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SUMMARY OF THE DEVELOPMENT OF GROUND WATER FOR IRRIGATION IN THE LOBO FLATS AREA, CULBERSON AND JEFF DAVIS COUNTIES, TEXAS

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PREPARED COOPERATIVELY BY THE GEOLOGICAL SURVEY
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SUMMARY OF THE DEVELOPMENT OF GROUND WATER FOR IRRIGATION IN THE LOBO FLATS AREA, CULBERSON AND JEFF DAVIS COUNTIES, TEXAS, 1948-50

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James W. Hood and R. A. Scalapino

INTRODUCTION

The investigation of the ground-water resources in the Lobo Flats area is one of a series of investigations being made by the United States Geological Survey in cooperation with the Texas State Board of Water Engineers. The purpose of the present study is to determine, insofar as practicable, the source, movement, quality, quantity, and availability of ground water in the area.

Interest in the availability of ground water for irrigation in the Lobo Flats area is indicated by the fact that between August 1948 and January 1951, 61 wells were drilled for irrigation supplies. Of these, 46 wells were actually placed in use.

The area was visited in the summer of 1943, at which time ground-water withdrawals were limited to supplies for stock and domestic use and for the railroad station at Lobo.

In the summer of 1948 the area was visited again, and it was found that one irrigation well had been completed. The yield obtained during the test of this well led to the drilling of the 61 wells for irrigation in the subsequent 2½ years.

The preliminary work in this area in 1943 and 1948 was done by J. W. Lang. Subsequent work was by J. W. Hood and R. A. Scalapino.

This report lists data on most of the wells in the area and chemical analyses of water samples from 29 wells, briefly summarizes the development of ground water through 1950, and describes the general ground-water conditions in the Lobo Flats area.

LOCATION AND EXTENT OF THE AREA

The Lobo Flats area is in the southwestern part of Culberson County and the western part of Jeff Davis County. Lobo, a railroad siding, is about 12 miles south of Van Horn. The irrigated area lies on both sides of U. S. Highway 90, and extends from about a mile north of Lobo southward to Chispa.

ACKNOWLEDGMENTS

The information given on the geology and structure of the area is based largely on the work done by C. L. Baker. 1/

The authors take this opportunity to express their appreciation for the courteous assistance given by Sam Hastings, former county agricultural agent, and by the well drillers, well owners, farmers, and ranchers who so generously supplied information pertaining to wells in the area.

1/ Baker, C. L., Exploratory geology of a part of southwestern Trans-Pecos, Tex.: Texas Univ. Bull. 2745, 1927.

SURFACE FEATURES AND DRAINAGE

The irrigated area of Lobo Flats lies in the valley of Chispa and Wildhorse Creeks, tributaries to the Salt Basin of Texas. Chispa Creek heads in Presidio County and flows northward, joining Wildhorse Creek about 7 miles northwest of Chispa. Wildhorse Creek heads in Jeff Davis County, about 2½ miles southwest of Chispa, and flows northward to disappear in the flats north of Wildhorse section house on the Texas and Pacific Railroad. Chispa and Wildhorse Creeks are intermittent streams.

The valley is relatively flat and is bounded on the east and west by hills and mountains. The most prominent land features are Chispa Mountain, and the Wylie, Van Horn, and Sierra Vieja Mountains.

CLIMATE

According to records of the United States Weather Bureau, the climate of the area is typical of western Texas. The average annual temperature is relatively high. At Van Horn, 12 miles north of Lobo, the average annual precipitation is approximately 11 inches for an 11-year period (table 1), and at Valentine, 39 miles southeast of Lobo, the average annual precipitation is about 12 inches for a 20-year period (table 2). Figure 1 shows the average monthly air temperature and precipitation at Van Horn. The maximum monthly precipitation in the area usually falls in the summer when the air temperature is high; consequently the major part of precipitation is returned to the atmosphere through evaporation and transpiration.

Table 1.- Monthly and annual precipitation, in inches, at Van Horn, Culberson County, Tex.

Year	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Annual
1939	0.99	0.00	0.20	0.58	1.13	0.40	3.45	3.26	0.49	0.90	0.99	0.09	12.48
1940	.07	.00	.00	.13	.70	.67	.56	1.61	.00	1.08	.82	.19	5.83
1941	.85	.87	.53	1.90	2.15	1.91	4.52	5.05	7.05	2.25	.00	.19	27.27
1942	.00	.00	.00	.63	.40	.84	1.09	2.21	.92	.76	.19	1.81	8.85
1943	.55	.00	.07	.04	.24	.94	3.60	.40	1.08	.01	.45	1.29	8.67
1944	.53	.84	.02	.00	.40	.34	.96	1.97	3.95	.09	1.32	.98	11.40
1945	.18	T.	.96	.16	.00	T.	2.87	1.21	.58	3.14	.00	T.	9.10
1946	1.63	.00	.06	.12	.21	.93	1.48	1.36	2.92	1.05	.21	.41	10.38
1947	.63	T.	.41	.04	1.75	.34	.82	1.66	.59	T.	.62	.22	7.08
1948	.10	.21	T.	.02	.18	1.36	.63	.92	.07	.67	T.	.82	4.98
1949	3.39	.28	T.	1.15	1.79	.43	2.80	1.19	3.28	1.63	.00	.78	16.00
1950	.17	-	-	-	-	-	-	.00	.00	.14	.00	.00	-

T, trace.

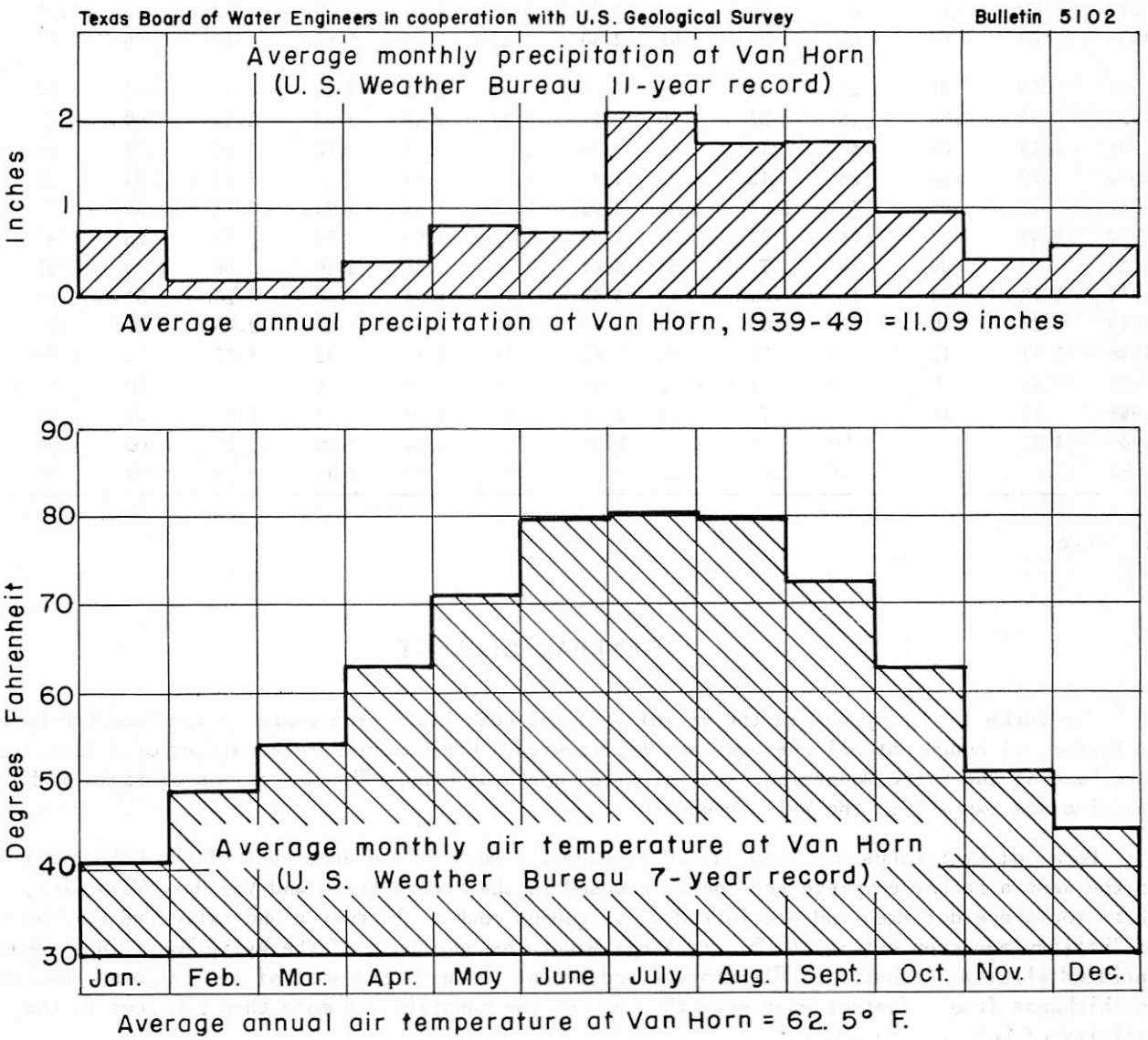


FIGURE 1.- Graphs showing average monthly precipitation and temperature at Van Horn in the Lobo Flats area.

Table 2.- Monthly and annual precipitation, in inches, at Valentine, Jeff Davis County, Tex.

Year	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Annual
1908	0.00	0.00	1.20	1.50	0.00	0.50	4.30	7.25	1.50	0.00	0.00	0.00	16.25
1909	.00	.00	.00	.00	.00	.00	1.80	.00	.30	.00	.00	.50	2.69
1910	.00	.50	.00	1.00	1.00	.11	3.10	.00	.00	.00	.00	.00	5.71
1911	.70	3.15	.80	.08	.25	2.52	3.57	1.20	.90	.00	.10	.98	14.25
1912	.00	.20	.00	1.00	.00	2.00	3.20	2.20	1.20	.00	.40	.20	10.40
1913	.00	.00	.00	.30	.05	2.40	.12	1.24	1.85	.11	.09	.05	6.21
1937	.00	.36	.20	.13	1.05	.85	.61	2.22	3.15	2.13	.61	1.05	12.36
1938	.59	.54	.15	.27	.00	3.27	5.20	1.48	3.85	1.22	.00	.50	17.07
1939	1.19	.00	.49	.16	.41	.89	1.83	2.57	.56	1.29	.93	.29	10.61
1940	.79	.36	.24	.12	1.25	1.42	1.22	2.88	.57	1.84	1.31	.59	12.59
1941	.76	.91	.79	1.87	3.04	2.92	2.82	3.11	5.24	3.77	.20	.55	25.98
1942	.45	.27	.24	.97	.18	1.85	1.35	4.03	.52	1.23	.25	.47	11.81
1943	.33	.00	.10	T.	.53	4.62	1.52	.46	2.10	.00	1.30	1.67	12.63
1944	1.12	.93	T.	.00	.37	3.57	.76	1.54	3.56	.28	.53	.85	14.51
1945	.21	.00	1.35	.00	.00	.55	4.37	2.51	.65	2.75	.00	.00	12.39
1946	1.17	T.	.05	.32	.00	.65	2.14	2.15	5.32	1.27	.00	1.35	14.42
1947	.66	.00	.79	.00	1.73	.69	.76	3.03	2.31	-	.20	.90	-
1948	.13	.27	-	T.	.14	2.16	.94	1.19	.52	1.56	.00	.57	-
1949	3.55	.56	.00	.62	1.06	2.15	-	1.24	3.08	1.26	.00	1.09	-
1950	.67	-	.06	.09	.12	2.74	2.97	.22	2.05	1.84	.00	.00	-

T, trace.

GENERAL GEOLOGY

The rocks that crop out in the vicinity of the Lobo Flats area range in age from pre-Cambrian to Recent, although not all the ages are represented. Pre-Cambrian rocks are exposed along the west base of the Wylie Mountains, several miles north of Lobo. Thick sections of rocks of Permian age also are exposed in the Wylie Mountains.

Rocks of Cretaceous age crop out in or underlie much of the area east of the Lobo Flats, and to the west a rather complete section is exposed in the Sierra Vieja and Van Horn Mountains, where these rocks are deformed and are intruded by igneous rocks. Intrusive and extrusive igneous rocks of Tertiary age crop out in the Sierra Vieja Mountains and south of the Wylie Mountains. Undifferentiated alluvial deposits of Pleistocene and Recent age underlie most of the valleys; they range in thickness from a feather edge near the base of the mountains to more than 800 feet in the vicinity of Lobo and Van Horn.

Information is not available to evaluate the water-bearing characteristics of the consolidated rocks. However, some water for irrigation has been obtained from a few wells developed in lava of Tertiary (?) age along the east side of the irrigated area. In general, it is probable that the consolidated rocks, other than lavas, will not be suitable aquifers, capable of yielding moderate to large quantities of water to wells.

The water-bearing zones in the area are the more permeable sand and gravel deposits of the Quaternary alluvium that underlies the valleys. The sand and gravel deposits are lenticular and have not been correlated as a single unit between wells. Drillers' logs indicate that the alluvium consists principally of clay, locally called shale, and that the sand and gravel zones form only a fraction of the total volume of alluvium.

STRUCTURE

The Salt Basin of Texas lies in the southern end of the Basin and Range province of the western United States. In that part of the Salt Basin in the immediate vicinity of Lobo Flats the structures are principally the result of faulting. The main faults trend southeast. The east face of the Van Horn and the west face of the Wylie Mountains are eroded fault scarps. The few deep test holes that have been drilled in the valley indicate that the base of the Pleistocene is not uniform. The thickness of the alluvium ranges from less than 400 feet on the east side of the irrigated area to more than 800 feet near Lobo.

The relatively shallow depths to water in wells in the vicinity of Lobo are related either to an underground barrier extending across Wildhorse Valley between the north end of the Van Horn Mountains and the south end of the Wylie Mountains or to changes in the permeability of the water-bearing beds which would also act as a barrier. The barrier functions as a subsurface dam, causing the water level to be comparatively shallow throughout the irrigated area to about a mile north of Lobo. Within a short distance north of the barrier water levels become much deeper. At Van Horn the water table is approximately 400 feet below the land surface.

GROUND WATER

OCCURRENCE

The ground water used for irrigation in the Lobo Flats area is obtained principally from sand and gravel in the alluvium. The grains range in size from fine-grained sand to boulders. The sand and gravel are rarely well sorted, although drillers have reported zones of sand of relatively uniform grain size. In all but a few of the wells for which drillers' logs were obtained, thick sections of clay reduced the producing, saturated section and locally confined the water under artesian pressure.

The altitude of the water surface in wells in the Lobo Flats area was determined by instrumental leveling. The water surface in wells in the irrigated area has a nearly uniform slope of 13 feet per mile northward. The slope of the land surface is greater than the slope of the water surface. Thus, the depth to water at Valentine is about 270 feet, at Chispa about 160 feet, and at Lobo about 90 feet. (See pl. 2).

At the barrier near the north end of the irrigated area the slope of the water surface increases to an average of about 23 feet per mile. On the west side of the irrigated area, three wells had water levels 100 feet, or more, lower than nearby wells. These three wells were drilled near the mountains and on a line somewhat parallel to the face of the mountains. The altitude of the water surface in the wells that penetrated lava conforms to the altitude of the water surface in surrounding wells that penetrated only alluvium.

RECHARGE

The extent of the area supplying natural recharge to the irrigated area is not known. The movement of ground water is northward in the same direction as the gradient of Chispa and Wildhorse Creeks. as shown in profile A-A' plate 2. Recharge to the reservoir in the drainage basin south of Lobo is from seepage along the small intermittent streams that discharge into the valley from the slopes of the surrounding mountains. Recharge occurs primarily during and after heavy rainfall because only then is the rate of precipitation greater than the rate of evaporation.

NATURAL DISCHARGE

Water that is not withdrawn from wells moves to the underground barrier at the north end of the irrigated area and percolates downward into the zone of deeper water. The water continues to move slowly northward and is eventually discharged into the alkali flats in the central part of Culberson County where it is returned to the atmosphere by evapotranspiration.

PRESENT DEVELOPMENT

Prior to the summer of 1948 the only use of ground water in Lobo Flats was for livestock, domestic supplies, and railroad supplies at Lobo. During the 2½-year period, August 1948-January 1951, inclusive, 61 wells were drilled for the purpose of irrigation. Of the 61 wells, 15 were not used because of insufficient water for irrigation, or failure during use owing to excessive amounts of sand pumped. The average of reported yields for 16 wells was 953 gallons a minute. The average drawdown reported for 10 wells was 50 feet, indicating an average specific capacity of approximately 19 gallons a minute per foot of drawdown. It is estimated that about 7,500 acre-feet of water was pumped to irrigate 2,500 acres in 1949, and 17,000 acre-feet to irrigate 7,000 acres in 1950.

FLUCTUATIONS OF WATER LEVELS

Measurements of the depths to water in wells in the Lobo Flats area were made in the summers of 1943 and 1948. During that period withdrawals were extremely small, and records indicate no appreciable change in water levels. However, in the irrigated area the decline from August 1948 to January 1951 ranged from 2 to 13 feet. In the vicinity of Chispa there was a general decline of about 2 to 3 feet; the maximum decline occurred near Lobo.

QUALITY

The chemical analyses of water from 23 wells in Culberson County and 6 wells in Jeff Davis County are given in table 5, (p. 25.)

The analyses show that although the water is not excessively mineralized as compared to other supplies used for irrigation in Texas, the sodium percentage is generally high and the effects upon the irrigated plants and soils should be carefully considered.

The following classification 2/ has been used as a guide in evaluating irrigation water:

Water class	Conductance (micromhos at 25° C.)	Salt content		Sodium (percent)	Boron (parts per million)
		Total parts per million	Tons per acre-foot		
Class 1	1,000	700	1	60	0.5
Class 2	1,000-3,000	700-2,000	1-3	60-75	.5-2.0
Class 3	3,000	2,000	3	75	2.0

1. Excellent to good, suitable for most plants under most conditions.
2. Good to injurious, the higher concentrations probably harmful to the more sensitive crops.
3. Injurious to unsatisfactory, probably harmful to most crops and unsatisfactory for all but the most tolerant. If a water falls in Class 3 on any basis -- that is, conductance, salt content, percentage of sodium, or boron content, it should be classed as unsuitable under most conditions. Should the salts present be largely sulfate , the values for salt content in each class can be raised 50 percent.

2/ Magistad, O. C., and Christiansen, J. E., Saline soils: U. S. Dept. Agr. Circ. 707, 1944.

The analyses of ground water in Lobo Flats compare favorably with the standards set by the U. S. Public Health Service 3/ for public consumption on interstate carriers. In all samples analyzed the dissolved solids were less than 1,000 parts per million, and most of the wells sampled yielded water containing less than 400 parts per million of dissolved solids.

SUMMARY

Although the water levels in wells in the irrigated area near Lobo have declined as much as 13 feet since the beginning of large withdrawals in 1949, sufficient data are not available to estimate the maximum practicable rate of withdrawal from the ground-water reservoir. Possible deeper water-bearing formations have not been thoroughly explored.

The movement of ground water in the area is northward parallel to the flow of Chispa Creek and Wildhorse Creek. Water not withdrawn from the ground-water reservoir in the Lobo Flats irrigated area moves over or through an underground barrier which lies between the Van Horn and Wylie Mountains, about 1 mile north of Lobo. Natural discharge occurs through the alkali flats in central Culberson County.

Data suggest that further development may be possible in Chispa Valley south of the present irrigated area, although the depth to water will be progressively greater southward.

Analyses of samples from wells in Lobo Flats indicate that the water is not excessively mineralized but the sodium percentage is high.

3/ Public Health Service drinking water standards: Public Health Reports, vol. 61, pp. 371-384, 1946

Table 3.- Records of wells in the Lobo Flats area, Culberson County Tex.

Method of lift: A, air lift; C, cylinder; D, diesel; E, electric; G, gasoline or butane; T, turbine; W, windmill. Number indicates horsepower.
Use of water : D, domestic; Irr, irrigation; N, not used; P, public supply; RR, railroad; S, stock.

Well	Distance from Lobo	Owner	Driller	Date completed	Depth of well (ft.)	Diameter of well (in.)	Altitude of land-surface datum (ft.)	Water level		Method of lift	Use of water	Remarks
								Below land surface (ft.)	Date of measurement			
S1	7 miles northwest	Cameron Lumber Co.	-- Geaslin	Old	411	6	3,955±	a/340	1943	C,W	S	Southernmost of three wells at "Old Cox place."
S2	5½ miles north	do.	N. B. Virdell	1941	370	6	3,895.3	a/300	1943	C,W	S	Pump set at 350 feet. Temp. 71° F.
S3	4½ miles northwest	do.	L. W. Stratton	1949	923	16	3,907.8	272.4 272.4	June 12, 1950 Feb. 8, 1951	None	N	Test well for irrigation supply. See log.
S4	4 miles north	do.	--	Old	359	--	3,915.3	280.0	Aug. 29, 1943	C,W	S	Known as "Jackson well." Temp. 77° F.
S5	4¼ miles northeast	do.	N. B. Virdell	1942	391	6	--	a/325 360.0	1943 Feb. 8, 1951	C,W	S	Temp. 77° F.
S6	2½ miles north	do.	L. W. Stratton	1949	500	16	3,927.5	141.7 151.8	May 3, 1950 Feb. 8, 1951	None	N	Test well for irrigation. Owner's well 7. See log.
S7	1¼ miles north	do.	do.	1949	406	--	3,933.1	153.2 154.2	May 3, 1950 Feb. 8, 1951	None	N	Abandoned. See log.
S8	1 mile southwest	do.	--	Old	30	48	--	13.3	Aug. 27, 1951	--	--	Dug. Known as "Van Horn well."
S9	¾ mile north	Jones & Wainwright	--	Old	--	6	3,933.0	128.3	Feb. 8, 1951	None	N	
S10	do.	do.	L. W. Stratton	--	400	16	3,933.8	137.7 133.5	May 3, 1950 Feb. 8, 1951	T,G	Irr	
S11	¾ mile northeast	do.	do.	1950	406	16	3,934.8	137.9 134.0	May 2, 1950 Feb. 28, 1951	T,G	Irr	See log.
S12	do.	do.	do.	1949	405	16	3,936.6	132.2 139.3 151.0 144.4	June 22, 1949 May 3, 1950 June 2, 1950 Feb. 8, 1951	T,G, 120	Irr	Casing slotted from 200 to 405 feet. Pumped at 1,150 gallons a minute when drilled; drawdown reported 25 feet.
S13	1 mile northeast	do.	do.	1950	407	16	3,938.6	141.1 152.8 136.4	May 2, 1950 June 2, 1950 Feb. 28, 1951	T,G	Irr	Casing: 407 feet of 16-inch. See log.
S14	1½ miles northeast	Ray Landreth	--	Old	145	6	3,954.7	112.3 112.2	Aug. 24, 1943 Feb. 8, 1951	C,W	S	Temp. 72° F.

a/ Reported by owner or driller.

Table 3.- Records of wells in Lobo Flats area, Culberson County--Continued

Well	Distance from Lobo	Owner	Driller	Date completed	Depth of well (ft.)	Diameter of well (in.)	Altitude of land-surface datum (ft.)	Water level: Below land surface (ft.)	Water level: Date of measurement	Method of lift	Use of water	Remarks
S15	1½ miles northeast	Ray Landreth	Fred Scroggins	1950	387	16	3,956.9	a/131 112.9	May 6, 1950 Feb. 8, 1951	T,G	Irr	Casing slotted from 0 to 387 feet. Pump set at 250 feet. Drawdown reported by pump company 134 feet while well was pumped at 490 gallons a minute on May 6, 1950.
S16	1¾ miles east	do.	L. W. Stratton	1949	463	16	3,959.6	a/90 106.5	June 1949 Feb. 8, 1951	T,G	Irr	Temp. 78.5° F. See log.
S17	do.	do.	Fred Scroggins	--	375	--	--	--	--	None	N	Test well for irrigation supply; insufficient water reported.
S18	1½ miles east	do.	do.	1949	380	16	3,945.6	90.5	Feb. 8, 1951	T,G, 100	Irr	Casing from 0 to 380 feet. Temp. 77.8° F.
S19	1¾ miles southeast	C. L. & F. A. Bell	--	1911	600	10	3,960.7	89.1 102.0	Aug. 26, 1943 Feb. 8, 1951	C,W	S	Temp. 73° F.
S20	¼ mile northeast	Jones & Wainwright	--	1949	400	16	3,937.6	99.0 95.9 87.0	Apr. 21, 1950 Nov. 17, 1950 Feb. 8, 1951	T,G, 120	Irr	Casing to 400 feet, slotted from 180 to 400 feet. Drawdown, 63 feet after 12 hours' pumping at 786 gallons a minute. Temp. 78° F.
S21	At Lobo	Southern Pacific Railroad Co.	C. R. Hawker	1912	420	12, 8	--	a/70	1912	None	N	Casing: 217 feet of 12-inch, 203 feet of 8-inch.
S22	do.	do.	O. E. Lindholm	1917	437	12, 10, 8	--	a/94	1917	A,D	RR	Casing: 90 feet of 12-inch, 142 feet of 10-inch, 235 feet of 8-inch; perforated from 162 to 302 and 397 to 437 feet.
S23	do.	do.	J. W. Jackson	1929	428	12	--	a/92	1929	A,D	RR	Casing: 372 feet of 12-inch; 372 feet of 8-inch liner; 8 and 6-inch screen from 370 to 426 feet. Estimated yield, 150 gallons a minute, Aug. 27, 1943. Drawdown reported 100 feet while well was pumped at 200 gallons a minute, when drilled. Temp. 77° F. See log.
S24	1 mile southeast	Jones & Wainwright	L. W. Stratton	1950	421	--	3,947.6	a/95 138.4 102.4	1950 May 5, 1950 Feb. 28, 1951	T,G	Irr	See log.

Table 3.- Records of wells in the Lobo Flats area, Culberson County--Continued

Well	Distance from Lobo	Owner	Driller	Date completed	Depth of well (ft.)	Diameter of well (in.)	Altitude of land-surface datum (ft.)	Water level: Below land surface (ft.)	Water level: Date of measurement	Method of lift	Use of water	Remarks
S25	¾ mile southeast	Jones & Wainwright	John Alexander	1948	382	16	3,948.2	104.2	Nov. 17, 1950	T,G	Irr	Drilled to 910 feet; plugged back to 382 feet. Pumping level reported 153.8 feet while well was pumped at 1,200 gallons a minute. Driller reported crevice between 850 and 855 feet, and water rose to 40 feet below surface. Temp. 77.5° F. See log.
S26	1 mile southeast	D. L. Brewster	Fred Scroggins	1950	385	16	3,952.4	a/100 102.7	Jan. 1950 Feb. 28, 1951	T,G, 45	Irr	Casing to 385 feet; 200 feet perforated.
S27	1 mile south	do.	do.	1949	385	14	3,955.0	a/100 111.1 105.3	June 21, 1949 Nov. 17, 1950 Feb. 28, 1951	C,W	D,S	Casing to 385 feet; 260 feet perforated. Drawdown reported 70 feet while well was pumped at 500 gallons a minute. Pumped sand for more than 30 days.
S28	do.	do.	do.	1949	385	--	--	a/100	June 1949	None	N	Abandoned. Yield reported, 200 gallons a minute.
S29	do.	do.	Mountain Drilling Co.	1949	432	--	--	a/104	Apr. 1949	None	N	Abandoned.
S30	do.	George Turner	Ted Lindemann	1949	425	16	3,969.0	a/140	Aug. 1949	T,G	--	Casing to 225 feet, perforated. Owner's well 1. See log.
S31	2 miles southwest	Cameron Lumber Co.	L. W. Stratton	1949	332	7	3,994.1	280.4	May 2, 1950	None	N	Drilled to 400 feet, plugged back to 332 feet. Casing 7-inch to 332 feet. See log.
S32	1½ miles south	do.	--	Old	295	8	3,963.6	98.0 161.3 117.3 110.1 108.5	Aug. 23, 1943 May 3, 1950 Nov. 17, 1950 Jan. 24, 1951 Feb. 9, 1951	C,W	N	Known as "Espy well."
S33	do.	George Turner	Ted Lindemann	1949	403	16	3,962.3	a/108	Aug. 26, 1949	T,G	Irr	Owner's well 2. See log.
S34	1¾ miles southeast	Grover Neely	Fred Scroggins	1949	350	16	3,955.3	99.1	Feb. 28, 1951	T,G	Irr	Casing to 350 feet; slotted from 100 to 350 feet.
S35	2¾ miles southeast	do.	do.	1949	386	16	3,959.3	102.1	do.	T,G	Irr	Casing to 386 feet; slotted from 100 to 386 feet.
S36	2¾ miles southeast	C. L. & F. A. Bell	--	Old	129	6	--	92.9 101.8	Aug. 26, 1943 Feb. 8, 1951	None	N	

Table 3.- Records of wells in Lobo Flats area, Culberson County--Continued

Well	Distance from Lobo	Owner	Driller	Date completed	Depth of well (ft.)	Diameter of well (in.)	Altitude of land-surface datum (ft.)	Water level: Below land surface (ft.)	Water level: Date of measurement	Method of lift	Use of water	Remarks
S37	2 miles southeast	George Turner	Ted Lindemann	1949	415	16	3,965.7	a/85 117.4	Sept. 21, 1949 Nov. 17, 1950	T,G	Irr	Casing to 416 feet. Owner's well 3. See log.
S38	do.	Texas State Highway Department	--	1938	274	8	3,963	90.2 86.8 98.0	July 30, 1943 Aug. 13, 1948 Feb. 9, 1951	None	N	Used during road construction. Perched water 45 feet above water level.
S39	2 miles south	Bates & Gamble	Fred Scroggins	--	350	16	3,971.7	167.8	May 2, 1950	T,G	Irr	Casing to 350 feet.
S40	do.	do.	L. W. Stratton	1949	385	16	3,969.6	a/150.0 168.0 125.3 115.9	Nov. 1949 May 3, 1950 Nov. 17, 1950 Feb. 9, 1951	T,G	Irr	Casing to 385 feet. See log.
S41	2½ miles southwest	do.	--	--	--	--	--	--	--	None	N	Test well for irrigation supply; insufficient water reported.
S42	2½ miles south	do.	Fred Scroggins	1949	400	16	3,975.5	--	--	T,G	Irr	Casing to 400 feet; 300 feet perforated. Perched water seeps into well above water level.
S43	3 miles southeast	Stanley Carter	do.	1950	350	16	3,971.3	a/105 114.5	Jan. 1950 Nov. 17, 1950	T,G	Irr	Casing to 350 feet; 200 feet perforated. Yield reported 700 gallons a minute.
S44	do.	George Turner	Ted Lindemann	1949	435	16	3,971.2	a/125 112.9	Aug. 24, 1949 Feb. 28, 1951	T,G	Irr	Casing to 435 feet; 208 feet perforated. Owner's well 4. See log.
S45	3¼ miles southeast	L. B. Dodson	Fred Scroggins	1950	315	16	3,980.9	a/100 126.8	Apr. 18, 1950 Feb. 28, 1951	T,G, 45	Irr	Casing to 215 feet; slotted from 100 to 215 feet. Drawdown reported 60 feet while well was pumped at 850 gallons a minute. Alluvium to 215 feet; hard shale or hard lava 215 to 315 feet.
S46	3½ miles southeast	C. L. & F. A. Bell	-- Threatt	1949	411	16, 14	3,985.1	79.7 86.8 90.9	June 22, 1949 May 10, 1950 Feb. 9, 1951	T,G	Irr	Yield, 1,375 gallons a minute, measured by County Agent.
S47	do.	do.	--	Old	160	6	--	80.4 91.1	Aug. 26, 1943 Feb. 9, 1951	None	N	
S48	4 miles southeast	George Turner	Ted Lindemann & L. W. Stratton	1949	267	--	4,001.5	a/95 102.6 103.4	Sept. 15, 1949 June 1, 1950 Feb. 9, 1951	T,G	Irr	Temp. 75.5° F. Owner's well 5. See log.

Table 3.- Records of wells in Lobo Flats area, Culberson County--Continued

Well	Distance from Lobo	Owner	Driller	Date completed	Depth of well (ft.)	Diameter of well (in.)	Altitude of land-surface datum (ft.)	Water level		Method of lift	Use of water	Remarks
								Below land surface (ft.)	Date of measurement			
S49	3¾ miles southeast	James P. Williams	--	1949	350	14	3,985.8	a/105 121.7 116.6	June 21, 1949 Nov. 17, 1950 Feb. 9, 1951	T,G	Irr	Casing to 350 feet; 150 feet perforated. Drawdown reported 35 feet while well was pumped at 1,100 gallons a minute. See log.
S50	3½ miles south	do.	--	1948	385	14	3,980.8	103.3 121.3 116.7	June 21, 1949 Nov. 17, 1950 Feb. 9, 1951	T,G	Irr	Casing to 385 feet. Drawdown reported 75 feet while well was pumped at 900 gallons a minute.
S51	do.	do.	--	1937	187	6	3,977.5	82.3 84.7	Aug. 24, 1943 Feb. 9, 1951	C,W	S	
S52	do.	do.	--	1949	355	14	3,977.8	85.1	June 21, 1949	T,G	Irr	Casing to 345 feet. Drawdown reported 30 feet while well was pumped at 1,100 gallons a minute. Owner's well 2. See log.
S53	4¼ miles south	Van Horn Irrigated Farms	L. W. Stratton	1949	368	16, 14	3,987.3	a/86 92.7 88.5	Nov. 1949 May 2, 1950 Feb. 28, 1951	T,G	Irr	Casing to 285 feet 16-inch; 93 feet of 14-inch. Pump set at 200 feet. Owner' well 9. See log.
S54	4½ miles southeast	Shannon, Holland & Logan	do.	1949	375	16	4,010.2	a/95 99.7 97.3	Oct. 1949 Nov. 17, 1950 Feb. 28, 1951	T,G, 125	Irr	Casing to 375 feet; pump set at 200 feet. Temp. 78.5° F. See log.
S55	5 miles southeast	George Turner	Ted Lindemann	1949	417	16, 13	4,025.9	a/114 110.5	Sept. 1949 Nov. 17, 1950	T,G	Irr	Casing to 361 feet of 16-inch; 61 feet of 13-inch; slotted from 110 to 160, and 265 to 417 feet. See log.
S56	5¼ miles southeast	do.	L. W. Stratton	1949	408	16	4,043.1	a/120 141.1	Sept. 16, 1949 May 10, 1950	T,G, 85	Irr	Temp. 78.6° F.
S57	do.	Lobo Farms Co.	do.	1949	383	16	4,022.1	a/114 116.2 113.8	Apr. 1949 Nov. 17, 1950 Feb. 28, 1951	T,G, 125	Irr	Casing to 383 feet. Temp. 74.8° F. See log.
S58	5½ miles southeast	Van Horn Irrigated Farms Co.	do.	1949	397	16	4,031.0	111.6 109.8	May 2, 1950 Feb. 28, 1951	T,G, 85	Irr	Casing to 397 feet; pump set at 200 feet. See log.

Table 3.- Records of wells in Lobo Flats area, Culberson County--Continued

Well	Distance from Lobo	Owner	Driller	Date completed	Depth of well (ft.)	Diameter of well (in.)	Altitude of land-surface datum (ft.)	Water level: Below land surface (ft.)	Water level: Date of measurement	Method of lift	Use of water	Remarks
S59	5¼ miles south	Lobo Farms Co.	--	1937	20	--	--	a/95 75.5	1943 Feb. 9, 1951	C,W	S	
S60	5 miles south	do.	L. W. Stratton	1949	360	16	4,008.6	a/100 118.2 116.0	Jan. 1949 Nov. 17, 1950 Feb. 9, 1951	T,G, 125	Irr	Casing to 360 feet; pump set at 200 feet. Yield reported, 1,200 gallons a minute. Temp. 76° F. See log.
S61	6 miles south	Ray Willoughby	do.	1949	399	--	4,051.4	a/339	Mar. 1949	None	N	Test well for irrigation supply; insufficient water reported. See log.
S62	5¾ miles south	L. W. Stratton	do.	1949	340	16	4,025.0	--	--	T,G	Irr	See log.
S63	6 miles southeast	Lobo Farms Co.	do.	1949	384	16	4,024.3	95.3 99.0	June 22, 1949 Feb. 28, 1951	T,G	Irr	Do.
S64	do.	Van Horn Irrigated Farms Co.	do.	1949	422	16	4,036.0	105.8 115.0	June 22, 1949 Feb. 28, 1951	T,G, 85	Irr	Casing to 385 feet; pump set at 200 feet. Yield reported, 300 gallons a minute. Temp. 76.7° F. See log.
S65	6¼ miles south	do.	do.	1950	--	16	4,037.7	116.1	Feb. 28, 1951	T,G	Irr	
S66	6½ miles south	Ray Willoughby	--	--	--	8	4,075.0	198.0	Feb. 9, 1951	C,W	S	
S67	do.	Van Horn Irrigated Farms Co.	L. W. Stratton	--	355	16	--	107.0	Feb. 28, 1951	T,G	Irr	Casing to 355 feet; pump set at 220 feet. Owner's well 18. See log.
S68	8 miles south	do.	do.	--	400	16	4,046.3	129.8 117.4	June 11, 1950 Feb. 28, 1951	T,G	Irr	Casing to 400 feet; pump set at 230 feet. Owner's well 16. See log.
T1	8¼ miles northeast	Cameron Lumber Co.	--	1941	600	--	--	--	--	None	N	Abandoned; no water reported.
T2	6 miles northeast	do.	--	1942	93	6	--	21.4	July 28, 1943	C,W	S	300 feet from outcrop of lava.
T3	5 miles northeast	do.	--	1937	200	7	--	a/100	--	C,W	S	On upthrown side of fault. Temp. 75° F.
T4	5¼ miles northeast	--	--	Old	37	48	--	22.0	July 28, 1943	C,W	S	On edge of outcrop of igneous rock.
T5	3¾ miles northeast	Cameron Lumber Co.	--	1941	521	6	--	a/450	--	C,W	S	On downthrown side of fault. Temp. 78° F.

Table 3.- Records of wells in the Lobo Flats area, Culberson County--Continued

Well	Distance from Lobo	Owner	Driller	Date completed	Depth of well (ft.)	Diameter of well (in.)	Altitude of land-surface datum (ft.)	Water level: Below land surface (ft.)	Water level: Date of measurement	Method of lift	Use of water	Remarks
T6 ✓	4½ miles east	C. L & F. A. Bell	--	Old	400	--	--	270.6 268.6	Aug. 26, 1943 Feb. 8, 1951	C,W	S	
T7	4¾ miles southeast	do.	--	1938	200+	8	--	197.6	Aug. 26, 1943	C,W	S	600 feet from outcrop of lava.

Records of wells in the Lobo Flats area, Jeff Davis County, Texas

Well	Distance from Chispa	Owner	Driller	Date completed	Depth of well (ft.)	Diameter of well (in.)	Altitude of land-surface datum (ft.)	Water level: Below land surface (ft.)	Water level: Date of measurement	Method of lift	Use of water	Remarks
E1	3¾ miles southwest	Van Horn Irrigated Farms Co.	--	Old	152+	6	4,092.6	142.6 145.1	July 21, 1943 Feb. 9, 1951	C,W	S	
F1	3½ miles southwest	do.	--	1951	436	14	--	142.7	Feb. 28, 1951	None	N	Casing to 436 feet; slotted from 100 to 436 feet. Yield reported 200 to 300 gallons a minute when well was drilled.
F2	2½ miles west	do.	L. W. Stratton	1949	500	--	4,082.0	--	--	None	N	Abandoned. Owner's well 13. See log.
F3	2¼ miles west	H. J. Thannisch	do.	1949	448	16, 14	4,086.1	134.0 134.5 137.7	Apr. 18, 1950 May 2, 1950 Feb. 28, 1951	T,G	Irr	Casing: 368 feet of 16-inch, 50 feet of 14-inch. See log.
F4	1 mile northwest	Van Horn Irrigated Farms Co.	--	Old	140	6	4,067.2	124.3 126.1	July 21, 1943 Feb. 9, 1951	C,W	S	
F5	½ mile east	C. Cowden Means	--	Old	189	8	4,100.2	158.5	Aug. 23, 1943	C,W	S	
F6	do.	do.	Emmitt Harrell	1948	447	16, 14	4,100.5	159.3	Feb. 28, 1951	T,G, 138	Irr	Casing: 304 feet of 16-inch, 14-inch liner to 447 feet. Drawdown 30 feet while well was pumped an estimated 1,500 gallons a minute.
F7	1¼ miles southeast	do.	--	--	--	--	4,141.4	197.3	June 13, 1950	None	N	Drilled for irrigation.
F8	1¼ miles southwest	Raymond Reed	L. W. Stratton	1950	480	16, 12	4,090.5	136.4 136.5 137.1	May 2, 1950 May 10, 1950 Feb. 28, 1951	T,G	Irr	Casing: 322 feet of 16-inch, 190 feet of 12-inch liner; pump set at 250 feet. See log.
F9	2¼ miles southwest	W. J. Russell	do.	1950	500	16, 12	4,095.0	a/145 154.0 141.1 141.2 142.6	Mar. 1, 1950 Apr. 18, 1950 May 2, 1950 May 19, 1950 Feb. 9, 1951	T,G, 110	Irr	Casing: 377 feet of 16-inch, 144 feet of 12-inch; 429 feet perforated; pump set at 250 feet. Yield reported, 1,000 gallons a minute. See log.

Table 3.- Records of wells in Lobo Flats area, Jeff Davis County--Continued

Well	Distance from Chispa	Owner	Driller	Date completed	Depth of well (ft.)	Diameter of well (in.)	Altitude of land-surface datum (ft.)	Water level: Below land surface (ft.)	Water level: Date of measurement	Method of lift	Use of water	Remarks
F10	2½ miles southwest	W. J. Russell	L. W. Stratton	1950	450	16, 12	4,094.3	a/150 141.1 142.2	Feb. 1950 Apr. 18, 1950 May 2, 1950	None	N	Casing: 285 feet of 16-inch. Well sanded up. Abandoned.
F11	do.	do.	do.	1950	465	16, 14	4,093.9	139.9 140.8 142.3	Apr. 18, 1950 May 2, 1950 Feb. 9, 1951	None	N	Casing: 307 feet of 16-inch, 170 feet of 14-inch. Yield reported, 1,100 gallons a minute. Abandoned. See log.
F12	do.	Van Horn Irrigated Farms Co.	--	1937	225	6	4,121.8	169.7 174.9	July 21, 1943 Feb. 9, 1951	C,W	S	
G1	In Valentine	Southern Pacific R.R. Co.	Layne-Texas Co. Inc.	1937	867	12	--	a/365	1937	T,-	RR	Casing to 862 feet; slotted from 330 to 862 feet. Drawdown reported 86 feet after 18 hours' pumping at 150 gallons a minute in 1937. Temp. 82° F.
G2	do.	City of Valentine	--	--	--	10, 7	--	189.6	Aug. 13, 1943	None	N	Owner's well 4. See log.
G3	do.	do.	Emmitt Harrell	1944	870	8	--	a/270	--	T,E, 25	P	Yield reported, 80 gallons a minute. Temp. 82° F.

a/ Reported by owner or driller.

Table 4.- Drillers' logs of wells in the Lobo Flats area, Culberson County, Tex.

	Thickness (feet)	Depth (feet)		Thickness (feet)	Depth (feet)
Well S3					
Cameron Lumber Co., 4½ miles northwest of Lobo. Driller, L. W. Stratton.					
Topsoil	5	5	Shale, brown	169	650
Shale, yellow	40	45	Gravel	10	660
Sand, dry	15	60	Shale	68	728
Shale, yellow	95	155	Lime, brown	9	737
Sand, dry	10	165	Shale	17	754
Shale, brown, and gravel	115	280	Lime	30	784
Sand and gravel, water	8	288	Gravel	27	811
Shale, red	7	295	Shale and gravel	11	822
Sand	10	305	Lime	31	853
Shale, red	68	373	Shale	2	855
Shale, sandy, brown	15	388	Lime	8	863
Sand	12	400	Shale	4	867
Sand and gravel	3	403	Shale and lime streaks	15	882
Shale, red	21	424	Lime	7	889
Sand	3	427	Shale and lime streaks	18	907
Gravel, water at 433 feet	21	448	Shale	13	920
Shale and gravel	33	481	Lime	3	923
Well S6					
Cameron Lumber Co., (Owner's well 7), 2½ miles north of Lobo. Driller, L. W. Stratton.					
Topsoil	12	12	Sand, hard	13	285
Shale	48	60	Shale	2	287
Sandstone	4	64	Sand, hard	27	314
Shale, sandy, hard	32	96	Gravel	41	355
Sand and gravel; water	34	130	Shale, red	10	365
Shale	20	150	Sand and gravel	5	370
Lime	2	152	Shale, red	5	375
Shale	60	212	Gravel	10	385
Sand	3	215	Shale, red	115	500
Shale	57	272			
Well S7					
Cameron Lumber Co., 1¼ miles north of Lobo. Driller, L. W. Stratton.					
Topsoil	5	5	Gravel	62	282
Clay, brown	10	15	Shale	8	290
Sand	63	78	Gravel	15	305
Clay and gravel	17	95	Clay and shale	5	310
Sand	17	112	Gravel	6	316
Clay and gravel	34	146	Shale, red	19	335
Clay, red, sticky	14	160	Gravel	47	382
Clay, sandy; a little water at 167 feet	35	195	Sand and shale	9	391
Sand, water	5	200	Gravel	12	403
Clay	5	205	Shale	3	406
Shale, red	15	220			

Table 4.- Drillers' logs of wells in the Lobo Flats area, Culberson County--Continued

	Thickness (feet)	Depth (feet)		Thickness (feet)	Depth (feet)
Well S11					
Jones & Wainwright, ¾ mile northeast of Lobo. Driller, L. W. Stratton.					
Topsoil	10	10	Shale	30	289
Shale	14	24	Gravel	15	304
Sand	11	35	Shale	26	330
Shale	23	58	Gravel	5	335
Sand and shale	12	70	Shale, sticky	7	342
Shale	15	85	Shale and gravel	10	352
Sand and gravel; water at 110 feet	30	115	Gravel	17	369
Sand	5	120	Shale	5	374
Shale	50	170	Shale and gravel	16	390
Shale, sandy	30	200	Shale, sticky	5	395
Shale, red	25	225	Gravel	9	404
Shale	13	238	Shale	2	406
Sand and shale	21	259			
Well S13					
Jones & Wainwright, 1 mile northeast of Lobo. Driller, L. W. Stratton.					
Topsoil	20	20	Sand	15	285
Sand	5	25	Shale	42	327
Shale	16	41	Shale and sand	12	339
Sand and shale	24	65	Shale	18	357
Shale	20	85	Sand and gravel	9	366
Sand; water at 109 feet	27	112	Shale, red	12	378
Shale	66	178	Sand and gravel	4	382
Sand	7	185	Shale, red	3	385
Shale	15	200	Sand and gravel	12	397
Shale, red	70	270	Shale	10	407
Well S16					
Ray Landreth, 1¾ miles east of Lobo. Driller, L. W. Stratton.					
Topsoil	2	2	Gravel and sand; water	25	260
Shale	12	14	Shale, brown	15	275
Sand, hard	8	22	Gravel	7	282
Sand, dry	35	57	Shale, brown	8	290
Shale, red	5	62	Gravel	80	370
Shale, brown	28	90	Shale, brown	15	385
Gravel; water	3	93	Gravel	18	403
Shale, brown	32	125	Shale	22	425
Gravel and sand	12	137	Gravel and sand	31	456
Shale, brown	98	235	Rock, red, very hard	7	463
Well S23					
Southern Pacific Railroad Co., at Lobo. Driller, J. W. Jackson.					
Topsoil	20	20	Gumbo	6	272
Clay, red	41	61	Sand, coarse-grained	6	278
Sand	11	72	Gumbo	82	360
Sand and fine-grained gravel	12	84	Quicksand, red, fine	12	372
Clay, red, and gumbo	126	210	Sand and gravel, coarse-grained	56	428
Shale, red, hard	50	260			
Sand, coarse-grained; water	6	266			

Table 4.- Drillers' logs of wells in the Lobo Flats area, Culberson County--Continued

	Thickness (feet)	Depth (feet)		Thickness (feet)	Depth (feet)
Well S24					
Jones & Wainwright, 1 mile southeast of Lobo. Driller, L. W. Stratton.					
Clay	18	18	Shale	4	223
Sand and gravel	21	39	Sand and gravel	6	229
Shale	41	80	Shale	45	274
Sand; water at 95 feet	18	98	Gravel	8	282
Shale	57	155	Shale	56	338
Sand and gravel	8	163	Sand and gravel	51	389
Shale	47	210	Gravel	30	419
Sand and gravel	9	219	Shale	2	421
Well S25					
Jones & Wainwright, ¾ mile southeast of Lobo. Driller, John Alexander.					
Topsoil	10	10	Shale, brown	20	770
Sand, gravel, and soil	15	25	Lava wash	55	825
Shale, sandy, red	200	225	Shale, red	25	850
Sand, brown, water level minus 125 feet	10	235	Shale, brown, and crevice water level rose to 40 feet below land surface	5	855
Shale, brown	90	325	Shale, white	5	860
Sand and gravel	25	350	Lava wash	18	878
Shale, brown	20	370	Shale, brown	6	884
Sand and gravel	12	382	Rock, red	26	910
Shale, brown	313	695			
Sand and gravel	8	703			
Shale, brown	39	742			
Sand and gravel	8	750			
Well S30					
George Turner, (Owner's well 1), 1 mile south of Lobo. Driller, Ted Lindemann.					
Topsoil	5	5	Sand and clay streaks	21	335
Clay	82	87	Sand and gravel	36	371
Gravel and sand	15	102	Clay	9	380
Clay	81	183	Sand and gravel	18	398
Sand and gravel	21	204	Clay	27	425
Clay	85	289			
Sand and gravel	25	314			
Well S31					
Cameron Lumber Co., 2 miles southwest of Lobo. Driller, L. W. Stratton.					
Clay	7	7	Shale and sand	57	285
Sand and gravel	58	65	Sand and gravel; water	25	310
Clay, red	5	70	Shale, sandy	35	345
Sand and gravel	90	160	Shale and gravel	5	350
Shale and gravel	18	178	Shale, red	50	400
Sand and gravel	50	228			

Table 4.- Drillers' logs of wells in Lobo Flats, Culberson County--Continued

	Thickness (feet)	Depth (feet)		Thickness (feet)	Depth (feet)
Well S33					
George Turner, (Owner's well 2), 1½ miles south of Lobo. Driller, Ted Lindemann.					
Topsoil	4	4	Sand	7	130
Clay	12	16	Clay	64	194
Sand	11	27	Sand	31	225
Gravel	7	34	Gravel	135	360
Clay	47	81	Conglomerate	31	391
Sand and gravel	17	98	Clay	12	403
Clay	25	123			
Well S37					
George Turner, (Owner's well 3), 2 miles southeast of Lobo. Driller, Ted Lindemann.					
Topsoil	4	4	Clay	16	194
Clay	18	22	Sand	11	205
Sand	15	37	Clay	75	280
Clay and boulders	43	80	Sand and gravel	34	314
Gravel	11	91	Clay	7	321
Clay	62	153	Sand and gravel	90	411
Sand	25	178	Clay	4	415
Well S40					
Bates & Gamble, 2 miles south of Lobo. Driller, L. W.Stratton.					
Topsoil	9	9	Sand; water; water rose to 150 feet	9	304
Clay	26	35	Shale, red	11	315
Clay, sandy	122	157	Sand and gravel	46	361
Shale, red	43	200	Gravel	22	383
Shale, brown	65	265	Shale, red	2	385
Shale, sandy	30	295			
Well S44					
George Turner, (Owner's well 4), 3 miles southeast of Lobo. Driller, Ted Lindemann.					
Topsoil	4	4	Clay	9	243
Clay	82	86	Sand	21	264
Sand	22	108	Clay	38	302
Clay	59	167	Sand	25	327
Sand	8	175	Gravel	101	428
Clay	48	223	Clay	7	435
Sand	11	234			
Well S48					
George Turner, (Owner's well 5), 4 miles southeast of Lobo. Drillers, Ted Lindemann, & L. W. Stratton.					
Lava wash	240	240	Lime, black	5	267
Lava	22	262			

Table 4.- Drillers' logs of wells in the Lobo Flats area, Culberson County--Continued

	Thickness (feet)	Depth (feet)		Thickness (feet)	Depth (feet)
Well S49					
James P. Williams, 3¾ miles southeast of Lobo.					
Topsoil	15	15	Lava	30	310
Clay, with some sand and gravel at 140 feet. Water rose to 120 feet	185	200	Sand and gravel; water rose to 105 feet. Hard rock at 350 feet	40	350
No record	80	280			
Well S52					
James P. Williams, (Owner's well 2), 3½ miles south of Lobo.					
Topsoil	6	6	Sand and gravel; water	13	253
Clay, red	19	25	Shale, red	48	301
Sand	7	32	Gravel	10	311
Shale, red	8	40	Shale, red	3	314
Shale, gray	39	79	Gravel	11	325
Sand and gravel, dry	11	90	Shale, red	3	328
Sand; water	10	100	Gravel	11	339
Shale, red	24	124	Shale, red	5	344
Clay, adobe	53	177	Gravel	10	354
Sand, white	31	208	Shale, red	1	355
Shale, red	32	240			
Well S53					
Van Horn Irrigated Farms, (Owner's well 9), 4¼ miles south of Lobo. Driller, L. W. Stratton.					
Topsoil	6	6	Shale, soft	32	235
Shale	11	17	Sand and gravel	30	265
Sand	8	25	Gravel, hard	18	283
Shale	45	70	Sand and gravel	10	293
Sand; water at 86 feet	22	92	Shale and sand	44	337
Shale, red	53	145	Sand, hard	16	353
Clay and gravel	45	190	Gravel	12	365
Lime and sand	13	203	Shale, red	3	368
Well S54					
Shannon, Holland & Logan, 4½ miles southeast of Lobo. Driller, L. W. Stratton.					
Topsoil	8	8	Shale	2	221
Shale	32	40	Lime	5	226
Gravel	15	55	Gravel	10	236
Shale and gravel	15	70	Shale	15	251
Shale	25	95	Gravel	15	266
Sand; water	5	100	Shale and gravel	59	325
Sand and gravel	25	125	Gravel	7	332
Gravel	60	185	Shale and gravel	17	349
Shale	23	208	Gravel	24	373
Lime	11	219	Shale	2	375
Well S55					
George Turner, 5 miles southeast of Lobo. Driller, Ted Lindemann.					
Sand, hard	265	265	Shale, sandy	15	327
Shale, sandy	30	295	Sand and gravel	28	355
Gravel	9	304	Gravel	62	417
Sand, hard	8	312			

Table 4.- Drillers' logs of wells in the Lobo Flats, area, Culberson County--Continued

	Thickness (feet)	Depth (feet)		Thickness (feet)	Depth (feet)
Well S57					
Lobo Farms Co., 5¼ miles southeast of Lobo. Driller, L. W. Stratton.					
Topsoil	5	5	Shale, red	35	320
Gravel, dry	20	25	Gravel	15	335
Shale, sandy	6	31	Shale, sticky, brown	7	342
Gravel, dry	83	114	Gravel	9	351
Sand and gravel; water	9	123	Shale, brown	21	372
Lime, black	53	176	Shale and gravel	6	378
Shale and gravel	20	196	Gravel	2	380
Shale	4	200	Shale, brown	3	383
Shale and sand	75	275			
Gravel	10	285			
Well S58					
Van Horn Irrigated Farms Co., 5½ miles southeast of Lobo. Driller, L. W. Stratton.					
Topsoil	10	10	Sand	15	210
Gravel	11	21	Shale	4	214
Shale	32	53	Lava rock	6	220
Gravel, dry	7	60	Shale	20	240
Limestone, broken	5	65	Shale and gravel	15	255
Gravel, dry	43	108	Sand and gravel	10	265
Clay and gravel	10	118	Gravel	30	295
Sand; water	7	125	Lime	2	297
Gravel	35	160	Shale, sandy	18	315
Lime and gravel	10	170	Sand and gravel	10	325
Lime and lava rock	7	177	Sand	5	330
Gravel	13	190	Gravel	10	340
Lime	2	192	Sand	47	387
Shale, sandy	3	195	Shale	10	397
Well S60					
Lobo Farms Co., 5 miles south of Lobo. Driller, L. W. Stratton.					
Topsoil	6	6	Clay, red	34	290
Shale, yellow	89	95	Sand and gravel	24	314
Sand and gravel	31	126	Shale, red	4	318
Shale, yellow	27	153	Sand and gravel	28	346
Clay, red	36	189	Shale, red	6	352
Gravel	16	205	Gravel	5	357
Shale, red	17	222	Shale, red	3	360
Sand and gravel	34	256			
Well S61					
Ray Willoughby, 6 miles south of Lobo. Driller, L. W. Stratton.					
Topsoil	6	6	Shale, red	220	339
Shale, sandy	4	10	Sand and gravel; water	12	351
Gravel, dry	66	76	Shale, red	12	363
Clay, sandy	14	90	Sand and gravel	5	368
Sand and gravel, dry	10	100	Gravel, hard	19	387
Shale, sandy	9	109	Shale, red	2	389
Gravel, dry	10	119	Gravel, hard	10	399

Table 4.- Drillers' logs of wells in the Lobo Flats area, Culberson County--Continued

	Thickness (feet)	Depth (feet)		Thickness (feet)	Depth (feet)
Well S62					
L. W. Stratton 5¾ miles south of Lobo. Driller, L. W. Stratton.					
Topsoil	17	17	Shale, sandy	11	205
Shale	83	100	Sand and gravel	55	260
Gravel	7	107	Shale, red	40	300
Shale	57	164	Sand	10	310
Sand; water	6	170	Shale	7	317
Gravel, large	8	178	Sand	19	336
Shale	16	194	Shale	4	340
Well S63					
Lobo Farms Co., 6 miles southeast of Lobo. Driller, L. W. Stratton.					
Topsoil	4	4	Sand and gravel	143	308
Sand	6	10	Shale, red	4	312
Shale, red	15	25	Gravel	18	330
Sand and gravel	5	30	Shale, red	4	334
Shale, red	7	37	Sand	8	342
Gravel	17	54	Shale, sandy	2	344
Shale	6	60	Shale, red	4	348
Gravel	7	67	Gravel	8	356
Shale, brown	18	85	Shale, red	4	360
Gravel; water at 105 feet	42	127	Gravel	4	364
Lime, black	18	145	Shale, red	2	366
Shale, red	9	154	Sand and gravel	7	373
Shale and gravel	11	165	Shale	11	384
Well S64					
Van Horn Irrigated Farms Co., 6 miles southeast of Lobo. Driller, L. W. Stratton.					
Topsoil	2	2	Sand, hard	2	384
Gravel	66	68	Shale	3	387
Rock, red	17	85	Sand with shale breaks	15	402
Sand and gravel; water at 125 feet	40	125	Sand and gravel	8	410
Shale, sandy	13	138	Sand with shale breaks	12	422
Sand and gravel	244	382			
Well S67					
Van Horn Irrigated Farms Co., (Owner's well 18), 6½ miles south of Lobo. Driller, L. W. Stratton.					
Topsoil	4	4	Sand and gravel	16	252
Shale, red	166	170	Shale	10	262
Sand	5	175	Sand and gravel	43	305
Shale	2	177	Shale	20	325
Sand; water	33	210	Gravel	28	353
Shale	26	236	Shale	2	355

Table 4.- Drillers' logs of wells in the Lobo Flats area, Culberson County--Continued

	Thickness (feet)	Depth (feet)		Thickness (feet)	Depth (feet)
Well S68					
Van Horn Irrigated Farms Co., (Owner's well 16), 8 miles south of Lobo. Driller, L. W. Stratton.					
Topsoil	4	4	Shale, red	25	285
Shale, red	204	208	Sand and gravel	5	290
Sand; water	12	220	Shale	15	305
Shale, red	25	245	Sand and gravel	5	310
Sand and gravel	15	260	Shale, red	90	400

Drillers' logs of wells in the Lobo Flats area, Jeff Davis County--Continued

Well F2					
Van Horn Irrigated Farms, (Owner's well 13), 2½ miles west of Chispa. Driller, L. W. Stratton.					
Topsoil	5	5	Shale	3	185
Sand	15	20	Sand	7	192
Shale	3	23	Sand and gravel; water	35	227
Sand	5	28	Shale, red	24	251
Shale	7	35	Gravel	25	276
Gravel	25	60	Shale, red	108	384
Shale, sandy	17	77	Shale and gravel	16	400
Sand and gravel	16	93	Gravel	13	413
Sand	5	98	Shale, red	23	436
Shale, red	65	163	Gravel	12	448
Sand	19	182	Shale, red	52	500
Well F3					
H. J. Thannisch, 2¼ miles west of Chispa. Driller, L. W. Stratton.					
Topsoil	5	5	Gravel	44	340
Sand	13	18	Shale, sandy	15	355
Gravel	22	40	Shale	43	398
Sand	10	50	Gravel	5	403
Shale, red	130	180	Shale, red	9	412
Sand; water	15	195	Sand and gravel	32	444
Shale, red	101	296	Shale, red	4	448
Well F8					
Raymond Reed, 1¾ miles southwest of Chispa. Driller, L. W. Stratton.					
Topsoil	5	5	Shale	3	337
Shale	10	15	Lime, shell, and gravel	4	341
Sand	45	60	Shale	19	360
Shale	11	71	Lime, shells, and gravel	2	362
Shale, red	84	155	Shale	93	455
Sand; water	5	160	Gravel	5	460
Shale	15	175	Shale	10	470
Sand and gravel	15	190	Sand and gravel	8	478
Shale	124	314	Shale	2	480
Gravel	20	334			

Table 4.- Drillers' logs of wells in the Lobo Flats area, Jeff Davis County--Continued

	Thickness (feet)	Depth (feet)		Thickness (feet)	Depth (feet)
Well F9					
W. J. Russell, 2¼ miles southwest of Chispa. Driller, L. W. Stratton.					
Topsoil	6	6	Gravel	27	340
Sand	29	35	Shale, red	15	355
Shale	131	166	Gravel	3	358
Sand; water	14	180	Shale, red	102	460
Shale	25	205	Gravel	3	463
Sand and gravel	7	212	Shale	12	475
Shale	46	258	Gravel	5	480
Gravel	52	310	Shale	20	500
Shale	3	313			
Well F11					
W. J. Russell, 2½ miles southwest of Chispa. Driller, L. W. Stratton.					
Topsoil	18	18	Gravel	40	425
Shale, red	67	85	Shale and gravel	10	435
Gravel, dry	10	95	Sand	12	447
Shale, red	120	215	Sand and gravel	3	450
Sand; water	60	275	Shale, red	15	465
Shale, red	110	385			
Well G1					
Southern Pacific Railroad Co., (Owner's well 4), in Valentine. Driller, Layne-Texas Co., Inc.					
Topsoil	10	10	Sand and gravel	5	581
Gravel, and clay	6	16	Rock	5	586
Gravel	20	36	Clay	4	590
Clay	43	79	Gravel	4	594
Clay, sandy	27	106	Rock	2	596
Gravel	24	130	Rock and gravel	7	603
Clay	23	153	Clay	6	609
Sand and gravel	146	299	Rock and gravel	8	617
Clay	29	328	Rock	2	619
Gravel	10	338	Sand and gravel	25	644
Clay	83	421	Clay	11	655
Sand and gravel	22	443	Sand and gravel	34	689
Clay and gravel	61	504	Clay	14	703
Rock	1	505	Sand and gravel	22	725
Clay and boulders	7	512	Clay	15	740
Rock	6	518	Sand and gravel	51	791
Clay	4	522	Rock	7	798
Rock	4	526	Clay	10	808
Sand and gravel	16	542	Rock	1	809
Clay	12	554	Sand	14	823
Sand and gravel	11	565	Clay	12	835
Rock	3	568	Sand and gravel	24	859
Sand and gravel	7	575	Clay	7	866
Rock	1	576	Rock	1	867

Table 5.- Analyses of water from wells in the Lobo Flats area, Culberson County, Tex.
(Analyses are in parts per million except for specific conductance, pH, and percent sodium)

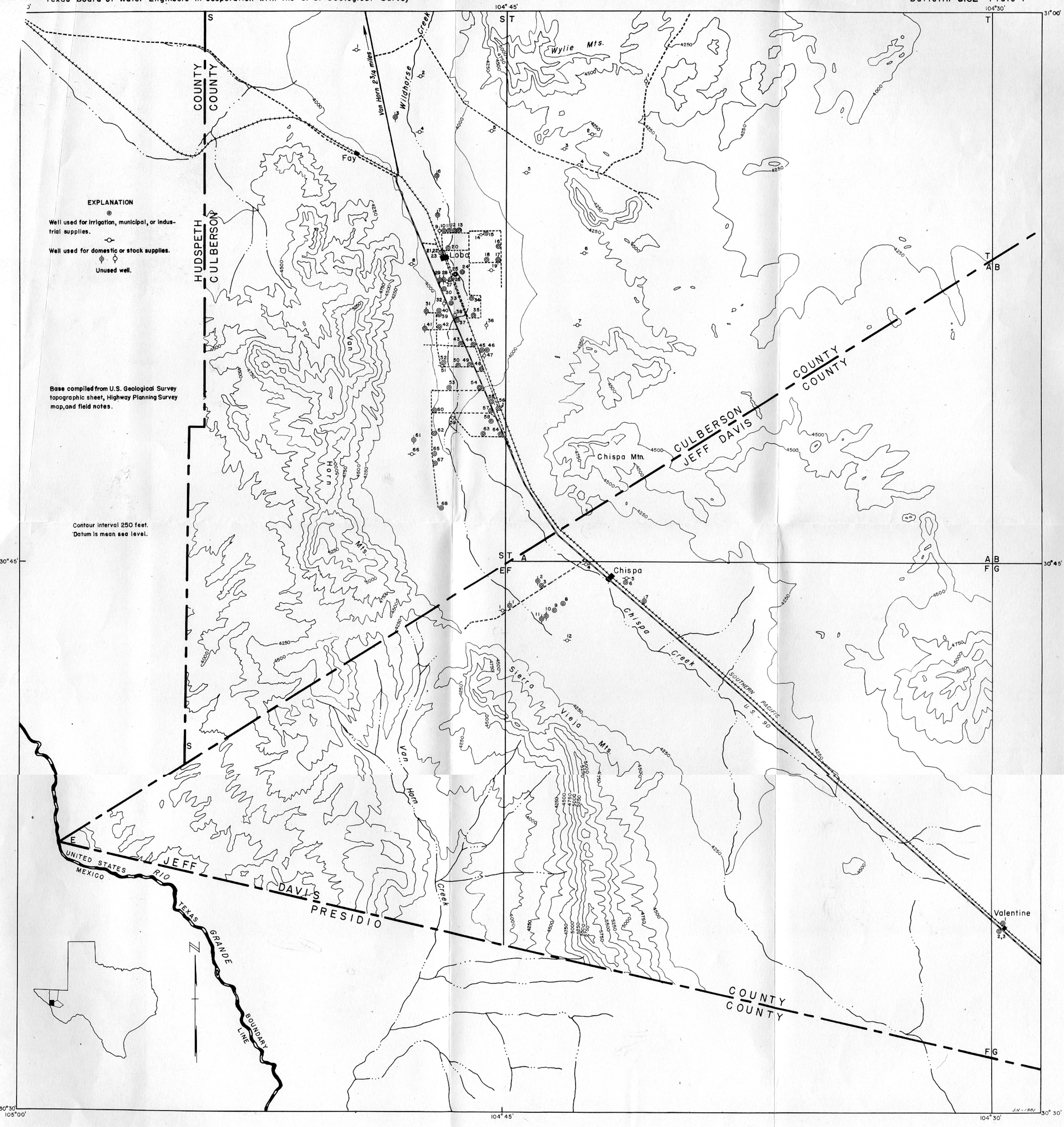
Well	Owner	Depth of well (ft.)	Date of collection	Specific conductance (micromhos at 25° C)	pH	Silica (SiO_2)	Calcium (Ca)	Magnesium (Mg)	Sodium and potassium (Na + K)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	Nitrate (NO_3)	Boron (B)	Dissolved solids	Total hardness as $CaCO_3$	Percent sodium
S1	Cameron Lumber Co.	411	July 30, 1943	743	-	-	-	-	-	257	119	27	-	-	-	-	-
S2	do.	370	July 28, 1943	533	-	-	-	-	-	228	49	18	-	-	-	-	-
S4	do.	350	July 29, 1943	583	-	-	-	-	-	253	56	19	-	-	-	-	-
S5	do.	391	July 28, 1943	625	-	-	-	-	-	243	68	29	-	-	-	-	-
S8	do.	30	July 27, 1943	860	-	-	90	24	65	444	43	32	13	-	486	323	30
S14	Ray Landreth	145	Aug. 24, 1943	-	-	-	40	7.5	132	223	177	32	6.4	-	505	131	69
S16	do.	463	May 5, 1950	517	7.9	64	-	-	89	211	50	17	6.3	0.24	366	59	77
S18	do.	380	do.	506	7.9	65	-	-	88	211	48	16	5.8	.45	363	57	77
S20	Jones & Wainwright	400	June 22, 1949	499	8.0	64	9.5	3.1	97	210	45	17	6.0	-	354	36	85
S23	Southern Pacific Railroad Co.	426	June 27, 1943	493	-	-	14	3.8	89	206	45	17	4.8	-	275	51	79
S25	Jones & Wainwright	382	Aug. 13, 1948	495	-	60	15	4.1	92	210	49	18	7.5	-	371	54	79
S26	D. L. Brewster	385	May 5, 1950	502	8.3	66	14	4.4	90	208	49	16	4.8	.23	359	53	79
S48	George Turner	267	May 4, 1950	510	7.9	65	-	-	87	206	49	16	5.2	.12	362	54	78
S49	James P. Williams	350	June 21, 1949	493	8.0	68	13	3.9	89	206	44	17	4.8	-	353	48	80
S51	do.	187	Aug. 24, 1943	-	-	-	29	5.5	91	215	73	25	7.0	-	336	95	68
S54	Shannon, Holland & Logan	375	May 4, 1950	489	7.9	64	-	-	87	205	44	16	5.1	.18	353	56	77
S56	George Turner	408	May 5, 1950	720	7.9	74	32	20	89	204	130	33	9.2	.24	492	162	54
S57	Lobo Farms Co.	383	June 22, 1949	559	7.9	74	15	10	92	204	68	26	6.5	-	400	78	72
S60	do.	360	May 2, 1950	501	8.4	64	-	-	88	206	49	17	4.7	.29	357	53	78
T3	Cameron Lumber Co.	200	July 28, 1943	908	-	-	-	-	-	342	123	50	-	-	-	-	-
T4	-	37	do.	838	-	-	-	-	-	396	93	20	-	-	-	-	-
T5	Cameron Lumber Co.	521	do.	562	-	-	-	-	-	224	62	22	-	-	-	-	-
T6	C. L. & F. A. Bell	400	Aug. 26, 1943	-	-	-	37	8.4	84	202	91	29	11	-	360	127	59

Analyses of water from wells in the Lobo Flats area, Jeff Davis County, Tex.

F3	H. J. Thannisch	448	May 3, 1950	311	8.0	34	-	-	51	160	12	7.0	2.2	.06	209	44	72
F5	C. Cowden Means	189	Aug. 23, 1943	-	-	-	70	29	222	186	468	95	3.2	-	979	294	62
F6	do.	447	June 21, 1949	562	8.0	74	10	5.2	105	217	58	22	5.9	-	392	46	83
F12	Van Horn Irrigated Farms	225	July --, 1943	1,240	-	-	5.0	3.3	271	385	186	76	.2	-	731	26	96
G1	Southern Pacific Railroad Co.	867	Aug. 26, 1943	356	8.5	51	4.9	.8	77	157	27	12	6.0	-	263	16	91
G3	City of Valentine	879	Aug. 13, 1948	362	8.2	28	4.3	.8	79	152	27	13	4.5	.67	231	14	87

Iron (Fe): G1, 0.01; G3, 0.15.

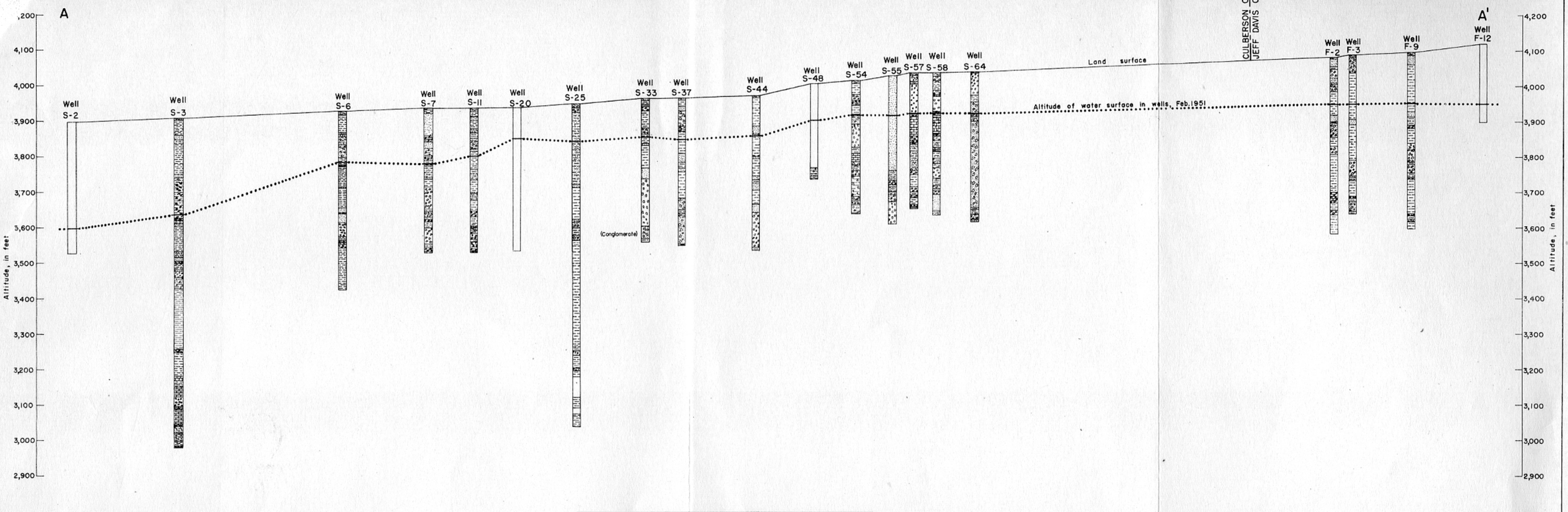
Fluoride (F): G1, 1.4; G3, 1.3.

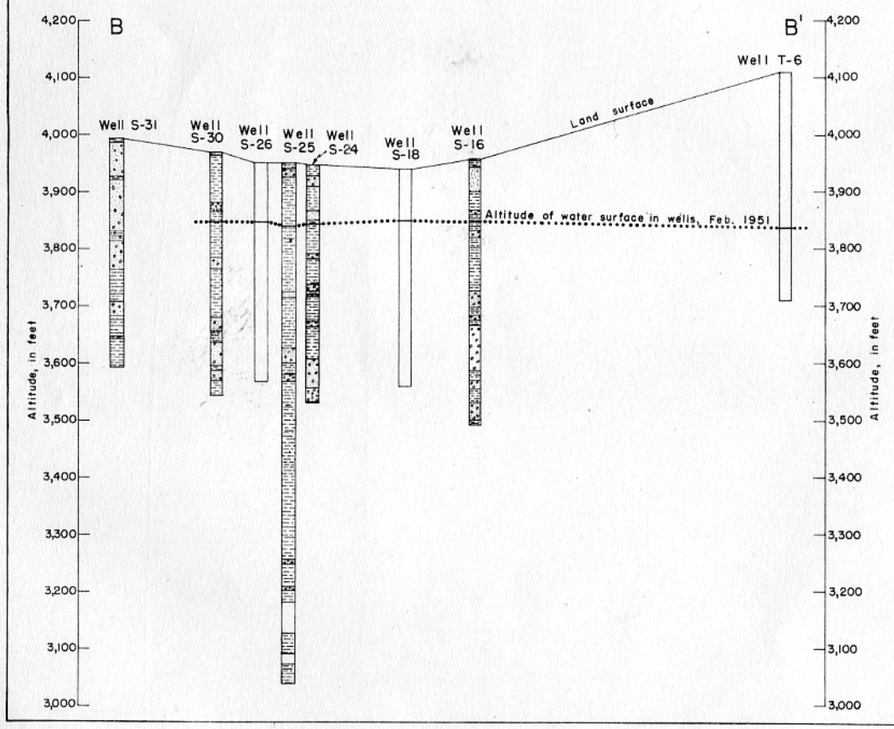

104° 45'
104°30'
31°00'
30°45'
30°30'
105°00'
EXPLANATION
Well used for irrigation, municipal, or industrial supplies.
Well used for domestic or stock supplies.
Unused well.
Base compiled from U.S. Geological Survey topographic sheet, Highway Planning Survey map, and field notes.
Contour interval 250 feet.
Datum is mean sea level.
HUDSPETH COUNTY
CULBERSON COUNTY
CULBERSON COUNTY
JEFF DAVIS COUNTY
JEFF DAVIS COUNTY
PRESIDIO COUNTY
Van Horn 2 3/4 miles
Wildhorse Creek
Wylie Mts.
Fay
Lobo
Van Horn Mts.
Chispa Mtn.
Chispa
Chispa Creek
Sierra Vieja Mts.
Van Horn Creek
SOUTHERN PACIFIC
U.S. 90
Valentine
UNITED STATES
MEXICO
RIO GRANDE
TEXAS
BOUNDARY LINE
J.N.-1951

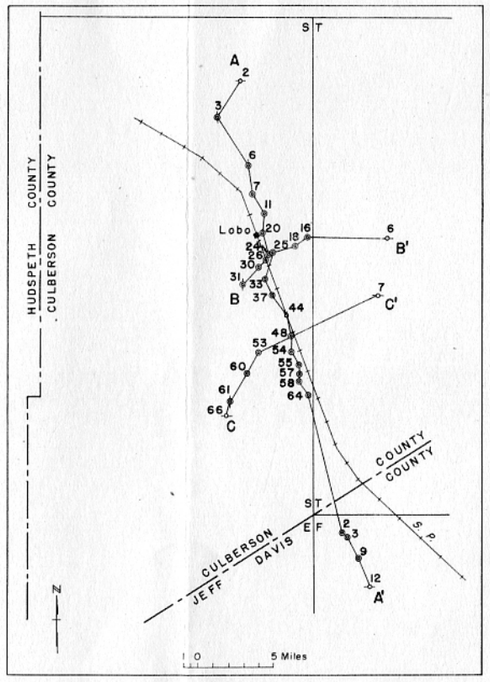
MAP SHOWING WATER WELLS IN THE LOBO FLATS AREA, CULBERSON AND JEFF DAVIS COUNTIES, TEXAS

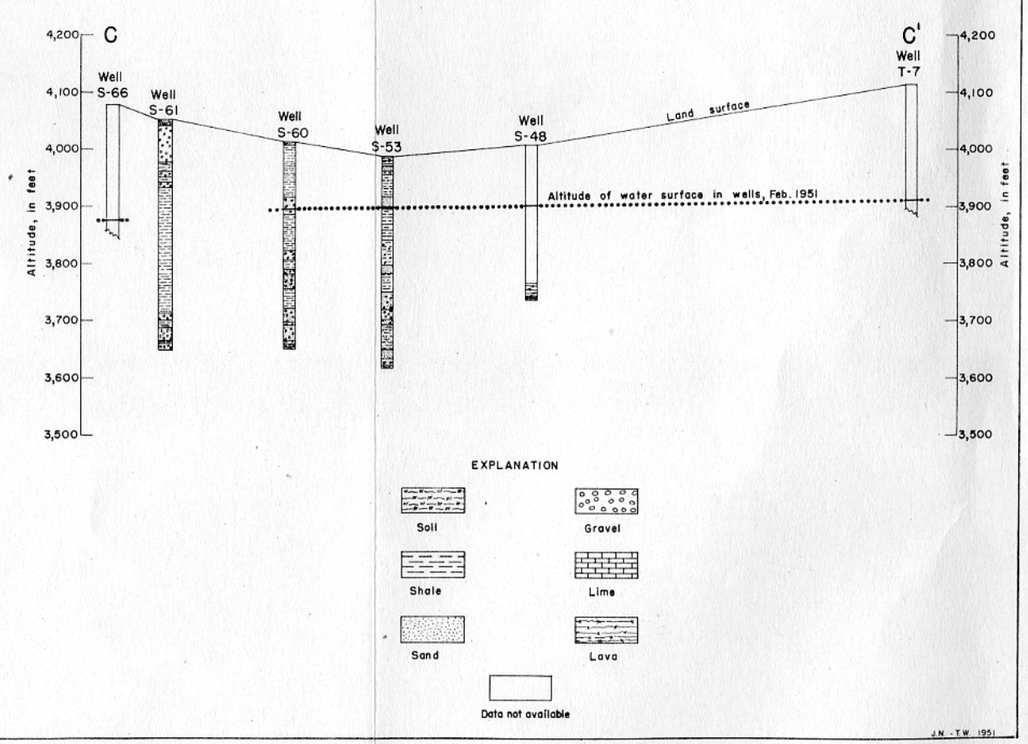
JAN. 1951

1 0 1 2 3 4 5 Miles









EXPLANATION

Soil
Gravel
Shale
Lime
Sand
Lava
Data not available

J.N. - T.W. 1951

CROSS SECTIONS IN LOBO FLATS AREA, CULBERSON AND JEFF DAVIS COUNTIES, TEXAS

1951

1 0 1 2 3 4 5 Miles