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Perkins County Test Hole Logs

Vincent H. Dreeszen

University of Nebraska-Lincoln

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PERKINS COUNTY Test-Hole Logs

Vincent H. Dreeszen

**Nebraska Water Survey
Test-Hole Report No. 68**

**Conservation and Survey Division
Institute of Agriculture and Natural Resources
University of Nebraska-Lincoln**



July 2000



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UNIVERSITY OF NEBRASKA-LINCOLN CREDITS

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The Conservation and Survey Division of the University of Nebraska is the agency designated by statute to investigate and interpret the geologically related natural resources of the state, to make available to the public the results of these investigations, and to assist in the development and conservation of these resources.

The division is authorized to enter into agreements with federal agencies to engage in cooperative surveys and investigations in the state. Publications of the division and the cooperating agencies are available from the Conservation and Survey Division, University of Nebraska, Lincoln, Nebraska 68588-0517.

It is the policy of the Conservation and Survey Division, as it is of the University of Nebraska-Lincoln, not to discriminate on the basis of and to provide information and educational programs to all regardless of sex, age, handicap, race, color, religion, marital status, veteran's status, national or ethnic origin or sexual orientation.

Publication and price lists are furnished upon request.

July 2000

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INTRODUCTION

In 1930, the Conservation and Survey Division of the University of Nebraska and the U.S. Geological Survey began a program of cooperative groundwater studies in Nebraska. Since then test drilling by use of rotary drilling equipment has been an integral part of that program. This report contains logs of all the test holes drilled in the county under the program as well as those drilled by the Conservation and Survey Division with financial assistance from other government agencies.

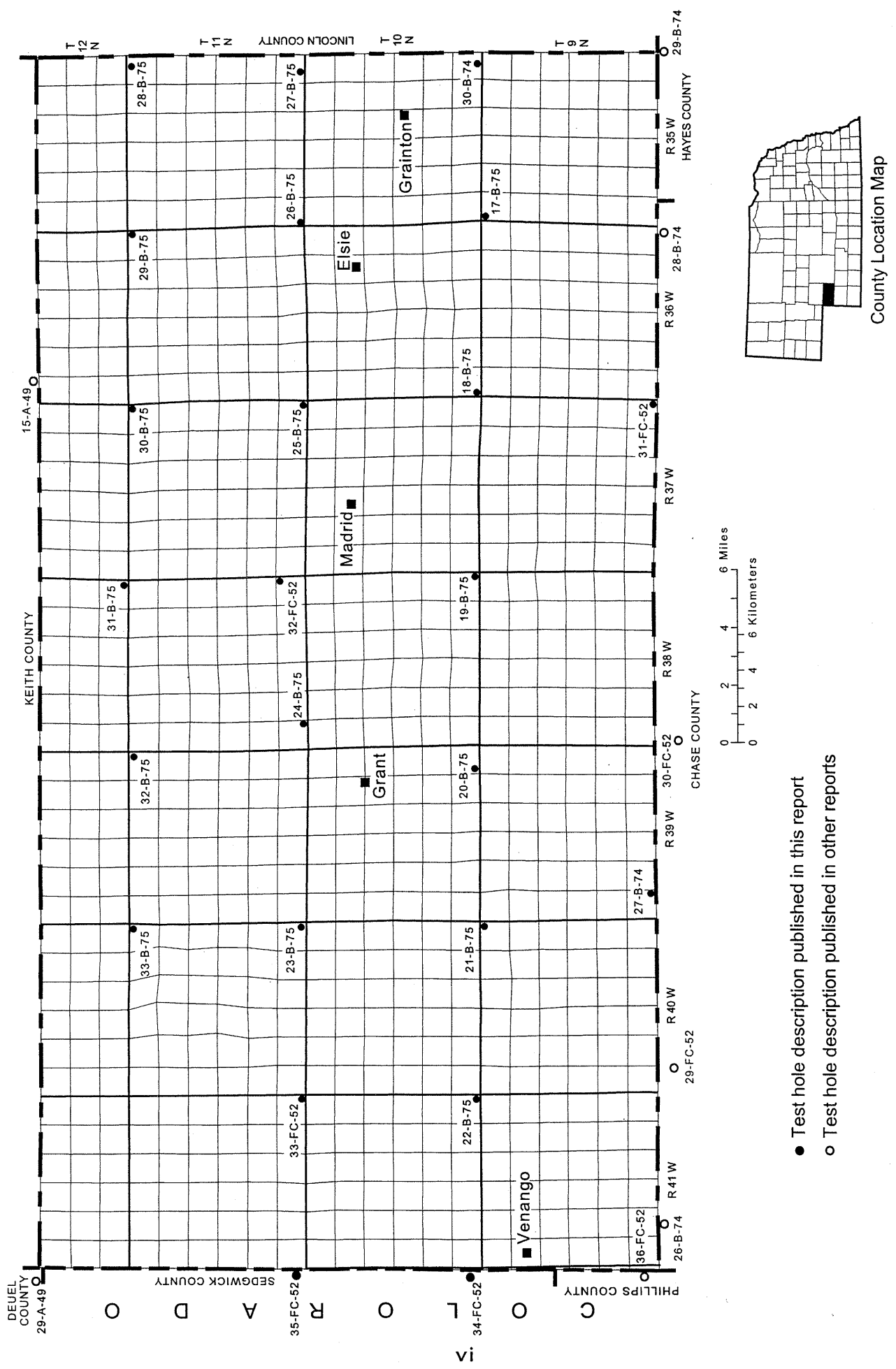
The map in this report (see figure 1) shows the location of all test holes drilled in the county.

Present techniques of test-hole logging and sampling include use of drilling mud suitable to drilling conditions, timing by stopwatch of the drilling of each 5-foot increment of depth, and removal of all cuttings from the test hole at intervals of 5 feet or less. During the drilling of the hole, cuttings from each interval are examined immediately; samples representing each 5-foot interval and each recognizable change in material are retained. After samples are washed, they are described lithologically and the color is evaluated by comparison with standard color charts. The samples then are dried, stored, and cataloged. Beginning in September 1951, the test holes have been logged electrically (see sample e-log in figure 2). All samples are processed and kept on open file in the offices of Conservation and Survey Division, 113 Nebraska Hall, University of Nebraska-Lincoln, 68588-0517.

This publication is one of a series being issued to make more readily available the record of test holes drilled since 1930. The series of publications is made on a county basis and includes, with some exceptions, logs of all test holes drilled in each of the counties. The logs have not been reviewed for conformance with editorial standards and nomenclature.

The method whereby the altitude of the land surface at testhole sites was determined is indicated in the heading of each log, as follows: a = altimeter, h = hand leveling, i = spirit leveling, t = estimated from topographic map.

The test-hole records accurately reflect subsurface conditions only at the locations where the test holes were drilled. Interpretive data reflecting probable subsurface conditions between test-holes are being compiled for publication in county reports and are available for inspection in the office of the Conservation and Survey Division or in press.



- Test hole description published in this report
- Test hole description published in other reports

Fig. 1. Test-hole location map of Perkins County.

Figure 2. Perkins County sample geophysical log 11-37-1aaaa (30-B-75)

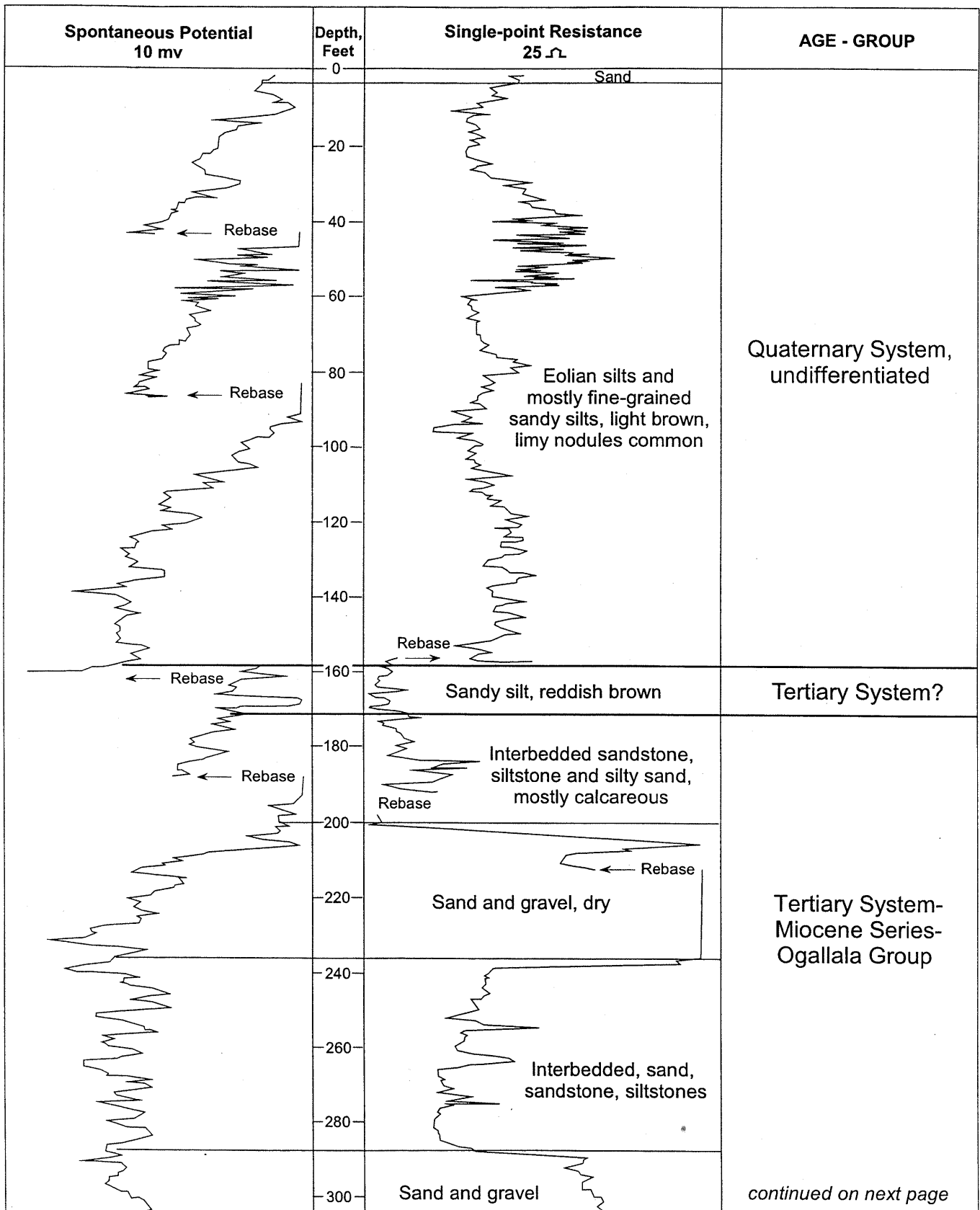
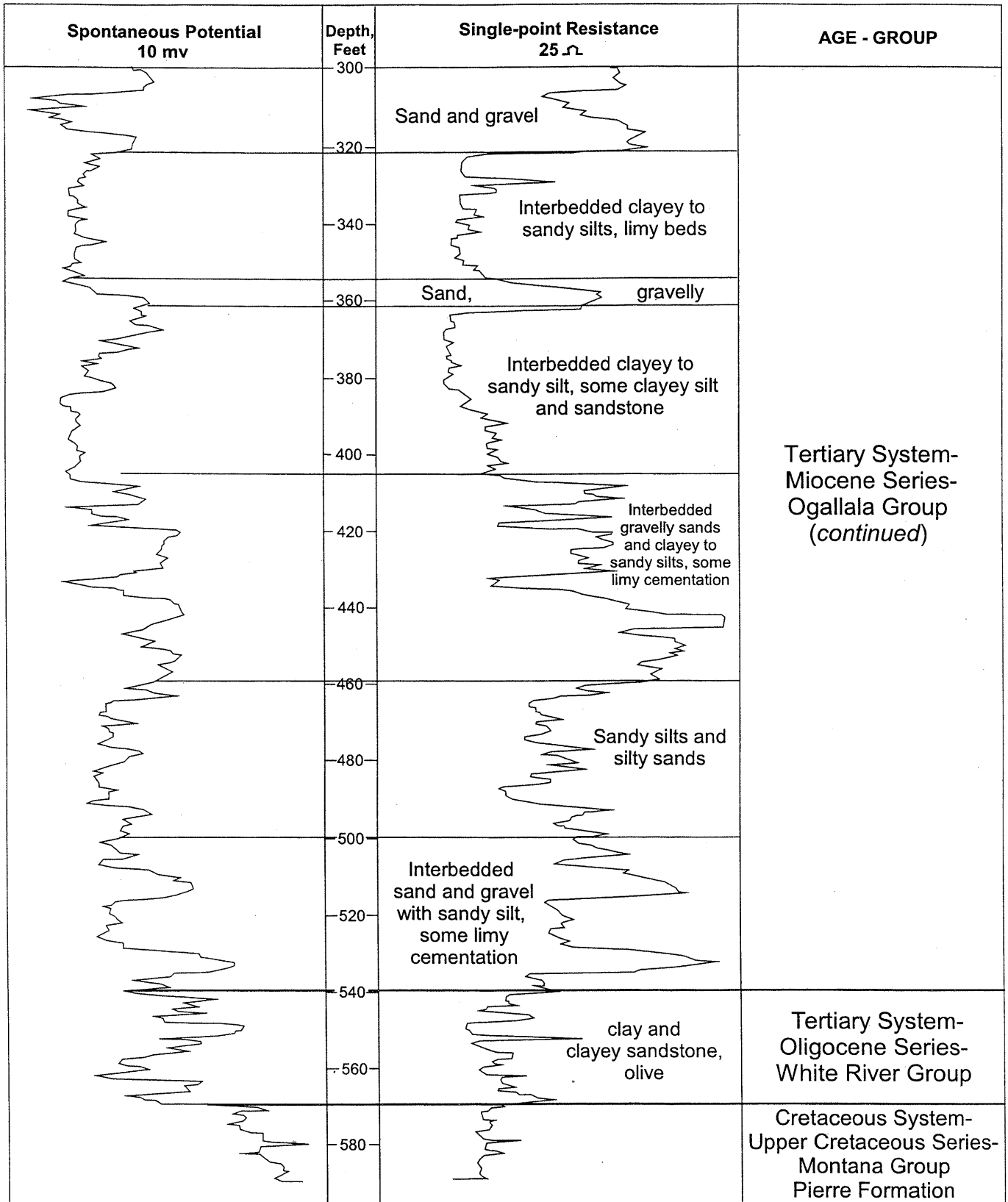


Figure 2 continued. Perkins County sample geophysical log 11-37-1aaaa (30-B-75)



Each test hole is identified by a number used in filing logs and samples by agency, numerical number and year (for example 2-FC-52, 26-B-74), and most are also identified by a number indicating its location within the land divisions of the U.S. Bureau of Land Management's survey of Nebraska. Location numbers of test holes east of the 6th principal meridian, which passes through Columbus in a north-south direction, are preceded by the capital letter A; those west of the principal meridian have no preceding letter. The first numeral indicates the township, the second the range, and the third the section. As shown in figure 3, the letters that follow the section number indicate the location of the test hole within the section, the first letter indicating the quarter section and the second letter indicating the quarter-quarter section. The letters A, B, C, and D are applied in counterclockwise direction beginning with A in the northeast quadrant. The last numeral is the serial number of the test hole within the quarter-quarter section. No number is shown unless more than one test hole is within the given quarter-quarter section. A test hole located in the SW SW NW NW section 12-5N-36W is also located as 12-5-36ccbb or 12-5-36CCBB.

The logs of test holes drilled in 1952 for the United States Bureau of Reclamation (USBR) are included in this report. The test drilling was done as a part of the program of the Department of Interior for development of the Missouri River Basin. The information was used in the investigation and publication of USGS Water-Supply Paper 1577, 1963. The report describes the hydrogeology of the Frenchman Creek Basin and includes the logs of test holes. The logs were also published in a test-hole log book for the Frenchman Creek Basin by the Conservation and Survey Division in 1957. The logs in the later publication includes water levels not reported in USGS Water-Supply Paper 1577. Test holes were also assigned field numbers in the test-hole log book, e.g. well number 9-37-36ddd is also labeled as 31-FC-52 (the letters FC represent Frenchman Creek).

"The well cuttings from all test holes (1952), other than those in 1949 or otherwise noted, were collected and studied by Cardwell and Spiegel", p. 129, USGS Water-Supply Paper 1577. This report indicates that all test holes drilled for the study were electric logged. Driller's logs and the electric logs cannot be located at this time and may have been discarded. Samples for most of the test holes are on file in the Conservation and Survey Division core and sample library, although some samples are missing. The author of this report examined samples from some of the test holes. Absent the driller's and electric logs and due to the sampling procedure used in combining lithologic units into one long sample interval, the samples were difficult to interpret. Most of the logs are reproduced in this report as initially published. The contact between some geologic units was reinterpreted.

Two test holes drilled for the USBR in the Frenchman Creek basin study along the Nebraska-Colorado line and located in Sedgwick County, Colorado are included in this report. The test holes complement the grid pattern selected for Perkins County and the logs may not be available elsewhere.

As noted previously in the introduction, most test holes drilled as a part of the cooperative program have been logged electrically. No electric log was obtained in the lower portion of a number of test holes because the holes were found to be plugged. Drill crews encountered considerable difficulty in drilling and removing drill cuttings from the test hole in the clay beds of the White River Group (Chadron Formation). Because of the drilling problems, the quality of the samples is poor through the White River Group. The contact between the White River Group and the underlying Pierre Formation is in question in a few test holes and in some holes the Pierre may not have been reached.

Test holes are arranged in this publication by township, range and section starting with 9N-35W through 9N-40W and then to 10N-35W and so on.

SELECTED REFERENCES

Some Publications that are Guides to Earth Resources in Perkins County

Some of the published references pertinent to an understanding of the geologic and hydrologic resources of Perkins County are included below. The interested reader will find citations of other studies in these reports.

- Cardwell, W.D.E., and Jenkins, E.D., *Ground-Water Geology and Pump Irrigation in Frenchman Creek Basin above Palisade, Nebraska* with a section on The Chemical Quality of the Water by Jochens, E.R., and Krieger, R.A., U.S. Geological Survey Water-Supply Paper 1577, 1963.
- Keech, C.F., *Logs of Test Holes, Frenchman Creek Basin, Nebraska*, Conservation and Survey Division, University of Nebraska, Lincoln, 1957.
- Lappala, E.G., *Quantitative Hydrogeology of the Upper Republican Natural Resources District, Southwest Nebraska*, U.S. Geological Survey Water-Resources Investigations 78-73, 1978.
- Scott, G.R., *Map Showing Geology Structure, and Oil and Gas Fields in the Sterling 1°x2° Quadrangle, Colorado, Nebraska, and Kansas*, U.S. Geological Map I-1092, 1978.
- Eversoll, D.A., Dreeszen, V.H., Burchett, R.R., and Prichard, G.E., *Bedrock Map Showing the Configuration of the Bedrock Surface, McCook 1°x2° Quadrangle, Nebraska and Kansas and part of the Sterling 1°x2° Quadrangle, Nebraska and Colorado*, U.S. Geological Survey Map I-1878, 1988.
- Paden, H., Morris, C., and Staples, R., *Soil Survey of Perkins County Nebraska*, U.S. Department of Agriculture, SCS in cooperation with the Conservation and Survey Division, University of Nebraska-Lincoln, 1991.
- Goeke, J.W., Peckenpaugh, J.M., Cady, R.E., and Dugan, J.T., *Hydrogeology of the Twin Platte and Middle Republican Natural Resources Districts, Southwestern Nebraska*, Nebraska Water Survey Paper No. 70, 1992.
- Swinehart, J.B. and others, *Quaternary Geologic Map of the Platte River 4°x6° Quadrangle, United States*, U.S. Geological Survey, Map I-1420 (NK-14), 1994.

Perkins County
Test-Hole Table of Contents

Legal Descrip Twp Rge Sec	Test-Hole Number	Page
09N 35W 06BBBA	17-B-75	1
09N 37W 36DDD	31-FC-52	7
09N 39W 31DDDC	27-B-74	10
09N 40W 01AAAA	21-B-75	14
10N 35W 36DCCC	30-B-74	19
10N 36W 31CCBB	18-B-75	25
10N 38W 36DDAD	19-B-75	31
10N 39W 36CCCB	20-B-75	36
10N 41W 36DDDD	22-B-75	41
10N 42W 32CCD	34-FC-52 (Colorado)	45
11N 35W 01ABBB	28-B-75	47
11N 35W 31CCCB	26-B-75	52
11N 35W 36CDDC	27-B-75	58
11N 36W 01AAAA	29-B-75	63
11N 37W 01AAAB	30-B-75	68
11N 37W 36DDDD	25-B-75	73
11N 38W 31DDDD	24-B-75	80
11N 38W 36AAA	32-FC-52	85
11N 39W 01AAAA	32-B-75	88
11N 40W 01AAAA	33-B-75	93
11N 40W 36DDAD	23-B-75	99
11N 41W 36DDD	33-FC-52	103
11N 42W 32CCD	35-FC-52 (Colorado)	105
12N 38W 36DDDA	31-B-75	108

Test-holes are arranged in this publication by township, range and section.

Perkins County
Test-Hole Table of Contents

Arranged by year drilled, test-hole number.

1952

09N	37W	36DDD	31-FC-52	. . . . .	7
11N	38W	36AAA	32-FC-52	. . . . .	85
11N	41W	36DDD	33-FC-52	. . . . .	103
10N	42W	32CCD	34-FC-52 (Colorado)	. . . . .	45
11N	42W	32CCD	35-FC-52 (Colorado)	. . . . .	105

1974

09N	39W	31DDDC	27-B-74	. . . . .	10
10N	35W	36DCCC	30-B-74	. . . . .	19

1975

09N	35W	06BBBA	17-B-75	. . . . .	1
10N	36W	31CCBB	18-B-75	. . . . .	25
10N	38W	36DDAD	19-B-75	. . . . .	31
10N	39W	36CCCB	20-B-75	. . . . .	36
09N	40W	01AAAA	21-B-75	. . . . .	14
10N	41W	36DDDD	22-B-75	. . . . .	41
11N	40W	36DDAD	23-B-75	. . . . .	99
11N	38W	31DDDD	24-B-75	. . . . .	80
11N	37W	36DDDD	25-B-75	. . . . .	73
11N	35W	31CCCB	26-B-75	. . . . .	52
11N	35W	36CDDC	27-B-75	. . . . .	58
11N	35W	01ABBB	28-B-75	. . . . .	47
11N	36W	01AAAA	29-B-75	. . . . .	63
11N	37W	01AAAB	30-B-75	. . . . .	68
12N	38W	36DDDA	31-B-75	. . . . .	108
11N	39W	01AAAA	32-B-75	. . . . .	88
11N	40W	01AAAA	33-B-75	. . . . .	93

9-35-6bbba
17-B-75
Perkins County

Location: NE NW NW NW sec 6-9N-35W, 10 ft S and 650 ft E of NW cor sec
 Ground elevation: 3325 ft (t) Grainton 7.5 min. quadrangle
 Depth to water: Dry to 187 ft, caved (7/16/75)
 Electric log

	<u>Depth, in feet</u>	
	From	To
Quaternary System, undifferentiated:		
Road fill.....	0.0	1.0
Sand, moderately silty, sand is very fine to fine with a little medium to very coarse, brown.....	1.0	2.5
Sand, very slightly clayey, silty, mostly very fine sand, silt is very coarse, light yellow-brown, some limy areas.....	2.5	4.0
Silt, slightly clayey, very sandy, sand is very fine to fine, light medium brown, slightly calcareous..	4.0	5.0
Silt, moderately clayey, moderately sandy, sand is very fine, very light yellow-brown, moderately calcareous; slightly clayey below 7.6 ft.....	5.0	10.0
Silt, moderately clayey, slightly sandy, sand is very fine, very light yellow-brown, slightly calcareous; contains indurated limy nodular areas; slightly less clayey below 13.5 ft.....	10.0	21.5
Silt, moderately clayey, very slightly sandy, sand is very fine, silt is coarse, light brown, slightly calcareous; contains hard limy nodules 23.5 to 30 ft; moderately calcareous 28 to 30 ft.....	21.5	30.0
Silt, slightly clayey, slightly sandy, sand is mostly very fine, silt is coarse, light reddish brown, moderately calcareous; slightly calcareous below 35 ft; limy nodular layer 38.5 to 39.5 ft; moderately clayey 39.5 to 50 ft; slightly sandy, sand is very fine with some fine sand 40 to 50 ft; light brown 45 to 50 ft; contains limy areas and nodules 43.5 to 49.5 ft.....	30.0	50.0
Silt, slightly clayey, slightly to moderately sandy, sand is very fine, silt is coarse, light brown, slightly calcareous; contains limy nodules or nodular layers 53.5 to 58.7 ft, indurated, white to very light yellow gray.....	50.0	58.7
Silt, slightly clayey, slightly sandy, sand is very fine, silt is coarse, light brown, slightly to moderately calcareous; contains limy nodules 60 to 62.3 ft; contains a limy nodular layer 68.5 to 70 ft.....	58.7	70.0

Silt, slightly clayey, moderately sandy, sand is mostly very fine, silt is coarse, light brownish gray, slightly calcareous; very calcareous 73.5 to 75 ft.....	70.0	75.0
Silt, slightly clayey, slightly sandy, sand is very fine, silt is coarse, very light brown, moderately calcareous, contains some limy nodules; contains some fine sand 77 to 80 ft.....	75.0	80.0
Silt, moderately clayey, slightly sandy, sand is very fine, silt is coarse, light medium brown, slightly calcareous; slightly clayey 82 to 97.3 ft, light yellow-brown.....	80.0	97.3
Silt, slightly clayey, slightly sandy, sand is very fine, silt is coarse, light reddish brown, slightly calcareous; very slightly calcareous, moderately clayey below 100 ft; very calcareous 102.5 to 103.5 ft; contains much nodular limestone 103.5 to 105.7 ft, 109 to 110.9 ft and 115 to 116.5 ft; slightly less clayey below 110.9 ft.....	97.3	117.5
Silt, slightly to moderately clayey, slightly sandy, sand is mostly very fine, silt is coarse, very light yellow-brown to whitish gray, moderately calcareous; contains limy nodules 125 to 130 ft...	117.5	130.0
Sand, slightly silty, sand is very fine to fine, light gray to brown and light medium brown-gray; contains a trace of limy areas 130 to 145 ft; contains much fine sand below 135 ft.....	130.0	147.3
Silt, very sandy, sand is very fine with some fine, silt is very coarse, light brown to light brown-gray; slightly clayey below 150 ft; contains very little fine sand below 153 ft; moderately calcareous 152.5 to 153 ft; light brown 152.3 to 155.9 ft.....	147.3	155.9
Silt, slightly clayey, slightly sandy, sand is mostly very fine, silt is coarse, very light brown, slightly calcareous; light brown 160 to 165 ft; reddish brown 165 to 166.5 ft, noncalcareous.....	155.9	165.0
Silt, moderately clayey, slightly sandy, sand is very fine, light brown; moderately to very clayey 168.5 to 170 ft, slightly calcareous.....	165.0	170.0
Silt, moderately clayey, very slightly sandy, sand is mostly very fine, very light yellow brown to light yellow-gray, moderately calcareous; contains limy nodular areas 174 to 175.5 ft and 176.5 to 178.5 ft; slightly sandy below 175.5 ft; moderately to very clayey 178.5 to 180 ft, contains soft and indurated limy areas, matrix is light reddish brown; very light brown, slightly sandy, contains much secondary lime 183 to 185 ft.....	170.0	185.0

Tertiary System - Miocene Series - Ogallala Group:

Silt, moderately clayey, moderately sandy, sand is very fine to fine, much fine sand, light reddish brown, contains much white secondary lime; very calcareous, white 190 to 191 ft.....	185.0	191.0
Siltstone, moderately clayey, slightly to in part very sandy, sand is very fine to fine with a trace of medium to coarse sand, white with some reddish brown, slightly calcareous; very calcareous, well indurated 192.5 to 197.7 ft, some very light olive-gray.....	191.0	197.0
Siltstone-sandstone, sand is very fine to fine, a little medium sand and a trace of coarser grains, white, very calcareous.....	197.0	200.0
Sandstone, moderately silty, sand is very fine to fine with a trace of medium to coarse sand, light brownish to olive-gray, slightly calcareous, moderately calcareous 203 to 203.5 ft; contains a few siliceous rootlets below 203.5 ft; contains a few gravel grains 207 to 209 ft.....	200.0	209.0
Sandstone, sand is very fine to medium with a trace of very coarse sand and gravel, light brown, slightly calcareous; contains some volcanic ash 209 to 210 ft; contains siliceous rootlets 210 to 219 ft.....	209.0	219.0
Sand, medium to very coarse, some fine gravel; contains some medium gravel 220 to 230 ft.....	219.0	230.0
Sand and gravel, gravel is fine to medium with a trace of coarse, much very coarse sand.....	230.0	235.3
Silt, very sandy, sand is very fine to medium, reddish brown, contains rootlets.....	235.3	240.0
Sandstone, very silty, sand is very fine to coarse with a trace of very coarse sand and fine gravel, contains siliceous rootlets; slightly calcareous 242.8 to 248 ft; sand is fine to very coarse with a trace of fine to medium gravel 245 to 248 ft....	240.0	248.0
Sand and gravel, gravel is fine to medium; much coarse to very coarse sand 248 to 250 ft.....	248.0	254.3
Silt, moderately clayey, moderately sandy, sand is mostly very fine to fine, light olive-gray and light brown, slightly calcareous; pale brown and reddish brown 256.5 to 266 ft and 271.6 to 275 ft, in part moderately calcareous, contains rootlets; contains opaline chert, and limy nodules 271.6 to 275 ft; mostly reddish brown below 260 ft; only in part slightly calcareous 275 to 281.7 ft.....	254.3	282.8
Sand, some gravel, gravel is fine to medium, much coarse to very coarse sand.....	282.8	291.0

Sandstone, silty, sand is very fine to fine with some coarser sand and trace of gravel, pale brown, some dark stain, in part very calcareous; slightly clayey 295 to 300 ft, pale brown, slightly calcareous, contains rootlets.....	291.0	300.0
Silt, slightly clayey, slightly sandy, sand is mostly fine, reddish brown and pale brown, in part slightly calcareous.....	300.0	305.0
Sandstone, very silty, sand is very fine to medium, very light brownish gray, very calcareous.....	305.0	310.5
Sand and gravel, silty, interbedded with sandy silt, reddish brown.....	310.5	314.0
Sand and gravel, gravel is mostly fine, much coarse to very coarse sand.....	314.0	333.5
Silt, moderately clayey, moderately sandy, sand is mostly very fine to fine, reddish brown and pale brown, slightly calcareous; moderately calcareous 335 to 340 ft; very sandy 340 to 350 ft, contains some interbedded fine to very coarse sand.....	333.5	350.0
Sandstone, very silty, sand is very fine to fine, pale brown, moderately calcareous.....	350.0	352.0
Silt, slightly clayey, slightly sandy, sand is mostly very fine, mottled reddish brown and pale greenish gray, slightly calcareous; contains limy areas 355 to 356 ft; moderately to very calcareous 356 to 360 ft, contains a trace of green fine grained sandstone.....	352.0	360.0
Silt, moderately clayey, slightly sandy, sand is mostly very fine, light brown, slightly calcareous.....	360.0	365.0
Silt, moderately clayey, moderately to very sandy, sand is very fine, medium dark reddish brown.....	365.0	367.0
Silt, moderately clayey, slightly sandy, olive-brown; moderately sandy 370 to 375 ft, sand is very fine to medium, reddish brown and greenish gray.....	367.0	375.0
Sand, very fine to medium.....	375.0	378.0
Sandstone, silty, sand is very fine to medium, light reddish brown, slightly calcareous, contains rootlets; moderately calcareous 380 to 385 ft; very slightly silty 385 to 395 ft, slightly indurated.....	378.0	400.0
Sandstone, slightly silty, sand is very fine to coarse, very light brown, moderately calcareous, moderately well indurated 401 to 402.5 ft; slightly calcareous 406.3 to 406.9 ft.....	400.0	406.9
Sand, very fine to coarse.....	406.9	410.0
Sand and gravel, gravel is fine.....	410.0	415.3
Sandstone, gravelly, contains fine gravel, light brown, moderately calcareous, contains some limy silt and a trace of volcanic ash.....	415.3	420.0

Sandstone, sand is very fine to fine, contains volcanic ash, moderately calcareous.....	420.0	422.5
Sandstone, silty, sand is very fine to medium, very light brown, very calcareous.....	422.5	425.0
Silt, moderately clayey, moderately sandy, sand is very fine, reddish brown; slightly indurated, some fine sand 432 to 435 ft, slightly calcareous; very sandy 435 to 440 ft, slightly calcareous, contains rootlets.....	425.0	440.0
Sand, moderately to very silty, sand is very fine to fine with a little medium, slightly indurated, moderately calcareous; slightly silty 445 to 463.5 ft; contains very hard calcareous layers 445 to 454.3 ft; contains silty layer 463.5 to 465 ft....	440.0	465.0
Silt, slightly clayey, very sandy, sand is very fine to medium with some coarse to very coarse sand, light brown, moderately calcareous, contains siliceous rootlets; contains a hard layer 474.5 to 475.5 ft.....	465.0	475.5
Sand, fine to very coarse, slightly indurated, moderately calcareous; contains some fine gravel 480 to 485 ft, silty, slightly indurated.....	475.5	485.0
Sand, fine to very coarse, slightly gravelly, gravel is fine, moderately calcareous; very little gravel below 490 ft, slightly calcareous below 500 ft; contains much coarse sand 500 to 505 ft; contains some fine gravel and a trace of medium gravel 515 to 520 ft; contains only a trace of fine gravel 520 to 540.9 ft, much coarse to very coarse sand; very slightly calcareous 530 to 540.9 ft.....	485.0	540.9
Tertiary System - Oligocene Series - White River Group:?		
Clay, slightly to in part very sandy, sand is mostly very fine to fine, light greenish gray and very light olive-gray, slightly calcareous.....	540.9	545.0
Clay, very sandy, some clayey sand, sand is very fine to fine, light olive-gray, slightly to moderately calcareous; contains some interbedded light olive-gray and light pinkish brown clay layers 550 to 555 ft.....	545.0	560.0
Sandstone, clayey, sand is mostly very fine to medium, light olive-gray, slightly calcareous.....	560.0	565.0
Siltstone, clayey, very slightly to in part very sandy, sand is mostly very fine to fine, very light olive, some light greenish gray, slightly to moderately calcareous; slightly sandy 570 to 571 ft, in part light brown.....	565.0	571.0
Siltstone-sandstone, very clayey, sand is very fine to fine with a trace of coarser grains, very light olive-gray to greenish gray, very slightly calcareous, some limy areas; moderately calcareous 580 to 590 ft, contains limy layers.....	571.0	590.0

Sand, fine to coarse, some coarser grains, (no sample preserved).....	590.0	592.0
Siltstone, moderately clayey, slightly to in part very sandy, sand is fine to very coarse.....	592.0	595.0
Clay, silty, some embedded sand, very light green-gray.....	595.0	598.8
Cretaceous System - Upper Cretaceous Series - Montana Group:		
Pierre Formation:		
Shale, clay, yellow brown and yellow gray, moderately calcareous; bright yellow 600 to 605 ft; yellow-brown and olive-brown to brownish gray 605 to 610 ft.....	598.8	610.0

9-37-36ddd
31-FC-52
Perkins County

Location: SE SE SE sec 36-9N-37W

Ground elevation: 3225 ft (i) Dittons Creek NW 7.5 min. quadrangle

Depth to water: 51 ft (1952)

Electric log: Not available

Note: Test hole drilled for USBR, log first published in USGS WSP-1577 and later in logs of Test Holes, Frenchman Creek Basin, 1957, USGS-CSD. Sample description and correlation by V.H. Dreeszen

	<u>Depth, in feet</u>	
	From	To
Quaternary System, undifferentiated:		
Silt, very slightly clayey, very sandy, sand is very fine to fine, dark brown-gray.....	0.0	3.0
Silt, moderately clayey, slightly sandy, dark brown and light yellow brown.....	3.0	5.0
Tertiary System - Miocene Series - Ogallala Group:		
Siltstone, in part sandy, very light yellow-gray to white, very calcareous and siliceous, common root holes; clay or sandy clay logged from 5 to 7 ft, reddish brown; some silty sandstone in sample, sand is very fine to fine; mostly very light brown below 26 ft, very sandy.....	5.0	30.5
Sand and gravel, gravel is fine to coarse, common dark mineral stain.....	30.5	33.0
Siltstone, slightly to in part very sandy, sand is mostly fine, very light yellowish gray, very calcareous, siliceous, contains a few rootlets....	33.0	40.0
Sand, very clayey, sand is mostly very fine to fine, reddish brown and very light yellow-gray; considerable calcareous siltstone in sample and some reddish brown clay.....	40.0	52.0
Siltstone-sandstone, sand is mostly very fine to fine; some calcareous coarse grained sandstone containing gravel grains, siltstone is very calcareous and siliceous.....	52.0	68.0
Sand, some gravel, approximately 10 percent fine to medium gravel.....	68.0	74.0
Sandstone, clayey and sandy clay, sand is mostly very fine to fine with some medium to coarse, light reddish brown, noncalcareous.....	74.0	80.0
Sand, some gravel, gravel is mostly fine to medium, mostly light colored and pink silicates.....	80.0	86.5
Clay, silty, reddish brown and very light reddish brown.....	86.5	89.5
Siltstone, clayey, slightly sandy, some clayey fine grained sandstone, very light yellowish gray, mostly very calcareous.....	89.5	93.5

Clay, very slightly sandy, sand is fine to coarse, very light olive-gray, rare limy areas.....	93.5	98.0
Clay, silty, slightly to in part very sandy, sand is mostly very fine, reddish brown, noncalcareous; very calcareous 103 to 104 ft, very sandy, well indurated.....	98.0	112.0
Sandstone, slightly clayey, very silty, sand is mostly very fine to fine, rare medium to coarse sand, light reddish brown; contains some indurated calcareous and siliceous areas, very light yellowish gray.....	112.0	118.0
Siltstone, in part clayey, very calcareous and siliceous, well indurated.....	118.0	121.5
Sand and gravel, gravel is fine to coarse, some pebbles, common dark mineral stain.....	121.5	152.0
Sandstone, moderately to very clayey, sand is mostly fine, scattered coarser grains, light brown and light yellow-brown, very calcareous, slightly to in part well indurated; sand is fine to coarse below 158 ft; well indurated, very calcareous and siliceous 158 to 163.5 ft.....	152.0	171.0
Sand and gravel, gravel is fine to coarse.....	171.0	175.0
Silt, moderately clayey, very sandy, sand is mostly very fine to fine, some medium, light olive and olive-brown, very slightly indurated.....	175.0	181.0
Silt, moderately to very clayey, very sandy, sand is mostly very fine to fine, reddish brown, micaceous.....	181.0	186.0
Siltstone, clayey, slightly sandy, white and very light brown, very calcareous, siliceous.....	186.0	195.0
Sand and gravel, gravel is mostly fine.....	195.0	212.0
Sandstone, slightly clayey, sand is very fine to medium, some coarse, light brown; some light greenish gray fine-grained sandstone in sample....	212.0	222.0
Siltstone, slightly sandy, sand is very fine to fine with a few coarser grains, very light gray, very calcareous, siliceous, well indurated.....	222.0	223.0
Silt, moderately clayey, moderately sandy, sand is very fine to fine with some medium, very light brown and olive-brown, slightly calcareous, contains limy areas.....	223.0	233.0
Siltstone-sandstone, slightly clayey, sand is mostly very fine to fine, some medium and coarse, white and very light yellowish gray, very calcareous, siliceous; well indurated below 238 ft, in part very light brown; very slightly sandy below 249.5 ft.....	233.0	252.0
Sandstone, moderately clayey, sand is very fine to fine, some medium reddish brown, slight induration, some limy areas.....	252.0	260.0

Siltstone, clayey, slightly sandy, white to very light yellowish gray, very calcareous, siliceous, well indurated.....	260.0	263.5
Sandstone and siltstone, in part clayey, sand is mostly fine, rare medium to coarse, very light yellow-gray, very calcareous, slightly siliceous; logged as being interbedded with soft brown clay..	263.5	281.0
Sand, silty, sand is fine to coarse, slight induration, logged as being loose.....	281.0	286.5
Silt, clayey, slightly to moderately sandy, sand is mostly fine, in part indurated as a calcareous siltstone, white and very light yellow-gray; some moderately clayey silt, reddish brown in sample...	286.5	291.0
Sand, some gravel, gravel is fine to medium, light colored silicates.....	291.0	302.0
Sandstone, slightly clayey, silty, sand is very fine to fine with some medium and a few coarser grains, very light brown, very calcareous, slight to moderate induration.....	302.0	328.0
Sandstone, moderately clayey, sand is very fine to fine, light greenish gray, slight to moderately calcareous (correlated as Brule Formation, USGS WSP 1577; considered to be part of the Ogallala Group in this report).....	328.0	342.0

**9-39-31dddc
27-B-74
Perkins County**

Location: SW SE SE SE sec 31-9N-39W, 16 ft N and 358 ft W of SE cor
sec
Ground elevation: 3435 ft (t) Lamar NE 7.5 min. quadrangle
Depth to water: 105.9 ft (8/14/74)
Electric log

	Depth, in feet	
	From	To
Quaternary System, undifferentiated:		
Silt, very sandy, sand is very fine to medium, dark brown.....	0.0	2.5
Sand, very fine to coarse, much fine to medium, light brown.....	2.5	3.3
Tertiary System - Miocene Series - Ogallala Formation:		
Sandstone, sand is mostly very fine to fine, pale brown, white, some pink, very calcareous, much dark stain 3 to 6 ft, moderately silty 6 to 10 ft, in part reddish brown; slightly silty 11 to 13.9 ft, contains a trace of coarse sand.....	3.3	13.9
Sandstone, sand is mostly very fine to fine, a little medium, a trace of coarse, light pinkish brown to white, very calcareous, contains seed fragments and siliceous rootlets; moderately to very calcareous below 15 ft, contains rare fine gravel; slightly coarser grained 20 to 28 ft, less indurated.....	13.9	28.0
Sandstone, sand is very fine to very coarse, much coarse sand, a trace of fine gravel, pinkish brown, moderately to very calcareous, slightly indurated; slightly silty 30 to 31.5 ft; moderately silty, finer grained 33.3 to 34 ft, contains a few rootlets.....	28.0	34.0
Silt, slightly clayey, moderately sandy, sand is very fine to fine, pinkish brown, moderately calcareous; interbedded with fine to very coarse sand 35 to 37.2 ft.....	34.0	37.2
Sandstone, slightly silty, sand is very fine to very coarse, a trace of fine gravel, pale brown, moderately calcareous.....	37.2	40.0
Sandstone, slightly clayey, moderately silty, sand is mostly fine, grayish brown, slightly calcareous.....	40.0	44.7
Sand, slightly silty, sand is very fine to very coarse, a trace of fine gravel, light brown, moderately calcareous; contains some interbedded sandy silt, slightly clayey 46.5 to 49 ft, light olive-gray and pinkish brown.....	44.7	49.0

Sand, some gravel, sand is fine to very coarse, gravel is fine, much coarse to very coarse sand; slightly more gravel 55 to 60 ft.....	49.0	60.0
Sand and gravel, gravel is fine to medium, much fine gravel.....	60.0	67.0
Silt, slightly clayey, very sandy, sand is fine, brown; moderately clayey 70 to 75.7 ft.....	67.0	75.7
Silt, moderately clayey, slightly sandy, sand is mostly fine, pale reddish brown, moderately calcareous, contains limy indurated areas; contains a sandstone layer 80.2 to 80.5 ft, sand is very fine to very coarse.....	75.7	85.0
Sand, moderately to very silty, sand is very fine to very coarse, much medium to coarse sand, brown, moderately calcareous, contains seed fragments....	85.0	90.0
Sand, fine to very coarse, a trace of fine gravel, much coarse to very coarse sand, slightly indurated, slightly calcareous; slightly to moderately silty 101.9 to 105.2 ft; contains some fine gravel 105.2 to 110 ft.....	90.0	110.0
Sand and gravel, gravel is fine to medium.....	110.0	120.1
Silt, moderately to very silty, sand is mostly fine to medium; contains thin beds of sand, very fine to very coarse.....	120.1	125.0
Sand, moderately to very silty, sand is mostly very fine to medium, light brown; contains some sandy silt and sandstone layers, sandstone is calcareous; very silty 133.7 to 135 ft; sand is fine to very coarse 135 to 140 ft, slightly calcareous, contains some sandy silt interbeds; contains a trace of fine gravel 136.5 to 140 ft.....	125.0	140.0
Silt, moderately to very sandy, sand is very fine to medium, reddish brown, slightly calcareous, contains some limy indurated areas; slightly to moderately silty 142.9 to 145 ft, light brown-gray; moderately calcareous 144 to 145 ft, whitish gray.....	140.0	145.0
Sandstone, moderately silty, sand is very fine to fine, very light brown, very calcareous, well indurated; contains a trace of medium to very coarse sand 150 to 155 ft; contains hard limy nodules 151.5 to 155 ft, sandstone less indurated.	145.0	155.0
Sand and sandstone, slightly to moderately silty, sand is very fine to medium, light brown, slightly to moderately calcareous, some limy cemented areas; contains a trace of very coarse sand 160 to 165.8 ft.....	155.0	165.8

Tertiary System - Oligocene Series - White River Group:

Siltstone, clayey, very light olive-gray, noncalcareous, thin limy layers or nodules to 171.9 ft, some clay and claystone; contains some very light brown 170 to 171.9 ft and common very light brown 171.9 to 174 ft; noncalcareous below 174 ft, mostly very light olive-gray; very light olive-gray and very light greenish gray 180 to 190 ft; in part well indurated 185 to 198 ft; some yellow-brown iron staining 190 to 198 ft.....	165.8	198.0
Siltstone, clayey, very light olive-gray and pale yellow; moderate yellow-brown stain 198 to 202 ft; very light olive-gray 202 to 225 ft; silt is fine to very coarse 205 to 210 ft.....	198.0	210.0
Siltstone, clayey, moderately sandy, sand is mostly very fine, moderately clayey below 214.5 ft, contains a trace of fine sand 214.5 to 220 ft; contains rare medium to coarse sand grains 220 to 225 ft; contains some red, yellow and pink clay 225 to 230 ft, may be lithic gravel or pebble grains.....	210.0	230.0
Sandstone, slightly to moderately clayey, sand is very fine to fine, a little medium sand and traces of coarse sand and gravel, a few lithic clay and shale grains; common lithic grains 235 to 240 ft; some medium sand 240 to 245.8 ft, very few lithic grains.....	230.0	245.8
Sand, slightly clayey, sand is very fine to fine, much fine sand, largely clear to opaque quartz, a few pink quartz grains, common dark grains; rare lithic grains of claystone and shale below 250 ft, a little medium sand.....	245.8	252.0
Clay, silty, very light olive-gray and light pinkish brown; mottled very light gray, pink and yellow brown 254 to 255 ft; very light brown, some yellow 255 to 260 ft; very light brownish gray with some pinkish brown 260 to 265 ft, in part slightly sandy, sand is very fine.....	252.0	265.0
Claystone, very light brown and very light brownish gray, brittle; mostly very light olive-gray 270 to 275 ft, contains some embedded fine sand; very light gray 275 to 280 ft, contains a trace of embedded very fine sand.....	265.0	285.0
Clay, silty, in part slightly sandy, sand is very fine, very light gray with a trace of pink.....	285.0	290.0
Clay, moderately sandy and sandstone, very clayey, mostly very fine sand, very light gray.....	290.0	295.0

<p>Sandstone, slightly clayey, very silty, sand is very fine to fine, much very fine sand, very light gray; contains thin claystone layer or lithic claystone grains and a few ironstone grains; contains a trace of coarse quartz grains 305 to 310 ft.....</p>	295.0	310.0
<p>Clay, slightly to in part very sandy, sand is mostly very fine to fine, very light gray, slight yellow stain; moderately to very sandy below 315 ft, sand is very fine to fine with some medium and a trace of coarse to very coarse sand, very light gray, some reddish brown.....</p>	310.0	320.0

**9-40-1aaaa
21-B-75
Perkins County**

Location: NE NE NE NE sec 1-9N-40W, 11 ft S and 94 ft W of NE cor sec
Ground elevation: 3450 ft (t) Brandon SE 7.5 min. quadrangle
Depth to water: 134.3 ft (7/29/75)
Electric log to 344 ft

	<u>Depth, in feet</u>	
	From	To
Quaternary System, undifferentiated:		
Silt, moderately clayey, moderately sandy, sand is mostly fine, dark brown-gray.....	0.0	2.3
Sand, slightly to in part moderately clayey, silty, sand is very fine to fine with some medium and a trace of coarse sand, rare rounded limy grains, light yellow-brown, moderately calcareous.....	2.3	3.2
Tertiary System - Miocene Series - Ogallala Group:		
Sandstone, moderately clayey, silty, sand is very fine to fine with a trace of medium to coarse sand, very light reddish brown, moderately calcareous, moderately well indurated; mostly very fine to fine sand 3.8 to 4.5 ft, medium reddish brown; very calcareous, well indurated 4.5 to 5.6 ft, whitish gray; very pale brown 5.6 to 7.5 ft, contains tooth fragment, moderately to very calcareous, contains rare coarse sand grains; moderately calcareous 8 to 10 ft, light yellowish to reddish brown, slightly calcareous 11.5 to 13 ft, light yellow-brown; very pale brown 13 to 13.8 ft, very calcareous, well indurated; slightly calcareous, contains a trace of coarse sand to fine gravel 13.8 to 16 ft.....	3.2	16.0
Sandstone, sand is fine to very coarse, contains some fine to medium gravel, yellow-brown, very calcareous; moderately calcareous with limy indurated areas 17 to 19 ft, reddish brown.....	16.0	19.0
Silt, moderately clayey, moderately sandy, sand is fine to medium, reddish brown, slightly calcareous; very sandy, contains some coarse sand to fine gravel 20.5 to 21.5 ft.....	19.0	21.5
Sand and gravel, gravel is mostly fine; much dark stain 25 to 30.5 ft.....	21.5	30.5
Silt, slightly clayey, very sandy, sand is fine to coarse, pale brown, moderately calcareous.....	30.5	32.8
Sand, some gravel, gravel is mostly fine, reddish brown.....	32.8	35.0
Sand, slightly silty, sand is fine to very coarse, reddish brown, moderately calcareous; moderately silty, very slightly calcareous 36.9 to 40 ft.....	35.0	40.0

Silt, very sandy, sand is very fine to coarse, much fine sand, reddish brown, very slightly calcareous; moderately clayey 41.2 to 42.3 ft, very pale brown, very calcareous; well indurated 42 to 42.3 ft; slightly calcareous 42.3 to 43.5 ft, sand is mostly very fine to medium.....	40.0	43.5
Silt, slightly clayey, very slightly sandy, sand is very fine, reddish brown; contains limy nodular areas 45 to 46.8 ft; moderately calcareous in part 46.8 to 48 ft, very pale brown; very calcareous, moderately clayey, moderately sandy 48 to 49.5 ft, sand is mostly very fine, pale grayish brown.....	43.5	49.5
Silt, slightly clayey, moderately sandy, sand is very fine to coarse, much fine sand, pale grayish brown, in part moderately calcareous; very slightly calcareous, light brown 51.5 to 53 ft; very calcareous 53 to 53.5 ft, pale brown, moderately well indurated; very sandy 53.5 to 54.8 ft, reddish brown, slightly calcareous.....	49.5	54.8
Sand, very fine to very coarse, much medium sand, reddish brown, contains a few limy areas; slightly silty and with interbedded sandy silt layers 58.5 to 69.5 ft, reddish brown and white, slightly to moderately calcareous.....	54.8	69.5
Silt, slightly clayey, grayish brown, slightly calcareous.....	69.5	70.0
Silt, slightly clayey, sandy silt, and sand interbedded, sand is mostly very fine to medium, grayish brown, very slightly calcareous.....	70.0	75.0
Silt, moderately clayey, moderately sandy, sand is very fine to medium, some coarse to very coarse, sand, a trace of fine gravel, grayish brown; reddish brown 80.2 to 86.6 ft; very slightly sandy 86.6 to 90 ft, pale brown and grayish brown; moderately calcareous 86.6 to 86.8 and 89.2 to 89.5 ft, contains limy nodular areas; very slightly calcareous 86.8 to 89.2 ft and 89.3 to 90 ft.....	75.0	90.0
Silt, moderately clayey, slightly sandy, sand is very fine, light brown 90 to 91.8 ft; olive-gray 91.8 to 92.8 ft; reddish brown 92.8 to 95 ft; contains white marly areas 95 to 95.5 ft.....	90.0	95.5
Silt, slightly clayey, very sandy, sand is mostly very fine to medium, some interbedded fine to very coarse sand, grayish brown; very calcareous 97.3 to 99.2 ft; contains some coarse sand to fine gravel 99.2 to 100 ft.....	95.5	105.0

Silt, moderately clayey, moderately sandy, sand is very fine to medium, light brown, very slightly calcareous; moderately calcareous 102.8 to 103.7 ft, indurated; slightly calcareous 103.7 to 105 ft; contains interbedded fine to very coarse sand 105 to 109 ft, much medium sand; very sandy 109 to 110 ft, sand is very fine to coarse, much medium.....	105.0	110.0
Sand, slightly to moderately silty, sand is fine to very coarse, a trace of fine gravel, light brown, very slightly calcareous; slightly silty, slightly calcareous 114.5 to 115 ft.....	110.0	115.0
Sand and gravel, gravel is fine to medium.....	115.0	120.5
Sand, very silty, sand is very fine to medium. reddish brown.....	120.5	122.0
Silt, slightly clayey, moderately sandy, sand is very fine to fine, reddish brown, slightly to moderately calcareous.....	122.0	127.7
Sand, moderately to very silty, sand is very fine to medium with a trace of coarse; sand is very fine to coarse 128.5 to 132 ft.....	127.7	132.0
Sand and gravel, gravel is fine to medium.....	132.0	144.0
Silt, moderately to very sandy, sand is mostly very fine to medium, reddish brown; slightly sandy 150 to 155 ft.....	144.0	155.0
Silt, moderately to very clayey, very slightly sandy, reddish brown, slightly calcareous.....	155.0	157.5
Sand, very silty, sand is very fine to very coarse, some fine gravel, reddish brown, very slightly calcareous.....	157.5	159.5
Sand, fine to very coarse; contains sandy silt layers 163.1 to 165 ft; moderately to very silty 165 to 168.3 ft.....	159.5	168.3
Silt, moderately clayey, slightly sandy, sand is very fine to fine, light brown, slightly calcareous with limy areas; very calcareous, indurated 170 to 170.4 ft.....	168.3	170.4
Silt, slightly clayey, moderately sandy, sand is very fine to fine, light brown, moderately calcareous; contains rootlets 175 to 187.7 ft; very calcareous 180.5 to 187.7 ft.....	170.4	187.7
Sandstone, sand is very fine to medium, very calcareous, contains hard limy areas; light brown, a few dense limy nodules with dark stain 190 to 193 ft.....	187.7	193.0
Sandstone, moderately silty, sand is mostly very fine to fine, light brown, slightly calcareous; contains milky opal 194 to 195 ft and 197.4 to 200 ft; very calcareous 196.9 to 197.4 ft; sand is very fine to medium 197.4 to 200 ft.....	193.0	205.0

Silt, slightly clayey, slightly sandy, sand is very fine to fine, light brown, slightly calcareous; contains some limy cemented sandstone layers 207.5 to 209 ft; moderately calcareous 207.5 to 217 ft; very sandy 213.2 to 215 ft.....	205.0	217.0
Sandstone, very fine to coarse, a trace of fine gravel, slightly to in part very calcareous.....	217.0	221.0
Sand and gravel, gravel is fine to medium, contains some limy cemented areas.....	221.0	225.0
Sandstone, sand is very fine to fine, very light brown, moderately calcareous, contains hard limy nodular areas.....	225.0	226.2
Sand, very silty, sand is very fine to medium, light brown, slightly calcareous; contains thin calcareous clayey layer 230 to 231.7 ft; contains thin hard limy layers 231.7 to 235.5 ft, reddish brown; moderately clayey 235.5 to 237 ft, sand is mostly very fine to fine, moderately calcareous.....	226.2	237.0
Sandstone, sand is very fine to medium, light brown, moderately calcareous, contains rootlets.....	237.0	240.0
Sand, very silty, light brown, slightly calcareous; moderately calcareous 250 to 260 ft; contains some clayey silt, 259 to 262 ft.....	240.0	260.0
Sand, very fine to medium, a trace of coarse, very slightly calcareous, contains rootlets.....	260.0	267.5
Silt, slightly clayey, moderately sandy, sand is mostly fine, light brown; very sandy 271.8 to 273.5 ft.....	267.5	278.0
Sand, very fine to medium, a trace of coarse; very fine to coarse 280 to 283.5 ft, contains rootlets, very slightly calcareous; contains a clayey silt layer 283.5 to 285 ft.....	278.0	285.0
Sandstone, clayey, sand is mostly fine, very light brownish gray, slightly calcareous, contains rootlets.....	285.0	292.0
Sand, very fine to medium, a trace of coarse, silty in part, very light brown, very slightly calcareous.....	292.0	295.0
Tertiary System - Oligocene Series - White River Group:		
Silt, very clayey, contains some very fine sand, light brown.....	295.0	299.0
Clay, silty, very light brown, contains some thin indurated layers 299 to 305 ft, noncalcareous; contains limy nodular layer 318.5 to 319 ft; light olive-gray below 327 ft; contains thin limy areas 324 to 327 ft; contains thin volcanic ash layers 327 to 338 ft; contains some very light greenish gray claystone 338 to 340 ft; contains fine grained white sandstone layer 343 to 345 ft; contains limy areas 347 to 350 ft; bentonitic 350 to 352 ft.....	299.0	352.0

Sand, in part clayey, very fine to fine, very light olive-gray; sand is very fine to medium 357 to 360 ft.....	352.0	360.0
Sand, fine to medium, some coarse.....	360.0	368.2

Cretaceous System - Upper Cretaceous Series - Montana Group:

Pierre Formation:

Clay, yellow, yellow-gray, some purple, very slightly calcareous; some reddish purple 375 to 380.3 ft; light yellow-gray 380.3 to 385 ft; mostly medium to dark gray 385 to 400 ft, noncalcareous.....	368.2	400.0
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**10-35-36dccc
30-B-74
Perkins County**

Location: SW SW SW SE sec 36-10N-36W, 7 ft N and approximately 2563
ft W of SE cor sec
Ground elevation: 3257 ft (t) Grainton 7.5 min. quadrangle
Depth to water: 172 ft (9/3/74)
Electric log

	<u>Depth, in feet</u>	
	From	To
Quaternary System, undifferentiated:		
Road fill.....	0.0	1.0
Silt, moderately clayey, slightly sandy, sand is very fine to medium, dark brown-gray, slightly calcareous.....	1.0	5.0
Silt, slightly clayey, very sandy, sand is very fine to very coarse, brown, slightly calcareous.....	5.0	10.0
Silt, slightly clayey, slightly sandy, sand is very fine, light brown, slightly calcareous, contains limy nodules; moderately calcareous 15 to 19 ft, light yellow-brown; moderately clayey 19 to 20 ft; very calcareous 21.2 to 22.8 ft, contains limy nodules.....	10.0	22.8
Silt, slightly clayey, slightly sandy, sand is very fine, light yellow-brown, slightly calcareous; slightly more clayey below 30 ft, light reddish brown.....	22.8	37.5
Silt, moderately clayey, slightly sandy, sand is very fine, pale brown, moderately calcareous, contains limy nodules.....	37.5	38.7
Silt, slightly clayey, slightly sandy, sand is very fine, light brown, slightly calcareous; very calcareous 40.8 to 41 ft, very pale brown.....	38.7	41.0
Silt, slightly clayey, slightly sandy, sand is mostly very fine, brown, very slightly calcareous; contains a few limy nodules below 50 ft; very calcareous 58.2 to 58.4 ft.....	41.0	60.5
Sand, very fine to fine, much very fine sand, light brown.....	60.5	73.5
Silt, moderately clayey, slightly sandy, sand is very fine, brown to pale brownish gray, moderately calcareous; very calcareous 78.4 to 78.7 ft, 79 to 79.3 ft and 80 to 81 ft.....	73.5	81.0
Silt, slightly clayey, slightly sandy, sand is mostly very fine, silt is coarse, brown, slightly calcareous; very calcareous 87 to 88 ft, hard.....	81.0	98.0

Silt, moderately clayey, slightly sandy; sand is very fine to fine, medium dark reddish brown, very slightly calcareous; very clayey 102 to 105.8 ft, light brown, contains hard limy areas and nodules; contains limy areas 110 to 114 ft, light brown....	98.0	114.0
Silt, moderately clayey, slightly sandy, mostly very fine sand, reddish brown, slightly calcareous; contains limy areas; slightly clayey 116 to 117.2 ft, moderately calcareous, pale brown; moderately clayey 117.2 to 118 ft.....	114.0	118.0
Silt, very slightly clayey, light brown, slightly calcareous; noncalcareous 130 to 135.1 ft; very pale brown to very light brownish gray 135.1 to 136 ft, moderately to very calcareous; slightly sandy 136 to 141.7 ft, sand is very fine, silt is coarse, light brown, moderately calcareous; contains limy nodules 140 to 141.7 ft.....	118.0	141.7
Silt, moderately clayey, very slightly sandy, sand is very fine, light reddish brown and pale brown, slightly calcareous, contains limy areas; moderately to very calcareous 143.8 to 145.6 ft, common limy areas.....	141.7	145.6
Silt, moderately clayey, silt is coarse, very light brown, slightly calcareous; very calcareous 149.5 to 150 ft; moderately to very clayey 150 to 151.5 ft.....	145.6	151.5
Tertiary System - Miocene Series - Ogallala Group:		
Silt, very clayey, slightly to moderately sandy, sand is very fine to fine, rare medium sand, light reddish brown and very pale brown, slightly calcareous, contains a few limy areas; common limy areas 155 to 156.8 ft.....	151.5	156.8
Sandstone, slightly clayey, sand is very fine to fine, much fine sand, light reddish brown, poorly indurated, contains a few limy areas.....	156.8	160.1
Siltstone, slightly sandy, sand is very fine to fine, white, very calcareous, marly, moderate induration; moderately sandy, moderately calcareous 161.9 to 165 ft; contains some interbeds of very clayey to moderately sandy silt 169.5 to 172.5 ft, brown.....	160.1	172.5
Silt, moderately clayey, moderately sandy, sand is very fine to fine, light reddish brown, contains limy areas; in part very clayey, moderately calcareous 173.3 to 175 ft.....	172.5	175.0

Sand, silty, very slightly clayey, sand is very fine to fine with a little medium and a trace of coarse sand, light reddish brown; contains some medium and a little coarse to very coarse sand below 177 ft; contains limy areas 180 to 184 ft; contains a little fine gravel 184 to 188 ft; contains some interbedded moderately clayey to very sandy silt 185 to 188 ft.....	175.0	188.0
Silt, moderately clayey, in part very sandy, sand is very fine to very coarse, pale olive-brown, slightly calcareous.....	188.0	192.5
Silt, slightly clayey, very sandy, sand is mostly very fine to fine, light grayish brown, moderately calcareous, slight induration; contains some coarse to very coarse sand 195 to 199 ft, slightly calcareous; contains rootlets and seed fragments 200 to 204.5 ft; contains some interbeds of moderately clayey to sandy silt below 204.5 ft, sand is mostly fine, slightly calcareous.....	192.5	213.5
Silt, moderately clayey, very sandy, sand is very fine to very coarse with a trace of fine gravel, slightly indurated, slightly to in part moderately calcareous, light brown, contains rootlets; very slightly calcareous 214.2 to 215 ft.....	213.5	215.0
Sand, very silty, sand is very fine to very coarse, grayish brown, slightly calcareous; contains some interbedded gravelly sand and is in part moderately clayey 214 to 220 ft, moderately to very calcareous.....	215.0	220.0
Sand, moderately silty, sand is very fine to very coarse, slightly calcareous.....	220.0	223.0
Sand, some gravel, much coarse to very coarse sand, gravel is fine with a trace of medium.....	223.0	227.0
Silt, slightly clayey, very sandy, sand is very fine to very coarse, brown.....	227.0	230.0
Silt, moderately clayey, slightly sandy, greenish gray and reddish brown, very slightly calcareous; moderately to very clayey 235 to 237.3 ft.....	230.0	237.3
Sand, very fine to very coarse, a trace of fine gravel, reddish brown.....	237.3	239.1
Silt, moderately clayey, slightly sandy, sand is mostly fine, reddish brown; very calcareous 240 to 243.4 ft; slightly calcareous, slightly more clayey 243.4 to 245 ft.....	239.1	245.0
Silt, very sandy and sand interbedded, sand is very fine to very coarse, much medium sand, a trace of fine gravel.....	245.0	250.0
Sand, fine to very coarse, much coarse to very coarse sand, a trace of fine gravel.....	250.0	259.1
Silt, very clayey, in part sandy, reddish brown, very slightly calcareous, contains limy areas; indurated, marly 262.1 to 263.5 ft, pale brown....	259.1	263.5

Sand, very silty, sand is very fine to coarse, contains some very coarse sand, a trace of fine gravel 265 to 267 ft.....	263.5	267.0
Silt, slightly clayey, sandy, brown, very slightly calcareous.....	267.0	270.0
Sandstone, silty, slightly clayey, sand very fine to very coarse, reddish brown, very slightly calcareous; contains limy indurated zones below 279 ft; slightly to moderately calcareous 284 to 290 ft, contains some very coarse sand and a little fine gravel; noncalcareous 290 to 290.8 ft.....	270.0	290.8
Silt, slightly clayey, moderately sandy, sand is very fine to medium, reddish brown; contains limy areas and indurated layers 295 to 299 ft.....	290.8	299.0
Sandstone, sand is very fine to very coarse, much fine to medium sand, a trace of fine gravel, brown, slightly calcareous, contains rootlets; slightly to moderately silty below 305 ft; calcareous cementation 306 to 312 ft and 316 to 316.8 ft.....	299.0	316.8
Silt, very clayey, very slightly sandy, brown, very slightly calcareous.....	316.8	320.0
Silt, slightly clayey, very sandy, sand is very fine to coarse, reddish brown, slightly calcareous; contains some silty sand 325 to 327.2 ft; limy cemented, marly 327.2 to 328 ft; slightly to moderately clayey 328 to 329 ft; moderately to very calcareous 329 to 332 ft, contains some very coarse sand.....	320.0	332.0
Silt, moderately clayey, in part very sandy and indurated, sand is very fine to fine, reddish brown, slightly calcareous.....	332.0	334.5
Silt, slightly clayey, slightly sandy, sand is mostly fine, pale brown, slightly calcareous.....	334.5	336.0
Sandstone, very silty, sand is fine to coarse, pale brown, limy cementation.....	336.0	338.8
Silt, slightly clayey, very sandy, sand is very fine to medium, reddish brown; contains some interbedded very fine to coarse sand 340 to 345 ft, very slightly calcareous.....	338.8	345.0
Sand, very fine to very coarse, much medium to coarse sand.....	345.0	356.0
Sand, some gravel sand is fine to very coarse, much very coarse sand, gravel is fine; contains a trace of medium gravel 355 to 360 ft.....	356.0	361.5
Silt, very clayey, pale olive; limy layers at 367 and 368.5 ft; slightly sandy, less clay below 369 ft; very calcareous 369.8 to 370.5 ft.....	361.5	372.5
Silt, slightly clayey, moderately sandy, sand is mostly very fine, light olive-gray, slightly calcareous.....	372.5	373.5

Sandstone, sand is fine to very coarse, much medium sand, light olive-gray, contains a trace of rootlets; contains seed fragments below 380 ft; slightly more coarse to very coarse sand 385 to 388 ft; silty and is lime cemented 358 to 390 ft; contains white opaque limy nodules 390 to 400 ft; slightly silty 395 to 400 ft and moderately silty 400 to 405 ft; only slightly indurated below 405 ft; contains thin pale olive silty clay layers 405 to 410 ft; slightly silty 410 to 434 ft, contains rootlets and seed fragments; slightly clayey, moderately silty 435 to 452 ft, pale brown, slightly calcareous; very calcareous, lime cemented 440 to 445 ft.....	373.5	452.0
Sandstone, slightly silty, sand is fine to coarse, much medium sand, brown, slightly calcareous; very calcareous 454 to 455 ft; moderately silty, slightly clayey 455 to 465 ft, olive-gray; sand is fine to very coarse below 465 ft, light brown.....	452.0	470.0
Sand, some gravel, sand is fine to very coarse, gravel is fine with a trace of medium.....	470.0	479.0
Silt, moderately clayey, moderately sandy, very pale brown and white, very calcareous; moderately to very sandy below 480 ft, whitish gray; very sandy 485 to 493 ft, very pale brown and white; indurated as sandstone 493 to 495 ft.....	479.0	495.0
Silt, moderately clayey, sandy, light reddish brown, contains marly areas; very sandy 500 to 503 ft, sand is very fine to very coarse.....	495.0	503.0
Sand, very fine to very coarse, much coarse to very coarse sand, contains a trace of fine to medium gravel; slightly silty 503 to 507 ft, pale olive; contains layers of moderately clayey silt 507 to 510 ft; moderately silty, slightly clayey 510 to 512.5 ft, slightly calcareous.....	503.0	512.5
Sand, some gravel, sand is fine to very coarse, gravel is mostly fine.....	512.5	520.0
Sand and gravel, gravel is fine to coarse; clayey in lower 2 to 3 ft.....	520.0	525.0
Tertiary System - Oligocene Series - White River Group:		
Sand, slightly clayey, moderately to very silty, sand is mostly fine, olive-brown.....	525.0	528.0
Clay and clayey siltstone, light medium reddish brown, some limy areas.....	528.0	535.0
Sandstone, clayey, silty, sand is very fine to fine, much very fine sand, silt is coarse, reddish brown, noncalcareous; light brown, moderately calcareous below 540 ft, contains some clayey silt; slightly sandy, sand is very fine, very light brown, moderately calcareous 540 to 545 ft..	535.0	545.0

Siltstone, clayey, very sandy, sand is very fine, silt is coarse, light brown, slightly calcareous; moderately sandy 547 to 550 ft, very pale brown, moderately calcareous; some brown clayey silt in sample.....	545.0	550.0
Clayey siltstone and silty clay, light brown, slightly calcareous; moderately sandy in part 555 to 557 ft, sand is very fine with some fine, light brown, noncalcareous.....	550.0	557.0
Clay, silty, light olive-gray and light brown, very slightly calcareous, contains a trace of very fine grained sandstone or sandy clay.....	557.0	560.0
Sandstone, very clayey, sand is very fine to fine with scattered medium to very coarse sand grains, very light olive- to brown-gray; some very sandy clay 565 to 570.0 ft, sand is very fine to fine; sand is very fine to fine with some medium and scattered coarse to very coarse sand 570 to 575 ft, very light olive-gray, contains some limy areas.....	560.0	575.0
Sandstone, clayey, very sandy, sand is mostly very fine to medium, very light olive-gray, some limy concretions; contains some layers of slightly to very sandy clayey silt 578.3 to 580 ft, very light olive.....	575.0	580.0
Sand, fine to very coarse, a trace of gravel, about 90 percent quartz, a little pink quartz, feldspar and a few limestone and shale grains.....	580.0	589.7
Cretaceous System - Upper Cretaceous Series - Montana Group:		
Pierre Formation:		
Shale, clay, bright yellow and yellow-brown, slightly calcareous; some light yellow gray and olive-gray 595 to 597 ft; mostly dark gray 597 to 610 ft.....	589.7	610.0

**10-36-31ccbb
18-B-75
Perkins County**

Location: NW NW SW SW sec 31-10N-36W, approximately 1320 ft N and
10 ft E of SW cor sec
Ground elevation: 3270 ft (t) Elsie 7.5 min. quadrangle
Depth to water: 94.9 ft (7/16/75)
Electric log

	<u>Depth, in feet</u>	
	From	To
Quaternary System, undifferentiated:		
Road fill.....	0.0	1.5
Sand, very fine to medium, much medium, light brown.	1.5	5.7
Sand, slightly clayey, very silty, sand is very fine to medium, contains a trace of coarser grains, medium dark gray-brown.....	5.7	10.0
Sand, slightly silty, sand is very fine to medium, light brown; may contain some sandy silt layers...	10.0	15.0
Sand, fine to coarse, contains a trace of very coarse; mostly very fine to medium sand 15 to 20 ft, may contain some sandy silt layers.....	15.0	22.0
Silt, slightly clayey, slightly to moderately sandy, sand is mostly very fine to fine, light yellow-brown to brown gray, slightly calcareous.....	22.0	25.0
Sand, very fine to fine, a little medium sand and a trace of coarser grains, light yellow-brown.....	25.0	31.1
Silt, very slightly clayey, very slightly sandy, sand is very fine, silt is coarse, very light brownish gray to very light brown, slightly calcareous, contains soft limy areas; moderately clayey 33.8 to 35 ft, moderately to very calcareous; light brown 35 to 38.9 ft, contains a trace of very fine sand, slightly calcareous; moderately calcareous 38.9 to 40 ft.....	31.1	40.0
Tertiary System - Miocene Series - Ogallala Group:		
Silt, moderately clayey, very sandy, sand is mostly very fine, light yellow-brown and light brown, moderately calcareous.....	40.0	42.0
Silt, slightly clayey, moderately to very sandy, sand is very fine to fine with a little medium, white to pinkish white, very calcareous, marly....	42.0	43.5
Silt, moderately to very clayey, slightly to in part very sandy, sand is mostly very fine to fine, very light brown to very light brownish gray, very calcareous.....	43.5	44.3

Siltstone, moderately clayey, slightly to moderately sandy, sand is very fine to fine, rare medium sand, very light brown, very calcareous, moderately indurated; very sandy in part 45 to 45.9 ft, contains some medium sand, light brown, matrix is mostly noncalcareous; moderately to very clayey 45.9 to 48.1 ft.....	44.3	48.1
Sandstone, slightly clayey, moderately silty, sand is very fine to fine, light reddish brown, contains a few limy areas; moderately clayey 50 to 52 ft; white, very calcareous 52 to 52.7 ft; very pale brown to white 52.7 to 55 ft, moderately to very calcareous, contains a trace of medium to coarse sand; mostly very light brown 55 to 57 ft, moderately calcareous, contains limy areas.....	48.1	57.0
Sandstone, slightly clayey, sand is very fine to fine, contains a little medium sand and a trace of coarse sand to fine gravel, medium dark reddish brown, noncalcareous; very light brown, moderately to very calcareous 57.7 to 58.4 ft; light reddish brown 58.4 to 61 ft, slightly calcareous; moderately calcareous 61 to 63.5 ft, very light brown; very slightly calcareous 63.5 to 65.7 ft, reddish brown, contains rootlets; slightly silty 65.7 to 75 ft, pale brown, moderately calcareous, contains some nodular limy areas 70 to 75 ft, sand is very fine to medium with some coarser grains; silty, slightly clayey 75 to 81.3 ft, light reddish brown, slightly calcareous, contains some coarse sand to fine gravel, contains many rootlets.....	57.0	81.3
Sand and gravel, gravel is fine, much very coarse sand; slightly more gravel 85 to 90 ft, contains a trace of medium gravel.....	81.3	90.0
Sand and gravel, gravel is fine to medium with a little coarse gravel and pebbles, approximately 50 percent fine gravel.....	90.0	96.5
Silt, slightly clayey, moderately sandy, sand is mostly very fine, light reddish brown; very sandy 97.3 to 99.5 ft, moderately calcareous, contains limy cemented areas.....	96.5	99.5
Sand, fine to very coarse, much coarse to very coarse sand, contains a trace of fine gravel.....	99.5	100.2
Silt, moderately clayey, very slightly sandy, sand is mostly very fine, pale brown, moderately calcareous; slightly calcareous 103 to 106.8 ft.....	100.2	106.8
Sand and gravel, gravel is mostly fine, common dark grains.....	106.8	114.9

Silt, slightly clayey, moderately sandy, sand is very fine to fine, pale brown, moderately calcareous; very sandy, 116.5 to 122 ft, sand is very fine to medium; very slightly calcareous 116.5 to 120 ft; sand is very fine to coarse 122 to 122.5 ft, slightly calcareous.....	114.9	125.5
Sand, fine to very coarse, much coarse sand and a trace of fine gravel.....	125.5	135.0
Sand and gravel, gravel is mostly fine.....	135.0	138.7
Silt, slightly clayey, slightly sandy, sand is mostly very fine, reddish brown; moderately clayey 140 to 146.7 ft, slightly to moderately calcareous, contains thin limy layers.....	138.7	146.7
Silt, slightly clayey and silty sand, sand is fine to very coarse, silt is olive-brown to brown-gray, very slightly calcareous.....	146.7	150.0
Sand, very silty, sand is very fine to fine, light reddish brown, slightly calcareous; contains some clayey silt layers 153 to 155 ft; slightly indurated 154 to 155 ft, sand is very fine to medium..	150.0	155.0
Silt, slightly clayey, moderately silty, sand is mostly very fine to fine, light reddish brown; slightly calcareous 156.8 to 158 ft, contains rootlets.....	155.0	158.0
Sand, slightly silty, sand is very fine to fine, light reddish brown, contains a few sandy marl areas.....	158.0	162.3
Sand, very slightly silty, sand is fine to very coarse, contains a trace of fine gravel; slightly limy cemented 165 to 166.6 ft; moderately to very silty 166.6 to 170 ft; contains some interbedded slightly clayey and sandy silt 170 to 177.5 ft; some limy cementation 177.5 to 185 ft; mostly very fine to medium sand 185 to 187.6 ft, very slightly calcareous.....	162.3	187.6
Sandstone, sand is very fine to medium with a trace of coarse to very coarse, pale brown, very calcareous; contains some slightly clayey and sandy silt layers 189.5 to 200 ft; very slightly calcareous, very slightly indurated 195 to 200 ft, sand is mostly very fine to coarse.....	187.6	200.0
Sand, fine to very coarse with a trace of fine gravel, very slightly calcareous, contains a trace of rootlets; very slightly silty 205 to 210 ft....	200.0	210.0
Sand, very silty, sand is mostly fine to coarse, contains interbedded sandy silty layers, very slightly calcareous, contains a trace of gravel...	210.0	215.3
Silt, slightly clayey, moderately sandy, sand is fine to coarse with a little very coarse sand and fine gravel, light brown, slightly calcareous.....	215.3	220.0
Silt, moderately clayey, slightly sandy, sand is very fine, light reddish brown.....	220.0	225.0

Silt, moderately sandy, sand is mostly fine, light reddish brown, slightly calcareous; contains a hard layer 226.5 to 227.5 ft.....	225.0	229.5
Sand, some gravel, gravel is fine, contains some thin interbedded silty layers.....	229.5	233.8
Silt, moderately sandy, sand is fine to coarse, very light brown-gray.....	233.8	235.2
Sand, interbedded with sandy silt, sand is fine to very coarse, a little fine gravel, reddish brown, slightly calcareous.....	235.2	238.0
Silt, slightly clayey, moderately sandy, sand is fine to very coarse, little reddish brown; moderately calcareous 245 to 246 ft.....	238.0	246.0
Siltstone, sandy, sand is very fine to fine, light reddish brown, moderately calcareous; clayey 248.8 to 249.5 ft.....	246.0	249.5
Silt, very sandy, sand is very fine to fine, light reddish brown; very slightly calcareous 250 to 255 ft; some silty sand 253.5 to 255 ft.....	249.5	255.0
Sand, very fine to medium, a trace of coarse, very slightly indurated, slightly calcareous, contains rootlets; some very sandy silt 257.4 to 259.4 ft; moderately indurated 259.7 to 260.3 ft, sand is fine to coarse, some very coarse.....	255.0	260.3
Sand, fine to very coarse, contains trace of fine gravel, contains some thin silty layers, moderately calcareous, contains a trace of rootlets; noncalcareous 265 to 270 ft; slightly calcareous 270 to 275.5 ft.....	260.3	275.5
Silt, moderately clayey, light brown, moderately calcareous, contains a trace of very fine-grained sandstone.....	275.5	280.0
Silt, very sandy, sand is very fine to medium with a trace of coarse to very coarse sand, light brown.....	280.0	285.5
Siltstone, very sandy, sand is mostly fine, contains some coarse sand and a trace of fine gravel, light olive-gray, moderately calcareous, contains rootlets; very calcareous 289 to 295 ft; light brown 290 to 295 ft, contains seed fragments.....	285.0	295.0
Silt, very sandy, in part clayey, sand is very fine to fine, light reddish brown, slightly calcareous; contains some coarse sand and a trace of gravel 298 to 300 ft, moderately calcareous, contains seed fragments.....	295.0	300.0
Sandstone, moderately silty, sand is very fine to coarse with a trace of very coarse, much fine to medium sand, pale brown, moderately calcareous, contains seed fragments; sand is fine to very coarse, some fine gravel 300 to 319 ft; less calcareous 310 to 316 ft; very calcareous 316 to 319 ft.....	300.0	319.0

Clay, silty and clayey siltstone, in part sandy, pale brown and reddish brown, moderately calcareous, contains some indurated layers.....	319.0	320.0
Silt, moderately clayey, moderately sandy, mostly very fine sand, light reddish brown, moderately calcareous; contains some reddish brown indurated silty clay layers.....	320.0	322.5
Silt, moderately clayey, very sandy, sand is very fine, pale olive, slightly calcareous, contains indurated limy areas and rootlets; contains some thin claystone layers, reddish brown, has some dark dendritic stain.....	322.5	335.0
Sand, very silty, sand is very fine to very coarse, contains a trace of gravel, light brown; contains some limy areas.....	335.0	340.0
Sand and gravel, gravel is mostly fine; very silty 344 to 347.5 ft, slightly calcareous; slightly silty in part 342.5 to 359.3 ft; noncalcareous 350 to 359.3 ft.....	340.0	359.3
Silt, slightly clayey, slightly sandy, sand is mostly fine, light brown, slightly calcareous; contains some very fine to medium sand 360 to 365 ft; slightly calcareous, slightly indurated 365 to 370.5 ft.....	359.3	370.5
Sand, slightly silty, sand is fine to very coarse, slightly calcareous; contains a trace of brown clayey silt 375 to 380 ft.....	370.5	380.0
Sand, moderately to very silty, sand is fine to very coarse, some fine gravel; sand is mostly very fine to coarse 385 to 388 ft, slightly indurated, moderately calcareous.....	380.0	388.0
Sand, slightly silty, sand is very fine to coarse with a trace of very coarse sand, slightly calcareous; very silty 400 to 404 ft; contains a hard layer 408.5 to 409 ft.....	388.0	410.0
Interbedded sand and clay, sand is clayey and fine to coarse grained, clay is reddish brown with some dark staining, all slightly to moderately calcareous.....	410.0	415.0
Sandstone, very silty, sand is very fine to very coarse, brown, moderately calcareous, slightly indurated; mostly olive-brown 420 to 425 ft, slightly calcareous, contains many rootlets.....	415.0	425.0
Sandstone, very silty, sand is mostly very fine to medium, light brown, slightly calcareous; moderately well indurated, slightly to moderately calcareous 427 to 430 ft; contains some reddish brown clay 430 to 435.5 ft, possibly lag from above.....	425.0	435.5

Sandstone, moderately to in part very clayey, sand is mostly fine, pale olive and olive brown, very calcareous; slightly less calcareous 440 to 442 ft, light brown.....	435.5	442.0
Sand, very fine to very coarse, much medium to coarse, pale olive brown, contains some limy areas; contains a trace of fine gravel below 445 ft.....	442.0	447.6
Cretaceous System - Upper Cretaceous Series - Montana Group:		
Pierre Formation:		
Shale, clay, light gray and yellow; some bright yellow to orange 455 to 455.6 ft; mostly dark gray 456.5 to 460 ft.....	447.6	460.0

**10-38-36ddad
19-B-75
Perkins County**

Location: SE NE SE SE sec 36-10N-38W, 882 ft N and 9 ft W of SE cor
sec

Ground elevation: 3335 ft (t) Madrid 7.5 min. quadrangle

Depth to water: 115.35 ft (7/30/75)

Electric log to 440 ft

	<u>Depth, in feet</u>	
	From	To
Quaternary System, undifferentiated:		
Road fill.....	0.0	1.5
Sand, very slightly silty, fine to coarse; moderate-ly to very silty 4 to 5 ft, medium brown-gray, slightly calcareous.....	1.5	5.0
Silt, slightly to moderately clayey, moderately sandy, sand is very fine to coarse, dark grayish brown; contains some yellow-brown silt layers, slightly sandy, sand is very fine 8 to 10 ft; very sandy 9 to 10 ft.....	5.0	10.0
Sand, moderately silty, sand is very fine to very coarse, dark brown.....	10.0	11.8
Silt, moderately clayey, slightly sandy, sand is mostly very fine to medium, yellow-brown; very slightly sandy 15 to 19.3 ft.....	11.8	19.3
Sand, very silty, sand is very fine to coarse with a trace of very coarse, brown.....	19.3	20.0
Silt, slightly clayey, slightly sandy, sand is very fine, light brown; slightly clayey 22.2 to 23 ft, light yellow brown, very calcareous; moderately sandy 23 to 25 ft, very pale brown; moderately clayey 25 to 28 ft.....	20.0	28.0
Silt, brown, slightly calcareous.....	28.0	30.0
Silt, moderately clayey, moderately sandy, sand is very fine to fine, light brown, slightly calcareous; moderately to very clayey, moderately calcareous 36.9 to 40 ft, pale brown.....	30.0	40.0
Tertiary System - Miocene Series - Ogallala Group:		
Silt, moderately clayey, moderately to very sandy, sand is mostly very fine, pale brown, moderately calcareous; very sandy 42.1 to 45 ft; indurated 42.1 to 43.6 ft, very calcareous; sand is very fine to fine below 43.6 ft, moderately to very calcareous.....	40.0	45.0
Silt, slightly clayey, slightly sandy, sand is mostly very fine, light reddish brown, matrix non-calcareous, common white limy areas.....	45.0	48.5

Silt, slightly clayey, very sandy, sand is mostly very fine, reddish brown and white, moderately calcareous, common limy areas; very calcareous 52.3 to 55 ft.....	48.5	57.6
Sandstone, sand is very fine to coarse with a trace of very coarse, much medium sand, very light brown, very calcareous, contains seed fragments; sand is fine to very coarse with some fine gravel 60 to 68 ft; moderately calcareous 60 to 65 ft; slightly coarser 65 to 68 ft.....	57.6	68.0
Sand and gravel, gravel is mostly fine, much very coarse sand, granitic; some medium gravel 70 to 73.8 ft.....	68.0	73.8
Silt, moderately to very clayey, pale brown and olive; contains interbedded reddish brown moderately clayey silt 75 to 78.3 ft.....	73.8	78.3
Silt, moderately clayey, moderately sandy, sand is very fine to medium, reddish brown.....	78.3	81.1
Sand, slightly silty, sand is very fine to very coarse, much medium to coarse, reddish brown.....	81.1	83.0
Silt, very sandy, sand is very fine to medium, brown; contains some interbedded very fine to very coarse sand 85 to 88 ft, contains limy nodular areas.....	83.0	88.0
Silt, moderately clayey, moderately sandy, sand is very fine to medium, very pale brown, very calcareous.....	88.0	90.0
Sandstone, silty, sand is very fine to coarse, pale brown, very calcareous.....	90.0	93.0
Silt, moderately sandy, sand is very fine to fine, reddish brown, contains thin sand layers and marly zones 95 to 101.5 ft.....	93.0	101.5
Sand and gravel, gravel is fine to medium, much very coarse sand and fine gravel; 45 percent gravel 105 to 107.5 ft.....	101.5	107.5
Silt, moderately clayey, slightly sandy, sand is very fine, reddish brown; slightly to moderately calcareous 110 to 115.5 ft; contains some fine to coarse sand 120 to 121 ft.....	107.5	121.0
Sand, fine to very coarse, a trace of fine gravel; some fine gravel 125 to 130 ft.....	121.0	130.0
Sand, some gravel, gravel is fine to medium; contains a little coarse gravel 135 to 138 ft; silty or with silt layer 136 to 138 ft.....	130.0	138.0
Silt, moderately clayey, slightly sandy, sand is very fine, pale reddish brown, slightly to moderately calcareous; contains limy nodular areas 140 to 141.5 ft, moderately sandy, slightly calcareous; less sandy, noncalcareous 141.5 to 145 ft.....	138.0	145.0

Silt, slightly clayey, moderately sandy, sand is very fine to very coarse, reddish brown, slightly calcareous.....	145.0	147.5
Silt, moderately clayey, very slightly sandy, sand is mostly fine, reddish brown, slightly calcareous, contains limy areas; pale brown, moderately calcareous 150 to 160.8 ft; in part moderately sandy, 155 to 160.8 ft, contains some coarser sand, slightly more clayey, pale brown, moderately calcareous.....	147.5	160.8
Sand, very silty, sand is very fine to coarse, pale brown, slightly calcareous, contains limy areas...	160.8	162.0
Silt, moderately clayey, slightly sandy, sand is mostly fine, reddish brown, very slightly calcareous; contains some medium to coarse sand 165 to 167 ft, moderately sandy, slightly calcareous; sand is very fine to medium 167 to 170 ft, very slightly calcareous; contains some interbedded sand 170 to 175.3 ft, sand is mostly medium with some coarse to very coarse sand.....	162.0	175.3
Sand, some gravel, gravel is fine, much very coarse sand; contains some medium gravel 185 to 187.2 ft, dark silicates common.....	175.3	187.2
Silt, very slightly clayey, very slightly sandy, sand is very fine, reddish brown, some dark stain.	187.2	190.0
Silt, moderately clayey, in part very sandy, sand is very fine to coarse, pale brown, in part moderately calcareous; reddish brown 195 to 200 ft, contains limy nodular areas; very sandy 200 to 203 ft, pale brown, slightly to moderately calcareous.	190.0	203.0
Sand, very fine to very coarse, much coarse sand, slightly calcareous; some limy cementation 204 to 206.8 ft; very silty, moderately calcareous 206.8 to 207.2 ft.....	203.0	207.2
Silt, slightly clayey, very slightly sandy, sand is very fine, pale olive; in part pale brown 210 to 211 ft, slightly calcareous; reddish brown 211 to 217 ft, noncalcareous; contains some thin sand layers 217 to 218 ft; slightly more clayey 220 to 222.7 ft.....	207.2	222.7
Sand, fine to very coarse, a little fine gravel, silty in upper 1 to 2 ft.....	222.7	230.0
Sand and gravel, gravel is mostly fine, granitic; some limy cementation 243 to 243.7 ft; very little gravel, slightly silty 243.7 to 245 ft.....	230.0	245.0
Silt, slightly clayey, slightly sandy, sand is very fine to fine, reddish brown, moderately calcareous; very sandy 250 to 251.5 ft, contains limy indurated areas; slightly calcareous 251.5 to 255.5 ft; contains a trace of medium to very coarse sand below 254 ft.....	245.0	255.5

Sandstone, slightly clayey, sand is fine to coarse with a little very coarse, light reddish brown, slightly calcareous, contains rootlets; some reddish brown silty claystone in interval; slightly finer grained, noncalcareous 260 to 261 ft.....	255.5	261.0
Sandstone, slightly clayey, moderately to very silty, light reddish brown, slightly to in part very calcareous; slightly indurated, slightly to moderately silty, slightly calcareous 267.5 to 270 ft.....	261.0	270.0
Sandstone, silty, sand is very fine to coarse, light reddish brown, moderately to very calcareous, contains rootlets and seed fragments; contains some siliceous concretions 275.1 to 280 ft, moderately calcareous.....	270.0	280.0
Limestone, sandy, white, some siliceous areas and "opal".....	280.0	281.5
Sand, moderately to very silty, sand is very fine to medium, contains some moderately to very sandy silt, reddish brown, moderately calcareous; contains a trace of reddish brown claystone 285 to 286.8 ft; slightly clayey, very calcareous 286.8 to 288.7 ft.....	281.5	288.7
Sand, moderately silty, sand is very fine to medium with a trace of coarse to very coarse, light reddish brown, moderately calcareous; mostly very fine to medium sand below 290 ft, contains rootlets and a little light olive-green clayey siltstone.....	288.7	303.0
Sandstone, sand is very fine to medium, light reddish brown, slightly calcareous, contains some hard limy cemented areas; moderately to very calcareous 310 to 318 ft; contains some sandy silt lenses 315 to 318 ft; very silty 318 to 319 ft, sand is fine to very coarse.....	303.0	319.0
Sand, moderately to very silty, sand is very fine to very coarse, moderately calcareous.....	319.0	326.0
Sand, fine to very coarse.....	326.0	330.0
Sand and gravel, gravel is fine to medium, very slightly calcareous.....	330.0	342.0
Silt, moderately sandy, sand is mostly very fine to fine, reddish brown; contains some slightly sandy clay 345 to 346.3 ft, moderately calcareous.....	342.0	346.3
Sand, very fine to fine with a trace of medium, in part very silty, light reddish brown, slightly calcareous; very calcareous 349.9 to 350.9 ft, clayey, contains a trace of coarse to very coarse sand.....	346.3	350.9
Silt, very sandy with some sandy to clayey silt layers, sand is very fine to fine with a trace of medium to very coarse sand, moderately to very calcareous.....	350.9	355.0

Sand, moderately silty, sand is fine to coarse with a trace of very coarse, light reddish brown, slightly calcareous.....	355.0	360.0
Sand and gravel, gravel is mostly fine to medium; mostly fine to very coarse sand 370 to 375 ft and 380 to 385 ft; contains some very silty sand 387.7 to 385 ft, sand is mostly very fine to fine.....	360.0	385.0
Tertiary System - probably a part of the Ogallala Group:		
Sand, in part silty, sand is very fine to medium, much medium sand, light brown; much fine sand 390 to 398 ft; samples contain some calcareous silt and reddish brown clay or claystone.....	385.0	398.0
Silt, very sandy, sand is very fine to fine with a trace of medium, reddish brown, slightly calcareous, may contain some brown clay; very calcareous 400 to 410 ft; very pale brown to white with some pale olive; mostly very pale gray to pale olive 410 to 415 ft; very little sample obtained 415 to 420 ft.....	398.0	420.0
Sand, very fine to very coarse, a trace of fine gravel, olive-green, grains well rounded; contains some fine gravel 425 to 430 ft.....	420.0	430.0
Sand and gravel, gravel is mostly fine, yellowish green; contains a trace of medium gravel 435 to 440 ft.....	430.0	443.4
Cretaceous System - Upper Cretaceous Series - Montana Group:		
Pierre Formation:		
Shale, clay, light gray and bright yellow; some dark gray 449 to 450 ft; mostly dark gray 450 to 460 ft; thin hard layers 452.8 to 453, 455 to 455.1 and 457.9 to 458 ft, calcareous.....	443.4	460.0

**10-39-36cccb
20-B-75
Perkins County**

Location: NW SW SW SW sec 36-10N-39W, 595 ft N and 9 ft E of SW cor
sec
Ground elevation: 3435 ft (t) Grant 7.5 min. quadrangle
Depth to water: 146.5 ft (7/29/75)
Electric log to 516 ft

	<u>Depth, in feet</u>	
	From	To
Quaternary System, undifferentiated:		
Road fill.....	0.0	1.5
Sand, very fine to medium, much fine, gray-brown; yellow-brown 5 to 10 ft; much fine to medium sand 10 to 30 ft; contains a trace of coarse sand 15 to 25 ft.....	1.5	30.0
Sand, very fine to medium, much medium with a trace of coarse to very coarse, light yellow-brown.....	30.0	45.0
Sand, very slightly silty, sand is fine to coarse, much medium to coarse with a trace of very coarse, contains a few secondary limy areas 45 to 50 ft...	45.0	52.0
Tertiary System - Miocene Series - Ogallala Group:		
Silt, slightly sandy, sand is mostly very fine to fine, reddish brown, very calcareous, contains thin hard limy zones; moderately clayey 55.2 to 56.5 ft, very pale brown and white, marly; in part moderately calcareous 56.5 to 57.3 ft; moderately to very clayey, lime cemented 57.3 to 59 ft; in part slightly calcareous 59 to 60.7 ft, very pale reddish brown.....	52.0	60.7
Silt, moderately clayey, very sandy, sand is very fine to fine, very pale brown and white, mod- erately to very calcareous; moderately calcareous 63 to 65 ft.....	60.7	65.0
Silt, slightly clayey, moderately sandy, sand is very fine to fine, reddish brown; very sandy, very calcareous 66.9 to 67.1 ft, indurated, very pale brown; slightly calcareous 67.1 to 70.6 ft.....	65.0	70.6
Sandstone, sand is very fine to very coarse with a trace of fine gravel, light brown, some limy cementation; contains some fine gravel and a trace of medium gravel 75 to 79 ft; in part very calcar- eous and silty 78.4 to 79 ft.....	70.6	79.6
Silt, very sandy, sand is mostly very fine to medium, very pale brownish gray to white, moder- ately calcareous, slightly indurated; contains some coarse to very coarse sand 80.2 to 82.3 ft, very calcareous.....	79.6	82.3

Silt, slightly clayey, slightly sandy, sand is mostly very fine to fine, reddish brown, slightly to moderately calcareous; slightly indurated as sandy siltstone 84.5 to 85.3 ft; sand is very fine to medium; slightly to moderately calcareous 85.3 to 86.3 ft.....	82.3	86.3
Silt, sandy and silty sand, sand is very fine to very coarse with a trace of fine gravel, much medium sand, reddish brown, very slightly calcareous.....	86.3	90.0
Sand, moderately silty, sand is mostly fine to coarse, slightly calcareous.....	90.0	92.9
Silt, slightly clayey, moderately sandy, sand is very fine to fine, reddish brown, slightly calcareous.....	92.9	95.5
Sand, very silty, interbedded with sandy silt, sand is very fine to coarse, olive-gray and pale brown, moderately calcareous.....	95.5	100.0
Silt, moderately sandy, sand is fine to very coarse, light olive-gray, slightly calcareous; very sandy 104 to 104.3 ft, contains a hard limy area; well indurated, very calcareous 105 to 105.3.....	100.0	105.3
Sandstone, moderately silty, sand is very fine to very coarse, light brown, moderately calcareous; very silty 105.3 to 106.5 ft and slightly silty 106.5 to 108.5 ft.....	105.3	108.8
Sand, slightly clayey, moderately silty, sand is mostly very fine to fine, contains a trace of coarser grains, reddish brown; moderately clayey 114 to 115.4 ft, contains limy areas.....	108.8	115.4
Silt, slightly clayey, moderately to very sandy, sand is very fine to medium, reddish brown, moderately calcareous 115.4 to 117.1 ft; slightly calcareous 117.1 to 130 ft; slightly less sandy 121.5 to 125 ft; very sandy 128.5 to 130 ft.....	115.4	130.0
Sandstone, very silty, sand is very fine to medium, reddish brown, slightly calcareous; moderate induration, moderately calcareous 131 to 134 ft...	130.0	134.0
Sandstone and sandy siltstone, sand is very fine to fine, light brown, moderately calcareous.....	134.0	136.0
Silt, moderately clayey, slightly sandy, mottled reddish brown and olive to greenish gray; slightly more clayey 138.5 to 141 ft; contains some indurated calcareous areas 141 to 145 ft; very slightly calcareous 145 to 146.5 ft; noncalcareous 146.5 to 154 ft, reddish brown; moderately sandy 153 to 154 ft, contains some medium sand.....	136.0	154.0
Silt, slightly clayey, very silty, sand is very fine to coarse, reddish brown with some olive-gray; some limy indurated areas 156 to 157.5 ft; slightly silty 160 to 160.8 ft.....	154.0	160.8

Sand, very silty, sand is very fine to medium, reddish brown, moderately calcareous, some induration.....	160.8	162.4
Silt, moderately to very clayey, slightly sandy, sand is very fine to fine, light reddish brown and olive-gray; slightly calcareous 162.4 to 165 ft; very sandy 166.8 to 170.4 ft, sand is very fine to coarse; contains a little very coarse sand below 169 ft.....	162.4	170.4
Sand and gravel, gravel is mostly fine; contains some thin silt lenses 170.4 to 175 ft; contains some medium gravel 180 to 190.4 ft.....	170.4	194.4
Silt, moderately clayey, slightly sandy, sand is very fine to coarse, reddish brown; slightly clayey 199 to 202.2 ft; very sandy 202.2 to 203 ft.....	194.4	203.0
Sand and gravel, gravel is fine to medium; very silty 205 to 205.3 ft.....	203.0	205.3
Silt, slightly sandy, sand is fine to coarse, light reddish brown, slightly calcareous; contains limy areas 213.5 to 215.5 ft.....	205.3	215.5
Sand, some gravel, gravel is fine.....	215.5	219.8
Silt, slightly clayey, moderately sandy, sand is mostly fine, light reddish brown; contains some indurated limy areas 222.7 to 227 ft; moderately to very sandy 227 to 227.5 ft and 229.7 to 234 ft; contains a trace of medium to coarse sand below 227 ft.....	219.8	235.0
Sand, moderately to very silty, sand is very fine to medium, light reddish brown, slightly calcareous; moderately calcareous, indurated 239.5 to 240 ft; contains some very coarse sand and a trace of gravel 242.5 to 245 ft.....	235.0	245.0
Silt, slightly clayey, moderately sandy, sand is very fine to medium, light reddish brown, slightly calcareous.....	245.0	250.4
Sand, fine to very coarse, contains some fine gravel 255 to 275 ft; contains a silt layer 262.6 to 264 ft.....	250.4	278.0
Silt, slightly clayey, moderately sandy, sand is mostly fine, mottled light reddish brown and light greenish gray, very slightly calcareous; contains a very calcareous sandy siltstone layer 285 to 286.5 ft.....	278.0	286.5
Silt, slightly clayey, moderately to very sandy, sand is very fine to medium, pale brown, moderately calcareous; contains some coarse sand 300 to 307.7 ft; contains a trace of fine gravel 307.7 to 310 ft; very calcareous 310 to 314.9 ft.....	286.5	314.9
Siltstone, very sandy, sand is mostly fine to medium, very pale yellow-brown, very calcareous...	314.9	317.6

Sand and gravel, silty, gravel is fine to medium, some limy cementation.....	317.6	320.0
Sand, moderately to very silty, sand is fine to very coarse, reddish brown, slightly calcareous; indurated and moderately calcareous 325 to 328.8 ft...	320.0	328.8
Sand and gravel, gravel is mostly fine; some limy cementation 340.2 to 344.5 ft.....	328.8	344.5
Silt, slightly clayey, very silty, sand is very fine to coarse, much fine to medium sand, slightly calcareous; moderately to very calcareous 350 to 353 ft.....	344.5	353.0
Sand, fine to very coarse, slightly indurated, pale brown, slightly calcareous; moderately silty, very calcareous 355 to 356.5 ft; slightly silty, moderately calcareous 356.5 to 360 ft.....	353.0	360.0
Sand, slightly clayey, very silty, sand is very fine to coarse, very pale brown, moderately to very calcareous, slightly indurated, contains a trace of rootlets.....	360.0	375.5
Sandstone-siltstone, moderately to very silty, sand is very fine to medium, very pale brown, very calcareous; moderately silty, moderately calcareous, contains a few rootlets below 380 ft; contains a trace of coarse sand 385 to 395 ft.....	375.5	395.0
Sandstone, slightly silty, sand is very fine to fine with a trace of medium sand, silt is coarse, very pale brownish gray, moderately calcareous....	395.0	400.0
Tertiary System - Oligocene Series - White River Group:		
Clay-claystone, very light greenish gray, slightly to in part very calcareous, non-indurated clay is waxy, contains a few small limy nodules.....	400.0	406.5
Silt, moderately clayey, slightly sandy, sand is very fine, silt is coarse, light olive-gray, slightly to in part noncalcareous.....	406.5	409.7
Siltstone-sandstone, moderately clayey, sand is very fine, silt is coarse, light olive-gray, moderately calcareous 409.7 to 413 ft; very slightly calcareous below 413 ft, contains some interbeds with a little fine sand; very pale brownish gray to olive and yellowish gray 420 to 445 ft; contains a trace of yellow stain 415 to 420 ft; contains slightly more clay below 430 ft; contains interbeds of slightly sandy siltstone-claystone 430 to 447.8 ft; appears to contain rare medium to coarse sand and gravel grains 445 to 447.8 ft, possibly some thin clay layers; very light olive-gray below 447.8 ft, may have rare coarse grains; very little sand 455 to 456.5 ft.....	409.7	456.5

Clay, very light greenish gray; contains a little mottled very pale brown and a trace of reddish brown.....	456.5	470.0
Note: interval from 460 to 470 ft was highly resistive on electric log		
Sandstone, very clayey, sand is mostly very fine, rare medium to coarse sand grains, very light-olive to greenish gray.....	470.0	475.0
Siltstone-claystone, in part slightly sandy, sand is very fine, very light green-gray; very sandy 480 to 485 ft, sand is very fine with a trace of fine sand; may contain a thin clayey gravel layer.....	475.0	490.0
Clay, very light greenish gray, contains a trace of very pale brown; contains a little limy claystone 490 to 495.3 ft.....	490.0	500.0
Clay, very light gray, greenish tint; contains a few dense rounded limy concretions and bentonite layers 511.8 to 515 ft; slightly sandy in part below 515 ft, sand is very fine.....	500.0	520.0

**10-41-36dddd
22-B-75
Perkins County**

Location: SE SE SE SE sec 36-10N-41W, 3 ft N and 141 ft W of SE cor
sec
Ground elevation: 3498 ft (t) Brandon 7.5 min. quadrangle
Depth to water: 126.5 ft (7/29/75)
Electric log

	Depth, in feet	
	From	To
Quaternary System, undifferentiated:		
Silt, slightly clayey and slightly sandy, dark brown-gray, organic.....	0.0	3.0
Tertiary System - Miocene Series - Ogallala Group:		
Silt, slightly clayey, very sandy, sand is mostly fine, light brown, very calcareous, indurated; contains a trace of medium to very coarse sand 3 to 4 ft; reddish brown, moderately calcareous 4 to 10 ft, contains a trace of medium sand; very calcareous, moderately well indurated 7.2 to 10 ft...	3.0	10.0
Sandstone, very silty, sand is very fine to medium with a trace of coarse, light reddish brown, very calcareous.....	10.0	11.0
Silt, moderately clayey, slightly sandy, sand is very fine to medium, reddish brown, slightly calcareous with some limy areas, reddish brown; contains some mottled light-brown and greenish gray 16.5 to 18 ft; very clayey 18 to 20 ft, reddish brown and greenish gray; contains some coarse to very coarse sand 20 to 21.5 ft.....	11.0	21.5
Sand and gravel, gravel is mostly fine to medium; contains silty layer 30.7 to 31 ft.....	21.5	39.5
Silt, slightly clayey, moderately sandy, sand is mostly fine, reddish brown, slightly calcareous; moderately clayey 41 to 46.2 ft; contains some medium to very coarse sand 46.2 to 49 ft.....	39.5	49.0
Sand and gravel, gravel is fine to medium, contains limy cemented areas.....	49.0	53.5
Silt, slightly clayey, very sandy, sand is mostly very fine to medium, reddish brown; very slightly calcareous 53.5 to 55 ft; contains some coarse sand 58.5 to 60.5 ft.....	53.5	60.5
Sand and gravel, slightly silty, gravel is fine to medium.....	60.5	66.0
Silt, very sandy, sand is fine to very coarse, some gravel.....	66.0	71.8
Sand and gravel, gravel is fine to medium; slightly silty 71.8 to 75 ft; contains silty lenses 86 to 98 ft.....	71.8	98.0

Sand, moderately to very silty, sand is very fine to medium with a little coarse to very coarse, light brown, slightly calcareous; slightly indurated as sandstone 105 to 110 ft, moderately calcareous....	98.0	110.0
Sand, slightly clayey, moderately silty, sand is mostly very fine to medium, light reddish brown, slightly calcareous, slightly indurated.....	110.0	121.8
Sand, very fine to very coarse, contains some fine gravel; silty 130 to 133.5 ft, lime cemented; hard limy area 134.8 to 135 ft.....	121.8	135.0
Silt, slightly clayey, very sandy, sand is very fine to medium, pale brown, slightly to moderately calcareous.....	135.0	147.5
Sand, moderately clayey, sand is very fine to very coarse, very pale brown and white, moderately to very calcareous; well indurated 150.2 to 153.5 ft; yellow brown, slightly calcareous with limy areas 153.5 to 154 ft.....	147.5	154.0
Silt, very sandy, sand is very fine to coarse, brown; contains limy areas 154 to 160 ft; contains some very coarse sand and a trace of fine gravel 160 to 162 ft.....	154.0	162.0
Sand, moderately silty, sand is fine to very coarse, contains a trace of fine gravel.....	162.0	168.2
Silt, moderately clayey, slightly sandy, sand is mostly fine, pale brown, slightly calcareous; moderately calcareous, marly 170 to 175 ft; mostly noncalcareous 175 to 177 ft, very pale greenish gray.....	168.2	177.0
Sandstone, slightly clayey, silty, sand is very fine to coarse, very pale greenish gray, moderately calcareous; very pale brown 180 to 196 ft, sand is mostly very fine to medium with some coarse sand 190 to 196 ft.....	177.0	196.0
Silt, slightly clayey, slightly sandy, sand is very fine to medium, very light brown, very calcareous.	196.0	201.0
Sand, moderately silty, sand is very fine to very coarse, much medium sand, light brown, slightly calcareous; in part very silty 205 to 211 ft, sand slightly coarser, contains a little fine gravel...	201.0	211.0
Sand, some gravel, gravel is fine, much very coarse sand.....	211.0	215.0
Sand and gravel, gravel is fine to medium, contains a greenish gray clay lens in interval 220 to 225 ft.....	215.0	230.0
Siltstone, clayey, reddish brown, calcareous, possibly a lithic boulder.....	230.0	231.8
Sandstone-siltstone, clayey, sand is very fine to medium, light reddish brown, very calcareous, may contain some gravel grains.....	231.8	233.5

Siltstone-sandstone, sand is very fine to fine with some medium to coarse, light brown, very calcareous; sand is mostly very fine to fine, much fine sand 235 to 240 ft.....	233.5	240.0
Tertiary System - Oligocene Series - White River Group:		
Brule Formation:		
Siltstone, clayey, moderately sandy, sand is mostly very fine, very pale brown, very calcareous; light brown 245 to 250 ft.....	240.0	250.0
Sand, slightly clayey, very silty, sand is very fine to fine, light brown, slightly calcareous; contains some clayey silt and limy nodular fragments 255 to 260 ft; some reddish brown clay 260 to 262 ft.....	250.0	262.0
Sandstone, slightly clayey, sand is very fine to fine, pale brown, noncalcareous.....	262.0	270.0
Silt, clayey, in part moderately sandy, sand is mostly very fine, in part indurated as calcareous siltstone; contains some light brown clay.....	270.0	273.0
Siltstone, clayey, slightly to in part moderately sandy, sand is mostly very fine, light brown, slightly to in part very calcareous.....	273.0	275.1
Sand, slightly silty, sand is very fine to fine with some medium and a trace of coarse sand; contains some indurated fine grained sandstone layers; slight induration 280 to 285 ft.....	275.1	285.0
Tertiary System - Oligocene Series - White River Group:		
Chadron Formation:		
Silt, very slightly clayey, slightly sandy, sand is very fine, micaceous, very light olive-brown to olive-gray, noncalcareous, slightly indurated.....	285.0	290.0
Silt, slightly clayey, silt is mostly fine grained, slightly micaceous, light greenish gray, very slightly calcareous; contains some interbeds of silty clay and moderately sandy clayey silt 295 to 300 ft, sand is very fine, very light greenish gray.....	290.0	300.0
Silt, moderately to very clayey, silt is very fine grained, very light greenish gray, slightly calcareous.....	300.0	310.0
Clay, very light greenish gray to olive-gray, slightly calcareous, waxy luster; contains layers of dense claystone, brittle, light green-gray and very light gray 316.5 to 321.8 ft.....	310.0	321.8
Claystone, light to light medium gray, dense, brittle, slightly calcareous, organic?, interval contains some brown clay.....	321.8	324.0
Silt, slightly clayey, very sandy, sand is very fine, light green-gray.....	324.0	325.0
Sandstone, silty, sand is very fine to fine, light greenish gray, slightly calcareous.....	325.0	330.0

Siltstone-claystone, in part sandy, sand is mostly very fine to fine, light olive-gray, moderately calcareous; in part moderately well indurated.....	330.0	335.0
Clay, slightly to in part moderately sandy, sand is mostly very fine with scattered fine to coarse grains; in part a clay sandstone, moderately calcareous.....	335.0	340.0
Siltstone-sandstone, very clayey, sand is very fine, silt is coarse, light green-gray, slightly calcareous.....	340.0	345.0
Clay, silty, very light olive-gray, very slightly calcareous.....	345.0	347.0
Sandstone, clayey, very fine grained, light olive-gray; contains very fine to fine sand with scattered coarse sand and gravel grains 350 to 355.3 ft.....	347.0	355.3
Cretaceous System - Upper Cretaceous Series - Montana Group:		
Pierre Formation:		
No sample, logged in field as a brown clay.....	355.3	355.8
Clay, bright yellow-brown, noncalcareous; mostly a dark gray clay shale below 358.2 ft, noncalcareous.....	355.8	370.0

**10-42-32ccd
34-FC-52
Sedgwick County, Colorado**

Location: SE SW SW sec 32-10N-42W

Ground elevation: 3,612.0 ft (i) Venango 7.5 min. quadrangle

Depth to water: Not available

Electric log: Not available

Note: log reproduced from USGS Water-Supply Paper 1577, 1963; some correlations revised or suggested in this report; samples of logged intervals on file CSD-UNL

	<u>Depth, in feet</u>	
	From	To
Quaternary System, undifferentiated:		
Soil, silty, sandy.....	0.0	2.0
Tertiary System - Miocene Series - Ogallala Group:		
Ogallala Formation:		
Limestone, hard, white to orange.....	2.0	3.0
Caliche, hard, white.....	3.0	10.0
Caliche, sandy, soft, buff to tan.....	10.0	23.5
Clay, silty, sandy, soft, medium-brown.....	23.5	40.5
Sand, fine, to fine gravel.....	40.5	48.7
Clay, silty, sandy, soft, medium-brown.....	48.7	52.0
Sand, coarse to very coarse, silty, contains very fine to medium sand and very fine to medium gravel.....	52.0	63.0
Clay, soft, brown, interbedded with green to brown sandy, silty caliche.....	63.0	76.0
Clay, plastic, brown.....	76.0	92.0
Silt, clayey, and clay, silty, sandy.....	92.0	105.0
Sand, fine, to medium gravel; contains some coarse gravel.....	105.0	155.0
Clay, silty, sandy, hard, brown to buff.....	155.0	166.0
Caliche, soft, white; interbedded with white chert..	166.0	169.0
Clay, silty, sandy, hard, tan.....	169.0	174.5
Silt, clayey, hard, medium-brown.....	174.5	179.0
Caliche, sandy, silty, soft, gray.....	179.0	192.0
Clay, silty, sandy, buff.....	192.0	205.0
Sand, very fine, to fine gravel, calcareous, well-cemented.....	205.0	220.0
Clay, soft, gray.....	220.0	233.5
Clay, silty, sandy, tan.....	233.5	245.0
Sand, fine to coarse, loose; contains very coarse sand to very fine gravel and thin layers of clay and silt.....	245.0	274.0
Silt, clayey, hard, green; contains thin streaks of caliche.....	274.0	283.0
Sand, fine to coarse, well rounded; contains some very coarse sand to fine gravel.....	283.0	286.0
Silt, clayey, soft, buff.....	286.0	294.0

Sand, fine to coarse, well-rounded, frosted; contains very coarse sand to very fine gravel and caliche.....	294.0	312.0
Sand, very fine to coarse; contains very coarse sand to very fine gravel.....	312.0	316.0
Silt, and caliche.....	316.0	318.0
Sand, very fine to coarse; contains very coarse sand to very fine gravel.....	318.0	326.0
Tertiary System - Oligocene Series - White River Group:		
Note: Logged as "Brule Formation": may be the Chadron Formation		
Clay, silty, soft, gray to green.....	326.0	342.5
Clay, dense, brown, and buff silt, sandy.....	342.5	344.5
Chadron Formation:		
Sandstone, very fine grained, quartzitic, light-green.....	344.5	345.5
Silt, clayey, hard, gray to green.....	345.5	372.0
Silt, sandy, soft, green; contains some caliche and limonitic stains at 397 ft.....	372.0	402.0
Silt, clayey, hard, white to gray.....	402.0	408.0
Sand, very fine, silty, white to gray.....	408.0	434.0
Clay, limonitic, plastic, yellow.....	434.0	442.5
Sand, very fine to very coarse, well-cemented, blue.	442.5	447.0
Sand, very fine to coarse, silty, blue.....	447.0	452.0
Cretaceous System - Upper Cretaceous Series - Montana Group:		
Pierre Formation:		
Note: interval 452 to 460.5 ft was included as part of the Chadron Formation in USGS Water-Supply Paper 1577; considered to be weathered Pierre in this report		
Clay, plastic, varicolored with light shades of blue, purple, green and tan.....	452.0	460.5
Clay, plastic, yellow, light-blue and dark-gray shale.....	460.5	472.0

**11-35-1abbb
28-B-75
Perkins County**

Location: NW NW NW NE sec 1-11N-35W, approximately 4 ft S and 2428 ft W of NE cor sec
 Ground elevation: 3262 ft (t) Elsie NE 7.5 min. quadrangle
 Depth to water: 190 ft (8/28/75)
 Electric log to 530 ft

	<u>Depth, in feet</u>	
	From	To
Quaternary System, undifferentiated:		
Silt, clayey, slightly sandy, sand is mostly fine, dark brown-gray; slightly to moderately sandy below 0.7 ft.....	0.0	4.3
Silt, very sandy, slightly clayey, sand is mostly very fine, silt is coarse, dark brown-gray.....	4.3	5.0
Sand, moderately to very silty, very slightly clayey, sand is fine to coarse, medium brown-gray; sand is mostly very fine to medium below 10 ft, some dark brown-gray.....	5.0	15.0
Sand, very fine to medium, much fine sand; contains some sandy silt below 30 ft, slightly calcareous..	15.0	35.0
Silt, very sandy, sand is mostly very fine, silt is coarse, light yellow-brown, slightly calcareous, contains some limy areas.....	35.0	45.0
Silt, moderately sandy, sand is mostly very fine, silt is fine to coarse, light yellow-brown, slightly calcareous; slightly sandy below 50 ft; contains a few limy nodules below 52.2 ft.....	45.0	60.0
Silt, slightly clayey, moderately sandy, sand is very fine to fine, medium dark brown, matrix is noncalcareous.....	60.0	64.0
Silt, slightly to moderately clayey, moderately sandy, sand is very fine to fine, very light brown, slightly to moderately calcareous, contains limy areas.....	64.0	66.2
Silt, moderately clayey, very slightly sandy, sand is very fine, very light brown-gray, slightly to moderately calcareous.....	66.2	69.9
Silt, slightly clayey, slightly sandy, sand is very fine, medium brown, slightly calcareous; moderately calcareous 70 to 70.2 ft; light brown below 70.2 ft.....	69.9	72.8
Silt, slightly clayey, moderately sandy, sand is mostly very fine, light brown, slightly calcareous; slightly more clayey below 75 ft, very slightly calcareous.....	72.8	78.3

Silt, moderately clayey, slightly sandy, sand is mostly very fine, light medium brown; light reddish brown below 80 ft, contains a few limy areas; light brown to light yellow-brown below 86.5 ft...	78.3	90.8
Silt, slightly clayey, moderately sandy, sand is very fine, medium reddish brown, slightly calcareous; very sandy below 95 ft, noncalcareous.....	90.8	101.5
Nodular limestone, slightly sandy, whitish gray.....	101.5	101.6
Silt, moderately clayey, slightly sandy, light medium brown, contains limy areas; moderately sandy below 105 ft.....	101.6	110.8
Marl, white, sandy below 111.7 ft, sand is mostly fine, contains rare medium sand, white to very pale brown.....	110.8	113.6
Sand, silty, slightly clayey, sand is very fine to fine with rare medium sand, very pale brown, slightly calcareous; medium brown below 115 ft, very slightly calcareous.....	113.6	116.5
Tertiary System - Miocene Series - Ogallala Group:		
Sand, silty, moderately clayey, sand is very fine to fine with rare medium sand, medium brown-gray, moderately calcareous.....	116.5	119.0
Sand, moderately clayey, silty, sand is very fine to fine, light olive-gray, contains limy areas; in part very clayey below 119.9 ft, contains rare limy areas.....	119.0	122.1
Sandstone, slightly to moderately clayey, sand is very fine to fine, much fine sand, light olive-gray, slightly calcareous.....	122.1	125.0
Limestone, marly, white, moderately indurated; some very clayey to sandy silt below 127 ft, slightly calcareous.....	125.0	127.8
Sandstone, moderately clayey, sand is very fine to fine, light olive-gray, slightly calcareous, slight to moderate induration, contains limy areas; moderately calcareous 137.2 to 138.5 ft; moderately to very clayey 151 to 154 ft.....	127.8	154.0
Sand, silty, sand is very fine to medium; very slightly clayey 154 to 155 ft, noncalcareous.....	154.0	160.0
Sand, fine to very coarse.....	160.0	162.0
Sand and gravel, gravel is mostly fine to medium, granitic; contains slightly more medium gravel below 165 ft.....	162.0	178.0
Sand and gravel, moderately silty, gravel is fine to medium; slightly silty 180 to 188.5 ft; contains some very sandy silt below 190 ft.....	178.0	201.0
Sand, fine to very coarse, contains some fine gravel.....	201.0	206.2

Silt, sandy, sand is very fine to fine with a trace of medium; contains some coarser sand and trace of gravel below 210 ft, light brown, slightly calcareous.....	206.2	212.0
Silt, sandy, slightly clayey, sand is mostly very fine to medium, light brown, slightly calcareous, in part slightly indurated; moderately clayey 215 to 216 ft, some olive-gray.....	212.0	216.0
Silt, very sandy, sand is mostly fine, in part calcareous, slightly indurated, light reddish brown; contains some medium sand below 220 ft.....	216.0	223.5
Sand, very silty, sand is very fine to medium, contains some indurated limy areas; mostly very fine to fine sand below 225.8 ft; slightly clayey below 230 ft; moderately calcareous below 228.8 ft, contains some sandy to clayey silt.....	223.5	235.0
Silt, slightly clayey, very sandy, sand is mostly very fine to medium, contains a trace of coarse sand and fine gravel, light brown, mostly moderately calcareous, in part indurated as sandstone.....	235.0	240.0
Silt, very sandy, sand is very fine to medium, reddish brown, in part indurated; moderately calcareous 243.7 to 245.2 ft; contains a trace of coarse to very coarse sand below 246.5 ft; slightly calcareous below 247.5 ft.....	240.0	250.0
Siltstone, sandy, sand is mostly fine, reddish brown, slightly calcareous; moderately calcareous 251 to 251.5 ft, olive-gray, noncalcareous below 251.5 ft; may contain some volcanic ash below 253 ft.....	250.0	257.0
Sand, fine to very coarse, contains some fine to medium gravel 257 to 259.5 ft and 263.5 to 265 ft, common dark stains.....	257.0	271.0
Silt, slightly clayey, sand is very fine, light brown, contains limy areas.....	271.0	275.0
Silt, slightly clayey, very sandy, sand is very fine to medium with some coarse, dark reddish brown, slightly indurated; contains limy areas below 276 ft, reddish brown and white.....	275.0	280.5
Siltstone-sandstone, sand is mostly very fine to medium, very pale brown, moderately to very calcareous.....	280.5	282.9
Siltstone-sandstone, sand is mostly very fine to medium, light brown-gray; contains limy areas below 283.5 ft.....	282.9	285.5
Sandstone, slightly silty, sand is very fine to medium, much fine sand, light gray-brown and reddish brown; contains limy areas below 288 ft...	285.5	289.5

Sandstone, silty, sand is fine to coarse, reddish brown, contains limy nodular areas; mostly fine sand below 290 ft; very calcareous 291.9 to 294.5 ft; slightly to moderately calcareous below 295.3 ft.....	289.5	300.0
Sandstone, sand is very fine to coarse, much fine sand, slightly calcareous, reddish brown; very calcareous 309.3 to 310 ft.....	300.0	310.0
Sandstone, slightly silty, sand is very fine to coarse, reddish brown, slightly calcareous; moderately silty, slightly clayey below 315 ft, moderately to very calcareous.....	310.0	317.6
Silt, very sandy, slightly clayey, sand is fine to coarse, pale brown.....	317.6	319.0
Sand, fine to very coarse, much coarse sand, contains some limy areas, in part indurated to 335 ft; essentially noncalcareous below 335 ft.....	319.0	348.3
Sandstone, silty, sand is mostly very fine to medium, light reddish brown, moderately calcareous, contains a few rootlets.....	348.3	360.0
Sand, silty, sand is very fine to very coarse, much medium sand, slightly indurated, light to medium brown, slightly to moderately calcareous.....	360.0	370.0
Sand, fine to very coarse, much medium to coarse, light brown, some limy cementation; moderately calcareous, moderate induration 375.5 to 376.8 ft.	370.0	380.0
Sand, very fine to coarse, much medium sand, light brown, slightly calcareous, slight induration.....	380.0	383.7
Sand, moderately silty, sand is very fine to very coarse, light brown, contains limy areas.....	383.7	385.0
Sand-sandstone, very fine to medium with some coarse, light brown, moderately to very calcareous; slightly calcareous 390.8 to 393 ft; sand is very fine to coarse with some very coarse below 393 ft, slightly to moderately calcareous.....	385.0	395.0
Sand, fine to very coarse with some fine gravel, contains some limy areas; slightly more very coarse sand and fine gravel below 405 ft.....	395.0	420.0
Sand, some gravel, medium sand to fine and medium gravel, very slightly calcareous.....	420.0	425.0
Sand, fine to coarse with some very coarse, slightly calcareous.....	425.0	436.0
Sand, moderately to very silty, sand is very fine to fine, light brown, moderately calcareous.....	436.0	440.0
Sand, slightly silty, sand is fine to very coarse, slightly calcareous.....	440.0	445.0
Sandstone, sand is very fine to medium with a trace of coarse sand and a few lithic gravel grains of siltstone and claystone, light brown.....	445.0	450.0

Sandstone, slightly clayey, in part silty, sand is mostly very fine to medium, contains rare lithic grains, moderately calcareous; very calcareous 462 to 463 ft; contains limy areas below 463 ft; contains some coarse sand 465 to 470 ft.....	450.0	474.0
Tertiary System - Oligocene Series - White River Group:		
Siltstone, indurated, very calcareous, in part siliceous, very light brown, contains some calcite and a trace of volcanic ash; mostly whitish to very clayey light olive-gray below 475 ft.....	474.0	480.0
Siltstone, clayey, light brown, slightly to moderately calcareous; very calcareous 485 to 486 ft.	480.0	495.0
Siltstone, clayey, very light brown, essentially noncalcareous.....	495.0	515.0
Siltstone-claystone, light brown; in part light olive-gray below 520 ft; very light olive-gray below 530 ft.....	515.0	540.0
Clay, very pale olive to yellow-gray and a little light brown; in part siliceous below 547 ft; contains rare yellow-brown staining below 550 ft; logged as pale green below 564 ft; appears to be slightly sandy below 568.7 to 575 ft.....	540.0	575.0
Clay or claystone, very light olive-gray and very pale yellowish gray, contains a few yellowish brown stains; mostly very light gray below 585 ft.	575.0	±600.0
Cretaceous System - Upper Cretaceous Series - Montana Group:		
Pierre Formation:		
Clay, light yellow-gray, common yellow and reddish staining; some dark gray shale cuttings below 610 ft.....	±600.0	615.0
Note: Because of hole conditions samples are of poor quality below 560 ft; top of Cretaceous shale may be above 600 ft		

**11-35-31cccb
26-B-75
Perkins County**

Location: NW SW SW SW sec 31-11N-35W, 512 ft N and 22 ft E of SW cor
sec

Ground elevation: 3344 ft (t) Grainton 7.5 min. quadrangle

Depth to water: Not measured, dry to 216 ft, Electric log (8/8/75)

Electric log

	<u>Depth, in feet</u>	
	From	To
Quaternary System, undifferentiated:		
Sand, slightly silty, sand is very fine to fine with some medium, medium dark brown-gray; slightly clayey below 1.5 ft, sand is very fine to medium, dark brown gray.....	0.0	2.0
Sand, slightly clayey, very silty, sand is very fine to fine with a little medium, medium brown-gray...	2.0	5.3
Silt, moderately clayey, moderately sandy, sand is mostly very fine, light yellow-brown, slightly calcareous, contains limy areas; contains common limy areas below 7.5 ft, silt is very coarse.....	5.3	10.0
Silt, moderately clayey, moderately sandy, sand is mostly very fine, medium dark brown-gray, contains a few limy nodules.....	10.0	15.0
Sand, very slightly silty, sand is very fine to fine, much fine sand, silt is coarse, light yellow brown.....	15.0	17.5
Sand, very slightly clayey, slightly silty, sand is mostly very fine to fine, light yellow-brown, contains a few limy areas; contains indurated limy nodule or layer 20 to 20.3 ft.....	17.5	20.3
Sand, very slightly clayey, very silty, sand is mostly very fine, light yellow-brown, contains hard limy areas.....	20.3	25.0
Silt, very sandy, sand is very fine, silt is coarse, light yellow-brown, contains rare limy nodules....	25.0	50.0
Sand, silty, sand is very fine to fine, silt is coarse, light yellow-brown, contains limy areas and nodules, interbedded with some very sandy silt.....	50.0	60.5
Silt, moderately clayey, moderately sandy, sand is mostly very fine, silt is coarse, medium yellow-brown and light yellow-brown, slightly calcareous; reddish tint 70 to 75 ft; moderately calcareous 79.5 to 80 ft; light brown-yellow 80 to 85 ft; contains limy nodules 87.3 to 90 ft.....	60.5	90.0

Silt, slightly to moderately clayey, slightly sandy, sand is very fine, light yellowish to reddish brown, slightly calcareous; moderately to very calcareous with limy nodules 97.5 to 102.7 ft.....	90.0	102.7
Silt, slightly to moderately clayey, slightly sandy, sand is very fine, medium reddish brown, slightly calcareous; moderately calcareous 107 to 109 ft...	102.7	109.0
Silt, slightly clayey, very sandy, sand is mostly very fine, bright reddish-brown, slightly calcareous; moderately calcareous, contains limy areas 110 to 111.1 ft, very light brown to very pale yellow-brown below 111.1 ft, slightly to moderately calcareous; contains thin limy cemented areas 116.8 to 120 ft, very slightly calcareous 125 to 126.8 ft; contains limy nodules 126.8 to 127.2 ft, light reddish brown, very slightly calcareous below 127.2 ft.....	109.0	130.0
Silt, moderately clayey, moderately sandy, sand is very fine to fine, light medium brown, slightly calcareous; moderately to very sandy below 131.9 ft, light brown, contains small limy cemented areas, moderately calcareous; moderately to very calcareous, very light brown 135 to 135.6 ft; light reddish brown, slightly calcareous 136.5 to 140 ft.....	130.0	140.0
Silt, slightly clayey, moderately sandy, sand is mostly very fine, light reddish brown, moderately calcareous; slightly calcareous below 141.1 ft; light medium reddish brown below 150 ft, contains rare medium sand grains.....	140.0	153.0
Tertiary System - Miocene Series - Ogallala Group:		
Silt, moderately to very clayey, very sandy, sand is very fine to fine, medium brown, slightly calcareous, contains white limy areas; contains hard limy layers or nodules 154 to 155 ft.....	153.0	155.0
Siltstone-claystone, slightly sandy, sand is very fine to fine, white to very light brown, very calcareous, some siliceous cementation; moderately to well indurated.....	155.0	161.0
Silt, clayey, moderately sandy, sand is mostly very fine, very light brown and white, moderately to very calcareous.....	161.0	165.0
Silt, moderately clayey, slightly to moderately sandy, sand is mostly very fine, contains rare medium to coarse sand grains, reddish brown, contains some limy areas; slightly indurated 168 to 170 ft with rare coarse and very coarse sand grains.....	165.0	170.0
Silt, slightly clayey, moderately sandy, sand is mostly very fine, light medium brown, slightly calcareous.....	170.0	175.0

Sandstone, slightly clayey, silty, sand is mostly very fine to medium, contains scattered very coarse sand and gravel grains, light reddish brown, contains limy areas; sand is very fine to very coarse with some gravel below 180 ft.....	175.0	183.0
Sand and gravel, medium to very coarse sand, gravel is fine with some medium, gravel grains commonly dark stained.....	183.0	191.5
Silt, slightly clayey, very sandy, sand is very fine to very coarse, light brown, contains limy cemented areas, moderately calcareous 195 to 197 ft; brown, very slightly calcareous 197 to 200 ft.	191.5	200.0
Silt, sandy and sand and gravel interbedded, sandy silt is gray-brown, sand is very fine to very coarse with some fine gravel, contains some limy areas, gravel grains commonly dark stained.....	200.0	204.0
Sand and gravel, much coarse sand to very coarse sand, gravel is fine, common dark stains.....	204.0	206.8
Silt, very sandy, sand is mostly fine to coarse with some scattered gravel grains, slightly calcareous to 225 ft; moderately calcareous, slightly clayey in part below 230 ft; moderately clayey 233 to 235 ft.....	206.8	235.0
Sand, moderately silty, sand is fine to coarse with a trace of very coarse sand and fine gravel; slightly silty 245 to 249 ft.....	235.0	249.0
Silt, slightly clayey, very sandy, sand is very fine to coarse, contains traces of coarser grains, light brown, moderately calcareous; very clayey 251 to 254 ft; sand is mostly very fine to fine below 255 ft, reddish brown, very slightly calcareous.....	249.0	260.0
Sand, moderately to very silty, sand is very fine to medium with a trace of coarse sand and fine gravel.....	260.0	261.9
Sand, medium to coarse with some very coarse sand and fine gravel.....	261.9	276.7
Sand, slightly silty, sand is mostly very fine to medium, very slightly calcareous, contains siliceous rootlets; sand is medium to very coarse 290 to 295 ft; sand is mostly very fine to medium, slightly calcareous 295 to 298.5 ft.....	276.7	298.5
Sand, very slightly silty, sand is fine to coarse, light brown, slightly calcareous, contains siliceous rootlets.....	298.5	300.0
Sand, fine to coarse with some very coarse sand and fine gravel, reddish brown.....	300.0	307.0
Silt, slightly clayey, sandy, sand is mostly very fine to medium, reddish brown.....	307.0	310.0
Sand, slightly silty, sand is very fine to medium, reddish brown; contains some limy cementation below 314 ft, slightly indurated.....	310.0	317.0

Sand, moderately to very silty, sand is very fine to medium, light reddish brown, moderately to very calcareous, slight to moderate induration.....	317.0	320.0
Sandstone, moderately to very silty, sand is very fine to medium, light brown, slightly calcareous..	320.0	330.0
Sand, slightly silty, sand is very fine to medium, very slightly calcareous, slightly indurated; moderately calcareous 332 to 337.7 ft; very calcareous 337.7 to 338.5 ft; slightly calcareous 338.5 to 340 ft, slightly indurated.....	330.0	340.0
Sand, moderately silty, sand is very fine to coarse with a trace of very coarse, contains much fine to medium sand, light brown, moderately to very calcareous; contains some reddish brown silt 342.5 to 343.5 ft; contains scattered fine gravel below 343.5 ft; slightly indurated, only slightly calcareous below 345 ft, contains a trace of rootlets.....	340.0	352.1
Sandstone, sand and sandy silt interbedded, sand is very fine to medium, reddish brown, in part limy cemented, slightly to moderately calcareous; sand is fine to very coarse with much fine to medium sand below 360 ft.....	352.1	364.0
Sand, slightly clayey, very silty, sand is mostly very fine to medium, light reddish brown, slightly to moderately calcareous, lime cemented.....	364.0	365.9
Silt, slightly clayey, very sandy, sand is very fine to medium with a trace of coarse, reddish brown, contains limy cemented areas.....	365.9	370.0
Silt to siltstone, slightly clayey 375 to 376.5 ft, slightly calcareous.....	370.0	376.5
Silt, very sandy, sand is very fine to medium with some coarser sand and a trace of fine gravel, reddish brown, slightly calcareous; moderately calcareous and slightly indurated below 378 ft....	376.5	378.5
Sandstone, moderately to very silty, sand is fine to very coarse, much fine to medium sand, reddish to grayish brown; reddish brown, moderately calcareous 380 to 382.2 ft.....	378.5	384.2
Silt, slightly clayey, slightly to in part very sandy, sand is mostly very fine to medium, reddish brown, very slightly calcareous.....	384.2	386.9
Sand, slightly silty, sand is very fine to medium with a trace of coarse to very coarse; lime cemented 395.6 to 396.1 ft, pale brown.....	386.9	396.1
Sand, very fine to very coarse, slightly calcareous, sand is dark speckled; contains limy areas 400 to 405 ft, in part silty.....	396.1	405.0

Sand, fine to very coarse, much coarse to very coarse sand, contains a trace of fine gravel; contains limy cemented areas below 417 ft; slightly more very coarse sand and fine gravel below 418.5 ft.....	405.0	420.0
Sand, moderately silty, sand is fine to very coarse, pale grayish brown, moderately calcareous; slightly silty, slightly indurated below 425 ft, slightly calcareous, contains siliceous rootlets, brown; very calcareous 433 to 435.3 ft.....	420.0	433.5
Sand, very fine to very coarse, much fine sand, brown; very calcareous 440 to 441.5 ft; contains some clayey silt layers, olive 441.5 to 445 ft....	433.5	445.0
Sand, fine to very coarse, a trace of fine gravel, brown, some silt in samples.....	445.0	452.0
Sand, moderately silty, some interbeds of pale olive to pale yellow clayey to very fine sandy silt, sand is fine to very coarse.....	452.0	458.5
Sand, moderately silty, in part slightly clayey, sand is mostly very fine to coarse, pale grayish brown, moderately to in part very calcareous, contains some limy and marly beds and some fine grained sandstone.....	458.5	467.0
Sandstone, sand is very fine to medium with a trace of coarse to very coarse, pale grayish brown, moderately calcareous.....	467.0	468.0
Sand, moderately to very silty, sand is mostly very fine to medium, moderately to very calcareous; slightly to moderately silty 470 to 474 ft, contains rootlets; contains a trace of coarse to very coarse sand 474 to 475 ft; moderately calcareous below 475 ft and contains some calcareous pale olive to pale yellow silt; sand is slightly coarser grained below 477 ft.....	468.0	480.0
Sandstone and siltstone, sand is mostly very fine to fine, contains a trace of medium to very coarse sand, olive-gray, very calcareous.....	480.0	486.5
Silt, very sandy, sand is mostly very fine to coarse, pale olive-gray, moderately calcareous; slightly calcareous below 492 ft; contains some sandstone 492 to 495 ft, limy cemented; interbedded with some gravelly sand 495 to 500 ft.....	486.5	500.0
Silt, slightly clayey, very sandy, sand is very fine to medium, contains a trace of coarse to very coarse sand, light brown, moderately calcareous; slightly calcareous 505 to 506.3 ft, contains limy cemented areas, olive-gray.....	500.0	506.3
Silt, slightly clayey, sandy, sand is mostly very fine to fine with some coarser grains, moderately calcareous, in part indurated; moderately clayey, contains some coarse to very coarse sand 510 to 513 ft, very calcareous.....	506.3	513.0

Silt, very sandy, sand is very fine to medium with a little coarse sand to fine gravel, pale olive, very slightly calcareous; slightly clayey below 515 ft, noncalcareous.....	513.0	525.0
Sand, slightly silty, sand is fine to very coarse, much coarse to very coarse sand and a trace of fine gravel, olive, very slightly calcareous.....	525.0	529.5
Sand, some gravel, sand is fine to very coarse, gravel is fine, much coarse to very coarse sand...	529.5	535.0
Sand, very silty, sand is fine to very coarse, light brown, very calcareous; slightly calcareous 540 to 545 ft; sand is mostly fine to coarse 545 to 550 ft; slightly silty 550 to 555 ft, contains some lithic shale grains.....	535.0	566.6
Sand, very silty, sand is very fine to very coarse, light brown, contains some shale grains, moderately calcareous; slightly clayey below 570 ft..	566.6	573.3
Cretaceous system - Upper Cretaceous Series - Montana Group:		
Pierre Formation:		
Shale, clayey to silty, reddish brown, very light gray and yellow, moderately calcareous; noncalcareous below 580 ft; much yellow, some dark gray below 581.9 ft.....	573.3	590.0

**11-35-36cddc
27-B-75
Perkins County**

Location: SW SE SE SW sec 36-11N-35W, 25 ft N and approximately
2105 ft E of SW cor sec
Ground elevation: 3202 ft (t) Grainton 7.5 min. quadrangle
Depth to water: 124.5 ft (9/3/75)
Electric log

	<u>Depth, in feet</u>	
	From	To
Quaternary System, undifferentiated:		
Sand, slightly clayey, very silty, sand is very fine to fine with some medium, dark brown-gray; sand is very fine to medium with rare coarse sand below 1.2 ft, medium brown-gray.....	0.0	3.0
Sand, very fine to fine, much fine sand, light yellow-brown.....	3.0	10.0
Sand, very fine to medium with some coarse, much medium sand, light yellow-brown.....	10.0	15.0
Sand, very fine to medium, much fine sand, light yellow-brown, contains a trace of silty limy areas.....	15.0	21.3
Silt, slightly clayey, slightly sandy, sand is very fine, silt is coarse, light yellow-gray, slightly calcareous; mostly noncalcareous below 25 ft, contains small white limy areas.....	21.3	29.0
Silt, slightly to moderately clayey, slightly sandy, sand is very fine, silt is coarse, very light brown to very light brown-gray, very slightly calcareous; slightly less clayey below 30 ft, very light brown, much very coarse silt; slightly to moderately sandy below 34.8 ft, moderately calcareous, contains rare limy nodules.....	29.0	35.5
Silt, moderately clayey, moderately sandy, sand is mostly very fine, light brown, moderately to very calcareous, contains some white limy areas.....	35.5	35.7
Silt, slightly clayey, very sandy, sand is very fine with some fine, light brown, moderately calcareous; contains common limy indurated areas below 43 ft.....	35.7	45.3
Silt, moderately clayey, moderately sandy, sand is very fine with some fine, medium reddish brown, slightly calcareous, contains limy areas and rare limy nodules; moderately calcareous 50 to 52.4 ft; medium reddish to brownish yellow below 52.4 ft...	45.3	53.8
Silt, slightly clayey, very sandy, sand is very fine with some fine, medium brown to yellow-brown, slightly calcareous.....	53.8	57.0

Sand, slightly silty, sand is mostly very fine, light yellow-brown.....	57.0	60.0
Silt, slightly clayey, moderately sandy, sand is very fine, silt is very coarse, light yellow-brown, very slightly calcareous; medium yellow-brown below 63.8 ft.....	60.0	64.2
Silt, moderately clayey, moderately sandy, sand is very fine, silt is coarse, medium dark yellow-brown; in part slightly silty and very sandy below 65 ft, slightly calcareous, contains small limy areas; contains common limy areas and root holes below 67.5 ft.....	64.2	69.5
Tertiary System - Miocene Series - Ogallala Group:		
Siltstone, slightly to moderately sandy, sand is very fine to fine, very light brown to whitish gray, very calcareous, moderately well indurated, limy and siliceous cementation; mostly white 72.7 to 74.5 ft; some light brown-gray 74.5 to 75 ft; contains rare medium to coarse sand grains 75 to 75.7 ft; very light brown 75.6 to 76 ft.....	69.5	77.5
Siltstone, slightly clayey, moderately sandy, sand is mostly very fine, light reddish to yellow-brown, slightly calcareous, slightly indurated, contains scattered medium to coarse sand grains; moderate induration 79.7 to 80 ft, moderately calcareous; in part moderately clayey below 85 ft....	77.5	87.2
Sandstone, slightly clayey, sand is very fine to fine with some medium and scattered coarse to very coarse sand, light medium brown, contains some limy areas and a trace of calcite.....	87.2	90.0
Sandstone, slightly clayey, sand is mostly very fine to medium with much fine to medium sand, contains approximately 10 percent coarse sand and fine to medium gravel, yellow brown with some dark stain on gravel grains.....	90.0	95.0
Sand and gravel, fine sand to fine gravel, common dark stain, 25 percent fine gravel; contains some medium gravel 100 to 110 ft.....	95.0	113.2
Silt, moderately to very clayey, slightly sandy, sand is very fine to fine, light olive-gray.....	113.2	114.9
Sand, slightly clayey, very silty, sand is very fine to medium with a trace of coarse to very coarse...	114.9	126.5
Sand, very slightly clayey, moderately silty, sand is very fine to medium with a trace of coarse, light brown, very slightly calcareous; mottled olive-gray and reddish brown below 132.5 ft; sand is fine to coarse with a little very coarse sand below 135 ft.....	126.5	136.0

Sand and gravel, sand is fine to very coarse, gravel is fine to medium; contains silty lenses 150.5 to 151 ft and 154.5 to 155 ft; moderately silty below 155 ft.....	136.0	157.3
Sand and gravel, slightly silty, sand is fine to very coarse, gravel is fine to medium; moderately to very silty 160 to 170.2, contains rootlets; slightly calcareous 160 to 165 ft.....	157.3	170.2
Sand, slightly silty, sand is fine to very coarse; moderately silty below 174.5 ft.....	170.2	177.8
Sand, moderately to very silty, sand is fine to very coarse, moderately to very calcareous, slightly indurated, light brown; slightly clayey below 183 ft.....	177.8	189.5
Sand, very silty, sand is very fine to fine with some medium, light brown, slightly calcareous.....	189.5	194.5
Sandstone, slightly to moderately silty, sand is very fine to medium, light brown, slightly calcareous, contains rootlets; very calcareous below 200 ft; slightly clayey, indurated 202 to 202.6 ft....	194.5	202.6
Sandstone, moderately silty, sand is very fine to fine, light brown, moderately calcareous, contains hard limy areas; slightly silty below 205 ft, very calcareous; slightly calcareous below 210 ft.....	202.6	212.8
Silt, slightly clayey, sandy, sand is very fine to fine, light olive-gray, essentially noncalcareous.	212.8	216.0
Sand, slightly silty, sand is fine to coarse, much medium sand, light medium brown, slightly calcareous; sand is fine to very coarse below 219.7 ft, slightly to moderately calcareous, contains seed fragments.....	216.0	221.8
Sand, moderately silty, sand is fine to very coarse, reddish brown; slightly silty below 225 ft, slightly to moderately calcareous.....	221.8	230.0
Sandstone, sand is very fine to fine with some medium to coarse, moderately calcareous.....	230.0	235.4
Sand and gravel, sand is fine to very coarse, gravel is fine, much coarse sand to fine gravel; contains some limy areas and sandy silt below 258 ft.....	235.4	260.0
Silt, slightly clayey, sandy, sand is very fine to medium, reddish brown, slightly calcareous, in part indurated; very calcareous below 265.3 ft....	260.0	266.3
Sandstone, sand is fine to very coarse, reddish brown, slightly calcareous.....	266.3	271.5
Siltstone-sandstone, sand is very fine to medium, light brown, moderately calcareous; sand is mostly very fine to fine below 275.3 ft.....	271.5	277.4
Silt, slightly clayey, moderately to very sandy, sand is very fine to fine with a trace of medium, light brown to reddish brown, slightly calcareous; moderately calcareous 280 to 281.5 ft and 285 to 286.5 ft.....	277.4	290.0

Sand, slightly silty, sand is very fine to medium, reddish brown, contains rootlets.....	290.0	292.4
Sandstone, silty, sand is very fine to fine, reddish brown, slightly calcareous, contains rootlets; only slightly silty below 295.5 ft, sand is very fine to medium, very slightly calcareous.....	292.4	300.0
Sandstone, sand is very fine to medium, reddish brown, slightly calcareous, contains many rootlets, sand is very fine to coarse 305 to 310 ft; sand is mostly very fine to fine 313.8 to 315 ft, moderately calcareous.....	300.0	315.0
Sandstone, sand is fine to coarse, light brown, slightly calcareous; moderately calcareous 320 to 325 ft, contains rootlets.....	315.0	325.0
Sandstone, sand is very fine to coarse with a trace of very coarse sand and fine gravel, light brown, slightly calcareous, some siliceous cementation...	325.0	330.0
Sandstone, sand is very fine to very coarse, contains some fine gravel, light brown, slightly to in part moderately calcareous.....	330.0	340.0
Sandstone, very fine to very coarse, light brown, very calcareous 340 to 343.8 ft; slightly calcareous 343.8 to 345 ft.....	340.0	345.0
Sandstone, sand is very fine to coarse, light brown, very slightly calcareous.....	345.0	350.0
Sand, silty, sand is very fine to medium with some coarse sand and gravel, light brown, slightly calcareous; contains some slightly clayey to clayey silt interbeds.....	350.0	358.0
Sand, silty, sand is very fine to medium with a trace of coarse, yellow-brown, very slightly calcareous.....	358.0	360.0
Sand, silty, sand is very fine to medium with a trace of coarse to very coarse, light brown, moderately calcareous; sand is only slightly silty 365 to 370 ft, mostly very fine to medium sand....	360.0	380.0
Sandstone, sand is very fine to medium with a trace of coarse, light brown, contains rootlets; moderately calcareous 378.3 to 379 ft; contains some brown claystone interbeds below 380 ft, sandstone is slightly calcareous and sand is mostly very fine to fine.....	380.0	390.0
Sandstone, silty, sand is very fine to medium with a trace of coarse to very coarse, light brown, moderately calcareous.....	390.0	395.0
Silt, very sandy, sand is mostly very fine to coarse, light brown, slightly calcareous.....	395.0	403.7
Sandstone, sand is very fine to coarse, much fine sand, very pale brown, very calcareous; slightly less indurated below 406.3 ft.....	403.7	408.0

Sand, moderately silty, sand is very fine to medium, very pale brown and very pale yellow, moderately to very calcareous; slightly clayey 410.5 to 413.5 ft, very calcareous.....	408.0	413.5
Silt, very sandy, sand is very fine to very coarse with some fine gravel, olive, moderately calcareous.....	413.5	415.0
Sandstone, slightly silty, sand is very fine to fine, pale green, moderately to very calcareous; contains some interbedded fine to coarse sand below 421.8 ft, contains some seed fragments below 435 ft.....	415.0	440.0
Sandstone, slightly silty, sand is very fine to medium with some coarse to very coarse sand, light olive-gray, moderately calcareous; sand is mostly fine to coarse with some very coarse sand and a trace of fine gravel below 445 ft.....	440.0	451.8
Siltstone, slightly to moderately sandy, sand is mostly fine, pale olive, slightly calcareous; contains some ironstone fragments below 457.5 ft.....	451.8	459.0
Cretaceous System - Upper Cretaceous Series - Montana Group:		
Pierre Formation:		
Shale, clay, slightly silty, very pale olive and white, much yellow brown staining, noncalcareous; contains some light gray, maroon and brown-yellow 468 to 475 ft; mostly yellow-gray with some reddish brown 475 to 490 ft; mostly dark gray below 490 ft.....	459.0	500.0

**11-36-1aaaa
29-B-75
Perkins County**

Location: NE NE NE NE sec 1-11N-36W, 60 ft S and 8 ft W of NE cor sec
 Ground elevation: 3256 ft (t) Elsie NE 7.5 min. quadrangle
 Depth to water: 145 ft (9/3/75)
 Electric log to 438 ft

	<u>Depth, in feet</u>	
	From	To
Quaternary System, undifferentiated:		
Sand, slightly clayey, very silty, sand is very fine to fine with a trace of medium, very dark brown...	0.0	2.0
Sand, very silty, in part slightly clayey, sand is very fine to fine with much fine, medium brown-gray.....	2.0	5.0
Sand, slightly silty, very fine to fine with rare medium sand grains, light yellow-brown, contains rare shell fragments.....	5.0	21.0
Silt, slightly clayey, slightly sandy, sand is very fine, silt is fine to very coarse, light yellow-brown to light brown-gray, slightly calcareous; moderately clayey 24.2 to 25 ft, matrix noncalcareous, contains rare limy nodules.....	21.0	25.0
Silt, slightly clayey, moderately sandy, sand is very fine to fine with medium sand, light-yellow brown, contains a few limy nodules.....	25.0	26.8
Silt, moderately clayey, moderately sandy, sand is very fine to fine, very light brown-gray, slightly to in part moderately calcareous, contains a few limy nodules and slight yellow stain.....	26.8	30.8
Sand, very fine to fine with some medium, much fine and rare coarse sand; sand is very fine to medium with some coarse below 35 ft.....	30.8	38.5
Tertiary System - Miocene Series - Ogallala Group:		
Silt, moderately clayey, moderately sandy, sand is very fine to fine with some medium, light brownish gray, limy areas are common; very calcareous, slightly indurated below 40.3 ft, pale brown; moderately calcareous below 42.2 ft, light reddish brown.....	38.5	43.7
Silt, moderately clayey, slightly to in part very sandy, sand is mostly very fine, light brown, slightly calcareous, contains rare limy areas, slightly indurated.....	43.7	45.0
Siltstone, slightly to in part moderately sandy, sand is mostly very fine, light olive-gray to light brown-gray, contains rare limy areas.....	45.0	48.8

Sandstone, in part a sandy siltstone, sand is very fine to medium with rare coarse grains, light olive to light brown-gray, contains common limy areas.....	48.8	50.0
Sandstone, sand is very fine to fine with some medium, in part slightly clayey and silty, whitish gray to very pale brown, moderately calcareous....	50.0	55.0
Siltstone-sandstone, sand is very fine to fine, white to very light brownish-gray, moderately to very calcareous; sand is very fine to medium with rare coarse sand 56.5 to 60 ft; slightly to moderately calcareous below 60 ft, sand is mostly fine with rare medium to coarse sand.....	55.0	62.0
Sandstone, slightly clayey, slightly silty, sand is very fine to medium with a little coarse to very coarse sand, medium reddish brown.....	62.0	63.8
Silt, very sandy, sand is very fine to fine with some medium, light reddish brown.....	63.8	65.3
Sandstone, in part silty, sand is fine to medium with some coarse and a little very coarse sand and rare fine gravel, light reddish brown; contains much medium to coarse sand below 70 ft; contains some very coarse sand and fine gravel below 72.5 ft.....	65.3	75.0
Sandstone, sand is very fine to very coarse with a trace of fine gravel, much medium sand, light reddish brown, only slightly indurated; contains slightly more coarse sand to fine gravel below 77 ft; slightly silty below 79.6 ft; slightly clayey below 80 ft.....	75.0	81.0
Sand and gravel, fine to very coarse sand, gravel is fine with some medium, much fine gravel, interbedded with some sandstone; slightly silty 85 to 90 ft, very calcareous.....	81.0	90.0
Sand, fine to very coarse with a trace of fine gravel.....	90.0	94.3
Sand, slightly clayey, moderately silty, sand is mostly fine to medium, reddish brown.....	94.3	95.0
Silt, slightly clayey, very sandy, sand is fine to coarse, much medium sand and rare very coarse sand and gravel, reddish brown; brown 96 to 100 ft; contains rare rootlets and limy areas below 100 ft.....	95.0	103.8
Sand and gravel, sand is fine to very coarse, gravel is fine, some dark stain; slightly more fine gravel 105 to 115 ft; contains bone fragments and much dark stain below 110 ft.....	103.8	115.0
Sand, fine to very coarse with some fine to medium gravel, much coarse to very coarse sand, slight dark stain.....	115.0	122.5
Silt, slightly clayey, very sandy, sand is fine to very coarse, reddish brown.....	122.5	123.0

Sand, fine to very coarse with a little fine to medium gravel, reddish brown, slight dark stain...	123.0	130.8
Silt, moderately clayey, in part sandy, pale reddish brown, contains limy areas and nodules; very sandy below 135 ft, very slightly calcareous.....	130.8	137.3
Sand, very silty with some sandy to clayey silt, sand is fine to very coarse, contains a trace of fine gravel, very pale reddish brown, moderately calcareous.....	137.3	138.0
Silt, slightly clayey, light olive-gray, contains a trace of limy nodules.....	138.0	139.5
Silt, slightly clayey, very sandy, sand is very fine to very coarse, reddish brown, contains some interbedded sand.....	139.5	144.4
Sand, fine to very coarse with a trace of fine gravel, much coarse to very coarse sand; slight dark stain below 150 ft.....	144.4	156.0
Silt, slightly clayey, slightly sandy, sand is very fine to medium, reddish brown; contains limy areas, very calcareous 157.3 to 158 ft.....	156.0	158.0
Silt, slightly clayey, moderately sandy, sand is mostly very fine to fine, light reddish brown; contains some limy areas 159.4 to 160.7 ft; some induration below 163.2 ft as calcareous sandstone; contains a trace of medium to coarse sand below 170 ft; slightly calcareous and indurated below 173.5 ft.....	158.0	176.0
Sandstone, silty, sand is very fine to medium, light reddish brown, moderately calcareous; very calcareous below 177.7 ft.....	176.0	178.3
Sand, silty, sand is very fine to coarse, light reddish brown, essentially noncalcareous.....	178.3	182.5
Sand, very fine to medium with a little coarse; slightly more coarse sand below 185 ft; slightly indurated and calcareous below 186.3 ft.....	182.5	189.0
Silt, slightly clayey, very sandy, sand is mostly fine, light brown; contains some interbedded sandy silt below 195 ft, reddish brown, slightly calcareous.....	189.0	201.7
Sandstone, sand is very fine to fine, moderately to very calcareous.....	201.7	202.4
Silt, moderately sandy, sand is very fine to fine, reddish brown, very slightly calcareous.....	202.4	205.9
Silt, slightly clayey, reddish brown; indurated and sandy below 207.8 ft, very calcareous.....	205.9	208.5
Silt, very sandy, sand is very fine to fine with a trace of medium to coarse, light reddish brown, slightly calcareous; very calcareous below 211 ft.	208.5	211.5
Silt, clayey, brown, contains some calcareous siltstone.....	211.5	215.0

Sandstone, sandy, sand is mostly very fine, light reddish brown, slightly calcareous, contains rootlets.....	215.0	219.0
Silt, very sandy, sand is very fine to fine with a trace of medium to coarse sand, light reddish brown, slightly calcareous; contains thin limy indurated layer 221.8 to 222.6 ft; less silty, noncalcareous below 225 ft.....	219.0	228.3
Sand, fine to very coarse, contains a little fine gravel; contains much medium to coarse sand 235 to 240 ft.....	228.3	244.0
Sand, slightly clayey, very silty, sand is mostly fine, light pinkish brown; contains a few rootlets to 246.5 ft; slightly calcareous 246.5 to 249 ft and 255 to 265 ft, some induration; slightly less silty below 255 ft.....	244.0	265.0
Sandstone, moderately silty, sand is very fine to medium with a trace of coarse sand to fine gravel, light reddish brown, contains siliceous rootlets; slightly to moderately calcareous below 275 ft, light gray-brown; contains a slightly clayey and silty sandstone layer 275 to 276 ft; contains some rootlets and seed fragments below 276 ft; less induration below 278.4 ft; slightly clayey 278.4 to 280 ft.....	265.0	280.0
Sandstone, slightly silty, sand is very fine to medium, light gray-brown, slightly calcareous; light reddish brown, noncalcareous below 285 ft...	280.0	290.0
Sandstone, slightly silty, sand is very fine to medium, light brown to light grayish brown, slightly to moderately calcareous; very calcareous 294.2 to 295.2 ft; contains rootlets below 295.2 ft; moderately to very calcareous 300 to 305 ft; poorly indurated below 305 ft, contains some coarse sand; sand is fine to coarse below 310 ft; moderately calcareous with limy nodular areas and seed fragments below 316 ft.....	290.0	318.0
Sand, slightly to moderately clayey, very silty, very calcareous, light grayish brown and light olive-gray.....	318.0	320.5
Sandstone, sand is very fine to very coarse with much medium to coarse sand, slightly to moderately calcareous, light grayish brown; sand is slightly coarser below 327.5 ft, contains rare fine gravel, contains a thin olive silt layer.....	320.5	330.0
Sand, some gravel, sand is fine to very coarse, gravel is fine; contains a trace of medium gravel below 335 ft.....	330.0	344.3
Silt, slightly to moderately clayey, very sandy, sand is fine to very coarse, reddish brown, very slightly calcareous; light greenish gray below 349 ft, noncalcareous.....	344.3	350.0

Sandstone, sand is very fine to very coarse, much fine to medium sand, olive-gray.....	350.0	355.5
Sandstone, sand is very fine to medium with a trace of coarse, much fine sand, light brown; slightly silty below 360 ft, contains some clayey silt, very pale olive.....	355.5	365.0
Sandstone, slightly to moderately silty, sand is very fine to medium, very pale yellow, slightly to moderately calcareous; contains some reddish brown siltstone below 375 ft; contains a moderately clayey marly layer 379 to 379.3 ft.....	365.0	380.0
Sandstone, very silty, marly, sand is mostly fine, very pale yellow.....	380.0	382.5
Silt, slightly clayey, slightly sandy, very pale yellow, very calcareous; very sandy below 385 ft, sand is very fine to medium.....	382.5	386.0
Sandstone, sand is very fine to medium with a trace of coarse, gray-brown, contains a few limy areas; contains much reddish brown siltstone 390 to 391.5 ft, may be lithic gains.....	386.0	391.5
Sand, fine to coarse, much medium.....	391.5	395.0
Sand, fine to very coarse, contains some fine gravel, common reddish brown siltstone grains; slightly coarser grained below 400 ft, olive-brown; slightly silty below 405 ft, contains some pale olive silt.....	395.0	408.5
Sandstone, slightly silty, sand is very fine to medium, pale olive to pale yellow, moderately calcareous, contains rootlets and limy silt and siltstone grains.....	408.5	414.0
Tertiary System - Oligocene Series - White River Group:		
Silt, clayey, light gray and light greenish gray, very slightly calcareous; noncalcareous below 420 ft; some dark staining 429 to 430 ft; some pink clayey silt below 430 ft; some light yellow-green clayey silt 437.5 to 440 ft.....	414.0	449.0
Silt, clayey, very light olive-gray with some maroon and red and a trace of brown-yellow, contains a trace of claystone, brittle.....	449.0	460.0
Cretaceous System - Upper Cretaceous Series - Montana Group:		
Pierre Formation:		
Shale, clayey to silty, slightly micaceous, very light gray, yellow-gray and yellow-brown; some dark gray below 480 ft, noncalcareous.....	460.0	490.0

**11-37-1aaab
30-B-75
Perkins County**

Location: NW NE NE NE sec 1-11N-37W, 10 ft N and 331 ft W of NE cor
sec

Ground elevation: 3430 ft (t) Elsie NW 7.5 min. quadrangle

Depth to water: Dry to 253 ft, caved (9/15/75)

Electric log

Depth, in feet
From To

Quaternary System, undifferentiated:

Sand, slightly clayey, very silty, sand is very fine to fine with some medium to coarse grains, medium dark brown-gray; contains a few limy grains; very light yellow-brown below 0.8 ft; slightly clayey 3 to 4 ft, contains a few large limy concretions, probably lithic grains.....	0.0	4.0
Silt, moderately clayey, moderately sandy, sand is very fine to fine, very pale brown to very pale brown-gray, moderately calcareous; sand is mostly very fine below 5 ft, moderately to very calcareous.....	4.0	8.5
Silt, very slightly clayey, moderately sandy, sand is very fine, silt is coarse, light brown, slightly calcareous, contains a trace of limy nodules; contains large limy concretions 11.5 to 11.8 ft and 25 to 25.3 ft; slightly more sand 27.6 to 30.5 ft.....	8.5	30.5
Sand, slightly to moderately silty, sand is very fine to fine, yellow-brown; contains a trace of medium sand 35 to 40 ft; very slightly silty 40 to 45 ft and 50 to 51 ft; slightly clayey 51 to 54.4 ft, slightly calcareous; contains limy concretion 54.4 to 54.6 ft; moderately sandy 56.5 to 59.5 ft, contains rare medium to coarse sand, very slightly calcareous.....	30.5	59.5
Silt, slightly clayey, slightly to moderately sandy, sand is mostly very fine, silt is coarse, light yellow-brown, in part slightly calcareous; contains a few limy nodules below 74.3 ft; moderately sandy 75 to 90 ft.....	59.5	90.0
Silt, moderately clayey, slightly sandy, sand is mostly very fine, silt is coarse, pale yellow-brown, in part slightly calcareous; slightly less clayey 100 to 110 ft, contains slightly more sand; light reddish brown below 105 ft; slightly more clayey 110 to 112.5 ft, contains a trace of limy nodules.....	90.0	112.5

Silt, interbedded, slightly and moderately clayey, moderately sandy, sand is mostly very fine, silt is coarse, pale yellow-brown with a reddish tint to 117.5 ft, slightly calcareous; contains a few limy nodules below 117.5 ft; mostly slightly clayey below 140.3 ft, slightly sandy, sand is very fine; moderately calcareous 149.8 to 150.5 ft.....	112.5	158.5
?Tertiary System - Miocene Series - Ogallala Group:?		
Silt, very slightly clayey, moderately sandy, sand is mostly very fine, medium reddish brown, slightly calcareous; noncalcareous below 160 ft; contains limy indurated areas.....	158.5	165.0
Sand, slightly to moderately clayey, silty, sand is very fine to fine, medium reddish brown, contains limy areas; contains a little medium sand below 167.5 ft.....	165.0	170.0
Tertiary System - Miocene Series - Ogallala Group:		
Silt, moderately clayey, very sandy, sand is mostly very fine, very pale brown and white, mostly very calcareous, contains slightly siliceous areas,....	170.0	170.7
Siltstone, sandy, sand is mostly very fine, very pale brown and white, very calcareous, slightly siliceous, well indurated.....	170.7	171.5
Siltstone-sandstone, sand is very fine to fine with rare medium sand.....	171.5	173.0
Sandstone, clayey, sand is very fine to fine, medium reddish brown, contains limy indurated areas.....	173.0	175.0
Siltstone, sandy, sand is very fine to fine with rare medium grains, very pale brown, very calcareous; siliceous; contains small noncalcareous areas 179 to 181 ft.....	175.0	181.0
Sandstone-siltstone, moderately clayey, sand is very fine to fine with rare coarser grains, very pale brown, moderately calcareous; very calcareous 183.1 to 185 ft, slightly calcareous; moderately calcareous below 185 ft, contains a trace of medium to coarse sand.....	181.0	189.0
Silt, slightly clayey, very sandy, sand is very fine to fine with rare medium to coarse grains, light yellow-brown, very slightly to in part moderately calcareous.....	189.0	194.0
Sand, silty, sand is very fine to fine with 10 percent medium to coarse sand, light medium yellow-brown, some lime cementation.....	194.0	196.5
Sandstone, slightly clayey, very silty, sand is fine to very coarse with a trace of fine gravel, light yellow-brown, slightly to in part moderately calcareous.....	196.5	200.0

Sand and gravel, gravel is fine with a trace of medium, granitic, some dark mineral stain; contains some medium gravel below 225 ft.....	200.0	237.8
Silt, slightly to moderately clayey, slightly to moderately sandy, sand is very fine to medium, reddish brown, slightly calcareous; contains some coarse sand to 243 ft and below 247 ft; pale brown to yellow-brown 247 to 253 ft; contains some interbedded sand and gravel 253 to 255 ft; very sandy below 255 ft, sand is fine to very coarse, reddish brown.....	237.8	260.0
Sand, very silty, sand is very fine to medium, reddish brown, some limy cementation; contains indurated limy areas 264.1 to 265.4 ft.....	260.0	265.4
Silt, moderately to in part very clayey, slightly sandy, sand is mostly very fine to medium, slightly calcareous, reddish brown; very calcareous 268.9 to 270 ft; slightly to moderately clayey below 272 ft; contains hard limy area 272 to 273.8 ft; moderately to very sandy below 280 ft, sand is fine to very coarse.....	265.4	286.0
Sand and gravel, sand is fine to very coarse, gravel is fine to medium, much very coarse sand.....	286.0	300.0
Sand, fine to very coarse, contains a trace of fine gravel, much dark mineral stain; contains some fine to rare medium gravel below 305 ft.....	300.0	322.0
Silt, slightly to moderately clayey, moderately sandy, sand is very fine to medium, reddish brown; very sandy 325 to 325.7 ft, moderately calcareous; limy cemented 327.5 to 332 ft; very sandy, very calcareous 330 to 332 ft, sand is fine to very coarse, pale brown.....	322.0	332.0
Silt, slightly to moderately clayey, slightly sandy, sand is very fine to medium with some coarse, very slightly calcareous, reddish brown; moderately sandy 325 to 338.8 ft, contains some limy areas; moderately calcareous 340 to 342.5 ft; noncalcareous below 342.5 ft; sand is fine to very coarse 345 to 355 ft.....	332.0	355.0
Sand, sand is very fine to very coarse with a trace of fine gravel, reddish brown, limy cemented.....	355.0	357.8
Sand, some gravel, sand is fine to very coarse, gravel is fine, much coarse to very coarse sand...	357.8	362.4

Silt, moderately clayey, slightly to moderately sandy, sand is mostly fine, brown and reddish brown, in part slightly calcareous; slightly more clayey below 365 ft, contains some reddish brown very clayey silt; contains some limy areas below 366.5 ft; may contain some volcanic ash 370 to 380 ft, contains some limy indurated zones; gray-brown 375 to 380 ft; contains some interbedded reddish to pink clayey silt 380 to 384 ft, noncalcareous; contains limy cemented layers 384 to 385 ft.....	362.4	385.0
Silt, slightly clayey, very sandy, sand is very fine to very coarse, much medium sand, slightly calcareous, medium reddish brown, slightly indurated, contains some rootlets; grayish brown below 395 ft; contains some reddish brown to pink siltstone below 400 ft.....	385.0	403.8
Sandstone, slightly clayey, silty, sand is mostly very fine to fine with a trace of medium to coarse, grayish brown and reddish brown, very calcareous.....	403.8	406.8
Sand, some gravel, sand is fine to very coarse with some fine gravel, much very coarse sand, dark mineral stains; contains thin brown clayey silt 413 to 413.5 ft; some clayey silt interbeds 417 to 418 ft; contains some very light olive clayey silt below 425 ft.....	406.8	430.0
Silt, slightly clayey, slightly sandy, pale olive-gray, slightly calcareous, may contains volcanic ash; very sandy below 434.5 ft, sand is fine to very coarse.....	430.0	435.0
Sand and gravel, sand is fine to very coarse, gravel is fine, much coarse to very coarse sand, in part silty or with some silty layers; moderately to very calcareous, well indurated 400 to 450 ft; slightly calcareous 450 to 459 ft.....	435.0	459.0
Silt, clayey and sandy, sand is very fine to very coarse, pale brown, moderately calcareous; contains much volcanic ash 465 to 470 ft, slightly calcareous.....	459.0	470.0
Sand, slightly clayey, very silty, sand is very fine to coarse, pale brown, slightly calcareous; in part pale yellow-brown.....	470.0	479.7
Silt, slightly clayey, very sandy, sand is very fine to medium with a trace of coarse to very coarse sand, much fine to medium, pale olive-gray, very calcareous; noncalcareous 488 to 490 ft; well indurated and very calcareous 490 to 491.5 ft.....	479.7	491.5
Sand, moderately silty, sand is very fine to coarse, much medium sand, pale brown, moderately to very calcareous; slightly silty 495 to 498.5 ft; very silty 498.5 to 499.2 ft, indurated; only slightly calcareous below 499.2 ft, brown.....	491.5	500.0

Sand, moderately silty, sand is fine to very coarse with some fine gravel, moderately calcareous to 505 ft, common red feldspar; contains some limy cementation 514 to 515 ft.....	500.0	515.0
Silt, slightly clayey, very sandy, sand is very fine to medium, grayish brown, moderately calcareous; contains some coarse to very coarse sand 525 to 528 ft.....	515.0	528.0
Sand and gravel, moderately silty, gravel is fine, pale grayish brown, slight limy cementation.....	528.0	535.0
Sandstone, silty, and silt, probably interbedded, in part limy cemented.....	535.0	540.0
Tertiary System - Oligocene Series - White River Group:		
Silt, moderately clayey, light brown, in part slightly indurated.....	540.0	545.0
Clay, silty, pale olive.....	545.0	550.8
Volcanic ash, gray.....	550.8	551.4
Silt, very clayey, pale yellow, very slightly calcareous; contains a trace of white limy areas 555 to 556.5 ft.....	551.4	556.5
Silt, moderately clayey, olive, in part indurated, contains some very fine to fine sandstone; interbedded with some claystone below 560 ft; contains a few lithic shale grains below 562 ft.....	556.5	568.0
Sand, fine to very coarse, some gravel, white, quartz.....	568.0	569.0
Cretaceous System - Upper Cretaceous Series - Montana Group:		
Pierre Formation:		
Shale, clay, yellow, some dark gray; mostly dark gray below 580 ft; contains some ironstone fragments 581.5 to 581.9 ft.....	569.0	590.0

**11-37-36dddd
25-B-75
Perkins County**

Location: SE SE SE SE sec 36-11N-37W, 50 ft N and 10 ft W of SE cor
sec
Ground elevation: 3344 ft (t) Elsie 7.5 min. quadrangle
Depth to water: Dry to 82.8 ft, caved (8/12/75)
Electric log

	<u>Depth, in feet</u>	
	From	To
Quaternary System, undifferentiated:		
Silt, very sandy, sand is very fine to fine with a trace of medium, dark brown; slightly clayey 1.5 to 2 ft, medium dark brown-gray, contains rare coarse sand.....	0.0	2.0
Sand, very fine to medium, light brown; contains some interbedded sandy silt 7 to 8.7 ft.....	2.0	8.7
Silt, moderately clayey, slightly sandy, sand is very fine with some fine and a trace of medium sand, medium brown-gray; medium dark brown-gray 9.3 to 10 ft; light brown-gray and light yellow-gray 10 to 11.3 ft; light yellow-brown 11.3 to 12.5 ft, contains slightly more very fine to fine sand.....	8.7	12.5
Silt, moderately clayey, slightly sandy, sand is mostly very fine to fine, light medium brown, moderately to very calcareous, contains limy areas 13.5 to 14 ft; moderately sandy 14 to 16 ft, very pale brown; contains limy nodules below 14.9 ft; contains much very coarse silt and very fine sand 14.9 to 16 ft.....	12.5	16.5
Silt, slightly clayey, very sandy, sand is very fine to fine with a trace of medium, very pale brown, slightly calcareous, contains limy areas, indurated.....	16.5	20.0
Silt, very slightly clayey, moderately sandy, sand is very fine, pale brown.....	20.0	24.5
Sand, slightly to moderately silty, sand is very fine to fine with a trace of medium, much fine sand, light brown; very silty 25 to 26.5 ft, much very fine sand.....	24.5	26.5
Silt, very slightly clayey, very sandy, sand is very fine, brown, much very coarse silt.....	26.5	30.0
Sand, very silty, sand is very fine to fine, yellow-brown, essentially noncalcareous; very slightly calcareous below 30 ft; much very fine sand 33 to 35 ft.....	30.0	35.0

Sand, moderately silty, sand is very fine to fine with some medium, light brown; mostly slightly silty 40 to 50 ft; very slightly silty, sand is very fine to medium below 50 ft, contains a thin limy layer 53.8 to 53.9 ft.....	35.0	55.0
Sand, slightly silty, sand is very fine to medium...	55.0	57.0
Silt, very slightly clayey, slightly sandy, sand is very fine to fine with a trace of medium, light yellow brown, very slightly calcareous; very slightly clayey 58.7 to 60 ft.....	57.0	60.0
Silt, moderately clayey, contains a few fine to medium sand grains, medium reddish brown, contains a few limy areas; moderately to very clayey 60.6 to 62.7 ft, very light yellow-brown to brownish gray, slightly calcareous.....	60.0	62.7
Silt, slightly clayey, slightly sandy, sand is mostly very fine, silt is very coarse, pale brown; appears to be interbedded fine and coarse grained; contains limy nodules below 67.8 ft; pale brown to light reddish brown 70 to 73.6 ft.....	62.7	73.6
Silt, moderately clayey, slightly sandy, sand is very fine, silt is coarse, light reddish brown, very slightly calcareous; medium brown 75 to 77.2 ft, contains limy areas, very sandy 77.2 to 77.3 ft, sand is very fine with some fine, medium reddish brown; slightly more clayey 77.3 to 80 ft, contains limy areas, light reddish brown; light yellow-brown 80 to 82.8 ft, moderately calcareous; very sandy 82.8 to 84.3 ft, sand is mostly very fine to fine, slightly calcareous.....	73.6	84.3
Silt, slightly clayey, moderately sandy, sand is mostly very fine, light yellow-brown, slightly calcareous; much coarse silt below 85.5 ft; pale brown 90 to 95 ft; light reddish brown 95 to 95.9 ft, contains some fine sand.....	84.3	95.9
Tertiary System - Miocene Series - Ogallala Group:		
Silt, moderately clayey, moderately sandy, sand is very fine to fine, medium reddish brown, contains limy indurated areas, moderately calcareous; moderately to very clayey, very sandy 96.3 to 97.8 ft; slightly sandy, much very fine sand, limy areas are slightly siliceous; contains rare limy areas 98.5 to 100.4 ft.....	95.9	100.4
Siltstone-claystone, slightly sandy, sand is very fine, white to very light brown, very calcareous, slightly siliceous; contains a sandstone layer 101.7 to 102 ft, sand is very fine to fine.....	100.4	102.3

Sandstone, moderately clayey, sand is mostly very fine to fine with rare medium to coarse sand, whitish brown and reddish brown, moderately calcareous, contains some limy areas; contains a very clayey to sandy silt layer, pale yellow-brown 105 to 105.5 ft.....	102.3	105.5
Sand, moderately clayey, sand is very fine to fine with a little medium sand, bright reddish to yellowish brown, contains a few limy areas.....	105.5	107.3
Silt, moderately clayey, moderately to very sandy, sand is very fine to fine with rare medium sand grains, medium brown, moderately calcareous, contains limy areas.....	107.3	109.0
Siltstone-sandstone, clayey, sand is mostly very fine to fine, very light brown, moderately calcareous, contains rare medium sand and gravel grains; light yellow brown below 112.5 ft; contains slightly more medium sand and rare coarse sand and gravel below 116.2 ft, contains limy areas and calcareous siltstone layers.....	109.0	118.6
Sand and gravel, silty, slightly clayey, contains much very fine and fine sand and common indurated limy areas.....	118.6	125.0
Sand and gravel, sand is fine to very coarse, gravel is fine to medium, much dark stain on gravel grains.....	125.0	135.0
Sand, slightly clayey, very silty, sand is mostly very fine to fine, very light olive-brown, contains scattered coarse sand and gravel grains below 140 ft; very light brown 143 to 145 ft, contains rare coarse grains, slightly calcareous.....	135.0	145.0
Silt, slightly to moderately clayey, moderately sandy, sand is mostly very fine to fine, pale brown, slightly calcareous; contains a few rootlets; moderately to very sandy below 147.5 ft, sand is very fine to medium, medium brown.....	145.0	150.0
Silt, moderately clayey, moderately sandy, sand is mostly very fine with some medium, pale brown, micaceous, contains dense limy cemented areas; very sandy below 155 ft, sand is very fine to medium with some coarse to very coarse.....	150.0	157.0
Clay, silty, light greenish gray, contains some embedded sand.....	157.0	159.0
Sand, very silty, sand is fine to very coarse with rare gravel, brown.....	159.0	160.0
Sand and gravel, sand is fine to very coarse, gravel is fine with some medium; some dark stain 170 to 175 ft; much coarse sand and fine gravel below 175 ft; silty below 188.5 ft; reddish brown below 190 ft.....	160.0	192.0

Silt, very sandy, sand is very fine to medium with a trace of coarse sand, reddish brown; contains some silty sand 195 to 200 ft, sand is fine to very coarse with some fine gravel.....	192.0	200.0
Silt, moderately to very sandy, sand is very fine to fine with a little medium, reddish brown, very slightly calcareous; very sandy 205 to 209 ft; contains some siliceous cementation below 209 ft; slightly calcareous below 210 ft.....	200.0	213.0
Silt, slightly clayey, moderately sandy, sand is mostly very fine to fine, light reddish brown, very slightly calcareous; very slightly sandy, moderately clayey 220 to 222.7 ft, noncalcareous; contains a trace of medium to coarse sand below 222.7 ft, limy cemented.....	213.0	222.9
Sand, moderately to very silty, sand is very fine to medium with a trace of coarse, light brown; contains some coarse to very coarse sand below 224 ft; slightly calcareous with limy areas below 225 ft.....	222.9	230.0
Sand, moderately silty, sand is fine to very coarse, slightly calcareous, light brown; slightly silty below 233 ft.....	230.0	236.1
Sand, very slightly silty, sand is medium to very coarse, contains some fine gravel; contains slightly more fine gravel below 240 ft.....	236.1	256.1
Sand, moderately to very silty, sand is fine to very coarse, light brown.....	256.1	259.5
Silt, moderately clayey, moderately to very sandy, sand is mostly very fine to medium, light brown; contains limy areas 260 to 261 ft.....	259.5	261.8
Sandstone, sand is very fine to medium with a trace of coarse, very light brown, very calcareous.....	261.8	264.4
Silt, very sandy, sand is very fine to medium, very light brown, moderately calcareous.....	264.4	265.0
Sand, moderately clayey, silty, sand is very fine to very coarse, contains some interbedded sand.....	265.0	272.0
Sand and gravel, sand is fine to very coarse, gravel is fine, reddish, granitic.....	272.0	283.3
Clay, marly, pale olive-gray, very calcareous.....	283.3	285.0
Silt, slightly clayey, moderately sandy, sand is fine to coarse, pale olive.....	285.0	286.5
Sandy silt and silty sand interbedded, sand is very fine to very coarse, light reddish brown, moderately calcareous.....	286.5	290.0
Silt, moderately sandy, sand is very fine to medium, gray-brown and white, slightly calcareous, may contain some volcanic ash; limy cemented 292 to 293.5 ft.....	290.0	293.5
Sand, silty, fine to very coarse, contains a trace of fine gravel.....	293.5	295.0

Silt, slightly to moderately clayey, pale olive, contains limy areas, may contain volcanic ash; noncalcareous 297 to 300 ft; contains some very fine to medium sand 301 to 302 ft, very pale brown, very calcareous.....	295.0	302.0
Silt, slightly clayey, slightly sandy, sand is very fine, reddish brown, may contain volcanic ash; slightly more clayey 305 to 306.5 ft; moderately sandy 306 to 310 ft, sand is very fine to fine....	302.0	310.0
Silt, slightly clayey, slightly sandy, sand is mostly very fine to fine, contains some coarse sand grains, reddish brown, very slightly calcareous; mostly very fine to fine sand below 312.4 ft, contains limy areas; contains some siltstone-claystone beds below 315 ft, slight dark stain; very calcareous 316.7 to 317.3 ft, very light pinkish brown.....	310.0	317.3
Siltstone, slightly sandy, sand is very fine, olive-brown, slightly calcareous, some dark dendritic stain; contains a calcareous cemented volcanic ash 322.4 to 325.5 ft; contains some siltstone-sandstone layers 325.5 to 327 ft, sand is very fine, pale brown-gray, moderately calcareous.....	317.3	327.0
Silt, moderately clayey, pale olive, moderately to very calcareous, contains limy areas.....	327.0	329.2
Silt, slightly clayey, slightly sandy, sand is mostly very fine, brown, contains slightly more sand below 330 ft, slightly calcareous; very sandy 331.5 to 333 ft, sand is very fine to coarse, pinkish gray.....	329.2	333.0
Sand, moderately silty, sand is very fine to very coarse with rare fine gravel; very slightly silty below 335 ft.....	333.0	336.8
Silt, moderately clayey, very slightly sandy, pale reddish brown; moderately sandy below 339.5 ft, sand is very fine to very coarse, in part indurated, reddish brown, slightly calcareous; moderately calcareous below 342 ft; contains siliceous rootlets 345 to 347 ft.....	336.8	347.0
Siltstone, olive and reddish brown, very calcareous, contains some dark stain.....	347.0	348.0
Sand, moderately to very silty, sand is fine to coarse with much medium to coarse sand, reddish brown; slightly clayey, very silty, moderately calcareous 351.4 to 352.8 ft.....	348.0	352.8
Silt, slightly clayey, very sandy, sand is fine to coarse, reddish brown, slightly calcareous; moderately to very calcareous 357 to 358 ft.....	352.8	360.0
Sand, very silty, sand is very fine to very coarse, much coarse to very coarse sand, reddish brown; very calcareous 364.4 to 365.7 ft; very clayey 365 to 365.7 ft.....	360.0	365.7

Sand, some gravel, sand is fine to very coarse, gravel is fine, much coarse sand.....	365.7	375.3
Silt, very sandy, sand is very fine to medium, pale brown, moderately to very calcareous.....	375.3	380.0
Sand, some gravel, silty, fine sand to fine gravel, much coarse sand, very calcareous.....	380.0	383.2
Silt, very sandy, sand is fine to very coarse, much medium sand, light brown, moderately calcareous; contains some rootlets below 385 ft.....	383.2	387.8
Silt to siltstone, slightly clayey, pale olive and pale yellow, moderately calcareous, contains abundant limy nodules; slightly sandy below 395 ft, very calcareous.....	387.8	398.7
Silt, slightly clayey, moderately sandy, sand is very fine to medium, pale olive, moderately calcareous; very slightly clayey 400 to 401.2 ft, sand is very fine to coarse, slightly calcareous..	398.7	405.0
Silt, slightly clayey, very slightly sandy, pale yellow, very calcareous.....	405.0	407.0
Silt and siltstone, interbedded, moderately clayey, pale olive and light brown, slightly calcareous...	407.0	411.0
Silt, slightly clayey, slightly sandy, sand is very fine to coarse, pale olive, moderately calcareous; moderately sandy 416 to 418 ft.....	411.0	418.0
Silt, slightly clayey, moderately sandy, sand is very fine to fine, pale olive, moderately calcareous; olive-gray below 420 ft; contains some olive claystone, slightly calcareous 425 to 430 ft.....	418.0	430.0
Silt, moderately to very sandy, sand is very fine to medium; contains some interbedded sand, fine to very coarse; slightly clayey 437.5 to 440.8 ft....	430.0	440.8
Sand, fine to very coarse with a trace of fine gravel, much quartz; silty below 445 ft.....	440.8	446.9
Silt, very clayey, light olive-green, interval contains an interbedded sand, fine to very coarse....	446.9	451.5
Sand, very slightly silty, sand is fine to very coarse with a trace of fine gravel, much quartz; silty 461 to 463 ft; contains some fine to medium gravel below 465 ft, contains considerable siltstone below 470 ft (possibly lithic gravel), siltstone is light green with some red.....	451.5	486.5
Silt, clayey, slightly sandy, sand is mostly fine, red with some green and white, noncalcareous, contains some brown to yellow lithic grains; moderately to very sandy, very calcareous 491 to 493 ft; contains some loose sand 493 to 495 ft, sand is very fine to medium.....	486.5	495.0

Sand, moderately silty, very fine to very coarse,
 light brown and light olive, contains limy areas
 500 to 505 ft; silty or clayey 513.9 to 514.5 ft;
 contains a trace of fine gravel 515 to 520 ft;
 moderately silty with some shale grains below 520
 ft.....

495.0 524.7

Cretaceous System - Upper Cretaceous Series - Montana Group:

Pierre Formation:

Shale, clay, silty, yellow brown and very light
 gray, noncalcareous; some dark gray below 530 ft..

524.7 540.0

**11-38-31dddd
24-B-75
Perkins County**

Location: SE SE SE SE sec 31-11N-38W, 46 ft N and 10.5 ft W of SE
 cor sec
 Ground elevation: 3378 ft (t) Grant 7.5 min. quadrangle
 Depth to water: Dry to 36.4 ft, caved (8/12/75)
 Electric log to 468 ft

	<u>Depth, in feet</u>	
	From	To
Quaternary System, undifferentiated:		
Road fill.....	0.0	0.5
Sand, slightly clayey, moderately silty, sand is mostly very fine to medium, dark brown-gray.....	0.5	1.2
Silt, moderately clayey, moderately sandy, mostly very fine sand, dark brown-gray; very clayey 2 to 3.6 ft, medium dark brown-gray.....	1.2	3.6
Silt, moderately clayey, slightly sandy, sand is mostly very fine, light brown-gray, contains scattered gravel grains.....	3.6	4.4
Tertiary System - Miocene Series - Ogallala Group:		
Siltstone-sandstone, slightly clayey, sand is mostly very fine to fine with rare coarse grains, light brown and brown-gay, moderately calcareous, slightly siliceous, dark organic or mineral stain.	4.4	5.0
Sandstone, moderately to very clayey, sand is mostly very fine to fine with some medium and rare coarse sand and gravel grains, light reddish brown, contains a few white limy areas.....	5.0	6.5
Siltstone, moderately clayey, in part sandy, sand is very fine, very pale brown to pink, very calcareous, slightly siliceous; contains a little fine-grained sandstone 7.8 to 10 ft.....	6.5	10.0
Silt, slightly to in part very clayey, very sandy, sand is mostly very fine to fine, light reddish brown, in part indurated, calcareous.....	10.0	11.8
Siltstone-claystone, slightly sandy, sand is mostly very fine to fine with a trace of coarse grains, white, very calcareous, siliceous.....	11.8	15.8
Sandstone, slightly to moderately clayey, sand is very fine to fine with a trace of medium sand and rare gravel grains, bright yellow-brown, contains limy areas 15.8 to 19.5 ft.....	15.8	21.8
Sand, slightly clayey, silty, sand is very fine to medium with a trace of coarse to very coarse, light brown, some limy cementation 23 to 27.5 ft; moderately to very calcareous 27.5 to 28 ft.....	21.8	28.0

Sandstone, sand is very fine to coarse, light brown, moderately calcareous; sand is mostly very fine to medium 30 to 32 ft; very calcareous 33.5 to 36 ft.	28.0	36.0
Sand, moderately silty, sand is fine to very coarse with a little fine gravel, light brown, slightly calcareous, contains siliceous rootlets.....	36.0	40.0
Sand and gravel, slightly silty, sand is fine to very coarse, gravel is fine to medium, slightly calcareous; contains a few rootlets.....	40.0	63.4
Silt, slightly clayey, slightly sandy, sand is very fine to fine, light brown and olive-brown; moderately clayey 65 to 68.8 ft, light brown 65 to 65.7 ft; light reddish brown below 65.7 ft; moderately to very sandy 68.8 to 72.9 ft, slightly calcareous; very calcareous 71 to 72.9 ft.....	63.4	72.9
Silt, moderately clayey, slightly sandy, sand is very fine to coarse, light reddish brown, moderately to very calcareous; moderately to very clayey 73.8 to 75.5 ft.....	72.9	77.0
Sand, moderately silty, sand is very fine to very coarse, contains some fine to medium gravel; very silty 80 to 82 ft.....	77.0	87.4
Sand, slightly clayey, moderately to very silty; sand is mostly very fine to fine, light reddish brown, slightly calcareous; moderately calcareous, slightly indurated 89.5 to 90 ft.....	87.4	90.0
Silt, slightly clayey, moderately sandy, sand is very fine to fine, reddish brown; slightly calcareous below 91.8 ft, contains a trace of medium to very coarse sand.....	90.0	93.7
Sand, moderately to very clayey, sand is very fine to coarse, light reddish brown, moderately to very calcareous.....	93.7	95.5
Silt, moderately to very clayey, slightly sandy, sand is mostly fine, reddish brown, moderately calcareous; slightly less calcareous 97.9 to 99.2 ft; contains some limy nodular areas 99.2 to 105.6 ft; very calcareous 104.5 to 106.5 ft.....	95.5	110.5
Sand, medium to very coarse with a trace of fine gravel, slightly calcareous, some dark stain.....	110.5	115.0
Sand and gravel, sand is medium to very coarse, gravel is mostly fine, common dark stain 115 to 120 ft; contains clay layer 120.8 to 120.9 ft; contains some medium gravel 125 to 132.4 ft; common dark stain below 130 ft.....	115.0	132.4
Silt, clayey, light brown and gray brown, slightly calcareous; light greenish gray 136.2 to 137.9 ft; gray-brown and brown 137.2 to 140 ft.....	132.4	140.0

Silt, moderately clayey, moderately sandy, sand is very fine to fine with a trace of medium, medium reddish brown; very sandy below 143 ft, sand is very fine to medium with a trace of coarse, slightly calcareous; contains some limy cemented very fine to fine sand 145 to 150.7 ft.....	140.0	150.7
Sand and gravel, sand is fine to very coarse, gravel is fine to coarse; gravel is fine to medium below 155 ft.....	150.7	163.4
Silt, slightly clayey, very sandy, sand is very fine to medium, light brown; contains some silty sand below 167.2 ft, sand is very fine to medium with some coarse to very coarse.....	163.4	169.5
Sand, some gravel, sand is very fine to very coarse, gravel is mostly fine.....	169.5	189.5
Silt, moderately clayey, moderately sandy, sand is mostly very fine to fine with some medium, reddish brown; very calcareous below 193.3 ft, sand is very fine to medium; contains less clay below 196.4 ft, contains a trace of coarse sand.....	189.5	197.8
Silt, very clayey, brown; in part light greenish gray 198.5 to 200.5 ft.....	197.8	200.5
Silt, moderately to very clayey, sandy, sand is mostly fine, reddish brown, moderately calcareous; slightly calcareous 205 to 210 ft.....	200.5	220.0
Sand, silty, sand is fine to coarse, light brown....	220.0	221.3
Sand, fine to coarse; sand is mostly fine to medium below 225 ft.....	221.3	230.0
Siltstone, sandy, sand is very fine to medium, light brown, moderately calcareous.....	230.0	240.0
Sand, slightly clayey and silty, in part indurated, sand is mostly very fine to medium, light-brown, slightly calcareous; contains hard limy layer 248 to 248.1 ft; contains some volcanic ash 250 to 255 ft; moderately to very calcareous below 255 ft; contains seed fragments 255 to 260 ft.....	240.0	270.7
Sandstone, moderately to very silty, sand is very fine to medium with a trace of coarse and very coarse, light brown, very calcareous.....	270.7	284.5
Silt, moderately to very sandy, sand is very fine to fine with a trace of medium to very coarse, light reddish brown, slightly calcareous.....	284.5	292.4
Sand, slightly silty, sand is fine to very coarse with a little fine gravel, slightly calcareous....	292.4	295.0
Sand and gravel, sand is fine to very coarse, gravel is fine to medium; slightly silty 303 to 303.9 ft and below 305 ft; contains less gravel below 310 ft.....	295.0	314.5

Silt, very sandy with some silty sand, sand is very fine to medium with a trace of coarse and very coarse, light brown, very slightly calcareous; mostly a silty sand below 325 ft, sand is fine to very coarse with a trace of fine gravel.....	314.5	327.0
Sand, very slightly silty, sand is fine to very coarse with a trace of fine gravel, very slightly calcareous; slightly silty 334 to 337.8 ft; very silty 337.8 to 344 ft; contains some fine to medium gravel below 335 ft.....	327.0	341.0
Sand and gravel, sand is fine to very coarse, gravel is fine to medium.....	341.0	361.0
Sand, slightly clayey, very silty, sand is very fine to fine with a trace of medium to very coarse, light brown, slightly calcareous; noncalcareous 369.5 to 371 ft; sand is fine to very coarse 371 to 375 ft; moderately calcareous 373 to 374.5 ft..	361.0	375.0
Sand, moderately silty, sand is fine to very coarse with a trace of fine gravel, light brown, slightly calcareous.....	375.0	377.2
Silt, slightly clayey, moderately to very sandy, sand is mostly very fine to medium, contains limy nodular areas.....	377.2	381.0
Sand, moderately silty, sand is fine to very coarse.	381.0	385.0
Sand and gravel, slightly silty, sand is fine to very coarse, gravel is fine to medium.....	385.0	391.8
Silt, slightly clayey, slightly to moderately sandy, sand is fine to coarse with a little very coarse sand and fine gravel, light brown.....	391.8	397.5
Sand, moderately to very silty, sand is fine to very coarse, light brown, slightly calcareous; very calcareous, indurated 400 to 410 ft, sand is mostly very fine to medium; slightly silty 410 to 414 ft, moderately calcareous.....	397.5	414.0
Sand, moderately silty, sand is fine to very coarse, light brown, slightly calcareous.....	414.0	418.0
Sand and gravel, sand is fine to very coarse, gravel is mostly fine, contains light colored quartz and feldspar; contains some medium gravel 425 to 430 ft, contains some lithic shale grains.....	418.0	435.0
Tertiary System - Oligocene Series - White River Group:		
Clay, sandy, very light olive-gray, a trace of yellow, sand is mostly very fine to medium; some red and maroon coloration 438 to 440 ft; very light olive-gray with a trace of pink and yellow 440 to 442.5 ft; very sandy 442.5 to 444.5 ft, contains a trace of gravel.....	435.0	444.5

Sand, fine to very coarse with a trace of fine gravel, grains are largely clear and opaque quartz, rare dark grains, subrounded; sand is mostly medium to coarse 455 to 460 ft; slight iron stain 460 to 465 ft; clayey 464 to 464.7 ft; contains some lithic shale grains 465 to 466.3 ft, yellow and yellow brown..... 444.5 466.3

Cretaceous System - Upper Cretaceous Series - Montana Group:

Pierre Formation:

Shale, clayey to slightly silty, micaceous, very light gray and yellow-gray, noncalcareous; mostly dark gray below 470 ft..... 466.3 490.0

**11-38-36aaa
32-FC-52
Perkins County**

Location: NE NE NE sec 36-11N-38W

Ground elevation: 3313.8 ft (i) Grant NE 7.5 min. quadrangle

Depth to water: 99 ft (1952)

Electric log: Not available

Note: Test hole drilled for USBR, first published in USGS Water-Supply Paper 1577 and later in Logs of Test Holes, Frenchman Creek Basin, 1957, USGS-CSD. Sample description and correlations By V.H. Dreeszen

	<u>Depth, in feet</u>	
	From	To
Quaternary System, undifferentiated:		
Silt, slightly clayey, moderately sandy, sand is mostly very fine to fine with rare coarser grains, dark brown-gray.....	0.0	4.0
Tertiary System - Miocene Series - Ogallala Group:		
Sandstone-siltstone, sand is very fine to fine with some medium to coarse, reddish brown and white, mostly very calcareous and slightly siliceous.....	4.0	12.0
No sample, logged as "caliche".....	12.0	17.0
Sand, some gravel, logged as containing pebbles, mostly light colored silicates.....	17.0	27.0
Sandstone, clayey, sand is mostly fine, very light brown and whitish gray, very calcareous, slightly siliceous, moderately well indurated, logged as "caliche".....	27.0	35.0
Silt, moderately clayey, moderately sandy, sand is mostly fine, very light brown-gray, moderately calcareous, logged as "hard".....	35.0	38.5
Silt, very clayey, slightly sandy, sand is mostly very fine, contains a few medium to coarse grains, light and light medium reddish brown, contains some limy areas.....	38.5	54.0
Sand and gravel, texture grades from sand to medium and some coarse gravel; much dark mineral stain 62 to 71 ft (logged as top of the Ogallala).....	54.0	71.0
Silt, moderately clayey, moderately sandy, sand is mostly fine with some medium to very coarse, light reddish brown, slightly indurated, contains some limy areas.....	71.0	87.0
Clay, very slightly sandy, whitish gray with some reddish brown, mostly very calcareous, slight induration in part.....	87.0	93.0
Sand, slightly clayey, very silty, sand is mostly very fine to fine, reddish brown.....	93.0	102.0

Siltstone-claystone, white, very calcareous and slightly siliceous; contains some micaceous silt and a trace of brown clay.....	102.0	117.0
Silt, moderately clayey, moderately sandy, sand is mostly fine with some scattered medium to coarse, light yellow-brown, moderately calcareous.....	117.0	127.0
Sand and gravel, gravel is mostly fine, common dark mineral stain.....	127.0	141.0
Silt, slightly to moderately clayey, moderately sandy, sand is mostly very fine, silt is coarse, light yellow-brown, contains a few limy areas; very calcareous, slightly indurated, whitish gray 147.5 to 152 ft; moderately well indurated 152 to 157 ft, contains scattered medium to coarse sand..	141.0	157.0
Clay, silty, in part slightly sandy, sand is mostly fine, very light brown, some olive-gray, noncalcareous.....	157.0	174.0
Siltstone-claystone, slightly sandy, sand is very fine to fine with a trace of medium, whitish gray, very calcareous, moderately well indurated.....	174.0	175.0
Clay, silty and sandy, some clayey sand, sand is mostly very fine to fine, slightly micaceous, very light reddish brown with a little olive-gray, contains some limy areas.....	175.0	177.0
No sample, logged as a "caliche", hard.....	177.0	178.0
Note: next two samples apparently were reversed in packaging - description follows the log		
Clay, very light brown and reddish brown.....	178.0	186.0
Sand and gravel, fine sand to fine gravel, light colored silicates.....	186.0	209.0
Clay, some moderately clayey and sandy silt, sand is very fine to fine, light brown, contains a few limy areas.....	209.0	222.0
Sandstone, moderately clayey, sand is very fine to medium with a little coarse, whitish gray, moderately to in part very calcareous; contains scattered very coarse sand below 239 ft, very calcareous.....	222.0	244.0
Siltstone, clayey, in part sandy, mostly whitish gray, very calcareous and slightly siliceous.....	244.0	246.0
Sandstone, slightly to moderately clayey, sand is mostly very fine to fine with a little medium sand, very light brown and very light brownish gray, slightly to in part very calcareous.....	246.0	262.0
No sample, logged as cemented very fine to medium, sand, tan.....	262.0	265.0
Sandstone, slightly clayey, silty, sand is very fine to fine with a little medium to coarse, very light brown-gray and light olive-gray, contains some limy areas.....	265.0	273.0
Sand, fine to coarse with rare very coarse sand and fine gravel.....	273.0	276.0

Clay, in part slightly to very sandy, sand is mostly fine, very light olive-gray and light greenish gray, contains some limy areas.....	276.0	283.0
No sample, logged as clay, silty, soft, gray-green..	283.0	293.0
Sandstone, slightly clayey, silty, sand is very fine to medium with a trace of coarse, white and very light olive-gray, mostly very calcareous.....	293.0	296.0
Silt, very clayey, slightly to in part moderately sandy, sand is mostly very fine to fine with some medium to coarse, very light gray, moderately to in part very calcareous.....	296.0	316.0
Sand, slightly clayey, probably has some interbedded fine to medium sand with scattered coarse sand and fine gravel.....	316.0	332.0
Clayey sand, brown.....	332.0	335.0
Sand, fine to very coarse, contains a trace of fine gravel; contains some fine gravel below 362 ft, approximately 15 percent gravel.....	335.0	375.0
Clay, probably sandy, light brown; either a clayey sand or has interbedded sand below 385 ft, sand logged as very fine to medium.....	375.0	398.0
Sandstone, clayey in part, sand is fine to very coarse, light brown.....	398.0	408.0
Sand, fine to coarse with a trace of very coarse....	408.0	425.0
Sample logged as "caliche", silty, medium to hard, white, sample is mostly sand.....	425.0	433.0
Sand, fine to coarse with some very coarse.....	433.0	435.0
Cretaceous System - Upper Cretaceous Series - Montana Group:		
Pierre Formation:		
Shale, clay, very light gray, some yellow-gray (this interval was considered to be the Chadron Formation, USGS WSP 1577).....	435.0	441.5
Shale, clay, slightly silty, yellow and yellow-gray; mostly medium dark gray below 449 ft.....	441.5	452.0

**11-39-1aaaa
32-B-75
Perkins County**

Location: NE NE NE NE sec 1-11N-39W, 14 ft S and 309 ft W of NE
cor sec

Ground elevation: 3431 ft (t) Wild Horse Springs 7.5 min. quadrangle

Depth to water: Dry to 123 ft, caved (9/15/75)

Electric log to 520 ft

	<u>Depth, in feet</u>	
	From	To
Quaternary System, undifferentiated:		
Road fill.....	0.0	1.0
Sand, slightly silty, very fine to medium, much fine, brown; contains more fine to medium sand 10 to 12 ft.....	1.0	12.0
Silt, moderately sandy, sand is very fine to fine, silt is coarse, yellow-brown, very slightly calcareous; moderately sandy 15 to 19 ft; very calcareous, hard 19 to 19.3 ft; very light brown to light reddish brown 19.3 to 26.3 ft.....	12.0	26.3
Silt, moderately clayey, very sandy, sand is very fine to fine, medium yellow-brown, essentially noncalcareous; contains limy layer or nodule 26.2 to 29.3 ft; moderately sandy below 29.3 ft; medium dark yellowish brown 30 to 31.5 ft; very light brown 31.5 to 32.2 ft; moderately calcareous below 32.2 ft.....	26.3	33.3
Sand, slightly clayey, silty, sand is mostly very fine to fine with rare medium sand, yellow-brown, slightly calcareous.....	33.3	35.0
Tertiary System - Miocene Series - Ogallala Group:		
Sand, moderately clayey, sand is mostly very fine to fine with rare medium to coarse sand grains, reddish brown, limy cemented areas common; moderately to very calcareous 35.8 to 37.2 ft; slightly clayey 37.2 to 37.6 ft.....	35.0	37.6
Sand, slightly clayey, silty, sand is very fine to fine, light reddish brown; moderately calcareous; moderately to very calcareous 43.8 to 45 ft; slightly more fine sand 44 to 46 ft.....	37.6	46.0
Marl, slightly sandy, sand is mostly very fine, white, very calcareous, moderately indurated.....	46.0	47.0
Silt, very sandy, sand is mostly very fine, very light brown, very calcareous; sand is very fine to fine 47 to 49 ft; contains hard limy areas 47.5 to 48 ft; contains a little medium sand 48 to 49 ft..	47.0	49.0

Sand, very slightly clayey, silty, sand is very fine to fine with a trace of medium to coarse, reddish brown, noncalcareous; very calcareous 50 to 51.3 ft, light brown, contains a few coarse to very coarse sand grains.....	49.0	51.3
Sandstone, slightly clayey, silty, sand is mostly very fine to medium with a few coarse to very coarse sand grains, contains some volcanic ash....	51.3	55.0
Silt, moderately sandy, sand is mostly very fine to fine, micaceous, light yellow-brown, slightly calcareous.....	55.0	56.5
Sand, fine to very coarse with some fine gravel, grains appear to be limy coated.....	56.5	62.9
Silt, in part moderately clayey, sandy, sand is mostly fine, very light olive to greenish gray....	62.9	64.0
Sand and gravel, gravel is mostly fine, granitic; very silty, slightly clayey 90.5 to 91 ft.....	64.0	91.0
Silt, slightly clayey, very sandy, sand is mostly very fine to fine, brown; moderately sandy, moderately to very calcareous 93.7 to 99.5 ft; moderately to very clayey 97 to 99.5 ft; very sandy, slightly indurated 99.5 to 99.8 ft, grayish brown.	91.0	99.8
Sand and gravel.....	99.8	100.0
Silt, slightly clayey, slightly sandy, sand is mostly fine, grayish brown to brown, very slightly calcareous; moderately clayey 100.5 to 104 ft; moderately sandy 104 to 105 ft, contains some medium sand.....	100.0	105.0
Silt, slightly clayey, very sandy, sand is fine to coarse, much medium sand, pale brown, slightly calcareous; slightly coarser grained 109 to 110 ft, moderately calcareous; slightly calcareous, pale reddish brown 109 to 111 ft; moderately clayey, moderately sandy 111 to 111.9 ft.....	105.0	112.6
Silt, very clayey, reddish brown; very slightly calcareous 115 to 118.5 ft; slightly sandy 118.3 to 118.5 ft; moderately sandy 118.5 to 120 ft.....	112.6	120.0
Silt, moderately clayey, slightly sandy, sand is very fine, pale brown, slightly calcareous; moderately to very clayey 123 to 128 ft; contains limy areas 123 to 130 ft; brown 127.2 to 131.5 ft; very sandy 130 to 131.5 ft, very slightly calcareous.....	120.0	131.5
Sand, some gravel, gravel is fine, much very coarse sand; slightly more gravel 135 to 140 ft, contains some medium gravel.....	131.5	146.2
Silt, moderately clayey, sandy, reddish brown, very slightly calcareous.....	146.2	149.3
Sand, some gravel, gravel is mostly fine, much dark mineral stain.....	149.3	160.0

Sand and gravel, gravel is fine to medium, much dark mineral stain; 50 to 60 percent fine gravel 165 to 177.4 ft, contains a little coarse gravel.....	160.0	177.4
Silt, slightly clayey, slightly sandy, sand is mostly very fine, reddish brown; moderately sandy 185 to 187 ft, sand is very fine to coarse.....	177.4	187.0
Sand and gravel, gravel is mostly fine.....	187.0	189.0
Silt, moderately clayey, pale brown to white, moderately calcareous, contains common limy areas; slightly calcareous 194.2 to 205 ft, brown, slightly sandy, sand is very fine to fine, contains some thin limy cemented sandstone layers; moderately sandy 202 to 203.3 ft; slightly more clayey 205 to 210 ft; very slightly calcareous 205 to 214.5 ft.....	189.0	214.5
Sand, moderately silty, sand is very fine to very coarse, much coarse.....	214.5	217.1
Sand, fine to very coarse, much medium to coarse sand with a trace of fine gravel.....	217.1	225.7
Silt, moderately clayey, very slightly sandy, reddish brown; slightly calcareous 230 to 233.5 ft...	225.7	235.0
Silt, moderately clayey, slightly sandy, sand is very fine to very coarse, pale reddish brown and reddish brown, in part moderately calcareous with limy cemented areas; in part very clayey 238.5 to 240 ft.....	235.0	240.0
Sandy silt and silty sand, sand is very fine to very coarse, pale brown, slightly calcareous.....	240.0	245.0
Silt, very sandy, sand is very fine, micaceous, brown, very slight calcareous.....	245.0	248.7
Sand, very fine to coarse, much medium sand; indurated as sandstone and calcareous 249.7 to 251.4 ft.....	248.7	251.4
Silt, slightly clayey, slightly sandy, sand is very fine to medium with some coarse to very coarse, moderately calcareous, slightly indurated; slightly calcareous 254.5 to 255 ft.....	251.4	255.0
Sand, fine to coarse with some very coarse; very calcareous 256.8 to 257 ft.....	255.0	257.0
Sand and gravel, gravel is fine; contains some sandy silt lenses 265 to 275 ft; slight dark mineral stain 270 to 275 ft, some limy cementation; moderate dark stain 275 to 281.3 ft; contains some medium gravel 280 to 281.3 ft, contains some limy areas.....	257.0	281.3
Silt, moderately clayey, slightly sandy, sand is very fine, reddish brown.....	281.3	285.0
Sandstone, silty, sand is very fine to fine, pale brown, moderately calcareous; very calcareous 286 to 289 ft.....	285.0	289.0
Volcanic ash, white to very pale brown.....	289.0	290.4

Sandstone, silty, reddish brown, very slightly calcareous, contains some volcanic ash.....	290.4	291.0
Silt, moderately clayey to very clayey, slightly sandy, sand is very fine to medium, pale olive-gray, very slightly calcareous.....	291.0	294.0
Sandstone, very silty, sand is very fine to medium, pale olive; contains a clayey silt layer 295 to 296.5 ft, reddish brown, some dark stains.....	294.0	296.5
Sandstone, sand is very fine to medium, pale olive-gray, very calcareous; samples contain some brown silt (interbeds?), very clayey 305.5 to 307.3.....	296.5	307.3
Sand and gravel, gravel is fine, very slight limy cementation.....	307.3	311.3
Sandstone, slightly silty, sand is very fine to medium, pale olive-brown, moderately to very calcareous; moderately silty 319 to 325 ft.....	311.3	325.0
Sandstone, very silty, sand is mostly very fine to fine, pale olive-brown, moderately calcareous; contains some medium sand 325 to 326.5 ft; contains some dark olive clayey lenses 330 to 334 ft; very calcareous 334 to 334.5 ft.....	325.0	334.5
Sand, silty, fine to medium with some coarse, very calcareous; slightly silty 347.2 to 351 ft, very slightly calcareous; contains a sandy silt layer 346 to 347.2 ft.....	334.5	351.0
Silt, moderately to very clayey, slightly sandy, sand is very fine, dark brown and olive.....	351.0	352.0
Sand and gravel, gravel is fine to medium; slightly calcareous 355 to 357 ft.....	352.0	357.0
Sandstone and clayey to sandy silt, sand is very fine to medium, moderately to very calcareous, light brown with some olive.....	357.0	365.7
Sand and gravel, silty, slightly calcareous.....	365.7	369.0
Silt, very clayey, slightly sandy, sand is fine, dark brown and olive, slightly calcareous; slightly clayey, very sandy 370 to 374 ft, noncalcareous.....	369.0	374.0
Sand and gravel, gravel is fine, very slightly calcareous; contains some thin clayey to sandy silt layers; noncalcareous 380 to 385 ft; contains limy areas 385 to 390 ft; contains sandy silty layers 407 to 410 ft, light brown; contains some sandy silt layers 410 to 415 ft, pale olive, slightly calcareous.....	374.0	415.0
Sand, very silty, sand is mostly fine, pale to dark olive, very slightly calcareous.....	415.0	417.1
Sand, fine to very coarse with a little fine gravel, slightly calcareous; contains slightly more fine gravel 420 to 425 ft.....	417.1	425.0

Sandstone, slightly clayey, sand is fine to coarse, slightly calcareous; sand is very fine to medium 430 to 435.3 ft; moderately calcareous 432.5 to 435.3 ft.....	425.0	435.3
Sand, fine to very coarse, silty, contains calcareous areas.....	435.3	440.0
Silt, slightly clayey, slightly sandy, olive brown and reddish brown, very slightly calcareous.....	440.0	443.8
Sand, fine to coarse, slightly calcareous; samples contain some brown silt or siltstone; sand is fine to very coarse 455 to 459.8 ft.....	443.8	459.8
Silt, moderately clayey, micaceous, light brown and light brown-gray; moderately to very sandy in lower part, sand is fine to coarse.....	459.8	463.9
Sand, fine to very coarse with a little fine gravel, slightly clayey 463.9 to 465 ft.....	463.9	471.5
Silt, clayey, sandy, sand is mostly fine to medium, light olive-gray with some brown; very sandy 476.5 to 478.3 ft, sand is fine to very coarse.....	471.5	480.0
Sand, some gravel, gravel is mostly fine, may contain lithic grains of clay and siltstone; moderately calcareous 480 to 485 ft; silty to clayey 487 to 489 ft.....	480.0	489.0
Tertiary System - Oligocene Series - White River Group:		
Clay, very light olive-gray with some red-brown; contains some greenish gray 490 to 495 ft; contains some yellow-brown 497.7 to 500 ft; mottled light brown and pink 500 to 503 ft; slight yellow stain 500 to 515 ft; contains some indurated claystone and clayey siltstone below 500 ft.....	489.0	533.2
Claystone, very slightly sandy, sand is very fine, very light olive-gray; a little very fine sandy siltstone in lower part.....	533.2	535.4
Clay, very light olive-gray.....	535.4	539.7
Sandstone, sand is very fine to fine, clayey.....	539.7	540.0
Sandstone, sand is very fine to fine with a little medium to coarse sand, mostly clear quartz.....	540.0	550.0
Sand, very fine to fine with some medium, mostly clear quartz with a few dark grains; contains rare coarse and very coarse sand grains 565 to 570 ft, contains clay layer.....	550.0	570.0
Sand, very fine to medium with some coarse and a trace of very coarse, white.....	570.0	575.3
Cretaceous System - Upper Cretaceous Series - Montana Group:		
Pierre Formation:		
Shale, clay, slightly micaceous, dark gray, noncalcareous.....	575.3	590.0

**11-40-1aaaa
33-B-75
Perkins County**

Location: NE NE NE NE sec 1-11N-40W, 143 ft S and 26 ft W of NE
cor sec

Ground elevation: 3465 ft (t) Brandon NE 7.5 min. quadrangle

Depth to water: Caved at 92 ft (9/24/75), approximately 172 ft
(Electric log)

Electric log to 450 ft

Depth, in feet
From To

Quaternary System, undifferentiated:

Silt, moderately clayey, moderately sandy, sand is mostly very fine with a little fine sand and rare medium sand, medium dark brown-gray; slightly clayey 0.5 to 1.1 ft, light brown-gray and light gray, slightly calcareous.....	0.0	1.1
Sand, moderately silty, sand is very fine to fine with some medium, light brown-gray, moderately calcareous.....	1.1	3.8

Tertiary System - Miocene Series - Ogallala Group:

Siltstone-sandstone, sand is very fine to fine with a trace of medium to coarse, light yellow-brown to very light gray, very calcareous, slightly siliceous; light yellow-brown with some reddish brown sandy to clayey silt 4.5 to 5 ft, well indurated; very light reddish brown 5 to 6.5 ft, not siliceous.....	3.8	6.5
Sandstone, silty, slightly clayey, sand is very fine to fine with some medium, very light brown, very calcareous, moderate induration.....	6.5	8.0
Sand, slightly clayey, slightly silty, sand is mostly very fine to fine, contains a trace of gravel, light reddish brown, contains some limy cemented areas; bright reddish brown 9.5 to 10 ft, contains a trace of limy areas; very slightly clayey 10 to 13 ft, much very fine sand, slightly calcareous, light reddish brown.....	8.0	13.0
Siltstone, slightly to moderately sandy, sand is very fine to medium with a trace of coarse and rare gravel grains, medium brown, matrix noncalcareous, contains limy areas; light reddish brown 14 to 15 ft.....	13.0	15.0

Sandstone, silty, sand is very fine to coarse, light brown, slightly to moderately calcareous, weakly indurated; contains some very calcareous sandy siltstone areas 17.5 to 20 ft; mostly a sandy siltstone, very calcareous, well indurated 20 to 22 ft.....	15.0	22.0
Sand, some gravel, much fine to coarse sand, 10 to 20 percent fine to medium gravel, dark stained....	22.0	24.5
Sand-sandstone, sand is very fine to medium with some coarse to very coarse, much very fine to fine sand, slightly calcareous, weakly indurated.....	24.5	28.0
Sandstone-siltstone, sand is very fine to fine with some medium and a trace of coarser grains, light reddish brown, very calcareous; moderately calcareous 30 to 32.3 ft.....	28.0	33.0
Silt, moderately to very clayey, slightly sandy, sand is mostly very fine, light reddish brown; slightly calcareous 30.3 to 33.5 ft; very calcareous, moderately sandy 35 to 36.2 ft, sand is very fine to medium.....	33.0	36.2
Sandstone, silty, sand is very fine to medium, reddish brown, very calcareous.....	36.2	37.5
Silt, slightly clayey, very sandy, sand is very fine to fine; light reddish brown, very slightly calcareous; mostly very silty sand 40 to 41 ft.....	37.5	41.0
Sand, slightly silty, sand is very fine to medium, reddish brown; moderately indurated 45 to 49.5 ft, moderately to very calcareous, contains rootlets; contains some coarse to very coarse sand 48.5 to 49.5 ft.....	41.0	49.5
Sandstone-siltstone, sand is mostly very fine to medium, light reddish brown, moderately calcareous; slightly to moderately clayey 50 to 52 ft, very slightly calcareous.....	49.5	52.0
Sand, very silty, sand is very fine to coarse, reddish brown.....	52.0	53.8
Sand and gravel, gravel is fine with a trace of medium, gravel is dark mineral stained; contains slightly more medium gravel 60 to 65 ft; gravel is mostly fine with a trace of medium to coarse 65 to 70 ft.....	53.8	70.0
Sand, fine to very coarse with a trace of fine gravel.....	70.0	76.8
Silt, very clayey, slightly to moderately sandy, sand is very fine to medium, reddish brown; contains limy areas 78.2 to 79.5 ft.....	76.8	79.5
Silt, moderately clayey, very sandy, sand is fine to very coarse, very pale brown, moderately calcareous; sand is very fine to coarse 80.5 to 83.5 ft; contains some silty sand 83.5 to 84 ft; non-calcareous below 80.5 ft.....	79.5	84.0

Silt, very clayey, pale olive, slightly calcareous; contains some sandy limy areas 85 to 86 ft; moderately to very sandy 86 to 88 ft, sand is very fine to medium.....	84.0	86.0
Silt, very clayey, very slightly sandy, reddish brown; contains some limy areas or layers 91 to 94 ft, sand is fine to coarse.....	86.0	97.0
Sand and gravel, gravel is mostly fine.....	97.0	100.0
Silt, moderately to very clayey, slightly sandy, sand is very fine to fine, very pale reddish brown, slightly to moderately calcareous; contains some sandy siltstone layers 105 to 107.3 ft, sand is fine to coarse.....	100.0	107.3
Sand and gravel, gravel is mostly fine, much coarse to very coarse sand.....	107.3	110.9
Silt, moderately to very clayey, slightly sandy, sand is very fine to fine, moderately calcareous 110.9 to 111.5 ft, very light reddish brown; mostly moderately clayey and moderately sandy below 111.5 ft, noncalcareous 111.5 to 116 ft; slightly calcareous 116 to 122 ft; very sandy 120 to 122 ft; contains some interbedded fine to very coarse sand 122 to 123.7 ft.....	110.9	123.7
Sand and gravel, gravel is fine, much coarse to very coarse sand; slightly silty 124.2 to 124.5 ft; contains a trace of medium gravel 125 to 137.8 ft.	123.7	137.8
Silt, slightly clayey, slightly sandy, sand is very fine, light reddish brown.....	137.8	145.0
Silt, slightly clayey, moderately to very sandy, pink to light reddish brown, moderately to very calcareous; noncalcareous 145.7 to 150 ft; slightly more clayey 146 to 150 ft; moderately to very clayey 150 to 155 ft; very calcareous 150 to 153 ft.....	145.0	155.0
Silt, moderately clayey, moderately sandy, sand is very fine to medium with some coarse, light reddish brown; very sandy 160 to 162.3 ft.....	155.0	162.3
Sand and gravel, gravel is fine with a trace of medium.....	162.3	174.6
Silt, very clayey, slightly sandy, sand is very fine to fine, reddish brown, moderately calcareous; very sandy 179.4 to 180 ft.....	174.6	180.0
Silt, very clayey, slightly sandy, sand is very fine to fine, reddish brown; slightly calcareous 185.9 to 195 ft; moderately to very sandy 188.5 to 194 ft; very sandy 194 to 195 ft, sand is fine to very coarse with a little gravel.....	180.0	195.0
Sand and gravel, gravel is fine with a trace of medium.....	195.0	200.4
Silt, very clayey, slightly sandy, sand is mostly very fine to medium, moderately calcareous; very calcareous 205 to 205.3 ft.....	200.4	210.5

Sand, fine to very coarse with some fine gravel; contains some limy cemented areas 225 to 231.5 ft.	210.5	231.5
Silt, moderately clayey, moderately sandy, sand is mostly fine, light reddish brown, moderately calcareous; slightly more clayey 235 to 240 ft, less calcareous; only slightly clayey 240 to 242 ft, light brown, contains limy areas.....	231.5	242.0
Silt, slightly clayey, moderately to very sandy, sand is very fine to fine, very calcareous, contains limy indurated areas; contains a silty sand layer 245 to 246.7 ft, sand is very fine to fine with a trace of medium.....	242.0	246.7
Silt, moderately clayey, moderately sandy, sand is mostly fine, pink to white, very calcareous; in part reddish brown 251 to 255 ft.....	246.7	255.0
Sand, slightly clayey, very silty, sand is very fine to fine, reddish brown, moderately clayey.....	255.0	260.0
Silt, slightly clayey, very sandy, sand is mostly fine, reddish brown with some pink and olive, moderately to very calcareous; contains slightly more sand 265 to 267 ft; moderately clayey 267 to 270 ft, slightly calcareous; very sandy 270 to 272.8 ft; contains some fine to coarse sand 272.8 to 275 ft.....	260.0	275.0
Silt, slightly clayey, moderately sandy, sand is very fine to fine, reddish yellow, slightly calcareous; contains slightly more sand 277.5 to 278 ft, light reddish brown; moderately clayey 278 to 280 ft; moderately to very sandy with some medium sand 280 to 285 ft, very pale brown.....	275.0	285.0
Sand, silty, sand is very fine to medium, moderately to very calcareous; contains some coarse sand 286.5 to 290 ft.....	285.0	290.0
Silt, moderately to very sandy, sand is very fine to medium, dark reddish brown, moderately calcareous.....	290.0	294.0
Sand, moderately to very silty, sand is fine to very coarse, light reddish brown, moderately calcareous.....	294.0	295.0
Sand, fine to very coarse with a trace of fine gravel, moderately calcareous; silty 296 to 300 ft.....	295.0	300.0
Sand and gravel, gravel is fine with a trace of medium, contains some limy areas.....	300.0	309.7
Silt, moderately to very clayey, in part sandy, sand is mostly fine, yellowish red and yellowish olive, moderately to very calcareous, in part indurated; moderately sandy 311.2 to 312.4 ft; very sandy 312.4 to 315 ft, interval may contain some gravel grains.....	309.7	315.0

Sand, very silty, sand is very fine to fine, reddish brown, very calcareous; some bright yellowish red sandy silt in sample.....	315.0	320.0
Sand, very silty, sand is fine to coarse, light reddish brown, moderately to very calcareous; some induration.....	320.0	324.0
Sand, some gravel, gravel is fine with some medium, moderately silty, moderately calcareous, some induration; very little gravel 325 to 332 ft; contains much fine to medium sand 325 to 330 ft.....	324.0	332.0
Sand, some gravel, gravel is mostly fine, slightly calcareous, granitic; noncalcareous 340 to 380 ft; contains much fine to medium sand 345 to 360 ft; contains thin sandy silt layers 355 to 360 ft and 369.3 to 380 ft; contains much fine to coarse sand 360 to 375 ft; contains much fine to medium sand 375 to 380 ft.....	332.0	380.0
Sand and gravel, gravel is mostly fine with a trace of medium to coarse gravel and pebbles, slightly calcareous; slightly silty 365 to 388.3 ft, contains much fine to coarse sand; moderately calcareous 385 to 390 ft, slightly to moderately silty, contains some lithic grains of clayey siltstone and limestone.....	380.0	390.0
Tertiary System - Oligocene Series - White River Group:		
Siltstone, clayey, moderately sandy, sand is mostly very fine, very light brown, slightly calcareous, contains some claystone 395 to 400 ft and some limy areas or layers.....	390.0	400.0
Siltstone, clayey, most of sample is bright reddish brown, contains some embedded very fine medium sand, noncalcareous.....	400.0	405.0
Silt, very clayey, very light olive-gray, moderately calcareous; slightly indurated below 407 ft, slightly to in part noncalcareous; slightly sandy, sand is very fine to fine with a trace of medium 412.5 to 419 ft.....	405.0	419.0
Siltstone, clayey, very slightly sandy, mostly very fine sand, very light olive-gray, slightly calcareous; contains a trace of siliceous claystone in interval 420 to 421.1 ft, light olive; some very pale brown 421.1 to 423.8 ft; slightly sandy 423.8 to 425.3 ft.....	419.0	425.3
Siltstone, clayey and silty clay, very light olive-gray, noncalcareous; some clay 427.3 to 430 ft, slightly indurated as claystone.....	425.3	430.0

Clay, silty, very light olive-gray to very light greenish gray; slightly calcareous in part 435 to 440 ft, slightly indurated; very slightly sandy 440 to 445 ft, mostly very fine sand, very pale brown; light yellowish gray and pale yellow 445 to 455 ft; pale yellow to white 455 to 460 ft, slightly yellow-brown stain; mostly pale olive to pale yellow 460 to 465 ft.....	430.0	465.0
Siltstone, clayey, very light brownish gray, slightly indurated; in part moderately calcareous 470 to 474.5 ft, contains a trace of reddish yellow; mostly very pale brown to pale yellow 480 to 485 ft; very light gray 485 to 490 ft.....	465.0	505.0
Clay, silty, very light gray to white, light olive-gray to pale olive-yellow below 510 ft.....	505.0	535.9
Sandstone, clayey, sand is very fine to fine with some medium, white; slightly pinkish, well indurated 535.9 to 537.9 ft; contains coarse sand below 537.9 ft.....	535.9	540.0
Sand, very fine to fine with a trace of medium, whitish gray; contains some medium sand with a little coarse sand and rare very coarse sand 550 to 557.8 ft, mostly clear to white quartz.....	540.0	557.8
Samples below 557.8 ft are of poor quality as the result of test hole plugs. Samples are largely of clay, very light olive gray, and sand. Field crew reported traces of gray clay or shale. None noted in samples. The Pierre Formation of Cretaceous age probably was not reached.....	557.8	600.0

**11-40-36ddad
23-B-75
Perkins County**

Location: SE NE SE SE sec 36-11N-40W, 685 ft N and 30 ft W of SE
cor sec

Ground elevation: 3472 ft (t) Brandon SE 7.5 min. quadrangle

Depth to water: Dry to 69.1 ft, caved (8/18/75)

Electric log

	<u>Depth, in feet</u>	
	From	To
Quaternary System, undifferentiated:		
Silt, very sandy, sand is mostly very fine, dark brown-gray, slightly calcareous; sand is very fine to fine below 1 ft, moderately calcareous.....	0.0	2.0
Sand, moderately to very silty, sand is very fine to medium with a trace of coarse, dark gray-brown, moderately calcareous.....	2.0	4.5
Tertiary System - Miocene Series - Ogallala Group:		
Silt, slightly clayey, slightly sandy, sand is very fine to medium, reddish brown, slightly to moderately calcareous, contains limy nodular areas...	4.5	7.4
Silt, slightly clayey, moderately sandy, sand is mostly very fine to fine, very pale reddish brown, very calcareous, indurated; moderately clayey 7.8 to 9.3 ft.....	7.4	10.0
Siltstone, moderately clayey, slightly sandy, sand is very fine to fine, very pale brown to white, very calcareous; slightly clayey, less indurated below 13 ft; moderately sandy 15.3 to 16.5 ft, very pale brown.....	10.0	16.5
Silt, very slightly clayey, moderately sandy, sand is mostly fine, reddish brown, slightly calcareous, contains limy nodular or cemented areas.....	16.5	19.8
Sandstone, silty, sand is mostly very fine to fine, very pale brown, moderately to very calcareous; contains rare very coarse sand grains below 20.3 ft; matrix noncalcareous 21.0 to 21.8 ft; contains some coarse sand to fine gravel below 24.7 ft; moderately calcareous 24.7 to 25 ft.....	19.8	25.0
Sand and gravel, fine sand to medium gravel with a trace of coarse gravel, reddish black stained, 30 to 50 percent gravel.....	25.0	48.0
Sand and gravel, slightly clayey, silty, some limy cementation.....	48.0	58.0
Sand and gravel, fine sand to medium gravel, much dark staining, 50 percent gravel; slightly more sand and a little coarse gravel 65 to 71 ft.....	58.0	71.0

Silt, slightly clayey, moderately sandy, sand is very fine to medium, reddish brown; slightly more clayey 74.3 to 75 ft.....	71.0	77.5
Sand, slightly silty, sand is fine to very coarse with a little fine gravel, reddish brown, very slightly calcareous.....	77.5	80.0
Silt, moderately clayey, moderately sandy, sand is very fine to very coarse, light reddish brown, very slightly calcareous; slightly calcareous 94.5 to 95 ft, reddish brown below 98.5 ft; slightly clayey, less silty below 100.2 ft.....	80.0	105.0
Sand, slightly silty, sand is fine to very coarse, contains some fine gravel.....	105.0	110.0
Sand and gravel, medium sand to medium gravel.....	110.0	117.7
Silt, moderately clayey, moderately sandy, sand is mostly very fine to fine, light reddish brown.....	117.7	122.8
Sand, moderately silty, sand is very fine to medium with a trace of coarse; light reddish brown, slightly calcareous; contains some volcanic ash in upper few feet.....	122.8	130.0
Sand, slightly silty, sand is very fine to medium with a trace of coarse, light reddish brown, slightly calcareous; thin limy areas 135 to 138 ft.....	130.0	138.0
Sand, moderately to very silty, sand is fine to very coarse, light reddish brown; some very coarse sand 140 to 141 ft.....	138.0	141.0
Sand and gravel, fine sand to medium gravel; contains some sandy silt or silty layers 140 to 160 ft.....	141.0	180.9
Silty sand and sandy silt, interbedded, sand is mostly fine to very coarse, light reddish brown; some light greenish gray sandy silt 190 to 195.5 ft; moderately calcareous 185 to 195.5 ft.....	180.9	196.3
Silt, slightly clayey, gray-brown, slightly calcareous, slightly sandy 205 to 222.8 ft, sand is very fine to fine, reddish brown, contains some limy areas; very sandy 220 to 222.8 ft.....	196.3	222.8
Sand, some gravel, fine sand to fine gravel.....	222.8	230.2
Clay, sandy, marly and reddish brown clayey siltstone, sand is very fine, very calcareous 231 to 235 ft, hard; some greenish gray limy clay layers 235 to 237.5 ft and below 245 ft; very calcareous below 240 ft; very sandy 250 to 255 ft, sand is very fine to fine.....	230.2	255.0
Silt, moderately clayey, moderately to very sandy, sand is very fine to fine, grayish brown and light brown, moderately calcareous.....	255.0	261.5

Silt, moderately clayey, moderately to very sandy, sand is very fine, light gray and white, moderately calcareous, contains some thin hard layers; contains some very sandy layers or interbedded sand, very fine to coarse below 280 ft; in part some light greenish gray below 280 ft.....	261.5	293.7
Sand, very fine to very coarse, may be slightly indurated, reddish brown.....	293.7	303.3
Siltstone, slightly sandy, sand is mostly very fine to medium, olive, grayish green and reddish brown; moderately calcareous 308.5 to 310 ft.....	303.3	312.7
Sand, moderately silty, sand is fine to very coarse, contains some fine gravel; slightly silty below 315 ft; contains thin claystone layer 320 to 325 ft.....	312.7	331.3
Silt, slightly clayey, slightly to moderately sandy, sand is mostly very fine to medium, reddish brown with some light greenish gray; contains a trace of hard limy areas below 335 ft.....	331.3	341.0
Siltstone-sandstone, in part clayey, sand is very fine to medium with some coarse, very pale brown, slightly to moderately calcareous with limy cemented areas; moderately to very calcareous below 352.5 ft, slightly siliceous.....	341.0	370.0
Clay, light, greenish gray with some brown, waxy, slightly micaceous.....	370.0	374.0
Silt, slightly to moderately clayey, slightly sandy, sand is very fine to fine, olive and brown, contains some limy indurated areas; sand is very fine to medium with a trace of coarser grains 379 to 385 ft; well indurated 385.8 to 388.5 ft; contains some coarse to very coarse sand 385 to 385.8 ft...	374.0	389.3
Silt, clayey, sandy, sand is mostly fine, light olive-gray, contains limy indurated areas; contains some fine to medium sand and a trace of coarser grains below 395 ft; moderately calcareous 398.3 to 400 ft.....	389.3	400.0
?Tertiary System - Oligocene Series - White River Group:?		
Clay, silty, very light olive-gray, some very light brown, slightly calcareous.....	400.0	405.0
Sand, silty, slightly clayey, sand is mostly fine, very pale brown, very slightly calcareous.....	405.0	407.5
Silt, slightly to in part very clayey, slightly sandy, sand is mostly fine, very light brownish gray, contains a trace of limy beds; slightly clayey, very sandy 410 to 415 ft, light yellowish gray; very light olive-gray with some light brown 415 to 420 ft; moderately calcareous; very light brown-gray below 421.7 ft, may have scattered coarse grains.....	407.5	428.6

Tertiary System - Oligocene Series - White River Group:

Clay, very light olive-gray with a trace of light brown.....	428.6	429.4
Claystone, very olive-gray, brittle.....	429.4	430.0
Clay, very light olive-gray and very light yellow-gray; logged in field as containing volcanic ash; slightly silty 435 to 435.6 ft contains rare embedded very fine to fine sand; very slightly sandy 440 to 445 ft, sand is very fine to fine; contains a trace of light brown 440 to 450 ft; very slightly calcareous below 435 ft.....	430.0	450.0
Clay, silty, in part slightly sandy, sand is very fine to fine, very light greenish gray; in part moderately sandy 455 to 460 ft, contains rare medium and coarse sand.....	450.0	460.0
Clay, very light olive-gray and very light gray, in part slightly indurated; some interbedded moderately sandy clay 465 to 470 ft, sand is very fine to medium with a trace of coarser grains; contains a trace of pink clay in interval 470 to 475.5 ft.....	460.0	475.5
Clay, very sandy and clayey sand interbedded, sand is very fine to medium with a little coarse sand and trace of gravel, sand is clear, opaque and smoky quartz.....	475.5	485.0
Sand with some interbedded clayey sand, sand is mostly fine to coarse, quartz; sand is mostly fine to medium with some coarse below 490 ft; contains some yellow-brown and red sandy clay below 495 ft.	485.0	500.0
Sand, very fine to very coarse, much medium to coarse sand, mostly clear and opaque quartz, slightly iron stained, contains some ironstone and shale grains.....	500.0	512.0

Cretaceous System - Upper Cretaceous Series - Montana Group:

Pierre Formation:

Shale, clay, slightly silty, very slightly sandy; sand is very fine, light-yellow gray with some yellow-brown and light olive-gray; contains thin ironstone layers or concretion 515 to 520 ft; slightly calcareous below 520 ft; mostly light medium olive-gray below 523 ft.....	512.0	530.0
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11-41-36ddd
33-FC-52
Perkins County

Location: SE SE SE sec 36-11N-41W

Ground elevation: 3529.6 ft (i) Brandon 7.5 min. quadrangle

Depth to water: 172 ft (1952)

Electric log: Not available

Samples missing, presumed to have been discarded

Note: Test hole drilled for USBR, log first published in USGS
 WSP-1577 and later in Logs of Test Holes, Frenchman Creek
 Basin, 1957, USGS-CSD. Log reproduced from USGS WSP-1577,
 suggested changes in correlation, this report

	<u>Depth, in feet</u>	
	From	To
Quaternary System, undifferentiated:		
Soil, silty, sandy, chocolate brown.....	0.0	2.9
Tertiary System - Miocene Series - Ogallala Group:		
Ogallala Formation:		
Sand, very fine, to pebbles, silty, brown.....	2.9	3.5
Sand, medium, to medium gravel, loose, tan.....	3.5	8.0
Clay, sandy, soft, brown.....	8.0	8.5
Sand, very fine to very coarse gravel, loose, tan..	8.5	50.0
Clay, sandy, soft brown.....	50.0	54.0
Caliche, sandy, clayey, medium-hard, gray to tan....	54.0	61.0
Gravel, medium, to sand medium, loose, tan.....	61.0	71.0
Clay, silty, soft, brown.....	71.0	84.0
Sand, very fine, to very fine gravel, loose, tan....	84.0	85.0
Clay, silty, medium-soft, tan.....	85.0	136.0
Sand, very fine, to fine gravel, slightly cemented, tan.....	136.0	144.0
Clay, silty, calcareous, medium-soft, gray to brown.	144.0	173.0
Sand, very fine to very coarse, silty, slightly cemented, tan.....	173.0	175.0
Clay, calcareous, soft, gray-green; contains thin streaks of white hard caliche and red-brown soft silty clay.....	175.0	189.5
Clay, soft, red-brown.....	189.5	196.5
Sand, very fine, to very fine gravel, loose, tan....	196.5	202.2
Caliche, silty, soft to hard, white to gray.....	202.2	208.0
Clay, silty, medium-soft, gray-green.....	208.0	214.0
Caliche, sandy, medium-hard, white to gray and silty medium-soft gray-green clay.....	214.0	235.0
Clay, silty, hard, brown; contains white hard caliche, opalized pebbles, and layers of green hard claystone.....	235.0	256.0
Sand, very fine, to fine gravel, cemented, green and tan.....	256.0	268.0
Clay, silty, hard, white and brown.....	268.0	275.0

Brule Formation: (considered to be part of the Ogallala Group in this report)

Siltstone, hard, gray-green.....	275.0	282.0
Silt and clay, sandy, gray green to light brown.....	282.0	294.0
Sand, medium, to fine gravel, cemented, well-rounded to subangular grains.....	294.0	303.0
Silt, sandy, soft, brown to gray; interbedded with thin lenses of dense clay.....	303.0	322.0

Chadron Formation: (considered to be part of the Ogallala Group in this report)

Clay, dense, brown to green, and hard white caliche; interbedded with very fine sand to very fine gravel.....	322.0	342.5
Sand, very coarse, green; contains medium to coarse sand and caliche.....	342.5	351.5

Tertiary System - Oligocene Series - White River Group:

Clay, plastic, light-green to brown.....	351.5	366.0
Sand, very coarse, to very fine gravel.....	366.0	367.0
Clay, plastic, light-green to brown.....	367.0	372.0
Clay, soft, tan.....	372.0	382.0
Clay, dense, hard, green to brown.....	382.0	397.0
Sandstone, clayey, very dense, hard, white; contains layers of green hard claystone.....	397.0	413.5
Claystone, orange, limonitic stain, hard, white; contains layers of hard yellow clay.....	413.5	442.0
Sandstone, very fine grained to coarse-grained, cemented, hard, tan.....	442.0	444.0
Clay, silty, hard, red-brown, and hard green claystone.....	444.0	463.0

Note: Interval 444 to 463 ft is considered likely to be the top of the Cretaceous System - Upper Cretaceous Series-Montana Group-Pierre Formation

Pierre shale:

Shale, hard, blue.....	463.0	472.0
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11-42-32ccd
35-FC-52
Sedgwick County, Colorado

Location: SE SW SW sec 32-11N-42W

Ground elevation: 3614.4 (i) Venango 7.5 min. quadrangle

Depth to water: Not available

Electric log: Not available

Note: Log reproduced from USGS Water-Supply Paper 1577, 1963;
 correlation of Pre-Ogallala Group revised for this report;
 samples of logged intervals on file CSD-UNL

	<u>Depth, in feet</u>	
	From	To
Quaternary System, undifferentiated:		
Soil, silty, sandy, brown.....	0.0	2.0
Tertiary System - Miocene Series - Ogallala Group:		
Ogallala Formation:		
Caliche, hard, white to buff; contains very fine sand to fine gravel.....	2.0	5.0
Sand, fine, to medium gravel.....	5.0	26.0
Silt, clayey, hard; contains very fine to very coarse sand.....	26.0	32.0
Clay, silty.....	32.0	36.0
Sand and gravel.....	36.0	37.0
Clay, silty.....	37.0	38.5
Clay, hard, plastic, gray-green.....	38.5	40.5
Caliche, hard, buff.....	40.5	43.0
Silt, hard, tan; contains very fine to very coarse sand.....	43.0	56.5
Sand, fine, to fine gravel, loose.....	56.5	70.5
Clay, hard, plastic, tan; contains fine sand to medium gravel; interbedded with layers of sand and gravel.....	70.5	81.0
Sand, medium to very coarse, loose; contains very fine sand to fine gravel.....	81.0	98.5
Clay, silty, hard, gray.....	98.5	106.0
Sand, very fine, to fine gravel, silty.....	106.0	125.0
Clay, silty, hard; contains very fine to coarse sand.....	125.0	135.0
Sand, very fine, to coarse gravel.....	135.0	141.0
Silt, hard, tan; contains very fine sand to fine gravel.....	141.0	152.0
Clay, silty, hard, light-brown; contains very fine to very coarse sand; interbedded with dense clay..	152.0	173.0
Sand, very fine, to fine gravel, silty.....	173.0	178.0
Clay, silty, hard, light-brown; contains very fine to very coarse sand.....	178.0	184.0
Sand, medium to coarse; contains very fine sand to very fine gravel.....	184.0	187.0

Clay, silty, hard, light-brown, and clayey silt; contains very fine to very coarse sand.....	187.0	204.0
Caliche, hard, white; contains some white chert.....	204.0	211.5
Silt, hard, light-brown; contains very fine to very coarse sand.....	211.5	219.0
Chert, white.....	219.0	221.0
Silt, hard, light-brown; contains very fine to very coarse sand and buff hard caliche.....	221.0	232.0
Silt and clay; light-brown; contains very fine to very coarse sand and caliche.....	232.0	248.0
Sand, very fine, to very fine gravel, silty; inter- bedded with sandy silt.....	248.0	252.0
Silt, hard, tan to green; contains sand, gravel, and caliche.....	252.0	258.5
Caliche, hard, buff.....	258.5	259.5
Silt, hard, tan to green; contains sand, gravel, and caliche; interbedded with silty clay.....	259.5	272.0
Silt, sandy, hard, tan; contains some large pebbles; interbedded with lenses of clay.....	272.0	285.0
Sand, very fine, [to medium] gravel.....	285.0	289.0
Sand, very fine, to medium gravel, well-cemented....	289.0	291.5
Clay and silt; contains very fine to very coarse sand.....	291.5	309.0
Sand, fine, to very fine gravel, well-cemented; interbedded with soft sandy to silty clay.....	309.0	320.0
Clay, hard, plastic, tan; contains very fine to very coarse sand and some caliche.....	320.0	332.0
Note: Interval from 372 ft to 396 ft was correlated as White River Group in USGS Water-Supply Paper 1577; considered to be part of the Ogallala Group in this report		
Silty, clayey, tan; contains very fine to coarse sand and caliche.....	332.0	372.0
Silt, clayey, tan; contains lenses of brown dense clay.....	372.0	382.0
Silt, clayey, tan; contains lenses of very fine to coarse sand.....	382.0	386.5
Sand, medium to coarse; contains very fine to very coarse sand.....	386.5	396.0
Tertiary System - Oligocene Series - White River Group:		
Clay, hard, plastic, light-green.....	396.0	402.0
Claystone, hard, green; contains maroon hard clay...	402.0	412.0
Clay, silty, hard, gray-green.....	412.0	419.0
Clay, plastic, and hard green claystone; contains layer of gray and maroon hard clay.....	419.0	442.0
Clay, silty, calcareous, hard, gray to tan.....	442.0	482.0
Clay, hard, plastic, white to green.....	482.0	512.0
Clay, hard, plastic, green.....	512.0	529.0
Clay, silty, calcareous, very hard, white to gray...	529.0	551.0
Siltstone, hard, white to light-green; contains layers of white hard silty clay.....	551.0	565.0

Clay, hard, plastic, yellow and light-gray with limonitic stain.....	565.0	582.0
Sandstone, very fine grained, hard, light-blue.....	582.0	595.0
Sandstone, fine-grained, very hard, royal blue to blue-gray.....	595.0	599.0
Pierre (?) shale:		
Clay, silty, hard, light-blue.....	599.0	613.0
Note: Sample is a light gray clay, some cuttings appear to have embedded fine to coarse sand; interval considered to be a part of the White River Group in this report		

**12-38-36ddda
31-B-75
Perkins County**

Location: NE SE SE SE sec 36-12N-38W, 506 ft N and 37 ft W of SE
 cor sec
 Ground elevation: 3338 ft (t) Grant NE 7.5 min. quadrangle
 Depth to water: Dry to 133 ft, caved (9/15/75)
 Electric log to 420 ft

Depth, in feet
 From To

Quaternary System, undifferentiated:

Silt, slightly clayey, slightly sandy, sand is mostly very fine with rare coarse grains, dark brown-gray; moderately sandy 1.2 to 2.9 ft, contains some fine sand; in part light gray 2.9 to 3.3 ft, slightly calcareous, contains a few limy areas.....	0.0	3.3
Silt, very slightly clayey, moderately sandy, sand is mostly very fine, silt is very coarse, light olive-gray, slightly calcareous; light brown to light brownish gray 4.7 to 5 ft, contains a trace of medium to coarse sand and rare lithic limy grains.....	3.3	5.0
Silt, moderately clayey; moderately sandy, sand is very fine to fine with a little medium and rare coarse sand grains, medium reddish brown, contains rare limy areas and a trace of lithic limy grains; light yellow-brown 5.7 to 7 ft, sand is mostly very fine to fine.....	5.0	9.0

Tertiary System - Miocene Series - Ogallala Group:

Silt, moderately to very clayey, moderately sandy, sand is very fine to fine with rare coarser grains, very light brown-gray to reddish brown, very calcareous, in part slightly indurated; mostly slightly to moderately clayey 10 to 15 ft, contains much secondary lime 10 to 13.5 ft; bright reddish brown 13.5 to 15 ft, contains scattered consolidated limy areas, slightly siliceous.....	9.0	15.0
Sand, slightly to in part moderately clayey, sand is very fine to fine with much fine sand, bright reddish brown, contains rare limy areas; contains considerable limy cementation 18 to 18.5 ft, siliceous.....	15.0	18.5
Siltstone, sandy, sand is mostly fine with scattered coarse grains, very calcareous and siliceous, light pinkish to whitish gray.....	18.5	20.0

Siltstone-sandstone, sand is very fine to fine with a trace of medium sand, very light pinkish-gray and white, very calcareous, moderately siliceous; sand is slightly finer grained 22.5 to 23 ft.....	20.0	23.0
Sand, slightly clayey, sand is very fine to fine with rare medium to coarse sand, reddish brown, contains some limy areas; contains scattered medium to very coarse sand 24 to 25 ft.....	23.0	25.0
Silt, slightly to moderately clayey, very sandy, sand is very fine to fine with a trace of medium sand, light yellow-brown and bright reddish brown, contains common limy areas; only slightly clayey below 26 ft and with fewer limy areas, slight dark stains.....	25.0	28.0
Sandstone, moderately clayey, sand is very fine to fine with a little medium and a trace of coarse sand, noncalcareous, slightly indurated, medium brown-gray to gray-brown; contains rare gravel grains 30 to 33 ft.....	28.0	33.0
Sand, very fine to fine with 10 to 20 percent medium sand to fine gravel, contains rare limy grains, (possibly lithic); very light reddish brown 35 to 36 ft; indurated, very calcareous 36 to 39 ft; contains some coarse sand and fine gravel below 37.9 ft.....	33.0	39.0
Sand, some gravel, sand is fine to very coarse, gravel is fine, much coarse sand; much very coarse sand and fine gravel 40 to 43.5 ft, granitic.....	39.0	45.3
Sandstone, slightly clayey, silty, sand is mostly fine, light gray-brown, very calcareous; very silty, probably contains volcanic ash 50 to 53 ft; slightly more clayey 53 to 55 ft, contains siliceous rootlets; moderately clayey below 55 ft, sand is very fine to medium.....	45.3	58.0
Silt, moderately clayey, sandy, sand is mostly very fine, brown, moderately calcareous; moderately to very clayey 59.5 to 61.3 ft.....	58.0	61.3
Silt, moderately clayey, moderately sandy, sand is very fine to fine, reddish brown, slightly calcareous; slightly less clayey and slightly more sandy below 63 ft.....	61.3	68.0
Silt, slightly clayey, very sandy, sand is fine to coarse with rare very coarse sand and fine gravel, gray-brown, moderately to very calcareous; moderately sandy 70 to 74.5 ft; slightly calcareous 70.5 to 73.8 ft.....	68.3	74.5

Silt, moderately clayey, slightly sandy, sand is mostly fine, reddish brown, slightly to moderately calcareous; moderately to very clayey 76 to 77 ft; pale olive 77 to 86 ft; slightly calcareous below 83 ft; contains a trace of coarser sand and fine gravel below 86 ft; moderately to very sandy 88.7 to 90 ft.....	74.5	90.0
Silt, moderately to very clayey, slightly sandy, sand is mostly fine, reddish brown, slightly calcareous; mostly moderately to very calcareous 91.3 to 103 ft, contains some hard layers.....	90.0	103.0
Silt, slightly to moderately clayey, slightly sandy, sand is fine, pale reddish to gray-brown, slightly calcareous; moderately to very clayey 106.5 to 110 ft, reddish brown; interbedded slightly and moderately calcareous below 112 ft; limy indurated layer 115.6 to 116 ft; moderately sandy below 122 ft; may have some volcanic ash and or mica 125 to 127.8 ft.....	103.0	127.8
Sand, some gravel, sand is fine to very coarse, gravel is fine; much coarse to very coarse sand 130 to 135.1 ft.....	127.8	135.1
Silt, moderately clayey, slightly sandy, sand is mostly fine, brown, slightly calcareous; very calcareous 142 to 143.5 ft, contains some fine calcareous sandstone; slightly more clayey 143.5 to 145.9 ft; moderately sandy 145.9 to 148 ft, sand is very fine to medium, contains a trace of coarse sand and fine gravel; moderately calcareous with indurated layers below 148 ft; very sandy 155 to 156 ft.....	135.1	156.0
Sand, some gravel, sand is fine to very coarse with some fine gravel, much coarse to very coarse sand; silty 156 to 156.5 ft; contains a trace of medium gravel 160 to 164.6 ft.....	156.0	164.6
Silt, slightly clayey, slightly sandy, sand is mostly fine, pale brown, moderately calcareous, contains rare gravel grains; contains some calcareous sandstone 170 to 171 ft; moderately sandy 171 to 175.5 ft; very sandy 175.5 to 178 ft.....	164.6	178.0
Sand, fine to very coarse, much coarse sand, contains a trace of gravel; slightly gravelly below 178 ft, gravel is fine; contains a trace of medium gravel 185 to 188 ft.....	178.0	188.0
Silt, slightly to moderately clayey, slightly sandy, sand is mostly very fine, reddish brown; contains some limy indurated areas 190 to 195.5 ft.....	188.0	195.5
Sandstone and sandy to clayey silt interbedded, pale brown, very calcareous; contains a dark brown sandstone layer 199.5 to 200 ft.....	195.5	200.0

Sandstone, slightly clayey, very silty, sand is very fine to medium, much fine sand, brown, slightly calcareous; slightly more medium sand 204.5 to 210 ft, moderately calcareous; slightly calcareous 210 to 212.4 ft.....	200.0	212.4
Silt, slightly clayey, moderately to very sandy, sand is mostly very fine, brown, moderately calcareous; moderately clayey 218 to 222 ft; slightly more sand 222 to 225 ft,, slightly calcareous; dark brown 225 to 226 ft, very slightly calcareous, may contain volcanic ash; contains limy indurated areas 229 to 239.7 ft; slightly calcareous 239.7 to 240 ft, very sandy, contains a trace of coarse to very coarse sand, may contain some volcanic ash.....	212.4	240.0
Sand and gravel, sand is fine to very coarse, gravel is fine with a trace of medium, common red silicates with some orthoclase feldspar; contains a little medium gravel 250 to 260 ft; contains rare coarse gravel 255 to 260 ft; contains thin clayey and limy area 258 to 258.8 ft.....	240.0	260.0
Sand, some gravel, gravel is fine, much coarse sand, silty, contains limy indurated areas.....	260.0	280.0
Sandstone, slightly clayey, very silty, sand is very fine to medium, reddish brown, contains some limy indurated areas.....	280.0	287.0
Silt, slightly clayey, very sandy, sand is mostly fine, pale brown, moderately calcareous.....	287.0	288.3
Silt, clayey, pale yellow, contains a little olive-green sandstone.....	288.3	290.0
Silt, very sandy, sand is very fine to fine, interbedded pale olive and reddish brown.....	290.0	295.0
Silt, very sandy, sand is very fine to medium, pale olive; moderately to very calcareous 298 to 300 ft; slightly indurated 300 to 305 ft, noncalcareous, contains many siliceous rootlets.....	295.0	305.0
Sandstone, slightly silty, sand is very fine to fine, pale olive, moderately calcareous.....	305.0	310.0
Silt, slightly clayey, very sandy, sand is mostly very fine to fine, contains rare very coarse sand grains, pale olive to white, slightly calcareous; sand is fine to coarse below 320 ft.....	310.0	321.3
Sand and gravel, sand is fine to very coarse, gravel is fine, much very coarse sand and fine gravel; contains a trace of medium gravel 335 to 340 ft; mostly fine to very coarse sand 360 to 370 ft.....	321.3	370.0
Sand, moderately clayey, slightly silty, sand is fine to very coarse with some fine gravel.....	370.0	375.0
Sand and gravel, sand is fine to very coarse, gravel is fine, much very coarse sand and fine gravel....	375.0	392.5

Tertiary System - Oligocene Series - White River Group:

Clay, white, gray, reddish brown and reddish purple; mostly white and very light gray below 405 ft; slight dark staining below 415 ft.....	392.5	426.0
Sand, very fine to medium, much fine.....	426.0	428.0
Clay, medium gray and yellow.....	428.0	431.5
Sand, fine to very coarse, some fine gravel, white and gray quartz.....	431.5	432.9

Cretaceous System - Upper Cretaceous Series - Montana Group:

Pierre Formation:

Shale, clay, dark gray; contains thin ironstone layer or concretion 436.8 to 437.2 ft.....	432.9	440.0
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