, March 8, 1946.
175	109.9	Dec. 14, 1945	T,G, 55	Irr	Cased to 200 feet. Pump set at 140 feet, 8-5/8-inch column. Yield reported, 1,000
176	15.5	do.	T,G, 40	Irr	Cased to 150 feet. gallons a minute. Pump set at 80 feet, 8-inch column. Located in draw.

Records of wells in the Amarillo area, (Deaf Smith County) -- Continued

Well	Distance from Hereford	Owner	Driller	Date completed	Depth of well (ft.)	Diameter of well (in.)	Height of measuring point above ground (ft.) a/
177	19½ miles northeast	F. A. Paul	-- Ellis	1946	180	14	2.0
178	18 miles northeast	W. P. Axe	--	Old	106	--	0.5
179	do.	J. H. Cheatam	L. Ellis	1940	196	16	--
180	18½ miles northeast	W. F. Axe	W. D. Jones	1944	200	12	1.0
181	20 miles northeast	Toy E. Price	Hereford- Johnston Pump Co.	1945	193	16	--
182	16½ miles northeast	Owen P. Smith	do.	1946	212	16	--
710	17½ miles northeast	J. M. White	do.	1944	212	16	1.8
711	do.	Brunner and Spurrier	-- Gatlin	1945	200	16	2.0
712	17 miles northeast	Clarence L. McBroom	-- Jones	1944	200	16	1.2
713	18¼ miles northeast	A. Beckman	--	1945	--	--	1.5
717	27 miles northeast	H. H. Elam	--	1940	300	16	--

Well	WATER LEVEL		Method of lift b/	Use of water c/	Remarks
	Below land surface (ft.)	Date of measurement			
177	96.1	Mar. 8, 1946	--	--	Cased to 180 feet. No pump installed when visited on March 8, 1946.
178	89.2	Dec. 6, 1939	C,W	D,S	No casing visible when visited.
179	91.0	Dec. 1940	T,G, 40	Irr	Cased to 196 feet. Pump set at 130 feet 9-inch column.
180	93.7	Mar. 8, 1946	T,G, 50	Irr	Steel casing. Pump set at 150 feet, 8-inch column.
181	93.0	Apr. 1945	T,G, 100	Irr	Cased to 193 feet. Pump set at 170 feet, 9-inch column.
182	--	--	T,G, 60	Irr	Cased to 212 feet. Pump set at 140 feet, 8-inch column.
710	90.7	Dec. 14, 1945	T,G, 40	Irr	Do.
711	89.3	do.	T,G, 60	Irr	Cased to 200 feet. Pump set at 145 feet, 8-inch column.
712	94.2	do.	T,G, 40	Irr	Cased to 200 feet. Pump set at 140 feet, 8-inch column.
713	93.4	Dec. 13, 1945	T,G, 70	Irr	
717	180.0	d/	--	--	Abandoned irrigation well. Filled with sand to 135 feet when visited May 31, 1946.

Records of wells in the Amarillo area, (Oldham County), Texas
 All wells are drilled unless noted in the remarks column

Well	Distance from Vega	Owner	Driller	Date completed	Depth of well (ft.)	Diameter of well (in.)	Height of measuring point above ground (ft.) a/
434	12 $\frac{1}{8}$ miles east	W. H. Gray	--	--	--	--	--
435	13 $\frac{1}{8}$ miles east	-- Cozart	--	Old	240	5	2.5
436	14 miles east	C. M. Humphrys	--	1927	195	4 $\frac{1}{2}$	1.6
437	13 $\frac{1}{2}$ miles east	B. Gist	--	--	200	--	0.4
438	13 miles east	J. R. Gouldy	Leo McDade	1916	204	4 $\frac{1}{2}$	--
439	do.	Joe Allred	do.	1917	195	4	--
440	do.	City of Wildorado	--	Old	--	--	--
441	11 miles east	J. M. Beasley	--	1916	210	4	--
442	do.	W. B. Hurley	--	Old	225	4 $\frac{1}{2}$	1.0
443	10 miles east	Ruth Arney	D. J. Muncy	1936	200	6	0.0
444	9 $\frac{1}{2}$ miles east	do.	--	Old	--	4	--
445	do.	do.	--	Old	--	6	--
498	12 miles east	Ben Milhoan	D. J. Muncy	1945	305	10, 4	1.0

a/ Measuring point was usually top of casing, top of wood pipe clamp, top of concrete pump foundation, or top of air-line hole in pump base.

b/ T, turbine; Cf, centrifugal; C, cylinder; E, electric; G, gas-line; Ng, natural gas; O, diesel or semi-diesel; W, windmill; H, hand; number indicates horsepower.

Well	WATER LEVEL		Method of lift	Use of water	Remarks
	Below land surface (ft.)	Date of measurement			
434	--	--	C,W	S	Estimated yield, 2 gallons a minute.
435	215.6	May 31, 1938	None	N	Cased to 240 feet.
436	161.7	Mar. 19, 1938	C,W	D,S	Cased to 195 feet. Measured one foot drawdown after pumping about 1½ gallons
437	178.1	Mar. 21, 1938	C,W	D,S	a minute for one-half hour.
438	164.0	d/	C,W	D,S, Irr	Cased to 204 feet. Reported yield, 3 gallons a minute. Irrigates garden.
439	165.0	d/	C,W	D,S, P,Irr	Cased to 195 feet. Reported yield, 3 gallons a minute. Irrigates garden.
440	--	--	C,W, G,2	P	Supplies City of Wildorado.
441	--	--	C,W	D,S	Cased to 210 feet. Reported good yield.
442	184.9	Mar. 21, 1938	C,W, G,3	D,S	Cased to 217 feet. Pump set at 215 feet.
443	175.8	July 19, 1938	None	N	Cased to 200 feet. Originally drilled to supply water for highway construction.
444	--	--	None	N	Filled with dirt. Reported strong supply originally.
445	--	--	C,W	D,S, Irr	Steel casing. Irrigates garden.
498	185.5	June 4, 1946	T,E, 40	Irr	Cased to 285 feet. Pump set at 208 feet, 7-inch column. Measured yield, 150 gallons a minute, and pumping level, 196.5 feet June 10, 1946. "Red beds" reported at 305 feet.

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

d/ Water level reported.

Table of drillers' logs in the Amarillo area,
Randall County, Texas

	Thickness (feet)	Depth (feet)
<u>Well 3</u>		
L. A. Pierce test well No. 23. miles northwest of Canyon.		14 $\frac{1}{2}$
Surface materials	3	3
Reddish clay	49	52
White clay	19	71
White rock	6	77
Red sand	30	107
Honeycomb lime rock	4	111
Honeycomb lime rock, water	3	114
Loose soft sand, water	4	118
Packsand, sand pebbles and light-brown clay balls	64	182
Loose soft sand, water	6	188
Packsand, little clay	50	238
White clayey sand	4	242
Loose soft red sand, water	3	245

	Thickness (feet)	Depth (feet)
<u>Well 4</u>		
L. A. Pierce test well No. 25. miles northwest of Canyon.		14 miles
Surface materials	3	3
Yellowish clay	57	60
Red clay and rock	10	70
Hard white rock	2	72
White clay and rock	46	118
Packsand, water	22	140
Clay and packsand	10	150
Packsand, water	15	165
Packsand and sand pebbles, water	17	182
Loose soft sand, water	18	200
Packsand and sand pebbles, water	4	204
Packsand, water	18	222
Packsand, little clay, water	16	238

	Thickness (feet)	Depth (feet)
<u>Well 5</u>		
L. A. Pierce test well No. 24. miles northwest of Canyon.		13 $\frac{1}{2}$
Surface materials	4	4
Yellowish clay	36	40

	Thickness (feet)	Depth (feet)
<u>Well 5 -- Continued</u>		
Soft white rock	55	95
Yellow clay, sand, white rock	17	112
Honeycomb lime rock and sand	3	115
Honeycomb lime rock, water	5	120
Loose soft sand, water	7	127
Packsand and lime rock, water	13	140
Clayey sand, water	10	150
Loose soft sand, water	11	161
Packsand and white rock, water	4	165
Packsand and sand pebbles, water	27	192
Loose soft sand, water	38	230
Clay and packsand	3	233
Packsand and gravel, water	5	238
Red clay	12	250

	Thickness (feet)	Depth (feet)
<u>Well 6</u>		
Jesse Pierce test well No. 12. miles northwest of Canyon.		12 miles
Surface materials	4	4
Yellowish clay	36	40
White rock, hard and soft layers	35	75
White rock, clay and sand	25	100
Hard white rock	3	103
White rock, clay and sand	15	118
Reddish sand, water	18	136
Hard sand rock, water	4	140
Packsand, little clay, water	10	150
Reddish sand, water	25	175
Soft sand, loose, water	8	183
Loose sand, soft, honey- comb sand rock, sand pebbles, water, soft	31	214
Hard boulders	2	216

	Thickness (feet)	Depth (feet)
<u>Well 7</u>		
L. A. Pierce test well No. 4. miles northwest of Canyon.		14 miles
(Continued on next page)		

Table of drillers' logs in the Amarillo area,
Randall County, Texas -- Continued

	Thickness (feet)	Depth (feet)
<u>Well 7 -- Continued</u>		
Surface materials	3	3
Chalky materials	12	15
Yellowish clay	13	28
Reddish clay	10	38
Grayish clay	20	58
Hard rock	3	61
Soft reddish clay	4	65
Hard rock	3	68
Soft white clay	22	90
Red packsand	10	100
Hard rock	5	105
Honeycomb rock, porous lime, little sand, little water	22	127
Packsand	15	142
Blue clay	12	154

<u>Well 8</u>		
L. A. Pierce test well No. 17. 13 miles northwest of Canyon.		
Surface materials	2	2
Chalky materials	10	12
Hard white rock	10	22
Packsand	10	32
Sand and clay	20	52
Sand and small boulders	8	60
Tight sand and sand pebbles, water	33	93
Yellowish clay	12	105
White clay and sand	46	151

<u>Well 9</u>		
L. A. Pierce test well No. 3. 12 $\frac{1}{2}$ miles northwest of Canyon.		
Surface materials	3	3
Chalky materials	2	5
Lime, sand rock and clay	52	57
Packsand	3	60
Lime rock	4	64
Packsand and clay	16	80
Lime rock	4	84
Packsand and clay	18	102
Soft sand and sand pebbles, water	8	110
Sandy clay	30	140
No record	10	150
Soft caving sand, water	14	164

	Thickness (feet)	Depth (feet)
<u>Well 9 -- Continued</u>		
Sandy clay	22	186
Soft sand and sand pebbles	10	196
No record	19	215
Soft caving sand, water	5	220
Soft sand and pebbles, water	7	227
Sandy clay	7	234

<u>Well 10</u>		
-- Slaughter test well No. 16. 11 $\frac{1}{2}$ miles northwest of Canyon.		
Surface materials	4	4
Yellowish clay	31	35
White rock	25	60
White rock and clay	15	75
Hard rock	28	103
Soft white rock	21	124
Packsand	10	134
Reddish sand and sand pebbles, water	25	159
Coarse sand, water	6	165
Packsand, little clay	12	177
Loose soft sand and sand pebbles, water	64	241

<u>Well 11</u>		
T. B. Slaughter test well No. 10. 12 miles west of Canyon.		
Surface materials	2	2
Reddish clay	24	26
Sand	2	28
Hard white rock	2	30
Yellowish clay	10	40
White rock	2	42
Packsand	18	60
Tight packsand, water	18	78
Soft sand and sand rock, water	31	109
Sand and sand pebbles, water	15	124
Sand and sand rock, water	10	134
Loose soft sand, water	14	148
Sand and sand pebbles, water	4	152
Loose soft sand, water	18	170
Hard packsand and clay	3	173

Table of drillers' logs in the Amarillo area
Randall County, Texas -- Continued

	Thickness (feet)	Depth (feet)
<u>Well 12</u>		
-- Slaughter test well No. 15. 12½ miles west of Canyon.		
Black soil	14	14
Sand and gravel, water	3	17
Blue mud	13	30
Sand and gravel, water	10	40
Honeycomb sand rock and loose sand	51	91

	Thickness (feet)	Depth (feet)
<u>Well 13</u>		
-- Slaughter test well No. 27. 11½ miles west of Canyon.		
Surface materials	3	3
Yellowish clay	39	42
Soft white rock	30	72
Packsand and white rock	26	98
Honeycomb sand rock and sand, water	22	120
Clayey sand and lime rock	7	127
Honeycomb sand rock, lime and sand, water	41	168
Hard packsand, water	10	178
Loose soft sand, water	12	190
Clay and packsand	6	196
Loose soft sand, water	15	211

	Thickness (feet)	Depth (feet)
<u>Well 14</u>		
-- Word test well No. 26. 10 miles northwest of Canyon.		
Surface materials	3	3
Reddish clay	32	35
Soft white rock	15	50
Packsand and clay	32	82
Honeycomb lime rock	12	94
Honeycomb lime rock, water	4	98
Packsand, water	17	115
Loose soft sand	24	139
Hard clay	4	143

	Thickness (feet)	Depth (feet)
<u>Well 15</u>		
-- Word test well No. 28. 9½ miles west of Canyon.		

	Thickness (feet)	Depth (feet)
<u>Well 15 -- Continued</u>		
Black sand and mud	13	13
Mud	5	18
White rock and sand, water	21	39
Clayey sand	15	54
Packsand and rock, water	21	75
Packsand, water	20	95

	Thickness (feet)	Depth (feet)
<u>Well 16</u>		
-- Word test well No. 33. 8 miles northwest of Canyon.		
Surface materials	3	3
Red clay	9	12
White rock and sand	6	18
Red clay	4	22
Red sand and rock	8	30
White rock and clay	9	39
Soft rock and sand	8	47
Sand and clay	8	55
Soft sand rock	15	70
Hard red sand	7	77
Sand and clay	4	81
Loose red sand and rock, water	15	96
White rock, clay and sand	22	118
Soft sand and clay	4	122
Reddish clay	3	125
Yellowish clay	10	135
Red clay	5	140

	Thickness (feet)	Depth (feet)
<u>Well 17</u>		
-- Word test well No. 32. 6½ miles northwest of Canyon.		
Red clay	3	3
White rock	10	13
White sand and rock	5	18
Hard white rock	17	35
Red sand and rock	7	42
Light-red sand rock	3	45
Loose yellow sand	5	50
Red sand	15	65
White sand and rock	11	76
Hard red water sand	7	83
Soft sand and rock, water	8	91

(Continued on next page)

Table of drillers' logs in the Amarillo area
Randall County, Texas -- Continued

	Thickness (feet)	Depth (feet)
<u>Well 17 -- Continued</u>		
Hard red packsand, water	29	120
Hard reddish packsand, water	20	140
Light-red packsand, water	10	150
Hard red packsand, water	14	164
Hard packsand and clay	33	197

<u>Well 18</u>		
-- Word test well No. 30. 6 miles northwest of Canyon.		
Surface materials	3	3
White clay	9	12
Red clay, sand and rock	6	18
Clay, sand and white rock	6	24
Hard white rock	2	26
Red packsand	10	36
White rock and sand	11	47
Red sand and rock	13	60
Packsand	4	64
Loose water sand	7	71
Red packsand, rock, and clay	8	79
Packsand and clay	39	118
Blue clay	4	122
Red clay	3	125

<u>Well 19</u>		
-- Word test well No. 31. 6½ miles northwest of Canyon.		
Surface materials	4	4
Red clay	10	14
Light-red clay	3	17
White rock and clay	13	30
Red sand	4	34
Red sand and white rock	25	59
Red sand and clay	4	63
White sand and clay	6	69
Red sand	16	85
Hard gray sand	6	91
Hard gray sand, water	3	94
Loose sand, water	22	116
Red sand and rock	4	120
Reddish sand, water	43	163
Clay and sand	4	167

	Thickness (feet)	Depth (feet)
<u>Well 20</u>		
-- Word test well No. 34. 6½ miles northwest of Canyon.		
Black sandy materials	4	4
Sandy clay	26	30
Hard gray sand, clay and rock, water	14	44
Hard gray sand, water	10	54
Red sand and rock	10	64
Hard packsand, little water	53	117

<u>Well 21</u>		
-- Word test well No. 35. 6½ miles northwest of Canyon.		
Red surface materials	12	12
Red sandy clay	6	18
Loose sand and rock	4	22
Red sand and rock	13	35
Hard red sand and rock, water	11	46
Loose red sand and rock, water	11	57
Loose red sand, water	12	69
Tight red sand	11	80
Red sand, clay and rock, tight	38	110
Tight red sand	11	121
Hard gray packsand	11	132
Blue clay	9	141

<u>Well 22</u>		
-- Word test well No. 29. 6½ miles northwest of Canyon.		
Sandy clay materials	12	12
Red sand and mud	5	17
Packsand and rock, water	28	45
Loose water sand	19	64
Red packsand, water	16	80
Gray packsand, water	10	90
Red packsand, water	5	95
Gray packsand, water	14	109
Loose water sand	1	110

Table of drillers' logs in the Amarillo area
Randall County, Texas -- Continued

	Thickness (feet)	Depth (feet)
<u>Well 23</u>		
City of Amarillo. $6\frac{1}{2}$ miles northwest of Canyon.		
Soil	2	2
Brown clay	3	5
Caliche	60	65
Caliche and sand	25	90
Clean sand	50	140
Red shale	6	146

	Thickness (feet)	Depth (feet)
<u>Well 24</u>		
-- Word test well No. 36. 7 miles northwest of Canyon.		
Dark-colored sandy surface materials	14	14
Light-colored sand and clay	4	18
White rock and sand	14	32
White rock and water sand	16	48
Red packsand, water	34	82
Hard red packsand	26	108
Hard packsand	17	125
Red sandy clay	8	133
Red clay	7	140

	Thickness (feet)	Depth (feet)
<u>Well 25</u>		
-- Word test well No. 37. 8 miles northwest of Canyon.		
Red sandy materials	12	12
Black sandy clay	6	18
White rock and sand	7	25
Red sandy clay	13	38
Light-red sandy clay, water	14	52
Light-red sand and clay	30	82
Soft red sand, water	11	93
Hard red sand	21	114
Blue clay	16	130
Red clay	4	134

	Thickness (feet)	Depth (feet)
<u>Well 26</u>		
-- Belles test well No. 1. 10 miles northwest of Canyon.		
Surface materials	5	5
Chalky materials	15	20
Lime, sand, rock and clay	100	120
Red packsand	11	131
Hard red sand rock	4	135
Tight sand, little water	10	145
Reddish sandy clay	30	175
Blue clay	5	180
Red clay	10	190

	Thickness (feet)	Depth (feet)
<u>Well 61</u>		
City of Amarillo, Greely Well No. 3. 8 miles northwest of Canyon.		
Soil	3	3
Caliche	17	20
Sand and caliche	60	80
Sand and shells	180	260
Water sand	19	279
Red shale	5	284

	Thickness (feet)	Depth (feet)
<u>Well 62</u>		
City of Amarillo, Greely Well No. 2. 8 miles northwest of Canyon.		
Soil	3	3
Red and yellow caliche	17	20
Yellow sand, caliche	40	60
Sand, and shells	20	80
Red sand and shells	10	90
Water sand - shells	30	120
Red water sand and shells	120	240
Hard shell - sand	20	260
Brcwn and yellow clay	4	264

Table of drillers' logs in the Amarillo area
Randall County, Texas -- Continued

	Thickness (feet)	Depth (feet)
<u>Well 62a</u>		
A. M. Olson, 6 $\frac{1}{2}$ miles northwest of Canyon. D. L. McDonald, driller.		
Soil	6	6
Caliche	24	30
Sticky clay	45	75
Clay and rock	21	96
White rock	23	119
Sand rock	15	134
Sand	26	160
Soft sand	10	170
Sand and sand rock	10	180
Sand	40	220
Hard sand rock	10	230
Sand	13	243
Sand and clay	9	252
Pea gravel	1	253
Rock	4	257

	Thickness (feet)	Depth (feet)
<u>Well 63</u>		
City of Amarillo, Greely Well No. 5. 8 miles northwest of Canyon.		
Soil	7	7
Sand and clay	43	50
Caliche	30	80
Sand and caliche	40	120
Sand and shells	10	130
Sand	20	150
Sand and shells	20	170
Sand	30	200
Sand and shells	62	262
Red rock	1	263

	Thickness (feet)	Depth (feet)
<u>Well 64</u>		
City of Amarillo, Greely Well No. 1. 8 $\frac{1}{4}$ miles northwest of Canyon.		
Soil	3	3
Caliche	17	20
Red sand	20	40
Caliche	40	80
Sand and caliche	20	100
Red water sand	40	140
Water sand	60	200
Water sand and shells	20	220
Water sand	20	240
Fine water sand	40	280

	Thickness (feet)	Depth (feet)
<u>Well 64 -- Continued</u>		
Red sand and shells	20	300
Red - white shells	13	313

	Thickness (feet)	Depth (feet)
<u>Well 65</u>		
City of Amarillo, Greely Well No. 4. 8 $\frac{1}{4}$ miles northwest of Canyon.		
Soil	3	3
White caliche	7	10
Brown caliche	12	22
White caliche	58	80
Muddy sand and shells	70	150
Red sand - coarse shells	130	280
Red sand, clay and shells	15	295
Red beds	10	305

	Thickness (feet)	Depth (feet)
<u>Well 66</u>		
City of Amarillo, Bush Well No. 6. 8 $\frac{3}{4}$ miles north of Canyon.		
Soil	4	4
Caliche	16	20
Caliche and sand	80	100
Sand	60	160
Sand and shells	80	240
Shells and sand	7	247
Red shale	13	260

	Thickness (feet)	Depth (feet)
<u>Well 67</u>		
City of Amarillo, Bush Well No. 5. 9 miles north of Canyon.		
Soil	4	4
Brown caliche	51	55
Brown caliche (coarse)	75	130
Water sand	34	164
Sand and shell	9	173
Shell and sand	27	200
Water sand	10	210
Sand and hard shell	40	250
Red and blue shale	13	263

Table of drillers' logs in the Amarillo area
Randall County, Texas -- Continued

	Thickness (feet)	Depth (feet)
<u>Well 68</u>		
City of Amarillo, Bush Well No. 4. 9½ miles north of Canyon.		
Soil	4	4
Brown caliche clay	23	27
Sandy clay	13	40
Brown clay and caliche	44	84
Brown clay and sandy clay	31	115
Brown sand	18	133
Fine water sand	60	193
Sand and shells	17	210
Sand and hard shell	19	229
Loose red sand	24	253
Hard shell, red and blue clay	22	275
Red, blue and white clay	11	286
Fine gray sand	3	289
Hard shell	2	291
Loose gray sand	6	297
Red beds	8	305

	Thickness (feet)	Depth (feet)
<u>Well 69</u>		
City of Amarillo, Bush Well No. 3. 9 miles north of Canyon.		
Soil	5	5
Gray caliche, sand	15	20
Red caliche, sand	40	60
Dry sand, clay and shells	16	76
Dry sand, clay and shells	54	130
Clean water sand	100	230
Red shale and shells	9	239

	Thickness (feet)	Depth (feet)
<u>Well 70</u>		
City of Amarillo, Bush Well No. 2. 10½ miles north of Canyon.		
Soil	3	3
Gray caliche	17	20
Gray fine-grained sand	20	40
Hard gray sand	60	100
Brown sand and shells	54	154
Clean water sand	76	230
Red and blue sand and shells, and shale	11	241
Gray sand	9	250

	Thickness (feet)	Depth (feet)
<u>Well 71</u>		
City of Amarillo, McDonald Well No. 1. 12½ miles north of Canyon.		
Top soil (clay and sand)	4	4
Caliche	8	12
Yellowish clay	58	70
Red sandy clay	12	82
Light sandy clay	13	95
Gray clayey sand	45	140
Soft red sandy clay	5	145
Honeycombed sand rock	18	163
Red cavey sand	6	169
Sand rock	1	170
Soft honeycombed sand rock	12	182
Sand rock	4	186
Sand and sand boulders	8	194
Sandy clay	19	213
Red cavey sand	10	223
Very fine-grained red sand	15	238
White clay	2	240
Red sand	11	251
White clay	3	254
Clean red sand	5	259
Red clay	11	270

	Thickness (feet)	Depth (feet)
<u>Well 72</u>		
City of Amarillo, McDonald Well No. 2. 12 miles north of Canyon.		
Soil	4	4
Red clay	13	17
Caliche	4	21
Yellow clay	47	68
Yellow sandy clay	19	87
Gray sandy clay	5	92
Light gray sandy clay	8	100
Soft red sandy clay	48	148
Honeycomb sand rock	3	151
Dirty gray sand	9	160
Clean red sand	3	163
Gray clayey sand	7	170
Loose sand boulders	6	176
Clean red sand	4	180
Gray clayey sand	3	183
Gray sand and sand rock	3	186
Gray clayey sand	14	200
Soft sand rock	4	204
Coarse sand and honey- comb sand rock	6	210

(Continued on next page)

Table of drillers' logs in the Amarillo area
Randall County, Texas -- Continued

	Thickness (feet)	Depth (feet)
<u>Well 72 -- Continued</u>		
Soft sand rock	7	217
Clean red sand	7	224
Gray clayey packsand	3	227
Clean red sand	3	230
Red sandy clay	5	235
Cavey red sand	3	238
Gray clayey sand	8	246
Gray clay	2	248
Clayey sand	6	254
White clay	3	257
Red clay	13	270

Well 73

City of Amarillo, McDonald Well No. 3.
11 $\frac{3}{4}$ miles north of Canyon.

Soil	4	4
Yellow clay	46	50
Gray sandy clay	12	62
Red sandy clay	45	107
Red sandy clay, soft	43	150
Sand rock	4	154
Gray sand and rock	2	156
Coarse sand and sand rock	14	170
Honeycomb sand	6	176
Red sandstone	14	190
Red sand with thin clay strata	8	198
Red cavey sand	10	208
Clayey gray sand	4	212
Red caving sand	3	215
No record	55	270

Well 74

City of Amarillo, McDonald Well No. 4.
11 $\frac{1}{2}$ miles north of Canyon.

Soil	3	3
Yellow clay	47	50
White sandy clay	15	65
Yellow sandy clay and gravel	9	74
Rock	4	78
Yellow sandy clay and gravel	76	154
Soft water-bearing sand rock	10	164

	Thickness (feet)	Depth (feet)
<u>Well 74 -- Continued</u>		
Yellow sand and white rock	16	180
Red water-bearing honey- comb sand with corals	29	209
Soft yellow water-bearing sand	15	224
Red sand and corals with streaks of yellow sandy clay	31	255
Blue clay	10	265
Red clay	26	291
Brown clay	21	312
Red water-bearing sand	2	314
Red and blue clay	8	322

Well 75

City of Amarillo, McDonald Well No. 5.
12 $\frac{1}{2}$ miles north of Canyon.

Soil	2	2
Yellow clay	63	65
Yellow sandy clay	33	98
Gray sandy clay	34	132
Yellow clayey sand	26	158
Soft loose water-bearing sand and pebbles	6	164
Yellow sand with thin clay streaks	30	194
White sandy clay	6	200
Red sand	12	212
White sandy clay	3	215
Red sand	31	246
Red sand with loose white rock	9	255
White sandy clay	3	258
Red sand	26	284
Reddish brown clay	28	312
Red sand	5	317
Gray sand	9	326
Red beds	10	336

Well 76

City of Amarillo, Bush Well No. 1. 10 $\frac{1}{2}$
miles north of Canyon.

Soil	3	3
Brown clay	5	8
Brown caliche	32	40

(Continued on next page)

Table of drillers' logs in the Amarillo area
Randall County, Texas -- Continued

	Thickness (feet)	Depth (feet)
<u>Well 76 -- Continued</u>		
Brown caliche	35	75
Hard shell and gravel	6	81
Brown sandy clay	47	128
Fine-grained sand	32	160
Sand and shell	90	250
Clay and shell	10	260
Red and blue shale	36	296
<u>Well 77</u>		
City of Amarillo, Brinkman Well No. 1. 13½ miles north of Canyon.		
Soil	4	4
Caliche	6	10
Brown caliche	110	120
Sand and shells	53	173
Fine-grained sand and shells	35	208
Fine water sand, shells	42	250
Red and blue sand and shells	6	256
Red, gray and blue shells	21	277

	Thickness (feet)	Depth (feet)
<u>Well 302</u>		
Log Llano Cemetery Well No. 1. 13¾ miles north of Canyon.		
Top soil	4	4
Caliche	5	9
Red sandy clay	81	90
Red sandy clay and gravel	5	95
Red sandy clay - gravel and white rock	64	159
Red sand and gravel, dry	9	168
White sandy clay	10	178
Red sandy clay	25	203
White clay	17	220
Red sand and white rock, water	2	222
Clayey sand and white rock	3	225
White rock and clay	13	238
Soft clayey sand	5	243
Gray sand and gravel cemented	35	278
Red beds	12	290

Table of drillers' logs in the Amarillo area,
Potter County, Texas

	Thickness (feet)	Depth (feet)
<u>Well 283</u>		
U. S. Government Helium Plant Well No. 1. $6\frac{1}{2}$ miles west of Amarillo		
No record	160	160
Quicksand	5	165
Porous rock	37	202
Hard sandy clay	12	214
Quicksand and gravel	12	226
Limestone	4	230
Gravel, sand and fine sand	20	250
Rock	3	253
Fine-grained yellow sand	2	255

Table of drillers' logs in the Amarillo area,
Deaf Smith County, Texas

	Thickness (feet)	Depth (feet)
<u>Well 173</u>		
R. L. Campbell, $21\frac{1}{2}$ miles northeast of Hereford.		
Top soil	4	4
Caliche	14	18
Brown clay	52	70
Sand rock	3	73
Sandy clay	7	80
Dry sand and gravel	17	97
Dry sand	31	128
Sand rock	9	137
Honeycomb sand rock	4	141
Loose sand	4	145
Sand rock	31	176
Loose sand	24	200
Sand rock	6	206
Loose sand	45	251

Partial analyses of water from wells in the Amarillo area, Randall County, Texas
(Results are in parts per million)

Well	Owner	Depth of well (ft.)	Date of collection	Total dissolved solids	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.)
2	H. R. Gwyn	245	May 9, 1946	334	41	39	25.4	322	24	10	3.6	1.2	263
9	L. A. Pierce	234	June 16, 1937	437	-	-	-	403	44	20	-	a/	-
33	R. L. Pond	118	May 13, 1937	200	-	-	-	195	20	9	-	a/	-
137	-- O'Brien	150	June 10, 1937	245	-	-	-	232	29	9	-	a/	-
138	John Menke	183	Aug. 17, 1937	282	47	29	19	256	47	14	-	a/	283
304	R. T. Beaman	187	May 21, 1937	273	-	-	-	262	25	14	-	a/	-
310	R. P. Boehning	176	May 20, 1937	284	-	-	-	268	22	21	-	a/	-
314	W. P. Boehning	180	May 8, 1937	-	-	-	-	-	25	56	-	a/	-
315	Carl Overton	180	May 20, 1937	274	-	-	-	250	34	13	-	a/	-

Partial analyses of water from wells in the Amarillo area, Potter County, Texas
(Results are in parts per million)

275	-- Sapp	183	Apr. 30, 1937	-	-	-	-	-	69	16	-	a/	-
*			Nov. 9, 1938	326	54	38	13	260	67	20	-	-	-
279	Bush Estate	167	Apr. 29, 1937	-	-	-	-	-	80	12	-	a/	-
*			Nov. 9, 1938	334	42	45	18	276	77	9	-	-	-
*283	U. S. Government	255	do.	335	48	33	24	288	66	10	-	-	-
286	Bush Estate	183	Apr. 6, 1937	314	-	-	-	256	55	17	-	a/	-
342	W. L. Campbell	200	Feb. 15, 1937	229	-	-	-	238	11	12	-	a/	-
343	John Blessen	213	Apr. 10, 1937	-	-	-	-	-	25	11	-	a/	-
346	W. J. Hill	195	Mar. 31, 1937	318	-	-	-	305	29	17	-	a/	-
348	Geo. Menke	266	Apr. 27, 1937	-	-	-	-	-	59	10	-	a/	-
349	Joe Gray	207	Apr. 7, 1937	260	-	-	-	244	29	12	-	a/	-
354	Cletus Rae	205	Mar. 30, 1937	275	-	-	-	268	29	9	-	a/	-
355	C.R.I. & G. Ry.Co.	200	Feb. 15, 1937	316	-	-	-	293	40	12	-	a/	-
357	Bush Estate	210	Mar. 30, 1937	323	-	-	-	293	48	10	-	a/	-
358	U. S. Government	200	Apr. 10, 1937	267	-	-	-	250	25	17	-	a/	-
361	A. C. Seitz	200	Apr. 21, 1937	-	-	-	-	-	44	10	-	a/	-
366	J. M. Beasley	200	Apr. 27, 1937	-	-	-	-	-	22	17	-	a/	-

a/ Nitrate less than 20 parts per million.

* Analyses by E. W. Lohr.

Partial analyses of water from wells in the Amarillo area, Deaf Smith County, Texas
(Results are in parts per million)

Well	Owner	Depth of well (ft.)	Date of collection	Total dissolved solids	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.)
115	H. F. Floyd	170	June 21, 1938	284	49	27	23	281	36	8	-	a/	231
117	C. L. Garrison	159	June 3, 1938	247	26	37	18	262	28	9	-	a/	218
119	L. C. Moore	-	do.	307	-	-	-	268	28	21	-	a/	-
120	G. L. Muse	-	do.	316	-	-	-	305	32	10	-	a/	-
124	do.	40	July 6, 1938	267	62	27	2	256	12	18	3.8	a/	267
125	R. L. Campbell	-	June 3, 1938	277	70	22	5	293	10	4	0.8	22	263
126	do.	-	do.	297	-	-	-	261	32	14	-	a/	-
167	Daniels Public School	110	Dec. 4, 1937	229	42	34	-	250	20	10	-	a/	246

Partial analyses of water from wells in the Amarillo area, Oldham County, Texas
(Results are in parts per million)

434	W. H. Gray	-	Apr. 25, 1938	227	-	-	-	220	20	12	-	a/	-
436	C. M. Humphrys	195	Mar. 19, 1938	299	-	-	-	305	28	6	-	a/	-
437	B. Gist	200	Mar. 21, 1938	281	-	-	-	256	28	10	-	a/	-
438	J. R. Gouldy	204	May 31, 1938	268	41	29	23	287	28	6	-	a/	223
439	Joe Alred	195	do.	280	59	21	22	293	26	6	2.2	a/	233
440	City of Wildorado	-	do.	286	-	-	-	293	28	4	-	a/	-
441	J. M. Beasley	210	Mar. 19, 1938	318	-	-	-	342	20	6	-	a/	-
442	W. B. Hurley	225	Mar. 21, 1938	241	34	20	34	256	20	7	-	a/	167
445	Ruth Arney	-	May 31, 1938	355	-	-	-	262	65	24	-	a/	-

a/ Nitrate less than 20 parts per million.



Drainage from soil maps and aerial photographs
of U.S. Department of Agriculture

EXPLANATION

- WELL WITH WINDMILL OR SMALL POWER PUMP
- ⊙ WELL WITH PUMPING PLANT - 5 HORSEPOWER OR LARGER
- UNUSED WELL
- SPRING

WELLS IN AMARILLO AREA, TEXAS

(83a)

SCALE

TEXAS BOARD OF WATER ENGINEERS
IN COOPERATION WITH THE
U.S. GEOLOGICAL SURVEY
AUGUST 1946

