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Buffalo County Test Hole Logs

Vincent H. Dreeszen

University of Nebraska-Lincoln

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BUFFALO COUNTY Test-Hole Logs

Vincent H. Dreeszen

**Nebraska Water Survey
Test-Hole Report No. 10**

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



February 2000



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UNIVERSITY OF NEBRASKA-LINCOLN CREDITS

UNIVERSITY OF NEBRASKA-LINCOLN

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INSTITUTE OF AGRICULTURE AND NATURAL RESOURCES

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CONSERVATION AND SURVEY DIVISION

Mark S. Kuzila - Director

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, 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.

The Conservation and Survey Division provides information and educational programs to all people without regard to race, color, national origin, sex or handicap.

Publication and price lists are furnished upon request.

February 2

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The author gratefully acknowledges the contributions of the following Conservation and Survey Division personnel for production of this test-hole log book: Duane Mohlman for computer assistance, Melba Stemm for typing the logs, Dee Ebbeka and Ann Mack for drafting the illustrations, and Larry Cast for his review.

INTRODUCTION

In 1930, the Conservation and Survey Division (CSD) of the University of Nebraska and the U.S. Geological Survey (USGS) 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 CSD 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 since 1930.

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 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, most 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 the Conservation and Survey Division, 113 Nebraska Hall, University of Nebraska-Lincoln, 68588.

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 test-hole sites was determined is indicated in the heading of each log, as follows: a = altimeter, h = hand leveling, i = instrument, t = estimated from topographic map.

The test-hole records 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 CSD or in press.

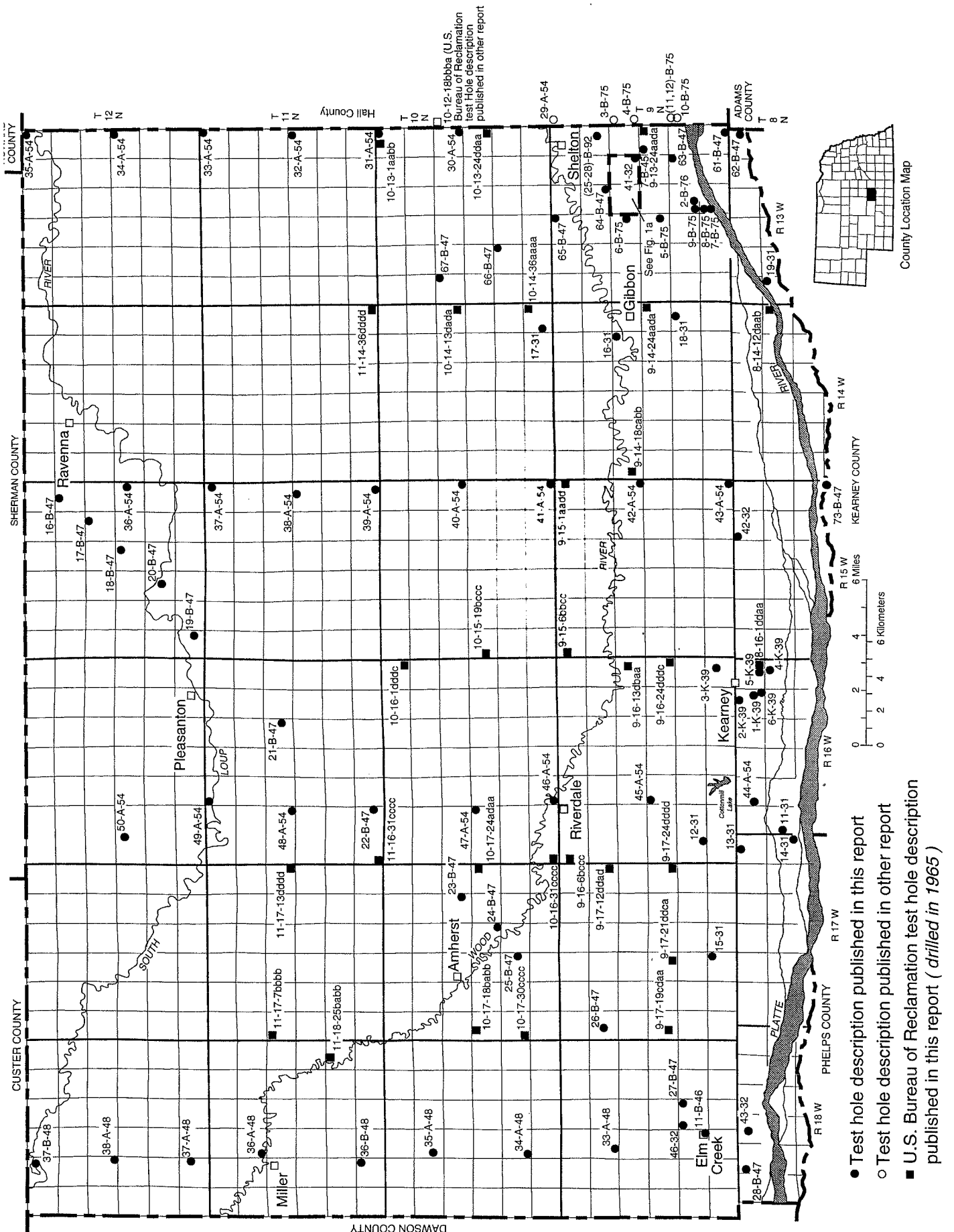


Fig. 1. Test-hole location map of Buffalo County.

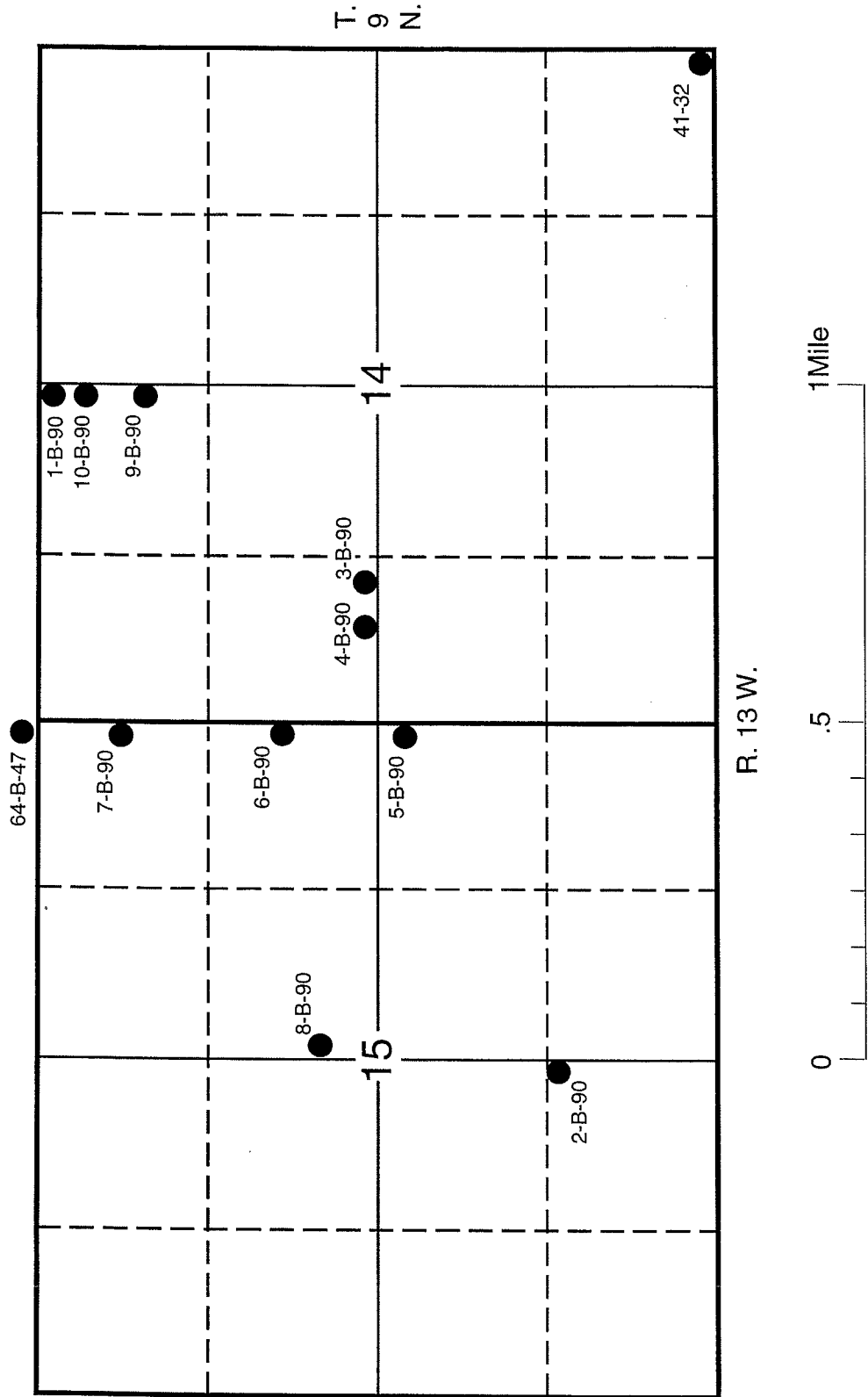


Fig. 1a. Test-hole location of enlargement area in Buffalo County.

Figure 2. Buffalo County sample geophysical log 10-15-13 ddaa (40-A-54)

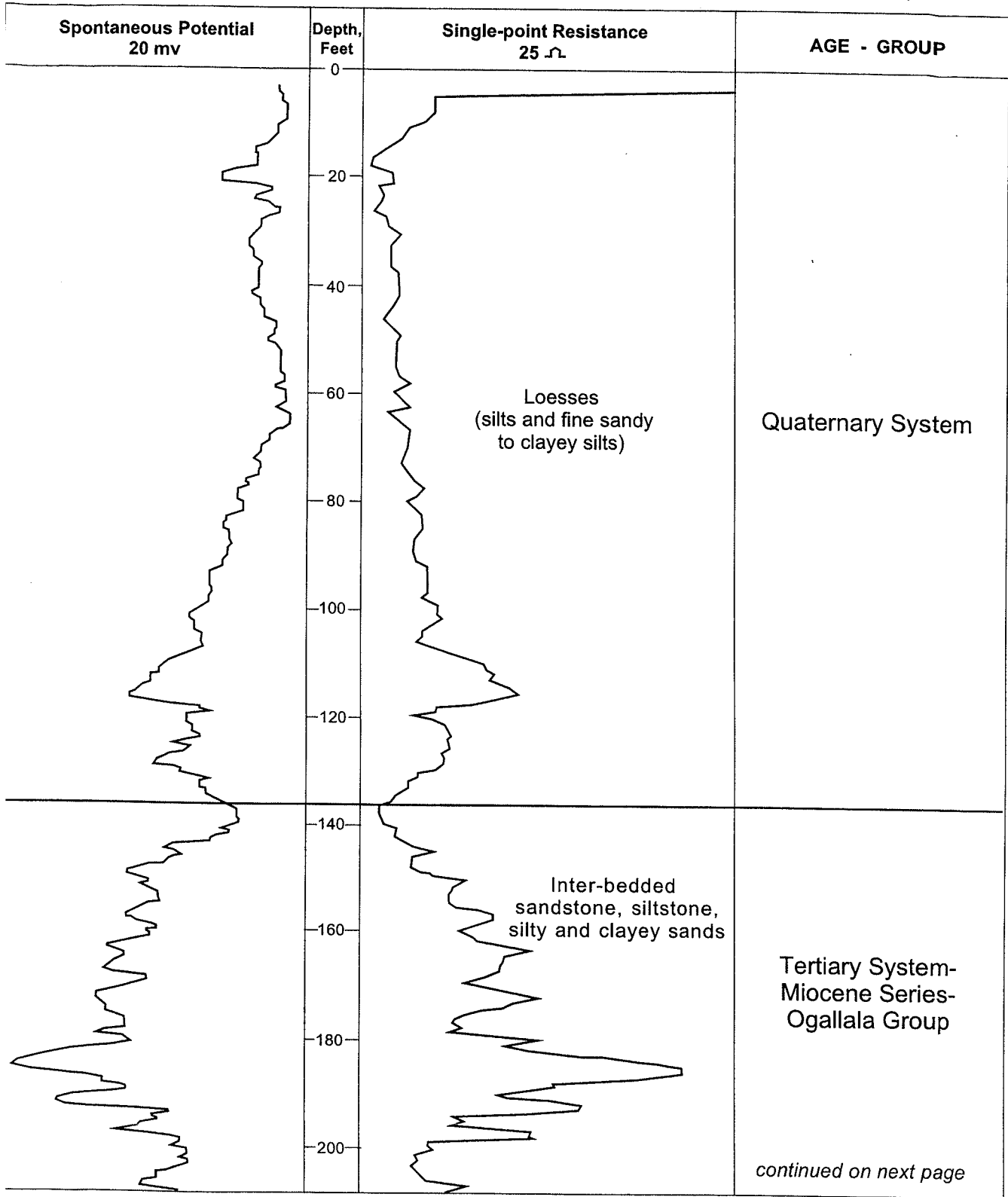
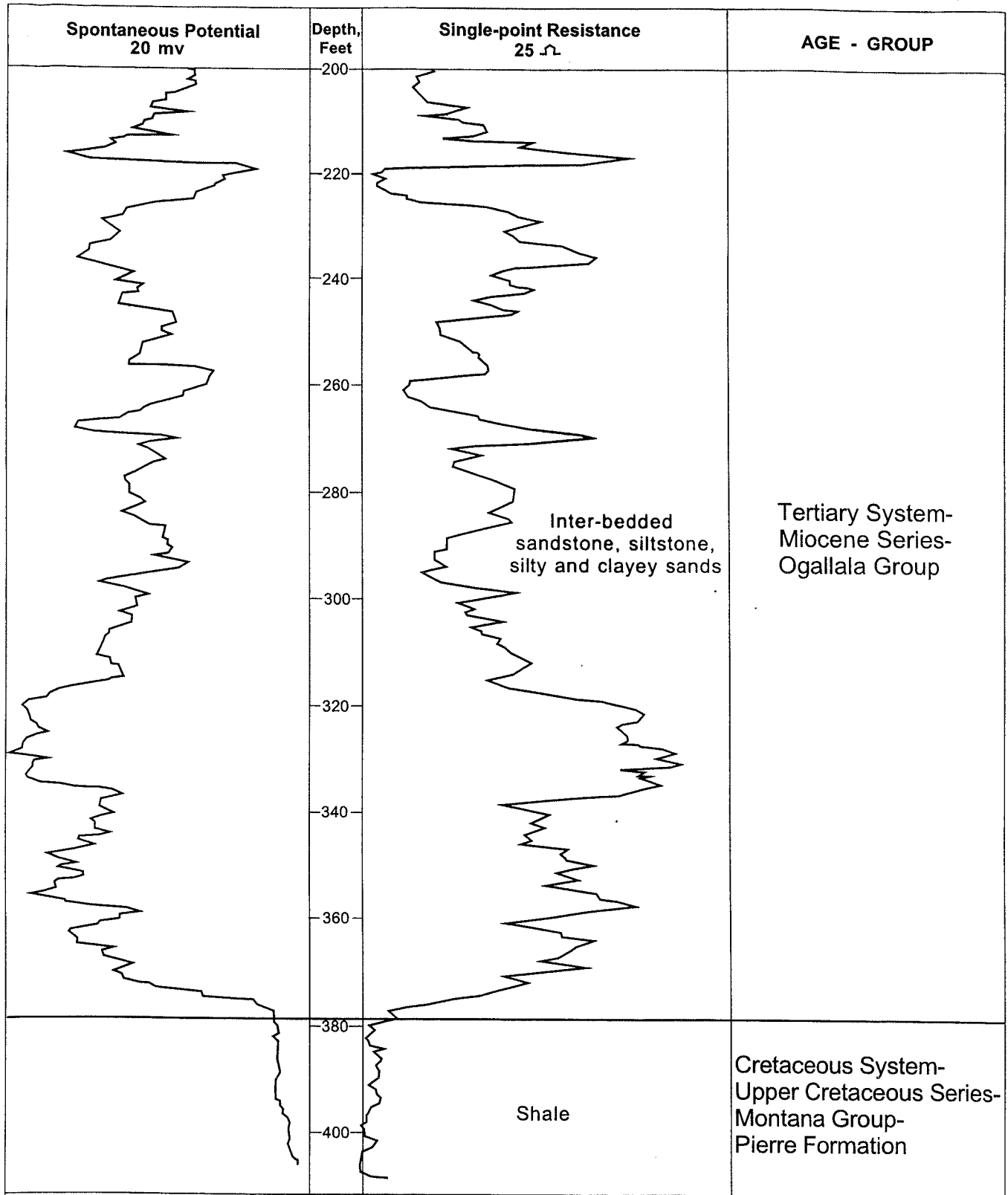


Figure 2 continued. Buffalo County sample geophysical log 10-15-13 ddaa (40-A-54)



Each test hole is identified by a number assigned in the field (for example #3-B-67, #41-79), 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. For example, a test hole located in the SW NW SW NW section 31-10N-10W is also located as 10-10-31bcbc or 10 10W 31 BCBC.

The logs of test holes drilled by the United States Bureau of Reclamation (USBR) are included in this report. Test holes were drilled in 1965 as a part of the Mid-State investigation to supplement the grid pattern of test drilling previously established by CSD and the USGS. They provide additional valuable insight to the hydrogeology of Buffalo County and the region. Test holes drilled by USBR were along north-south lines; profile numbers 6, 7, 8, 9, and 10, starting with profile 6 in the west along range lines 17 and 18W, profile 10 is to the east along range lines 12 and 13W on the Buffalo-Hall county line. The profile number is included with the test hole number to facilitate the filing of the logs. Samples, field logs, and geologic logs are on file with CSD. Test holes were drilled with hydraulic rotary equipment. Some intervals were sampled with use of a split spoon or by coring equipment. The author, and/or Frank A. Smith, CSD geologist emeritus, visually examined all of the available samples (some were submitted for laboratory analysis).

The author or other CSD scientist examined most of the available samples microscopically. The age of sediments in the paleovalley fills is in question. Although included with the Quaternary in this report, some of the sediments may be late Tertiary (Pliocene) in age. Likewise there is a fine-grained Tertiary unit underlying typical Ogallala sediments. The sediments are probably a part of the Ogallala Group.

Test holes are arranged in this publication by township, range and section starting with 8N-13W and progressing numerically to 8N-14W and then to 9N-13W and so on.

A = NE 1/4
 B = NW 1/4
 C = SW 1/4
 D = SE 1/4
 1 Section =
 1 Mile²=
 640 Acres

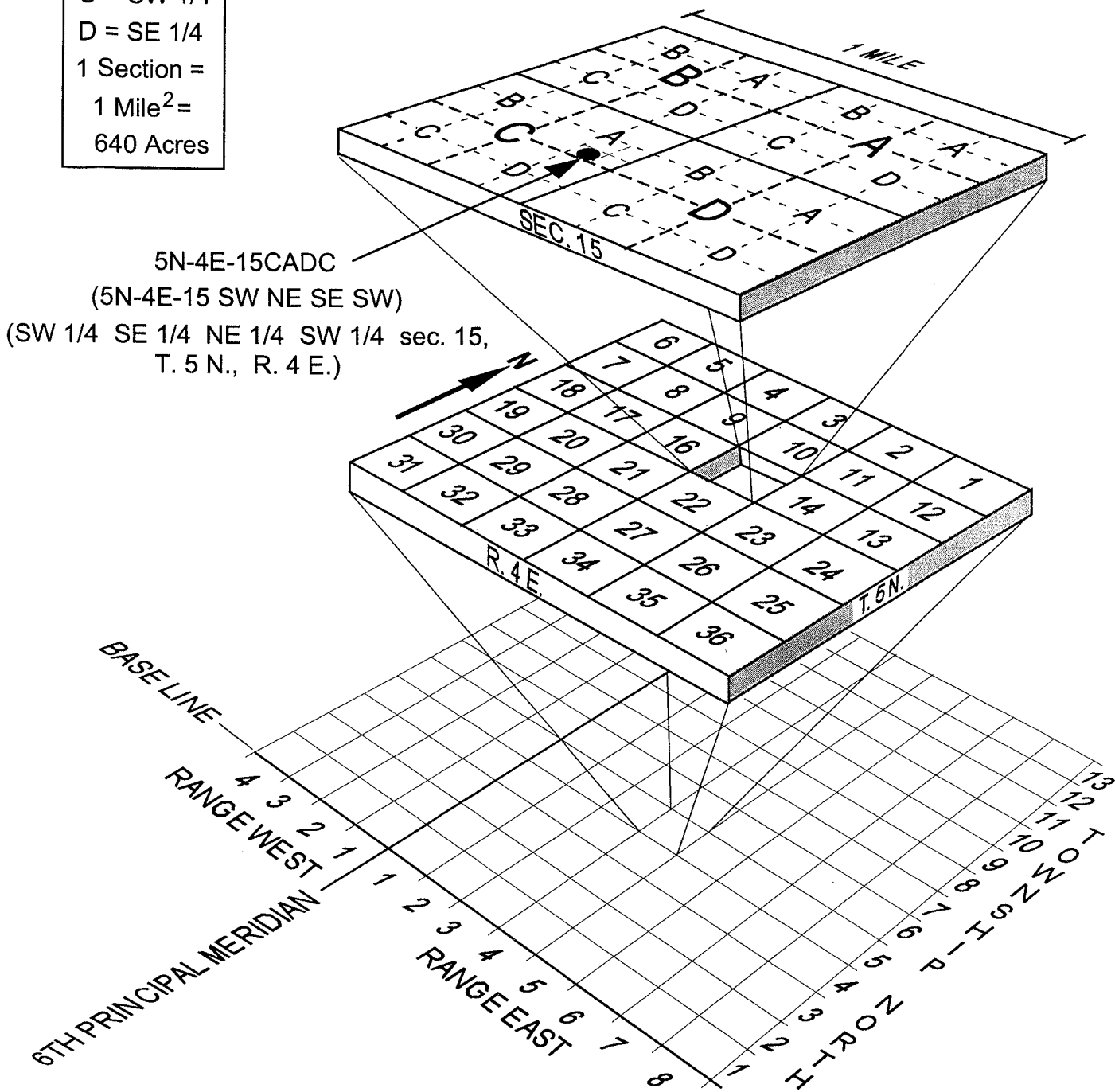


Fig. 3. System for identifying test-hole according to its location.

SELECTED REFERENCES

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

Some Publications that are Guides to Earth Resources of Buffalo County

- Lugn, A. L., and Wenzel, L. K., *Geology and Ground-Water Resources of South-Central Nebraska, with special references to the Platte River valley between Chapman and Gothenberg*. U. S. Geological Survey Water-Supply Paper 779, 1936.
- Waite, H. A., Swenson, H. A., and others, *Progress Report on the Geology and Ground-Water Hydrology of the Lower Platte River Valley, Nebraska, with a section on the chemical quality of the ground water*. Geological Circular 20, 1949.
- Schreurs, R. L., and Rainwater, F. H., *Geology and Ground-Water Resources of Buffalo County and Adjacent Areas, Nebraska*. U. S. Geological Survey Water-Supply Paper 1358, 1956.
- Bentall, R., and Dreeszen, V. H., and others, *Hydrology, Nebraska Mid-State Division, and associated areas*. Conservation and Survey Division, Institute of Agriculture and Natural Resources, University of Nebraska-Lincoln, 1975.
- Diffendal, R. F. Jr., and Smith, F. A., *Geology Beneath the Primary Management Systems Evaluation Area (MSEA) Site Southwest of Shelton, Buffalo County, Nebraska*. Geological Survey Report of Investigations No. 11, 1996.
- Souders, V. L., *Bedrock Maps and Cross Sections Showing Configuration of Bedrock Surfaces, Broken Bow 1° x 2° Quadrangle, Nebraska*. Prepared in cooperation with the Conservation and Survey Division, Institute of Agriculture and Natural Resources, University of Nebraska-Lincoln, and the U. S. Geological Survey, Geologic Investigation Map, in press.

**Buffalo County
Test-Hole Table of Contents**

Legal Descrip	Test-Hole	Page
Twp Rge Sec	Number	
08N 13W 01ADDD	62-B-47	1
08N 13W 07AAAA	19-31	3
08N 14W 12DAAB	USBR Profile 9(a)	4
08N 15W 02BBBB	42-32	5
08N 15W 24AAAA	73-B-47	6
08N 16W 01CDAA	05-K-39	8
08N 16W 01DDAA	USBR Profile 7(a)	9
08N 16W 02ABCD	02-K-39	10
08N 16W 02DBDA	01-K-39	11
08N 16W 02DDDA	06-K-39	12
08N 16W 05BCCC	44-A-54	13
08N 16W 07CB	11-31	16
08N 16W 12ABDD	04-K-39	17
08N 17W 01AB	13-31	18
08N 17W 12DDD	14-31	19
08N 18W 04DDDB	43-42	20
08N 18W 05BCCC	28-B-47	21
09N 13W 04AAAA	65-B-47	24
09N 13W 10DDDD	64-B-47	26
09N 13W 12DACC	27-B-92	28
09N 13W 12DBDD	28-B-92	29
09N 13W 12DCAA	25-B-92	30
09N 13W 12DDBB	26-B-92	31
09N 13W 14BAAA	01-B-90	32
09N 13W 14BAAA	10-B-90	34
09N 13W 14BADA	09-B-90	35
09N 13W 14BCD	04-B-90	36
09N 13W 14BDC	03-B-90	37
09N 13W 14DDDD	41-32	38
09N 13W 15AAD	07-B-90	39
09N 13W 15ACC	08-B-90	40
09N 13W 15AD	06-B-90	41
09N 13W 15ADD	05-B-90	42
09N 13W 15CAD	02-B-90	43
09N 13W 16DAAA	06-B-75	45
09N 13W 21DDDD	05-B-75	46
09N 13W 24AADA	USBR Profile 10(a)	47
09N 13W 26AAAA	63-B-47	48
09N 13W 27CCCC	09-B-75	50
09N 13W 27CDCA	02-B-76	51
09N 13W 34BBB	08-B-75	53

09N	13W	34BBC	07-B-75		54
09N	13W	36DDCD	61-B-47		55
09N	14W	14AAAA	16-31		56
09N	14W	18CABB	USBR Profile 8(a)		57
09N	14W	24AADA	USBR Profile 9(b)		58
09N	14W	25BAA	18-31		60
09N	15W	01AADD	USBR Profile 8(b)		61
09N	15W	06BBCC	USBR Profile 7(b)		63
09N	15W	13DDDD	42-A-54		65
09N	15W	36DDDD	43-A-54		68
09N	16W	06BCCC	USBR Profile 6(a)		71
09N	16W	13DBAA	USBR Profile 7(c)		72
09N	16W	20BBBA	45-A-54		74
09N	16W	24DDDC	USBR Profile 7(d)		78
09N	16W	30CDDD	12-31		80
09N	16W	36DBA	03-K-39		82
09N	17W	07BD DD	26-B-47		83
09N	17W	12DDAD	USBR Profile 6(b)		87
09N	17W	19CDAA	USBR Profile 5(a)		89
09N	17W	21DDCA	USBR Profile 5(b)		93
09N	17W	24DDDD	USBR Profile 6(c)		95
09N	17W	33AAA	15-31		98
09N	18W	09CDDD	33-A-48		100
09N	18W	27AAAA	27-B-47		102
09N	18W	27BBBB	46-32		105
09N	18W	28DDDD	11-B-46		106
10N	13W	01AAAA	31-A-54		108
10N	13W	01AABB	USBR Profile 10(b)		111
10N	13W	13DDDA	30-A-54		113
10N	13W	18AAAA	67-B-47		116
10N	13W	24DDAA	USBR Profile 10(c)		119
10N	13W	29AAAA	66-B-47		120
10N	14W	13DADA	USBR Profile 9(c)		122
10N	14W	36AAAA	USBR Profile 9(d)		124
10N	14W	36CB	17-31		125
10N	15W	13DDAA	40-A-54		126
10N	15W	19BCCC	USBR Profile 7(e)		130
10N	15W	36DDDA	41-A-54		132
10N	16W	01DDDC	USBR Profile 7(f)		136
10N	16W	19AAAA	47-A-54		138
10N	16W	31CCCC	USBR Profile 6(d)		142
10N	16W	32CCCC	46-A-54		145
10N	17W	14DDAA	23-B-47		148
10N	17W	18BABB	USBR Profile 5(c)		151
10N	17W	22DDDC	24-B-47		154
10N	17W	24ADAA	USBR Profile 6(e)		157
10N	17W	28DAAD	25-B-47		159
10N	17W	30CCCC	USBR Profile 5(d)		162

10N 18W 09CCBB 35-A-48	163
10N 18W 28CCCC 34-A-48	166
11N 13W 01AABB 33-A-54	169
11N 13W 24AAAA 32-A-54	173
11N 14W 36DDDD USBR Profile 9(e)	176
11N 15W 01ADAA 37-A-54	178
11N 15W 24ABBA 38-A-54	181
11N 15W 36DCDD 39-A-54	185
11N 16W 05BBBC 49-A-54	190
11N 16W 15DADA 21-B-47	194
11N 16W 18DDDD 48-A-54	197
11N 16W 31CCCC USBR Profile 6(f)	202
11N 16W 31DADD 22-B-47	205
11N 17W 07BBBB USBR Profile 5(e)	208
11N 17W 13DDDD USBR Profile 6(g)	210
11N 18W 09CCBB 36-A-48	211
11N 18W 25BABB USBR Profile 5(f)	214
11N 18W 32AAAA 36-B-48	215
12N 13W 01AAAA 35-A-54	219
12N 13W 24AAAA 34-A-54	221
12N 15W 12BAAD 16-B-47	224
12N 15W 14ABAA 17-B-47	226
12N 15W 22ABAB 18-B-47	228
12N 15W 24ADAD 36-A-54	230
12N 15W 28BDCD 20-B-47	233
12N 15W 31DDAA 19-B-47	235
12N 16W 19BDDA 50-A-54	238
12N 18W 05ABDD 37-B-48	243
12N 18W 17DDDD 38-A-48	246
12N 18W 32ADDD 37-A-48	249

Letters in parentheses are for Conservation and Survey Division internal use.

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

Buffalo County
Test-Hole Table of Contents

Arranged by year drilled, test-hole number.

1931			
08N 16W 07CB	11-31	. . . . .	16
09N 16W 30CDDD	12-31	. . . . .	80
08N 17W 01AB	13-31	. . . . .	18
08N 17W 12DDD	14-31	. . . . .	19
09N 17W 33AAA	15-31	. . . . .	98
09N 14W 14AAAA	16-31	. . . . .	56
10N 14W 36CB	17-31	. . . . .	125
09N 14W 25BAA	18-31	. . . . .	60
08N 13W 07AAAA	19-31	. . . . .	3
1932			
09N 13W 14DDDD	41-32	. . . . .	38
08N 15W 02BBBB	42-32	. . . . .	5
09N 18W 27BBBB	46-32	. . . . .	105
1939			
08N 16W 02DBDA	01-K-39	. . . . .	11
08N 16W 02ABCD	02-K-39	. . . . .	10
09N 16W 36DBA	03-K-39	. . . . .	82
08N 16W 12ABDD	04-K-39	. . . . .	17
08N 16W 01CDAA	05-K-39	. . . . .	8
08N 16W 02DDDA	06-K-39	. . . . .	12
1942			
08N 18W 04DDDB	43-42	. . . . .	20
1946			
09N 18W 28DDDD	11-B-46	. . . . .	106
1947			
12N 15W 12BAAD	16-B-47	. . . . .	224
12N 15W 14ABAA	17-B-47	. . . . .	226
12N 15W 22ABAB	18-B-47	. . . . .	228

10N	16W	32CCCC	46-A-54	. . . . .	145
10N	16W	19AAAA	47-A-54	. . . . .	138
11N	16W	18DDDD	48-A-54	. . . . .	197
11N	16W	05BBBC	49-A-54	. . . . .	190
12N	16W	19BDDB	50-A-54	. . . . .	238

1965

See USBR listing at end of this table.

1975

09N	13W	21DDDD	05-B-75	. . . . .	46
09N	13W	16DAAA	06-B-75	. . . . .	45
09N	13W	34BBC	07-B-75	. . . . .	54
09N	13W	34BBB	08-B-75	53
09N	13W	27CCCC	09-B-75	50

1976

09N	13W	27CDCA	02-B-76	51
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1990

09N	13W	14BAAA	01-B-90	32
09N	13W	15CAD	02-B-90	43
09N	13W	14BDC	03-B-90	37
09N	13W	14BCD	04-B-90	36
09N	13W	15ADD	05-B-90	. . . . .	42
09N	13W	15AD	06-B-90	. . . . .	41
09N	13W	15AAD	07-B-90	. . . . .	39
09N	13W	15ACC	08-B-90	. . . . .	40
09N	13W	14BADA	09-B-90	. . . . .	35
09N	13W	14BAAA	10-B-90	. . . . .	34

1992

09N	13W	12DCAA	25-B-92	. . . . .	30
09N	13W	12DDBB	26-B-92	. . . . .	31
09N	13W	12DACC	27-B-92	. . . . .	28
09N	13W	12DBDD	28-B-92	. . . . .	29

United States Bureau of Reclamation (USBR)
Most drilled in 1965

09N	17W	19CDAA	USBR	Profile 5(a)	. . . . .	89
09N	17W	21DDCA	USBR	Profile 5(b)	. . . . .	93
10N	17W	18BABB	USBR	Profile 5(c)	. . . . .	151
10N	17W	30CCCC	USBR	Profile 5(d)	. . . . .	162
11N	17W	07BBBB	USBR	Profile 5(e)	. . . . .	208
11N	18W	25BABB	USBR	Profile 5(f)	. . . . .	214
09N	16W	06BCCC	USBR	Profile 6(a)	. . . . .	71
09N	17W	12DDAD	USBR	Profile 6(b)	. . . . .	87
09N	17W	24DDDD	USBR	Profile 6(c)	. . . . .	95
10N	16W	31CCCC	USBR	Profile 6(d)	. . . . .	142
10N	17W	24ADAA	USBR	Profile 6(e)	. . . . .	157
11N	16W	31CCCC	USBR	Profile 6(f)	. . . . .	202
11N	17W	13DDDD	USBR	Profile 6(g)	. . . . .	210
08N	16W	01DDAA	USBR	Profile 7(a)	. . . . .	9
09N	15W	06BBCC	USBR	Profile 7(b)	. . . . .	63
09N	16W	13DBAA	USBR	Profile 7(c)	. . . . .	72
09N	16W	24DDDC	USBR	Profile 7(d)	. . . . .	78
10N	15W	19BCCC	USBR	Profile 7(e)	. . . . .	13
10N	16W	01DDDC	USBR	Profile 7(f)	. . . . .	136
09N	14W	18CABB	USBR	Profile 8(a)	. . . . .	57
09N	15W	01AADD	USBR	Profile 8(b)	. . . . .	61
08N	14W	12DAAB	USBR	Profile 9(a)	. . . . .	4
09N	14W	24AADA	USBR	Profile 9(b)	. . . . .	58
10N	14W	13DADA	USBR	Profile 9(c)	. . . . .	122
10N	14W	36AAAA	USBR	Profile 9(d)	. . . . .	124
11N	14W	36DDDD	USBR	Profile 9(e)	. . . . .	176
09N	13W	24AADA	USBR	Profile 10(a)	. . . . .	47
10N	13W	01AABB	USBR	Profile 10(b)	. . . . .	111
10N	13W	24DDAA	USBR	Profile 10(c)	. . . . .	119

**8-13-1addd
62-B-47
Buffalo County**

Location: SE SE SE NE sec 1-8N-13W, approximately 2640 ft S and 9 ft W
of NE cor sec

Ground elevation: 2014.1 ft (i) Denman 7.5 minute quadrangle

Depth to water: 5.5 ft (9/22/47)

	<u>Depth, in feet</u>	
	From	To
Quaternary System, undifferentiated:		
Road fill, sandy, silt.....	0.0	1.0
Sand, fine to coarse, thin gravel seams, iron stained.....	1.0	4.3
Sand, silty, sand is fine to coarse with scattered gravel grains, dark brown-gray.....	4.3	4.8
Silt, moderately clayey, sandy, sand mostly very fine to medium, light gray.....	4.8	6.0
Sand and gravel, silty, dark brown-gray.....	6.0	6.5
Sand and gravel, gravel is fine to medium, 45 per- cent gravel; 35 percent gravel below 10 ft.....	6.5	22.0
Silt, sandy, sand is very fine to fine, light yellowish to brownish gray.....	22.0	27.0
Sand, some gravel, sand is fine to very coarse, gravel is fine, 20 percent gravel; 10 percent gravel below 35 ft; slightly silty 39.5 to 44 ft..	27.0	44.0
Sand, some gravel, sand is fine to very coarse, gravel is mostly fine, 15 to 20 percent gravel....	44.0	60.0
Sand and gravel, gravel is fine with some medium, 50 to 60 percent gravel; 60 to 70 percent gravel below 75 ft.....	60.0	103.5
Silt, slightly clayey, moderately sandy, sand is very fine to fine, light brown-gray; some inter- bedded light gray sandy silt below 109.5 ft; light gray, slightly more clayey below 120 ft; light yellowish to brownish gray below 126 ft.....	103.5	145.0
Silt, very slightly clayey, moderately sandy, light brown; very sandy below 147.5 ft.....	145.0	150.0
Tertiary System - Miocene Series - Ogallala Group:		
Silt, very sandy and sandstone, sand is mostly very fine to fine, light brownish gray and light yellowish gray, sandstone only slightly indurated, many rootlets.....	150.0	154.0
Sandstone, sand is fine grained, whitish to very light olive-gray, some lithic yellow clay grains..	154.0	160.0

Cretaceous System - Upper Cretaceous Series - Montana Group:

Pierre Formation:

Shale, clay, light gray and yellow-brown, some bentonitic clay, noncalcareous; light to light medium gray below 170 ft.....	160.0	179.0
Shale, clay, dark gray, noncalcareous.....	179.0	190.0

**8-13-7aaaa
19-31
Buffalo County**

Location: NE NE NE NE sec 7-8N-13W, distances not recorded
 Ground elevation: 2040 ft (i) Gibbon South 7.5 minute quadrangle
 Depth to water: 5.4 ft (1931)
 Note: Log from WSP779 and examination of available samples

	<u>Depth, in feet</u>	
	From	To
Quaternary System, undifferentiated:		
"Soil, limy, hard, dark gray".....	0.0	4.0
Sand and gravel; "some intermixed clay 57 to 60 ft"; considerable sand 68 to 72 ft.....	4.0	74.0
"Sand, fine".....	74.0	84.0
"Sand, very fine, quicksand, quartz".....	84.0	135.0
Silt, brown, a few small rootlets.....	135.0	±155.0
Tertiary System - Miocene Series - Ogallala Group:		
Ogallala Group:		
Sand, clay, or sandstone.....	±155.0	157.0

8-14-12daab
USBR Mid-State Division (Profile 9)
Buffalo County

Location: NW NE NE SE sec 12-8N-14W, approximately 2630 ft N and
 500 ft W of SE cor sec
 Ground elevation: 2057.4 ft (i) Gibbon South 7.5 minute quadrangle
 Depth to water: Not measured

Compiled from sample descriptions by V.H. Dreeszen and
 interpretation of USBR geologic and field logs

	<u>Depth, in feet</u>	
	From	To
Quaternary System, undifferentiated:		
Silt, moderately clayey, slightly sandy, very dark brown-gray.....	0.0	3.0
Silt, very clayey, slightly sandy, sand is very fine to fine with some coarser grains, medium brown-gray, moderately calcareous.....	3.0	5.0
Sand, slightly gravelly, sand is fine to very coarse, a little fine to medium gravel, 5 to 10 percent gravel; 15 to 20 percent gravel 70 to 90 ft; 20 to 25 percent gravel 90 to 110 ft.....	5.0	117.0
Silt, moderately clayey, moderately sandy, sand is very fine to fine, light olive to yellowish gray..	117.0	120.0
Sand, fine to very coarse, 5 to 10 percent gravel, maximum size 3/4 inch.....	120.0	145.0
Silt, moderately clayey, very slightly sandy, sand is very fine to fine, light brown; light brownish gray 145 to 150 ft; slightly calcareous 150 to 160 ft; light medium brownish gray 160 to 170 ft, slightly to moderately calcareous; light brown 170 to 174 ft, moderately calcareous; very light brown 174 to 190 ft; some very light gray below 200 ft..	145.0	210.0
Silt, moderately clayey, moderately sandy, sand is very fine to fine, very light brown, slight plasticity.....	210.0	222.0
Silt, moderately clayey, very light brown, moderately calcareous, small limy particles.....	222.0	233.0
Cretaceous System - Upper Cretaceous Series - Montana Group:		
Pierre Formation:		
Shale, clay, very light gray with some very light brown, slight iron-oxide stain, moderately calcareous; some medium gray 247 to 245 ft; dark gray below 245 ft, moderately calcareous.....	233.0	260.0

**8-15-2bbbb
42-32
Buffalo County**

Location: NW NW NW NW sec. 2-8N-15W, distances not recorded
 Ground elevation: 2110 ft (i) Newark 7.5 minute quadrangle
 Depth to water: Not recorded

	<u>Depth, in feet</u>	
	From	To
Quaternary System, undifferentiated:		
"Soil, fine, silty, buff.....	0.0	3.0
Sand and gravel, approximately 60 percent gravel; approximately 40 percent gravel below 30 ft.....	3.0	58.0
Tertiary System - Miocene Series - Ogallala Group:		
Samples missing 50 to 70 ft, logged as calcareous grit, hard and soft, silty, sandy, light gray or whitish (Ogallala).....	58.0	70.0
Sandstone and clayey to sandy silt, light olive- gray, some light medium brown.....	70.0	80.0

**8-15-24aaaa
73-B-47
Buffalo County**

*Location: NE NE NE NE sec 24-8N-15W, approximately 330 ft S and 43 ft W of NE cor sec

Ground elevation: 2093.5 ft (i) Newark 7.5 minute quadrangle

Depth to water: 1.7 ft (10/1/47)

*Note: County line and E-W section line are indefinite boundaries, test hole may be on Buffalo-Kearney County line or may actually be in Kearney County

	<u>Depth, in feet</u>	
	From	To
Quaternary System, undifferentiated:		
Sand, silty, sand is fine to coarse with scattered gravel, medium brown-gray.....	0.0	0.7
Sand, fine to medium with a little coarse.....	0.7	0.9
Sand, fine to very coarse, contains scattered gravel and pebbles; contains thin yellow to dark stained seams.....	0.9	1.8
Sand, some gravel, sand is fine to very coarse, gravel is mostly fine to medium; contains some thin iron-stained zones; contains thin yellow-brown clay layers or clay balls at 15 and 18.5 ft.	1.8	20.0
Sand and gravel, gravel is fine with some medium to coarse, common iron staining; contains silt layer at 22.5 ft.....	20.0	29.0
Sand and gravel, gravel is fine to coarse; contains a few yellow and dark stained grains.....	29.0	40.0
Sand and gravel, gravel is mostly fine to medium, very slight iron staining.....	40.0	69.0
Silt, slightly clayey, slightly sandy, sand is very fine to fine, light brownish gray, moderate iron staining in upper 0.5 ft; light brown below 70 ft.	69.0	77.5
Sand, some gravel, sand is fine to very coarse, gravel is mostly fine.....	77.5	81.0
Silt, moderately clayey, light brown.....	81.0	90.0
Sand, fine to very coarse, contains a little fine to medium gravel; contains a thin silt layer at 98.5 ft.....	90.0	109.5
Silt, slightly clayey, interbedded, slightly and very sandy, sand is mostly very fine to medium, light brown-gray.....	109.5	124.0
Sand, fine to very coarse, contains some fine gravel.....	124.0	128.0
Sand, fine to coarse, with a little very coarse; contains silt layers 142 to 142.5 ft and 154 to 154.3 ft, light gray; sand is mostly fine to medium 160 to 165 ft.....	128.0	165.0

Silt, moderately to in part very clayey, contains a trace of embedded sand, light and medium gray, moderately to very calcareous; mostly light gray to light brownish gray 170 to 175 ft, some soft limy areas; in part very light brown below 175 ft, slightly sandy, sand is very fine to medium.....	165.0	179.5
Tertiary System - Miocene Series - Ogallala Group:		
Sand, slightly silty, very slightly clayey, sand is very fine to medium, light brownish gray, very slightly calcareous, weakly indurated; from 195 to 200 ft contains a few lithic gravel grains of clay or shale, white, calcareous, also contains a few grains of aragonite.....	179.5	204.0
Cretaceous System - Upper Cretaceous Series - Montana Group:		
Pierre Formation:		
Shale, clay, light gray and yellow-gray, some yellow brown, moderately calcareous; medium gray, moderately calcareous below 237 ft.....	204.0	260.0

8-16-1cdaa
5-K-39
Buffalo County

Location: NE NE SE SW sec 1-8N-16W, approximately 1150 ft N and 2550 ft W of SW cor sec, (75 ft E and 30 ft N of intersection of 14th Ave and D St.)

Ground elevation: 2145 ft (t) Kearney 7.5 minute quadrangle

Depth to water: Not recorded

Note: Samples missing, log interpreted from original field log

	<u>Depth, in feet</u>	
	From	To
Quaternary System, undifferentiated:		
Soil, dark brown.....	0.0	2.0
Silt, gray.....	2.0	5.5
Sand, some gravel, gravel is fine with some medium..	5.5	21.6
Sand and gravel.....	21.6	50.6
Silt, clayey, very light brown and brownish gray, calcareous.....	50.6	59.7

8-16-1ddaa
USBR Mid-State Division (Profile 7)
Buffalo County

Location: NE NE SE SE sec 1-8N-16W, 1050 ft N and 74 ft E of SE
 cor sec

Ground elevation: 2136.8 ft (i) Kearney 7.5 minute quadrangle

Depth to water: 14.2 ft (7/27/65)

Compiled from interpretation of USBR geologic log

	<u>Depth, in feet</u>	
	From	To
Quaternary System, undifferentiated:		
Silt, 75 percent low plasticity fines, 25 percent sand, dark brown.....	0.0	1.0
Sand, sand is fine to very coarse.....	1.0	4.0
Clay, organic, 85 percent medium plasticity fines, 15 percent fine to coarse sand, black, granular...	4.0	6.0
Sand and gravel, maximum size fine gravel, sand-stone boulder at 20 ft.....	6.0	43.0
Silt, 80 percent medium plasticity fines, 20 percent fine sand, light brown, firm, massive.....	43.0	78.0
Tertiary System - Miocene Series - Ogallala Group:		
Silt, sandy, 70 percent medium plasticity fines, 30 percent fine to medium sand, gray, moderately to highly calcareous, contains thinly bedded hard layers.....	78.0	155.0
Sand, silty, 20 percent medium plasticity fines, 70 percent fine to medium sand, 10 percent coarse sand, olive, cross bedded, in part slightly calcareous.....	155.0	189.0
Cretaceous System - Upper Cretaceous Series - Montana Group:		
Pierre Formation:		
Shale, clay, brown, firm bedded, moderately calcareous.....	189.0	196.0
Shale, clay, very dark gray, lightly weathered, slightly calcareous.....	196.0	200.0

**8-16-2abcd
2-K-39
Buffalo County**

Location: SE SW NW NE sec 2-8N-16W, in Pioneer Park, approximately
 1100 ft S and 2000 ft W of NE cor section
 Ground elevation: 2149 ft (t) Kearney 7.5 minute quadrangle
 Depth to water: Not recorded
 Note: Samples missing, log interpreted from original field log

	Depth, in feet	
	From	To
Quaternary System, undifferentiated:		
"Loam", very dark brown.....	0.0	7.0
Clay, gravelly, gray.....	7.0	9.0
Sand, some gravel, a few "Ogallala" fragments.....	9.0	20.0
Sand and gravel, mostly fine to medium gravel.....	20.0	56.2
Silt, slightly clayey, probably very fine to fine, sandy, soft, light brown to brownish gray, some concretions or calcareous layers; moderately clayey below 76.5 ft, light reddish brown; appears to have gravel lenses below 110 ft.....	56.2	115.0
Tertiary System - Miocene Series - Ogallala Group:		
Sand, silty to clayey, fine-grained, greenish, some white sandy clay; calcareous, some induration below 140 ft, very pale green; hard calcareous cementation 191 to 194 ft.....	115.0	194.0
Sandstone, greenish; hard layer 220 to 221 ft.....	194.0	221.0
Cretaceous System - Upper Cretaceous Series - Montana Group:		
Pierre Formation:		
Shale, clay, greenish to yellow-brown.....	221.0	227.0
Shale, light to medium gray with some yellow-brown..	227.0	234.0

**8-16-2dbda
1-K-39
Buffalo County**

Location: NE SE NW SE sec 2-8N-16W (30 ft N and 50 ft E of inter-section of 16th Street and 6th Avenue)

Ground elevation: 2149 ft (t) Kearney 7.5 minute quadrangle

Depth to water: Not recorded

Note: Samples missing, log interpreted from original field log

	<u>Depth, in feet</u>	
	From	To
Quaternary System, undifferentiated:		
Soil, very dark brown.....	0.0	5.0
Silt, clayey to gravelly, yellow-brown.....	5.0	8.0
Sand and gravel, coarse, a few pebbles.....	8.0	15.0
Sand and gravel, finer than above.....	15.0	25.0
Sand and gravel, fine to medium gravel.....	25.0	45.0
Silt, light to dark brown; mostly light brown below 55 ft; common concretions below 80 ft; lighter in color below 85.6 ft, probably calcareous; hard layer 94.7 to 95 ft.....	45.0	95.0
Tertiary System - Miocene Series - Ogallala Group:		
Marl, chalky, yellow.....	95.0	98.0
Sand, clayey, whitish to very light gray.....	98.0	111.0
Sandstone, soft, very light gray.....	111.0	127.0
Sand, silty, very light greenish gray.....	127.0	143.0
Sandstone, silty, white to very light greenish gray, sand mostly fine, calcareous, some hard layers....	143.0	197.0
Cretaceous System - Upper Cretaceous Series - Montana Group:		
Pierre Formation:		
Shale, black.....	197.0	207.0

8-16-2ddda
6-K-39
Buffalo County

Location: NE SE SE SE sec 2-8N-16W, approximately 400 ft N and 150 ft
E of SE cor sec

Ground elevation: 2147 ft (t) Kearney 7.5 minute quadrangle

Depth to water: Not recorded

Note: Samples missing, log interpreted from original field log

	<u>Depth, in feet</u>	
	From	To
Quaternary System, undifferentiated:		
"Loam", dark brown.....	0.0	2.0
Silt, clayey and sandy, brownish gray, calcareous...	2.0	11.0
Sand and gravel, gravel is mostly fine, some medium; gravel is fine to coarse below 24 ft.....	11.0	46.0
Silt, clayey, light brown.....	46.0	57.0

**8-16-5bccc
44-A-54
Buffalo County**

Location: SW SW SW NW sec 5-8N-16 W, approximately 2460 ft S and
9 ft E of NW cor sec
Ground elevation: 2179 ft (t) Alfalfa Center 7.5 minute quadrangle
Depth to water: 4.4 ft (9/3/54)
Electric log

	<u>Depth, in feet</u>	
	From	To
Quaternary System, undifferentiated:		
Silt, moderately clayey, very dark brown-gray; moderately to very clayey below 1 ft; light medium yellow-gray below 2.5 ft.....	1.0	3.0
Silt, moderately clayey, light yellow-gray; in part slightly calcareous below 5 ft, a few limy nodules; slightly clayey below 10 ft.....	3.0	12.8
Sand, medium to very coarse, 5 to 10 percent fine to medium gravel; only a trace of fine gravel 15 to 20 ft; 15 percent fine to medium gravel below 20 ft.....	12.8	21.7
Silt, slightly clayey, very sandy, sand is fine to coarse, pale brown.....	21.7	24.5
Sand, medium to very coarse, 10 percent gravel.....	24.5	30.0
Tertiary System - Miocene Series - Ogallala Group:		
Silt, moderately clayey, moderately sandy, sand is fine to coarse, very light olive-gray.....	30.0	32.0
Silt, moderately to very sandy, sand is very fine to fine, light brown, slightly indurated.....	32.0	34.5
Silt, moderately clayey, moderately sandy, sand is very fine to fine, very light olive-gray.....	34.5	36.8
Sand, very silty, sand is very fine to fine with a trace of medium, light brownish gray, slightly indurated.....	36.8	39.0
Silt, moderately clayey, very slightly sandy, sand is very fine to fine, light brown, slightly indurated below 40 ft.....	39.0	42.0
Siltstone, very light yellow-gray, slightly calcareous with limy areas.....	42.0	45.5
Siltstone, moderately sandy, sand is very fine to medium, light brown.....	45.5	48.0
Sandstone, moderately silty, sand is very fine to fine with some medium, light brown, poorly indurated; slightly silty below 50 ft; very slightly silty below 55 ft, sand is very fine to medium.....	48.0	65.7
Limestone, sandy, white, sand is very fine to fine..	65.7	66.3

Siltstone-sandstone, silt is coarse, sand is very fine to fine, very light brown-gray, moderately calcareous; thin noncalcareous sandy silt, light green and brown silty sandstone layers interbedded below 71 ft.....	66.3	74.5
Siltstone, moderately sandy, sand is very fine to fine, white, very calcareous.....	74.5	75.6
Sandstone, slightly to in part very silty, sand is very fine to fine with a little medium, very light brown-gray, limy areas common in upper 4 ft.....	75.6	85.0
Siltstone-sandstone, sand mostly very fine, very light olive gray.....	85.0	90.0
Sandstone, slightly to moderately silty, sand is very fine to fine, very light gray limy areas.....	90.0	95.0
Marl, clayey silt and volcanic ash, non to very calcareous, white to very light gray.....	95.0	98.0
Silt, slightly clayey, moderately to very sandy, sand is very fine to medium, very light yellow-gray, slightly indurated in part; slightly to moderately calcareous below 103.5 ft; limy nodular areas below 110 ft.....	98.0	120.6
Sandstone, slightly silty, sand is very fine to medium, very light olive-gray, poorly indurated, some limy areas.....	120.6	137.0
Silt, slightly clayey, very sandy, sand is very fine to medium, very light olive-gray.....	137.0	142.0
Sandstone-siltstone, sand is mostly very fine to fine, very light olive-gray, common limy areas.	142.0	147.0
Sandstone, sand is very fine to medium, essentially noncalcareous.....	147.0	150.0
Silt, slightly clayey, moderately to very sandy, sand is very fine to medium, very light olive-gray; very sandy below 155 ft.....	150.0	160.0
Sand, interbedded slightly to very silty, sand is very fine to medium, very light olive-gray.....	160.0	168.0
Sandstone, very fine to medium, moderately calcareous; slightly finer grained below 170 ft; non-calcareous below 172.5 ft.....	168.0	176.0
Siltstone-sandstone, sand is very fine to fine with a little medium, white, very calcareous.....	176.0	180.0
Siltstone-sandstone, fine grained, very light olive-gray.....	180.0	184.0
Silt, slightly clayey, very sandy, fine grained, very light olive-gray.....	184.0	185.0
Sandstone, sand is very fine to medium, slightly calcareous, poorly indurated.....	185.0	193.0
Siltstone, slightly clayey, very slightly sandy, very light gray, moderately to very calcareous; moderately sandy below 194.5 ft, sand is very fine to fine with a little medium sand.....	193.0	200.5

Siltstone, very slightly sandy, sand is very fine to medium, white, very calcareous, moderately well indurated; in part very light brown 204 to 211 ft; very light brown below 211 ft.....	200.5	219.0
Silt, slightly clayey, slightly sandy, sand is very fine to fine, light yellow-gray, slightly calcareous.....	219.0	220.0
Silt, slightly clayey, moderately to very sandy, sand is very fine to fine with a little medium, very light olive-gray; slightly to moderately clayey 227.5 to 235 ft.....	220.0	238.0
Sandstone, slightly silty, sand is very fine to fine with a little medium, very light gray to greenish gray; in part slightly calcareous below 240 ft; a few small limy rootlets below 240 ft.....	238.0	246.5
Sandstone, sand is very fine to medium, very light brown-gray, a few rounded clay grains, poorly indurated, very slightly calcareous.....	246.5	250.0
Sand, very fine to medium, a little coarse sand and a few coarse sand to fine gravel grains, some lithic clay grains; slightly indurated; common clay grains below 270 ft.....	250.0	275.7
Silt, very clayey, mottled very light greenish gray and brown-yellow, a few rounded lithic grains.....	275.7	277.0
Sand and gravel, silty, composed mainly of lithic clay grains and aragonite, some quartz.....	277.0	277.6
Cretaceous System - Upper Cretaceous Series - Montana Group:		
Pierre Formation:		
Shale, clay, light gray and light yellow-gray, moderately calcareous; light medium gray 282 to 285 ft; medium gray below 285 ft; a little brown-yellow 295 to 300 ft.....	277.6	310.0

**8-16-7cb
11-31
Buffalo County**

Location: NW SW sec 7-8N-16W, distances not recorded
 Ground elevation: 2173 ft (i) Alfalfa Center 7.5 minute quadrangle
 Depth to water: 4 ft (1931)

	<u>Depth, in feet</u>	
	From	To
Quaternary System, undifferentiated:		
"Soil" and fine sand.....	0.0	4.0
Sand, fine to very coarse, a trace of fine gravel...	4.0	25.0
Sand, fine to coarse, trace of very coarse.....	25.0	30.0
Sand, fine to medium, some coarse; fine to very coarse below 35 ft, rare gravel grains.....	30.0	47.0
Tertiary System - Miocene Series - Ogallala Group:		
Sandstone, sand is mostly very fine to fine, light olive-gray, contains rare rootlets, slightly indurated; some limy areas below 50 ft; moderate induration, limy cementation below 55 ft.....	47.0	65.0

**8-16-12abdd
4-K-39
Buffalo County**

Location: SE SE NW NE sec 12-8N-16W, in north road ditch near intersection of 8th Ave and G St

Ground elevation: 2138 ft (t) Kearney 7.5 minute quadrangle

Depth to water: Not recorded

Note: Samples missing, log interpreted from original field log

	Depth, in feet	
	From	To
Quaternary System, undifferentiated:		
Soil, dark brown.....	0.0	2.0
Clay, gray, calcareous.....	2.0	6.0
Sand and gravel, very poorly sorted, fine sand to coarse gravel.....	6.0	15.0
Sand and gravel, well sorted, much fine to medium gravel; some coarse gravel 20 to 30 ft; mostly fine gravel below 30 ft.....	15.0	47.0
Silt, clayey, light brown.....	47.0	58.0

8-17-1ab
13-31
Buffalo County

Location: NW NE sec 1-8N-17W, distances not recorded
 Ground elevation: 2212 ft (i) Alfalfa Center 7.5 minute quadrangle
 Depth to water: approximately 17 ft (1931)

	<u>Depth, in feet</u>	
	From	To
Quaternary System, undifferentiated:		
Silt, moderately clayey, slightly sandy, principally very fine sand, medium yellow brown to medium brown-gray.....	0.0	3.0
Silt, slightly clayey, moderately sandy, sand is very fine to fine, medium brown-gray, yellow tint; slightly finer grained below 5 ft, may contain a dark-brown gray soil in interval 5 to 10 ft.....	3.0	10.0
Silt, slightly clayey, slightly sandy, sand mostly very fine, light yellow-brown; contains a trace of small limy areas below 15 ft; very slightly calcareous below 20 ft, a few limy rootlets; slightly calcareous below 30 ft, common limy rootlets.....	10.0	35.0
Clayey to sandy silt, medium dark brown-gray.....	35.0	38.0
Sand, fine to medium, some coarse; fine to coarse below 45 ft, some very coarse and a little gravel.	38.0	48.0
Tertiary System - Miocene Series - Ogallala Group:		
Sandstone, silty, may be in part clayey, sand very fine to medium; light olive-gray, very little induration below 60 ft.....	48.0	65.0
Sandstone, silty, sand is mostly very fine to fine, rare limy areas, slight induration; a few limy areas and rootlets below 75 ft, bit sample at 80 ft is a moderately clayey to slightly sandy silt, light green-gray.....	65.0	80.0

**8-17-12ddd
14-31
Buffalo County**

Location: SE SE SE sec 12-8N-17W, distance not recorded
 Ground elevation: 2174 ft (i) Alfalfa Center 7.5 minute quadrangle
 Depth to water: 5 ft (1931)

	<u>Depth, in feet</u>	
	From	To
Quaternary System, undifferentiated:		
Sandy silt and silty sand, dark brown-gray.....	0.0	6.0
Sand, some gravel, fine to very coarse sand with approximately 15 percent gravel; much medium to coarse sand below 20 ft, approximately 10 percent gravel.....	6.0	25.0
Sand and gravel, medium to very coarse sand, approximately 30 percent gravel 25 to 30 ft, 40 percent gravel 30 to 35 ft; 50 percent very coarse sand and gravel 35 to 40 ft.....	25.0	40.0
Sand, fine to coarse, approximately 15 percent very coarse sand and fine gravel.....	40.0	42.0
Silt, very slightly clayey, moderately sandy, sand is very fine to fine, light medium yellow-brown; light brown and light brown-gray below 44 ft, calcareous.....	42.0	45.0

8-18-4dddb
43-42
Buffalo County

Location: NW SE SE SE sec 4-8N-18W, distances not recorded
Ground elevation: 2246 ft (i) Elm Creek East 7.5 minute quadrangle
Depth to water: Not recorded

	<u>Depth, in feet</u>	
	From	To
Quaternary System, undifferentiated:		
"Soil", silty, sandy, light buff.....	0.0	2.0
Clay, mouse gray, silty, compact.....	2.0	7.0
Sand and gravel, very coarse, reddish pink.....	7.0	25.0
Grit and clay Ogallala.....	25.0	32.0
Note: Ogallala Group probably not penetrated		

8-18-5bccc
28-B-47
Buffalo County

Location: SW SW SW NW sec 5-8N-18W, on half section line and 20 ft
 E of NW cor sec
 Ground elevation: 2260 ft (t) Elm Creek West 7.5 minute quadrangle
 Depth to water: 7.6 ft (7/25/47)

	<u>Depth, in feet</u>	
	From	To
Quaternary System, undifferentiated:		
Road fill.....	0.0	1.0
Silt, moderately clayey, very dark brownish gray, granular structure.....	1.0	2.5
Silt, very clayey, light brownish gray.....	2.5	3.5
Silt, slightly clayey, medium brown-gray, granular structure, a few small limy nodules.....	3.5	4.0
Silt, very clayey, light brownish gray, a few limy nodules in lower part; a very calcareous nodular limy zone below 5 ft.....	4.0	7.5
Silt, moderately clayey, moderately sandy, dark brown-gray.....	7.5	8.0
Sand, some gravel. gravel is fine to coarse.....	8.0	10.0
Sand and gravel, gravel is fine to coarse, 50 to 60 percent gravel.....	10.0	27.5
Silt, very clayey, slightly sandy, sand is very fine to fine, very light brown, slightly calcareous; light brown-gray 32.5 to 47 ft, moderately to highly calcareous; limy nodules common; only slightly calcareous below 47 ft, light brown.....	27.5	51.0
Sand and gravel, gravel is fine to coarse, some pebbles.....	51.0	56.0
Tertiary System - Miocene Series - Ogallala Group:		
Sandstone, mostly very fine to fine sand, very light brown.....	56.0	68.0
Sandstone, fine grained, very light olive-gray, very calcareous.....	68.0	69.5
Sandstone, fine grained, light brownish to olive- gray, in part slightly calcareous, a few rootlets.	69.5	72.5
Sandstone, fine grained, light brown, moderately well indurated.....	72.5	76.0
Sand, fine to coarse.....	76.0	80.5
Sand, silty, sand is fine, light greenish gray.....	80.5	86.0
Sandstone, fine grained, light brown in upper part then brownish gray.....	86.0	96.0
Sand, fine to coarse, some very coarse sand and fine gravel.....	96.0	97.5
Sandstone, fine grained, light brown; some siliceous rootlets below 100 ft.....	97.5	105.0

Sandstone, fine grained, light olive to greenish gray, a few calcareous rootlets; highly calcareous below 110 ft, limy and siliceous rootlets, hackberry seeds.....	105.0	112.0
Sandstone, fine grained, light brown-gray, common hackberry seeds.....	112.0	115.0
Sandstone, very fine to medium with a little coarse sand, light brownish gray, slightly calcareous, a few rootlets.....	115.0	123.0
Sandstone, fine grained, light greenish to yellowish gray, a few rootlets.....	123.0	130.5
Silt, slightly clayey, sandy, light greenish gray...	130.5	140.0
Sandstone, fine grained, light brown-gray, moderately calcareous, poorly indurated.....	140.0	143.0
Sandstone, some silty sand, sand mostly fine grained, highly calcareous, moderately well indurated; some reddish brown clay and thin soft limy beds below 145 ft.....	143.0	150.0
Sandstone, sand is very fine to medium, moderately calcareous, some rootlets.....	150.0	151.5
Sand, fine to coarse, some very coarse.....	151.5	162.0
Sandstone, fine grained, light olive to greenish gray, highly calcareous; well indurated 164 to 167 ft.....	162.0	167.0
Sandstone, fine grained, light greenish gray to olive.....	167.0	168.5
Silt, slightly clayey, sandy, light greenish gray, in part slightly calcareous.....	168.5	171.5
Sandstone, fine grained, light greenish gray, moderately to highly calcareous; some interbedded sandy to clayey silt below 175 ft.....	171.5	179.0
Sand, moderately clayey, silty, very fine to medium, very light greenish gray.....	179.0	185.0
Sand, very fine to medium, a little coarse.....	185.0	192.0
Sandstone, very fine to medium, a little coarse sand, poorly indurated, a few rounded silty clay grains; only slight induration below 200 ft.....	192.0	214.0
Sand, slightly silty, sand is very fine to medium, light brownish gray, slight induration.....	214.0	220.0
Sand, fine to coarse, some very coarse, common lithic clay grains, light green.....	220.0	230.0
Sand, some gravel, gravel mostly fine, olive brown, some pink grains.....	230.0	242.5
Sandstone, silty, sand is fine grained, very calcareous; moderately well indurated below 247.5 ft.	242.5	250.0
Sandstone, fine grained, light olive-gray, moderately calcareous; very calcareous 260 to 265.5 ft.....	250.0	273.0
Sand, very fine to medium, light brownish gray, slightly calcareous, slightly indurated.....	273.0	283.0
Siltstone, clayey, light green-gray.....	283.0	285.0

Cretaceous System - Upper Cretaceous Series - Montana Group:

Pierre Formation:

Shale, clay, light gray with much yellow-brown, common limonitic fragments.....	285.0	291.0
Shale, clay, medium gray; dark gray below 295 ft, noncalcareous.....	291.0	310.0

9-13-4aaaa
65-B-47
Buffalo County

Location: NE NE NE NE sec 4-9N-13W, 11 ft S and 75 ft W of NE cor sec
 Ground elevation: 2030 ft (t) Gibbon North 7.5 minute quadrangle
 Depth to water: approximately 14 ft (caved) 9/25/47

	<u>Depth, in feet</u>	
	From	To
Quaternary System, undifferentiated:		
Silt, clayey, dark brown, dark brownish gray 2 to 4 ft; medium brownish gray 4 to 6 ft.....	0.0	6.0
Silt, clayey, medium grayish brown.....	6.0	7.0
Silt, slightly clayey, light brown.....	7.0	8.7
Silt, sandy, sand is fine grained; very light gray to very light yellow gray, a few limy nodules.....	8.7	12.0
Sand, fine to coarse.....	12.0	16.0
Sand, fine to very coarse, some fine gravel, pink with some green silicates.....	16.0	20.0
Sand and gravel, gravel is fine with some medium, very light gray with pink and green silicates, 20 to 30 percent gravel.....	20.0	30.0
Sand and gravel, gravel is fine to medium, 50 percent gravel; a little coarse gravel and a few pebbles below 40 ft.....	30.0	48.5
Silt, slightly clayey, dark olive gray 48.5 to 49.5 ft; very light gray below 49.5 ft.....	48.5	50.0
Silt, moderately sandy, sand is very fine to fine, silt is coarse to very coarse, very light olive-gray, some aggregates; very light gray to very light brown below 52.5 ft, slightly calcareous; slightly clayey, very light brown, noncalcareous below 62.5 ft.....	50.0	64.5
Sand, fine to very coarse, a little fine gravel, slightly silty, light brown to pink, thin silt layers, light gray below 74.5 ft.....	64.5	84.5
Tertiary System - Miocene Series - Ogallala Group:		
Sandstone, fine grained, very light yellow-gray.....	84.5	89.5
Sandstone, fine grained, very light brownish to whitish gray, moderately to highly calcareous, a few rootlets.....	89.5	98.5
Silt, slightly clayey, sandy, sand is very fine to fine, very light greenish gray; some silty sand below 105 ft, probable thin volcanic ash layer at 108 ft.....	98.5	115.0
Siltstone-sandstone, fine grained, very light greenish gray; moderately well indurated 123 to 127 ft.....	115.0	127.0

Sand, very silty, some very sandy silt, sand is very fine to fine, very light brownish to greenish gray; some induration below 134.5 ft.....	127.0	150.0
Sand, very fine to fine with some medium, common lithic greenish clay pebbles.....	150.0	160.0
Sand, very fine to fine, some medium, very light brownish gray, slight induration.....	160.0	169.0
Silt, moderately to very clayey, whitish to very light greenish gray, essentially noncalcareous, a few thin limy beds or nodules.....	169.0	174.5
Sand, very fine to medium.....	174.5	177.0
Sandstone, fine grained, very light brownish to greenish gray, slightly to in part moderately calcareous; light brownish gray 180 to 185 ft, very light yellowish to greenish gray below 190 ft.....	177.0	198.5
Cretaceous System - Upper Cretaceous Series - Montana Group:		
Pierre Formation:		
Shale, clay, white, moderately calcareous, thin limy nodular zones; slight iron staining 200 to 205 ft, moderate staining below 205 ft.....	198.5	220.0
Shale, clay, light gray.....	220.0	227.5
Shale, clayey, medium to dark gray, slightly to moderately calcareous; dark gray below 230 ft; thin limonitic zone at 237 ft.....	227.5	240.0

9-13-10dddd
64-B-47
Buffalo County

Location: SE SE SE SE sec 10-9N-13W, 77 ft N and 6 ft W of SE cor sec
 Ground elevation: 2029 ft (t) Gibbon North 7.5 minute quadrangle
 Depth to water: 12.2 ft (9/24/47)

	<u>Depth, in feet</u>	
	From	To
Quaternary System, undifferentiated:		
Silt, moderately sandy, sand is fine grained, dark brown-gray.....	0.0	1.0
Silt, very clayey, dark brown; medium brown-gray 2 to 3 ft; light yellowish to brownish gray below 3 ft.....	1.0	4.0
Silt, slightly clayey, moderately sandy, sand is very fine to fine, light yellowish gray.....	4.0	5.0
Sand, fine to very coarse, some fine gravel.....	5.0	9.0
Silt, very clayey, very light yellow gray.....	9.0	10.0
Sand and gravel, gravel is fine to coarse, pinkish, 50 to 60 percent gravel.....	10.0	30.0
Sand and gravel, gravel mostly fine to medium, some coarse, 45 to 50 percent gravel; 60 percent gravel below 50 ft.....	30.0	60.0
Silt, moderately clayey, very light gray to light brown-gray, much yellow in upper foot; light brown below 68 ft.....	60.0	71.0
Silt, moderately to very clayey, very light gray to brown-gray, very calcareous, a few limy nodules and rootlets, some large limy nodules below 75 ft; light brown below 80.5 ft.....	71.0	87.5
Silt, slightly clayey, moderately sandy, sand is very fine to fine, light brown, granular structure, noncalcareous, rootlets; very sandy below 90 ft.....	87.5	97.5
Silt, slightly clayey, moderately sandy, sand is very fine to fine, very light gray to very light brownish gray.....	97.5	99.5
Sand, some gravel, gravel is mostly fine, light brownish gray with pink and olive silicates; a few lithic calcareous sandstone grains below 105 ft.....	99.5	115.5
Tertiary System - Miocene Series - Ogallala Group:		
Sandstone, silty, slightly clayey, fine-grained, very light olive-gray; light greenish gray below 130 ft, a few siliceous rootlets.....	115.5	134.0
Silt, sandy, slightly clayey, sand is very fine to fine, very light olive-gray.....	134.0	137.0
Sand, fine to coarse, a few lithic light green clay grains.....	137.0	140.0

Sand, fine to very coarse, a little fine gravel, common lithic clay grains and pebbles to 150 ft...	140.0	159.0
Cretaceous System - Upper Cretaceous Series - Montana Group:		

Pierre Formation:

Shale, clay, very light gray and yellow-brown, non- calcareous; slightly to moderately calcareous below 160 ft; some aragonite 160 to 167 ft and 170 to 175 ft.....	159.0	184.0
Shale, clay, medium gray, moderately calcareous, contains thin limonitic layer.....	184.0	190.0

**9-13-12dacc
27-B-92
Buffalo County**

Location: SW SW NE SE sec 12-9N-13W, approximately 100 ft NE of center SE1/4 sec

Ground elevation: 2015.5 ft (t) Shelton 7.5 minute quadrangle

Depth to water: Approximately 17 ft (10/27/92)

	Depth, in feet	
	From	To
Quaternary System, undifferentiated:		
"Topsoil".....	0.0	3.0
Sand, fine to very coarse.....	3.0	4.5
Silt, sandy, brown.....	4.5	5.2
Sand, some gravel, fine sand to fine gravel, mostly medium to coarse sand, gravel is reddish.....	5.2	10.0
Sand and gravel, medium sand to medium and a little coarse gravel, quartz and red feldspar, some lithic grains; much medium to coarse gravel 15 to 20 ft, large lithic grains.....	10.0	20.0
Sand, medium to very coarse, some fine gravel, arkosic; very little gravel below 25 ft.....	20.0	30.0
Sand and gravel, medium sand to medium gravel, much very coarse sand and fine gravel; light green silt layer 34.8 to 35 ft.....	30.0	35.0
Sand, some gravel, sand is fine to very coarse, gravel is mostly fine, overall light gray in color, much quartz; mostly coarse sand to fine gravel 45 to 55 ft, light greenish gray.....	35.0	55.0
Gravel, some sand, gravel is fine to coarse.....	55.0	56.0
Silt, clayey, brown in upper 2 ft, light gray to grayish green.....	56.0	65.0

**9-13-12dbdd
28-B-92
Buffalo County**

Location: SE SE NW SE sec 12-9N-13W, approximately 100 ft NW of center
SE1/4 sec

Ground elevation: 2015.5 ft (t) Shelton 7.5 minute quadrangle

Depth to water: approximately 17 ft (10/27/92)

	<u>Depth, in feet</u>	
	From	To
Quaternary System, undifferentiated:		
"Top soil".....	0.0	3.0
Silt, clayey and sandy, sand is very fine to fine with some medium and coarse, brown.....	3.0	5.0
Sand, some gravel, sand is fine to very coarse, some some fine gravel, much coarse sand, arkosic; some medium to coarse gravel 10 to 15 ft.....	5.0	25.0
Sand and gravel, medium sand to medium gravel, arkosic, red feldspars.....	25.0	30.0
Sand, fine to very coarse, a little fine gravel, grayish in color, a few red feldspars, much quartz; some mafic and lithic grains below 45 ft; much coarse gravel in lower 3 ft.....	30.0	58.0
Silt, clayey, light brown and light greenish gray; light greenish gray below 60 ft.....	58.0	65.0

**9-13-12dcaa
25-B-92
Buffalo County**

Location: NE NE SW SE sec 12-9N-13W, approximately 100 ft SW of center
SE1/4 sec

Ground elevation: 2015.5 ft (t) Shelton 7.5 minute quadrangle

Depth to water: approximately 17 ft (10/26/92)

	<u>Depth, in feet</u>	
	From	To
Quaternary System, undifferentiated:		
"Top soil", sandy, some silty clay at base.....	0.0	3.0
Sand, fine to very coarse, arkosic, some feldspar...	3.0	5.0
Sand, slightly gravelly, sand is medium to coarse, some fine gravel, scattered medium gravel, gravel mostly fine 10 to 15 ft.....	5.0	15.0
Sand, some gravel, gravel is fine to medium.....	15.0	20.0
Sand, fine to coarse, much medium to very coarse sand, a little fine gravel, arkosic, red; very little gravel, much fine to medium sand 30 to 40 ft.....	20.0	40.0
Sand and gravel, medium sand to fine, some coarse gravel, some greenish clayey silt in upper 3 ft; overall greenish color below 45 ft; gravel is mostly fine 50 to 55 ft; coarse gravel in lower 2.5 ft.....	40.0	57.5
Silt, clayey, light olive-gray.....	57.5	65.0

9-13-12ddb
26-B-92
Buffalo County

Location: NW NW SE SE sec 12-9N-13W, approximately 100 ft SE of center SE1/4 sec
Ground elevation: 2015.5 ft (t) Shelton 7.5 minute quadrangle
Depth to water: approximately 17 ft (10/27/92)

	<u>Depth, in feet</u>	
	From	To
Quaternary System, undifferentiated:		
"Top soil", brown-gray clayey layer lower part.....	0.0	3.0
Sand, fine to coarse, some very coarse, arkosic, some feldspars; some fine to medium gravel layers below 5 ft.....	3.0	10.0
Sand, some gravel, sand is medium to coarse, some fine gravel; some medium gravel 15 to 20 ft.....	10.0	40.0
Sand and gravel, gravel is fine to medium, some coarse; thin greenish clay silt layers 42 to 45 ft.....	40.0	45.0
Sand and gravel, gravel is mostly fine to medium, overall greenish color; much medium to coarse gravel below 55 ft.....	45.0	57.5
Silt, very clayey, light olive-gray.....	57.5	60.0

**9-13-14baaa
1-B-90
Buffalo County**

Location: NE NE NE NW sec 14-9N-13W, approximately 18 ft S and 2630 ft E of NW cor sec
 Ground elevation: 2027.7 ft (i) Gibbon North 7.5 minute quadrangle
 Depth to water: Not recorded
 Electric log: 0-75 ft
 Natural Gamma: 0-130 ft

	<u>Depth, in feet</u>	
	From	To
Quaternary System, undifferentiated:		
Silt, slightly clayey, moderately sandy, principally very fine to fine sand, scattered medium to coarse sand, medium brown-gray.....	0.0	3.0
Sand, fine to very coarse, 5 to 10 percent fine gravel; 10 to 15 percent gravel 11 to 15 ft, much coarse to very coarse sand.....	3.0	25.0
Sand, some gravel, gravel is mostly fine, some medium, 15 to 20 percent gravel; many rounded lithic silty clay grains 33 to 38 ft, may contain thin silty clay layers.....	25.0	38.0
Sand, fine to very coarse, contains a trace of fine gravel.....	38.0	41.0
Sand and gravel, gravel is fine to medium, pink silicates common, 40 percent gravel.....	41.0	61.0
Silt, slightly clayey, slightly sandy, silt is coarse, sand is mostly very fine, light brownish to yellowish gray, very slightly clayey below 62 ft, contains some fine sand; very light yellowish brown below 64 ft.....	61.0	65.0
Silt, slightly to in part moderately clayey, slightly sandy, sand is principally very fine, possibly interbedded slightly and moderately clayey; very light brown 72 to 72.5 ft, very calcareous.....	65.0	72.5
Silt, slightly clayey, slightly sandy, sand is very fine with some fine, silt is coarse, light brown, moderately calcareous, common aggregates; slightly calcareous 75 to 78 ft.....	72.5	78.0
Silt, slightly clayey, very slightly sandy, sand is very fine, silt is coarse to very coarse, very light brown, moderately calcareous.....	78.0	80.0
Silt, moderately clayey, slightly sandy, sand is very fine to fine, rare medium sand, medium yellow-brown, slightly calcareous; moderately calcareous, very light brown below 82 ft, a few aggregates.....	80.0	83.0

Silt, slightly to moderately clayey, slightly sandy, sand is very fine to fine, light yellow-brown, noncalcareous, contains weathered volcanic ash, aggregates common, a few root holes; common volcanic ash 85 to 90 ft; contains rare small dense limy nodules; volcanic ash shards rare below 90 ft.....	83.0	95.0
Silt, slightly clayey, slightly sandy, sand is very fine, silt is fine to coarse, light yellow-brown, rare root holes, very few aggregates.....	95.0	101.0
Silt, very slightly clayey, moderately sandy, sand is very fine to fine with a trace of medium, light yellow-brown.....	101.0	105.0
Silt, very slightly to in part slightly clayey, slightly sandy, sand is mostly very fine, light yellow-brown; contains a few medium to coarse sand and gravel grains below 114 ft.....	105.0	116.0
Silt, slightly to moderately clayey, in part slightly sandy, sand is mostly very fine to medium, light yellow-brown.....	116.0	121.0
Sand and gravel, approximately 20 to 30 percent gravel; mostly fine to very coarse sand below 123 ft.....	121.0	124.0
Tertiary System - Miocene Series - Ogallala Group:		
Sandstone, slightly silty, sand is very fine to fine, very light olive-gray, contains some volcanic ash; very slightly clayey below 125 ft.....	124.0	130.0

**9-13-14baaa
10-B-90
Buffalo County**

Location: NE NE NE NW sec 14-9N-13W, approximately 300 ft S and
 2635 ft E of NW cor sec
 Ground elevation: 2025.5 ft (i) Gibbon North 7.5 minute quadrangle
 Depth to water: Not recorded
 Electric log
 Natural gamma log

	<u>Depth, in feet</u>	
	From	To
Quaternary System, undifferentiated:		
Silt, clay, sandy to gravelly in lower part, dark brown-gray.....	0.0	2.5
Sand and gravel, interlayered fine and coarse; silty clay layer or balls 28 to 31 ft and at 38 and 42 ft.....	2.5	55.0
Silt, clayey, light brownish gray, some mottled iron-oxide stain; very light olive-gray below 57 ft.....	55.0	61.0

9-13-14bada
9-B-90
Buffalo County

Location: NE SE NE NW sec 14-9N-13W, approximately 700 ft S and
 2635 ft E of NW cor sec
 Ground elevation: 2024.7 ft (i) Gibbon North 7.5 minute quadrangle
 Depth to water: Not recorded
 Electric log
 Natural gamma log

	<u>Depth, in feet</u>	
	From	To
Quaternary System, undifferentiated:		
Silt, in part sandy and clayey, very dark brown-gray; dark brown-gray below 3.5 ft.....	0.0	4.0
Sand and gravel, fine to medium, a little coarse gravel; clay silt layers or balls 28.5 to 29 ft and 46 to 46.5 ft.....	4.0	54.0
Silt, clayey, light brownish gray; some iron-oxide stain in upper 3 ft.....	54.0	60.0

**9-13-14bcd
4-B-90
Buffalo County**

Location: SE SW NW sec 14-9N-13W, along north side of trail east of house and near center S line NW1/4
 Ground elevation: 2027.8 ft (i) Gibbon North 7.5 minute quadrangle
 Depth to water: Not recorded
 Electric log
 Natural Gamma log

	<u>Depth, in feet</u>	
	From	To
Quaternary System, undifferentiated:		
Silt, sandy, clay, dark brown-gray.....	0.0	3.5
Sand and gravel; a few clay granules 19 to 23 ft....	3.5	54.0
Silt, clayey, light yellow-gray, common yellow stain; slightly to moderately calcareous 59 to 65 ft; secondary limy zone at 59 ft.....	54.0	65.0
Silt, clayey, light yellow-brown, moderately to very calcareous 68 to 70 ft; very light brownish gray 69.5 to 70 ft.....	65.0	71.5

9-13-14bdc
3-B-90
Buffalo County

Location: SW SE NW sec 14-9N-13W north side of farm trail east of house
 Ground elevation: 2027.4 ft (i) Gibbon North 7.5 minute quadrangle
 Depth to water: Not recorded
 Electric log
 Natural Gamma log

	<u>Depth, in feet</u>	
	From	To
Quaternary System, undifferentiated:		
Topsoil, no sample.....	0.0	2.0
Sand and gravel, clay ball at 30 ft; silty clay or clay balls 49 to 51 ft.....	2.0	53.0
Silt, sandy, light gray.....	53.0	55.0

**9-13-14ddd
41-32
Buffalo County**

Location: SE SE SE SE sec 14-9N-13W
 Ground elevation: 2008 ft (i) Denman 7.5 minute quadrangle
 Depth to water: 4 ft (7/18/32)
 Log from WSP 779 and examination of available sample

	<u>Depth, in feet</u>	
	From	To
Quaternary System, undifferentiated:		
Soil, black, silty, hardpan.....	0.0	3.0
Clay, silty, gray-brown, compact.....	3.0	5.0
Sand and gravel, gravel is fine to medium.....	5.0	21.0
Clay, compact, tenacious, silty and sandy, gray.....	21.0	26.0
Gravel, coarse and fine, interlayered, some sand....	26.0	42.0
Silt, clayey, sandy, light brown-gray, samples missing below 45 ft.....	42.0	65.0

**9-13-15aad
7-B-90
Buffalo County**

Location: SE NE NE sec 15-9N-13W, along section line road south of NE
cor sec
Ground elevation: 2026.8 ft (i) Gibbon North 7.5 minute quadrangle
Depth to water: Not recorded
Electric log
Natural gamma log

	<u>Depth, in feet</u>	
	From	To
Quaternary System, undifferentiated:		
"Topsoil", no sample.....	0.0	2.0
Silt, sandy, dark brown-gray; clayey below 6 ft.....	2.0	6.0
Sand and gravel, alternating fine and coarse; clay layer or clay ball 32 to 33 ft; some iron-oxide stain 35 to 42 ft; increasing anorthosite content below 35 ft; some coarse gravel below 45 ft.....	6.0	57.0
Silt, clayey, light brownish to yellowish gray; mod- erately calcareous 60 to 61 ft, some secondary carbonate.....	57.0	61.0

**9-13-15acc
8-B-90
Buffalo County**

Location: SW SW NE sec 15-9N-13W, east side of half-mile line farm trail

Ground elevation: 2031.8 ft (i) Gibbon North 7.5 minute quadrangle

Depth to water: Not recorded

Electric log

Natural Gamma log

	<u>Depth, in feet</u>	
	From	To
Quaternary System, undifferentiated:		
Silt, clayey, sandy, light brown-gray, moderately calcareous.....	0.0	7.0
Sand and gravel, silty.....	7.0	7.5
Silt, clayey, sandy, very light brown-gray, slightly calcareous.....	7.5	8.5
Sand and gravel, some anorthosite and rhyolite; slightly finer grained 15 to 32 and 39 to 45 ft; slight iron-oxide stain 39 to 45 ft.....	8.5	60.0
Silt, clayey, in part sandy, light yellow-gray, some iron-oxide stain.....	60.0	65.0

**9-13-15ad
6-B-90
Buffalo County**

Location: SE NE sec 15-9N-13W, along east section line
 Ground elevation: 2026.4 ft (i) Gibbon North 7.5 minute quadrangle
 Depth to water: Not recorded
 Electric log
 Natural Gamma log

	<u>Depth, in feet</u>	
	From	To
Quaternary System, undifferentiated:		
"Top soil", no sample.....	0.0	2.0
Silty, clayey, some sand, dark brown-gray.....	2.0	8.0
Sand and gravel, mostly sand and fine gravel 6 to 25 ft with interbedded sand and gravel; a little coarse gravel 25 to 35 ft.....	8.0	35.0
Sand and gravel, some iron-oxide stain, pebbles in lower few feet.....	35.0	45.0
Sand and gravel.....	45.0	56.0
Silt, clayey, light yellow-brown, slight iron-oxide stain in upper 2 ft.....	56.0	60.0

**9-13-15add
5-B-90
Buffalo County**

Location: SE SE NE sec 15-9N-13W, north of USGS marker
 Ground elevation: 2026.8 ft (i) Gibbon North 7.5 minute quadrangle
 Depth to water: Not recorded
 Electric log
 Natural Gamma log

	<u>Depth, in feet</u>	
	From	To
Quaternary System, undifferentiated:		
Silt, clayey, sandy, dark brown-gray.....	0.0	6.0
Sand and gravel, slightly finer grained 11 to 15 ft; some coarse gravel 32 to 35 ft and below 43 ft, common iron-oxide stain; much anorthosite below 43 ft; some clay balls at 45 ft.....	6.0	57.0
Silt, clayey, light yellowish to brownish gray.....	57.0	60.0

**9-13-15cad
2-B-90
Buffalo County**

Location: SE NE SW sec 15-9N-13W, near the center of the S1/2 sec,
west side of half-mile line trail
Ground elevation: 2032 ft (i) Gibbon 7.5 minute quadrangle
Depth to water: Not recorded
Electric log
Natural Gamma log: 0 to 115 ft

	<u>Depth, in feet</u>	
	From	To
Quaternary System, undifferentiated:		
Silt, slightly clayey, sandy, very dark brown-gray, light brown-gray below 3 ft.....	0.0	8.0
Sand and gravel, gravel is fine to medium with some coarse.....	8.0	21.0
Sand, some gravel.....	21.0	32.0
Sand, and gravel, gravel is fine to medium with some coarse; some silty clay granules 37 to 38 ft, slight iron stain; slightly finer grained 38 to 45 and 47 to 55 ft.....	32.0	58.0
Silt, slightly clayey, light olive-gray, moderately clayey, light yellow-gray below 60 ft.....	58.0	65.0
Silt, moderately clayey, slightly sandy, sand mostly fine, light brown; slightly calcareous 68 to 70 ft; moderately calcareous 74 to 76.5 ft, contains limy nodules.....	65.0	76.5
Silt, slightly clayey, moderately to very sandy, sand is mostly very fine to fine, rare medium sand, light yellow-brown, very slightly calcareous, contains a few limy areas; rare limy indurated concretionary areas 80 to 80.5 ft; slightly calcareous, slightly more sand 80.5 to 85 ft; rare medium sand 85 to 87 ft; very sandy 87 to 90 ft; sand is very fine to fine with some medium to coarse sand, a few limy concretions.....	76.5	90.0
Silt, slightly clayey, moderately sandy, sand is very fine to fine, light yellow-brown, common limy concretions and nodules; very slightly clayey 95 to 98 ft, noncalcareous.....	90.0	98.0
Silt, very slightly clayey, very sandy, sand is very fine to medium, some coarse, light brown-gray.....	98.0	100.0
Silt, moderately to very sandy, silt is coarse, sand is very fine to fine, massive, very light brownish to olive-gray; moderately sandy below 105 ft, very light olive-gray; a little medium sand 109 to 111 ft; common medium to coarse sand, trace of gravel 116 to 118 ft.....	100.0	118.0

Tertiary System - Miocene Series - Ogallala Group:

Sandstone, sand is very fine to medium, some coarse to very coarse sand, very light olive-gray, common siliceous rootlets.....	118.0	124.0
Sandstone, slightly clayey, silty, sand is very fine to fine, very light olive-gray, contains a few volcanic ash shards, rare siliceous material.....	124.0	131.0
Siltstone-sandstone, fine grained, very light olive-gray, noncalcareous.....	131.0	135.0

9-13-16daaa
6-B-75
Buffalo County

Location: NE NE NE SE sec 16-9N-13W, approximately 2593 ft N and 33 ft W of SE cor sec
 Ground elevation: 2037 ft (t) Gibbon South 7.5 minute quadrangle
 Depth to water: Not recorded

	<u>Depth, in feet</u>	
	From	To
Quaternary System, undifferentiated:		
Sand, very silty, sand is mostly very fine to fine, some medium, medium dark brown-gray.....	0.0	2.0
Sand, very silty, in part slightly clayey, sand is mostly very fine to fine, rare medium, light brown-gray.....	2.0	8.0
Sand, very silty, slightly clayey, sand is very fine to medium, a little coarse light brown-gray; a little coarse to very coarse sand below 9 ft.....	8.0	10.0
Sand and gravel, gravel is fine to medium, much pink, 60 percent gravel.....	10.0	20.0
Sand, fine to very coarse, 5 percent fine gravel....	20.0	30.0
Sand and gravel, gravel is fine to medium, some coarse.....	30.0	56.0
Silt, slightly clayey, moderately sandy, sand is very fine, very light gray to light yellow-gray; moderately clayey below 58.5 ft, slightly calcareous, contains limy areas.....	56.0	60.0
Silt, very slightly clayey, moderately to very sandy, very fine to fine sand, light yellow-brown, moderately calcareous; in part moderately clayey below 70 ft, contains a little medium sand, light medium brown.....	60.0	80.0
Silt, in part moderately clayey, moderately to very sandy, sand is very fine to medium, some coarse, light brown; very sandy below 85.5 ft, trace of lithic sandstone grains.....	80.0	±90.0
Tertiary System - Miocene Series - Ogallala Group:		
Sandstone, very fine to medium sand, very light brownish to olive-gray, very light olive-gray below 100 ft, rare limy areas.....	±90.0	110.0
Sandstone, slight silty, sand is mostly very fine to fine, very slightly indurated, trace of silicate rootlets.....	110.0	120.0

9-13-21dddd
5-B-75
Buffalo County

Location: SE SE SE SE sec 21-9N-13W, 186 ft N and 34 ft W of SE cor
 sec

Ground elevation: 2028 ft (t) Gibbon South 7.5 minute quadrangle

Depth to water: Not recorded

	<u>Depth, in feet</u>	
	From	To
Quaternary System, undifferentiated:		
Silt, very slightly clayey, slightly sandy, silt is coarse, sand is mostly very fine, very dark brown-gray.....	0.0	1.2
Silt, moderately sandy, sand is very fine to fine, light gray, slightly calcareous.....	1.2	3.8
Sand, very fine to medium, some coarse, trace very coarse, light gray.....	3.8	10.0
Sand, fine to coarse, arkosic.....	10.0	16.0
Sand and gravel, medium sand to fine, some medium gravel, quartz with some pink feldspars, 25 percent gravel.....	16.0	20.0
Sand, fine to very coarse, a little fine gravel, 10 percent gravel.....	20.0	30.0
Sand and gravel, medium sand to medium, a little coarse gravel, 50 to 60 percent gravel, quartz with pink and rare dark silicates.....	30.0	46.0
Silt, moderately clayey, moderately sandy, sand is very fine, some fine, light medium yellow-brown; light medium brown below 50 ft.....	46.0	57.5
Silt, slightly clayey, moderately sandy, sand is very fine, some fine, light medium brown-yellow...	57.5	60.0
Silt, moderately clayey, moderately to in part very sandy, light medium brown, contains either embedded sand and gravel grains or thin sand and gravel layers below 62 ft.....	60.0	67.3
Silt, slightly moderately clayey, moderately sandy, sand principally very fine to fine, a little medium sand and rare gravel, light medium brown, contains hackberry seed fragments; probably silty sand and some gravel below 70 ft.....	67.3	±75.0
Tertiary System - Miocene Series - Ogallala Group:		
Sandstone, sand is very fine to medium, very light gray, in part slightly calcareous, slightly indurated.....	±75.0	87.0
Siltstone-sandstone, whitish gray, moderately calcareous, common root holes; some siliceous cementation, moderately well indurated below 90 ft.....	87.0	100.0

9-13-24aada
USBR Mid-State Division (Profile 10)
Buffalo County

Location: NE SE NE NE sec 24-9N-13W, 900 ft S and 84 ft W of NE cor
 sec

Ground elevation: 2007.4 ft (i) Denman 7.5 minute quadrangle

Depth to water: Not recorded

Note: Compiled from sample descriptions by V.H. Dreeszen and
 interpretation of USBR geologic and field logs

	<u>Depth, in feet</u>	
	From	To
Quaternary System, undifferentiated:		
Sand, slightly silty, "Topsoil", 90 percent fine sand, 10 percent nonplasticity fines, maximum size fine sand, soft, dark brown.....	0.0	1.0
Sand, slightly silty, 95 percent fine sand, 5 percent nonplasticity fines, a little medium sand, light brown-gray.....	1.0	4.0
Sand, gravelly, fine to very coarse sand, about 50 percent gravel up to 3/8 inch in size, clean.....	4.0	11.8
Sand, moderately silty, 80 percent fine sand, 20 percent organic silt, maximum size medium sand, dark brown-gray.....	11.8	12.5
Sand, gravelly, fine to very coarse sand, about 35 to 40 percent gravel up to 5/8 inch in size, clay layer or clay ball 28 to 28.5 ft.....	12.5	50.0
Silt, moderately clayey, slightly sandy, principally very fine sand, 85 percent low plasticity fines, medium thread, slight dilatancy, light gray, slightly yellow stain; less clayey, light brown below 57 ft.....	50.0	99.0
Sand, predominantly fine to medium, small amount of coarse, maximum size very coarse sand, dense, fairly clean.....	99.0	100.5
Tertiary System - Miocene Series - Ogallala Group:		
Sandstone, silty, about 70 percent fine sand, 30 percent nonplasticity fines, numerous small white siliceous root casts, noncalcareous, lightly cemented, very light brownish to greenish gray....	100.5	107.0
Silt, moderately clayey, slightly sandy, 90 percent low plasticity fines, 10 percent fine sand, maximum size fine sand, a few white siliceous root casts, light brown.....	107.0	109.0
Silt, moderately clayey, moderately sandy, 80 percent medium plasticity fines, 20 percent fine to medium sand, lightly cemented, noncalcareous, light olive-gray.....	109.0	132.0

9-13-26aaaa
63-B-47
Buffalo County

Location: NE NE NE NE sec 26-9N-13W, 2 ft S and 130 ft W of NE cor
 sec

Ground elevation: 2017 ft (t) Denman 7.5 minute quadrangle

Depth to water: 4.7 ft (9/24/47)

	<u>Depth, in feet</u>	
	From	To
Quaternary System, undifferentiated:		
Silt, slightly sandy, sand is fine grained, very dark brownish gray.....	0.0	1.0
Silt, moderately sandy, sand is very fine to fine, very light yellow-gray.....	1.0	1.5
Silt, sandy with silty sand layers, in part peaty, medium to dark gray, common mica.....	1.5	4.0
Sand, fine to very coarse, a little fine gravel, 5 percent gravel, iron-stained below 5.5 ft.....	4.0	10.0
Sand and gravel, gravel is fine to medium, 50 to 60 percent gravel, pink with a few dark grains; pebbles in lower 3 ft.....	10.0	47.5
Silt, slightly clayey, moderately sandy, sand is very fine to fine, light brown to light brownish gray; light brown below 50 ft; very slightly indurated 60 to 63.5 ft.....	47.5	63.5
Silt, clayey, whitish gray, very calcareous, contains thin hard limy layers or nodules below 65 ft.....	63.5	70.5
Tertiary System - Miocene Series - Ogallala Group:		
Silt, very clayey and silty sandstone, both very light greenish gray, slightly calcareous.....	70.5	72.0
Siltstone, sandy, fine grained, some volcanic ash, very light gray to olive-gray, slightly to non-calcareous; very light brownish gray below 73.5 ft, noncalcareous.....	72.0	75.0
Sandstone, silty, sand is very fine to fine, very light brownish gray, slightly calcareous.....	75.0	80.0
Sandstone, sand is very fine to fine, very light brownish to olive-gray, noncalcareous; olive-gray below 90 ft; slightly to moderately calcareous below 100 ft.....	80.0	106.0
Sandstone-siltstone, whitish gray, very calcareous..	106.0	110.0
Sandstone, fine grained, very light gray to very light olive, slightly calcareous; noncalcareous below 114 ft, a few siliceous rootlets; silty, moderately calcareous below 126 ft.....	110.0	130.0
Sandstone-siltstone, sand is very fine to fine, very light yellowish gray, very calcareous.....	130.0	135.0

Silt, clayey to sandy, whitish gray, very calcareous, in part indurated, thin limestone at 138 ft, speckled.....	135.0	138.5
Cretaceous System - Upper Cretaceous Series - Montana Group:		
Pierre Formation:		
Shale, clay, very light gray, slight yellow stain, moderately to highly calcareous; much yellow-brown below 140 ft; some aragonite 144 to 146.5 ft.....	138.5	155.0
Shale, clay, light and light medium gray, moderate yellow-brown mottling, contains some bentonite layers; a little aragonite 160 to 165 ft, all moderately to highly calcareous.....	155.0	173.0
Shale, clayey, very dark gray, noncalcareous; slightly calcareous below 185 ft.....	173.0	190.0

9-13-27cccc
9-B-75
Buffalo County

Location: SW SW SW SW sec 27-9N-13W, not located from N section line,
 test hole may be in NW cor sec 34, 1 ft E of sec line and 629 ft
 N of Platte River
 Ground elevation: 2029 ft (t) Gibbon South 7.5 minute quadrangle
 Depth to water: Not recorded

	Depth, in feet	
	From	To
Quaternary System, undifferentiated:		
Silt, very sandy, sand is mostly very fine to fine, a few coarser grains, very dark brown-gray; some medium to coarse sand below 1 ft, slightly cal- careous.....	0.0	3.0
Sand, fine to very coarse, 15 percent very coarse sand and fine gravel, slight dark staining.....	3.0	10.0
Sand and gravel, gravel is fine to medium, common pink feldspars; a little coarse gravel 20 to 30 ft; 40 to 50 percent gravel below 30 ft, fewer pink silicates.....	10.0	42.0
Silt, slightly clayey, very sandy, sand is mostly very fine to fine, medium brown-yellow.....	42.0	42.5
Sand and gravel, gravel is mostly fine to medium, 60 percent gravel, a few pink silicates.....	42.5	73.5
Silt, moderately to in part very clayey, in part sandy, sand is very fine to medium, light brown- ish and yellowish gray; very light brown 76 to 79 ft; very light brownish gray 79 to 80 ft.....	73.5	80.0

**9-13-27cdca
2-B-76
Buffalo County**

Location: NE SW SE SW sec 27-9N-13W, approximately 450 ft N and 1900 ft E of SW cor sec
 Ground elevation: 2028 ft (t) Gibbon South 7.5 minute quadrangle
 Depth to water: Not recorded

	<u>Depth, in feet</u>	
	From	To
Quaternary System, undifferentiated:		
Sand, very silty, sand is very fine to medium, rare coarse sand, dark brown-gray.....	0.0	0.5
Sand, moderately silty, sand is very fine to coarse, gravel grains rare, medium brown-gray.....	0.5	6.5
Silt, slightly clayey, very sandy, sand is mostly very fine to fine, light gray, moderately calcareous; moderately clayey below 7 ft, moderately sandy, light gray, slightly calcareous.....	6.5	9.0
Silt, moderately clayey, moderately sandy, sand is very fine to medium, medium dark brown-gray; medium brown-gray below 9.5 ft, rare coarse grains.....	9.0	11.5
Sand and gravel, gravel is fine to medium, rare coarse gravel, common pink silicates, 50 percent gravel; a few dark silicates below 30 ft.....	11.5	78.8
Silt, moderately to very clayey, slightly sandy, sand is mostly very fine, very light yellow-gray, sample contains a trace of brown clay in upper foot; very light yellow-gray and light brown-gray below 87 ft; rare coarse sand and fine gravel grains below 90 ft.....	78.8	91.0
Sand and gravel, light brown-gray, overall very light in color, a few pink silicates, 50 percent gravel.....	91.0	104.0
Tertiary System - Miocene Series - Ogallala Group:		
Sandstone, sand is very fine to medium, much medium sand, dark speckling, poorly indurated, contains a trace of white siliceous root fillings.....	104.0	110.0
Sandstone, sand is very fine to fine, a little medium, very light brown-gray, poorly indurated; moderately well indurated 120 to 130 ft, siliceous cementation, contains siliceous rootlets; sand is very fine to medium, rare coarse sand below 140 ft.....	110.0	144.0
Silt, very clayey and clay, silt is coarse, very light olive-gray; very light brown-gray below 140 ft, massive structure.....	144.0	150.0

Silt, very clayey, light olive-gray, slightly calcareous, contains volcanic ash; common volcanic ash below 160 ft.....	150.0	166.0
Sandstone, sand is very fine to fine, some medium, very light brown-to olive-gray, slight induration, contains limy cemented areas; sand is very fine to medium, some coarse below 170 ft.....	166.0	173.5
Silt, moderately clayey to very clayey, slightly to moderately sandy, sand is very fine to fine, light greenish gray, slightly calcareous; moderately sandy below 175 ft, sand is very fine to medium, some coarse.....	173.5	178.2
Cretaceous System - Upper Cretaceous Series - Montana Group:		
Pierre Formation:		
Shale, clay, light gray and light olive-gray, some yellow-brown, slightly calcareous; some mottled medium dark-gray below 180 ft.....	178.2	190.0

**9-13-34bbb
8-B-75
Buffalo County**

Location: NW NW NW sec 34-9N-13W, approximately 329 ft N of Platte River and 2 ft E of NW cor sec
 Ground elevation: 2031 ft (t) Gibbon South 7.5 minute quadrangle
 Depth to water: Not recorded

	<u>Depth, in feet</u>	
	From	To
Quaternary System, undifferentiated:		
Silt, slightly to in part moderately clayey, slightly sandy, sand is very fine to fine, rare medium to coarse, mostly dark brown-gray, slightly calcareous.....	0.0	1.5
Silt, slightly clayey, slightly sandy, sand is very fine to fine, rare medium to coarse, medium brown-gray, moderately calcareous.....	1.5	3.0
Sand, fine to very coarse, a little fine gravel, 10 percent gravel.....	3.0	10.0
Sand and gravel, gravel is fine to coarse, 50 to 60 percent gravel, some pink feldspars, a few metamorphics.....	10.0	30.0
Sand, fine to very coarse, gravel is fine with a little medium, 10 percent gravel.....	30.0	40.0
Sand and gravel, gravel is mostly fine to medium, 50 percent gravel, light colored and pink feldspars..	40.0	60.0
Sand, some gravel, 20 percent fine to medium gravel, overall light color.....	60.0	73.5
Silt, moderately clayey, very slightly sandy, silt relatively coarse, sand is mostly very fine, a little embedded fine to medium sand, light yellow-brown; in part very sandy below 83 ft, sand is very fine to medium.....	73.5	90.0

**9-13-34bbc
7-B-75
Buffalo County**

Location: SW NW NW sec 34-9N-13W, 29 ft N of north edge of Platte River and 38 ft E of NW cor sec
 Ground elevation: 2030 ft (t) Gibbon South 7.5 minute quadrangle
 Depth to water: Not recorded

Depth, in feet
From To

Quaternary System, undifferentiated:

Sand, very sandy, sand is very fine to coarse, very dark-gray.....	0.0	1.5
Sand, some gravel, medium sand to fine gravel, 15 percent gravel.....	1.5	10.0
Sand and gravel, sand and fine to coarse gravel, dark stained, 50 to 60 percent gravel.....	10.0	20.0
Sand and gravel, fine sand and some medium gravel, 30 to 40 percent gravel, quartz, some pink feldspars; mostly fine and very coarse sand below 60 ft, 10 percent gravel; silty clay or clay ball 70 to 71.5 ft, light yellow-gray; 25 percent fine to medium gravel below 71.5 ft, a few pink feldspar grains.....	20.0	80.0

Tertiary System - Miocene Series - Ogallala Group:

Sandstone, slightly clayey, sand is very fine to medium, light olive-gray to light green-gray, moderately well indurated, slightly silty to clayey below 80 ft.....	80.0	100.0
Sandstone, very fine to fine, some medium sand, slightly indurated, silty lens at 106 ft.....	100.0	110.0

9-13-36ddcd
61-B-47
Buffalo County

Location: SE SW SE SE sec 36-9N-13W, approximately 900 ft W and 98 ft N of SE cor sec

Ground elevation: 2016.2 ft (i)

Depth to water: 6.1 ft (9/19/47)

	<u>Depth, in feet</u>	
	From	To
Quaternary System, undifferentiated:		
Silt, very sandy, dark brown-gray.....	0.0	0.8
Sand, mostly very fine to fine with some sandy silt, dark brown-gray.....	0.8	2.0
Silt, very slightly clayey, moderately sandy, sand is fine to coarse with scattered coarser grains, dark brown-gray.....	2.0	3.0
Silt, sandy, slightly clayey, very light brown-gray, moderately to highly calcareous; very light gray, very calcareous below 4 ft.....	3.0	4.5
Silt, very sandy, fine to coarse sand with some coarse grains, light yellow-brown.....	4.5	5.0
Sand and gravel, gravel is fine with some medium and a little coarse, 40 percent gravel, much rusty yellow brown staining; 50 to 60 percent gravel below 10 ft, very little yellow staining.....	5.0	22.0
Silt, very sandy, sand is very fine to fine, very light gray, in part calcareous.....	22.0	24.0
Sand, fine to very coarse, some fine gravel, 10 percent gravel.....	24.0	28.0
Sand and some gravel, gravel is fine to medium, a little coarse gravel, 25 percent gravel.....	28.0	56.0
Sand and gravel, gravel is fine to medium with a little coarse, 50 to 60 percent gravel, silt or clay ball at 98 ft; slightly less gravel below 100 ft.....	56.0	103.5
Tertiary System - Miocene Series - Ogallala Group:		
Silt, sandy, sand is very fine to fine, light yellowish gray; highly calcareous, whitish gray 105 to 106.5 ft; siliceous layer, light greenish gray 106.5 to 108 ft, did not penetrate.....	103.5	108.0

9-14-14aaaa
16-31
Buffalo County

Location: NE NE NE NE sec 14-9N-14W, distances not recorded
 Ground elevation: 2063 ft (i) Gibbon North 7.5 minute quadrangle
 Depth to water: Not recorded

	<u>Depth, in feet</u>	
	From	To
Quaternary System, undifferentiated:		
"Soil, brown loam", no sample.....	0.0	0.5
"Sand, well rounded", no sample.....	0.5	10.0
Sand, fine to coarse, much fine to medium sand; 10 percent very coarse sand below 15 ft and 20 percent below 20 ft; no sample 30 to 35 ft.....	10.0	40.0
Sand, fine to coarse, trace of very coarse, much coarse sand.....	40.0	45.0
Sand, fine to very coarse, much coarse to very coarse sand, no sample 60 to 65 ft.....	45.0	65.0
Sand, medium to very coarse, a little fine gravel, approximately 50 percent very coarse sand and fine gravel.....	65.0	73.0
Tertiary System - Miocene Series - Ogallala Group:		
Sandstone, sand is mostly very fine to fine, very light olive-gray, contains a trace of rootlets, slight induration; contains a few siliceous rootlets below 85 ft; some clayey silt in sample 95 to 100 ft; no sample below 100 ft.....	73.0	105.0

9-14-18cabb
USBR Mid-State Division (Profile 8)
Buffalo County

Location: NW NW NE SW sec 18-9N-14W, 1335 ft E and approximately 2583 ft N of SW cor sec

Ground elevation: 2098.8 ft (i) Newark 7.5 minute quadrangle

Depth to water: 27.5 ft (4/19/65)

Interpreted from USBR geologic log

	<u>Depth, in feet</u>	
	From	To
Quaternary System, undifferentiated:		
Top soil, dark brown.....	0.0	1.4
Lean clay, 95 percent medium plasticity fines, strong thread, brown-gray.....	1.4	5.0
Silt, 90 percent nonplasticity fines, 10 percent fine sand, no thread, slightly calcareous, light gray, many iron-oxide spots.....	5.0	16.4
Sand, some gravel, small amount of gravel up to 1 inch in size.....	16.4	28.3
Sand and gravel, quartz with granitic subrounded to well rounded grains, 7 percent gravel grains up to 1 inch.....	28.3	56.0
Silt, 90 percent nonplasticity fines, 10 percent fine sand, no thread, light gray; weak thread below 70 ft, variable in sand content.....	56.0	128.5
Sand, silty, fine to medium, some coarser grains....	128.5	130.2
Silt, 90 percent nonplasticity fines, 10 percent fine sand, variable in sand content, weak thread, buff.....	130.2	149.0
Tertiary System - Miocene Series - Ogallala Group:		
Sand, 10 percent nonplasticity fines, 90 percent fine sand, maximum size medium sand, dense, light gray.....	149.0	186.0
Note: logged as Ogallala, may be in part Quaternary undifferentiated		

9-14-24aada
USBR Mid-State Division (Profile 9)
Buffalo County

Location: NE SE NE NE sec 24-9N-14W, 665 ft S and 88 ft W of NE cor
 sec

Ground elevation: 2052.4 ft (i) Gibbon South 7.5 minute quadrangle

Depth to water: 13 ft (7/12/65)

Interpreted from USBR geologic log

	Depth, in feet	
	From	To
Quaternary System, undifferentiated:		
Silt, slightly clayey, very slightly sandy, 90 percent medium plasticity fines, very dark brown-gray, granular.....	0.0	1.0
Silt, slightly clayey, slightly sandy, 85 percent medium plasticity fines, dark brown-gray, slightly calcareous, granular.....	1.0	6.0
Sand, fine to very coarse, traces of gravel up to 1 inch in size.....	6.0	56.0
Tertiary System - Miocene Series - Ogallala Group:		
Sand, silty, 35% low plasticity fines, sand is fine, buff, moderately calcareous.....	56.0	64.0
Silt, sandy, slightly clayey, 75% medium plasticity fines, white to very light olive-gray; moderately calcareous 64 to 75 ft.....	64.0	101.0
Sand, silty, 45 percent low plasticity fines, sand is fine, light olive-gray.....	101.0	126.0
Silt, slightly clayey, slightly sandy, 80 percent low plasticity fines, sand is fine, light olive-gray.....	126.0	137.0
Sand, silty, 40 percent low plasticity fines, sand is fine to medium, light olive-gray.....	137.0	147.0
Silt, slightly clayey, slightly sandy, 80 percent low plasticity fines, sand is fine, light olive-gray.....	147.0	149.5
Sand, silty, 25 percent low plasticity fines, sand is fine, light greenish gray.....	149.5	165.0
Silt, sandy, 75 percent low plasticity fines, sand is fine, light brown, moderately to very calcareous.....	165.0	199.0
Sand, silty, 20 percent low plasticity fines, sand is very fine to medium, some coarse sand, brown, calcareous.....	199.0	206.0
Silt, sandy, slightly clayey, 65 percent low plasticity fines, sand is fine, olive, highly calcareous.....	206.0	213.0

Cretaceous System - Upper Cretaceous Series - Montana Group:

Pierre Formation:

Shale, clay, brown with uneven streaks, very calcareous; dark gray below 224 ft..... 213.0 230.0

**9-14-25baa
18-31
Buffalo County**

Location: NE NE NW sec 25-9N-14W, distances not recorded
 Ground elevation: 2055 ft (i) Gibbon South 7.5 minute quadrangle
 Depth to water: Not recorded
 Note: Log compiled from WSP 779 and examination of available samples

	<u>Depth, in feet</u>	
	From	To
Quaternary System, undifferentiated:		
"Soil", black silty loam.....	0.0	1.0
Silt, clayey and sandy, light yellow-brown.....	1.0	3.0
Sand and gravel, 25 to 30 percent gravel.....	3.0	16.0
Sand, fine to medium, some coarse, possibly a sandy silt at top.....	16.0	25.0
Sand, some gravel, much coarse to very coarse sand, gravel is fine with some medium; snail shell and trace of light to medium gray sandy silt in lower part.....	25.0	58.0
Silt, moderately clayey, sandy, mostly very fine to fine sand, light brown, in part calcareous.....	58.0	±120.0
Tertiary System - Miocene Series - Ogallala Formation:		
Silt and sandy silt, in part clayey, mostly very fine to fine sand, very light olive-gray, rare rootlets; some sandstone, very fine to medium sand 150 to 155 ft; some medium to very clayey silt 155 to 160 ft, very light olive-gray, noncalcareous.....	±120.0	160.0
Sand, silty or sandstone, sand is very fine to medium, some flat rounded lithic clay and silt grains.....	160.0	173.5

9-15-1aadd
USBR Mid-State Division (Profile 8)
Buffalo County

Location: SE SE NE NE sec 1-9N-15W, 1325 ft S and 106 ft W of NE cor
 sec

Ground elevation: 2144.6 ft (i) Buckeye Valley 7.5 minute quadrangle

Depth to water: 64.9 ft (4/19/65)

Compiled from sample descriptions by V.H. Dreeszen and
 interpretation of USBR geologic and field logs

	<u>Depth, in feet</u>	
	From	To
Quaternary System, undifferentiated:		
Silt, clayey, 90 percent low plasticity fines, 10 percent fine sand, medium thread, dark brown-gray.	0.0	2.5
Silt, very slightly clayey, approximately 100 percent slightly plastic noncalcareous silt, light brownish gray; slightly clayey 40.5 to 43.3 ft....	2.5	43.3
Silt, slightly to moderately clayey, light brown; slightly clayey 50.5 to 53.5 ft.....	43.3	53.5
Silt, moderately clayey, light brown, slightly more clayey below 60.5 ft, light medium brown.....	53.5	70.5
Silt, slightly to moderately clayey, very light brown, moderately calcareous; slightly calcareous below 80.5 ft; some sandy silt layers 93.5 to 104.5 ft, sand, mostly very fine to fine; occasional limy nodules below 102.8 ft.....	70.5	104.3
Silt, moderately clayey, very light brown, moderately calcareous.....	104.3	111.0
Silt, moderately clayey, contains sandy layers, sand is fine to medium, a little coarse, light pinkish brown, a few limy nodules.....	111.0	116.5
Tertiary System - Miocene Series - Ogallala Group:		
Silt, moderately clayey, slightly sandy, sand is mostly very fine to fine, very light brown and light olive-gray.....	116.5	120.0
Sand, slightly clayey, moderately silty, very light olive-gray, noncalcareous, contains white siliceous rootlets; slightly calcareous in lower 0.5 ft.....	120.0	124.6
Sandstone, sandy, sand is very fine to fine, in part slightly clayey, light brownish to light olive-gray, slightly indurated, some limy areas.....	124.6	131.0
Sand, very silty, slightly clayey, sand is mostly very fine, very light olive-gray, moderately calcareous; slightly indurated below 144.7 ft.....	131.0	151.0
Siltstone-sandstone, sand is very fine to fine, very light olive-gray, some limy areas; poorly indurated below 161 ft; sample below 170 ft contains some light brown clayey silt.....	151.0	176.5

Silt, slightly clayey, very slightly sandy, whitish gray, very calcareous.....	176.5	181.0
Sand, slightly silty, sandy is very fine to fine, light olive-gray; sand is very fine to medium below 190 ft.....	181.0	195.0
Sand, slightly clayey, slightly silty, sand is very fine to fine, light greenish gray.....	195.0	204.0
Sand, moderately clayey, sand is very fine to fine, some medium, very light greenish gray; sand is very fine to medium below 211 ft, slightly indurated, contains some limy areas.....	204.0	221.0
Sand, slightly silty, sand is very fine to medium; thin clayey siltstone layers below 223.2 ft; mostly very fine to fine sand, slightly indurated below 230.1 ft, contains rootlets.....	221.0	241.1
Sand, very slightly silty, sand is very fine to fine, some medium.....	241.1	243.6
Siltstone, slightly clayey, moderately sandy, sand is mostly very fine, poorly indurated, very light olive-gray.....	243.6	261.0
Sand, very silty, sand is mostly very fine, some fine, very light olive-gray, slightly indurated, slightly calcareous.....	261.0	287.0
Cretaceous System - Upper Cretaceous Series - Montana Group:		
Pierre Formation:		
Shale, clay, very light olive-gray, light gray and yellow, calcareous; light olive-gray 291 to 311 ft; medium gray below 311 ft.....	287.0	323.4

9-15-6bbcc
USBR Mid-State Division (Profile 7)
Buffalo County

Location: SW SW NW NW sec 6-9N-15W, 660 ft S and 78 ft E of NW
 cor sec

Ground elevation: 2195.5 ft (i) Pleasanton SE 7.5 minute quadrangle

Depth to water: 67.9 ft (6/24/65)

Compiled from sample descriptions by V.H. Dreeszen and
 interpretation of USBR geologic and field logs

	<u>Depth, in feet</u>	
	From	To
Quaternary System, undifferentiated:		
Silt, slightly clayey, about 100 percent slightly plastic noncalcareous silt, dark brown.....	0.0	1.4
Silt, about 100 percent slightly plastic silt, contains a trace of very fine to fine sand, slight toughness, moderately quick dilatancy, light brownish to yellowish gray, slightly calcareous below 13 ft.....	1.4	25.0
Silt, slightly to moderately clayey, light brownish gray, slightly calcareous.....	25.0	27.0
Silt, slightly to moderately clayey, dark brown-gray; very clayey 29 to 29.7 ft, medium brown-gray.....	27.0	29.7
Silt, moderately clayey, slightly sandy, sand is mostly very fine to fine, medium brown; slightly less clayey below 40.5 ft; slightly to moderately sandy below 42.6 ft; hard limy nodules and limy areas below 54 ft, common limy areas below 60 ft..	29.7	63.8
Silt, moderately clayey, very slightly sandy, very light brown, occasional limy nodule and limy areas; very clayey below 60 ft, light reddish brown 66 to 80 ft; light brown below 80.5 ft.....	63.8	82.5
Clay, silty, very light gray with some mottled light brown, some secondary lime; light and medium brown below 83.8 ft.....	82.5	90.5
Silt, moderately to very clayey, light brown, moderately calcareous, a few dense limy nodules; very clayey below 100.5 ft, small limy areas; white, very calcareous 112 to 113.7 ft.....	90.5	113.7
Silt, moderately clayey, very light brownish to whitish gray, moderately to highly calcareous; slightly clayey below 114.3 ft, very light brownish gray.....	113.7	130.5
Sand, slightly silty, sand is very fine to fine, some medium and rare coarse sand, probably very silty to 136.5 ft.....	130.5	140.5
Sand, very fine to coarse, contains a trace of very coarse sand and gravel.....	140.5	143.0

Sand, some gravel, gravel is mostly fine, maximum size is 3/8 inch.....	143.0	153.0
Silt, slightly clayey, slightly sandy, sand is mostly very fine; light brownish gray and very light brown, slightly calcareous, moderately quick dilatancy, low toughness, contains some limy nodules; may be some silty sand layers below 186 ft.....	153.0	198.0
Tertiary System - Miocene Series - Ogallala Group:		
Sand, slightly silty, sand is very fine to fine, very light olive-gray, calcareous; some induration below 210 ft.....	198.0	220.5
Silt, slightly clayey, very sandy, sand is mostly very fine, light olive-gray and light brown-gray; some moderately clayey layers and silty sand, very fine to fine grained sand below 221.5 ft.....	220.5	222.7
Sand, very slightly silty, sand is very fine to fine, some medium; some coarse sand below 223.7 ft; contains a trace of reddish brown clay 230.5 to 240.5 ft; contains some coarse and a trace of very coarse sand below 240.5 ft.....	222.7	245.9
Sand, slightly silty, slightly indurated, sand is very fine to fine, some medium, very light brown; some slightly clayey silt layers below 250.5 ft...	245.9	260.5
Siltstone-sandstone, sand is mostly very fine, calcareous.....	260.5	280.5
Sand, silty, sand is very fine with some fine, silt is relatively coarse, very light olive-gray, calcareous in upper portion.....	280.5	±287.0
Cretaceous System - Upper Cretaceous Series - Montana Group:		
Pierre Formation:		
Shale, clay, yellow brown; some dark gray below 300 ft; mostly dark gray to black below 310 ft, non-calcareous.....	±287.0	320.5

9-15-13dddd
42-A-54
Buffalo County

Location: SE SE SE SE sec. 13, T. 9 N., R. 15 W., approximately
 30 ft N and 10 ft W of SE cor sec

Ground elevation: 2104 ft (t) Newark 7.5 minute quadrangle

Depth to water: approximately 28.5 ft from electric log, hole
 caved at 28.2 ft (8/30/54)

Electric log

	<u>Depth, in feet</u>	
	From	To
Quaternary System, undifferentiated:		
Silt, slightly clayey, slightly sandy, sand is very fine, silt is coarse, dark gray.....	0.0	2.0
Silt, moderately to very clayey, medium yellow-gray; moderately clayey below 3 ft, medium brown-gray; in part slightly calcareous.....	2.0	4.0
Silt, slightly to moderately clayey, light yellow-gray, slightly calcareous, contains a few limy nodules; slightly clayey below 4.5 ft, very light yellow-gray; silt is coarse below 5 ft, a little mottled yellow-brown.....	4.0	7.5
Silt, slightly to moderately clayey, very light yellow-gray, slightly calcareous, contains limy nodules and shell fragments.....	7.5	10.0
Silt, slightly clayey, light yellow-gray; much rusty yellow brown mottling, slightly calcareous.....	10.0	12.5
Silt, slightly clayey, very light gray.....	12.5	16.0
Sand, fine to very coarse, a little fine gravel, quartz with pink silicates; 15 percent gravel 20 to 25 ft and 20 percent gravel 25 to 30 ft.....	16.0	30.0
Sand and gravel, circulation lost, no sample obtained, E log indicates silt layer 34 to 36 ft..	30.0	40.0
Sand and gravel, 50 percent fine to coarse gravel, 60 percent gravel.....	40.0	59.5
Silt, very clayey, medium brown; moderately clayey, slightly sandy below 60 ft, silt is coarse, sand is mostly very fine, medium yellow-gray; light medium gray 61 to 63.5 ft; slightly clayey below 63.5 ft.....	59.5	64.5
Silt, slightly clayey, slightly sandy, silt is coarse, sand is mostly very fine, light olive-gray, slightly calcareous; noncalcareous below 80 ft; moderately clayey 86.2 to 88 ft, slightly calcareous, moderately calcareous below 89.5 ft; moderately sandy below 90 ft, sand is very fine to fine, slightly calcareous, light gray.....	64.5	94.0
Sand, fine to very coarse, a trace of fine gravel; 15 percent fine gravel below 100 ft.....	94.0	105.0

Sand and gravel, gravel is fine with some medium, 30 percent gravel.....	105.0	107.0
Silt, slightly clayey, silt is coarse, light medium gray, slightly calcareous, limy nodules; light olive-gray 110 to 115 ft; noncalcareous below 115 ft, medium yellow-gray below 118.5 ft.....	107.0	120.0
Silt, slightly to moderately clayey, light brown-gray, slightly calcareous.....	120.0	123.0
Silt, moderately clayey, light medium brown; slightly clayey below 123.5 ft, coarse grained; slightly to moderately clayey below 125 ft, slightly calcareous.....	123.0	130.0
Silt, slightly clayey, moderately to very sandy, sand is very fine to fine, medium brown.....	130.0	140.0
Silt, slightly to moderately clayey, silt is coarse, a little very fine sand, light medium brown, slightly calcareous, contains limy nodules; noncalcareous 145 to 150 ft; moderately clayey below 147.7 ft, very slightly sandy; moderately calcareous below 150 ft.....	140.0	151.5
Silt, slightly to moderately clayey, slightly sandy, sand is very fine to medium, light medium brown; slightly calcareous 153.5 to 154 ft, contains some coarse sand, moderately sandy below 154 ft, sand is fine to coarse.....	151.5	155.0
Sand, some gravel, slightly clayey, very silty, sand is fine to very coarse with 10 percent fine gravel.....	155.0	157.0
Sand, very silty, sand is very fine to fine, moderately ashy, medium gray; interbedded slightly clayey sandy silt and volcanic ash below 161.5 ft, light olive-gray, sand is fine to coarse.....	157.0	166.5
Sand, fine to very coarse, some fine gravel.....	166.5	168.0
Silt, slightly clayey, coarse, slightly sandy, sand is very fine, ashy, light olive-gray, a few rootlets.....	168.0	174.0
Sand, some gravel, sand is fine to very coarse, a little fine and trace of medium gravel; 35 percent gravel 180 to 185 ft.....	174.0	185.0
Sand, fine to coarse, a little very coarse.....	185.0	191.0
Tertiary System - Miocene Series - Ogallala Group:		
Siltstone-sandstone, marly, sand is very fine to fine, white, very calcareous.....	191.0	195.0
Sandstone, slightly to moderately silty, sand is very fine to fine, very light olive-gray, very calcareous.....	195.0	197.0
Sandstone, slightly silty, sand is very fine to fine with some medium, very light olive-gray, in part slightly calcareous.....	197.0	210.0
Sand, very fine to very coarse, some lithic light green siltstone grains.....	210.0	211.0

Cretaceous System - Upper Cretaceous Series - Montana Group:

Pierre Formation:

Shale, clay, very light gray, some yellow and yellow-brown mottling, moderately calcareous, bentonite layer at 227.5 ft.....	211.0	229.0
Shale, clay, medium gray, a little yellow-brown in upper foot, some light medium olive-gray to 236 ft.....	229.0	236.0
Shale, clay, medium gray, moderately calcareous; slightly friable below 239 ft, moderately to very calcareous.....	236.0	250.0

9-15-36dddd
43-A-54
Buffalo County

Location: SE SE SE SE sec 36-9N-15W, approximately 174 ft N and 7 ft W of SE cor sec

Ground elevation: 2093 ft (t) Newark 7.5 minute quadrangle

Depth to water: approximately 8.5 ft, hole caved at 8.4 ft (9/3/54)

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 mostly fine with a few coarse grains, dark brown-gray; slightly more clayey below 2.8 ft, very dark brown-gray; very clayey below 3.2 ft, dark brown-gray.....	1.0	3.4
Sand and gravel, medium sand to fine and a little medium gravel, 25 percent gravel, quartz with pink silicates; 35 percent gravel 5 to 10 ft; 25 percent gravel 10 to 15 ft; 15 percent gravel 15 to 20 ft; 30 to 40 percent gravel 20 to 45 ft and 40 to 50 percent gravel 45 to 54 ft.....	3.4	54.0
Silt, medium to very clayey, light yellow-brown; very clayey 57 to 60 ft, light brown, slightly calcareous.....	54.0	60.0
Silt, slightly clayey, coarse silt, medium dark brown-gray; slightly to moderately clayey 61.5 to 63 ft.....	60.0	63.0
Sand, very fine to medium, a little coarse to very coarse sand.....	63.0	70.0
Sand, fine to very coarse, a little fine gravel.....	70.0	78.0
Silt, moderately clayey, very light gray, slightly calcareous; moderately to very clayey below 80 ft.	78.0	81.5
Silt, very clayey, mottled very light gray and very light brown, slightly calcareous; slightly sandy below 85 ft, sand is very fine to fine, very light gray.....	81.5	86.5
Silt, very sandy, sand is mostly very fine, light brown, slightly calcareous, granular structure....	86.5	87.5
Silt, slightly clayey, slightly sandy, silt is coarse, sand is mostly very fine, very light gray, moderately calcareous; very light brown 93 to 95 ft, slightly calcareous; interbedded light brown-gray and light olive-gray below 95 ft.....	87.5	101.0
Silt, slightly clayey, slightly to moderately sandy, sand is very fine to fine, light gray, slightly calcareous; in part very sandy 105 to 110 ft; non-calcareous below 110 ft.....	101.0	112.0

Sand, very fine to medium, a trace of coarse.....	112.0	114.5
Silt, slightly clayey, medium yellow-gray, slightly calcareous; slightly more clayey 117 to 119.5 ft, light gray.....	114.5	120.0
Silt, moderately to very clayey, light gray, slightly calcareous; very clayey below 121 ft; some coarse clayey silt below 124 ft, moderately calcareous below 121.5 ft.....	120.0	125.0
Silt and very sandy silt, interbedded, sand mostly very fine to fine; a silty sand 127 to 129.5 ft, slightly calcareous; many snail shells.....	125.0	129.5
Silt, slightly to moderately clayey, slightly sandy, silt is coarse, sand is very fine to fine, slightly calcareous; very sandy in part below 131.5 ft; many snail shells below 135 ft.....	129.5	139.0
Silt, slightly clayey, slightly sandy, light gray, slightly calcareous.....	139.0	143.5
Sand, fine to very coarse, some fine gravel, much black stain.....	143.5	144.5
Silt, moderately clayey, in part slightly sandy, sand is very fine to fine, light gray, slightly calcareous; moderately to very sandy below 152 ft, sand is very fine to medium, slightly to moderately calcareous; some silty sand below 155 ft..	144.5	156.0
Silt, moderately clayey, slightly sandy, silt is coarse, sand is very fine to fine, light gray, slightly calcareous.....	156.0	160.0
Silt, slightly clayey, very sandy, sand is very fine to coarse with a trace of fine gravel, slightly calcareous, shell fragments.....	160.0	164.0
Silt, slightly clayey, slightly sandy, silt is coarse, sand is very fine to fine, light medium gray, slightly calcareous; very slightly sandy below 165 ft.....	164.0	170.0
Silt, slightly clayey, silty is coarse, light medium gray, slightly calcareous; slightly sandy 180 to 185 ft; moderately clayey 185 to 186 ft....	170.0	186.0
Silt, slightly clayey, slightly sandy, sand is very fine to medium, medium gray, slightly calcareous; slightly to moderately clayey below 191.5 ft.....	186.0	195.0
Silt, slightly clayey, moderately sandy, sand is very fine to fine, medium gray, slightly calcareous; slightly sandy below 197 ft.....	195.0	200.0
Silt, slightly clayey, very slightly sandy, silt is coarse, sand is very fine, medium gray, slightly calcareous; slightly to moderately clayey 201.5 to 203 ft, moderately calcareous; slightly clayey, slightly calcareous 203 to 205 ft.....	200.0	205.0

Silt, slightly clayey, very slightly sandy, sand is mostly very fine, light medium gray, slightly calcareous; moderately clayey 208 to 209 ft; slightly to moderately calcareous below 213.5 ft; many limy nodules 214 to 216 ft; light medium olive-gray below 216 ft; a few limy nodules 200 to 223.5 ft; noncalcareous below 225 ft, some embedded sand....	205.0	229.0
Sand, very fine to very coarse, trace of fine gravel.....	229.0	239.9
Cretaceous System - Upper Cretaceous Series - Montana Group:		
Pierre Formation:		
Shale, clay, medium gray, moderately to very calcareous; a little very light yellow-brown mottling in the upper part; bentonite layer at 253.5 ft....	239.9	290.0

9-16-6bccc
USBR Mid-State Division (Profile 6)
Buffalo County

Location: SW SW SW NW sec 6-9N-16W, approximately 2594 ft S and 36 ft E of NW cor sec

Ground elevation: 2264.7 ft (i) Pleasanton SE 7.5 minute quadrangle

Depth to water: 87.4 ft (6/24/65)

USBR Geologic log

	<u>Depth, in feet</u>	
	From	To
Quaternary System, undifferentiated:		
Silt, "top soil", 85 percent low plasticity fines, 15 percent fine sand, dark brown.....	0.0	1.5
Silt, "Loess", 80 percent low plasticity fines, 20 percent fine sand, firm, some rust spots, brown...	1.5	33.0
Silt, "soil zone", 85 percent low plasticity fines, 15 percent fine sand, firm, dark brown.....	33.0	36.0
Silt, 80 percent low plasticity fines, 20 percent fine sand, low to medium plasticity, scattered limy nodules, buff.....	36.0	75.0
Sandy silty, 75 percent low plasticity fines, 25 percent fine sand, traces of lime, firm, buff.....	75.0	108.0
Sandy silt, 70 percent low plasticity fines, variable amounts of sand, bedded, firm, gray.....	108.0	135.0
Tertiary System - Miocene Series - Ogallala Group:		
Silt, 85 percent non-plasticity fines, 15 percent fine sand, high in lime, greenish gray.....	135.0	139.0
Sand, fine, 15 percent non-plasticity fines, 85 percent fine sand, slightly cemented in spots, firm, greenish gray.....	139.0	152.8

9-16-13dbaa
USBR Mid-State Division (Profile 7)
Buffalo County

Location: NE NE NW SE sec 13-9N-16W, approximately 2607 ft N and 1420 ft N of SW cor sec

Ground elevation: 2150.8 ft (i) Kearney 7.5 minute quadrangle

Depth to water: 37.4 ft (3/8/65)

Compiled from sample descriptions by V.H. Dreeszen and interpretation of USBR geologic logs

	<u>Depth, in feet</u>	
	From	To
Quaternary System, undifferentiated:		
Silt, slightly clayey, slightly sandy, dark brown; very dark brown-gray to black 1 to 1.5 ft; moderately clayey, dark brown-gray 1.5 to 2.7 ft; moderately to very clayey 2.7 to 4.5 ft.....	0.0	4.5
Silt, moderately clayey, very slightly sandy, light brown-gray.....	4.5	10.0
Silt, slightly clayey, mottled light yellow-gray and brown-yellow; light yellow-gray, slightly calcareous below 13.2 ft.....	10.0	24.0
Sand, slightly to in part moderately silty, sand is very fine to fine, light-gray; some medium sand below 40 ft; very slightly silty below 40.6 ft....	24.0	43.6
Silt, slightly clayey, slightly sandy, sand is very fine, medium gray.....	43.6	50.1
Sand, very silty, slightly clayey, sand is very fine to medium, contains a trace of dark gray clayey silt.....	50.1	50.6
Sand, very fine to medium, light gray.....	50.6	60.0
Sand, very fine to coarse, approximately 5 percent very coarse sand and fine gravel, very light gray, some dark silicates, slightly silty or with silt layers and clay balls 62 to 64.3 ft, 10 percent fine gravel, overall is very light gray, some pink silicates.....	60.0	67.0
Silt, very sandy, sand is very fine, light brown, calcareous.....	67.0	73.8
Sand, very silty, sand is very fine to fine, some medium, light brown.....	73.8	78.5
Silt, slightly clayey, moderately sandy, sand is very fine to fine, light brown, calcareous.....	78.5	80.1
Clay, silty, medium dark brown, contains limy areas, light brown below 84 ft, contains some limy nodules.....	80.1	87.5
Clay, silty, very light gray, contains a few limy nodules.....	87.5	91.1
Sand, moderately silty, sand is mostly very fine to fine, very light gray.....	91.1	91.5

Sand, very fine to coarse, very light gray.....	91.5	92.5
Sand, some gravel, contains a few rounded limy grains; moderately silty 100 to 101.5 ft, may have some volcanic ash 101.5 to 102.7 ft; slightly silty below 110 ft, mostly fine to coarse sand with some very coarse and a trace of gravel.....	92.5	116.0
Silt, very clayey, light olive-gray, in part calcareous.....	116.0	120.1
Silt, slightly clayey, slightly sandy, sand is very fine with some fine, very light olive-gray, moderately calcareous, contains small limy areas.....	120.1	140.0
Silt, moderately clayey, very slightly sandy, sand is mostly very fine, very light olive-gray, contains limy areas.....	140.0	141.0
Silt, moderately clayey, moderately sandy grading to a silty sand in lower part, sand is very fine to fine, some medium, light olive-gray.....	141.0	142.5
Sand, moderately silty, slightly clayey, sand is very fine to medium, trace of coarse, light olive-gray.....	142.5	146.5
Silt, slightly clayey, slightly sandy, sand is mostly very fine, light brown, slightly calcareous, some limy nodules in upper few feet.....	146.5	180.1
Silt, slightly sandy, sand is mostly very fine to fine, very light brownish to yellowish gray; very light gray with yellow-brown iron-oxide stain below 181.2 ft.....	180.1	184.6
Sand, very silty, slightly clayey, sand is very fine to medium with some coarse and a trace of very coarse sand and fine gravel.....	184.6	187.5
Silt, slightly clayey, slightly sandy, sand is very fine to medium, very light brownish gray.....	187.5	±195.0
Tertiary System - Miocene Series - Ogallala Group:		
Sandy silt, white, calcareous, contains rootlets, slightly indurated.....	±195.0	200.0
Sand, moderately silty, sand is very fine to fine, some medium, very light gray, moderately calcareous in part, slightly indurated.....	200.0	202.8

**9-16-20bbba
45-A-54
Buffalo County**

Location: NE NW NW NW sec 20-9N-16W, approximately 63 ft S and 556 ft W of NW cor sec

Ground elevation: 2300 ft (t) Alfalfa Center 7.5 minute quadrangle

Depth to water: Not known; caved at 95 ft (9/7/54)

Electric log indicates water level below 119 ft

Electric log

	<u>Depth, in feet</u>	
	From	To
Quaternary System, undifferentiated:		
Silt, moderately clayey, medium dark gray; moderately to very clayey below 1.5 ft, medium brown-gray.....	0.0	2.5
Silt, slightly to moderately clayey, light yellow-gray, slightly to moderately calcareous, limy areas.....	2.5	3.0
Silt, slightly clayey, light yellow-gray, essentially noncalcareous.....	3.0	5.0
Silt, slightly clayey, mottled, light olive-and light yellow-gray; light medium yellow-gray below 20 ft; light brownish gray below 25 ft.....	5.0	29.0
Silt, slightly clayey, medium dark brown-gray; dark brown-gray 30 to 31.5 ft; slightly more clayey below 31.5 ft, medium dark brown-gray.....	29.0	32.0
Silt, moderately to very clayey, silt is coarse, medium dark brown-gray.....	32.0	35.0
Silt, moderately clayey, light brown; light medium brown-gray below 38.5 ft, slightly calcareous; trace of limy nodules below 40 ft.....	35.0	41.0
Silt, moderately to very clayey, medium brown; slightly to moderately clayey below 45 ft; light brown, slightly calcareous 55 to 60 ft; light yellow-brown 60 to 67 ft; very slightly calcareous 65 to 67 ft.....	41.0	67.0
Silt, moderately clayey, light brown, slightly calcareous, slightly less clayey 70 to 75 ft; moderately to very clayey 75 to 77.5 ft; light yellow brown 80 to 84 ft; very light brown 84 to 85 ft, very calcareous.....	67.0	85.0
Silt, slightly to moderately clayey; slightly clayey and moderately sandy in lower part, sand is very fine to medium, light brown, slightly calcareous.....	85.0	90.0
Sand, slightly to moderately silty, sand is very fine to medium, light brown, slightly calcareous..	90.0	96.8
Silt, slightly clayey, slightly sandy, sand is very fine to fine, light medium brown.....	96.8	102.0

Sand, slightly to moderately silty, sand is very fine to fine with some medium, light medium brown; slightly silty below 105 ft.....	102.0	110.0
Sand, very fine to fine with a little medium; slightly silty 112 to 115 ft.....	110.0	119.0
Silt, slightly clayey, light medium brown; some very light brown-gray below 126 ft, moderately calcareous.....	119.0	135.0
Silt, moderately clayey, contains a few fine to coarse sand grains, light brown, slightly calcareous; contains white limy areas 139 to 139.5 ft...	135.0	139.5
Silt, slightly clayey, slightly sandy, sand is mostly very fine to fine with scattered grains of coarse sand and fine gravel, light brown, slightly calcareous.....	139.5	140.2
Tertiary System - Miocene Series - Ogallala Group:		
Silt, moderately clayey, marly, white, very calcareous, in part indurated.....	140.2	142.5
Siltstone, clayey, in part sandy, very light brown and white, in part very calcareous, sandy in upper 0.5 ft.....	142.5	145.0
Limestone, marly, slightly sandy, sand is very fine to medium, white, very calcareous; contains thin sandstone layers.....	145.0	150.0
Siltstone, marly, very slightly sandy, sand is very fine to medium, white, moderately well indurated to 152.5 ft.....	150.0	153.0
Sand, fine to very coarse, trace of fine gravel, contains rounded limy grains.....	153.0	156.0
Siltstone-sandstone, some interbedded clayey silt and nodular limestone zones, whitish gray, calcareous.....	156.0	166.0
Silt, slightly clayey, very sandy, sand is very fine to fine with a trace of medium, very light olive-gray, very slightly calcareous.....	166.0	169.0
Sandstone, slightly silty, sand is very fine to fine with some medium; interbedded, slightly clayey to sandy silt below 174.2 ft.....	169.0	175.0
Siltstone, slightly sandy, sand is very fine to fine; very light olive-gray.....	175.0	179.0
Silt, moderately clayey, slightly to moderately sandy, sand is very fine to medium, very light olive-gray; interbedded with some silty sand, very light olive-gray and light brown.....	179.0	184.5
Limestone, sandy, sand is very fine to medium, white.....	184.5	185.0

Sandstone, slightly silty, sand is very fine to medium; limy cemented areas 185 to 193 ft; light brown 190 to 193 ft; very light olive-gray 193 to 200 ft, some interbedded very silty sand 195 to 200 ft; very light brown below 195 ft, moderately calcareous.....	185.0	205.0
Siltstone-sandstone, sand is very fine to fine, white to very light olive-gray, moderately calcareous; slightly clayey to very sandy silt layer 208 to 208.5 ft, very light olive-gray, noncalcareous.....	205.0	210.0
Sandstone, some interbedded sandy siltstone, sand is very fine to fine; light olive-gray, in part calcareous.....	210.0	213.5
Silt, very sandy, sand is very fine to fine, very light olive-gray, in part indurated.....	213.5	220.0
Sand, silty, sand is very fine to fine with some medium, some limy cementation to 225.6 ft, very calcareous, white, indurated 225.6 to 227 ft; slightly to moderately calcareous below 227 ft....	220.0	230.0
Silt, slightly clayey, very sandy, sand is very fine to medium, very light olive-gray, slightly indurated, noncalcareous; very calcareous, indurated 235 to 236.5 ft.....	230.0	236.5
Silt, moderately clayey, moderately sandy, sand is mostly fine, very light olive-gray; in part calcareous 240 to 244 ft; very calcareous, marly 240 to 247 ft.....	236.5	247.0
Sandstone, slightly silty, sand is very fine to fine with a trace of medium, very light olive-gray....	247.0	249.0
Silt, siltstone and sandstone interbedded, sand is mostly very fine to fine, calcareous marly areas..	249.0	260.0
Silt, slightly sandy, sand is very fine, very light olive-gray, some nodular limestone, possibly a silty volcanic ash layer in interval.....	260.0	266.0
Volcanic ash, very light gray.....	266.0	272.3
Silt, slightly clayey, light greenish gray.....	272.3	273.0
Sandstone, moderately silty, sand is very fine to fine, marly, white, very calcareous.....	273.0	273.5
Sandstone, slightly silty, sand is very fine to fine with some medium, very light olive-gray, contains indurated white calcareous areas.....	273.5	277.5
Sand, slightly to moderately silty, sand is very fine to fine, very light olive-gray, in part indurated.....	277.5	282.0
Silt, slightly clayey, very sandy, sand is very fine to fine with a little medium, very light olive-gray; slightly silty below 290 ft; calcareous indurated layer 292 to 292.5 ft.....	282.0	292.5
Sand, very silty, sand is very fine to fine with some medium, very light olive-gray, moderately silty below 295.5 ft.....	292.5	299.5

Sandstone, very fine to fine, some medium sand, very light olive-gray.....	299.5	300.0
Silt, moderately clayey, light greenish gray.....	300.0	302.0
Sand, very fine to fine, some medium.....	302.0	309.5
Silt, moderately clayey, moderately sandy, sand is very fine to fine with some medium, light greenish gray.....	309.5	310.0
Siltstone, white, and very light brown, very calcareous; noncalcareous below 316.5 ft, light greenish gray.....	310.0	318.0
Silt, slightly clayey, moderately sandy, sand is mostly fine, white to very light greenish gray, slightly calcareous; moderately calcareous below 320 ft; contains limy nodules.....	318.0	323.0
Silt, moderately clayey, slightly sandy, very light gray, contains lithic grains of clay and bentonitic clay.....	323.0	325.2
Cretaceous System - Upper Cretaceous Series - Montana Group:		
Pierre Formation:		
Shale, clay, mottled, very light gray, light yellow gray and yellow-brown, noncalcareous; bentonite layer 332.5 to 333 ft; some mottled red-brown 333 to 333.5 ft.....	325.2	341.0
Shale, clay, very light gray and light gray, noncalcareous; some medium and a little dark gray 345 to 348 ft, some brown-yellow and olive-gray 348 to 350 ft; dark gray below 350 ft, thin calcareous ironstone layer 357.5 to 357.6 ft.....	341.0	360.0

9-16-24dddc
USBR Mid-State Division (Profile 7)
Buffalo County

Location: SW SE SE SE sec 24-9N-16W, 52 ft N and 567 ft W of SE cor
 sec

Ground elevation: 2193 ft (i) Kearney 7.5 minute quadrangle

Depth to water: 78.8 ft (4/9/65)

Compiled from sample descriptions by V.H. Dreeszen and
 interpretation of USBR geologic and field logs

	<u>Depth, in feet</u>	
	From	To
Quaternary System, undifferentiated:		
Silt, slightly clayey, about 100 percent slightly plastic noncalcareous silt, very dark brown-gray..	0.0	1.3
Silt, essentially 100 percent slightly plastic noncalcareous silt, moderately slow dilatancy, light brownish to yellowish gray.....	1.3	25.0
Silt, moderately clayey, dark brown-gray.....	25.0	27.5
Silt, moderately clayey, medium brown; slightly sandy below 30 ft, light medium brown; granular structure 36.5 to 40 ft, medium brown.....	27.5	40.0
Silt, moderately to in part very clayey, light brown; moderately clayey below 43.5 ft, light medium brown.....	40.0	50.0
Silt, moderately clayey, light brown; slightly calcareous below 60 ft; contains much secondary lime 70 to 71 ft.....	50.0	73.3
Silt, slightly to moderately clayey, light brown; some white limy areas 90 to 95 ft.....	73.3	95.2
Silt, very clayey, light medium brown; thin limy marl layer 110 to 110.3 ft.....	95.2	110.3
Silt, moderately clayey, contains a trace of very fine to fine sand, light brown-gray, slightly calcareous, numerous small rootlets; very light brown-gray 111.4 to 130 ft, rare rootlets; much secondary lime 138 to 139.5 ft; a few limy areas below 139.5 ft.....	110.3	167.0
Tertiary System - Miocene Series - Ogallala Group:		
Clay, silty, slightly sandy, sand is fine, very light brown, slightly indurated, some highly calcareous nodular areas.....	167.0	170.0
Sand, slightly silty, sand is very fine to fine, some medium, very light olive-gray, some limy areas; moderately well indurated as sandstone 173.8 to 180 ft.....	170.0	180.0
Siltstone-sandstone, sand is mostly very fine to fine, very light olive-gray, slight induration 190 to 194 ft; moderate induration 194 to 200 ft, in part clayey.....	180.0	200.0

Sand, silty, moderately clayey, sand is very fine to fine, some medium, light olive-gray; slightly less clayey below 210 ft, some white rootlets, limy areas; moderate induration 220 to 223.4 ft, calcareous.....	200.0	223.4
Silt, slightly clayey, white, very calcareous, moderately well indurated.....	223.4	230.0
Silt, slightly to moderately clayey, very light olive-gray, thin hard layers; moderately to very clayey 240 to 250 ft, very light greenish gray, some hard layers, may be sandy in lower part.....	230.0	250.0
Sand, very silty, sand is very fine grading to very fine and fine, very light olive-gray; silt is coarse below 252 ft, sand is mostly very fine.....	250.0	253.7
Silt, moderately clayey, light medium brown; slightly clayey below 270 ft, slightly sandy, sand is very fine; moderately sandy below 280 ft, sand is very fine with some fine.....	253.7	281.3
Sand, slightly to moderately silty, sand is very fine to medium, trace of coarse, very light brown.	281.3	283.3
Clay, silty, very light olive-to green-gray, some secondary lime, slightly sandy 300 to 310 ft; medium dark gray 310 to 312.6 ft, contains shale fragments.....	283.3	312.6
Sand, slightly silty, sand is very fine to fine, very light yellow-gray.....	312.6	313.1
Cretaceous System - Upper Cretaceous Series - Montana Group:		
Pierre Formation:		
Shale, clay, dark gray, some yellow-brown.....	313.1	332.4
Note: Top of Pierre Formation was logged at 286 feet in USBR geologic log, samples not conclusive		

**9-16-30cddd
12-31
Buffalo County**

Location: SE SE SE SW sec 30-9N-16W (section is 2 miles wide)
 Ground elevation: 2260 ft (i) Alfalfa Center 7.5 minute quadrangle
 Depth to water: approximately 80 ft (1931)

	<u>Depth, in feet</u>	
	From	To
Quaternary System, undifferentiated:		
Silt, moderately clayey, slightly to in part moderately sandy, sand is very fine to fine with some medium, dark reddish brown; slightly sandy below 5 ft, medium yellow-brown 5 to 10 ft and light medium yellow-brown 10 to 15 ft, bone fragment in 5 to 10 ft sample.....	0.0	15.0
Silt, moderately to in part very clayey, very slightly sandy, sand is very fine to medium, medium dark reddish brown.....	15.0	20.0
Silt, moderately clayey, very slightly sandy, sand is very fine to fine, light medium yellow-brown to medium reddish brown; slightly lighter in color below 25 ft; contains a little dark brown-gray clayey to sandy silt below 30 ft.....	20.0	35.0
Silt, moderately clayey, slightly to moderately sandy, sand is very fine to fine, light yellow-brown, reddish tint; in part moderately sandy below 45 ft, contains a trace of brown waxy clay..	35.0	50.0
Silt, slightly to moderately clayey, slightly sandy, sand is very fine to fine, light medium reddish brown; light yellow-brown below 55 ft.....	50.0	60.0
Silt, slightly to moderately clayey, slightly sandy, sand is mostly very fine, silt is coarse to very coarse, light yellow-brown.....	60.0	75.0
Silt, moderately clayey, slightly sandy, sand is mostly very fine, yellowish to reddish brown, contains a trace of limy nodules; moderately calcareous below 80 ft, some limy areas and nodules; in part very clayey 85 to 100 ft; very calcareous below 90 ft.....	75.0	105.0
Silt, moderately clayey, slightly to moderately sandy, light yellowish to reddish brown, moderately to very calcareous, contains scattered coarse to very coarse sand grains.....	105.0	110.0
Sand, clayey, sand is fine to very coarse, calcareous, light yellow-brown.....	110.0	113.0

Tertiary System - Miocene Series - Ogallala Group:

Sandstone, silty, slightly clayey, sand is very fine to fine with a trace of medium, light olive-gray, essentially noncalcareous; contains a trace of rootlets; contains more siliceous rootlets below 128 ft.....	113.0	128.5
Marl, sandy, some sandstone, white.....	128.5	130.0
Sand, moderately clayey, sand is very fine to fine, very light greenish gray, some limy areas.....	130.0	135.0
Sandstone, sand is very fine to medium, light olive-gray, some limy areas, common rootlets; very calcareous 150 to 150.5 ft, well indurated; in part clayey 150.5 to 152 ft.....	135.0	152.0
Sand to sandstone, clayey, sand is mostly very fine to fine, light olive-gray, contains limy areas....	152.0	154.0
Siltstone-sandstone, sand is very fine to fine with some medium, light olive-gray, contains a few rootlets.....	154.0	155.0
Silt, moderately clayey, moderately sandy, sand is very fine to fine, light olive-gray, non-to slightly calcareous.....	155.0	158.0
Sand, probably silty, sand is very fine to fine, very light olive-gray, slight induration.....	158.0	160.0

9-16-36dba
3-K-39
Buffalo County

Location: NE NW SE sec 36-9N-16W, in Dryden Park
 Ground elevation: 2144 ft (t) Kearney 7.5 minute quadrangle
 Depth to water: Not recorded
 Note: Samples missing, log interpreted from original field log

	<u>Depth, in feet</u>	
	From	To
Quaternary System, undifferentiated:		
Soil, very dark brown.....	0.0	5.0
Sand, some gravel, gravel is fine.....	5.0	40.0
Sand and gravel.....	40.0	50.0
Silt, clayey, soft, loose, very light brown.....	50.0	63.0
Clay, silty, light brown.....	63.0	67.0
Tertiary System - Miocene Series - Ogallala Group:		
Sandstone, pale green, calcareous below 67 ft; very hard 93 to 93.9 ft and 95 to 96.8 ft.....	67.0	96.8

**9-17-7bddd
26-B-47
Buffalo County**

Location: SE SE SE NW sec 7-9N-17W, approximately 105 ft N and 5 ft W of center of sec
 Ground elevation: 2342.4 ft (i) Amherst 7.5 minute quadrangle
 Depth to water: 105.9 ft (7/25/47)

	<u>Depth, in feet</u>	
	From	To
Quaternary System, undifferentiated:		
Road fill.....	0.0	0.5
Silt, very slightly clayey, slightly sandy, sand is very fine, silt is coarse, dark brownish gray; light brownish gray, slightly calcareous below 1.5 ft.....	0.5	3.5
Silt, slightly sandy, sand is mostly very fine, very dark brown-gray.....	3.5	4.5
Silt, slightly sandy, sand is mostly very fine, silt is coarse, light yellowish gray, some limy rootlets and yellow limonitic flecks; very few limy rootlets below 10 ft and none below 15 ft; brownish tint in lower few feet.....	4.5	26.5
Silt, slightly clayey, light brown; dark brown in upper foot; slightly sandy below 30 ft, sand is very fine to fine; large limy nodules 30 to 40 ft.	26.5	40.0
Silt, moderately sandy, sand is very fine to fine, light brown; light brown-gray, moderately calcareous below 54 ft, a few limy nodules.....	40.0	60.0
Silt, moderately sandy, mostly very fine to fine sand, light brown, occasional limy nodule; slightly more sand below 70 ft.....	60.0	75.0
Silt, slightly sandy, sand is mostly very fine, silt is coarse, very light gray-brown, granular structure 75 to 82 ft; slightly to moderately calcareous below 82 ft; moderately to very calcareous 87.5 to 90 ft; contains large limy nodule; light brown below 90 ft, slightly to moderately calcareous; moderately to very calcareous below 100 ft, many nodular limy fragments.....	75.0	108.0
Silt, moderately sandy, sand is very fine to medium with a little coarse, light brown, very calcareous to 112 ft; very light olive-gray and brown below 112 ft.....	108.0	115.0
Silt, very sandy, sand is fine to coarse with some very coarse, very light brown-gray; some interbedded sand below 125 ft.....	115.0	128.0
Sand, fine to coarse.....	128.0	130.0

Tertiary System - Miocene Series - Ogallala Group:

Sandstone, silty, mostly very fine to fine sand, light brown and light olive-gray.....	130.0	139.0
Limestone, sandy, very light brownish to whitish gray, a few rootlets.....	139.0	140.5
Silt, very sandy, very light olive-gray, sand is very fine to medium, moderately to highly calcareous, contains limy cemented areas.....	140.5	145.0
Sandstone, slightly silty, very fine to medium, a little coarse sand, very light brownish gray, contains a few limy areas; in part very silty below 152.5 ft, noncalcareous.....	145.0	156.0
Sand, fine to very coarse, a little fine gravel.....	156.0	160.0
Sandstone, slightly silty, sand is very fine to fine with some medium, light brownish to light olive-gray.....	160.0	170.0
Sand, very fine to medium, a little coarse sand, contains a few siliceous rootlets.....	170.0	180.0
Sandstone, sand is very fine to fine with a little medium sand, light brown and light olive-gray, contains siliceous rootlets and seed fragments....	180.0	189.5
Sandstone, slightly silty, sand is very fine to fine, poorly indurated to 198 ft.....	189.5	203.5
Silt, slightly clayey, sandy, sand is very fine, light olive-gray.....	203.5	207.0
Sandstone, very slightly silty, sand is very fine to fine, light brown; light olive-gray, a little medium sand below 213 ft.....	207.0	220.0
Silt, slightly clayey, sandy, sand is very fine to fine, light olive-gray.....	220.0	222.0
Sand, fine to coarse.....	222.0	230.5
Sandstone-siltstone, sand is mostly fine, whitish gray, moderately to very calcareous; a little medium sand below 235 ft, very calcareous.....	230.5	240.0
Sandstone, mostly fine sand, light brown, moderately calcareous; scattered coarse sand and fine gravel grains below 242 ft.....	240.0	243.0
Sandy silt, light brown with some light brown silty clay.....	243.0	247.0
Sand, fine to very coarse, trace fine gravel, brown-gray to pinkish; a little fine to medium gravel below 255 ft.....	247.0	260.5
Sandstone, mostly fine grained, scattered medium to coarse sand grains, whitish gray, very calcareous.	260.5	264.5
Sandstone, fine grained, whitish to light brownish gray, highly calcareous, many rootlets.....	264.5	270.0
Sand, fine to coarse, a little very coarse sand and fine gravel, slightly indurated.....	270.0	275.0

Sandstone, fine grained, whitish gray, very calcareous; thin speckled sandy limestone layer 282.5 to 283 ft; a few rootlets 283 to 286 ft; some sandy siltstone below 286 ft, very light olive-gray, calcareous.....	275.0	290.0
Sand, very fine to coarse; in part slightly indurated.....	290.0	294.0
Sandstone, silty, fine grained, whitish gray, very calcareous.....	294.0	301.5
Siltstone-sandstone, slightly clayey, fine grained, whitish to light olive-gray, very calcareous in upper few feet; slightly calcareous below 304.5 ft.....	301.5	307.0
Limestone, sandy, whitish gray.....	307.0	309.0
Sand, slightly silty, sand is very fine to medium with a trace of coarse; very silty below 317 ft...	309.0	319.0
Silt, slightly clayey to sandy, sand is very fine to fine, light grayish green, contains a few rounded clay grains.....	319.0	323.0
Clay, light reddish brown, blocky.....	323.0	326.0
Sand, very fine to medium; a little coarse sand below 330 ft, contains indurated layer of light brown sandstone.....	326.0	338.0
Sandstone, fine grained, whitish gray, very calcareous; silty below 342 ft.....	338.0	344.5
Sandstone, fine grained, light green-gray and whitish gray, in part calcareous with thin hard layers; contains a thin light green silty clay layer.....	344.5	350.0
Sand, very fine to medium.....	350.0	353.0
Sandstone, silty, light brown-gray, moderately calcareous, common light green and light brown clay grains.....	353.0	355.0
Sand, very fine to medium, a few limy indurated areas.....	355.0	360.0
Silt, sandy, slightly clayey, sand is very fine to fine, light olive to brownish gray, very calcareous, in part indurated; well indurated below 363 ft.....	360.0	366.5
Limestone, sandy, whitish gray.....	366.5	368.0
Sandstone, silty, sand is very fine to fine with a little medium, whitish gray, very calcareous; thin hard sandy limestone layers 373 to 374 ft, 380 to 380.5 ft and 382 to 382.5 ft.....	368.0	383.0

Sand, slightly silty, sand is very fine to fine with a trace of medium to coarse; silty zone 390 to 395 ft; very fine to medium sand 420 to 430 ft; a little coarse sand 430 to 440 ft, slight induration 420 to 440 ft; thin indurated layers 440 to 445 ft, contains common rounded light green-gray lithic grains of gravel and pebbles below 445 ft; much medium to coarse sand below 475 ft, very slightly silty; some very coarse sand below 475 ft.....	383.0	479.5
Cretaceous System - Upper Cretaceous Series - Montana Group:		
Pierre Formation:		
Shale, clay, white to light yellow-gray, slightly indurated, very slightly calcareous.....	479.5	480.0
Shale, clay, light medium to light yellow-gray, moderately calcareous.....	480.0	483.0
Shale, clayey, silty, medium gray, moderately to highly calcareous; medium dark gray below 490 ft, a few limonitic fragments and aragonite; some dark gray below 495 ft.....	483.0	500.0

9-17-12ddad
USBR Mid-State Division (Profile 6)
Buffalo County

Location: SE NE SE SE sec 12-9N-17W, 800 ft N and 500 ft W of SE cor
 sec
 Ground elevation: 2324.5 ft (i) Riverdale 7.5 minute quadrangle
 Depth to water: 132.5 ft (5/10/65)
 Compiled from sample description by F.A. Smith and
 interpretation of USBR geologic and field logs

	<u>Depth, in feet</u>	
	From	To
Quaternary System, undifferentiated:		
Silt, clayey, very slightly sandy, sand is very fine, dark brown; light brown-gray below 2.3 ft...	0.0	3.5
Silt, slightly clayey, very slightly sandy, sand is very fine, light brownish to yellowish gray; slightly less clay and slightly sandy below 20.1 ft, very slightly calcareous; slightly more clayey below 23.4 ft.....	3.5	30.1
Silt, very clayey, slightly sandy, sand is mostly fine, dark brown gray; brown with a reddish tint below 35.3 ft.....	30.1	40.1
Silt, moderately to very clayey, very slightly sandy, brown.....	40.1	50.1
Silt, moderately to very clayey, slightly sandy, sand is mostly very fine to fine, very pale brown, moderately calcareous; snail shell; noncalcareous below 60 ft.....	50.1	80.1
Silt, moderately clayey, moderately sandy, sand is very fine to fine, trace of medium, light brown...	80.1	103.0
Silt, slightly clayey, moderately sandy, sand is very fine to medium, pale brown.....	103.0	110.1
Sand, moderately silty, sand is very fine to medium.	110.1	114.1
Silt, moderately to very clayey, slightly sandy, sand is very fine to fine, trace of medium, pale brown, rare small limy grains.....	114.1	124.0
Silt, moderately to very clayey, slightly sandy, sand is mostly very fine, pale brown; slightly calcareous 130 to 140 ft; very calcareous, slightly more sand below 140 ft, sand is mostly very fine to fine, very pale brown.....	124.0	150.6
Sand, silty, slightly clayey, sand is fine coarse, a little fine gravel, light gray, very calcareous.....	150.6	±151.0
Tertiary System - Miocene Series - Ogallala Group:		
Clay, silty, very sandy, sand is mostly very fine to medium, pale brown, contains limy layers and limy nodules, calcareous.....	±151.0	153.0

Sandstone, very silty, sand is very fine to medium, some coarse, calcareous with many limy areas.....	153.0	156.0
Sandstone, silty, sand is very fine to medium, calcareous, limy areas common, very light gray; mostly very fine to fine sand below 157.5 ft.....	156.0	170.1
Sandstone, silty, very fine to fine, some medium, a few limy areas, common mica.....	170.1	173.8
Silt, moderately clayey, slightly to moderately sandy, sand is mostly very fine to fine, very light gray, very calcareous.....	173.8	180.1
Silt, slightly clayey, very sandy, sand is very fine to fine, some medium, pale yellow, moderately calcareous.....	180.1	190.1
Sand, silty, very slightly clayey, sand is very fine to fine, some medium, very light yellowish gray to pale olive.....	190.1	193.0

9-17-19cdaa
USBR Mid-State Division (Profile 5)
Buffalo County

Location: NE NE SE SW sec 19-9N-17W, 1088 ft N and 124 ft W of SE cor SW1/4 sec (Note: USBR logs located drill hole as 1088 ft N and 124 ft W of SW cor sec)

Ground elevation: 2357 ft (i) Elm Creek East 7.5 minute quadrangle

Depth to water: 123.2 ft (3/18/65)

Compiled from sample descriptions by V.H. Dreeszen and interpretation of USBR geologic and field logs

Note: Samples missing except for drive core samples taken at irregular intervals above 351.5 ft

	<u>Depth, in feet</u>	
	From	To
Quaternary System, undifferentiated:		
Silt, moderately to very clayey, dark brown-gray, contains a trace of sand; medium brown-gray below 3.4 ft.....	0.0	3.6
Silt, slightly clayey, light grayish brown, slightly plastic, moderately quick dilatancy, noncalcareous.....	3.6	10.0
Silt, slightly clayey, very light yellow-brown, very slightly calcareous.....	10.0	11.5
Silt, slightly clayey, light grayish brown, moderately quick dilatancy, noncalcareous, noncalcareous (description based on USBR field observations).....	11.5	30.0
Silt, moderately clayey, light brown-gray, noncalcareous.....	30.0	31.4
Silt, moderately clayey, medium brown.....	31.4	32.7
Silt, moderately clayey, light brown.....	32.7	34.9
Silt, slightly to moderately clayey, slightly sandy, principally very fine sand, medium pinkish brown..	34.9	37.6
Silt, about 100 percent slightly plastic fines, light brown (description based on USBR field observations).....	37.6	50.0
Silt, slightly to moderately clayey, moderately sandy, sand is very fine with some fine, slightly clayey, slightly more sand 52.8 to 53.5 ft.....	50.0	53.5
Silt, about 100 percent slightly plastic fines, light brown (description based on USBR field observations).....	53.5	70.0
Silt, moderately clayey, slightly sandy, sand is mostly very fine, light brown, moderately calcareous; moderately to very clayey 71 to 73.5 ft, some secondary lime.....	70.0	73.5

Silt, about 100 percent slightly plastic fines, light brown; noncalcareous to 70 ft, small soft limy nodules from 70 to 92.5 ft (description based on USBR field observations).....	73.5	110.0
Silt, moderately clayey, moderately sandy, sand is very fine to fine, light pinkish brown, noncalcareous.....	110.0	112.4
Silt, about 100 percent slightly plastic fines, light brown, noncalcareous (description based on USBR field observations).....	112.4	124.0
Sand, silty, about 80 percent fine sand, mostly quartz grains, gray, noncalcareous (description based on USBR field observations).....	124.0	130.0
Sand, slightly to moderately silty, sand is very fine to fine with some medium, light brown.....	130.0	132.5
Silt, about 90 percent slightly plastic fines and 10 percent fine sand, very calcareous, light brown (description based on USBR observations).....	132.5	150.0
Silt, slightly to moderately clayey, moderately sandy, sand is very fine to fine, light medium brown.....	150.0	153.5
Silt, about 90 percent slightly plastic fines and 10 percent fine sand, very calcareous, light brown (description based on USBR field observations)....	153.5	170.0
Silt, slightly to moderately clayey, very slightly sandy, sand mostly very fine, very light brown-gray, moderately calcareous.....	170.0	173.5
Silt, about 90 percent slightly plastic fines and 10 percent fine sand, very calcareous, light brown (description based on USBR field observations)....	173.5	186.0
Sand, silty, about 60 percent fine to medium sand and 40 percent low plasticity fines, noncalcareous, light brown (description based on USBR field observations).....	186.0	190.0
Silt, slightly clayey, moderately sandy, sand is very fine to medium, some coarse sand, trace of gravel and pebbles, pinkish brown.....	190.0	194.0
Silt, about 85 percent fines with low plasticity and 15 percent fine sand, trace of gravel up to 3 inch, light brown (description based on USBR field observations).....	194.0	207.0
Sand, about 90 percent fine to medium sand and 10 percent nonplastic fines, trace of coarse sand, medium tan-brown (description based on USBR field observations).....	207.0	210.0
Sand, slightly clayey, slightly silty, sand is fine to very coarse, approximately 10 percent gravel, medium reddish brown.....	210.0	211.5
Tertiary System - Miocene Series - Ogallala Group:		
Silt, slightly clayey, very sandy, sand is very fine to fine, light olive-gray.....	211.5	213.4

Silt, sandy, 65 percent low plasticity fines and 35 percent fine sand, noncalcareous, light gray (description based on USBR field observations)....	213.4	230.0
Sand, very silty, sand is very fine, some fine, olive to brownish gray.....	230.0	232.0
Silt, very sandy, sand is very fine, some fine, very light olive to brownish gray, calcareous.....	232.0	233.1
Silt, about 80 percent slightly plastic fines and 20 percent fine sand, very calcareous, light grayish brown, very slightly cemented; (description based on USBR field observations).....	233.1	250.0
Sand, very silty, sand is very fine, some fine, in part a very coarse silt, very light brownish to olive-gray; calcareous 253 to 254.7 ft.....	250.0	254.7
Silt, about 80 percent slightly plastic fines and 20 percent fine sand, very calcareous, light grayish brown, very slightly cemented (description based on USBR field observations).....	254.7	259.5
Sand, fine; Note - description based on USBR field notes of drilling action as no samples recovered..	259.5	274.0
Sand, silty, about 60 percent fine sand and 40 percent nonplastic plastic fines, noncalcareous, lightly cemented, greenish gray (description based on USBR field observations).....	274.0	280.0
Silt, clayey, very sandy; light olive to brown-gray.	280.0	280.5
Silt, moderately to very clayey, moderately to very sandy, sand is very fine to medium, light greenish gray, scattered limy areas, lower 0.8 foot is a very silty sand, slightly clayey, whitish gray, noncalcareous.....	280.5	286.4
Sand, silty, about 60 percent fine sand and 40 percent nonplastic fines, noncalcareous, lightly cemented, greenish gray (description based on USBR field observations).....	286.4	295.0
Sand, silty, variable amounts of silt, sand is fine, slightly calcareous, slightly cemented, brownish white (description is based on USBR field observations).....	295.0	310.0
Silt, moderately clayey, whitish gray, very calcareous; marly to lime cemented below approximately 310.5 ft.....	310.0	311.3
Sand, silty, variable amounts of silt, sand is fine, slightly calcareous, slightly cemented, brownish white to light gray (description is based on USBR field observations).....	311.3	350.0
Sand, moderately silty, sand is very fine to fine, trace of medium, very light olive-gray; very fine to medium sand in lower part.....	350.0	351.5
Silt, moderately clayey, moderately sandy, sand is very fine to medium, light olive-gray; limy areas common 365 to 370 ft.....	351.5	370.0

Siltstone-sandstone, sand is mostly very fine to fine, may be in part clayey, whitish to very light olive-gray, very calcareous.....	370.0	390.0
Sand, very fine to fine, medium to very silty, highly calcareous 391 to 391.7 ft (Note-cored interval).....	390.0	391.7
Silt, very limy, lightly cemented, very calcareous areas.....	391.7	440.0
Silt, clayey, sandy, sand is very fine, light brown, contains limy nodules (Note-cored interval).....	440.0	440.1
Sand, slightly silty, very fine to fine sand (Note-cored interval).....	440.1	440.5
Sand, slightly silty, sand is very fine to fine, some medium.....	440.5	480.0
Sand, very fine to fine, some medium to coarse, contains a trace of very coarse sand and fine gravel below 490.3 ft, some clay and chert grains (Note-cored interval 490 to 490.3).....	480.0	501.5
Cretaceous System - Upper Cretaceous Series - Montana Group:		
Pierre Formation:		
Shale, clay, dark gray, moderately calcareous.....	501.5	520.0
Note: weathered shale logged in field from 506.5 to 508 ft, and unweathered shale below 508 ft, samples inconclusive		

9-17-21ddca
USBR Mid-State Division (offset to Profile 5)
Buffalo County

Location: NE SW SE SE sec 21-9N-17W, 512.5 ft N and 699.3 ft W of SE cor sec
 Ground elevation: 2350.4 ft (i) Elm Creek East 7.5 minute quadrangle
 Depth to water: 130.9 ft (4/19/65)
 Compiled from sample description by V.H. Dreeszen and interpretation of USBR geologic and field logs
 Note: samples missing except for core sample taken at irregular intervals

	<u>Depth, in feet</u>	
	From	To
Quaternary System, undifferentiated:		
"Top soil" no sample, silt, clayey, slightly plastic, dark brown.....	0.0	1.5
Silt, moderately clayey, light medium, grown-gray...	1.5	2.0
Silt, slightly clayey, very light gray, rare yellow stain, slightly calcareous; very light gray, brown tint below 4.5 ft, no sample 23.8 to 28 ft.....	2.0	28.0
Silt, moderately clayey, dark brown, no sample 32.1 to 33 ft.....	28.0	33.5
Silt, moderately clayey, contains about 10 percent fine sand, moderately calcareous in areas, light medium brown (description based on USBR field observations).....	33.5	38.0
Silt, moderately clayey, slightly sandy, very slightly sandy, light medium brown.....	38.0	40.3
Silt, moderately clayey, contains about 10 percent sand, moderately calcareous in areas, light medium brown; a few limy nodules below 47 ft (description based on USBR field observations).....	40.3	60.5
Silt, moderately clayey, very slightly sandy, light brown.....	60.5	62.5
Silt, moderately clayey, contains about 10 percent fine sand, moderately calcareous in areas, light medium brown (description based on USBR field observations).....	62.5	80.5
Silt, very clayey, very slightly sandy, light medium brown, contains limy nodules.....	80.5	81.8
Silt, moderately clayey, contains about 10 percent fine sand, moderately calcareous in areas, light medium brown (description based on USBR field observations).....	81.8	100.5
Silt, moderately clayey, very slightly sandy, light medium brown, contains a trace of secondary lime..	100.5	101.7

Silt, moderately clayey, contains about 10 percent fine sand, moderately calcareous in areas, light medium brown (description based on USBR field observations).....	101.7	120.5
Silt, moderately clayey, very light brown, noncalcareous; very clayey slightly sandy 130.5 to 142 ft, sand is very fine to fine, light medium brown, contains small limy nodules.....	120.5	142.0
Sand, very fine to coarse, a little very coarse sand and gravel.....	142.0	149.7
Sand, some gravel, slightly silty, 20 percent gravel.....	149.7	151.8
Sand, some gravel, 25 to 30 percent gravel.....	151.8	163.6
Sand, slightly to moderately silty, sand is very fine to fine, some medium, light brown-gray, common white limy areas, some mica.....	163.6	166.8
Sand, very slightly silty, sand is very fine to medium, some coarse; sand is fine to very coarse, some fine gravel below 167.2 ft, pink silicates...	166.8	180.5
Tertiary System - Miocene Series - Ogallala Group:		
Sand, very slightly clayey, sand is fine to medium with some very fine and coarse, very light olive-gray.....	180.5	181.3
Sand, moderately silty, sand is very fine to fine, very light yellow-gray; sand is very fine to fine; no sample 182.7 to 190 ft, logged as silty sand...	181.3	190.5
Sand, slightly silty, sand is very fine with some fine, light brown; no sample 195.4 to 199 ft, logged as silty sand, noncalcareous, color varies from brownish gray to light brown.....	190.5	199.0
Siltstone, clayey, sandy, whitish gray, very calcareous; moderately clayey, moderately sandy 210.5 to 211.1 ft; moderately clayey, very sandy 211.1 to 211.7 ft, moderately calcareous; slightly less sandy 211.7 to 212.9 ft.....	199.0	212.9
Silt, very sandy, sand is very fine to fine, very light brown, common limy areas; slight induration below 213.7 ft.....	212.9	220.0
Siltstone-sandstone, sand is mostly very fine, light brown, some limy fragments.....	220.0	230.0
Sand, very silty, grading downward to a sandy and slightly clayey silt, very light olive-gray, moderately calcareous.....	230.0	234.6

9-17-24dddd
USBR Mid-State Division (Profile 6)
Buffalo County

Location: SE SE SE SE sec 24-9N-17W, 123 ft N and 35 ft W of SE cor
 sec

Ground elevation: 2348.6 ft (i) Alfalfa Center 7.5 minute quadrangle

Depth to water: 147.5 ft (5/10/65)

Compiled from sample descriptions by V.H. Dreeszen and F.A. Smith
 and interpretation of USBR geologic and field logs

	<u>Depth, in feet</u>	
	From	To
Quaternary System, undifferentiated:		
Silt, moderately clayey, very slightly sandy, silt is coarse, sand is very fine, dark brown-gray.....	0.0	3.0
Silt, slightly to moderately clayey, very slightly sandy, sand is very fine, light olive brown, slightly calcareous in upper part; very slightly clayey below 10 ft; slightly calcareous 13.4 to 20 ft, very light olive-to yellow-gray.....	3.0	29.3
Silt, slightly to moderately clayey, very slightly sandy, medium brown-gray; dark gray-brown 30.6 to 31.5 ft.....	29.3	31.5
Silt, very clayey, slightly sandy, sand is mostly very fine, medium brown grading to light medium medium brown; moderately clayey below 34.3 ft, light medium brown, pink tint.....	31.5	50.1
Silt, slightly clayey, slightly to moderately sandy, sand is very fine to fine, light brown.....	50.1	60.1
Silt, moderately clayey, slightly to moderately sandy, sand is mostly very fine, medium dark brown-gray in upper part, light brown in lower part.....	60.1	70.1
Silt, moderately clayey, slightly sandy, sand is very fine, silt is coarse, light medium brown.....	70.1	73.4
Silt, moderately clayey, slightly to moderately sandy, sand is very fine, some fine, light medium brown; slightly calcareous below 80.1 ft.....	73.4	86.5
Silt, slightly to moderately clayey, moderately sandy, sand is very fine, some fine, light medium brown; moderately sandy below 97 ft, sand is very fine to fine, some medium, medium brown.....	86.5	102.0
Silt, moderately to very clayey, slightly to moderately sandy, sand is very fine to fine, light medium brown; light brown below 107 ft, moderately calcareous; large limy nodules 110 to 112.7 ft; very slightly calcareous below 112.7 ft; slightly more sand below 120 ft.....	102.0	130.0

Sand, very silty, slightly clayey, sand is mostly very fine, light brown, slightly calcareous, rare limy nodules.....	130.0	140.0
Silt, moderately clayey, slightly to moderately sandy, sand is very fine to fine, very light brown, slightly calcareous, a few limy nodules; slightly to moderately calcareous below 151.5 ft..	140.0	155.0
Silt, moderately to very clayey, slightly sandy, sand is very fine to fine, some medium, light brown and light brown-gray; moderately sandy below 163 ft, essentially noncalcareous.....	155.0	170.0
Silt, slightly clayey, very sandy, sand is very fine to fine, some medium, light brown, noncalcareous; contains a silty sand layer at about 172 ft; sand is mostly very fine below 173.7 ft; slightly calcareous below 175 ft, sand is very fine to fine; some medium sand below 190 ft.....	170.0	193.3
Sand, moderately silty, slightly to moderately clayey, sand is fine to very coarse, contains 5 percent fine gravel; light brownish gray; very silty, moderately clayey below 194.2 ft; contains a trace of limy cemented areas 194.2 to 195 ft, rare root casts; mostly very fine to medium silty sand 195 to 196 ft; slightly gravelly below 196 ft, 20 percent gravel.....	193.3	205.0
Tertiary System - Miocene Series - Ogallala Group:		
Sand, moderately silty, slightly clayey, sand is very fine to medium, some coarse, trace of very coarse, very light greenish gray; in part moderately clayey below 210 ft.....	205.0	212.5
Sand, slightly to moderately silty, sand is very fine to medium, light greenish gray; a little coarse sand 213.9 to 220 ft, a few limy indurated areas.....	212.5	220.0
Silt, slightly clayey, very sandy, sand is very fine to medium, trace of coarse, light olive-gray.....	220.0	230.0
Silt and clayey silt, in part sandy, very light olive-gray, calcareous.....	230.0	240.0
Sand, slightly silty, sand is very fine to fine, trace of medium, very light olive-gray, slightly indurated, slightly calcareous; some clayey silt and common limy areas from 243 to 250 ft.....	240.0	250.0
Silt, very clayey, very light greenish gray, moderately calcareous.....	250.0	260.0
Sand, slightly clayey, moderately silty, sand is very fine to medium, light greenish gray, slightly calcareous.....	260.0	272.0
Silt, moderately clayey, very sandy, sand is very fine to medium, light greenish gray, very calcareous layer in upper part.....	272.0	273.2

Sand, slightly silty, sand is very fine to medium, trace of coarse.....	273.2	280.0
Sand, moderately silty, sand is very fine to fine, very light olive-gray, some limy indurated areas; slightly silty below 300 ft, sand is very fine to medium, slightly indurated as sandstone; a few root casts below 323.3 ft; contains some coarse sand below 350 ft.....	280.0	352.0
Sand, slightly clayey, moderately silty, sand is very fine to fine, light olive-gray; some clayey silt layers; some induration below 360 ft, some limy areas.....	352.0	375.0
Silt, slightly clayey, in part sandy, sand is mostly very fine to fine, very light olive-gray, calcareous.....	375.0	385.0
Sand, moderately clayey, sand is very fine to medium, light greenish gray.....	385.0	390.0
Sand, slightly clayey; moderately silty, sand is very fine to medium, light olive to greenish gray; slight induration below 420 ft.....	390.0	426.5
Cretaceous System - Upper Cretaceous Series - Montana Group:		
Pierre Formation:		
Shale, clay, yellow-brown, some gray, slightly calcareous; light to medium gray 430 to 440 ft; dark gray below 440 ft, slightly calcareous.....	426.5	450.1

**9-17-33aaa
15-31
Buffalo County**

Location: NE NE NE sec 33-9N-17W, distances not recorded
 Ground elevation: 2237 ft (i) Elm Creek East 7.5 minute quadrangle
 Depth to water: "about 20 ft" (1931)

	Depth, in feet	
	From	To
Quaternary System, undifferentiated:		
Silt, slightly clayey, moderately sandy, principally very fine sand, dark brown-gray, a little light yellow-brown.....	0.0	5.0
Silt, in part slightly clayey, mostly moderately to very sandy, sand is very fine with some fine, light yellow-brown.....	5.0	10.0
Silt, slightly to in part moderately clayey, slightly sandy, sand is very fine, mixed sample of dark brown-gray and light yellow-brown; sample missing 15 to 20 ft.....	10.0	20.0
Silt, slightly clayey, slightly sandy, principally very fine sand, light yellow-brown, rare secondary lime, only in part calcareous, contains a trace of small limy root casts.....	20.0	30.0
Silt, slightly clayey, very slightly sandy, sand is very fine, light yellowish to brownish gray; some dark brownish gray sandy silt in sample interval 35 to 40 ft.....	30.0	38.0
Sand, sample mostly medium to very coarse sand, rare gravel grains.....	38.0	48.0
Silt, slightly to moderately clayey, slightly to in part moderately sandy, sand is mostly very fine, very light brown and light yellow-brown, slightly moderately calcareous; moderately calcareous below 55 ft, a few limy areas; a few limy nodules below 65 ft; very sandy below 70 ft.....	48.0	73.0
Tertiary System - Miocene Series - Ogallala Group:		
Sandstone-siltstone, sand is very fine to fine with a little medium, very light olive-gray and whitish gray, in part calcareous, slight to moderate induration; contains a few limy and siliceous rootlets; slightly more medium sand below 90 ft; slight induration below 95 ft.....	73.0	105.0
Sand, very fine to medium, trace of coarse, slightly indurated, essentially noncalcareous.....	105.0	110.0
Sandy marl and limestone, in part clayey, whitish-gray to very light olive-gray; moderately well indurated below 115 ft.....	110.0	118.0

Sand and sandstone, sand is very fine to medium; slight induration, rare limy concretions, contains a few rootlets.....	118.0	125.0
Sandstone-siltstone, sand is very fine to fine; slightly to moderately well indurated; essentially noncalcareous; slightly calcareous below 130 ft...	125.0	132.0

**9-18-9cddd
33-A-48
Buffalo County**

Location: SE SE SE SW sec 9-9N-18W, approximately 17 ft N and 2596 ft
E of SW cor sec

Ground elevation: 2390.9 ft (i) Miller SW 7.5 minute quadrangle

Depth to water: 120.7 ft (8/30/48)

	<u>Depth, in feet</u>	
	From	To
Quaternary System, undifferentiated:		
Silt, clayey, very dark brown; medium brown-gray below 1 ft.....	0.0	2.5
Silt, slightly clayey, light yellow-gray.....	2.5	32.5
Silt, clayey, dark brown.....	32.5	34.0
Silt, clayey, light reddish brown; limy areas below 41 ft.....	34.0	45.0
Silt, light reddish brown; scattered white limy areas 55 to 60 ft; a few limy nodules below 70 ft; common limy areas below 80 ft; some indurated limy areas below 97 ft; slightly clayey below 110 ft.....	45.0	115.0
Silt, slightly sandy, mostly very fine to fine sand, light reddish brown, many rootlets; moderately to very sandy below 125 ft.....	115.0	130.0
Sandy silt to silty sand, sand is mostly fine grained, light reddish brown, many rootlets; con- tains a trace of shell fragments 130 to 135 ft; mostly silty sand 135 to 146 ft.....	130.0	146.0
Sandy silt and silty sand interbedded, sand is mostly fine grained, light brown; contains some rounded lithic clay areas.....	146.0	160.0
Sand, silty, fine grained, light brown.....	160.0	164.0
Silt, clayey, light medium brown; light brown below 165 ft.....	164.0	173.0
Silt, light gray.....	173.0	176.0
Sand, fine to coarse, a little very coarse, some secondary lime; thin light greenish gray silt layer in interval 186 to 190 ft; a thin hard limy layer at 191.5 ft; sand is fine to medium, some coarse below 190 ft.....	176.0	195.5
Tertiary System - Miocene Series - Ogallala Group:		
Siltstone, white, hard, noncalcareous.....	195.5	196.0
Sandstone, very fine to medium, light brownish gray.	196.0	201.0
Sand, very fine to medium, light brownish gray; slightly indurated; a few siliceous rootlets below 225 ft.....	201.0	240.0
Sandstone, very fine to medium, very light olive- gray; limy nodular areas below 250 ft; some coarse sand below 260 ft.....	240.0	264.0

Sandy to clayey silt, sandy to gravelly, light gray.	264.0	265.0
Sand, fine to very coarse, some fine gravel; thin silty layers 270 to 275 ft.....	265.0	288.0
Sandstone, silty, in part slightly clayey, very light brown-gray; well indurated 288 to 288.5 ft..	288.0	290.0
Sandstone, sand is very fine to medium; poorly indurated layers 295 to 300 ft.....	290.0	310.0
Sand, very fine to medium, slightly indurated.....	310.0	321.0
Sandstone, very fine to coarse, light brown-gray, poorly indurated.....	321.0	327.5
Sandstone, fine grained, light brown-gray.....	327.5	329.0
Sand, very fine to medium, in part slightly silty, slightly indurated.....	329.0	340.0
Sand, very fine to medium, some coarse, slightly indurated.....	340.0	362.0
Silt, sandy, slightly clayey, very fine to medium sand, light greenish gray; thin indurated layer 365 to 365.2 ft.....	362.0	370.0
Sand, very fine to medium, some coarse; some interbedded sandy silt 375 to 380 ft.....	370.0	387.5
Silt, slightly clayey, light greenish gray; thin siltstone layers in upper 2 ft.....	387.5	394.0
Silt, slightly moderately clayey, light reddish brown; hard siltstone layer 395.5 to 395.6 ft; slightly sandy below 400 ft.....	394.0	404.5
Sandstone, some interbedded sandy siltstone, light greenish gray, in part slightly calcareous.....	404.5	410.0
Sandstone, fine grained, light greenish gray; some interbedded fine sandy silt layers below 430 ft...	410.0	445.0
Silt, sandy, sand is fine to coarse, light olive-gray; some induration below 450 ft.....	445.0	460.0
Silt, slightly to moderately clayey, very slightly sandy to gravelly, light olive-gray; very slightly calcareous below 465 ft.....	460.0	477.0
Cretaceous System - Upper Cretaceous Series - Montana Group:		
Pierre Formation:		
Shale, clay, light medium gray and yellow-brown, noncalcareous; medium gray 480 to 491 ft; dark gray below 491 ft.....	477.0	500.0

**9-18-27aaaa
27-B-47
Buffalo County**

Location: NE NE NE NE sec 27-9N-18W, 106 ft S and 6 ft W of NE cor
sec

Ground elevation: 2277.8 ft (i) Elm Creek East 7.5 minute quadrangle

Depth to water: 20.1 ft (7/25/47)

Depth, in feet
From To

Quaternary System, undifferentiated:

Silt, very slightly clayey, slightly sandy, sand is very fine, very dark brown-gray; slightly clayey below 2 ft, medium yellow-brown.....	0.0	4.0
Silt, very slightly clayey, dark brown-gray, granular structure.....	4.0	6.0
Silt, very slightly clayey, moderately sandy, sand mostly very fine, light yellowish brown, granular structure, a few limy rootlets.....	6.0	8.0
Silt, slightly clayey, medium dark brownish gray, granular structure.....	8.0	10.5
Silt, moderately to very clayey, light yellowish brown to light brown-gray; a few snail shells.....	10.5	16.0
Silt, slightly clayey, slightly sandy, sand is mostly very fine, light yellowish brown to very light brown-gray, very slightly calcareous, a few limy rootlets.....	16.0	20.0
Silt, sandy, sand is very fine to fine, medium to dark brownish gray, granular structure, many rootlets; some gray peaty silt and a few rounded light olive-gray silty clay pebbles below 25 ft...	20.0	28.0
Silt, very clayey, very dark brown-gray, granular structure; dark gray-brown below 34 ft.....	28.0	38.0
Sand, fine to coarse, some very coarse sand and fine gravel; light brown-gray to pink.....	38.0	40.0
Sand and gravel, gravel is fine to medium.....	40.0	50.0
Silt, very clayey, very light brown; in part greenish gray below 54.5 ft, in part sandy, sand is very fine to fine.....	50.0	57.0
Silt, light brown and light greenish gray, a few rootlets, some rounded light brown lithic clay grains.....	57.0	60.0
Sand, in part silty, sand is very fine to medium with some coarse, common limonitic and dark grains, a few lithic clay grains.....	60.0	65.0
Sand, fine to coarse with some very coarse, common ferric grains, a few bone fragments; a few limestone and clay pebbles below 70 ft.....	65.0	74.5

Silt, moderately to very clayey, light olive-gray, in part slightly calcareous below 80 ft, a few rootlets.....	74.5	83.5
Silt, in part clayey, light olive-gray and very light brown; granular structure 85 to 90 ft; slightly clayey below 90 ft, light olive-gray, slightly calcareous, common shells 90 to 100 ft; noncalcareous below 100 ft and sandy.....	83.5	102.5
Sand, slightly silty, very fine to fine with some medium, light brownish gray.....	102.5	105.0
Sand, some gravel, gravel is fine with a little medium, common iron staining.....	105.0	115.0
Clay, silty, light greenish gray, slightly calcareous.....	115.0	118.0
Sand and gravel, gravel is fine to coarse, about 50 to 60 percent gravel.....	118.0	124.5
Tertiary System - Miocene Series - Ogallala Group:		
Sandstone, sand is very fine to fine, light greenish gray, moderately well indurated; some limy and siliceous rootlets; less induration below 135 ft..	124.5	139.5
Sandstone, fine grained, whitish gray, very calcareous.....	139.5	141.0
Sandstone, fine grained, light brown, a few limy rootlets.....	141.0	146.0
Sandstone, very fine grained, light olive to greenish gray, moderately well indurated.....	146.0	153.0
Sandstone, mostly very fine to fine sand, very light brown, common siliceous rootlets; a few hackberry seeds below 160 ft.....	153.0	173.0
Sandstone, sand is mostly fine, whitish gray, very calcareous 173 to 174 ft; partly calcareous below 174 ft with hard limy zones 175.5 to 178 ft and 179 to 181 ft.....	173.0	180.0
Sandstone, sand is very fine to medium with a little coarse.....	180.0	184.5
Sand, fine to coarse with some very coarse, slight induration; a little fine gravel below 195 ft.....	184.5	204.0
Silt, slightly clayey, sandy, light greenish gray...	204.0	207.0
Sand, silty, mostly very fine to fine sand, light greenish gray.....	207.0	210.0
Sandstone, light olive to brown-gray, some rootlets; very calcareous below 216 ft, moderately well indurated below 219 ft, some sandy limestone below 221 ft.....	210.0	224.5
Silt, sandy and silty sand, sand is very fine to medium, light brownish to olive-gray, slightly indurated; some siliceous rootlets below 235 ft...	224.5	240.0
Sandstone, sand is very fine to medium, light olive to greenish gray; moderately well indurated below 249 ft; some siliceous rootlets below 250 ft.....	240.0	252.5
Silt, slightly clayey, sandy, light greenish gray...	252.5	257.5

Sandstone, mostly fine grained, light brownish gray, some interbedded olive to greenish sandy silt.....	257.5	261.0
Sandstone, sand is fine to medium with some coarse, light brownish to greenish gray, poorly indurated; a few siliceous rootlets and some lithic greenish clay grains below 265 ft.....	261.0	280.0
Silt, slightly clayey, sandy, light greenish gray...	280.0	285.0
Sand, very silty, some sandy silt, sand is fine grained.....	285.0	293.0
Sandstone, sand is very fine to medium, light olive-gray, moderately to highly calcareous; slightly to moderately calcareous below 295 ft.....	293.0	303.0
Sand, fine to medium.....	303.0	317.5
Silt, slightly clayey, very light greenish gray; thin hard limy layer from 320.5 to 321 ft; hard limy areas below 321 ft; very calcareous 332 to 334 ft; hard siliceous layer 334 to 334.3 ft, did not penetrate.....	317.5	334.3

**9-18-27bbbb
46-32
Buffalo County**

Location: NW NW NW NW sec 27-9N-18W
 Ground elevation: 2263 ft (i) Elm Creek East 7.5 minute quadrangle
 Depth to water: Not recorded
 Note: Samples missing, log from WSP 779

	<u>Depth, in feet</u>	
	From	To
Quaternary System, undifferentiated:		
Soil, soft, coherent, silty, brownish loam.....	0.0	2.0
Clay, soft but compact, uniform, grayish brown, silty; clay may be in part reworked; lower 2 feet gray and harder.....	2.0	25.0
Gravel, coarse, and sand.....	25.0	35.0
Grit, calcareous, silty, sandy (Ogallala).....	35.0	70.0
Note: Ogallala probably not penetrated, interval 35 to 70 ft logged in field as, "gray, soft, limy silty clay"		

9-18-28ddd
11-B-46
Buffalo County

Location: SE SE SE SE sec 28-9N-18W, 88 ft N and 19 ft W of SE cor
 Ground elevation: 2259.2 ft (i) Elm Creek East 7.5 minute quadrangle
 Depth to water: 8.7 ft (5/13/46)

	<u>Depth, in feet</u>	
	From	To
Quaternary System, undifferentiated:		
Silt, clayey, brown.....	0.0	1.5
Clay, silty, brown.....	1.5	2.5
Silt, moderately clayey, light medium brown, calcareous below 10 ft, many small snail shells.....	2.5	16.0
Sand and gravel, gravel is fine to medium, a little coarse gravel, light brown-gray to pink.....	16.0	22.0
Tertiary System - Miocene Series - Ogallala Group:		
Siltstone-sandstone, mostly fine sand, light brownish gray, slightly indurated.....	22.0	24.5
Marl, clayey, slightly sandy, white, well indurated in upper part.....	24.5	26.0
Siltstone-sandstone, sand is very fine to medium, light brown, slight to moderate induration.....	26.0	30.0
Sand, silty, some sand, sand is fine to very coarse.	30.0	34.0
Sandstone, silty, very calcareous, moderately well indurated; slightly indurated below 36 ft, a few rootlets.....	34.0	38.5
Sandstone, silty, slightly clayey, light olive-gray; some hard to soft calcareous layers below 41 ft...	38.5	50.0
Sandstone, sand is very fine to medium, very light brown-gray to greenish.....	50.0	61.0
Silt, limy, very light brown-gray to white, very calcareous with thin hard layers.....	61.0	64.5
Sand, mostly fine, a few cemented limy aggregates...	64.5	71.0
Sandstone, very fine to medium, white, very calcareous, moderately well indurated.....	71.0	73.5
Sandstone, sand is very fine to medium, contains some rootlets.....	73.5	88.0
Silt, slightly clayey, limy, very light brown-gray to white.....	88.0	90.0
Sand, fine to coarse, thin silty zones.....	90.0	95.0
Sand, silty, mostly fine sand, thin hard limy areas; well indurated below 97.5 ft, very calcareous.....	95.0	99.5
Sandstone, sand is very fine to medium, thin moderately well indurated layers.....	99.5	110.0
Sand, silty, sand mostly very fine to fine, very light brown, some rootlets; thin indurated layers below 121 ft; limy areas below 130 ft; very calcareous below 136 ft.....	110.0	139.0

Sand, silty, sand is mostly very fine to fine, very light brown.....	139.0	150.0
Sandstone, sand is mostly very fine to fine, very light brown-gray; thin hard calcareous layers 150.3 to 150.6 ft, at 158 ft, and below 160 ft; silty below 160 ft.....	150.0	166.0
Silt, sandy to clayey, very light brown and whitish gray, calcareous; very sandy below 170 ft.....	166.0	175.0
Silt, sandy, slightly clayey, very light brown; moderately well indurated below 180 ft.....	175.0	183.0
Sandstone, sand is very fine to medium, very light brown-gray; calcareous below 190 ft; light olive-gray below 195 ft.....	183.0	200.0
Clay, silty, limy, white, moderately to well indurated.....	200.0	210.0
Sand, very fine to fine.....	210.0	219.5
Clay, silty, light green-gray; very calcareous below 221 ft, well indurated.....	219.5	223.5
Sandstone, sand is very fine to medium, light olive-gray; some coarse to very coarse sand below 236 ft.....	223.5	247.0
Sand, some gravel, sand is fine to very coarse, gravel is mostly fine.....	247.0	253.0
Sand, silty, mostly very fine to fine, green.....	253.0	257.0
Sand, fine to coarse, some very coarse.....	257.0	264.5
Sandstone, limy, whitish gray, very calcareous with soft to hard layers.....	264.5	272.0
Sandstone, sand is very fine to medium; some coarse to very coarse sand below 275 ft.....	272.0	288.0
Sand, silty, mostly fine grained, light brown-gray..	288.0	290.0
Silt, limy, white, very calcareous, well indurated..	290.0	300.0
Silt, very sandy; slightly clayey, whitish gray, very calcareous.....	300.0	306.0
Sandstone, silty, sand is very fine to medium, very calcareous, moderately well indurated.....	306.0	310.0
Sand, silty, slightly clayey, mostly very fine to fine sand, very light gray; slightly indurated below 313 ft.....	310.0	316.0
Cretaceous System - Upper Cretaceous Series - Montana Group:		
Pierre Formation:		
Shale, clay, medium gray with some yellow; some medium dark gray below 325 ft.....	318.0	340.0
Shale, clay, medium gray, slightly calcareous.....	340.0	360.0

**10-13-1aaaa
31-A-54
Buffalo County**

Location: NE NE NE NE sec. 1, T. 10 N., R. 13 W., 108 ft S and 8 ft W
of NE cor sec
Ground elevation: 2006 ft (t) Shelton 7.5 minute quadrangle
Depth to water: 32.6 ft (8/4/54)
Electric log

	<u>Depth, in feet</u>	
	From	To
Quaternary System, undifferentiated:		
Road fill, clayey silt.....	0.0	1.5
Silt, moderately clayey, dark brown; very clayey below 2 ft.....	1.5	2.5
Silt, moderately to very clayey, medium dark brown, slightly calcareous.....	2.5	4.0
Silt, moderately clayey, medium brown, granular structure.....	4.0	4.5
Silt, moderately to very clayey, light medium gray, brown tint.....	4.5	5.0
Silt, slightly to moderately clayey, light medium gray, brown tint, granular structure, slightly calcareous.....	5.0	7.2
Silt, slightly clayey, light medium yellow-gray, slightly calcareous, contains limy concretions; very slightly calcareous below 10 ft, contains a few small shells; light gray 12.8 to 17.5 ft; very slightly clayey 20 to 25 ft; noncalcareous below 25 ft, light yellow-gray.....	7.2	28.2
Silt, moderately to very clayey, light yellow-gray, granular structure.....	28.2	29.0
Silt, slightly clayey, light yellow-gray; moderately clayey below 30 ft, light medium yellow-gray.....	29.0	32.5
Sand, fine to coarse, a trace of very coarse sand; fine to very coarse below 35 ft, 10 percent fine gravel.....	32.5	40.0
Sand, some gravel, gravel is fine, 20 percent gravel.....	40.0	45.0
Sand and gravel, fine to medium, a little coarse gravel, 60 percent gravel, contains a few lithic sandstone grains.....	45.0	48.5
Silt, slightly clayey, slightly sandy, sand is very fine, silt is coarse, light yellow-gray, slightly calcareous; moderately clayey 50 to 55 ft, light brown, some secondary limy areas.....	48.5	57.0

Silt, moderately clayey, slightly sandy, sand is very fine, silt is coarse, light brown and light brown-gray, slightly calcareous; moderately calcareous 65 to 68 ft; light medium brown below 68 ft; limy nodule or layer 73 to 73.5 ft; granular structure 75 to 80 ft; medium brown 75 to 83 ft; light brown 83 to 86.5 ft, interbedded, slightly and moderately clayey; limy nodule 86 to 86.5 ft..	57.0	86.5
Silt, very sandy, sand is very fine to fine, light medium brown.....	86.5	88.0
Sand, some gravel, gravel is fine, 20 percent gravel, dark stained grains below 90 ft.....	88.0	93.5
Silt, sandy, sand is fine to coarse, light gray, interbedded, sandy and clayey silt, and silty sand and gravel.....	93.5	106.0
Tertiary System - Miocene Series - Ogallala Group:		
Sandstone with some sandy silt, sand is very fine to fine with some medium, light gray.....	106.0	110.0
Sandstone, sand is very fine to medium with some coarse, very light olive-gray, poorly indurated; mostly very fine to fine sand 115 to 118 ft, moderately well indurated; slightly silty below 120 ft.....	110.0	122.0
Silt, slightly clayey, very sandy, some silty sand to sandstone, sand is very fine to fine, very light olive-gray.....	122.0	125.0
Sand, moderately silty, sand is very fine to medium with some coarse, light olive-gray; slightly less silty below 126.5 ft.....	125.0	130.0
Silt, slightly clayey, slightly to in part very sandy, very light olive-gray.....	130.0	133.0
Sand, slightly to moderately silty, sand is fine to coarse; thin indurated layers.....	133.0	140.0
Sand, fine to very coarse, trace of fine gravel, grains well rounded; sand and fine gravel 145 to 152 ft; sand is fine to very coarse, trace of fine gravel below 155 ft.....	140.0	157.0
Silt, very clayey, slightly sandy; sand is fine to very fine, silt is coarse, very light gray.....	157.0	160.0
Interbedded, sandstone and sandy silt, sand is very fine to fine, light olive-gray.....	160.0	165.0
Sand, slightly silty, sand is very fine to fine, very light gray.....	165.0	166.4
Sandstone, sand is very fine to fine, light brown-gray; interbedded with sandy silt below 168 ft, slightly calcareous.....	166.4	170.0
Sandstone, sand is very fine to fine, moderately calcareous; highly calcareous below 173 ft.....	170.0	175.0
Sandstone, sand is very fine to fine, very light brown-gray, slightly calcareous; some medium sand below 176.8 ft, slightly to moderately calcareous.	175.0	181.1

Silt, slightly clayey, very sandy, sand is very fine to fine, very light olive-gray, slightly calcareous.....	181.1	181.8
Sandstone, sand is very fine to fine, very light brown-gray, slightly calcareous; some very calcareous sandy siltstone below 190 ft.....	181.8	201.5
Silt, slightly clayey, very sandy, sand is very fine to fine, very light olive-gray.....	201.5	205.0
Sandstone, sand is mostly very fine to fine, light brown-gray; contains some sandy silt below 210 ft, light-gray.....	205.0	210.0
Interbedded sand, sandstone and sandy silt, sand is very fine to fine, very light olive-gray, slightly calcareous.....	210.0	226.5
Silt, slightly clayey, very sandy, sand is very fine to fine, very light olive-gray.....	226.5	233.5
Sandstone-siltstone, sand is very fine to fine, very light gray to whitish gray, moderately to very calcareous.....	233.5	235.0
Silt, slightly clayey, slightly sandy, marly, very light gray, moderately to very calcareous.....	235.0	238.0
Silt, slightly clayey, slightly sandy, light olive-gray, slightly calcareous, contains rounded grains of aragonite; very sandy below 240 ft.....	238.0	243.0
Cretaceous System - Upper Cretaceous Series - Montana Group:		
Pierre Formation:		
Shale, clayey, light yellow-gray, slightly calcareous, contains thin bentonite layer at 245 ft; mottled light yellow-gray, light gray and brown-yellow below 250 ft, some aragonite fragments; brown-yellow bentonite layer 253.8 to 254 ft, noncalcareous.....	243.0	254.0
Shale, clayey, dark gray, noncalcareous, contains some aragonite.....	254.0	259.9
Bentonite, light yellow-gray.....	259.9	260.0
Shale, clayey, dark gray, thin white bentonite layers at 268 and at 272 ft.....	265.0	280.0

10-13-1aabb
USBR Mid-State Division (Profile 10)
Buffalo County

Location: NW NW NE NE sec 1-10N-13W, 43 ft S and 1050 ft W of NE cor
 sec

Ground elevation: 2009.5 ft (i) Shelton 7.5 minute quadrangle

Depth to water: 37.3 ft (2/8/65)

Note: Compiled from sample descriptions by V.H. Dreeszen and
 interpretation of USBR geologic and field logs

	<u>Depth, in feet</u>	
	From	To
Quaternary System, undifferentiated:		
Silt, topsoil, slightly clayey, slightly sandy, 90 percent medium plasticity fines, 10 percent fine sand, maximum fine sand, dark brown-gray.....	0.0	4.0
Silt, slightly clayey, 85 percent low plasticity fines, 15 percent very fine sand, slightly calcareous, very light gray; a few yellow iron-oxide and limy areas below 12 ft.....	4.0	13.5
Silt, slightly clayey, 80 percent low plasticity fines, 20 percent fine sand, maximum size fine sand, no thread, slow dilatancy, light gray; moderately clayey below 33 ft.....	13.5	33.5
Silt, moderately clayey, 95 percent medium plasticity fines, 5 percent very fine to fine sand, light and medium gray; very clayey 33.5 to 34 ft..	33.5	38.0
Sand, fine to very coarse, much fine to coarse sand, about 5 to 10 percent gravel up to 3/8 inch in size, clean, common pink silicates.....	38.0	49.0
Silt, slightly clayey, 90 percent low plasticity fines, 10 percent very fine sand, slightly to in part moderately calcareous, light brown, pink tint to 72 ft, a few limy nodules 75 to 82 ft; large limy nodules 82 to 84 ft; slightly calcareous below 84 ft.....	49.0	99.0
Silt, slightly clayey, moderately sandy, principally fine sand, lenses of fine to medium sand, very sandy in lower few feet, very light gray, limy areas in top few feet.....	99.0	107.0
Tertiary System - Miocene Series - Ogallala Group:		
Silt, moderately clayey, slightly sandy, principally very fine to fine sand, light olive-gray, trace of yellow iron-oxide stain.....	107.0	110.0
Sand, silty, in part moderately clayey, slight consolidation, sand principally very fine to fine, some medium, very light olive-gray.....	110.0	142.0
Sand, slightly silty, sand is very fine to medium, trace of coarse sand; a little very coarse sand below 148 ft.....	142.0	157.0

Silt, moderately clayey, very light yellow to very light olive-gray, noncalcareous.....	157.0	166.0
Siltstone-sandstone, sand is principally very fine, very calcareous, common root casts, white to very light olive-gray; slightly silty below 182 ft, sand is very fine to fine with some medium, moderately calcareous.....	166.0	186.0
Silt, slightly sandy, in part clayey, sand principally very fine to fine, very calcareous, white..	186.0	192.0
Sand, silty, sand principally very fine to fine, slight consolidation, very calcareous in upper few feet, moderately calcareous below about 200 ft.....	192.0	237.0
Cretaceous System - Upper Cretaceous Series - Montana Group:		
Pierre Formation:		
Shale, clay, very light gray, some yellow iron-oxide stain.....	237.0	252.0
Shale, clay, very light gray with considerable iron-oxide stain.....	252.0	258.0
Shale, clay, principally dark gray, some yellow-brown streaks.....	258.0	272.0

10-13-13ddda
30-A-54
Buffalo County

Location: NE SE SE SE sec 13-10N-13W, 559 ft N and 10 ft W of SE cor
 sec

Ground elevation: 2005 ft (t) Shelton 7.5 minute quadrangle

Depth to water: 29.4 ft (8/2/54)

Electric log

	<u>Depth, in feet</u>	
	From	To
Quaternary System, undifferentiated:		
Road fill.....	0.0	1.5
Silt, moderately to very clayey, medium brown-gray; very clayey 2.5 to 3 ft, light yellow-gray; mod- erately clayey below 3 ft.....	1.5	5.0
Silt, moderately clayey, light yellow-gray, slightly calcareous, contains limy nodules; very light brown-gray below 7 ft; slightly sandy 12.8 to 13 ft.....	5.0	13.0
Sand, slightly to in part very silty, sand is very fine to medium.....	13.0	18.0
Silt, slightly clayey, in part sandy, sand is very fine, light yellow-gray, slightly calcareous.....	18.0	20.0
Silt, very clayey, light gray, slightly calcareous..	20.0	22.5
Silt, slightly clayey, silt is fine to coarse, very light gray, common mica, mostly noncalcareous, rare limy nodules.....	22.5	24.0
Sand, fine to coarse, slightly gravelly, 5 to 10 percent gravel, quartz with pink silicates.....	24.0	30.0
Sand and gravel, medium sand to medium gravel, 60 percent gravel, many pink silicates.....	30.0	35.0
Sand and gravel, medium sand to medium gravel, 50 percent gravel, quartz with pink, yellow and green silicates.....	35.0	45.5
Silt, slightly clayey, in part, very sandy, sand is very fine, very clayey in upper 0.5 foot, light gray.....	45.5	47.5
Silt, moderately clayey, silt is fine to very coarse, light brown, slightly calcareous, contains small limy nodules; limy areas 60 to 68 ft.....	47.5	68.0
Silt, very clayey, light medium brown.....	68.0	68.5
Silt, moderately clayey, light medium brown, silt is coarse grained; moderately sandy below 72.5 ft, sand is fine to coarse.....	68.5	75.5
Tertiary System - Miocene Series - Ogallala Group:		
Sandstone, sand is very fine to fine with some medium; light yellow-gray, moderately well indurated; mostly very fine to fine sand below 84 ft.....	75.5	85.0

Silt, slightly clayey, very sandy, sand is very fine to medium, light yellow-gray; very slightly clayey and very sandy below 90 ft, some coarse sand.....	85.0	91.5
Sand, very fine to medium, trace of coarse sand.....	91.5	95.0
Silt, slightly clayey, very sandy, sand is very fine to fine with some medium, light yellow-gray.....	95.0	106.0
Sandstone, very slightly silty, very fine to fine, some medium sand, light yellow-gray; mostly very fine to fine sand below 112 ft.....	106.0	120.0
Sandstone, slightly silty, sand is very fine to fine, some medium, light brownish gray.....	120.0	127.0
Silt, slightly clayey, very sandy, sand is very fine to medium, very light olive-gray.....	127.0	132.0
Sand, very fine to medium.....	132.0	136.0
Sand, slightly silty, slightly clayey, very fine to fine, some medium sand, light olive-gray.....	136.0	138.0
Sand, slightly silty, sand is very fine to fine with some medium, light gray.....	138.0	142.0
Sandstone, sand is very fine to fine, light olive-gray; light brown 148 to 150 ft.....	142.0	150.0
Sandstone, slightly silty, sand is very fine to fine, light olive-gray, a few siliceous rootlets..	150.0	154.0
Silt, very sandy, light olive-gray, slightly indurated.....	154.0	155.0
Sandstone, very slightly silty, sand is very fine to fine with a trace of medium sand, light olive-gray, common siliceous rootlets; light brown below 160 ft, a few rootlets.....	155.0	178.0
Sandstone, slightly silty, sand is very fine to fine, light olive-gray; very silty 180 to 185 ft..	178.0	185.0
Sandstone, very fine to fine, a little medium sand, light olive-gray.....	185.0	191.5
Limestone and marl, white; contains thin clay layers.....	191.5	192.5
Sandstone, slightly silty, sand is very fine to fine, very light brown, slightly to moderately calcareous; white and very calcareous below 194 ft.....	192.5	196.0
Sandstone, slightly to moderately silty, sand is very fine to fine with a little medium, very light olive-gray, very calcareous.....	196.0	205.0
Siltstone-sandstone, sand is very fine to medium, very light olive-gray, very calcareous, well indurated.....	205.0	209.0
Silt, slightly clayey, slightly sandy, light greenish gray, moderately calcareous.....	209.0	210.0
Sandstone-siltstone, sand is very fine to medium, whitish to very light olive-gray, moderately calcareous, some marly areas.....	210.0	213.5
Sand, very silty, sand is very fine to coarse, moderately calcareous.....	213.5	216.5

Sandstone, sand is very fine to coarse with a trace of very coarse sand and gravel.....	216.5	221.0
Limestone, white.....	221.0	221.5
Cretaceous System - Upper Cretaceous Series - Montana Group:		
Pierre Formation:		
Shale, clay, light yellow-gray, moderately calcareous, contains aragonite in upper part.....	221.5	225.0
Shale, clay, light brown-yellow, slightly calcareous; light medium yellow-gray below 230 ft; thin bentonite layer at 234.5 ft; light medium gray 234.5 to 236.8 ft; moderately calcareous below 235 ft; light yellow-brown 236.8 to 237 ft.....	225.0	237.0
Shale, clay, medium dark gray, slightly calcareous, thin bentonite layers at 238 ft, 246.7 ft, 247.4 ft and 249.4 to 249.7 ft.....	237.0	250.0

**10-13-18aaaa
67-B-47
Buffalo County**

Location: NE NE NE NE sec 18-10N-13W, 5 ft S and 79 ft W of NE cor
sec
Ground elevation: approximately 2135 ft (t) Gibbon North 7.5 minute
quadrangle
Depth to water: 79.4 ft (9/26/47)

	<u>Depth, in feet</u>	
	From	To
Quaternary System, undifferentiated:		
Silt, sandy, some clayey silt and very fine to medium sand, dark brown-gray and light brown.....	0.0	5.0
Silt, moderately sandy, sand is very fine to fine, medium brownish gray.....	5.0	8.5
Silt, moderately clayey, sandy, sand is very fine to fine, medium brownish gray.....	8.5	13.5
Silt, sandy, sand is very fine to fine, very light yellowish gray.....	13.5	20.0
Silt, sandy, sand is very fine to fine, very light brown; very slightly indurated below 24.5 ft, granular.....	20.0	30.0
Silt, sandy, sand is very fine to fine, light brown; a few limy nodules in lower 3 ft.....	30.0	45.0
Silt, sandy, mostly very fine sand, light brown limy areas and limy nodules.....	45.0	50.0
Silt, sandy, very fine to fine sand, light brown, granular structure; slightly clayey below 69 ft, slightly to moderately calcareous; contains limy nodules.....	50.0	79.0
Silt, slightly sandy, sand is mostly very fine, light brown, slightly indurated, essentially non-calcareous; some limy nodules 90 to 95 ft and at 98 ft.....	79.0	98.0
Sand, silty, sand is fine to very coarse, light olive-gray.....	98.0	105.0
Tertiary System - Miocene Series - Ogallala Group:		
Sandstone, slightly clayey, silty, fine grained, light greenish gray.....	105.0	109.0
Sandstone, silty, fine grained, very light greenish gray.....	109.0	129.5
Silt, slightly clayey, sandy, sand is very fine to fine, light greenish gray, slight induration.....	129.5	137.0
Sandstone, silty, fine grained, very light greenish gray; poorly indurated, less silty below 147 ft...	137.0	150.0
Sand, slightly silty, sand is very fine to medium with a little coarse, very light brownish gray, slight induration.....	150.0	159.5

Sandstone, sand is very fine to medium, whitish gray, very calcareous.....	159.5	160.5
Silt, slightly clayey, sandy, light greenish gray...	160.5	164.5
Sand, mostly very fine to fine, in part silty, slight induration, very light brownish gray.....	164.5	181.0
Sand, very fine to medium, some diatomaceous silt in lower foot.....	181.0	190.5
Sandstone, some clayey to sandy silt layers, sand is fine grained, light greenish gray.....	190.5	194.5
Silt, slightly clayey, sandy, light greenish gray...	194.5	197.0
Sandstone, silty, whitish gray, very calcareous; some light greenish gray sandy silt in upper part; poorly indurated below 203 ft, moderately calcareous.....	197.0	206.0
Sand, very fine to medium, very light brownish gray, slightly indurated, a few cemented limy areas.....	206.0	218.0
Sandstone-siltstone, whitish gray, very calcareous..	218.0	221.0
Sandstone, silty, slightly clayey, fine grained, light greenish gray.....	221.0	225.0
Silt, sandy, clayey, light greenish gray, slightly to moderately calcareous; slightly clayey below 230 ft, contains thin indurated limy layers.....	225.0	237.0
Sand, slightly silty, very fine to medium, light brownish gray.....	237.0	250.5
Sandstone-siltstone, very fine grained, whitish gray; contains volcanic ash, very calcareous.....	250.5	251.5
Sand, very fine to medium, a trace of coarse sand; slightly silty below 260 ft, slight induration below 270 ft.....	251.5	277.0
Sandstone, very light brownish gray, very calcareous.....	277.0	278.5
Sand, very fine to medium, light brownish to greenish gray, slightly indurated.....	278.5	292.5
Sandstone, fine grained, light greenish gray, very calcareous.....	292.5	295.2
Sand, very fine to medium, light brownish to greenish gray, slight induration.....	295.2	300.0
Sandstone, sand is very fine to medium, very light brownish to greenish gray, slightly calcareous, slight to moderate induration; moderately calcareous below 304.5 ft.....	300.0	310.0
Clay, silty, light greenish gray, blocky structure; thin limy layers 310 to 310.1 ft, 313.5 to 314 ft and 317.5 to 318 ft.....	310.0	319.0
Sand, slightly silty, sand is very fine to medium, light brownish to greenish gray; thin limy layer 327.9 to 328.4 ft.....	319.0	335.0

Cretaceous System - Upper Cretaceous Series - Montana Group:

Pierre Formation:

Shale, silty clay, white to very light gray, moderately to highly calcareous.....	335.0	340.0
Shale, clay, very light gray, moderately calcareous.	340.0	348.0
Shale, clay, light gray, some yellow-brown, slightly to moderately calcareous, some aragonite.....	348.0	352.0
Shale, clay, medium dark gray, moderately calcareous; slightly less calcareous below 360 ft.....	352.0	370.0

10-13-24ddaa
USBR Mid-State Division (Profile 10)
Buffalo County

Location: NE NE SE SE sec 24-10N-13W, 1050 ft N and 34 ft W of SE cor
 sec

Ground elevation: 2008.6 ft (i) Shelton 7.5 minute quadrangle

Depth to water: 34.9 ft (3/11/65)

Compiled from sample descriptions by V.H. Dreeszen and
 interpretation of USBR geologic and field logs

	<u>Depth, in feet</u>	
	From	To
Quaternary System, undifferentiated:		
Silt, slightly clayey, slight plasticity, dark brown-gray.....	0.0	2.5
Silt, slightly clayey, very light brownish gray, a few small iron-oxide stains, a few shells.....	2.5	19.0
Sand, fine to very coarse, a little fine to medium gravel; slightly more coarse to very coarse sand below 38 ft.....	19.0	50.0
Tertiary System - Miocene Series - Ogallala Group:		
Sand, silty, interbedded with some sandy silt layers, sand is very fine to fine, light olive-gray, a few small limy areas, very slight induration; mostly a very sandy silt, calcareous below 69 ft.....	50.0	72.5
Silt, slightly clayey, moderately sandy, sand is very fine to fine, light olive-gray, calcareous...	72.5	82.5
Sand, very silty, in part slightly clayey, sand is mostly very fine to fine, about 30 percent slightly calcareous fines, quick dilatancy.....	82.5	102.5

**10-13-29aaaa
66-B-47
Buffalo County**

Location: NE NE NE NE sec 29-10N-13W, 11 ft S and 94 ft W of NE cor
sec
Ground elevation: 2046 ft (t) Gibbon North 7.5 minute quadrangle
Depth to water: 31.7 ft (9/26/47)

	<u>Depth, in feet</u>	
	From	To
Quaternary System, undifferentiated:		
Silt, slightly clayey, sandy, sand is very fine to fine, dark brown-gray; very clayey below 2 ft.....	0.0	3.5
Silt, sandy, sand is very fine to fine, light yellowish to brownish gray.....	3.5	6.5
Silt, slightly clayey, medium brown-gray.....	6.5	7.0
Silt, slightly clayey, moderately sandy, sand is very fine to fine, light yellowish gray, a few yellow limonitic flecks; a few limy nodules below 8 ft.....	7.0	10.0
Silt, very slightly clayey, moderately sandy, sand is very fine to fine, very light gray, slight yellow tint, a few limonitic flecks, very slightly calcareous; a few snail shells below 15 ft.....	10.0	25.0
Silt, moderately clayey, light gray (bluish green wet), some peat in upper part.....	25.0	32.5
Sand, fine to very coarse, some fine gravel, very light medium gray, pink and light green silicates.	32.5	35.0
Sand, some gravel, gravel mostly fine, common greenish, some pink silicates; sand and fine to coarse gravel with pebbles below 50 ft.....	35.0	52.5
Siltstone, sandy, very fine to fine sand, whitish gray, very calcareous.....	52.5	52.7
Silt, slightly clayey, moderately sandy, sand is very fine to fine, light brown; moderately clayey, slightly sandy below 55 ft; principally very fine sand below 60 ft, slightly indurated; much very coarse silt to very fine sand below 65 ft.....	52.7	68.0
Tertiary System - Miocene Series - Ogallala Group:		
Siltstone, sandy, fine grained, very light brown and very light gray, some volcanic ash, slight induration, noncalcareous, a few rootlets.....	68.0	71.5
Silt, in part sandy, sand is fine grained, very light olive-gray, slightly indurated, siliceous, noncalcareous; very sandy below 80 ft, some volcanic ash.....	71.5	85.5
Sand, very fine to medium with some coarse and a trace of very coarse; some very coarse sand below 90 ft; mostly very fine to medium sand below 95 ft, slight induration.....	85.5	100.0

Sandstone, fine grained, very light yellowish gray, in part slightly calcareous.....	100.0	102.5
Sandstone-siltstone, white, very calcareous.....	102.5	107.5
Silt, slightly clayey, sandy, very light gray, moderately to highly calcareous.....	107.5	110.0
Sandstone, fine grained, very light gray to whitish gray, mostly very calcareous; a few rootlets 120 to 125 ft.....	110.0	137.5
Silt, slightly clayey, sandy, very light yellow-gray, slightly calcareous.....	137.5	140.0
Sandstone, silty, fine grained, very light yellow-green, slightly indurated below 143.5 ft.....	140.0	151.0
Siltstone, sandy, whitish to very light yellow-gray, very calcareous; moderately calcareous 152 to 152.8 ft.....	151.0	153.5
Sandstone, fine grained, light yellowish gray, moderately to highly calcareous.....	153.5	158.0
Silt, slightly clayey, very sandy, fine grained sand, very light olive-gray, noncalcareous, slightly indurated; some sandstone layers, slightly calcareous below 165 ft.....	158.0	169.0
Sandstone, fine grained, very light brownish gray, moderately calcareous, some rootlets.....	169.0	183.5
Silt, slightly clayey, very sandy, very light greenish gray.....	183.5	190.0
Sand, very fine to medium.....	190.0	195.0
Silt, slightly clayey, very sandy, light greenish gray.....	195.0	196.5
Sandstone, sand is very fine to medium, slightly indurated; silty below 205.5 ft.....	196.5	212.0
Sandstone, fine grained, very light greenish gray, moderately calcareous in part.....	212.0	216.0
Sandstone, fine to medium, a little coarse sand, very light brown-gray, slightly calcareous.....	216.0	220.0
Sandstone, fine grained, very light brownish to whitish gray, very calcareous, some sandy silt layers.....	220.0	249.0
Cretaceous System - Upper Cretaceous Series - Montana Group:		
Pierre Formation:		
Shale, clay, silty, whitish gray, very calcareous...	249.0	252.0
Shale, clay, white to very light gray, much yellow-brown mottling 252 to 255 ft and from 257.5 to 261 ft, all moderately to highly calcareous.....	252.0	261.0
Shale, clay, light gray, moderately to highly calcareous.....	261.0	265.0
Shale, clayey, dark gray, moderately calcareous; slightly calcareous below 275 ft.....	265.0	280.0

10-14-13dada
USBR Mid-State Division (Profile 9)
Buffalo County

Location: NE SE NE SE sec 13-10N-14W, approximately 1750 ft N and 119 ft W of SE cor sec

Ground elevation: 2114.6 ft (i) Gibbon North 7.5 minute quadrangle

Depth to water: 58.1 ft (4/26/65)

Compiled from sample descriptions by V.H. Dreeszen and interpretation of USBR geologic and field logs

Depth, in feet
From To

Quaternary System, undifferentiated:

Silt, slightly to moderately clayey, very slightly sandy, sand is fine, dark brown-gray, granular....	0.0	3.0
Silt, slightly clayey, very slightly sandy, very light brownish yellow, some very light gray.....	3.0	30.0
Silt, moderately clayey, very slightly sandy, sand is fine, medium brown; slightly more clayey 33.9 to 40 ft, medium reddish brown; slightly clayey 40 to 46 ft, light medium brown.....	30.0	46.0
Silt, very clayey, slightly sandy, sand is fine, medium brown, slightly calcareous.....	46.0	60.0
Silt, slightly to moderately clayey, very slightly sandy, sand is very fine to fine, noncalcareous matrix, limy areas; moderately calcareous below 62 ft.....	60.0	64.0
Silt, moderately clayey, very slightly sandy, sand is very fine to fine, light medium brown, slightly calcareous; many limy nodules 76 to 78.7 ft; moderately clayey below 78.7 ft, slightly calcareous, limy areas, rare limy nodules.....	64.0	82.8

Tertiary System - Miocene Series - Ogallala Group:

Sand, moderately silty, sand is very fine to fine, some medium, light olive-gray, slightly to moderately clayey below 84 ft.....	82.8	91.1
Sandstone, very silty, sand is mostly very fine, very light olive-gray, poorly indurated; sand is very fine to fine 110 to 116 ft.....	91.1	116.0
Sand, silty, slightly clayey, sand is very fine to fine, very light greenish gray.....	116.0	120.0
Sand, slightly silty, sand is very fine to fine, a little medium sand, very light olive-gray.....	120.0	125.0
Sand, very silty, slightly clayey, sand is very fine to medium, very light green-gray, slightly less silty below 131 ft, poorly indurated 141 to 150 ft.....	125.0	150.0
Sand, moderately silty, sand is very fine to fine, a little medium, very light olive-gray; slightly indurated 152.6 to 163 ft.....	150.0	163.0

Sand, silty, slightly clayey, sand is very fine to fine, trace of medium sand, very light olive-gray, contains some limy areas.....	163.0	171.0
Sand, slightly silty, sand is very fine to fine, some medium, light olive-gray; slight induration below 181 ft; contains some root casts 191 to 200 ft.....	171.0	200.0
Sand, slightly silty, sand is very fine to medium, a trace of coarse sand; slight induration below 202 ft.....	200.0	216.5
Sand, silty, slightly clayey, sand is mostly very fine to fine, white to very light olive-gray, non-calcareous.....	216.5	221.0
Sand, slightly silty, sand is very fine to fine, a trace of medium, light greenish gray.....	221.0	238.0
Sand, moderately silty, very slightly clayey, sand is very fine to medium, light greenish gray, rare limy areas.....	238.0	241.0
Sandstone, sand is very fine to fine, some medium, light greenish gray, poorly indurated.....	241.0	261.0
Sand, slightly silty, sand is very fine to fine, light greenish gray.....	261.0	264.0
Silt, moderately clayey, slightly sandy, sand is mostly very fine, light greenish gray, a few hard limy layers.....	264.0	278.5
Sand, slightly silty, very slightly clayey, sand is very fine to fine, a trace of medium, very light olive-gray, a few hard limy layers.....	278.5	291.0
Sand, very silty, slightly clayey, sand is mostly very fine to fine, very light greenish gray, a few hard limy layers.....	291.0	294.0
Silt, moderately clayey, slightly sandy, sand is very fine to fine, whitish gray, moderately to very calcareous.....	294.0	301.0
Silt, moderately clayey, moderately sandy, sand is very fine to medium, light greenish gray, contains limy nodules or hard limy areas.....	301.0	309.0
Sand, silty, sand is fine to medium with some coarser grains, contains some chalk or limestone grains.....	309.0	311.1
Cretaceous System - Upper Cretaceous Series - Montana Group:		
Pierre Formation:		
Shale, marly, clayey, light yellow-brown with some white, very calcareous; some light brown-gray 314.3 to 321.1 ft, moderately calcareous; mostly light yellow-brown 321.1 to 326 ft, moderately calcareous; medium dark gray below 326 ft, moderately calcareous.....	311.1	331.1

10-14-36aaaa
USBR Mid-State Division (Profile 9)
Buffalo County

Location: NE NE NE NE sec 36-10N-14W, 35.5 ft S and 76 ft W of NE cor
 sec

Ground elevation: 2070.1 ft (i) Gibbon North 7.5 minute quadrangle

Depth to water: 41.5 ft (4/19/65)

Compiled from sample descriptions by V.H. Dreeszen and
 interpretation of USBR geologic and field logs

	<u>Depth, in feet</u>	
	From	To
Quaternary System, undifferentiated:		
Silt, moderately clayey, 100 percent medium plasticity, dark brown-gray.....	0.0	2.8
Silt, very clayey, 100 percent medium plasticity, medium toughness, medium dark brown-gray.....	2.8	6.0
Silt, slightly to moderately clayey, 100 percent medium plasticity fines, low toughness, light brown-gray, calcareous.....	6.0	11.2
Silt, slightly to moderately clayey, 100 percent medium plasticity fines, low toughness, dark brown-gray.....	11.2	12.5
Silt, moderately clayey, 100 percent medium plasticity fines, light brown-gray.....	12.5	14.1
Silt, slightly clayey, 100 percent medium plasticity fines, very light yellow-gray, calcareous.....	14.1	34.6
Silt, coarse, light gray, wood fragments.....	34.6	36.0
Silt, slightly clayey, dark brown-gray, a few wood fragments; thin light gray layer at approximately 39 ft.....	36.0	41.8
Sand, slightly silty, sand is very fine to medium, very light gray.....	41.8	42.5
Sand, fine to coarse, some very coarse in lower part.....	42.5	45.1
Sand, fine to very coarse, a little fine to medium gravel, maximum size to up 1 inch.....	45.1	59.6
Tertiary System - Miocene Series - Ogallala Group:		
Silt, very sandy, sand is very fine to fine, some medium, very light yellowish to olive gray, some induration; slightly more induration 60.5 to 70 ft, common rootlets; slightly finer grained below 70.8 ft.....	59.6	80.8

10-14-36cb
17-31
Buffalo County

Location: NW SW sec 36-10N-14W, distances not recorded
 Ground elevation: 2082 ft (i) Gibbon North 7.5 minute quadrangle
 Depth to water: Not recorded

	<u>Depth, in feet</u>	
	From	To
Quaternary System, undifferentiated:		
Silt, moderately clayey, dark brown-gray.....	0.0	3.0
Silt, moderately clayey, very slightly sandy, sand is very fine, light yellowish to brownish gray; slightly less clay below 20 ft; very slightly calcareous below 25 ft, a few yellow-brown flecks; contains a trace of snail shells below 25 ft; a little medium dark brown-gray silt in interval 25 to 30 ft.....	3.0	30.0
Silt, slightly clayey, light yellow-gray, slightly calcareous, a few yellow-brown flecks; very slightly clayey, slightly sandy below 35 ft, sand is very fine; contains snail shells.....	30.0	43.0
Clay, light medium gray, dense, noncalcareous.....	43.0	45.0
Silt, in part moderately clayey, in part slightly sandy, sand is very fine, carbonaceous streaks, light medium gray, contains a trace of yellow-brown stain.....	45.0	54.0
Sand, medium to very coarse, much very coarse sand, a little fine gravel, logged in field as "green", possibly organic stain.....	54.0	58.0
Sand, medium to very coarse, a little fine gravel, quartz with pink silicates; some fine gravel below 65 ft, much very coarse sand.....	58.0	69.0
Tertiary System - Miocene Series - Ogallala Group:		
Sandstone, silty, slightly clayey, sand is very fine to fine with a little medium, very light olive to greenish gray, slightly indurated, rare limy areas; some sandy to clayey silt in interval 75 to 80 ft.....	69.0	80.0
Siltstone-sandstone, slightly clayey, sand is very fine to fine, very light greenish gray, moderate induration.....	80.0	85.0
Sandstone, silty, sand is very fine to medium, very light olive to greenish gray, contains a trace of siliceous rootlets; sand is mostly very fine to fine below 90 ft, moderately calcareous with some hard limy siltstone-limestone layers.....	85.0	98.0

**10-15-13ddaa
40-A-54
Buffalo County**

Location: NE NE SE SE sec 13-10N-15, approximately 1163 ft N and 1 ft W of SE cor sec
 Ground elevation: 2235 ft (t) Buckeye Valley 7.5 minute quadrangle
 Depth to water: 135.1 ft (8/27/54)
 Electric log

	<u>Depth, in feet</u>	
	From	To
Quaternary System, undifferentiated:		
Silt, moderately clayey, medium brown-gray; very clayey 0.8 to 1.5 ft.....	0.0	1.8
Silt, moderately clayey, light yellow-gray, slightly calcareous, granular structure, a few snails; contains a few limy nodules below 2 ft.....	1.8	5.0
Silt, slightly clayey, silt is coarse, light yellow-gray, slightly calcareous, a few snails; very slightly calcareous 11.5 to 15 ft.....	5.0	15.0
Silt, slightly to moderately clayey, light yellow-gray.....	15.0	18.5
Silt, slightly to moderately clayey, dark brown-gray; moderately clayey below 19 ft; moderately to very clayey below 22 ft, light medium brown....	18.5	24.5
Silt, moderately clayey, light brown; granular structure 29.5 to 30 ft.....	24.5	30.0
Silt, moderately clayey, very slightly sandy, sand is very fine to fine, light brown; a few shell fragments below 35 ft.....	30.0	44.0
Silt, moderately to very clayey, light brown; slightly sandy below 45 ft, sand is very fine to fine, slightly calcareous; common white limy areas 45.5 to 47 ft.....	44.0	50.0
Silt, moderately clayey, slightly sandy, sand is very fine to medium with a trace of coarse sand, light brown, slightly calcareous; medium brown below 52.5 ft.....	50.0	53.5
Silt, moderately to very clayey, light brown, slightly calcareous to 55 ft; medium brown 56 to 56.5 ft; very clayey 59 to 60 ft; moderately clayey below 70 ft, contains a little very fine to fine sand.....	53.5	80.0
Silt, slightly to moderately clayey, slightly sandy, sand is very fine, silt is coarse, light brown to light yellow-brown; slightly clayey below 110 ft..	80.0	116.0
Silt, slightly clayey, very light brown; moderately clayey; granular structure below 119 ft.....	116.0	125.0

Silt, very slightly clayey, slightly sandy, sand mostly very fine, silt is coarse; contains a little fine to coarse sand below 130 ft.....	125.0	137.0
Tertiary System - Miocene Series - Ogallala Group:		
Silt, very clayey, silt is coarse, light brown.....	137.0	140.0
Silt, very clayey, slightly sandy, sand is very fine to medium, light olive-gray, contains limy areas and nodules.....	140.0	143.0
Silt, moderately clayey, moderately sandy, sand is very fine to medium, very light olive-gray, contains a few limy nodules.....	143.0	145.0
Sand, moderately to very silty, sand is very fine to medium, very light olive-gray, slight induration; limy cementation.....	145.0	147.0
Silt, very slightly sandy, very light greenish gray.	147.0	148.5
Silt, marly, very light gray and whitish gray; some marly limestone below 150.5 ft.....	148.5	153.0
Silt, very sandy, sand is very fine to medium, in part slightly calcareous.....	153.0	155.0
Sand, very fine to medium with some coarse to very coarse; silty 159 to 159.5 ft.....	155.0	159.5
Sand, slightly silty, sand is very fine to medium, light olive, slight indurated; contains a few rootlets below 170 ft.....	159.5	174.0
Silt, slightly clayey, moderately sandy, sand is very fine to fine with a little medium sand, whitish gray, moderately to very calcareous, contains limy nodular areas.....	174.0	176.0
Siltstone, moderately clayey, marly, whitish gray, very calcareous, very light greenish gray, moderately calcareous below 178 ft.....	176.0	179.5
Sandy silt to silty sandstone, sand is very fine to medium, very light gray to whitish gray, moderately to very calcareous.....	179.5	181.5
Sandstone-siltstone, sand is very fine to medium, light olive-gray, moderately calcareous, contains a few rootlets; only slightly calcareous 188 to 190 ft.....	181.5	192.5
Clay, silty to clayey siltstone, very light greenish gray, in part very calcareous; a marly siltstone, white, very calcareous below 195.5 ft.....	192.5	197.2
Silt, slightly clayey, moderately sandy, very light greenish gray; contains some silty sandstone; contains a calcareous siltstone layer 198 to 198.6 ft.....	197.2	200.0
Sandstone, in part moderately silty, sand is very fine to fine, light greenish gray, slightly calcareous, some hard limy areas.....	200.0	203.0
Sand, very silty, sand is very fine to fine with a little medium, very light greenish gray, slightly calcareous.....	203.0	205.0

Siltstone, in part very clayey, silt is coarse, light greenish gray, slightly calcareous.....	205.0	206.0
Silt, moderately clayey, slightly sandy, sand mostly very fine, light olive-gray, moderately calcareous; contains some thin calcareous clayey silt layers; moderately sandy below 209.3 ft, sand is very fine to fine, slightly calcareous.....	206.0	210.0
Sandstone, in part slightly silty, sand is very fine to fine, very light olive- and brown-gray, slightly calcareous.....	210.0	211.5
Silt, moderately clayey, in part slightly sandy, light olive-gray, noncalcareous matrix; contains limy nodular areas.....	211.5	213.0
Sand, slightly silty, sand is very fine to coarse with some very coarse sand and fine gravel, common lithic clay grains, slightly calcareous; sand is mostly very fine to medium below 215 ft.....	213.0	218.5
Clay, silty, light greenish gray, noncalcareous, nodular limestone layers 219 to 219.3, 220.8 to 221.2 and 224.1 to 224.5 ft.....	218.5	224.5
Silt, moderately clayey, very slightly sandy, sand is very fine to fine, very light olive-gray; marly, very calcareous below 225.5 ft.....	224.5	226.0
Sand, slightly silty, sand is very fine to fine with a trace of medium, slightly indurated; very silty 229.7 to 231 ft.....	226.0	231.0
Sand, very fine to medium.....	231.0	236.5
Silt, slightly clayey, marly, white.....	236.5	238.0
Silt, coarse, may be ashy, very light gray.....	238.0	240.0
Silt, slightly clayey, very sandy, sand mostly very fine to fine, moderately calcareous, nodular limestone areas; contains seed fragments in upper 2 ft; sandy marl 242.4 to 242.8 ft; slightly calcareous but with limy areas below 242.8 ft, slightly indurated below 245 ft, moderately calcareous.....	240.0	247.5
Silt, slightly to moderately clayey, moderately to very sandy, mostly very fine to fine sand, light greenish gray, slight induration; moderately clayey below 250 ft; sandy siltstone layer 255 to 258.5 ft; sand is very fine to medium below 258.5 ft; very sandy below 260 ft.....	247.5	265.0
Sand, very fine to fine with some medium, slight induration; contains a trace of coarse sand below 270 ft.....	265.0	271.5
Silt, moderately clayey, very sandy, sand is very fine to medium, light greenish gray; slightly clayey below 275 ft.....	271.5	277.0
Sand, slightly silty, sand is very fine to fine with some medium, light olive-gray, slightly indurated; sand is very fine to medium with a little coarse below 280 ft.....	277.0	287.0

Silt, slightly clayey, very sandy, light greenish gray.....	287.0	290.0
Sandstone, moderately to very silty, very light olive-gray.....	290.0	291.7
Silt, slightly clayey, very sandy, sand is very fine to fine with a trace of medium, very light olive-gray; sand is very fine to medium below 295 ft....	291.7	299.0
Silt, slightly clayey, very slightly sandy, very light gray.....	299.0	300.0
Silty sand and sandy silt, interbedded, sand is very fine to fine; sand is very fine to medium below 303.5 ft.....	300.0	307.5
Sandstone, sand is very fine to fine with some medium, very light olive-gray, some rootlets, poorly indurated below 310 ft, possibly some volcanic ash 334 to 335 ft.....	307.5	335.0
Sand, fine to coarse, much medium sand, common lithic clay grains.....	335.0	338.3
Sand, slightly silty, sand is very fine to fine with a trace of medium.....	338.3	339.8
Sand, very fine to medium, dark speckling; thin silty sand layer 346.3 to 347 ft.....	339.8	356.5
Siltstone-sandstone, marly, fine grained, white.....	356.5	358.5
Silt, moderately clayey, moderately sandy, white, moderately calcareous.....	358.5	360.0
Siltstone, very slightly sandy, very light olive-gray, very calcareous, well indurated; marly 362 to 365 ft, slightly to moderately sandy below 365 ft.....	360.0	370.0
Siltstone-sandstone, sand is very fine to fine, very light olive-gray, moderately calcareous, moderately well indurated.....	370.0	373.5
Silt, moderately to very sandy, sand is very fine to fine, very light olive-gray, slightly to in part moderately calcareous.....	373.5	375.0
Sandstone, very fine grained, poorly indurated.....	375.0	376.0
Silt, moderately clayey, silt is fine to very coarse, contains aragonite grains, very light olive-gray, slightly calcareous.....	376.0	378.0
Cretaceous System - Upper Cretaceous Series - Montana Group:		
Pierre Formation:		
Shale, clayey, very light yellow-gray, some mottled yellow-brown, moderately calcareous; trace of bentonite in intervals 385.5 to 390 and 390 to 395.5 ft.....	378.0	395.5
Shale, clay, medium gray, moderately calcareous.....	395.5	410.0

10-15-19bccc
USBR Mid-State Division (Profile 7)
Buffalo County

Location: SW SW SW NW sec 19-10N-15W, approximately 2596 ft S and 118 ft E of NW cor sec
 Ground elevation: 2233.9 ft (i) Pleasanton SE 7.5 minute quadrangle
 Depth to water: Not obtained
 Compiled from sample descriptions by V.H. Dreeszen and interpretation of USBR geologic and field logs

	<u>Depth, in feet</u>	
	From	To
Quaternary System, undifferentiated:		
Silt, moderately to very calcareous, dark brown-gray in upper part, light medium brown-gray in lower part.....	0.0	3.0
Silt, slightly clayey, very slightly sandy, sand is very fine, very light brownish gray, some light olive and yellow, slightly calcareous below approximately 15 ft; slightly calcareous, very light brown-gray below 20 ft.....	3.0	27.0
Silt, moderately clayey, very sandy, very dark brown-gray grading to medium brown-gray.....	27.0	34.0
Silt, moderately clayey, slightly sandy, medium brown to approximately 40 ft; light brown grading to light brown-gray 40 to 59 ft, slightly calcareous in lower few feet.....	34.0	59.0
Silt, very clayey, slightly sandy, medium to medium dark brown-gray.....	59.0	61.0
Silt, moderately clayey, moderately sandy, sand is very fine to fine, light medium brown; slightly sandy 70 to 80 ft.....	61.0	80.0
Silt, moderately clayey, very slightly sandy, sand is very fine to fine, very light brown, common limy areas.....	80.0	110.0
Silt, slightly clayey, moderately sandy, sand is very fine to fine, light brown, slightly to in part moderately calcareous, widely scattered limy nodules and limy areas.....	110.0	145.0
Tertiary System - Miocene Series - Ogallala Group:		
Silt, slightly to in part moderately sandy, slightly clayey, sand is very fine to fine, white, very light olive-gray and green-gray, common limy areas.....	145.0	147.0
Silt, slightly clayey, moderately sandy, sand is very fine to medium with olive- to green-gray, limy areas.....	147.0	154.5
Sand, some gravel, arkosic, approximately 25 percent fine to medium gravel, up to ½ inch.....	154.5	170.0

Silt, slightly clayey, moderately sandy, sand is
very fine to fine, some medium, whitish gray,
moderately calcareous..... 170.0 180.0

**10-15-36ddda
41-A-54
Buffalo County**

Location: NE SE SE SE sec 36-10N-15W. approximately 441 ft N and 11 ft W of SE cor sec
 Ground elevation: 2175 ft (t) Buckeye Valley 7.5 minute quadrangle
 Depth to water: 80.9 ft (8/30/54)
 Electric log

	<u>Depth, in feet</u>	
	From	To
Quaternary System, undifferentiated:		
Silt, moderately clayey, medium dark brown-gray; medium dark yellow-gray below 1 ft.....	0.0	1.5
Silt, slightly clayey, light yellow-gray, slightly calcareous; common limy nodules 3.5 to 5 ft and a few limy nodules below 5 ft; essentially noncalcareous below 6 ft; slightly more clayey 15 to 16.4 ft; very slightly sandy below 16.4 ft, sand is very fine to fine.....	1.5	17.5
Silt, slightly clayey, medium dark brown-gray; in part slightly sandy 18.5 to 20 ft, sand is very fine to fine with rare coarser grains.....	17.5	20.0
Silt, moderately clayey, medium brown-gray; light medium brown below 21.5 ft; medium dark brown 30 to 31.5 ft.....	20.0	31.5
Silt, slightly to moderately clayey, silt is coarse grained, medium brown.....	31.5	33.5
Silt, moderately clayey, very light brown, moderately calcareous, contains limy areas and nodules.....	33.5	34.5
Silt, moderately to very clayey, light brown.....	34.5	37.0
Silt, slightly to moderately clayey, fine to coarse silt, contains a little very fine sand, light brown; slightly sandy below 40 ft, sand is very fine to fine.....	37.0	43.0
Silt, moderately clayey, light brown; moderately to very clayey 44.5 to 46.5 ft, moderately calcareous; slightly calcareous below 46.5 ft, moderately to very clayey 47.5 to 50 ft; contains some very fine to fine sand below 52 ft, light medium brown; moderately to very clayey below 60 ft; noncalcareous below 61.5 ft.....	43.0	66.0
Silt, slightly clayey, very sandy, sand is very fine with some fine, very light brownish gray.....	66.0	67.2
Silt, very clayey, light medium brown, some mottled dark gray-brown; moderately clayey below 68 ft....	67.2	69.0
Silt, very slightly clayey, slightly sandy, silt is coarse, sand is mostly very fine, light medium brown; thin dark brown layer 72 to 72.4 ft.....	69.0	73.5

Silt, very clayey, medium brown; moderately clayey 75 to 87.5 ft, moderately to very clayey 87.5 to 92 ft, limy areas and nodules below 92 ft.....	73.5	94.0
Silt, slightly clayey, light brown, slightly calcareous; in part moderately clayey below 95 ft, contains a few limy nodules; contains a little very fine to fine sand below 105 ft.....	94.0	107.0
Silt, slightly clayey, slightly sandy, sand is fine to coarse, medium brown, slightly calcareous; moderately sandy below 110 ft.....	107.0	112.5
Silt, moderately clayey, very light brown-gray, moderately calcareous, contains limy nodules.....	112.5	113.5
Silt, slightly to moderately clayey, contains a trace of fine to coarse sand, light brown, slightly to moderately calcareous; moderately sandy below 121.5 ft.....	113.5	122.1
Tertiary System - Miocene Series - Ogallala Group:		
Limestone, sandy and calcareous sandstone, sand is very fine to fine with some medium, white, well indurated 122.1 to 123.2 ft; slightly indurated below 123.2 ft, contains a little coarse sand and scattered very coarse sand and gravel grains.....	122.1	124.5
Sand, fine to coarse with some very coarse sand and trace of fine gravel, slight limy cementation, contains rare rootlets; finer grained below 130 ft, mostly a fine to coarse sand.....	124.5	134.5
Siltstone, sandy and silty sandstone, sand is mostly very fine to fine, light olive-gray; upper 0-2 ft is a sandy limestone; contains a trace of rootlets.....	134.5	135.1
Sand, some gravel, sand is fine to very coarse, 20 percent fine gravel, granitic, contains a few rounded lithic grains, slightly finer grained below 140 ft, slight cementation, contains some rootlets; gravel grains are mostly a fine grained limestone.....	135.1	145.0
Sandstone, silty, sand is very fine to fine with some medium, very light olive-gray, moderately calcareous, hackberry seeds; light greenish gray below 149.5 ft.....	145.0	155.5
Siltstone-sandstone, sand is very fine to fine with a little medium to coarse, light yellow-gray, moderately calcareous.....	155.5	161.5
Sandstone, sand is very fine to coarse with some very coarse, moderately calcareous; a sandy limestone layer 167 to 167.5 ft.....	161.5	167.5
Sandstone, slightly silty, sand is very fine to fine with a little medium, light yellow-gray, contains white limy areas.....	167.5	169.0
Sandstone, very silty, sand is mostly fine grained, very light gray.....	169.0	170.0

Siltstone-sandstone, sand is very fine to fine, very light olive-gray, slightly calcareous, contains siliceous rootlets, moderately calcareous below 175 ft.....	170.0	179.0
Silt, slightly sandy, silt is coarse, sand is very fine, very light olive-gray, contains limy areas..	179.0	181.0
Silt, slightly clayey, moderately sandy, sand is very fine to fine with some medium, very light olive-gray, slightly calcareous.....	181.0	182.3
Siltstone-sandstone, mostly very fine to fine sand, very light yellow-gray, moderately calcareous; some interbedded sandstone and very sandy silt below 185 ft.....	182.3	196.5
Silt, slightly clayey, moderately to very sandy, sand is very fine to fine with some medium, very light olive-gray, contains white limy areas; moderately clayey in upper 0.3 ft.....	196.5	200.0
Silt, moderately clayey, very slightly sandy, very light gray, slightly calcareous.....	200.0	202.0
Silt, coarse grained, very light gray, slightly calcareous, may contains volcanic ash; sandy in lower 0.5 ft.....	202.0	205.0
Silt, marly, in part moderately to very sandy, white, very calcareous, moderately clayey 211 to 211.5 ft.....	205.0	211.5
Silt, moderately clayey, moderately sandy, sand is mostly fine grained, very light green-gray.....	211.5	215.0
Siltstone-sandstone, sand is very fine to fine, light green-gray.....	215.0	219.0
Sandstone, slightly to moderately silty, sand is very fine to fine with some medium, very light green-gray; very slightly clayey 227 to 230 ft....	219.0	230.0
Sand, very silty, sand is very fine to fine with some medium, very light gray.....	230.0	235.0
Silt, coarse, very light gray.....	235.0	237.0
Sand, very silty, slightly clayey, sand is very fine to fine with some medium, very light olive-gray...	237.0	242.0
Sandstone, sand is very fine to fine with some medium, medium brown-gray.....	242.0	250.0
Sand, very fine to medium, slightly calcareous, many rounded lithic clay grains below 254 ft.....	250.0	260.0
Sand, very fine to medium, some coarse to very coarse sand, some rounded lithic clay grains.....	260.0	278.8
Clay, silty, light medium olive-gray.....	278.8	279.3
Silt, moderately clayey, contains some very fine to fine sand grains, light medium olive-gray; slightly clayey below 280 ft.....	279.3	281.0
Sandstone, slightly silty, sand is very fine to fine, medium brown.....	281.0	282.5
Silt, slightly sandy, coarse silt to very fine sand, micaceous, light medium olive-gray.....	282.5	283.5

Silt, very clayey, slightly sandy, sand is very fine to fine, light olive-gray.....	283.5	284.3
Sand, very fine.....	284.3	290.0
Silt, in part very sandy, common lithic clay grains, light yellow-gray.....	290.0	295.0
Sand and gravel, gravel consists largely of lithic clay and shale grains.....	295.0	297.0
Sand and coarse silt, micaceous, sand is mostly very fine, common lithic clay grains.....	297.0	300.0
Sand, very fine to very coarse, common lithic clay grains; micaceous silt layer 302 to 304 ft.....	300.0	304.0
Sand and gravel, 75 percent gravel consisting mostly of lithic clay grains.....	304.0	305.0
Sand, fine to very coarse, 10 percent fine gravel, lithic clay grains common; micaceous silt layer 312 to 313.5 ft; 25 percent very coarse sand to fine gravel 313.5 to 315 ft.....	305.0	317.0
Sand, moderately silty, sand is very fine to fine, medium dark brown; some lithic clay grains below 320 ft; light olive-gray below 322.3 ft.....	317.0	323.8
Sand, fine to very coarse, some fine gravel, rounded lithic grains common; sandy to clayey silt layer 324.2 to 325 ft.....	323.8	337.0
Silt, coarse to very fine sand, some lithic clay grains.....	337.0	340.0
Sand, silty, sand is very fine to fine with some medium, light olive-gray.....	340.0	343.8
Claystone, dense, light brown-gray, slightly calcareous.....	343.8	344.5
Cretaceous System - Upper Cretaceous Series - Montana Group:		
Pierre Formation:		
Shale, clayey, whitish gray with some yellow-brown, moderately calcareous; yellow-brown 347 to 347.5 ft; light medium gray with some mottled yellow-brown below 347.5 ft.....	344.5	349.0
Shale, clay, medium, gray; thin ironstone layer at 351.5 ft; some yellow-brown at 352.5 ft and 365.5 to 366.5 ft.....	349.0	377.5
Shale, clayey, light medium green, very calcareous..	377.5	380.0

10-16-1dddc
USBR Mid-State Division (Profile 7)
Buffalo County

Location: SW SE SE SE sec 1-10N-16W, 109 ft N and 330 ft W of SE cor
 sec

Ground elevation: 2267.3 ft (i) Pleasanton SE 7.5 minute quadrangle

Depth to water: Not obtained

Compiled from sample descriptions by V.H. Dreeszen and
 interpretation of USBR geologic and field logs

	<u>Depth, in feet</u>	
	From	To
Quaternary System, undifferentiated:		
Silt, moderately clayey, slightly sandy, sand is very fine to fine, silt is coarse, dark brown-gray, very slightly calcareous.....	0.0	2.5
Silt, slightly clayey, very slightly sandy, sand is very fine, very light brown-gray, very slightly calcareous; slightly calcareous below 5 ft, very light gray, brown tint.....	2.5	28.0
Silt, moderately clayey, slightly sandy, sand is mostly very fine, medium dark gray-brown; medium dark brown below 32 ft.....	28.0	34.0
Silt, moderately clayey, slightly moderately sandy, sand is mostly very fine, light brown; light medium brown below 41 ft.....	34.0	49.0
Silt, moderately clayey, very slightly sandy, sand is very fine, light brown, slightly calcareous....	49.0	55.0
Silt, moderately to very clayey, slightly sandy, sand is very fine to fine, slightly calcareous, a few limy nodules; moderately sandy 62 to 67 ft; noncalcareous below 67 ft, medium brown, slightly calcareous 62 to approximately 67 ft and only slightly sandy.....	55.0	70.0
Silt, moderately clayey, slightly sandy, sand is very fine, light brown; light medium brown below 81 ft.....	70.0	110.0
Silt, moderately clayey, slightly to moderately sandy, sand is very fine to fine with some medium to coarse sand, very light brown-gray, moderately calcareous; sand is very fine to medium with a little coarse below 114 ft, light brown, slightly calcareous.....	110.0	120.0
Silt, moderately clayey, slightly to moderately sandy, sand is very fine to fine, trace of medium, light yellow-brown, trace of iron oxide stain.....	120.0	122.0
Silt, moderately to very clayey, slightly sandy, light brown-gray, essentially noncalcareous.....	122.0	127.0
Sand, fine to very coarse.....	127.0	128.0

Silt, moderately clayey, very slightly sandy, sand is mostly fine, light brown; slightly sandy below 138 ft, sand is very fine to fine, scattered medium to coarse sand grains.....	128.0	140.0
Sand, fine to coarse, some very coarse, possibly some silt or clay layers.....	140.0	142.0
Sand, fine to very coarse, 5 to 10 percent fine gravel.....	142.0	153.0
Tertiary System - Miocene Series - Ogallala Group:		
Silt, slightly clayey, slightly sandy, sand is mostly very fine to fine, light olive-gray, in part slightly calcareous, a few cemented limy areas; moderately to very sandy in lower few feet.	153.0	176.0
Sand, slightly silty, sand is very fine to fine with some medium and rare coarse sand, slightly indurated, rootlets.....	176.0	191.0
Silt, slightly to moderately clayey, slightly sandy, sand is mostly very fine to fine, very light olive-gray, essentially noncalcareous.....	191.0	210.0
Sand, very silty, sand is mostly very fine, slight induration, rare limy areas to 210 ft, moderately calcareous 210 to 220 ft, thin silty clay layers near middle of interval.....	210.0	230.0
Silt, slightly clayey, slightly sandy, sand is mostly very fine, very light olive-gray, some limy indurated areas.....	230.0	242.0
Silt, moderately clayey, very sandy, sand is very fine with a trace of coarser grains, very light olive-gray, moderately calcareous, grades downward to a silty sand and sandstone.....	242.0	249.0
Sandstone, sand is very fine to fine with some medium, contains scattered coarser grains.....	249.0	290.0
Silt, very sandy, sand is very fine to fine, very light olive-gray.....	290.0	300.0
Sand, slightly silty, sand is very fine to fine, very light olive-gray; some medium sand 320 to 340 ft; slightly to moderately silty 340 to 360 ft....	300.0	360.0
Silty sandstone, sand is mostly very fine to fine, may contain clay layers.....	360.0	381.0
Cretaceous System - Upper Cretaceous System - Montana Group:		
Pierre Formation:		
Shale, clay, brown-yellow and light gray; mostly dark gray below 400 ft, slight iron-oxide stain, slightly to moderately calcareous.....	381.0	420.0
Note: Interval 381 to 395 ft was logged as "reworked Pierre Shale" on USBR logs, samples inconclusive		

**10-16-19aaaa
47-A-54
Buffalo County**

Location: NE NE NE NE sec 19-10N-16W, 9 ft S an 213 ft W of NE cor
sec

Ground elevation: 2249 ft (t) Riverdale 7.5 minute quadrangle

Depth to water: 83.6 ft (9/14/54)

Electric log

	<u>Depth, in feet</u>	
	From	To
Quaternary System, undifferentiated:		
Silt, slightly to moderately clayey, dark brown-gray.....	0.0	2.5
Silt, moderately to very clayey, light medium yellow gray.....	2.5	4.0
Silt, slightly clayey, light yellow-gray, essentially noncalcareous but with some secondary limy areas and limy nodules; only a trace of limy nodules below 8.5 ft.....	4.0	10.0
Silt, slightly clayey, light yellow gray, slightly calcareous, common snail shells; some very light gray mottling; very slightly calcareous 26.5 to 28.5 ft; noncalcareous, no snails below 28.5 ft, brown tint.....	10.0	29.5
Silt, slightly to moderately clayey, medium brown; medium dark brown moderately clayey 30 to 30.5 ft; light brown 32 to 32.5 ft.....	29.5	32.5
Silt, moderately to very clayey, medium dark brown-gray; very calcareous 33 to 34 ft.....	32.5	34.0
Silt, moderately clayey, medium brown; moderately to very clayey below 35 ft, light brown.....	34.0	41.0
Silt, very clayey, light medium brown.....	41.0	43.0
Silt, moderately to very clayey, light medium brown; moderately clayey 45 to 52 ft.....	43.0	60.0
Silt, moderately to very clayey, slightly sandy, sand is very fine to fine, light reddish brown; moderately clayey 63 to 64.5 ft, sand is very fine to medium, light brown-gray.....	60.0	64.5
Clay, silty, light gray, essentially noncalcareous, contains white limy areas 66.5 to 67.5 ft; contains rare limy areas and limy nodules below 66.5 ft; light brown-gray below 67.5 ft.....	64.5	78.0
Silt, moderately clayey, slightly sandy, sand is very fine to fine with a trace of medium, light brown, common white limy areas in upper foot; rare limy areas below 79 ft; moderately sandy 81.5 to 84.5 ft.....	78.0	84.5

Silt, moderately to very clayey, slightly sandy, sand is mostly fine, light medium brown, rare limy nodules.....	84.5	85.5
Silt, moderately to very clayey, light medium brown; very clayey 85.5 to 89 ft.....	85.5	90.0
Silt, slightly to moderately clayey, mottled light and medium brown, contains a trace of very fine to medium sand.....	90.0	92.5
Silt, slightly clayey, moderately sandy, sand is very fine to fine with some medium, light yellow-brown; granular structure 95 to 98 ft, only slightly sandy 97.1 to 98 ft.....	92.5	98.0
Silt, moderately clayey, light brown, slightly calcareous, contains limy nodules; large dense limy nodules below 100 ft.....	98.0	104.5
Silt, very clayey, light yellow-brown, slightly calcareous.....	104.5	105.5
Silt, slightly clayey, moderately to very sandy, sand is very fine to fine with some medium, medium brown.....	105.5	106.5
Silt, moderately clayey, slightly sandy, sand is very fine to fine, light brown, slightly calcareous, contains white limy areas; slightly clayey below 108 ft.....	106.5	110.0
Silt, slightly clayey, moderately to very sandy, sand is very fine to medium, light reddish brown; moderately clayey, moderately sandy in lower 0.5 ft.....	110.0	114.5
Silt, moderately clayey, very slightly sandy, sand is mostly fine, light brown, slightly calcareous below 116 ft.....	114.5	121.8
Marl, slightly sandy, in part moderately clayey, contains very fine to medium sand; very sandy 122.2 to 123.5 ft.....	121.8	123.5
Silt, slightly clayey, white and light brown, moderately calcareous, contains white limy areas; slightly calcareous below 125 ft, contains white limy areas and a few dense limy nodules.....	123.5	130.0
Silt, slightly clayey, slightly sandy, silt is coarse, sand is very fine to fine, light brown, slightly calcareous.....	130.0	138.0
Silt, very clayey, very light brown, slightly calcareous, contains limy layer or nodule at 138.8 ft.....	138.0	140.0
Silt, moderately clayey, slightly sandy, sand is very fine to fine, light brown, slightly calcareous, contains white limy areas, in part moderately calcareous; contains a trace of volcanic ash 143 to 143.5 ft, moderately sandy below 145 ft, light medium brown, contains limy nodules.....	140.0	149.0
Sand, silty, sand is very fine to medium, slightly calcareous.....	149.0	150.0

Silt, moderately clayey, light medium brown, slightly calcareous, contains limy nodules; contains a marl layer 154 to 155 ft; medium yellow-brown 164 to 168.5 ft; very clayey 168.5 to 169.5 ft and 169.5 to 170 ft.....	150.0	170.0
Silt, slightly clayey, slightly sandy, silt is coarse, sand is very fine to fine, light medium brown; very light brown and very light brown-gray below 175.5 ft.....	170.0	180.5
Sand and gravel, silty, gravel is fine to medium....	180.5	181.0
Silt, slightly clayey, very slightly sandy, contains sand and a trace of gravel, light brown.....	181.0	184.0
Silt, slightly clayey, moderately sandy and gravelly, light brown; slightly sandy and gravelly 185.5 to 187 ft; very sandy and gravelly below 187 ft.....	184.0	189.5
Sand and gravel, slightly to moderately silty, gravel is fine to medium.....	189.5	191.0
Sand, fine to very coarse, a little fine gravel....	191.0	195.0
Sand and gravel, gravel is fine with a little medium, quartz with pink and light-colored silicates.....	195.0	204.0
Tertiary System - Miocene Series - Ogallala Group:		
Sandstone, slightly silty, sand is very fine to fine with some medium, very light brownish gray, some limy areas; indurated calcareous siltstone-sandstone below 205 ft.....	204.0	205.5
Sandstone, slightly silty, interbedded with silty sand, sand is very fine to fine, light olive-gray; contains medium sand 210 to 215 ft; very silty, sand is very fine to medium below 221 ft.....	205.5	225.0
Sandstone, sand is very fine to medium with some coarse, slightly indurated; mostly very fine to fine with some medium below 232 ft; very fine to medium 240 to 245 ft.....	225.0	245.0
Sand, very fine to coarse, a little very coarse sand and fine gravel, contains lithic clay grains.....	245.0	249.0
Silt, very clayey, light green-gray, may be a lithic pebble.....	249.0	250.0
Sand, very fine to medium.....	250.0	253.0
Clay, silty, very light greenish gray.....	253.0	253.5
Silt, moderately clayey, marly, white, very calcareous; slightly sandy below 255 ft, moderately well indurated 255 to 257 ft.....	253.5	257.0
Sand, very fine to medium, some coarse; very fine to coarse below 260 ft.....	257.0	263.0
Silt, very sandy, sand mostly very fine to fine, very light greenish gray; very calcareous below 264.8 ft.....	263.0	265.3
Sand, very silty, sand is fine to coarse, very light green-gray.....	265.3	270.0

Sand, very fine to coarse with a trace of very coarse.....	270.0	272.0
Silt, sandy, silt is coarse, sand is very fine to fine, very light olive-gray; slightly indurated in lower part.....	272.0	275.0
Siltstone, white, very calcareous; moderately sandy, sand is very fine to fine.....	275.0	285.0
Sand, very fine to medium, a little coarse.....	285.0	289.5
Cretaceous System - Upper Cretaceous Series - Montana Group:		
Pierre Formation:		
Shale, clay, white, moderately calcareous.....	289.5	290.5
Shale, clay, medium brown-yellow with a little very light gray, noncalcareous; some mottled brown-red 301.5 to 302.5 ft, moderately calcareous; brown-yellow 302.5 to 303.5 ft, slightly calcareous.....	290.5	303.5
Shale, clay, light gray, very light gray and a little yellow-brown, noncalcareous.....	303.5	310.0
Shale, clay, medium to dark gray, some yellow-brown, noncalcareous; dark gray below 311 ft; chalky shale layer 322.6 to 322.8 ft; thin bentonite layer at 326.5 ft; bentonite 329.8 to 330.1 ft, light gray, dark speckled.....	310.0	331.5

10-16-31cccc
USBR Mid-State Division (Profile 6)
Buffalo County

Location: SW SW SW SW sec 31-10N-16W, 49 ft N and 105 ft E of SW cor
 sec

Ground elevation: 2204.3 ft (i) Riverdale 7.5 minute quadrangle

Depth to water: 30.4 ft (5/11/65) Water level recorded before
 completion of test

Electric log was run

Compiled from sample descriptions by F.A. Smith and
 V.H. Dreeszen and interpretation of USBR geologic and
 field logs

	<u>Depth, in feet</u>	
	From	To
Quaternary System, undifferentiated:		
Silt, slightly clayey, slightly sandy, medium dark brownish gray; some moderately clayey silt in interval.....	0.0	5.0
Silt, very slightly clayey, very slightly sandy, sand is very fine, silt is coarse, very light yellow-brown.....	5.0	13.5
Silt, moderately clayey, very slightly sandy, sand is very fine, light medium brown-gray; medium dark brown-gray 15.5 to 17.5 ft.....	13.5	17.5
Silt, slightly clayey, very slightly sandy, sand is very fine, very light brown-gray and very light yellow-gray; a few iron-oxide spots below 20.2 ft, mostly a very light gray, very slightly calcareous below 31 ft.....	17.5	32.9
Silt, moderately clayey, mottled light medium and medium gray; dark brown-gray 33.5 to 36.5 ft; medium brown-gray 36.5 to 40.2 ft; light brown-gray below 40.2 ft.....	32.9	40.6
Silt, slightly clayey, light gray, grades downward to a very sandy silt, sand is very fine to fine...	40.6	43.5
Silt, moderately clayey, slightly sandy, sand is mostly very fine, light to medium grayish brown, some wood fragments.....	43.5	50.2
Silt, slightly clayey, very sandy, sand is very fine to medium, very light gray.....	50.2	51.5
Sand, very silty, sand is very fine to medium; slightly silty in lower 2 ft.....	51.5	55.0
Sand, slightly silty, sand is very fine to medium, trace of coarse; very slightly silty below 60.2 ft.....	55.0	62.0
Sand, slightly silty, sand is very fine to medium with some coarse to very coarse, contains about 5 percent fine gravel.....	62.0	64.5
Sand, fine to coarse, some very coarse.....	64.5	69.0

Silt, slightly clayey, very slightly sandy, sand is mostly very fine to medium, light brown, slightly calcareous; slightly sandy below 70.2 ft, sand is very fine to fine, slightly calcareous to about 71.5 ft.....	69.0	77.5
Tertiary System - Miocene Series - Ogallala Group:		
Sandstone, silty, sand is mostly very fine to fine, very light olive-gray, rare rootlets, poorly indurated.....	77.5	81.5
Silt, very clayey, slightly sandy, sand is mostly very fine to fine, light greenish to olive-gray...	81.5	83.6
Sand, silty, sand is very fine to medium, a little coarse, light olive-gray; moderately clayey 83.8 to 85 ft.....	83.6	85.0
Sand, slightly gravelly, sand is fine to very coarse, 5 to 10 percent gravel; slightly silty 93.7 to 95 ft, slightly more gravel, 15 percent gravel; indurated 98 to 99 ft.....	85.0	99.0
Silt, moderately to very clayey, light greenish gray, some clay in sample below 100.2 ft.....	99.0	101.8
Silt, moderately clayey, very slightly sandy, very light olive-gray, moderately calcareous, micaceous, dense limy nodules.....	101.8	102.2
Sand, very silty, sand is very fine to fine, micaceous, very light brown to 103 ft, very light yellow-brown 103 to 103.3 ft.....	102.2	103.3
Silt, slightly to in part moderately clayey, moderately sandy, sand is very fine to fine, some thin clay layers, light brown, contains a few limy grains.....	103.3	106.0
Sand, silty, very fine to medium, trace of coarse and very coarse; mostly very fine to medium below 120 ft.....	106.0	123.0
Sand, very silty, sand is very fine with some fine, very light olive-gray, moderately calcareous in upper part, slightly calcareous in lower part.....	123.0	124.2
Silt, very clayey, slightly sandy, light green-gray, slightly calcareous, limy area at the top.....	124.2	124.6
Silt, clayey, moderately sandy, sand is very fine to medium, light greenish gray, slightly calcareous..	124.6	133.0
Marl, sandy, sand is very fine to medium, white, very calcareous.....	133.0	135.0
Sandstone, sand is very fine to fine with some medium, a little coarse sand and scattered gravel, very light brown, root casts.....	135.0	140.2
Sand, moderately silty, very fine to fine, some medium, moderately calcareous.....	140.2	141.4

Sand, slightly silty, sand is very fine to medium, dark speckled 141.4 to 141.7 ft; sand is very fine to medium, trace of coarse sand below 141.7 ft; slightly indurated 150.2 to 160.2 ft, root casts; sand is mostly very fine to medium below 160.2 ft, slightly indurated; slightly clayey 172 to 174.4 ft.....	141.4	174.4
Sand, very silty, slightly clayey, sand is very fine to medium, very light green-gray, slightly calcareous, slightly indurated.....	174.4	180.2
Sandstone, slightly silty, sand is very fine to medium, trace of coarse, very light green-gray, root casts, essentially noncalcareous.....	180.2	205.0
Silt, slightly sandy, marly, sand is mostly very fine to medium, white, very calcareous.....	205.0	209.0
Silt, moderately to in part very clayey, contains some very fine sand, very light olive to greenish gray, slightly to moderately calcareous, some limy nodules.....	209.0	225.0
Cretaceous System - Upper Cretaceous Series - Montana Group:		
Pierre Formation:		
Shale, clay, light yellow-brown, some limy nodular areas, moderately calcareous in upper few feet; medium brown-yellow 234 to 238 ft.....	225.0	238.0
Shale, clay, medium brown-yellow and medium gray, a trace of red, noncalcareous; much medium gray 240 to 246 ft; medium dark to dark gray below 246 ft..	238.0	250.0

**10-16-32cccc
46-A-54
Buffalo County**

Location: SW SW SW SW sec 32-10N-16W, 166 ft N and 9 ft E of SW cor
sec
Ground elevation: 2176 ft (t) Riverdale 7.5 minute quadrangle
Depth to water: 26.6 ft (9/9/54)
Electric log

	<u>Depth, in feet</u>	
	From	To
Quaternary System, undifferentiated:		
Silt, moderately clayey, light medium yellowish to brownish gray, slightly calcareous.....	0.0	2.0
Silt, very slightly clayey, light medium yellow-gray, slightly calcareous, contains small limy nodules; below 12 ft very slightly clayey, coarse grained, slightly sandy, sand is very fine to fine, very slightly calcareous.....	2.0	12.0
Silt, slightly to moderately clayey, light medium brown-gray.....	12.0	13.0
Silt, slightly clayey, light medium yellow-gray, essentially noncalcareous, contains a few limy nodules; slightly more clayey in lower foot.....	13.0	17.0
Silt, slightly sandy, silt is coarse, sand is mostly very fine, light medium yellow-gray, brown tint...	17.0	20.0
Silt, slightly to moderately clayey, light medium gray; light gray, slightly calcareous below 22 ft.	20.0	25.0
Silt, slightly to moderately clayey, dark brown-gray, granular structure; medium dark brown-gray below 26.5 ft, moderately to very clayey.....	25.0	27.5
Silt, moderately clayey, medium brown-gray, slightly darker in lower foot.....	27.5	29.0
Silt, moderately to very clayey, very dark brown-gray, slightly calcareous below 30.7 ft, contains snail shells.....	29.0	31.5
Silt, slightly to moderately clayey, very light greenish gray, slightly calcareous.....	31.5	33.5
Silt and peat, very light gray and light brown, slightly calcareous, snail shells common; very light gray, very little peat below 35 ft; medium gray, coarse silt below 37 ft.....	33.5	39.2
Sand, very fine to medium, a little coarse sand; very fine to coarse sand, thin peat layers below 40 ft, contains snail shells.....	39.2	41.3
Interbedded silt and peat, light gray and brown, a few snail shells.....	41.3	44.5
Sand, fine to coarse, some very coarse, quartz with pink and dark silicates, a few lithic clay grains; contains a trace of fine gravel below 50 ft.....	44.5	55.0

Sand, some gravel, gravel is fine with some medium, quartz with pink and dark silicates, common lithic silt and limy grains.....	55.0	58.5
Silt, very slightly clayey, slightly sandy, silt is coarse, sand is very fine, very light brown, contains rare limy nodules; slightly to moderately calcareous below 60 ft; very light brown, moderately calcareous 66 to 67 ft; moderately clayey, slightly calcareous, light brown 67 to 71 ft; slightly clayey below 71 ft.....	58.5	74.0
Silt, silt is coarse, granular structure, light brown, slightly calcareous, contains scattered fine to very coarse sand grains, a few rootlets...	74.0	83.5
Silt, slightly to moderately clayey, light brown, moderately calcareous, contains a trace of fine to coarse sand.....	83.5	88.5
Sand, fine to very coarse, some fine gravel, much coarse to very coarse sand, quartz with many pink silicates, slightly silty in upper 0.5 ft.....	88.5	91.8
Tertiary System - Miocene Series - Ogallala Group:		
Sandstone, sand is very fine to medium, some limy cementation, contains volcanic ash.....	91.8	95.0
Siltstone, sandy, mostly very fine sand, very light olive-gray, contains volcanic ash.....	95.0	95.5
Sandstone, very silty, sand is very fine to medium with a little coarse to very coarse sand.....	95.5	102.0
Silt, slightly clayey, moderately sandy, very light olive-gray.....	102.0	102.5
Sand, very fine to coarse, some very coarse sand, quartz with some dark grains.....	102.5	105.0
Sand, very fine to very coarse, quartz with pink silicates; sand is mostly fine to coarse 110 to 115 ft; contains 10 to 15 percent gravel below 115 ft; slightly indurated in lower foot.....	105.0	123.5
Sandstone, silty, sand is very fine to medium with a trace of coarse sand, very calcareous; contains seeds and rootlets below 125 ft; moderately to in part noncalcareous below 130 ft, contains some coarse sand.....	123.5	135.0
Sand, very fine to medium, very light olive-gray; slightly to moderately silty in lower part.....	135.0	140.0
Silt, slightly clayey, moderately to very sandy, sand is very fine to fine with some medium, very light olive-gray.....	140.0	142.0
Siltstone, sandy, sand is very fine to medium, white, very calcareous; moderately calcareous, white to very light olive-gray below 142.7 ft; some interbedded sandstone 145 to 150 ft; in part very light brown below 150 ft.....	142.0	151.5

Silt, very slightly clayey, moderately to very sandy, sand is very fine to fine with some medium, very light olive-gray, slightly calcareous.....	151.5	153.0
Siltstone, moderately sandy, sand is very fine to fine with some medium, white, moderately calcareous, contains rootlets; slightly clayey 156.8 to 157.1 ft; very light olive-gray below 157.1 ft....	153.0	157.6
Silt, slightly clayey, very light olive to very light green-gray, slightly calcareous, contains a few limy nodules; moderately clayey below 160 ft..	157.6	162.5
Silt, slightly clayey, white, slightly indurated, moderately calcareous.....	162.5	163.6
Silt, moderately to very clayey, very light yellow-gray, slightly calcareous; white to very light olive-gray below 165 ft, moderately calcareous....	163.6	166.4
Sandstone, slightly to moderately silty, sand is very fine to fine, very light olive-gray, slightly calcareous.....	166.4	175.5
Siltstone, moderately clayey, slightly to moderately sandy, sand is very fine to fine, white, very calcareous, moderately well indurated; well indurated, slightly sandy below 180 ft.....	175.5	183.5
Silt, moderately clayey, slightly sandy, sand is very fine to fine, white and very light olive-gray, moderately calcareous; indurated below 185 ft, very calcareous.....	183.5	188.0
Silt, slightly clayey, moderately sandy, sand is very fine to fine, very light greenish gray; slightly indurated below 190 ft.....	188.0	191.0
Sandstone, sand is very fine to fine, some medium, very light olive-gray, poorly indurated; thin silty layers 195 to 200 ft; moderately clayey silt layer 206.5 to 207.5 ft, moderately sandy; siltstone layer 224 to 225 ft, sandy; sand is mostly very fine below 225 ft; slightly silty below 230 ft.....	191.0	243.8
Cretaceous System - Upper Cretaceous Series - Montana Group:		
Pierre Formation:		
Shale, clay, very light gray and very light olive-gray, noncalcareous.....	243.8	245.5
Shale, clay, very dark gray, noncalcareous; thin aragonite and ironstone layers at 256 ft and in interval 260 to 261.5 ft; bentonite layers at 272.5 and 277 ft.....	245.5	280.0

**10-17-14ddaa
23-B-47
Buffalo County**

Location: NE NE SE SE sec 14-10N-17W, approximately 1300 ft N and 8 ft W of SE cor sec

Ground elevation: (?)2277 ft (i) or 2267 ft (t) Riverdale 7.5 minute quadrangle

Depth to water: approximately 78.8 ft (caved) (7/18/47)

	<u>Depth, in feet</u>	
	From	To
Quaternary System, undifferentiated:		
Road fill and soil, silty, slightly clayey, very dark brownish gray.....	0.0	1.5
Silt, slightly clayey, dark brown-gray.....	1.5	3.0
Silt, slightly clayey, medium yellow-brown to brown-gray.....	3.0	5.0
Silt, slightly clayey, light yellow-brown, in part moderately calcareous; silt is coarse below 9 ft, very slightly calcareous, a few small snail shells; slightly sandy below 15 ft; very light brown below 20 ft.....	5.0	21.0
Silt, slightly clayey, slightly sandy, medium dark to dark reddish brown.....	21.0	24.5
Silt, slightly sandy, sand is very fine to fine, light brown; medium brown 28 to 40 ft; moderately sandy 30 to 35 ft; light reddish brown below 40 ft, contains small limy nodules.....	24.5	45.0
Silt, moderately clayey, medium brown; slightly sandy below 46 ft, light brown; large limy nodules, moderately calcareous below 49 ft.....	45.0	60.0
Silt, moderately sandy, sand is mostly very fine to fine, light medium brown; very sandy below 64.5 ft, very light olive-gray; much yellow stain below 70 ft.....	60.0	73.0
Sand, very fine to fine, very light gray; slightly silty 80 to 85 ft and 90 to 94 ft.....	73.0	94.0
Silt, slightly sandy, sand is mostly very fine, silt is coarse, very light yellow-gray; very sandy below 100 ft, sand is very fine to fine; limy areas and limy nodular zone below 106.5 ft.....	94.0	110.0
Silt, very sandy, sand is very fine to fine with some medium, light brown, a few limy areas to 125 ft; sand is mostly very fine below 117.5 ft; non-calcareous below 125 ft.....	110.0	130.0
Silt, moderately sandy, sand is mostly fine, light brownish gray, moderately calcareous; limy nodules and some medium to coarse sand in lower foot.....	130.0	140.0

Silt, very slightly clayey, light brown to brownish gray, moderately to very calcareous, hard limy nodular zones; very calcareous 146 to 149 ft.....	140.0	149.0
Siltstone, very light brownish gray, very calcareous.....	149.0	151.0
Siltstone, light brown, in part calcareous with limy nodular layers; contains some fine to coarse sand 153 to 155 ft.....	151.0	160.0
Silt, very slightly sandy, mostly embedded fine to coarse sand, noncalcareous, some small rootlets...	160.0	169.5
Sand, in part silty, sand is fine to coarse with a little very coarse.....	169.5	172.0
Sand, some gravel, gravel is fine with some medium, yellowish and pink.....	172.0	176.5
Silt, slightly sandy, sand is mostly fine, light brownish gray.....	176.5	182.0
Sand, fine to very coarse.....	182.0	185.0
Sand and gravel, gravel is mostly fine to medium, brownish gray and pink.....	185.0	190.0
Tertiary System - Miocene Series - Ogallala Group:		
Siltstone, sandy, whitish gray, very calcareous.....	190.0	196.0
Sandstone, sand is very fine to medium, highly calcareous, whitish gray to light olive, some rootlets and a few seeds; many rootlets below 200 ft; a little coarse sand 205 to 210 ft; in part noncalcareous below 210 ft, sand is very fine to medium.....	196.0	215.0
Sandstone, silty with some sand, sand is very fine to medium, poorly indurated below 218 ft.....	215.0	227.0
Sandstone, sand is very fine to medium, very light brownish to whitish gray, very calcareous, a few rootlets.....	227.0	229.0
Sand, slightly silty, sand is very fine to medium...	229.0	236.0
Sandstone, sand is fine to coarse, light brownish gray, very calcareous, a few shell fragments.....	236.0	240.0
Sand, very fine to medium, a few light green lithic clay grains; a little coarse sand below 245 ft and scattered very coarse sand and gravel below 250 ft.....	240.0	258.0
Clay, silty, in part sandy, whitish gray, noncalcareous, some diatomaceous silt.....	258.0	259.5
Silt, clayey, whitish gray, very calcareous.....	259.5	262.0
Clay, silty, whitish gray to very light olive-gray and green, noncalcareous, blocky structure; in part reddish brown below 267.5 ft and in part calcareous.....	262.0	271.5
Sand, very fine to medium, some coarse.....	271.5	274.0
Silt, slightly clayey, very slightly sandy, whitish gray, very calcareous with thin hard limy bed.....	274.0	280.0

Sandstone, sand is very fine to medium, very light brownish to whitish gray, very calcareous, a few rootlets; very hard 283 to 285 ft; poorly indurated below 285 ft.....	280.0	292.0
Silt, sandy, clayey, very light green-gray, noncalcareous.....	292.0	294.0
Sand, in part slightly silty, sand is mostly very fine to medium; contains a trace of coarse sand 294 to 300 ft; sand is mostly very fine to fine 300 to 305 ft.....	294.0	312.0
Cretaceous System - Upper Cretaceous Series - Montana Group:		
Pierre Formation:		
Shale, clay, light gray and yellow orange.....	312.0	319.5
Shale, clay, slightly silty, dark gray to black, noncalcareous, contains a little limonite and bentonite.....	319.5	330.0

10-17-18babb
USBR Mid-State Division (Profile 5)
Buffalo County

Location: NW NW NE NW sec 18-10N-17W, 118 ft S and approximately 1520 ft E of NW cor sec
 Ground elevation: 2265.6 ft (i) Amherst 7.5 minute quadrangle
 Depth to water: Not obtained
 Compiled from sample examination by F.A. Smith and interpretation of USBR geologic and field logs

	<u>Depth, in feet</u>	
	From	To
Quaternary System, undifferentiated:		
Silt, very clayey, very slightly sandy, sand is very fine, dark gray.....	0.0	5.5
Silt, moderately clayey, very slightly sandy, sand is very fine, light gray, slightly calcareous.....	5.5	13.0
Silt, slightly clayey, very slightly sandy, silt is coarse, sand is very fine, dark brownish gray, very slightly calcareous.....	13.0	17.5
Silt, slightly clayey, very slightly sandy, sand is very fine, pale yellow, very slightly calcareous; light gray 20.2 to 26 ft; contains rare snail shells 26 to 30 ft; pale yellow 40 to 47 ft, slight iron-oxide stain; light gray 47 to 50.2 ft.	17.5	50.2
Silt, slightly to moderately clayey, very sandy, sand is very fine to medium, light olive-gray; slightly clayey below 54.6 ft.....	50.2	55.3
Silt, very clayey, slightly sandy, sand is very fine to fine, light gray.....	55.3	70.2
Sand, slightly silty, sand is very fine to fine, some medium, contains trace of limy grains.....	70.2	71.0
Silt, very clayey, very sandy, sand is very fine to fine, trace of medium, light olive-gray, moderately calcareous.....	71.0	72.0
Sand, slightly silty, sand is very fine to fine, trace of medium, contains small limy concretions..	72.0	76.5
Silt, very clayey, slightly sandy, sand is very fine to fine, pale yellow.....	76.5	77.5
Sand, slightly clayey, silty, sand is fine to very coarse, 5 percent gravel up to 1/4 inch in size...	77.5	80.2
Silt, slightly to moderately clayey, moderately sandy, sand is very fine to fine, pale yellow, slightly less sandy 84.7 to 100.2 ft; slightly clayey, light gray 100.2 to 110.2 ft, sand is mostly very fine.....	80.2	110.2
Sand, slightly silty, slightly gravelly, sand is fine to very coarse, gravel is fine to coarse, 10 to 15 percent gravel.....	110.2	122.3

Sand, slightly silty, sand is very fine to medium, contains a trace of coarse to very coarse sand....	122.3	123.3
Sand, moderately silty, sand is very fine to coarse, some very coarse.....	123.3	124.0
Sand, fine to very coarse.....	124.0	126.0
Tertiary System - Miocene Series - Ogallala Group:		
Sandstone, slightly silty, sand is very fine to fine, light olive-gray, a few rootlets.....	126.0	130.2
Sand, moderately silty, sand is very fine to fine, some medium, light olive-gray.....	130.2	133.1
Sandstone, slightly silty, sand is very fine to medium, light olive-gray.....	133.1	150.2
Sand, moderately silty, sand is very fine to fine, some medium, very light olive-gray, slightly indurated; moderately well indurated below 152.5 ft.....	150.2	160.2
Sand, slightly clayey, moderately silty, sand is very fine to medium, light olive-gray.....	160.2	162.9
Sand, slightly silty, sand is very fine to medium; sand is fine to coarse, some very coarse below 170.2 ft.....	162.9	177.5
Marl, silty, sandy, sand is very fine to medium, white, very calcareous.....	177.5	182.0
Sand, slightly silty, sand is very fine to medium..	182.0	187.0
Silt, moderately clayey, moderately sandy, sand is very fine to fine, some medium, pale yellow, moderately to very calcareous.....	187.0	192.0
Sandstone, slightly silty, sand is very fine to fine, some medium; poorly indurated below 200 ft, contains limy areas.....	192.0	200.2
Sand, very fine to medium, a little coarse; slightly more coarse sand below 242.5 ft.....	200.2	280.2
Sand, very fine to fine, some medium, slightly silty below 281.2 ft.....	280.2	286.2
Silt, moderately clayey, moderately sandy, sand is very fine to medium, pale yellow, very calcareous..	286.2	290.2
Sand, moderately silty, sand is very fine to medium, light olive, contains limy areas.....	290.2	310.2
Sand, slightly silty, sand is very fine to medium..	310.2	330.2
Sand, moderately silty, sand is very fine to medium, some coarse, some limy grains.....	330.2	340.2
Sand, slightly silty, sand is fine to coarse, a little very coarse.....	340.2	370.2
Sand, very slightly silty, sand is very fine to fine, some medium; very fine to medium, some coarse below 371.6 ft, contains some limy grains..	370.2	377.5
Silt, slightly clayey, slightly sandy, sand is very fine to fine, pale yellow.....	377.5	380.0
Sand, slightly clayey, silty, gravelly, gravel is fine with some medium, quartz with common lithic grains of claystone and limestone.....	380.0	402.0

Cretaceous System - Upper Cretaceous Series - Montana Group:

Pierre Formation:

Shale, clay, light gray, some yellow brown, slightly calcareous.....	402.0	404.0
Shale, clay, medium gray, some dark gray, moderately calcareous.....	404.0	420.2

10-17-22dddc
24-B-47
Buffalo County

Location: SW SE SE SE sec 22-10N-17W, approximately 7 ft N and 550 ft
W of SE cor sec

Ground elevation: 2215.9 ft (i) Riverdale 7.5 minute quadrangle

Depth to water: 26.1 ft (7/21/47)

	<u>Depth, in feet</u>	
	From	To
Quaternary System, undifferentiated:		
Silt, sandy, sand mostly very fine, very dark brown-gray.....	0.0	1.0
Silt, sandy, sand is mostly very fine, silt is coarse, medium brown.....	1.0	2.0
Silt, sandy, sand is mostly very fine, silt is very coarse, dark brown-gray.....	2.0	3.0
Silt, slightly sandy, sand is very fine to fine, light brownish gray, a few limy nodules and a large limy rootlet.....	3.0	8.0
Silt, slightly clayey, medium brown-gray; many small limy rootlets; slightly calcareous below 15 ft; light to medium brownish gray below 25 ft, contains small and large limy rootlets.....	8.0	30.0
Silt, slightly clayey, light medium gray.....	30.0	35.0
Sand, fine to medium, contains some clayey silt layers.....	35.0	38.0
Sand, fine to medium, some coarse, medium gray, contains small shells and lithic gray clay grains; some clay pebbles, contains peat and wood fragments and a few gravel grains below 50 ft.....	38.0	55.0
Sand, some gravel, gravel is fine to medium, brownish gray quartz with some yellowish and pink silicates.....	55.0	66.0
Silt, sandy, light brown; sand is mostly very fine to fine; very sandy below 70 ft, a few large limy nodular rootlets.....	66.0	75.0
Silt, slightly to in part very sandy, light olive-gray, moderately calcareous in lower part.....	75.0	80.0
Silt, moderately sandy, medium to dark brown-gray, many shells and shell fragments.....	80.0	85.0
Sand, some gravel, gravel is mostly fine, 20 percent very coarse sand and fine gravel, light brownish gray with pink and yellow silicates.....	85.0	88.5
Tertiary System - Miocene Series - Ogallala Group:		
Sandstone, sand is very fine to fine with some medium, very light olive-gray and whitish gray, mostly very calcareous, a few rootlets.....	88.5	92.0
Sandstone, slightly silty, mostly very fine to fine sand, light olive to brownish gray.....	92.0	96.0

Silt and silty clay, micaceous in part, light brown, reddish brown and light green-gray, contains thin limestone layers 98 to 98.5 ft and 99.5 to 100 ft.	96.0	100.0
Silt, very clayey, light brown and light reddish brown.....	100.0	102.0
Sandstone, and sandy silt, sand is very fine to medium, trace of coarse; thin yellowish limestone layers at 106 and 107 ft.....	102.0	107.0
Sandstone, silty, mostly fine sand, light brown.....	107.0	108.5
Sandstone, slightly silty, very fine to medium, trace of coarse sand, hard limy area 113.2 to 113.5 ft.....	108.5	113.5
Sand and gravel, gravel is fine to medium, some rounded limy grains, quartz with pink silicates...	113.5	120.0
Sandstone-siltstone, whitish gray, contains a few rootlets.....	120.0	122.5
Clay, very light brown to reddish brown, blocky structure, waxy.....	122.5	126.5
Limestone, light brown-gray to pink, brittle.....	126.5	127.5
Sandstone, very fine to fine sand, light brown, in part calcareous, a few rootlets.....	127.5	133.0
Clay, light reddish brown, blocky.....	133.0	135.0
Limestone, in part slightly sandy, white to light pinkish gray, brittle.....	135.0	137.5
Sandstone, very fine to fine sand, very light brown, in part calcareous, thin hard limy areas.....	137.5	145.0
Sandstone, sand is very fine to coarse with a trace of very coarse.....	145.0	153.5
Sandstone, sand is very fine to fine with some medium, very light brown-gray to whitish gray, very calcareous.....	153.5	156.5
Limestone, whitish gray, brittle; chalky below 161.5 ft.....	156.5	164.0
Silt, slightly clayey, sandy, very light brownish gray, calcareous.....	164.0	166.5
Sandstone, silty, sand is very fine to fine, whitish gray, calcareous.....	166.5	170.0
Sandstone, very fine to fine, some medium, very light brown-gray, moderately well indurated, calcareous.....	170.0	179.0
Sandstone, sand is very fine to medium, light olive-brown, moderately calcareous.....	179.0	186.5
Sandstone, sand is very fine to fine, very light brownish to whitish gray, very calcareous; some coarse sand and less induration below 198 ft.....	186.5	202.5
Silt, moderately clayey, slightly sandy, light greenish gray, some interbedded light brown clay from 202.5 to 207 ft.....	202.5	210.0
Silt, sandy, whitish gray, partly indurated.....	210.0	213.0
Sand, very fine to fine with some medium and a little coarse, brownish gray, dark speckled.....	213.0	215.0

Sand, silty, sand is very fine to medium with a little coarse, light greenish gray.....	215.0	218.5
Sand, slightly silty, sand is very fine to medium, dark speckled.....	218.5	224.5
Sandstone, sand is very fine to medium with a trace of coarse, light brownish to olive-gray, slightly calcareous, a few rootlets.....	224.5	225.5
Sandstone, very fine to medium, very light brownish gray, very calcareous; poorly indurated 229 to 231.5 ft; some slightly clayey to sandy silt and chalk 231.5 to 233.5 ft; hard below 233.5 ft, a few rootlets.....	225.5	236.0
Silt, slightly clayey, sandy, light greenish gray, mostly very fine to fine sand, limy areas.....	236.0	240.0
Sand, slightly silty, sand is very fine to medium, very light olive to brownish gray; very slightly calcareous 243 to 245.5 ft; a little very coarse sand below 260 ft.....	240.0	267.5
Silt, very sandy, very fine to medium sand, light greenish gray.....	267.5	269.5
Sand, very fine to medium with a trace of coarse sand; contains thin light green silt layers to 285 ft; contains a few lithic clayey silt grains 285 to 290 ft and below 305 ft; scattered very coarse sand and gravel grains below 285 ft.....	269.5	322.0
Silt, very clayey, sandy, sand is mostly very fine to medium, light greenish gray.....	322.0	325.0
Sand, fine to medium, many lithic clayey silt grains of gravel; mostly a sandy gravel below 335 ft consisting of lithic silt and clay grains.....	325.0	340.5
Cretaceous System - Upper Cretaceous Series - Montana Group:		
Pierre Formation:		
Shale, clayey, slightly silty, medium to dark gray, noncalcareous, contains some limonitic fragments..	340.5	350.0

10-17-24adaa
USBR Mid-State Division (Profile 6)
Buffalo County

Location: NE NE SE NE sec 24-10N-17W, approximately 1330 ft S and
 56 ft W of NE cor sec

Ground elevation: 2265.1 ft (i) Riverdale 7.5 minute quadrangle

Depth to water: Not available

Compiled from sample descriptions by V.H. Dreeszen
 and interpretation of USBR geologic and field logs

	<u>Depth, in feet</u>	
	From	To
Quaternary System, undifferentiated:		
Silt, slightly to moderately clayey, slightly sandy, sand is very fine, dark brown-gray.....	0.0	1.5
Silt, moderately clayey, very slightly sandy, sand is very fine, light yellowish to olive-gray, slightly calcareous below 5 ft; slightly clayey below 10 ft.....	1.5	28.0
Silt, very clayey, very slightly sandy, sand is very fine, dark brown-gray; light medium brown 31.5 to 35 ft; slightly sandy below 35 ft, sand is very fine to fine, light medium brown, pink tint.....	28.0	40.0
Silt, moderately to very clayey, moderately sandy, sand is very fine to fine, light medium brown, pink tint; slightly more sand below 50 ft, contains a trace of secondary lime.....	40.0	54.0
Silt, very clayey, slightly to moderately sandy; sand is very fine to fine, trace of medium, very light brown-gray to very light gray.....	54.0	56.0
Silt, very clayey, slightly sandy, sand is mostly very fine, light medium brown; moderately sandy 63 to 66 ft, slightly less clayey, sand is very fine to medium.....	56.0	66.0
Silt, very clayey, slightly sandy, sand is very fine to fine, light medium brown.....	66.0	69.0
Silt, moderately to very clayey, slightly sandy, sand is very fine to fine, trace of medium, medium dark gray-brown.....	69.0	70.5
Silt, moderately to very clayey, slightly sandy, sand is very fine to fine, light medium pinkish brown.....	70.5	73.5
Sand, slightly clayey, very silty, sand is very fine to medium, light medium pinkish brown; moderately silty below 74 ft, light brown.....	73.5	77.0
Silt, slightly clayey, very sandy, sand is mostly very fine to fine, light pinkish brown; moderately clayey and moderately sandy 80 to 88 ft; slightly more sand below 88 ft.....	77.0	90.0

Silt, moderately clayey, slightly to moderately sandy, sand is very fine to fine, very light brown-gray, slight iron-oxide stain.....	90.0	97.0
Sand, slightly clayey, moderately silty, sand is very fine to fine, trace of medium, very light gray, slight iron oxide stain.....	97.0	101.9
Silt, moderately clayey, moderately to in part very sandy, sand is very fine to fine, very light gray, slight iron oxide stain; very sandy below 103.5 ft, a trace of medium sand in lower part, light brown-gray.....	101.9	104.0
Sand, slightly silty, sand is very fine to fine, trace of medium, light brown-gray.....	104.0	104.9
Silt, slightly clayey, moderately to very sandy, sand is mostly very fine to fine, light brownish gray; very sandy 110 to 120 ft.....	104.9	120.0
Silt, slightly clayey, very sandy, sand is very fine to fine, trace of medium, very light olive-gray, yellow tint.....	120.0	122.0
Silt, slightly clayey, moderately sandy, sand is very fine, some fine, light gray, olive tint; very sandy below 130 ft, very light brown-gray; some silty sand below 134 ft.....	122.0	140.0
Silt, slightly clayey, moderately sandy, sand is very fine, some fine, very light brown-gray and very light brown.....	140.0	150.0
Silt, moderately clayey, slightly sandy, sand is mostly very fine, very light brown-gray and very light brown, a few secondary limy areas.....	150.0	168.6
Silt, moderately clayey, moderately sandy, sand is very fine to medium, rare coarse sand, very light brown; much secondary lime below 171.8 ft, a few gravel grains; thin layers of silty sand below 180 ft, sand is fine to coarse with a few gravel grains.....	168.6	190.0
Silt, slightly clayey, very light gray to whitish gray, very slightly calcareous, appears to have very thin fine to very coarse sand layers.....	190.0	197.8
Tertiary System - Miocene Series - Ogallala Group:		
Sand, slightly silty, sand is very fine to medium, trace of coarse, whitish gray, noncalcareous.....	197.8	199.6
Sand, silt, clayey, very silty, sand is mostly very fine to fine, very light olive-gray; moderately silty in lower portion, limy area at 201.5 ft; some induration with limy areas below 202 ft.....	199.6	210.0
Sandstone, silty, sand is very fine to fine, moderately to very calcareous; contains a trace of medium sand below 220 ft, all very light olive-gray to whitish gray.....	210.0	227.2

**10-17-28daad
25-B-47
Buffalo County**

Location: SE NE NE SE sec 28-10N-17W, approximately 2100 ft N and 7 ft W of SE cor sec
 Ground elevation: 2227.4 ft (i) Amherst 7.5 minute quadrangle
 Depth to water: 20.6 ft (7/24/47)

	<u>Depth, in feet</u>	
	From	To
Quaternary System, undifferentiated:		
Road fill.....	0.0	1.0
Silt, slightly clayey, very dark brown-gray.....	1.0	3.0
Silt, clayey, medium brown-gray; medium yellow-gray to brown below 5 ft, very slightly calcareous.....	3.0	8.0
Silt, slightly clayey, medium brown-gray, granular structure, large limy nodular rootlets.....	8.0	9.0
Silt, slightly sandy, sand is fine, dark yellowish gray, many limy rootlets.....	9.0	12.0
Silt, slightly clayey, dark brown-gray; medium dark brown-gray below 14.5 ft, a few small limy nodules.....	12.0	17.0
Silt, slightly sandy, sand is very fine, silt is coarse, very light gray, a few yellow-brown limonitic flecks, many snail shells below 19 ft...	17.0	27.0
Silt, slightly to moderately clayey, light gray.....	27.0	31.0
Silt, slightly sandy, sand is fine, silt is very coarse, slightly peaty; very peaty below 32 ft, dark gray-brown, some wood fragments.....	31.0	40.0
Silt, coarse-grained, medium gray, some thin peat beds and wood fragments.....	40.0	50.0
Silt, moderately sandy, sand is very fine to fine, medium gray; very sandy with some silty sand 52 to 53 ft.....	50.0	55.0
Sand, fine to medium with a little coarse to very coarse; fine to coarse with a little very coarse sand and gravel below 60 ft; about 20 percent very coarse sand and gravel below 65 ft, pinkish.....	55.0	69.0
Tertiary System - Miocene Series - Ogallala Group:		
Sandstone, sand is very fine to medium, light yellow-gray, calcareous, poorly indurated, a few rootlets.....	69.0	75.0
Sandstone, mostly very fine to fine sand, whitish gray, very calcareous, thin well indurated limy areas, contains rootlets.....	75.0	88.0
Sandstone, silty, sand is mostly fine, calcareous, poorly indurated.....	88.0	90.0

Sand, very fine to medium with a trace of coarse, in part indurated and calcareous, some siliceous rootlets; sand is fine to coarse below 95 ft, contains lithic greenish silty clay pebbles and scattered very coarse sand and gravel grains.....	90.0	103.0
Sandstone, sand is very fine to medium, brownish to olive-gray, a few limy areas and rootlets.....	103.0	110.0
Sandstone, sand is very fine to fine, light brownish gray, limy indurated areas.....	110.0	115.0
Sand, fine to very coarse with some fine and a little medium gravel, pink.....	115.0	123.0
Clay, silty, greenish gray, blocky, in part consists of rounded lithic grains.....	123.0	126.0
Sandstone, sand is mostly fine, very light greenish gray, moderately calcareous; some indurated very calcareous layers below 132 ft, whitish gray.....	126.0	140.0
Sandstone, sand is very fine to medium, light brownish gray, slightly calcareous; thin sandy limestone 145 to 145.5 ft.....	140.0	145.5
Sandstone, sand is very fine to fine with some medium, light brown; slightly calcareous below 150 ft, sand is very fine to medium, poorly indurated, a few rootlets; moderately calcareous below 155 ft, many hackberry seeds.....	145.5	159.0
Sandstone-siltstone, sand is mostly fine, very calcareous, whitish gray, thin hard sandy limestone layers.....	159.0	165.0
Limestone, white, slight gray speckling.....	165.0	167.5
Sandstone, very fine to fine, some medium sand, whitish gray, very calcareous.....	167.5	169.0
Limestone, sandy, whitish gray.....	169.0	170.0
Sandstone-siltstone, sand is fine, very light olive-gray, moderately calcareous, many rootlets.....	170.0	173.0
Silt, clayey, whitish gray, very calcareous.....	173.0	175.0
Sandstone-siltstone, sand is fine, whitish gray, very calcareous.....	175.0	179.5
Sandstone, sand is very fine to coarse, very light brown-gray, in part slightly calcareous, poorly indurated, siliceous rootlets.....	179.5	184.5
Sand, fine to coarse, some very coarse, trace of gravel.....	184.5	190.0
Sand, some gravel, gravel is mostly fine, brown-gray, many pink silicates.....	190.0	198.0
Silt, very sandy, slightly clayey, light olive-gray, some hard calcareous areas.....	198.0	200.0
Sand, silty, some sandy silt, sand is very fine to medium, light brown-gray.....	200.0	209.5
Silt, very clayey, some silty sand layers, very light green-gray.....	209.5	220.0
Sand, slightly silty, sand is very fine to medium with a trace of coarse, light brownish gray.....	220.0	236.0
Limestone, sandy, very light yellow-gray.....	236.0	239.5

Silt, sandy, slightly clayey, sand is very fine to fine, light greenish gray, thin hard limy zone in upper foot.....	239.5	250.0
Sand, in part silty, sand is very fine to medium with a trace of coarse sand, light brownish gray; some sandy silt layers below 255 ft.....	250.0	260.0
Silt, very sandy, some silty sand, sand is very fine to medium, trace of coarse sand, light olive-gray.	260.0	269.0
Sand, slightly silty, sand is very fine to medium, very light brown-gray; much medium sand below 275 ft, very slightly silty.....	269.0	284.0
Silt, very sandy, slightly clayey, sand is mostly very fine to fine, light olive-gray.....	284.0	288.0
Sand, in part silty, sand is very fine to fine, with some medium and a trace of coarse, very light olive-gray.....	288.0	292.5
Silt, moderately sandy, slightly clayey, light green-gray; very clayey below 296.5 ft.....	292.5	300.0
Sand, slightly silty, sand is very fine to medium, light brownish to olive-gray.....	300.0	305.0
Sand, fine to very coarse.....	305.0	307.5
Cretaceous System - Upper Cretaceous Series - Montana Group:		
Pierre Formation:		
Shale, clay, silty, light olive-gray and yellow-brown, thin hard limestone in upper 0.5 foot.....	307.5	310.0
Shale, clayey, slightly silty, dark gray, some orange and brown mottling, thin hard layers, limonitic; some bentonite 315 to 320 ft.....	310.0	330.0

10-17-30cccc
USBR Mid-State Division (Profile 5)
Buffalo County

Location: SW SW SW SW sec 30-10N-17W, distance from SW cor sec not available

Ground elevation: 2359.5 ft (i) and (t) Amherst 7.5 minute quadrangle

Depth to water: 109.2 ft about 3/26/48

Note: Drill Hole-20, proposed Amherst Damsite
 USBR geologic log

	<u>Depth, in feet</u>	
	From	To
Quaternary System, undifferentiated:		
Clay, silty, dark brown to light brown; light brown below 10 ft.....	0.0	80.0
Clay, sandy, brown with light streak; contains some chalky sandstone from 100 to 105 ft.....	80.0	105.0
Clay, sandy, dark brown; hard from 120 to 130 ft; rubbery from 130 to 150 ft.....	105.0	150.0
Clay, sandy, brown.....	150.0	154.0
Tertiary System - Miocene Series - Ogallala Group:		
Clay, sandy, fine, gray; very sandy 160 to 170 ft...	154.0	190.0
Sand, fine to coarse, gray.....	190.0	200.0

**10-18-9ccbb
35-A-48
Buffalo County**

Location: NW NW SW SW sec 9-10N-18W, approximately 1320 ft N and 20 ft E of SW cor sec
 Ground elevation: 2342.7 ft (i) Miller SW 7.5 minute quadrangle
 Depth to water: 67 ft (9/3/48)

	<u>Depth, in feet</u>	
	From	To
Quaternary System, undifferentiated:		
Silt, very slightly clayey, slightly sandy, silt is coarse, sand is very fine, medium dark brown-gray; slightly clayey below 2 ft, very dark brown-gray...	0.0	4.5
Silt, moderately clayey, slightly sandy, silt is coarse, sand is very fine, some fine, light brown-gray.....	4.5	8.0
Silt, slightly clayey, slightly sandy, silt is coarse, sand is very fine, medium dark brown-gray; very slightly clayey and sandy below 8 ft, light brown-gray.....	8.0	10.0
Silt, slightly clayey, slightly sandy, silt is coarse, sand is very fine with some fine sand, light yellow-brown; slightly clayey below 15 ft; light yellow-gray below 20 ft, contains rare fine to medium sand grains, contains a dense limy nodule.....	10.0	25.0
Silt, slightly clayey, very slightly sandy, sand is very fine with some fine, light yellow-gray; some aggregates below 30 ft, slightly sandy; in part light brown below 40 ft, limy areas, contains a trace of fine to medium sand.....	25.0	47.0
Silt, slightly to moderately clayey, in part very slightly sandy, very light brown and very light brown-gray, slightly calcareous, rare small limy nodules, rare shell fragments; a trace of very light brown clay below 50 ft.....	47.0	55.0
Silt, slightly to moderately clayey, very slightly sandy, very light brown-gray, slightly calcareous, common dark iron-manganese concretions and limy nodules or grains, rare coarse to very coarse sand grains.....	55.0	61.0
Silt, moderately to very clayey, very light brown, moderately to very calcareous, some limy nodules; slightly to moderately sandy below 65 ft, sand is mostly very fine to fine, a little medium to trace of coarse sand, a few limy nodules.....	61.0	70.0

Silt, moderately clayey, light brown, slightly calcareous, contains rare limy areas and nodules; slightly to moderately clayey below 74.5 ft, slightly sandy, sand is very fine to fine; mostly noncalcareous below 80 ft.....	70.0	85.5
Sand, fine to coarse, some very coarse, rare fine gravel, 15 percent gravel below 90 ft, quartz with a few pink silicates; sand is mostly very fine to medium below 97.5 ft.....	85.5	100.0
Tertiary System - Miocene Series - Ogallala Group:		
Sand, slightly to moderately clayey, sand is very fine to medium, some coarse, light brown-yellow; slightly clayey below 106.5 ft, light yellowish to brownish gray; slightly indurated 106.5 ft to 107.5 ft; very light olive-gray and very light yellow-brown below 107.5 ft.....	100.0	110.0
Sand, fine to coarse; fine to very coarse below 115 ft.....	110.0	122.0
Sandstone, very fine to medium, some coarse sand, whitish gray, highly calcareous; slightly clayey below 125 ft, very light olive-gray, moderately calcareous with limy areas.....	122.0	130.0
Sandstone, in part clayey, sand is very fine to fine with some medium, light brown with some light olive-gray, contains a few siliceous rootlets; sand is very fine to medium below 136.5 ft, poorly indurated.....	130.0	145.0
Siltstone-sandstone, sand is very fine to medium, very light olive-gray to whitish gray, mostly very calcareous.....	145.0	150.0
Sand, very fine to medium, a few limy rootlets.....	150.0	156.0
Siltstone-sandstone, mostly fine grained, very light olive-gray, very calcareous.....	156.0	158.0
Sandstone, very fine to medium sand, light brown-gray.....	158.0	170.0
Sand, very fine to medium, light brown; thin hard limy zone at 176 ft; in part calcareous below 176 ft, slightly indurated.....	170.0	185.0
Sandstone, fine grained, light greenish gray, slight limy cementation.....	185.0	195.0
Sand, very fine to medium, light brown-gray.....	195.0	207.0
Sandstone, very fine to medium, sand is light brown-gray, some limy cementation.....	207.0	220.0
Sand, very fine to medium; hard dense limestone layer 225.5 to 225.6 ft.....	220.0	230.0
Sandstone, mostly fine grained, very light brownish gray, moderately to highly calcareous, thin hard sandy limestone beds; many rootlets 240 to 245 ft.	230.0	250.0
Sand, very fine to medium, slightly indurated, limy cementation.....	250.0	256.0

Sand, silty, slightly clayey, very light olive-gray, slightly calcareous.....	256.0	260.0
Sandstone, sand is very fine to medium, interbedded slightly to very calcareous, thin hard layers.....	260.0	272.0
Sand, fine to very coarse, quartz with yellow to pink silicates.....	272.0	282.0
Sandstone, sand is very fine to medium, light brownish gray, moderately calcareous; slightly clayey, very silty below 290 ft.....	282.0	294.0
Sand, very fine to medium; hard limy indurated layer 301 to 302 ft.....	294.0	310.0
Sandstone, very fine to medium, light brownish gray, very slightly calcareous, poorly indurated.....	310.0	347.0
Sand, very fine to medium, some interbedded slightly clayey to silty layers, light brown-gray.....	347.0	360.0
Sand, very fine to medium, very light brownish gray.	360.0	375.0
Limestone, silty, sandy, sand is very fine.....	375.0	382.0
Sand, fine, gray.....	382.0	387.5
Limestone, sandy, very light gray, moderately to well indurated.....	387.5	390.0
Sandstone, fine grained, moderately to very calcareous, hard layers at 392 and 394 ft.....	390.0	395.0
Siltstone-sandstone, fine grained, very light gray, very calcareous.....	395.0	400.0
Sand, very fine to medium, light brown-gray.....	400.0	407.0
Sand, silty, slightly clayey, very light yellow-gray.....	407.0	415.0
Sand, very fine to medium, trace of coarse sand, slight dark speckling.....	415.0	426.0
Silt, slightly to moderately clayey, moderately sandy, sand is very fine to fine with some medium, light olive-gray; moderately to very clayey 435 to 440 ft; moderately clayey, moderately to very sandy below 440 ft.....	426.0	443.0
Silt, moderately clayey, slightly sandy, sand is very fine to fine, very light brown, slightly calcareous; light brown below 450 ft; in part moderately sandy below 455 ft; sand is very fine to medium with a few coarser grains, very light gray; light yellow-gray below 460 ft; mostly very fine to fine sand below 465 ft, moderately calcareous..	443.0	470.0
Silt, clayey to sandy and gravelly, a few limonitic and ironstone grains.....	470.0	476.5
Clay, sandy, sand is mostly very fine to medium, rare coarser grains, light olive-gray with some brown-gray.....	476.5	485.0
Cretaceous System - Upper Cretaceous Series - Montana Group:		
Pierre Formation:		
Shale, clay, medium gray, moderately to highly calcareous.....	485.0	500.0

**10-18-28cccc
34-A-48
Buffalo County**

Location: SW SW SW SW sec 28-10N-18W, 190 ft N and 97 ft E of SW
 cor sec
 Ground elevation: 2369.6 ft (i) Miller SW 7.5 minute quadrangle
 Depth to water: 85.7 ft (9/15/48)

	<u>Depth, in feet</u>	
	From	To
Quaternary System, undifferentiated:		
Silt, slightly clayey, slightly sandy, sand is very fine, medium gray, brown tint.....	0.0	4.5
Silt, slightly clayey, moderately sandy, sand is very fine to fine, light brown; contains a trace of medium sand below 10 ft, contains a few iron-manganese concretions, dark brown.....	4.5	13.5
Silt, moderately clayey, slightly sandy, sand is very fine, silt is coarse, medium yellow-brown; slightly clayey, moderately sandy below 26 ft, sand is very fine to fine.....	13.5	30.0
Silt, slightly to moderately clayey, slightly sandy, sand is very fine, some fine, medium yellow-brown, moderately sandy below 37.5 ft, medium brown; moderately to very sandy below 40 ft, light yellow-brown, common white limy nodules.....	30.0	45.0
Silt, moderately clayey, slightly sandy, sand is very fine, very light brown, slightly to moderately calcareous, some limy areas; granular structure below 60 ft.....	45.0	65.0
Silt, moderately clayey, slightly sandy, sand is mostly very fine, contains a trace of medium sand, very light brown-gray, moderately to very calcareous.....	65.0	70.0
Silt, moderately to very clayey, contains a little embedded fine to medium sand, very light brownish to whitish gray, moderately to very calcareous....	70.0	76.0
Tertiary System - Miocene Series - Ogallala Group:		
Silt, slightly clayey, moderately sandy, sand is very fine to medium, rare coarse sand, light medium to reddish brown, some limy areas.....	76.0	80.0
Limestone, nodular, dense, white clayey silt layer in upper 1.5 ft.....	80.0	84.0
Sand, silty, slightly clayey, very light olive-gray with some light brown, sand is very fine to fine with some medium to coarse, some limy areas, slight induration.....	84.0	90.0
Sand, slightly silty, fine to coarse, some very coarse, rare rootlets.....	90.0	95.0

Sand, some gravel, fine to very coarse sand, 20 percent fine to medium gravel, quartz with mostly light light-colored silicates, a few dark grains; approximately 30 percent fine to medium gravel below 100 ft.....	95.0	107.5
Sand, silty, slightly clayey, sand is mostly very fine to medium, light brown to light brownish gray; slight induration below 114 ft, mostly very light yellow-to olive-gray, sand is fine to coarse with some coarser grains.....	107.5	120.0
Sand, very fine to coarse, a little very coarse, rare fine gravel.....	120.0	125.0
Sand, very fine to medium.....	125.0	130.0
Sand, fine to very coarse, some gravel.....	130.0	133.0
Sandstone, silty fine to medium, light reddish to brownish gray; light yellow-gray below 137 ft.....	133.0	140.0
Sand and gravel, gravel is fine with some medium, gray to yellow and pinkish.....	140.0	160.0
Sand, fine to coarse, a little very coarse.....	160.0	170.0
Sand, some gravel, gravel is mostly fine.....	170.0	180.0
Sand, fine to coarse.....	180.0	191.5
Sandstone, fine to medium, light brown.....	191.5	193.5
Sand, fine to coarse.....	193.5	197.0
Sandstone-siltstone, fine grained, whitish gray, very calcareous.....	197.0	202.5
Sand, fine to coarse; some very coarse below 210 ft.	202.5	219.5
Sandstone, mostly fine grained, whitish gray, moderately calcareous; light brownish gray, slightly calcareous below 221 ft; thin hard limy zones at 232 ft and below 235 ft, a few seeds.....	219.5	248.0
Limestone, dense, light gray.....	248.0	249.9
Sandstone, fine grained, light grayish brown, limy cemented layers.....	249.9	260.0
Limestone, dense, light gray to white.....	260.0	263.0
Silt, slightly clayey, slightly sandy, sand is mostly fine, light brown, highly calcareous; some light olive-gray below 270 ft.....	263.0	280.0
Sandstone, fine grained, light brown, moderately calcareous; slightly calcareous, well indurated below 290 ft.....	280.0	320.0
Sandstone, sand is very fine to medium, light brownish gray, slightly calcareous.....	320.0	330.0
Sand, very fine to medium, very slightly calcareous, slightly indurated.....	330.0	344.0
Silt, slightly clayey, light greenish gray, moderately calcareous.....	344.0	350.0
Sand, very fine to medium, light brownish gray, some limy areas; some interbedded greenish gray sandy silt below 350 ft.....	350.0	360.0
Clay, greenish gray.....	360.0	390.0
Sand, fine to coarse; sand is fine to medium below 370 ft; slightly silty below 385 ft.....	390.0	395.0

Sand, very silty, fine grained, light greenish gray; interbedded with sandy silt and clayey silt below 395 ft, in part very calcareous.....	395.0	400.0
Silt, sandy and silty sandstone, fine grained, light olive-gray, calcareous.....	400.0	405.0
Sandstone, fine grained, very light gray to very light brownish gray, moderately to well indurated.	405.0	424.0
Cretaceous System - Upper Cretaceous Series - Montana Group:		
Pierre Formation:		
Shale, clayey , light yellow-gray, moderately calcareous, light gray 432 to 437.5 ft; medium gray below 437.5 ft.....	424.0	480.0

**11-13-1aabb
33-A-54
Buffalo County**

Location: NW NW NE NE sec 1-11N-13W, 5 ft S and approximately 2635 ft E of NE cor sec
 Ground elevation: 2071 ft (t) Cameron 7.5 minute quadrangle
 Depth to water: Not known, caved at 90.2 ft (8/12/54)
 Electric log

	<u>Depth, in feet</u>	
	From	To
Quaternary System, undifferentiated:		
Road fill.....	0.0	3.0
Silt, slightly clayey, medium dark brown-gray.....	3.0	3.5
Silt, slightly clayey, silt is coarse, light medium yellow-gray, very slightly calcareous, contains snail shells below 7.5 ft; mottled with light yellow-gray and olive-gray 10 to 15 ft; slightly more clayey 27.5 to 28.5 ft, light brown 28.5 to 29.5 ft.....	3.5	29.5
Silt, slightly to moderately clayey, medium brown; medium dark brown 30 to 31 ft and dark brown 31 to 32 ft.....	29.5	32.0
Silt, slightly clayey, medium brown.....	32.0	33.5
Silt, slightly to moderately clayey, slightly sandy, sand is very fine, silt is coarse, light medium brown.....	33.5	35.0
Silt, moderately clayey, light brown; slightly more clayey below 40 ft, light medium yellow-brown.....	35.0	44.0
Silt, slightly clayey, slightly sandy, sand is very fine, light medium yellow-brown.....	44.0	47.0
Silt, slightly clayey, light brown.....	47.0	48.0
Silt, moderately clayey, light medium reddish brown; moderately to very clayey 50 to 53.5 ft.....	48.0	53.5
Silt, slightly to moderately clayey, slightly sandy, sand is very fine, silt is coarse, light medium brown; moderately to very clayey 54 to 55 ft; sand is very fine to fine 55 to 56 ft.....	53.5	56.0
Silt, moderately clayey, light pinkish gray.....	56.0	60.0
Silt, slightly clayey, very slightly sandy, sand is very fine to fine, light reddish brown; light brown below 63.5 ft.....	60.0	65.0
Silt, moderately to very clayey, silty is coarse, light brownish gray; light medium brown below 67 ft; moderately clayey 68.2 to 71 ft and slightly clayey below 71 ft.....	65.0	72.5
Silt, very clayey, light reddish brown; moderately clayey below 78 ft, light yellow-brown.....	72.5	80.0
Silt, slightly clayey, light medium brown, granular structure; slightly calcareous below 88.5 ft.....	80.0	90.5

Silt, slightly clayey, slightly sandy, sand is very fine to fine, light brown; limy areas 93.5 to 94 ft.....	90.5	94.5
Silt, slightly clayey, silt is coarse, light brown, slightly calcareous.....	94.5	97.0
Silt, slightly clayey, moderately sandy, sand is very fine to medium with a trace of coarse to very coarse sand, light brown, slightly calcareous.....	97.0	97.5
Tertiary System - Miocene Series - Ogallala Group:		
Silt, slightly clayey, moderately sandy, sand is fine grained, very light gray, slightly calcareous.....	97.5	100.5
Sandstone, fine grained, light olive-gray, in part calcareous.....	100.5	103.0
Sandstone and silty sand, fine grained; very light olive-gray.....	103.0	105.0
Sandstone, fine grained, very light olive-gray, limy areas; very calcareous with some marly limestone below 111.8 ft.....	105.0	118.3
Sandstone, very fine to fine, whitish gray, very calcareous.....	118.3	125.5
Sand, very silty, slightly clayey, sand is very fine to medium, very light olive-gray, slightly calcareous.....	125.5	126.5
Sand, slightly silty, sand is very fine to medium, slightly calcareous; thin limy layer in lower part.....	126.5	132.0
Silt, slightly clayey, very sandy, sand is very fine to medium, very light olive-gray, slightly calcareous; limy marly layer 133.5 to 134.5 ft.....	132.0	134.5
Sand, silty, sand is very fine to medium, very light olive-gray, slightly calcareous.....	134.5	135.0
Sandstone, sand is very fine to fine, very light olive-gray, slightly calcareous; contains limy areas; silty in upper 0.5 foot.....	135.0	140.0
Sandstone, sand is fine to very coarse, light olive-gray; limy area 143.8 to 144 ft.....	140.0	147.0
Sand, fine to very coarse, contains rounded lithic grains of clayey silt and sandstone.....	147.0	152.5
Sand, very fine to medium, slightly indurated.....	152.5	156.0
Sand, silty, sand is very fine to medium; limy areas below 157.5 ft.....	156.0	160.0
Sandstone, marly, sand is fine to very coarse, light gray, calcareous.....	160.0	163.6
Sand, fine to very coarse, trace of fine gravel, contains lithic sandstone grains.....	163.6	166.0
Silt, slightly clayey, very sandy, sand is very fine to medium, very light olive-gray.....	166.0	167.0
Sand, moderately to very silty, sand is fine to coarse, light medium gray.....	167.0	174.0

Silt, slightly clayey, very sandy, sand is very fine to medium, very light olive-gray; slightly more clayey below 175 ft; very clayey 180 to 180.8 ft..	174.0	180.8
Sand, very fine to medium, light medium olive-gray; silty layer at 183.5 ft.....	180.8	185.0
Silty sand and very sandy silt, sand is fine grained, very light olive-gray; in part slightly indurated.....	185.0	191.0
Siltstone, sand is very fine to medium with a little coarse, light medium olive-gray; sand is fine to coarse, moderate induration below 195 ft.....	191.0	201.0
Sandstone, fine grained, light medium olive-gray, moderately well indurated; some interbedded silty sand and sandy silt below 207 ft.....	201.0	215.0
Sandstone, sand is very fine to medium, in part silty, light olive-gray; poorly indurated below 220 ft.....	215.0	230.5
Silt, slightly clayey, very sandy, sand is very fine to medium, very light olive-gray.....	230.5	233.0
Sand, very fine to medium, light olive-gray; slightly coarser grained 235 to 240 ft.....	233.0	249.0
Silt, slightly clayey, very sandy, sand is fine grained, light olive-gray.....	249.0	252.0
Sandstone, light olive-gray, contains some silt layers; contains interbedded slightly clayey to sandy silt layers below 255 ft.....	252.0	257.0
Sand, in part silty, sand is fine to coarse, very light olive-gray; contains trace of very coarse sand below 265 ft.....	257.0	265.0
Sandstone, very fine to medium sand, light olive-gray, well indurated.....	265.0	270.0
Sandstone, fine to very coarse, light brown-gray; slightly silty 277.3 to 280 ft; sand is fine to coarse 280 to 285 ft and fine to very coarse below 285 ft.....	270.0	295.0
Sand, very fine to medium, contains a trace of coarser grains; a few lithic silty clay grains 304 to 304.2 ft.....	295.0	314.2
Tertiary System - Miocene Series - Ogallala Group:		
Silt, moderately clayey, slightly sandy, sand is fine, very light olive-gray.....	314.2	315.0
Silt, very clayey, very light olive-gray, slightly calcareous; very calcareous, marly 316 to 320 ft, whitish gray.....	315.0	320.0
Silt, slightly clayey, slightly sandy, marly, whitish gray; indurated as siltstone below 325 ft.	320.0	328.0

Cretaceous System - Upper Cretaceous Series - Montana Group:

Pierre Formation:

Clay, very light yellow-gray, moderately to very calcareous; contains thin bentonite layer in interval 345 to 350 ft; light gray below 355 ft, contains bentonite layers at 355.9 and 364 ft.....	328.0	367.5
Shale, clay, medium gray, slightly calcareous; medium dark gray below 375 ft; contains bentonite layers 372.2 to 372.4 ft and 377.7 to 378 ft.....	367.5	390.0

**11-13-24aaaa
32-A-54
Buffalo County**

Location: NE NE NE NE sec 24-11N-13W, 9 ft S and 200 ft W of NE cor
sec
Ground elevation: 2074 ft (a) and (t) Cameron 7.5 minute quadrangle
Depth to water: 88.2 ft (8/10/54)
Electric log

	<u>Depth, in feet</u>	
	From	To
Quaternary System, undifferentiated:		
Silt, slightly clayey, light yellow-gray, light medium yellow-gray below 3 ft.....	0.0	12.5
Silt, slightly clayey, light medium brown.....	12.5	13.5
Silt, slightly clayey, medium dark brown, contains some very fine sand below 15 ft, medium brown.....	13.5	16.0
Silt, slightly to moderately clayey, medium brown; moderately clayey 18 to 20 ft; very clayey 20 to 21 ft.....	16.0	21.0
Silt, slightly to moderately clayey, light brown; slightly clayey 25 to 26.5 ft and 30 to 33 ft.....	21.0	33.0
Silt, slightly to moderately clayey, medium brown...	33.0	33.8
Silt, slightly clayey, light medium brown.....	33.8	39.0
Silt, moderately clayey, light yellow-brown; light medium brown 40.5 to 42 ft; moderately to very clayey below 42 ft.....	39.0	45.0
Silt, slightly clayey, light medium brown.....	45.0	46.5
Silt, moderately to very clayey, light brown.....	46.5	49.5
Silt, slightly clayey, slightly sandy, sand is very fine to fine, light medium brown; very little sand below 50 ft.....	49.5	51.0
Silt, very clayey, light medium brown.....	51.0	53.5
Silt, slightly clayey, slightly sandy, sand is very fine, silt is coarse.....	53.5	55.0
Silt, interbedded, slightly and moderately clayey, light medium brown, contains limy nodules below 75 ft, light brown.....	55.0	83.6
Silt, slightly clayey, medium brown; slightly to moderately clayey below 84 ft, light brown; contains some limy nodules below 90 ft, slightly calcareous; silt is very coarse below 99.5 ft.....	83.6	101.5
Silt, moderately clayey, light medium reddish brown; very clayey 104 to 105.2 ft; slightly calcareous below 105.2 ft, contains limy nodules; marly limestone 113 to 114 ft.....	101.5	115.0
Silt, slightly clayey, light brown, moderately calcareous; slightly sandy below 118 ft, sand is fine to coarse, slightly calcareous.....	115.0	120.0

Silt, slightly clayey, silt is very coarse, very light brown, slightly to moderately calcareous; marl, slightly clayey 121.5 to 122.1 ft.....	120.0	122.1
Silt, moderately sandy, sand is very fine to coarse, some limy grains.....	122.1	124.7
Sand, fine to very coarse, some fine gravel.....	124.7	125.5
Tertiary System - Miocene Series - Ogallala Group:		
Silt, slightly clayey, very sandy, sand is very fine to medium, some coarse, light yellow-gray.....	125.5	131.0
Sand, slightly silty, sand is very fine to medium, very light olive-gray; limy areas below 135 ft....	131.0	137.5
Sandstone, sand is very fine to medium, light olive-gray; marly areas below 142.5 ft, moderately indurated; some sandy to clayey silt 147.5 to 148.5 ft.....	137.5	151.5
Sandstone, silty, sand is very fine to fine, some medium, poorly indurated, very light olive-gray...	151.5	168.5
Sand, very silty, slightly clayey, sand is very fine to fine, very light olive-gray; some medium sand below 174.5 ft.....	168.5	175.0
Silt, very sandy, slightly clayey, sand is very fine to medium, very light olive-gray; trace of coarse sand below 180 ft.....	175.0	183.3
Silt, moderately clayey, very sandy, light olive-gray; slightly clayey below 185 ft, sand is very fine to medium.....	183.3	191.0
Sand, very fine to medium.....	191.0	196.0
Sandstone, very fine to medium, a little coarse sand, a few siliceous rootlets.....	196.0	200.0
Sand, very fine to coarse, with some very coarse and a trace of fine gravel, slightly silty in upper foot, slight induration; sand is very fine to coarse 205 to 210 ft.....	200.0	214.0
Sandstone, very silty, sand is very fine to medium, very light olive-gray.....	214.0	215.0
Sand, slightly to moderately silty, sand is very fine to coarse, slightly indurated.....	215.0	220.0
Sandstone, very fine to medium, some coarse, very light brown-gray, very poorly indurated.....	220.0	223.0
Volcanic ash, very light gray, slightly indurated...	223.0	231.0
Sandstone-siltstone, very fine to fine sand, whitish gray, very calcareous.....	231.0	235.0
Sand, silty, sand is very fine to fine with some medium, very light olive-gray.....	235.0	236.5
Sandstone, very fine to fine with some medium sand, light medium brown-gray; mostly fine grained below 240 ft; poorly indurated below 245 ft.....	236.5	249.0
Sandstone, silty, fine grained, very light brown-gray, slightly calcareous, some limy areas.....	249.0	251.0
Sandstone, fine grained, light olive-gray.....	251.0	255.0

Interbedded sandy to clayey silt and silty sandstone, fine grained.....	255.0	260.0
Silt, slightly clayey, sandy, sand is very fine to fine, very light yellow-gray, limy areas; interbedded with sandstone and silty sand below 261.5 ft.....	260.0	263.0
Sandstone, silty, fine grained, very light yellow-gray, calcareous.....	263.0	265.0
Sandstone, sand is very fine to fine, light medium brownish gray; poorly indurated and silty 269 to 270 ft.....	265.0	275.0
Sandstone, sand is fine to medium with a trace of coarse to very coarse sand; slightly indurated below 280 ft, slightly calcareous:.....	275.0	284.0
Silt, slightly clayey, moderately sandy, very light yellow-gray to white, very calcareous; indurated 285 to 288.5 ft, less calcareous.....	284.0	290.0
Silt, moderately clayey, slightly sandy, sand is very fine to fine, very light olive-gray, slightly calcareous, contains limy areas and nodules; moderately to very sandy below 295 ft.....	290.0	301.0
Sandstone, some interbedded sandy silt, sand is very fine to fine, light brown-gray, slightly calcareous.....	301.0	306.0
Tertiary System - Miocene Series - Ogallala Group:		
Clay, silty, light brown, slightly calcareous; very light brown-gray 307 to 309 ft; very light brown below 315 ft; contains limy nodules below 320 ft..	306.0	330.0
Silt, moderately clayey, slightly sandy, sand is very fine, very light brown, slightly calcareous..	330.0	335.0
Silt, slightly clayey, very sandy, sand is very fine, very light brown-gray; slightly sandy below 340 ft.....	335.0	344.0
Silt, moderately sandy, sand is very fine to very coarse, light medium brown; slightly clayey, light gray below 345.2 ft.....	344.0	346.8
Silt, sandy to gravelly, very light gray, common aragonite grains.....	346.8	350.0
Silt, moderately to very clayey, in part moderately sandy, sand mostly very fine to fine; contains thin sand and gravel layers.....	350.0	355.0
Cretaceous System - Upper Cretaceous Series - Montana Group:		
Pierre Formation:		
Shale, clayey, mottled light yellow-gray, light gray and brown-yellow; some medium gray below 356.5 ft.	355.0	358.0
Shale, clayey, dark gray, noncalcareous; contains a bentonite layer in interval 360 to 365 ft.....	358.0	370.0

11-14-36ddddd
USBR Mid-State Division (Profile 9)
Buffalo County

Location: SE SE SE SE sec 36-11N-14W, 109 ft N and 18 ft W of SE cor
 sec

Ground elevation: 2177.5 ft (i) Gibbon North 7.5 minute quadrangle

Depth to water: 122 ft (8/2/65)

Compiled from sample descriptions by V.H. Dreeszen
 and interpretation of USBR geologic and field logs

	<u>Depth, in feet</u>	
	From	To
Quaternary System, undifferentiated:		
Silt, moderately clayey, very slightly sandy, sand is fine, 90 percent medium plasticity fines, very dark brown-gray, granular.....	0.0	2.5
Silt, slightly clayey, very slightly sandy, sand is very fine, 90 percent low plasticity fines, light yellowish to brown-gray, very slightly calcareous.	2.5	22.0
Silt, moderately clayey, very slightly sandy, 90 percent medium plasticity fines, light brown; moderately to very clayey 30 to 40 ft, light reddish brown; light medium brown 40 to 60 ft; light brown 60 to 76 ft.....	22.0	76.0
Silt, clayey, slightly sandy, sand is fine to coarse, white, very calcareous, marly.....	76.0	79.0
Sand, slightly gravelly, sand is fine to very coarse, gravel is fine to medium up to 3/8 inch in size, 30 percent gravel.....	79.0	105.0
Tertiary System - Miocene Series - Ogallala Group:		
Silt, moderately clayey, very sandy, sand is very fine to medium, light brownish gray, contains limy areas.....	105.0	112.0
Sand, slightly gravelly, sand is fine to very coarse, gravel is fine to medium, 15 percent gravel up to 3/8 inch.....	112.0	118.0
Sand, slightly clayey, very silty, sand is very fine to fine with some medium to coarse, light brown, slightly indurated.....	118.0	135.0
Sand, moderately clayey, silty, sand is very fine to medium, white to very light olive-gray, contains a few limy areas.....	135.0	142.0
Sand, slightly gravelly, sand is fine to very coarse, gravel is fine to medium up to 3/8 inch, 5 to 10 percent gravel, slightly indurated.....	142.0	146.0
Sandstone, silty, sand is very fine to fine, very light olive-gray, poorly indurated, contains rootlets.....	146.0	173.0

Silt, moderately clayey, very slightly sandy, sand is fine, light brown, slightly calcareous, some limy areas, granular structure; very light brownish gray below 189 ft, moderately calcareous, very sandy in lower part.....	173.0	194.0
Silt, slightly clayey, very sandy, sand is very fine to medium, very light brownish to whitish gray, moderately to very calcareous, very slightly indurated.....	194.0	198.0
Siltstone-sandstone, sand is very fine to fine, very light olive-gray, moderately calcareous.....	198.0	226.0
Silt, moderately clayey, slightly sandy, sand is mostly very fine to fine, very light olive-gray, moderately calcareous; slightly calcareous, slightly more sand 230 to 239 ft, many limy areas, mottled light brown and light olive-gray.....	226.0	239.0
Sandstone, sand is very fine to medium, with a little coarse to very coarse, light olive-gray, contains rootlets.....	239.0	251.0
Sand, silty, mostly very fine to fine sand, very light olive to whitish gray, in part slightly calcareous, contains rootlets.....	251.0	300.0
Silt, slightly clayey, moderately to very sandy, sand is very fine to medium, whitish gray, moderately calcareous, in part slightly indurated; moderately clayey below 316 ft, moderately sandy, light olive to greenish gray, slightly to moderately calcareous.....	300.0	325.0
Sandstone, silty, sand is very fine to fine, light olive-gray, moderately calcareous, many rootlets..	325.0	352.0
Silt, moderately to very clayey, moderately sandy, sand is very fine to medium, very light olive-gray and whitish gray, in part very calcareous....	352.0	370.0
Sand, very clayey, sand is very fine to medium, light green-gray.....	370.0	375.0
Silt, moderately to very clayey, slightly sandy, light olive to greenish gray, a little brown, common dense limy nodules.....	375.0	400.0
Sand, very clayey, sand is mostly very fine to fine, light brown and olive-gray, calcareous.....	400.0	406.0
Sand, fine to coarse, a little very coarse.....	406.0	408.0
Cretaceous System - Upper Cretaceous Series - Montana Group:		
Pierre Formation:		
Shale, clay, yellow-brown, some brownish gray and light gray, moderately calcareous; medium to dark gray below 414 ft.....	408.0	420.0

**11-15-1adaa
37-A-54
Buffalo County**

Location: NE NE SE NE sec 1-11N-15W, approximately 1454 ft S and 7 ft W of NE cor sec
 Ground elevation: 2118 ft (t) Poole 7.5 minute quadrangle
 Depth to water: 73.9 ft (8/24/54)
 Electric log

	<u>Depth, in feet</u>	
	From	To
Quaternary System, undifferentiated:		
Sand, very silty, sand is very fine to medium and a trace of coarse to very coarse, medium brown....	0.0	5.0
Silt, slightly clayey, medium yellow-gray, slightly calcareous, contains snail shells.....	5.0	10.0
Silt, slightly clayey, slightly sandy, sand is very fine to fine, light medium brown, slightly calcareous.....	10.0	12.5
Sand, very fine to medium, trace of coarse.....	12.5	14.5
Silt, slightly clayey, very sandy, sand is mostly very fine, light medium brown, medium brown below 17.5 ft; very slightly clayey 20 to 22 ft, light brownish gray to medium brown-gray.....	14.5	23.7
Silt, slightly clayey, dark brown-gray; very dark brown-gray 25 to 26.5 ft; medium dark brown-gray below 26.5 ft.....	23.7	27.5
Silt, moderately clayey, light medium brown; slightly clayey below 29 ft; slightly calcareous below 33.5 ft, contains limy nodules.....	27.5	35.0
Silt, slightly clayey, light to light medium brown..	35.0	44.0
Silt, slightly clayey, medium dark brown.....	44.0	44.2
Silt, slightly clayey, light medium brown, slightly sandy below 50 ft, sand is very fine to fine, slightly calcareous, contains limy nodules and limy areas below 55 ft.....	44.2	60.0
Silt, moderately sandy, sand is mostly very fine, silt is coarse, medium brown, slightly calcareous, contains limy areas and nodules; very calcareous 62 to 64 ft; common small rootlets below 65 ft....	60.0	70.0
Silt, slightly sandy, sand is very fine, silt is coarse, light brown, slightly calcareous, granular structure, slightly indurated; slightly calcareous below 75 ft.....	70.0	79.0
Silt, slightly clayey, light brown to light brown-gray, slightly calcareous; limy areas 86.5 to 88 ft.....	79.0	88.0

Silt, slightly sandy, sand is very fine, silt is coarse, light brown, slightly calcareous, slightly indurated.....	88.0	96.5
Silt, slightly clayey, light brown, limy areas; contains limy nodules or layers 105 to 114.2 ft.....	96.5	114.2
Silt, moderately clayey, very light brown, slightly calcareous; slightly less clayey below 116.3 ft; silt is coarse below 120 ft, contains limy nodules.....	114.2	126.5
Silt, slightly clayey, silt is coarse, medium yellow-gray to 130.5 ft, then slightly to moderately clayey, slightly sandy, sand is fine to coarse, olive-gray	126.5	140.0
Silt, slightly clayey, moderately sandy, sand is fine to very coarse with a little fine gravel, light medium gray; slightly sandy 141 to 142 ft...	140.0	142.0
Sand and gravel, 30 percent fine gravel.....	142.0	142.5
Silt, slightly to moderately clayey, slightly sandy, sand is very fine to fine, light medium gray.....	142.5	145.0
Sand, fine to very coarse, some fine gravel, a few lithic rootlet grains.....	145.0	146.0
Tertiary System - Miocene Series - Ogallala Group:		
Silt, slightly clayey, very sandy, sand is very fine to medium, light medium gray, contains rootlets...	146.0	150.0
Sand, moderately silty, sand is very fine to medium with a trace of coarse to very coarse sand, light gray; slightly indurated below 155 ft.....	150.0	160.0
Sandstone, slightly silty, sand is very fine to medium, light olive-gray; very silty 163 to 163.5 ft.....	160.0	165.0
Sand, slightly silty, sand is very fine to medium with a trace of coarse, light olive-gray.....	165.0	170.0
Interbedded sandy silt and sandy to clayey silt, very light olive-gray.....	170.0	174.0
Sandstone, sand is very fine to medium.....	174.0	178.0
Sand, slightly silty, sand is very fine to medium with a trace of coarse; slightly indurated 180 to 185 ft.....	178.0	187.0
Silt, slightly clayey, moderately to very sandy, sand is very fine to medium.....	187.0	190.0
Sand, slightly to moderately silty, sand is very fine to medium; moderately to very silty below 192 ft.....	190.0	195.0
Sand, very fine to coarse, some very coarse.....	195.0	198.5
Sandstone, sand is very fine to medium, light olive-gray.....	198.5	203.0
Sand, very fine to coarse, a trace of very coarse, in part slightly indurated.....	203.0	220.0
Siltstone-sandstone, fine grained, very light olive-gray.....	220.0	222.5
Clay, very light olive-gray.....	222.5	223.0

Silt, slightly clayey, very sandy, light olive-gray; some interbedded silty sandstone below 225 ft; a thin layer of volcanic ash in interval 225 to 227 ft.....	223.0	230.0
Sandstone and silty sand, sand is very fine to medium, light olive-gray.....	230.0	240.0
Sandstone, sand is very fine to medium, light brown; light olive-gray below 247 ft, slight induration; slightly calcareous below 250 ft.....	240.0	252.0
Limestone, sandy, whitish gray.....	252.0	253.0
Sandstone, sand is very fine to medium, very light yellow-gray, moderately to very calcareous; slightly calcareous 260 to 261 ft.....	253.0	261.0
Sandstone, marly, whitish gray, very calcareous.....	261.0	262.0
Silt, moderately clayey, very light gray, very calcareous, contains some very limy areas.....	262.0	265.0
Silt, slightly clayey, slightly sandy, very light olive-gray, contains limy areas; moderately sandy below 266 ft, sand is very fine to medium.....	265.0	266.5
Sandstone, sand is very fine to medium, light yellow-gray; poorly indurated below 270 ft, contains a trace of coarse sand; sand is fine to coarse below 275 ft, contains lithic clay grains; slightly silty below 280 ft, common lithic clay and limestone grains.....	266.5	287.5
Cretaceous System - Upper Cretaceous Series - Montana Group:		
Pierre Formation:		
Shale, clay, mottled light yellow-gray and yellow-brown; thin nodular limestone in upper 0.5 ft; medium gray below 297.5 ft; bentonite layer 297.5 to 298 ft.....	287.5	302.0
Shale, clay, medium dark gray; bentonite layer 309.8 to 310 ft; dark gray below 310 ft; slightly sandy, very fine sand with mica 319 to 320 ft.....	302.0	320.0
Shale, clay, medium gray, very calcareous, slight speckling 320 to 321.5 ft; highly speckled below 321.5 ft.....	320.0	330.0

**11-15-24abba
38-A-54
Buffalo County**

Location: NE NW NW NE sec 24-11N-15W, approximately 11 ft S and 2060 ft W of NE cor sec
 Ground elevation: 2193 ft (t) Poole 7.5 minute quadrangle
 Depth to water: Unknown; hole caved at 106.2 ft (8/24/54)
 Electric log

	<u>Depth, in feet</u>	
	From	To
Quaternary System, undifferentiated:		
Silt, moderately to very clayey, medium brown-gray..	0.0	1.5
Silt, slightly clayey, silt is coarse, medium brown, contains a few limy nodules, slightly calcareous; light medium brown below 5 ft; contains a few snail shells.....	1.5	10.0
Silt, slightly clayey, light yellow-gray, slightly calcareous, noncalcareous below 15 ft, light and light medium yellow-gray; slight granular structure 20 to 23.5 ft; slightly calcareous below 23.5 ft.....	10.0	29.5
Silt, slightly clayey, medium dark brown-gray, dark brown-gray 30 to 32.5 ft.....	29.5	35.0
Silt, slightly clayey, medium brown.....	35.0	46.5
Silt, moderately to very clayey, medium dark brown; medium brown, moderately clayey below 47.2 ft; rare limy areas and nodules below 50 ft, slightly clayey.....	46.5	55.0
Silt, slightly clayey, medium brown, slightly calcareous, common limy nodules 55 to 56 ft; rare limy nodules 56 to 60 ft.....	55.0	60.0
Silt, slightly clayey, silt is coarse, light medium brown, slightly calcareous; light brown; moderately calcareous 65.5 to 67 ft and 68.5 to 70 ft.....	60.0	75.0
Silt, slightly clayey, slightly sandy, silt is coarse, sand is mostly very fine, light medium brown, slightly calcareous, contains limy nodular areas 78 to 78.5 ft and in lower few feet.....	75.0	85.0
Silt, moderately sandy, sand is very fine to fine, light medium brown, slightly calcareous; very sandy below 89 ft.....	85.0	90.0
Sand, very silty, sand is very fine to fine, light medium brown, slightly calcareous; some very sandy silt below 95 ft; contains a thin limy layer or nodule at 97.5 ft.....	90.0	100.0
Silt, very sandy, silt is coarse, sand is mostly very fine, light brown, slightly calcareous.....	100.0	113.0

Silt, slightly clayey, moderately sandy, sand is very fine to fine with a little medium, light brown.....	113.0	117.0
Silt, slightly clayey, silt is fine to very coarse, light brown; light reddish brown 125 to 126 ft; very slightly clayey below 130 ft.....	117.0	136.5
Silt, very slightly clayey, silt is fine to very coarse, contains embedded sand and gravel grains, light brown; contains a thin sandy limestone layer at 144 ft.....	136.5	144.0
Sand and gravel, gravel is fine with a little medium, quartz with pink and yellow silicates; in part silty 146 to 149.3 ft; 50 percent gravel below 149.3 ft.....	144.0	154.0
Tertiary System - Miocene Series - Ogallala Group:		
Silt, slightly clayey, slightly sandy, sand is very fine to fine with a trace of medium, very light olive gray, rare rootlets.....	154.0	155.0
Siltstone-sandstone, sand is very fine to fine, very light olive-gray, contains a trace of rootlets....	155.0	162.0
Sandstone, slightly silty, sand is very fine to medium.....	162.0	167.0
Silt, slightly clayey, moderately sandy, sand is very fine to fine with a trace of medium, very light olive-gray.....	167.0	170.5
Sand, moderately to very silty, sand is very fine to fine with some medium.....	170.5	175.7
Interbedded marl, sandstone and silty sand, sand is very fine to fine with some medium, sandstone is noncalcareous; contains a limestone layer 179 to 179.2 ft.....	175.7	180.0
Silt, very sandy, sand is mostly very fine, very light olive-gray, slightly calcareous.....	180.0	183.2
Silt, very clayey, slightly to moderately sandy, sand is very fine to medium, light olive-gray.....	183.2	185.0
Silt, moderately clayey, moderately to very sandy, sand is very fine to medium; contains a few limy nodules; slightly calcareous, many limy nodules below 190 ft.....	185.0	191.5
Sandstone, silty, some sandy silt, very light olive-gray, slightly calcareous.....	191.5	193.0
Sandstone, slightly silty, sand is very fine to medium, a little coarse to very coarse sand, very light olive-gray.....	193.0	194.8
Sandstone, slightly silty, sand is very fine to fine with a little medium, light olive-gray.....	194.8	197.0
Silt, slightly clayey, very sandy, sand is very fine to medium, very light olive-gray; very slightly clayey 199.3 to 200 ft; moderately clayey 206.5 to 207 and 208.5 to 210 ft; slightly clayey below 210 ft.....	197.0	212.0

Sand, very slightly clayey, very silty, very fine to medium sand, light olive-gray; slightly indurated below 215 ft; slightly silty below 219.2 ft.....	212.0	227.0
Silt, slightly clayey, slightly sandy, very light olive-gray, moderately to very sandy below 230 ft.	227.0	233.0
Sand, very silty, very fine to medium sand, very light olive-gray; slightly indurated below 237 ft.	233.0	251.5
Sand, slightly to moderately silty, sand is very fine to medium with a trace of coarse.....	251.5	257.0
Sand, slightly clayey, very silty, very fine to medium sand, very light olive-gray.....	257.0	260.0
Sand, very fine to medium, some coarse, very light olive-gray, very slightly indurated, contains many rootlets 260 to 265 ft; slightly silty below 273 ft.....	260.0	275.0
Sand, slightly silty, mostly very fine to fine, contains a little coarse to very coarse sand.....	275.0	280.0
Sand, a little fine gravel, 25 percent coarse sand to fine gravel.....	280.0	290.0
Sand, very fine to coarse.....	290.0	297.0
Sand, slightly silty, mostly very fine to medium, many hackberry seeds.....	297.0	305.0
Sandstone, slightly silty, mostly very fine to medium sand, very light olive-gray.....	305.0	307.8
Sandstone, silty, very light olive-gray to whitish gray; contains a limestone layer 307.8 to 308.3 ft and thin limy areas below 308.3 ft, mostly moderately to very calcareous.....	307.8	315.0
Sandstone, moderately silty, very light olive-gray, sand is very fine to medium, moderately to very calcareous, poorly indurated, some coarse sand below 330 ft.....	315.0	360.0
Limestone-marl, white.....	360.0	361.0
Sandstone, slightly silty, sand is very fine to medium, some limy areas; very calcareous 365.5 to 366.5 ft.....	361.0	366.5
Sandstone, slightly silty, sand is very fine to fine with some medium, very light olive-gray, slightly calcareous, contains some rootlets.....	366.5	370.0
Silt, moderately clayey, slightly to moderately sandy, sand is very fine to fine with a trace of medium sand, very light greenish gray.....	370.0	375.5
Silt, moderately to very clayey, whitish gray, very calcareous; very clayey below 377 ft.....	375.5	378.0
Silt, moderately to in part slightly clayey, slightly sandy, sand is mostly very fine, light olive-gray, contains some limy areas; moderately to very clayey below 380 ft, slightly calcareous.....	378.0	382.5

Cretaceous System - Upper Cretaceous Series - Montana Group:

Pierre Formation:

Shale, clayey, very light gray and brown-yellow, some bentonite, noncalcareous to moderately calcareous.....	382.5	384.0
Shale, clayey, light gray, moderately calcareous; light medium gray 385 to 386 ft; mottled light medium gray and yellow brown 386 to 386.5 ft.....	384.0	386.5
Shale, clayey, medium dark gray, moderately to very calcareous; mostly medium gray below 390 ft.....	386.5	420.0

11-15-36dcdd
39-A-54
Buffalo County

Location: SE SE SW SE sec. 36-11N-15W, approximately 30 ft N and 1650 ft W of SE cor sec
 Ground elevation: 2235 ft (t) Buckeye Valley 7.5 minute quadrangle
 Depth to water: 133.9 ft (8/24/54)
 Electric log

	<u>Depth, in feet</u>	
	From	To
Quaternary System, undifferentiated:		
Silt, slightly clayey, dark gray; very dark brown-gray below 1.5 ft.....	0.0	2.5
Silt, moderately clayey, medium dark brown-gray; slightly clayey below 4 ft, medium brown-gray.....	2.5	5.0
Silt, slightly clayey, light to medium brown-gray, slightly calcareous, contains limy nodules.....	5.0	13.0
Silt, slightly clayey, light medium yellow-gray; slightly granular structure 19 to 20 ft; very slightly calcareous, contains a few snail shells below 23 ft; light medium brownish gray below 28.5 ft; noncalcareous below 30 ft.....	13.0	31.5
Silt, slightly clayey, dark brown-gray; medium dark brown-gray below 33.5 ft.....	31.5	34.5
Silt, moderately clayey, medium dark brown; medium brown below 36.5 ft; moderately to very clayey 37.8 to 39 ft and moderately clayey below 39 ft...	34.5	40.0
Silt, slightly clayey, medium brown; slightly to moderately clayey 50 to 53 ft; slightly calcareous below 53 ft, light brown; contains limy nodules below 65 ft.....	40.0	69.0
Silt, slightly clayey, medium brown.....	69.0	71.0
Silt, very clayey, medium brown, slightly less clayey 72.5 to 74 ft.....	71.0	77.0
Silt, slightly to moderately clayey, medium brown, slightly calcareous, contains limy areas; contains a few limy nodules 77 to 80 ft, slightly clayey; contains a few limy nodules in intervals 85 to 88.5 ft and 90 to 91.5 ft, very calcareous 90 to 91.5 ft; marl 97 to 99 ft, very light brown.....	77.0	99.0
Silt, slightly clayey, very slightly sandy, sand is fine to coarse, light medium brown, slightly calcareous.....	99.0	103.1
Sand, a little gravel, gravel is fine, 15 percent gravel.....	103.1	110.0
Sand and gravel, gravel is fine with some medium, 40 to 45 percent gravel.....	110.0	120.5

Tertiary System - Miocene Series - Ogallala Group:

Silt, slightly clayey, moderately sandy, sand is very fine to medium, light brown; moderately clayey 125 to 127 ft; very sandy 127 to 129 ft....	120.5	129.0
Sand, very silty, sand is very fine to medium with a trace of coarse.....	129.0	130.1
Clay, very silty, slightly sandy, sand is very fine to fine, light olive-gray.....	130.1	135.0
Silt, moderately clayey, slightly sandy, sand is very fine to fine, very light olive-gray; contains a limestone layer 136 to 138 ft.....	135.0	140.0
Silt, very clayey, moderately sandy, sand is very fine to fine, rare coarse sand grains.....	140.0	142.0
Silt, moderately clayey, moderately sandy, sand is very fine to fine, very light olive-gray, slightly calcareous, contains limy nodules; very sandy below 144 ft.....	142.0	145.0
Siltstone, slightly to moderately sandy, sand is very fine to fine, very light olive-gray, slightly calcareous; very sandy below 148 ft.....	145.0	150.0
Sandstone, very fine to medium with some coarse to very coarse sand, slightly calcareous, poorly indurated.....	150.0	153.5
Silt, slightly clayey, moderately sandy, sand is mostly very fine to fine, light olive-gray; very sandy below 156.5 ft.....	153.5	157.0
Sand, very fine to very coarse, a little fine to medium gravel, some fine to medium gravel below 160 ft, silt layer 164.8 to 165 ft; 25 percent gravel below 165 ft.....	157.0	170.5
Sandstone and sandy silt, interbedded, sand is very fine to fine, very light olive-gray, slightly calcareous, contains some white limy areas.....	170.5	172.5
Siltstone, light olive-gray, slightly calcareous....	172.5	174.2
Sandstone, slightly silty and sandy siltstone, sand is very fine to medium, light olive-gray, slightly calcareous.....	174.2	177.0
Sand, very fine to medium, some coarse to very coarse, slightly calcareous, poorly indurated; contains white marly siltstone layer 184.8 to 186 ft.....	177.0	189.0
Sandstone, very silty, sand is very fine to fine, very light gray, slightly calcareous; some medium sand below 190 ft.....	189.0	192.7
Silt, slightly clayey, slightly sandy, sand is very fine to medium, very light gray, slightly calcareous.....	192.7	194.5
Sandstone, slightly to moderately silty, sand is very fine to medium, light medium brown, slightly calcareous.....	194.5	195.0

Siltstone-sandstone, sand is very fine to fine, medium brown, some seeds.....	195.0	198.0
Silt, very clayey, light brown, limy area in lower part.....	198.0	200.0
Silt, fine to very coarse grained, light medium brown, contains limy nodular areas and a sandy limestone layer 202.3 to 202.5 ft.....	200.0	202.5
Sand, very fine to medium with a trace of coarse, light brown, slightly calcareous, slightly indurated; sand is very fine to coarse below 205 ft.....	202.5	210.7
Clay, silty, light medium brown, slightly calcareous.....	210.7	211.7
Sandstone, sand is very fine to medium, light brown, slightly calcareous; moderately silty below 215 ft, sand is mostly very fine to fine.....	211.7	220.0
Siltstone, slightly sandy, sand is very fine to fine, very light brown, slightly calcareous.....	220.0	226.5
Silt, slightly clayey, very sandy, sand is very fine to fine, light pinkish gray, slightly calcareous, many seeds 230 to 235 ft; moderately calcareous below 239 ft; mottled very light brown and very light gray below 240 ft; mostly very light gray to whitish gray below 243.5 ft, in part very calcareous.....	226.5	248.5
Sandstone, sand is very fine to fine with some medium.....	248.5	251.0
Sandstone, very silty, sand is very fine to fine, light brown, slightly calcareous.....	251.0	258.0
Silt, slightly clayey, very sandy, sand is very fine to fine with some medium, very light brown; slightly indurated below 260 ft.....	258.0	261.5
Silt, slightly clayey, slightly sandy, sand is very fine to medium, very light brown-gray.....	261.5	265.0
Interbedded silty sand and sandy silt, sand is very fine to medium with a trace of coarse to very coarse sand, light olive-gray; sand is very silty below 271.8 ft, sand is very fine to very coarse, slightly calcareous.....	265.0	275.0
Sand, silty, sand is very fine to medium, light olive-gray, slightly calcareous.....	275.0	278.0
Silt, slightly clayey, very sandy, sand is very fine to fine, very light olive-gray, slightly calcareous; contains some thin indurated layers below 280 ft.....	278.0	283.0
Clay, light olive-gray, slightly calcareous; silty and moderately sandy in lower part.....	283.0	287.0
Sand, very silty, sand is very fine to fine, light olive-gray.....	287.0	290.0
Silt, moderately clayey, moderately sandy, sand is very fine to fine, light olive-gray.....	290.0	292.0

Silt, very sandy, very coarse silt to very fine sand, light olive-gray; possibly a volcanic ash 295 to 299.5 ft.....	292.0	299.5
Clay, silty, slightly clayey, noncalcareous at top, very calcareous and marly 300 to 302.5 ft, contains very fine to fine sand.....	299.5	302.5
Sand, very fine, some coarse silt, very light gray..	302.5	305.0
Silt, slightly clayey.....	305.0	306.0
Sandstone, slightly silty, sand is very fine to fine with some medium, light olive-gray; moderately silty 309 to 310 ft; poorly indurated below 310 ft.....	306.0	316.5
Siltstone-sandstone, very sandy, sand is very fine to fine, marly, whitish gray, moderately to very calcareous; slightly sandy below 317.5 ft.....	316.5	320.5
Silt, slightly clayey, slightly sandy, sand is very fine, contains limy areas, very calcareous; very sandy below 233 ft.....	320.5	323.5
Sand, very fine to medium, trace of coarse, slightly calcareous.....	323.5	329.0
Silt, moderately clayey, slightly sandy, sand is very fine to medium, light olive-gray, slightly calcareous.....	329.0	329.5
Sand, very fine to fine, some medium, slightly calcareous; very silty below 332.4 ft, a little coarse sand.....	329.5	333.0
Sand, very fine to medium, some coarse; mostly very fine to fine sand 340 to 346 ft.....	333.0	346.0
Sand, moderately silty, sand is very fine to fine with a trace of medium, light olive-gray, slightly calcareous, slightly clayey in upper foot; slightly indurated below 350 ft.....	346.0	355.0
Sand, very fine to medium, very light olive-gray, slightly calcareous, slightly indurated.....	355.0	365.0
Sand, very fine to fine, slightly calcareous, a little medium sand.....	365.0	368.7
Sand, moderately silty, sand is very fine to fine, light olive-gray; slightly silty, slightly indurated below 370.5 ft, slightly calcareous.....	368.7	374.9
Siltstone, slightly clayey, marly, whitish gray, very calcareous.....	374.9	380.0
Silt, moderately clayey, slightly sandy, sand is very fine to fine, very light gray, moderately calcareous; slightly clayey below 385 ft, contains limy nodules.....	380.0	387.0
Silt, very clayey, very slightly sandy, sand is very fine to fine, very light olive-gray, slightly calcareous, contains limy nodular zones.....	387.0	394.0
Silt, moderately clayey, moderately sandy, sand is mostly very fine, very light olive-gray; very clayey, slightly sandy 394.6 to 395 ft.....	394.0	399.0

Silt, moderately clayey, very sandy, sand is mostly very fine, very light olive-gray.....	399.0	404.0
Silt, very clayey, contains a trace of sand, very light olive-gray, limy nodules 404.8 to 405.2 ft, slightly sandy below 409 ft; moderately to very sandy below 410 ft.....	404.0	411.0
Sand, fine to very coarse, slightly calcareous, common lithic grains.....	411.0	411.7
Cretaceous System - Upper Cretaceous Series - Montana Group:		
Pierre Formation:		
Shale, very clayey, white, very calcareous; light olive-gray with some yellow-brown below 415 ft, moderately calcareous below 416 ft.....	411.7	425.0
Shale, clay, mottled very light gray, very light yellow-gray and a little yellow-brown, moderately calcareous.....	425.0	435.0
Shale, clay, light and light medium gray, moderately calcareous.....	435.0	443.5
Shale, medium gray, moderately calcareous.....	443.5	450.0

**11-16-5bbbc
49-A-54
Buffalo County**

Location: SW NW NW NW sec 5-11N-16W, 556 ft S and 20 ft E of NW cor
sec
Ground elevation: 2118 ft (t) Pleasanton NW 7.5 minute quadrangle
Depth to water: 14.2 ft (9/15/54)
Electric log

	<u>Depth, in feet</u>	
	From	To
Quaternary System, undifferentiated:		
Silt, slightly clayey, moderately sandy, sand is very fine to fine, light brown gray.....	0.0	0.7
Sand, very slightly silty, sand is very fine to fine with some medium, very light brown-gray.....	0.7	2.0
Silt, moderately sandy, very fine to fine in upper part, very fine to medium in lower, medium dark brown-gray.....	2.0	3.0
Sand, moderately silty, sand is very fine to fine with some medium, yellow-gray.....	3.0	4.0
Sand, fine to very coarse, contains 5 percent fine gravel; contains some shell fragments; in part moderately silty below 6 ft.....	4.0	8.3
Silt, moderately clayey, moderately sandy, sand is very fine to fine with some medium; very sandy below 8.8 ft.....	8.3	9.5
Sand, very slightly silty, sand is very fine to medium with a trace of coarse.....	9.5	10.0
Sand, fine to coarse, rare gravel grains.....	10.0	12.0
Tertiary System - Miocene Series - Ogallala Group:		
Sandstone, moderately silty, sand mostly very fine to fine, light medium olive-gray; very light greenish gray below 13.5 ft; sand is very fine to medium 15 to 18 ft, contains rootlets; less indurated below 16.5 ft; mostly very fine to fine sand below 18 ft.....	12.0	20.8
Sand, very silty, mostly very fine sand, light olive-gray; slightly indurated below 22 ft, light greenish gray, blue tint.....	20.8	23.7
Sandstone, very slightly silty, sand is very fine to fine with a little medium, light olive-gray, contains rootlets and hackberry seeds; sand is very fine to medium, slightly indurated below 30 ft.....	23.7	35.5
Sandstone, moderately silty, sand is very fine to fine, some medium, very light to whitish gray, moderately calcareous; very calcareous below 37.5 ft.....	35.5	39.0

Sandstone, very slightly silty, sand is very fine to fine, some medium, light gray, a few limy areas; some limy areas and cementation 40 to 41.5 ft, in part very calcareous below 41.5 ft.....	39.0	43.0
Sandstone, slightly silty, sand is very fine to fine, some medium.....	43.0	44.5
Siltstone, moderately sandy, sand is fine grained, very light yellow-gray, moderately calcareous, common rootlets.....	44.5	46.8
Siltstone, slightly to moderately sandy, sand is very fine to fine, some medium, white to very light yellow-gray, very calcareous in upper foot, moderately calcareous below, very light yellow-gray to brownish gray, a few rootlets.....	46.8	50.6
Silt, very sandy and silty sand, interbedded, sand is very fine to medium, in part slightly clayey, common indurated limy areas.....	50.6	55.0
Sandstone, slightly silty, slightly clayey in upper 1.5 ft, sand is very fine to medium, very light gray and light brownish gray, moderately calcareous; some interbedded light brown siltstone in lower 2 feet.....	55.0	65.0
Sand, very fine to medium, slightly calcareous, slight induration.....	65.0	67.8
Sandstone, moderately silty, sand is very fine to fine, some medium, very light brown in upper few inches, noncalcareous; moderately calcareous below with white limy areas.....	67.8	72.0
Sandstone, moderately to very silty, sand is very fine to medium, white to very light brown-gray, very calcareous.....	72.0	75.0
Siltstone, in part moderately sandy, sand is very fine to fine, white, very calcareous, moderately well indurated 75 to 76 ft.....	75.0	80.0
Silt, very sandy, sand is very fine to fine, some medium, very light yellow-gray, slightly calcareous, slightly indurated.....	80.0	82.0
Sandstone, very fine to fine, some medium sand, very light olive-gray; sand is very fine to medium below 85 ft.....	82.0	87.0
Silt, slightly clayey, very sandy, sand is very fine to fine, some medium, very light yellow-gray.....	87.0	90.0
Sand, moderately silty, sand is very fine to medium, contains a few rootlets; slightly silty below 95 ft.....	90.0	99.0
Sand, slightly clayey, very silty, sand is very fine to medium.....	99.0	100.0
Sand, slightly silty, sand is very fine to medium; slight induration; slightly more silty below 115 ft.....	100.0	119.2
Silt, moderately clayey, very sandy, sand is very fine to medium; slightly clayey below 124 ft.....	119.2	125.0

Sand, moderately silty, sand is very fine to medium with a trace of coarse, slightly indurated; contains a sandy siltstone layer 128.5 to 130 ft; moderately silty 130 to 132 ft; very silty, slightly clayey 132 to 133.5 ft; sand is very fine to medium below 133.5 ft.....	125.0	135.0
Sand, fine to coarse.....	135.0	138.2
Silt, moderately clayey, very light yellow- to olive-gray.....	138.2	140.0
Sand, moderately silty, sand is very fine to medium, some coarse; slightly silty below 142 ft, slight induration.....	140.0	148.0
Sandstone, slightly to moderately silty, sand is very fine to medium, trace of coarse; mostly very fine to medium 150 to 155 ft, poorly indurated; a little coarse sand and rare coarser grains below 155 ft.....	148.0	157.0
Volcanic ash, very light gray, in part slightly sandy.....	157.0	162.0
Sandstone, sand is very fine to fine grading to very fine to medium.....	162.0	165.0
Sand, very fine to medium, a little coarse.....	165.0	167.0
Silt, slightly clayey, very sandy, sand is very fine to medium.....	167.0	170.0
Sand, slightly to moderately silty, sand is very fine to medium.....	170.0	175.0
Sandstone, sand is very fine to medium, very light brown, poorly indurated; much medium sand below 180 ft.....	175.0	183.8
Silt, very sandy, sand is very fine to fine, some medium; slightly indurated below 185 ft, contains rootlets.....	183.8	190.0
Sandstone, very fine to medium sand, very light brown, contains rootlets; some limy areas below 195 ft; slightly silty, moderately calcareous below 197.5 ft, rootlets common.....	190.0	217.0
Silt, moderately clayey, slightly sandy, white, very calcareous; marly, very slightly sandy 218 to 220 ft; very calcareous silty sandstone layer 220 to 220.8 ft; siltstone and marl below 220.8 ft.....	217.0	223.0
Sandstone, very fine to medium sand, moderately calcareous.....	223.0	227.5
Sandstone, very fine to medium, some coarse sand; slightly calcareous to 230 ft; mostly very fine to fine, some medium sand below 235 ft, slight induration.....	227.5	243.0
Silt, slightly clayey, sand is very fine to fine, some medium, very light olive-gray.....	243.0	245.0
Sand, very fine to medium, some coarse, slight induration.....	245.0	249.0
Silt, moderately clayey, marly, very calcareous, slight to moderate induration.....	249.0	251.3

Silt, moderately to very clayey, interbedded with some siltstone-sandstone layers, sand is very fine to fine, very light greenish gray.....	251.3	255.0
Sand, silty, very fine to medium, some lithic clay grains.....	255.0	257.0
Cretaceous System - Upper Cretaceous Series - Montana Group:		
Pierre Formation:		
Shale, clay, mottled light medium gray, brown-yellow and light olive-gray, noncalcareous; a little dark gray below 265.5 ft.....	257.0	268.5
Shale, clay, dark gray to black; a little brown-yellow and ironstone 280.3 to 280.5 ft; aragonite fragments 295 to 295.2 ft.....	268.5	300.0

**11-16-15dada
21-B-47
Buffalo County**

Location: NE SE NE SE sec 15-11N-16W, approximately 1830 ft N and 10 ft W of SE cor sec

Ground elevation: (?)2155.1 ft (i) or 2162 ft (t) Pleasanton 7.5 minute quadrangle

Depth to water: 30.3 ft (7/17/47)

Depth, in feet
From To

Quaternary System, undifferentiated:

Road fill and silt, slightly clayey, dark brown-gray.....	0.0	1.5
Silt, slightly clayey, slightly sandy, sand is very fine to fine, very dark brown-gray; moderately clayey below 4.5 ft.....	1.5	6.0
Silt, very clayey, light brown-gray; moderately clayey below 8 ft.....	6.0	10.5
Silt, very clayey, whitish gray, very calcareous, common snail shells in upper part, some limonitic fragments; common yellow stain and limonitic fragments below 15 ft.....	10.5	17.5
Sand, fine to coarse, a little very coarse, very light brown-gray with some pink; some fine gravel below 25 ft.....	17.5	30.5
Silt, slightly clayey, slightly peaty, light medium gray, moderately calcareous, some wood fragments, snail and pelecypod shells; moderately to highly calcareous below 40 ft; peat common below 47.5 ft, in part dark gray.....	30.5	50.0
Silt, clayey, in part sandy, sand is very fine to fine, light gray, very slightly calcareous; rare snail shells in upper part; slightly clayey, moderately sandy below 55 ft.....	50.0	60.0
Sand, slightly silty, fine to very coarse, light medium gray with pink and green silicates.....	60.0	64.0
Sand and gravel, gravel mostly fine to medium, common pink and green silicates, a few lithic sandstone grains; a few pebbles below 70 ft.....	64.0	77.5

Tertiary System - Miocene Series - Ogallala Group:

Sandstone, sand is very fine to fine, light greenish gray, moderately well indurated, a few siliceous rootlets; some interbedded clay to sandy silt 80 to 82 ft; a little medium sand 82 to 86 ft.....	77.5	90.0
Siltstone-sandstone, sand is fine-grained, brownish to greenish gray, intermittently hard and soft; contains thin limy indurated areas; a few rootlets below 95 ft.....	90.0	100.0

Siltstone, slightly to very sandy, very fine to fine sand, whitish gray, very calcareous; contains a little medium sand below 105 ft; moderately calcareous below 116 ft, thin hard zones.....	100.0	123.0
Silt, sandy to clayey, light greenish gray, highly calcareous, some thin sandstone and limy layers...	123.0	135.0
Sandstone, sand is very fine to medium, very light olive-gray, some thin hard limy areas to 140 ft; noncalcareous 140 to 148 ft, a few rootlets and seeds.....	135.0	148.0
Sand, silty, slightly clayey, sand is fine to medium with a little coarse, very light gray, in part calcareous.....	148.0	150.0
Sandstone, sand is very fine to medium with some coarse, poorly indurated; light olive- to brown-gray; contains some limy areas below 150 ft; moderately calcareous below 160 ft, well indurated with a sandy limestone layer 162 to 167.5 ft.....	150.0	162.5
Sandstone, silty, whitish gray, very calcareous, poorly indurated.....	162.5	165.0
Clay, silty, olive to greenish gray with some whitish gray, mostly very calcareous.....	165.0	169.0
Sand, fine to medium, slightly silty below 175 ft, contains a trace of very coarse sand.....	169.0	180.0
Sandstone, very fine medium sand, light brown-gray, poorly indurated, moderately calcareous, a few rootlets.....	180.0	190.0
Sand, in part silty, fine to medium with a little coarse sand, light brown- to olive-gray.....	190.0	200.0
Sand, fine to medium, some coarse and a trace of very coarse, much coarse sand below 210 ft; in part silty 212 to 220 ft; some very coarse sand and trace of fine gravel 215 to 220 ft.....	200.0	225.0
Sand, very fine to medium, a little coarse, slight induration; contains a few siliceous rootlets 230 to 240 ft; some coarse sand below 235 ft, a few dark gray grains.....	225.0	247.5
Sandstone, sand is very fine to medium, light brownish gray, very calcareous, a few rootlets; only slightly calcareous below 225 ft but with thin hard limy layers.....	247.5	260.0
Cretaceous System - Upper Cretaceous Series - Montana Group:		
Pierre Formation:		
Shale, clay, light olive gray, blocky; a thin hard limy nodule or layer at 263 ft; some yellow-brown below 265 ft.....	260.0	267.0
Shale, clay, light gray, some medium gray, common yellow-brown; contains limonitic fragments.....	267.0	287.0

Shale, clay, slightly silty, dark gray, noncalcareous; contains thin limonitic seams; some bentonite in interval 295 to 300 ft; thin hard dark brown-gray carbonate layer 305 to 306.5 ft, very calcareous; shale below 306.5 ft is slightly calcareous..... 287.0 310.0

**11-16-18dddd
48-A-54
Buffalo County**

Location: SE SE SE SE sec 18-11N-16W, 66 ft N and 18 ft W of SE
cor sec

Ground elevation: 2252 ft (t) Pleasanton NW 7.5 minute quadrangle

Depth to water: Unknown, hole caved at 115.4 ft (9/14/54)

Electric log

	<u>Depth, in feet</u>	
	From	To
Quaternary System, undifferentiated:		
Silt, very clayey, light medium yellow-gray.....	0.0	1.5
Silt, slightly clayey, light medium yellow-gray, very slightly calcareous, common limy nodules; a few limy nodules below 5 ft.....	1.5	7.0
Silt, slightly clayey, light yellow-gray, slightly calcareous, common snail shells 7 to 18 ft; in part noncalcareous 18 to 20 ft; slightly more clayey, light brownish to yellowish gray below 29 ft; noncalcareous below 30 ft.....	7.0	32.0
Silt, moderately clayey, dark brown; medium brown 34 to 35 ft, slightly more clayey.....	32.0	35.0
Silt, moderately clayey, light medium brown; medium brown to brownish gray 40.5 to 41.5 ft, contains rare limy nodules.....	35.0	44.0
Silt, very clayey, light medium brown.....	44.0	44.5
Silt, moderately clayey, moderately sandy, sand is very fine to fine with a little medium sand, light medium brown; slightly more sand below 48 ft.....	44.5	50.0
Silt, moderately clayey, slightly sandy, sand is very fine to fine with some medium, light medium brown; only a trace of sand below 51 ft.....	50.0	52.2
Silt, moderately clayey, very light brown and white, contains limy areas and large limy nodules.....	52.2	53.4
Silt, slightly clayey, slightly sandy, sand is very fine to fine, light brown, slightly calcareous; moderately sandy below 55 ft, contains very fine to medium sand and a trace of coarse sand and gravel.....	53.4	58.0
Tertiary System - Miocene Series - Ogallala Group:		
Sandstone, silty, sand is very fine to fine with a little medium sand and rare coarse grains, very light yellow-gray, contains rare root holes and a few large volcanic ash shards, weakly indurated.	58.0	59.0

Sandstone, silty, sand is very fine to medium with rare coarse grains, light reddish-brown, contains a few limy areas, weakly indurated, clay binder; sand is mostly very fine to fine with some medium 60 to 65 ft; sand is mostly very fine to fine below 65 ft, contains a trace of rootlets and a shell or seed fragment, in part moderately well indurated.....	59.0	70.0
Silt, slightly clayey, moderately sandy, sand is very fine to fine, whitish to very light brown, moderately to very calcareous, slightly indurated with some thin well indurated cuttings, contains a few rootlets and root holes, a few seed fragments noted in field log.....	70.0	75.5
Silt, slightly to moderately clayey, moderately to very sandy, sand is principally very fine with a little fine to medium, light reddish brown, contains a few limy areas, slightly indurated; moderately clayey 77 to 78.5 ft, sand is mostly very fine to fine; contains scattered coarse to very coarse sand below 80 ft, noncalcareous.....	75.5	82.5
Siltstone, slightly to moderately sandy, sand is mostly very fine, contains scattered fine to coarse sand, very calcareous, well indurated.....	82.5	83.5
Siltstone-sandstone, slightly clayey, sand is very fine to fine, contains a trace of coarser grains of medium sand to fine gravel, light olive-gray, slightly calcareous; light yellow-brown below 85.2 ft, contains a few rootlets; moderately to very calcareous 86 to 87 ft, moderately well indurated.....	83.5	87.0
Sand, very silty, slightly clayey, sand is mostly very fine, contains some fine to medium sand, light brownish to light olive-gray.....	87.0	88.0
Sand, very fine to medium with 10 percent coarse to very coarse sand and a trace of gravel; 10 percent very coarse sand and gravel 90 to 95 ft, some limy cementation.....	88.0	95.0
Sand and gravel, gravel is fine with some medium, granitic, some metamorphics, 20 percent gravel; approximately 40 percent gravel below 105 ft.....	95.0	123.5
Sand, very silty, sand is very fine to fine, light yellow-brown.....	123.5	127.0
Silt, slightly clayey, very sandy, sand is mostly very fine to fine, white and very light brown, moderately to very calcareous, contains marly areas; very calcareous and well indurated below 130 ft.....	127.0	130.8
Silt, slightly to moderately clayey, interbedded, slightly and very sandy, sand is very fine to fine, light yellow-brown, slightly calcareous.....	130.8	136.4

Siltstone, slightly sandy, principally very fine sand, silt is coarse, white, very calcareous.....	136.4	138.0
Sand, fine to coarse, some very coarse, slightly calcareous; sand is fine to very coarse below 140 ft; contains thin silt layers in lower few feet and a trace of fine gravel.....	138.0	149.0
Sandstone, slightly silty, sand is very fine to fine, light olive-gray; moderately silty below 150 ft.....	149.0	153.0
Silt, very clayey, slightly sandy, sand is very fine to fine, very light olive-gray, moderately sandy in lower foot.....	153.0	155.0
Sandstone, moderately silty, sand is very fine to fine, light olive-gray; some interbedded slightly clayey layers in upper 2 ft; contains a few rootlets and seeds below 157 ft; very light brown in lower 2 ft.....	155.0	165.0
Siltstone, slightly to moderately sandy, white to very light olive-gray, moderately calcareous, moderately well indurated below 168.6 ft.....	165.0	170.0
Sandstone, sand is very fine to medium with some coarse and a trace of very coarse, contains common white limy areas, a few rootlets.....	170.0	175.0
Siltstone-sandstone, mostly fine grained, very light olive-gray, moderately calcareous; sandstone is fine grained below 180 ft.....	175.0	181.5
Sandstone, slightly silty, sand is very fine to medium, very light brownish gray, slightly calcareous.....	181.5	184.0
Silt, slightly clayey, marly, very calcareous.....	184.0	185.5
Sandstone, silty, sand is very fine to fine with a little medium.....	185.5	189.0
Siltstone, slightly clayey, slightly sandy, fine grained, whitish gray, moderately to in part very calcareous; very sandy 190 to 191.4 ft; very calcareous below 191.4 ft.....	189.0	192.0
Silt, moderately clayey, moderately sandy, sand is very fine to fine with a little medium, very light olive-gray, moderately calcareous; noncalcareous below 197 ft.....	192.0	200.0
Silt, slightly clayey, very sandy, sand is very fine to fine with some medium, very light olive-gray; some limy cementation below 205 ft.....	200.0	209.0
Siltstone, moderately sandy, fine grained, white to very light brown, very calcareous.....	209.0	210.0
Sandstone, slightly silty, sand is very fine to fine, light olive-gray, contains traces of white limy areas; contains some interbedded slightly clayey to sandy silt below 216 ft, contains a few seeds.....	210.0	219.0

Sandstone, slightly silty, sand is very fine to fine with some medium, moderately calcareous; common white limy areas, slightly calcareous and very slightly silty below 223 ft.....	219.0	227.0
Sand, very silty, sand is very fine to fine with some medium, moderately calcareous, slight induration; slightly calcareous below 230 ft.....	227.0	235.0
Sand, slightly silty, sand is fine to coarse, slightly calcareous, slight induration.....	235.0	244.0
Silt, moderately clayey, moderately sandy, sand is very fine to fine with some medium, very light greenish gray; very sandy below 245 ft, sand is very fine to medium.....	244.0	250.0
Sand, very silty, sand is very fine to medium with a trace of coarse.....	250.0	252.5
Sand, very fine to medium with a trace of coarse, very slight induration; sand is fine to coarse below 260 ft; slight induration below 265 ft.....	252.5	268.5
Silt, slightly to moderately clayey, very light olive-gray, slight induration.....	268.5	270.0
Siltstone, slightly clayey, slightly to in part very sandy, sand is very fine to fine, light olive-gray; very sandy below 278 ft, sand is very fine to medium.....	270.0	280.0
Sand, moderately silty, sand is fine to coarse, very light olive-gray; slightly silty, slightly indurated below 285 ft, contains a few rootlets...	280.0	290.0
Sand, medium to coarse with a little very coarse, dark speckling.....	290.0	295.8
Silt, moderately clayey, contains some very fine to fine sand, very light greenish gray, slightly indurated.....	295.8	299.5
Silt, very slightly clayey, moderately sandy, mostly very fine sand, light olive-gray; common seeds below 300 ft.....	299.5	301.5
Sand, very fine to medium, very light brownish gray, pink and dark speckling; contains trace of coarse sand 315 to 320 ft; contains common lithic clay grains below 320 ft.....	301.5	332.5
Sandstone, slightly silty, sand is very fine to medium, slightly indurated; moderately indurated below 340 ft.....	332.5	343.0
Siltstone, moderately sandy, sand is mostly very fine to fine, very light greenish gray and white, moderately to very calcareous; some clayey silt below 345 ft.....	343.0	346.8
Sand, very fine to medium, contains some silty layers, slightly calcareous; slightly indurated below 350 ft.....	346.8	360.0

Siltstone, slightly clayey, some very fine grained silty sandstone, white to very light olive-gray, moderately calcareous; slightly calcareous below 365 ft, light greenish gray.....	360.0	366.0
Sand, very fine to medium, much fine to medium, contains some thin silty layers.....	366.0	377.0
Clay, silty, contains a trace of sand, very light gray below 381 ft; slightly sandy below 384 ft, sand is very fine to medium, medium yellow-gray...	377.0	385.5
Cretaceous System - Upper Cretaceous Series - Montana Group:		
Pierre Formation:		
Shale, clay, mottled medium yellow and brown-gray, noncalcareous.....	385.5	389.0
Shale, clay, dark gray to black, noncalcareous.....	389.0	410.0

11-16-31cccc
USBR Mid-State Division (Profile 6)
Buffalo County

Location: SW SW SW SW sec 31-11N-16W, 30 ft N and 17 ft E of SE cor
 sec

Ground elevation: 2328.7 ft (i) Riverdale 7.5 minute quadrangle

Depth to water: Not obtained

Compiled from sample descriptions F.A. Smith and V.H.

Dreeszen and interpretation of USBR geologic and field logs

	<u>Depth, in feet</u>	
	From	To
Quaternary System, undifferentiated:		
Clay, silty, dark brown-gray.....	0.0	1.5
Silt, moderately clayey, very slightly sandy, sand is very fine, very light gray, slightly calcareous, some concentration of lime in upper foot; slightly clayey below approximately 4 ft.....	1.5	10.3
Silt, slightly clayey, slightly sandy, sand is very fine, light olive-gray; contains slightly more sand below 13.6 ft.....	10.3	28.8
Silt, moderately clayey, very slightly sandy, light brown-gray and light brown, slightly calcareous...	28.8	30.3
Silt, moderately clayey, very slightly sandy, sand is very fine, silt is coarse, dark brown-gray; in part very clayey.....	30.3	33.6
Silt, moderately clayey, moderately sandy, sand is very fine to medium, light brown-gray.....	33.6	37.5
Silt, very clayey, in part slightly sandy, sand is mostly very fine, light brown.....	37.5	50.3
Silt, moderately clayey, slightly sandy, sand is very fine to fine, light medium brown at top of interval, light brown in lower part.....	50.3	53.6
Silt, moderately clayey, light medium brown.....	53.6	60.3
Silt, very clayey, medium brown, contains a trace of limy areas.....	60.3	64.0
Silt, moderately clayey, slightly sandy, sand is very fine to fine, light medium brown; mostly light brown 70.3 to 80 ft.....	64.0	83.6
Silt, moderately clayey, moderately sandy, sand is mostly very fine to fine, light medium brown; slightly clayey below 87 ft, very light brown; very light brown-gray below 100.3 ft; slightly more sand below 120.3 ft, a little medium sand....	83.6	140.3
Silt, slightly clayey, moderately sandy, sand is very fine with some fine, very light brown-gray; very sandy 141.3 to 144.6 ft, sand is very fine to fine with a trace of medium.....	140.3	172.7

Silt, moderately to very clayey, very slightly sandy, sand is very fine to fine with a trace of coarser grains, very light brown and very light brown-gray; slightly sandy in lower foot, contains a few gravel grains, some limy cementation.....	172.7	175.5
Tertiary System - Miocene Series - Ogallala Group:		
Silt, slightly to moderately clayey, very sandy, sand is very fine to fine, some medium, very light olive-gray, trace of limy areas; moderately clayey below 180 ft.....	175.5	190.3
No sample available, logged as silty sand.....	190.3	200.3
Sand, slightly silty, sand is very fine to medium, much fine to medium sand, very light olive-gray; very calcareous white layer 201.3 to 201.5 ft.....	200.3	210.3
Sand, very silty, in part slightly clayey, sand is mostly very fine to fine, light olive-gray; some medium sand below 220 ft.....	210.3	230.3
Silt, very clayey, very light green-gray, granular to blocky structure; lower part is a slightly clayey to moderately sandy silt, sand is very fine.....	230.3	231.3
Sand, slightly silty, sand is mostly very fine, some granular claystone in lower part of interval, light green-gray.....	231.3	234.5
Silt, slightly clayey, slightly sandy, sand is very fine, silt is coarse, very light olive-gray.....	234.5	237.0
Sand, slightly to in part moderately silty, sand is very fine to fine, some medium, very light olive-gray.....	237.0	240.3
Silt, slightly to moderately clayey, moderately to very sandy, sand is mostly very fine to fine, very light olive-gray, some limy areas, slightly indurated.....	240.3	250.3
Silt, in part clayey and sandy, light olive-gray; some light brown silty clay and sandstone in interval.....	250.3	265.0
Sand, very silty, sand is very fine to medium.....	265.0	270.3
Sand, slightly silty, sand is very fine to medium, slightly clayey below 272 ft, moderately calcareous.....	270.3	273.4
Sand, slightly clayey, moderately silty, sand is very fine to fine, some medium, very light olive-gray, moderately calcareous; slight induration below 280 ft.....	273.4	290.3
Sand, slightly silty, sand is very fine to fine, some medium; slightly to moderately silty 300 to 310.3 ft.....	290.3	310.3
Sand, very slightly silty, sand is very fine to medium; some sandy silt layers 320 to 330 ft; some medium to coarse sand below 330 ft.....	310.3	340.3

Sand, slightly clayey, moderately silty, sand is very fine to medium, very light green-gray; slightly less clay and silt below 350.3 ft.....	340.3	370.3
Sand, very slightly clayey, moderately silty, sand is very fine to fine, some medium, light yellow, contains soft limy streaks.....	370.3	372.7
Sand, slightly silty, sand is very fine to medium, trace of coarse; some limy cementation below 376.5 ft.....	372.7	396.0
Sand, slightly clayey, moderately silty, sand is very fine to fine, very light gray, moderately calcareous.....	396.0	405.0
Cretaceous System - Upper Cretaceous Series - Montana Group:		
Pierre Formation:		
Shale, clay, yellow and yellow-brown, moderately calcareous; much light gray 410 to 420.3 ft.....	405.0	420.3
Shale, clay, dark gray, noncalcareous.....	420.3	430.3

**11-16-31dadd
22-B-47
Buffalo County**

Location: SE SE NE SE sec 31-11N-16W, approximately 1560 ft N and
8 ft W of SE cor sec
Ground elevation: 2304.3 ft (i) Pleasanton NW 7.5 minute quadrangle
Depth to water: 143.1 ft (7/17/47)

	<u>Depth, in feet</u>	
	From	To
Quaternary System, undifferentiated:		
Silt, slightly clayey, dark brownish gray.....	0.0	1.5
Silt, moderately to very clayey, dark gray-brown....	1.5	3.5
Silt, slightly clayey, light yellow-brown.....	3.5	4.5
Silt, very slightly clayey, slightly sandy, mostly very fine sand, silt is coarse, light yellow-gray, slight yellow stain in upper part; contains limy nodules and a few snail shells below 10 ft.....	4.5	16.0
Silt, light yellow-gray, light to very light yellow- gray, slight yellow stain, very slightly calcar- eous.....	16.0	28.0
Silt, moderately clayey, light yellow- to brown- gray.....	28.0	32.0
Silt, moderately clayey, dark reddish brown.....	32.0	36.0
Silt, very clayey, light brown; medium brown below 40 ft.....	36.0	43.0
Silt, moderately clayey, slightly sandy, sand mostly very fine to fine, medium reddish brown; slightly more clayey below 45 ft, light medium brown.....	43.0	50.0
Silt, slightly silty, slightly sandy, sand mostly very fine to fine, light brown, contains some limy areas and nodules; medium to very calcareous with- out limy nodules below 65 ft.....	50.0	80.0
Silt, very slightly clayey, slightly sandy, sand is very fine to fine, light brown, moderately calcar- eous, contains limy nodules; very calcareous below 95 ft; very light brownish gray below 97 ft.....	80.0	97.5
Sand and gravel, gravel is fine to coarse, pink....	97.5	102.0
Silt, very sandy, sand is very fine to fine, light brown.....	102.0	113.0
Sand and gravel, gravel is fine to medium; mostly fine gravel below 120 to 130 ft.....	113.0	138.0
Tertiary System - Miocene Series - Ogallala Group:		
Silt, very sandy, light brown-gray to olive, sand is very fine to fine with some medium, a few siliceous rootlets.....	138.0	145.0
Sandstone, sand is very fine to fine, whitish gray, very calcareous; interbedded with some noncalcar- eous sandy to clayey silt below 150 ft.....	145.0	160.0

Siltstone, sandy, light olive-gray and white, non-calcareous.....	160.0	168.0
Sand, fine to very coarse, trace of fine gravel; scattered fine to medium gravel below 170 ft.....	168.0	174.0
Clay, very light greenish gray, contains limy areas.	174.0	174.5
Sandstone, sand is very fine to fine, light brownish gray, slightly calcareous with some hard limy indurated areas, a few rootlets.....	174.5	195.0
Silt, very sandy, sand is very fine to fine with a little medium, light brown-gray to light olive-gray; in part slightly indurated; sand is very fine to medium 205 to 210 ft and very fine to coarse below 210 ft.....	195.0	216.0
Sandstone, sand is very fine to medium, whitish gray and very light brown-gray, contains limy areas and a few rootlets; some coarse sand 231 to 235 ft....	216.0	235.0
Silt, slightly clayey, whitish gray, very calcareous, some silty limestone; contains thin brown clay layers and thin limestone or nodules below 240 ft.....	235.0	245.0
Sandstone, sand is very fine to medium, very light brownish gray, very calcareous, some clay zones and nodular limy layers below 250 ft.....	245.0	260.0
Sandstone, sand is very fine to medium, light brownish gray, slightly calcareous, contains some hard limy areas and a few rootlets.....	260.0	264.5
Sand, slightly clayey, silty, sand is very fine to medium, light brownish gray to olive-gray, slightly calcareous, contains some siliceous rootlets; contains some coarse sand below 270 ft; slightly indurated below 283 ft, sand is fine to coarse....	264.5	290.0
Sand, silty, sand is very fine to medium, light brown-gray.....	290.0	299.5
Sandstone, silty, sand is mostly fine, very calcareous with some sandy limestone, whitish gray.....	299.5	304.0
Sand, fine to medium with some coarse, speckled pink and dark gray; contains thin green clay layer in interval 310 to 315 ft; mostly fine to medium sand below 320 ft; in part slightly silty below 325 ft; contains some lithic clay grains below 330 ft.....	304.0	335.0
Sand, fine to medium, with a little coarse sand and scattered very coarse sand and fine gravel.....	335.0	356.0
Silt, clayey, whitish gray, very calcareous.....	356.0	360.0
Sand, some gravel, in part silty, gravel is mostly fine, gray, pink and green, contains common limy grains.....	360.0	371.0

Cretaceous System - Upper Cretaceous Series - Montana Group:

Pierre Formation:

Shale, clay, light gray and yellow-gray, some yellow-brown, moderately calcareous.....	371.0	386.0
Shale, clay, medium gray with some dark gray, mod- erately calcareous, some bentonite 386 to 390 ft..	386.0	400.0

11-17-7bbbb
USBR Mid-State Division (Profile 5)
Buffalo County

Location: NW NW NW NW sec 7-11N-17W, 8 ft S and 48 ft E of NW cor sec
 Ground elevation: 2322.4 ft (i) Miller NE 7.5 minute quadrangle
 Depth to water: 34.4 ft (9/3/65)
 Compiled from sample examination by F.A. Smith and
 interpretation of USBR geologic and field logs

	<u>Depth, in feet</u>	
	From	To
Quaternary System, undifferentiated:		
Silt, slightly clayey, moderately sandy, sand is very fine to fine, dark brown-gray.....	0.0	4.0
Silt, slightly clayey, slightly sandy, sand is mostly very fine, pale brown, very slightly calcareous; very pale brown 20 to 26 ft; slightly lighter in color 26 to 41 ft.....	4.0	41.0
Silt, slightly clayey, very sandy, sand is very fine to medium, very light brownish gray.....	41.0	53.0
Sand, very fine to fine, some medium; sample contains some medium brown clayey silt.....	53.0	56.0
Sand, slightly gravelly, gravel is mostly fine with some medium, 10 to 15 percent gravel.....	56.0	84.0
Tertiary System - Miocene Series - Ogallala Group:		
Silt, moderately clayey, very sandy, sand is mostly very fine to medium, pale olive; pale yellow below 90 ft; some induration below 110 ft.....	84.0	120.0
Sandstone, silty, slightly clayey, sand is very fine to fine, some medium, whitish gray, very calcareous.....	120.0	130.0
Sand, slightly clayey, moderately silty, sand is very fine to fine, some medium, pale yellow; very slightly clayey, slightly silty below 152 ft; slight induration 160 to 180 ft.....	130.0	180.0
Sand, very fine to medium.....	180.0	200.0
Sandstone, sand is very fine to fine, some medium, light brown, contains rootlets, moderately well indurated; contains some coarse sand below 230 ft.	200.0	244.0
Sand, silty, marly, sand is very fine to fine, some medium, whitish gray, very calcareous.....	244.0	249.0
Sandstone, sand is very fine to fine with some medium to coarse, moderately well indurated, contains rootlets.....	249.0	271.0
Sand, slightly clayey, very silty, marly, sand is very fine to medium, moderately to very calcareous; some induration below 280 ft, contains limy grains.....	271.0	290.0
Sandstone, sand is very fine to medium, some coarse, contains rootlets.....	290.0	300.0

Silt, slightly clayey, slightly sandy, sand is mostly very fine, pale yellow.....	300.0	322.0
Sand, gravelly, gravel is fine to medium.....	322.0	326.0
Sandstone, sand is very fine to medium, some coarse to very coarse, poorly indurated, contains rootlets.....	326.0	346.0
Silt, slightly clayey, slightly sandy, sand is very fine to fine, pale brown, very calcareous, contains some clay grains.....	346.0	352.0
Sandstone, sand is very fine to medium, some coarse to very coarse, contains rootlets, poorly indurated.....	352.0	373.0
Sand, slightly silty, marly, sand is very fine to medium, some coarse, whitish gray, moderately to very calcareous.....	373.0	374.0
Silt, moderately clayey, slightly sandy, sand is very fine to fine, very light gray to white, very calcareous.....	374.0	382.0
Silt, very clayey, moderately sandy, sand is very fine to fine, pale olive, slightly calcareous.....	382.0	395.0
Cretaceous System - Upper Cretaceous Series - Montana Group:		
Pierre Formation:		
Shale, clay, light gray, some yellow-brown, slightly calcareous; some dark gray below 406 ft.....	395.0	410.0

11-17-13dddd
USBR Mid-State Division (Profile 6)
Buffalo County

Location: SE SE SE SE sec 13-11N-17W, 30 ft N and 255 ft W of SE cor
 sec

Ground elevation: 2287.5 ft (i) Pleasanton NW 7.5 minute quadrangle

Depth to water: 117.2 ft (7/30/48)

Drill hole site of proposed Amherst Damsite DH-31

USBR field log

	<u>Depth, in feet</u>	
	From	To
Quaternary System, undifferentiated:		
Clay, silty, light brown.....	0.0	25.0
Clay, silty, dark brown.....	25.0	28.0
Clay, silty, light brown, contains some calcareous concretions.....	28.0	71.0
Clay, silty, brown with white streaks.....	71.0	78.0
Clay, sandy, some gravel, brown.....	78.0	81.0
Sand and gravel.....	81.0	91.0
Clay, sandy, fine, brown with white streaks.....	91.0	101.0
Sand, very fine, silty.....	101.0	111.0
Sand and gravel.....	111.0	131.2

11-18-9ccb
36-A-48
Buffalo County

Location: NW NW SW SW sec 9-11N-18W, approximately 1100 ft N and 19 ft E of SW cor sec

Ground elevation: 2304.9 ft (i) Miller 7.5 minute quadrangle

Depth to water: 30.6 ft (9/8/48)

	<u>Depth, in feet</u>	
	From	To
Quaternary System, undifferentiated:		
Silt, sandy, sand is very fine to fine, light brown-gray; very light brown-gray below 1 ft.....	0.0	2.5
Silt, slightly clayey, very slightly sandy, sand is very fine, dark brown-gray.....	2.5	3.5
Silt, slightly to moderately clayey, very slightly sandy, light yellow-gray.....	3.5	5.0
Silt, slightly sandy, sand is very fine, some fine, light yellowish gray, very slightly calcareous, contains small limy rootlets and nodules; light medium yellowish to brownish gray below 25 ft.....	5.0	30.0
Silt, moderately sandy, sand is mostly very fine, light brown-gray and dark brown, contains many rootlets, slightly peaty in part.....	30.0	34.5
Silt, moderately clayey, medium to dark bluish gray, contains many snail shells; dark gray 35 to 37.5 ft; medium gray below 37.5 ft, no snail shells....	34.5	39.5
Sand, very fine to medium.....	39.5	42.5
Silt, peaty, dark brown.....	42.5	44.5
Silt, slightly clayey, light gray.....	44.5	50.0
Sand, fine to coarse, contains scattered very coarse sand and gravel; contains some wood at 50 ft.....	50.0	55.0
Sand, fine to coarse, a little very coarse sand and fine gravel, very light brown-gray.....	55.0	60.0
Sand and gravel, gravel is fine to medium, light brown-gray, some pink silicates.....	60.0	62.5
Tertiary System - Miocene Series - Ogallala Group:		
Silt, slightly clayey, moderately sandy, sand is fine to coarse, light brownish gray to light brown.....	62.5	65.0
Sandstone, sand is very fine to medium, light brown, a few rootlets.....	65.0	66.5
Sand, fine to coarse, some very coarse sand to fine gravel, light brown-gray.....	66.5	71.5
Sandstone, fine grained, light brown-gray, interbedded noncalcareous and very calcareous, contains hard limy layer at 71.5 ft.....	71.5	75.0
Sandstone, sand is very fine to medium, light brown-gray, moderately calcareous.....	75.0	78.0

Silt, slightly clayey, very sandy, sand is very fine to medium, very light greenish gray; slightly indurated below 80 ft, contains some rootlets.....	78.0	84.5
Sandstone, sand is very fine to fine, very light greenish gray, moderately calcareous, contains some thin hard layers; mostly noncalcareous below 90 ft.....	84.5	92.5
Sand, fine to coarse, a little very coarse sand and fine gravel.....	92.5	100.0
Sand and gravel, gravel is fine to medium, quartz with a few dark silicates.....	100.0	107.5
Sandstone, sand is very fine to medium, light greenish gray, slightly indurated; contains a little coarse sand below 110 ft; slightly more coarse sand below 115 ft, contains thin hard layer 119.5 to 119.7 ft, calcareous, contains a few rootlets..	107.5	120.0
Sandstone, sand is very fine to medium, light olive-gray, poorly indurated.....	120.0	133.0
Sand, very fine to medium; very silty, slightly clayey 138 to 140 ft.....	133.0	150.0
Sandstone, very fine to fine with some medium, light brown-gray, moderately calcareous.....	150.0	160.0
Sand to sandstone, mostly very fine to fine, in part indurated and calcareous below 165 ft, some hard layers; contains a few clay granules below 190 ft.	160.0	193.0
Sand, very fine to medium, light brown-gray.....	193.0	200.0
Sandstone, sand is very fine to medium with some coarse, in part moderately calcareous, very fine to medium sand below 205 ft.....	200.0	220.0
Sandstone-siltstone, interbedded noncalcareous and very calcareous, mostly fine grained, contains a few clay granules.....	220.0	225.0
Sandstone, very fine to medium sand, light brown-gray, slightly indurated; in part very calcareous below 230 ft, moderate induration.....	225.0	235.0
Sand, very fine to medium, very slightly indurated; contains a trace of coarse sand 270 to 290 ft.....	235.0	295.0
Sandstone, silty, in part slightly clayey, sand is mostly very fine to fine, light olive-gray.....	295.0	300.0
Sand, very fine to medium, light brown-gray; contains thin light greenish gray silty layers 315 to 320 ft; slight induration below 320 ft.....	300.0	330.0
Sand, very fine to fine.....	330.0	340.0
Silt, very clayey, slightly sandy, sand is very fine, light greenish gray.....	340.0	341.0
Sand, very fine to medium, contains some clay granules and some thin limy indurated layers below 345 ft.....	341.0	350.5
Siltstone, white, very calcareous, well indurated 350 to 354.5 ft and 356.5 to 359.8 ft.....	350.5	360.0
Sand, very fine to medium, a trace of coarse, contains some lime cemented layers.....	360.0	366.0

Sandstone, sand is very fine to medium, whitish gray, very calcareous.....	366.0	368.0
Siltstone, slightly sandy, mostly fine grained, whitish gray, very calcareous, may be clayey in part.....	368.0	377.5
Sand, very fine to medium, light brown-gray, slightly indurated.....	377.5	393.5
Silt, very clayey, light green-gray, blocky structure.....	393.5	398.0
Sand, very fine to medium; contains some coarse sand below 400.5 ft, contains thin hard limy layer 400.5 to 401 ft; sand is mostly fine to coarse below 405 ft, contains a hard limy layer 405 to 409 ft.....	398.0	409.0
Cretaceous System - Upper Cretaceous Series - Montana Group:		
Pierre Formation:		
Shale, clay, very light gray, some yellow-brown, moderately calcareous; medium to medium dark gray below 413.5 ft; medium gray below 420 ft, very calcareous.....	409.0	430.0

11-18-25babb
USBR Mid-State Division (Profile 5)
Buffalo County

Location: NW NW NE NW sec 25-11N-18W, 67 ft S and approximately 1415 ft E of NW cor sec
 Ground elevation: 2272.4 ft (i) Miller NE 7.5 minute quadrangle
 Depth to water: Not obtained
 USBR Geologic log

	<u>Depth, in feet</u>	
	From	To
Quaternary System, undifferentiated:		
Top soil: lean clay, 90 percent medium plasticity fines, very dark brown, moderately calcareous.....	0.0	7.0
Silt, 85 percent low plasticity fines, 15 percent fine sand, light brown, medium dilatancy, moderately calcareous.....	7.0	35.0
Silt, 85 percent low plasticity fines, 15 percent fine sand, brown, moderately calcareous, high in organic matter.....	35.0	45.0
Sand, fine to coarse, 10 percent low plasticity fines; contains decayed wood 50 to 51 ft; cross bedded 51 to 60 ft.....	45.0	60.0
Sand, slightly gravelly, 95 percent fine to coarse sand, maximum size gravel up to ½ inch.....	60.0	67.0
Silt, 90 percent low plasticity fines, 10 percent fine sand, brown, massive, soil zone, organic matter in places.....	67.0	72.0
Sand, slightly gravelly, 5 percent nonplasticity fines, contains a trace of gravel up to ½ inch in size.....	72.0	95.0
Sand, silty, 60 percent low plasticity fines, 40 percent fine sand, brown, firm, massive.....	95.0	105.0
Tertiary System - Miocene Series - Ogallala Group:		
Silt, 80 percent medium plasticity fines, 20 percent fine sand, white, firm, massive, highly calcareous; contains marl and hard limestone layers 110 to 112 ft.....	105.0	130.0

**11-18-32aaaa
36-B-48
Buffalo County**

Location: NE NE NE NE sec 32-11N-18W, 218 ft S and 6 ft W of NE cor
sec

Ground elevation: 2445.3 ft (i) Miller 7.5 minute quadrangle

Depth to water: 162.5 ft (9/8/48)

	<u>Depth, in feet</u>	
	From	To
Quaternary System, undifferentiated:		
Silt, sandy, sand is very fine to fine, medium brown-gray.....	0.0	0.5
Silt, very slightly sandy, very fine sand, light yellow- to brown-gray.....	0.5	2.0
Silt, slightly sandy, sand is mostly very fine, light yellow-gray, slightly to moderately calcareous, contains a few snail shells; slight yellow staining below 3.5 ft, slightly calcareous.....	2.0	7.0
Silt, slightly sandy, sand is very fine to fine, light gray, slightly brownish tint, noncalcareous; very slightly sandy below 10 ft, very slightly calcareous, contains a few snail shells and a few yellow-brown flecks.....	7.0	20.0
Silt, very slightly sandy, mostly very fine sand, light brownish gray, noncalcareous.....	20.0	27.0
Silt, slightly clayey, very slightly sandy, sand is mostly very fine to fine, dark brown-gray.....	27.0	28.5
Silt, moderately sandy, sand is very fine to fine, some medium, light brown to light brown-gray; contains limy nodules and areas below 35 ft.....	28.5	39.0
Sand, very silty, sand is very fine to fine with some medium, little gray.....	39.0	52.0
Silt, very sandy, sand is very fine to fine with some medium, very light brown.....	52.0	57.0
Sand, silty, sand is very fine to fine with some medium, light gray, brown tint.....	57.0	64.0
Silt, very clayey, very light brown-gray; light gray below 65 ft.....	64.0	71.0
Silt, slightly clayey, light gray, brown tint; slightly more brownish below 80 ft.....	71.0	82.0
Silt, moderately clayey, very slightly sandy, sand is very fine, light brown to light brown-gray; slightly less clayey below 85 ft, in part granular structure.....	82.0	90.0
Silt, slightly clayey, moderately sandy, sand is very fine to fine, light brown, granular structure; thin calcareous zone 148 to 148.5 ft.....	90.0	150.0

Silt, very slightly clayey, moderately sandy, sand is very fine to medium, light brown, contains a few rootlets; contains thin limy layers or nodules 157 to 157.2 ft, at 164.5 ft and at 166 and 168.5 ft; slightly calcareous 160 to 165 ft, moderately calcareous 165 to 170 ft; sand is very fine to fine 170 to 180 ft.....	150.0	180.0
Silt, moderately to very sandy, sand is very fine to fine, light brown, slightly calcareous, very slightly indurated 180 to 184 ft; below 184 ft silt is coarse and very sandy, sand is very fine to fine, contains rootlets, essentially noncalcareous; slightly calcareous below 190 ft, granular structure; very calcareous 201 to 202 ft.....	180.0	210.0
Silt, very sandy, mostly very fine to fine sand, contains scattered medium to coarse sand, very light brown-gray, contains thin limy layers or nodules; contains limy areas, moderately calcareous below 220 ft.....	210.0	232.0
Sand and gravel, medium sand to fine, some medium gravel, 40 to 50 percent gravel, quartz with pink and greenish silicates.....	232.0	239.0
Silt, very sandy, sand is very fine to medium, light brown-gray.....	239.0	245.0
Sand and gravel, gravel is mostly fine, quartz with pink and greenish silicates.....	245.0	258.0
Tertiary System - Miocene Series - Ogallala Group:		
Sandstone, sand is very fine to medium, light brownish to olive-gray.....	258.0	264.0
Silt, slightly clayey, very slightly sandy, light greenish gray.....	264.0	267.5
Sandstone, sand is very fine to medium, light brown-to olive-gray, contains thin calcareous clayey silt layer at 268.5 ft.....	267.5	270.0
Sandstone, fine grained, whitish gray, very calcareous, contains some thin sandy to clayey silt layers.....	270.0	278.0
Sandstone, sand is very fine to medium, light olive-gray.....	278.0	290.5
Sandstone, sand is very fine to fine, light brown-gray, moderately calcareous; contains thin hard cemented layers 295.5 to 295.7 ft and 298 to 298.5 ft.....	290.5	300.0
Sandstone, sand is very fine to fine with some medium, light brown-gray, noncalcareous, contains a few rootlets.....	300.0	301.5
Sand, very fine to medium.....	301.5	314.5
Sandstone-siltstone, sand is very fine to fine, very light brownish to whitish gray, moderately to very calcareous.....	314.5	316.0
Sand, fine to medium, a little coarse.....	316.0	320.0

Sandstone and clayey to sandy silt, interbedded, sand is very fine to fine, light brown-gray, in part calcareous; contains a hard very calcareous layer 326 to 326.5 ft.....	320.0	326.5
Sandstone, sand is very fine to medium, very light brown, highly calcareous.....	326.5	331.0
Silt, slightly clayey, moderately sandy, sand is very fine to medium, highly calcareous to 337 ft; slightly more clayey below 342 ft.....	331.0	348.0
Sandstone, sand is very fine to medium, very light brownish to whitish gray, moderately to highly calcareous, contains a few nodular limestone fragments, white to very light brown, contains some rootlets.....	348.0	352.5
Silt, moderately clayey, sandy, sand is very fine to medium, light greenish gray.....	352.5	354.0
Sandstone, sand is very fine to medium with some coarse, light brownish gray, only slightly indurated.....	354.0	360.0
Sandstone, sand is very fine to medium, very light brownish gray, highly calcareous, slightly indurated.....	360.0	364.0
Siltstone, sandy, white, very calcareous.....	364.0	366.0
Sandstone, sand is very fine to medium with a little coarse sand, moderately calcareous, slightly indurated, sand is fine to coarse below 375 ft, very slightly indurated.....	366.0	379.0
Silt, slightly clayey, very sandy, sand is very fine to medium, light greenish gray.....	379.0	385.0
Sand, very fine to medium, a little coarse, silty 385.5 to 389 ft, sand is fine to coarse below 390 ft.....	385.0	393.0
Silt, slightly clayey, sandy, sand is fine to medium, light greenish gray, slightly indurated.....	393.0	394.0
Sand, very fine to fine, some medium; sand is fine to medium below 400 ft.....	394.0	406.0
Silt, slightly clayey, slightly sandy to 410 ft, light greenish gray, contains limy nodular zones..	406.0	412.5
Siltstone-sandstone, fine grained, white, very calcareous, in part a sandy limestone.....	412.5	414.0
Silt, slightly clayey, sandy, light greenish gray, moderately calcareous; contains some thin interbedded sandstone layers.....	414.0	420.0
Silt, very slightly clayey, very sandy, sand is very fine to medium with some coarse, light greenish gray.....	420.0	426.0
Sand, fine to medium, a trace of coarse sand, light brown-gray; contains a green sandy silt layer 436 to 437 ft; in part slightly silty below 440 ft, contains some clayey silt granules; contains scattered gravel grains below 455 ft.....	426.0	458.0

Siltstone-sandstone, fine grained, whitish gray, very calcareous, well indurated; contains clay below 460 ft.....	458.0	462.5
Claystone, light green, brittle.....	462.5	463.0
Clay, light greenish gray, contains some hard limy areas.....	463.0	468.0
Cretaceous System - Upper Cretaceous Series - Montana Group:		
Pierre Formation:		
Shale, clay, very light gray, yellow-brown stain, noncalcareous; contains thin limonitic ironstone layer at 471 ft; light to light medium gray below 480 ft; medium dark gray below 484.5 ft, noncal- careous.....	468.0	490.0

**12-13-1aaaa
35-A-54
Buffalo County**

Location: NE NE NE NE sec 1-12N-13W, 19 ft S and 221 ft N of NE cor
sec
Ground elevation: 1922 ft (t) Boelus 7.5 minute quadrangle
Depth to water: 8.4 ft (8/12/54)
Electric log

	<u>Depth, in feet</u>	
	From	To
Quaternary System, undifferentiated:		
Silt, sandy, medium dark brown.....	0.0	1.0
Sand, silty, sand is mostly very fine to fine, light brown-gray, contains snail shells.....	1.0	1.5
Sand, very fine to medium.....	1.5	5.0
Sand, fine to very coarse, light gray, contains snail shells; contains a trace of fine gravel below 15 ft.....	5.0	20.0
Sand, fine to very coarse, some fine gravel, light gray, contains snail shells and some rounded lithic clay grains, 10 percent gravel; 20 percent fine gravel below 30 ft.....	20.0	40.0
Sand, very fine to medium, light gray.....	40.0	45.0
Sand, fine to coarse, contains rounded lithic silt and clay grains.....	45.0	50.0
Sand, some gravel, fine sand to fine gravel, 25 percent gravel, gray.....	50.0	57.0
Sand and gravel, gravel is fine to medium, 60 to 70 percent gravel, gray.....	57.0	73.0
Silt, slightly clayey, moderately sandy, very light gray; contains interbedded sand and gravel below 74.9 ft.....	73.0	78.8
Silt, slightly clayey, light gray; slightly sandy below 82.1 ft, sand is very fine to fine.....	78.8	87.5
Silt, moderately to very sandy, sand is very fine to fine; probable sand 83 to 88 ft.....	87.5	95.0
Silt and sand, contains common lithic sandstone grains and bone fragments.....	95.0	101.4
Silt, slightly clayey, silt is coarse, light brown, granular structure; contains limy nodules below 103 ft.....	101.4	110.0
Silt, slightly clayey, in part sandy, sand is mostly very fine, silt is coarse, light yellow-gray, slightly calcareous; contains limy nodules; granular structure 115 to 120 ft.....	110.0	135.0

Silt, moderately clayey, light brown, slightly calcareous, in part interbedded slightly clayey and sandy, sand is very fine to fine, some intervals with granular structure; contains limy areas and nodules below 143.5 ft; moderately to very clayey 155 to 165 ft.....	135.0	170.0
Sand, very fine to fine, light gray.....	170.0	175.0
Sand, very fine to medium, scattered coarse to very coarse sand, some silt in sample.....	175.0	180.0
Silt, moderately to very clayey, light gray.....	180.0	184.3
Sand, mostly very fine to fine but with 15 percent medium to very coarse sand and a few gravel grains.....	184.3	206.3
Silt, clay with some interbedded sand, light brown-gray.....	206.3	209.0
Silt, very clayey, contains some embedded fine to medium sand, very light gray.....	209.0	215.0
Sand and gravel, contains some lithic bedrock grains.....	215.0	218.4
Cretaceous System - Upper Cretaceous Series - Montana Group:		
Pierre Formation:		
Shale, clay, light medium yellow-gray, slightly calcareous; light gray below 219 ft; medium gray below 230 ft; noncalcareous below 235 ft.....	218.4	240.0

**12-13-24aaaa
34-A-54
Buffalo County**

Location: NE NE NE NE sec 24-12N-13W, 125 ft S and 9 ft W of NE cor
sec
Ground elevation: 1990 ft (t) Boelus 7.5 minute quadrangle
Depth to water: 31.8 ft (8/12/54)
Electric log

	<u>Depth, in feet</u>	
	From	To
Quaternary System, undifferentiated:		
Silt, slightly clayey, medium brown-gray; light medium yellow-gray below 2.5 ft.....	0.0	3.4
Silt, moderately sandy, sand is very fine to fine, light yellow-gray.....	3.4	5.0
Sand, fine to very coarse.....	5.0	6.8
Silt, slightly clayey, sandy, very light yellow-gray.....	6.8	8.0
Sand, slightly silty, sand is very fine to fine, light medium yellow-gray.....	8.0	9.0
Silt, slightly to moderately clayey, sandy, light yellow-gray.....	9.0	10.5
Sand, fine to coarse with a trace of very coarse; contains thin silt layer at 23 ft.....	10.5	25.0
Silt, slightly clayey, sandy, light gray.....	25.0	26.5
Sand, very fine to coarse; contains lithic clay grains; contains silt layer at 33 ft and many clay grains 34.2 to 34.6 ft.....	26.5	40.0
Sand, fine to coarse; rusty brown 46 to 46.7 ft; contains a thin dark layer 51 to 51.5 ft; contains common clay grains below 51.5 ft, some iron stain.	40.0	55.0
Sand, fine to coarse, trace of very coarse.....	55.0	57.0
Sand and gravel, medium brown.....	57.0	60.0
Sand, very fine to coarse; slightly coarser grained below 65 ft; contains lithic clay grains below 70 ft and some lithic sandstone grains below 75 ft...	60.0	82.0
Silt, slightly clayey, medium gray, brown tint; medium dark brown-gray 84 to 85.5 ft.....	82.0	85.8
Silt, slightly clayey, sand is very fine to fine, medium gray.....	85.8	86.5
Sand, very fine to coarse, gray.....	86.5	90.0
Sand, some gravel, gravel is fine, 25 percent gravel; contains some silt below 95 ft.....	90.0	100.0
Silt, slightly clayey, slightly sandy, sand is very fine to fine, light gray.....	100.0	101.5
Silt, slightly clayey, very slightly sandy, light brown, contains limy nodules, slightly calcareous; granular structure below 104 ft.....	101.5	110.0

Silt, moderately clayey, light medium brown, slightly calcareous; in part slightly sandy, very fine to fine sand below 114 ft; light yellow brown 115 to 116.5 ft; contains limy nodules 120 to 134 ft; slightly indurated 134 to 134.5 ft, moderately calcareous; granular structure below 136 ft; light gray below 137.2 ft; slightly sandy below 138 ft..	110.0	142.5
Sand and gravel, contains many rounded lithic clay and sandstone grains.....	142.5	145.0
Tertiary System - Miocene Series - Ogallala Group:		
Sandstone, sand is fine to coarse with some very coarse sand, light medium olive-gray; slight to moderate induration; slightly silty below 157 ft..	145.0	160.0
Sandstone, sand is very fine to medium.....	160.0	162.0
Silt, slightly clayey, very sandy, light olive-gray.	162.0	165.5
Sandstone, sand is very fine to medium, very light olive-gray; calcareous with limy well indurated areas below 168.5 ft; very silty below 177 ft.....	165.5	180.0
Sandstone, sand is fine to very coarse with some fine gravel; contains fossil fragments below 185 ft.....	180.0	190.0
Sandstone, silty, fine grained, very light olive-gray.....	190.0	192.5
Sand, slightly silty, very fine to fine sand, very light olive-gray.....	192.5	195.0
Sand and sandstone, slightly silty, sand is very fine to medium.....	195.0	201.3
Sand, moderately silty, sand is very fine to fine, light olive-gray.....	201.3	203.0
Sand, slightly silty, sand is very fine to medium; slightly indurated below 205 ft, contains some sandy silty and a few limy areas.....	203.0	210.0
Sandstone, very fine to medium sand, light olive-gray, contains limy areas.....	210.0	220.0
Sand, very fine to medium, a little coarse sand; silty 223.6 to 225 ft.....	220.0	226.0
Sandstone, fine grained, very light olive-gray, calcareous.....	226.0	227.0
Silt, clayey, slightly sandy, very light olive-gray, very calcareous.....	227.0	228.0
Siltstone-sandstone, fine grained, slightly to very calcareous.....	228.0	237.7
Sand, fine to coarse; sand is fine to very coarse below 240 ft; contains a trace of fine gravel below 245 ft.....	237.7	252.3
Silt, clayey, sandy, calcareous.....	252.3	253.5
Sand, fine to very coarse, contains a trace of fine gravel; sand and fine gravel below 255 ft.....	253.5	256.0
Silt, clayey, contains calcareous areas; contains a thin dark sandy silt in upper part.....	256.0	257.2

Cretaceous System - Upper Cretaceous Series - Montana Group:

Pierre Formation:

Shale, clay, very light gray and light yellow-gray,
moderately calcareous; light medium yellow-gray
262 to 262.7 ft; contains bentonite layer 273.5 to
273.8 ft, yellow orange; slightly calcareous below
275 ft, contains limonitic concretion..... 257.2 280.0

**12-15-12baad
16-B-47
Buffalo County**

Location: SE NE NE NW sec 12-12N-15W, 518 ft S and approximately 2630 ft E of NE cor sec
 Ground elevation: 2013.7 ft (i) Ravenna 7.5 minute quadrangle
 Depth to water: 6.4 ft (7/8/47)

	<u>Depth, in feet</u>	
	From	To
Quaternary System, undifferentiated:		
Sand, silty, sand is mostly fine, dark brown-gray; slightly more silty below 1 ft, very dark brown-gray.....	0.0	2.5
Silt, sandy, light brown-gray, contains small limy nodules.....	2.5	5.0
Sand, fine to medium with a trace of coarse, contains common snail and pelecypod shells.....	5.0	8.0
Sand, fine to coarse with some very coarse, contains common lithic sandstone and clay grains; contains some fine gravel below 12.5 ft and many rounded lithic gray clay grains.....	8.0	20.0
Sand, some gravel, gravel is mostly fine, contains common lithic clay grains and rootlets.....	20.0	25.0
Sand, very fine to fine, light gray; contains some interbedded gray clayey silt.....	25.0	30.0
Clay, silty, light medium gray.....	30.0	34.0
Peat and silt, brown, contains some wood fragments..	34.0	43.5
Sand and gravel, gravel is fine to medium, pink; contains a little coarse gravel below 60 ft.....	43.5	68.0
Tertiary System - Miocene Series - Ogallala Group:		
Sand, silty, sand is fine grained, very light olive-gray, slight induration.....	68.0	80.0
Silt, very sandy, slightly clayey, sand is mostly fine, very light olive-gray; slightly sandy below 85 ft, contains common white siliceous rootlets...	80.0	91.0
Sandstone, slightly silty, sand is very fine to fine, very light olive-gray, moderately well indurated, contains a few rootlets; well indurated below 97.5 ft.....	91.0	100.0
Sandstone, sand is very fine to medium, very light olive-gray, slightly indurated; contains a few rootlets below 110 ft.....	100.0	117.0
Siltstone-sandstone, sand is mostly fine, very light greenish gray, contains a few siliceous rootlets; contains a thin limy layer 123 to 123.2 ft.....	117.0	125.0
Sandstone, sand is very fine to medium, very light brown gray, contains a thin hard limy layer 132.5 to 133 ft.....	125.0	136.0

Sandstone, mostly fine grained, very light brownish gray, contains rootlets.....	136.0	142.5
Sandstone and sandy silt interbedded, sand is fine grained, very light olive-gray, contains some limy areas.....	142.5	147.0
Sandstone, very light brown-gray to olive-gray, very calcareous, contains a few rootlets; moderately calcareous below 148.5 ft.....	147.0	155.0
Sandstone, sand is very fine to medium, light olive-gray; contains much medium sand below 160 ft; contains some coarse and a little very coarse sand below 165 ft.....	155.0	170.0
Sandstone, sand is very fine to fine, some medium, light olive-gray, slightly indurated.....	170.0	175.0
Sand, fine to coarse with some very coarse, very light brown-gray; contains some fine gravel 185 to 190 ft; contains indurated calcareous layer 190.8 to 191.2 ft.....	175.0	200.0
Sandstone, sand is very fine to medium, light olive-gray, poorly indurated.....	200.0	210.0
Sand, fine to medium with a little coarse; sand is fine to coarse below 215 ft with a trace of gravel at base.....	210.0	225.0
Cretaceous System - Upper Cretaceous Series - Montana Group:		
Pierre Formation:		
Shale, clay, light gray with much mottled yellow and orange.....	225.0	235.0
Shale, clay, light and medium gray, some mottled yellow-brown.....	235.0	238.0
Shale, clay, medium dark-gray, contains some bentonite.....	238.0	244.5
Shale, silty clay, medium dark gray, moderately to highly calcareous; medium gray below 260 ft, highly calcareous.....	244.5	270.0

**12-15-14abaa
17-B-47
Buffalo County**

Location: NE NE NW NE sec 14-12N-15W, 65 ft S and approximately
1550 ft W of NE cor sec
Ground elevation: 2089.7 ft (i) Ravenna 7.5 minute quadrangle
Depth to water: 72 ft (7/10/47)

	<u>Depth, in feet</u>	
	From	To
Quaternary System, undifferentiated:		
Silt, sandy, dark brown-gray.....	0.0	1.0
Silt, slightly clayey, slightly sandy, sand is very fine, medium brown-gray.....	1.0	2.0
Silt, slightly clayey, light yellow-brown, slightly calcareous, contains a few limy nodules.....	2.0	4.0
Sand, fine to very coarse, a little fine gravel.....	4.0	10.0
Sand, fine to medium with a little coarse to very coarse sand, light gray; slightly coarser grained below 15 ft, contains lithic sandstone and clay grains.....	10.0	24.0
Clay, light gray with some yellow stain and nodular fragments.....	24.0	25.0
Sand, very fine to medium, very light brown-gray; contains light gray and yellow silty clay layers at 37.5 ft and from 38 to 40 ft; contains a little coarse sand below 40 ft.....	25.0	42.5
Silt, slightly clayey, light gray with yellow stain, slightly calcareous, contains many shell fragments.....	42.5	48.0
Sand, fine to medium, very light gray, contains common limonitic silt grains; contains a little coarse sand below 50 ft and a few gray lithic clay grains.....	48.0	56.0
Silt, slightly and very clayey, interbedded with some peat, light and dark gray; contains a thin fine grained sand layer.....	56.0	60.0
Sand, fine to medium, much medium and some coarse sand; very little coarse sand below 65 ft.....	60.0	67.0
Clay, silty, light medium gray; medium gray below 73.5 ft.....	67.0	75.0
Silt, slightly sandy and peaty, sand is very fine, dark gray and brown, contains a few wood fragments and small snail shells.....	75.0	80.0
Silt, slightly clayey, light gray, contains some peat and wood fragments.....	80.0	88.0
Sand, fine to medium, light gray, contains some coarse sand below 90 ft; contains a little very coarse sand below 115 ft.....	88.0	120.0

Sand and gravel, gravel is fine with some medium, pink and greenish gray.....	120.0	127.0
Silt, slightly clayey, little gray, contains nodular very calcareous layer 128 to 130 ft.....	127.0	130.0
Silt, sandy, sand is very fine, light gray, moderately calcareous.....	130.0	140.0
Sand, silty and silt, sandy, sand is very fine to medium, light brown-gray; very calcareous 150 to 151 ft.....	140.0	157.0
Sand, silty, sand is very fine to fine, light brown-gray.....	157.0	160.0
Sand, very fine to medium, light brown-gray, contains a little coarse sand below 165 ft; contains some coarse sand below 185 ft and a little very coarse sand below 195 ft; contains some sandy silt layers 200 to 210 ft.....	160.0	210.0
Sand and gravel, gravel is mostly fine, pinkish gray, contains a few lithic rootlet grains.....	210.0	240.0
Sand, fine to coarse with some very coarse.....	240.0	245.0
Sand and gravel, gravel is fine to medium, contains common rounded lithic sandstone grains.....	245.0	250.5
Tertiary System - Miocene Series - Ogallala Group:		
Silt, sandy, sand is fine, light olive-gray, some silt in sample.....	250.5	255.0
Sand and silty sand, sand is very fine to fine, light brownish to olive-gray; sand is very fine to medium below 265 ft.....	255.0	270.0
Sand, very silty, very fine grained, very light olive-gray; contains a limy area 278 to 280 ft....	270.0	286.0
Sand, silty, sand is fine to coarse, very light gray, contains a very thin hard limy area at 289 ft.....	286.0	289.0
Cretaceous System - Upper Cretaceous Series - Montana Group:		
Pierre Formation:		
Shale, clay, light green-gray and light gray; blocky.....	289.0	290.0
Shale, clay, light gray, much yellow-brown, contains some limonitic fragments.....	290.0	303.0
Shale, clay, dark gray; contains bentonite layers 305 to 320 ft.....	303.0	345.0
Shale, clay, medium dark gray and medium gray, moderately to highly calcareous.....	345.0	360.0

**12-15-22abab
18-B-47
Buffalo County**

Location: NW NE NW NE sec 22-12N-15W, 8 ft S and approximately 1950 ft
W of NE cor sec
Ground elevation: 2123 ft (i) Ravenna 7.5 minute quadrangle
Depth to water: 91.8 ft (7/11/47)

	<u>Depth, in feet</u>	
	From	To
Quaternary System, undifferentiated:		
Road fill and silt loam, dark brownish gray.....	0.0	1.5
Silt, slightly clayey, dark brown to dark brown- gray.....	1.5	3.5
Silt, slightly clayey, dark brownish-gray to dark gray, granular structure.....	3.5	8.0
Silt, slightly clayey, light brownish gray to light yellow-gray.....	8.0	17.5
Silt, slightly clayey, dark brownish gray.....	17.5	18.5
Silt, slightly clayey, light yellow-brown, some yellow stain; mottled very light gray below 21 ft; contains a few limonitic nodules 21 to 25 ft; very slightly clayey below 25 ft; mostly very light gray below 34.5 ft.....	18.5	40.0
Silt, slightly sandy, sand is very fine to fine, very light gray; moderately to very sandy below 45 ft.....	40.0	50.0
Sand, very fine to fine with a little medium, light gray.....	50.0	57.5
Silt, very sandy, sand is mostly very fine to fine, light yellow-gray; some silty sand layers below 65 ft.....	57.5	70.0
Sand, in part silty, mostly very fine to fine sand, light yellow-gray and light gray.....	70.0	72.5
Silt, sandy, sand is mostly very fine to fine, very light gray.....	72.5	77.0
Silt, very sandy, sand is very fine to fine, light brown-gray to light brown; some silty sand 83 to 85 ft, a little medium sand.....	77.0	85.0
Sand, slightly silty, sand is very fine to medium, very light brown; some interbedded very sandy silt below 90 ft.....	85.0	112.0
Silt, slightly sandy, sand is mostly very fine, light brown; common shell fragments below 116 ft; very calcareous below 116.5 ft; a few thin hard layers.....	112.0	129.0
Sand, fine to medium, some coarse.....	129.0	135.0
Silt, very sandy, sand is very fine to medium, very light gray, moderately calcareous.....	135.0	139.0
Sand, fine to coarse.....	139.0	149.5

Silt, slightly sandy, sand is very fine to fine, very light gray to very light brown, moderately to very calcareous, hard limy layers or nodules 157.5 to 158 ft and at 163 ft and 182 ft.....	149.5	183.0
Sand, in part silty, sand is very fine to medium, light brown-gray, slightly calcareous; some interbedded sandy silt below 190 ft, light medium grayish brown; light gray below 195 ft.....	183.0	200.0
Silt, moderately sandy, sand is mostly very fine to fine, light gray, moderately calcareous; limy nodule or layer 209 to 209.5 ft.....	200.0	212.5
Sand, fine to medium with scattered coarse to very coarse sand.....	212.5	218.0
Sand, some gravel, gravel is mostly fine, light brown-gray to pink, contains a few shell fragments.....	218.0	230.0
Sand and gravel, gravel is fine to medium, contains clayey silt layers 230.5 to 231.5 ft, 236 to 237 ft and 239 to 240 ft, silt is light gray; contains a few shell fragments 230 to 235 ft.....	230.0	245.0
Sand, some gravel, gravel is mostly fine with a little medium; some lithic silt and clay grains 258.5 to 260 ft.....	245.0	265.0
Sand, fine to very coarse.....	265.0	270.0
Sand, some gravel, gravel is fine with a little medium, some lithic limy grains 278 to 280 ft.....	270.0	288.0
Tertiary System - Miocene Series - Ogallala Group:		
Silt, sandy, sand is mostly fine, light greenish gray, contains common rounded lithic silty clay grains.....	288.0	292.0
Sandstone, fine-grained, whitish gray, contains a very calcareous, hard layer at 292 to 293 ft.....	292.0	295.0
Siltstone, whitish gray, very calcareous.....	295.0	297.0
Silt, slightly sandy, very light brown and whitish gray, slightly to in part very calcareous.....	297.0	304.0
Sand, fine to coarse with some very coarse, contains common lithic grains of clay and limonitic nodules.....	304.0	308.0
Cretaceous System - Upper Cretaceous Series - Montana Group:		
Pierre Shale:		
Shale, clay, light gray with much mottled yellow-brown, contains some limonitic fragments; some medium gray below 315 ft.....	308.0	322.0
Shale, clay, dark gray, a little mottled yellow, orange and brown, noncalcareous.....	322.0	340.0

12-15-24adad
36-A-54
Buffalo County

Location: SE NE SE NE sec 24-12N-15W, approximately 1775 ft S and
 11 ft W of NE cor sec
 Ground elevation: 2098 ft (t) Poole 7.5 minute quadrangle
 Depth to water: 85 ft (8/16/54)
 Electric log .

	<u>Depth, in feet</u>	
	From	To
Quaternary System, undifferentiated:		
Silt, slightly clayey, medium brown-gray; light medium brown-gray, slightly more clayey below 1 ft.....	0.0	3.0
Silt, slightly clayey, slightly sandy, light medium brown-gray.....	3.0	3.8
Sand, very fine to coarse with a trace of very coarse.....	3.8	5.0
Sand, very fine to medium with a trace of coarse to very coarse.....	5.0	10.0
Sand, very fine to medium; contains a trace of coarse sand below 15 ft and a trace of very coarse sand below 20 ft.....	10.0	25.0
Sand, very fine to fine with a trace of medium.....	25.0	26.5
Silt, slightly clayey, slightly sandy, light olive-gray.....	26.5	28.5
Sand, very fine to medium, contains a trace of very coarse sand; contains thin silt layer at 31 ft....	28.5	40.0
Sand, very fine to coarse, contains thin silt layers.....	40.0	49.0
Silt, slightly clayey, light gray; some yellow staining below 50 ft.....	49.0	56.0
Sand and gravel, mostly lithic silt and clay grains with some quartz and feldspars, contains snail shells and bone fragments.....	56.0	60.0
Silt, slightly to moderately clayey, light gray.....	60.0	62.0
Sand, fine to very coarse, contains many lithic grains of clay and sandstone.....	62.0	66.0
Silt, slightly clayey, light olive-gray, slightly calcareous; very clayey 68 to 68.8 ft; medium gray below 68.8 ft, contains wood fragments 70 to 70.5 ft.....	66.0	70.5
Silt, slightly clayey, medium gray, slightly calcareous; slightly sandy below 75 ft, silt is coarse, sand is very fine to fine; noncalcareous below 80 ft; very sandy 85 to 88.5 ft.....	70.5	90.0
Sand, very fine to very coarse, gray.....	90.0	95.0
Sand, very fine to fine with some medium to coarse..	95.0	100.0

Sand, very fine to coarse, gray, contains a silt layer 104.8 to 105 ft.....	100.0	106.1
Silt, slightly clayey, light gray; silt is coarse below 106.5 ft, slightly peaty.....	106.1	107.1
Silt, moderately clayey, light gray, granular structure; very clayey, bluish gray below 110 ft, slightly calcareous.....	107.1	112.8
Silty clay pebble bed, gray, slightly calcareous....	112.8	114.3
Silt, slightly clayey, slightly sandy, sand is very fine to fine, light gray, slightly calcareous; slightly peaty 116.6 to 116.9 ft, 120 to 120.5 ft and 123.5 to 125 ft, contains some wood fragments, essentially noncalcareous below 120 ft.....	114.3	125.0
Silt, slightly clayey, slightly sandy, sand is very fine to fine, medium dark-gray.....	125.0	126.5
Silt, slightly clayey, slightly sandy, sand is very fine to fine, light medium gray, slightly calcareous.....	126.5	130.0
Sand, very fine to medium, light gray; contains a trace of coarse sand below 135 ft.....	130.0	140.0
Interbedded sandy silt and sand and gravel, brown-gray and medium gray.....	140.0	145.0
Silt, moderately sandy, sand is mostly very fine to fine, light gray; slightly sandy below 150 ft; slightly calcareous.....	145.0	154.5
Interbedded sandy silt and sand, sand is fine to very coarse.....	154.5	160.0
Silt, slightly clayey, very slightly sandy, very light gray; contains interbedded sand below 161 ft.....	160.0	165.0
Sand and gravel, contains common dark silicates, common lithic sandstone grains and a few bone fragments.....	165.0	175.0
Tertiary System - Miocene Series - Ogallala Group:		
Sandstone, sand is mostly very fine to fine, very light olive-gray, poorly indurated.....	175.0	197.0
Sandstone, sand is very fine to medium, light brown-gray.....	197.0	201.5
Sand, silty, sand is very fine to fine, very light olive-gray.....	201.5	205.0
Sandstone, sand is very fine to medium, very light olive-gray.....	205.0	206.5
Siltstone, sandy, very light yellow-gray to white, very calcareous.....	206.5	210.0
Silt, slightly clayey, very sandy, sand is very fine to fine, very light gray, slightly indurated, moderately calcareous to in part very calcareous, contains thin sandstone layers; slightly clayey 216.5 to 217 ft; moderately clayey 225 to 227.6 ft.....	210.0	234.5

Sandstone, sand is very fine to fine with a little medium below 238 ft; very calcareous 238.5 to 239.5 ft; slightly calcareous below 140 ft, mostly very fine to fine sand.....	234.5	244.0
Siltstone-sandstone, fine grained, very calcareous..	244.0	244.5
Sandstone, sand is very fine to medium, very light olive-gray; slightly calcareous in upper 0.5 foot.	244.5	260.0
Sand, very fine to medium, contains many lithic clay grains.....	260.0	265.0
Sand, very fine to medium with a trace of coarse....	265.0	269.2
Silt, clayey to very sandy, sand is very fine to fine, light olive-gray.....	269.2	271.0
Sand, fine to very coarse with a little fine gravel; contains common lithic clay and sandstone grains below 280 ft; contains a silt layer 286 to 286.7 ft.....	271.0	290.7
Silt, slightly clayey, sandy, very light olive-gray, slightly calcareous, contains lithic grains of clay, claystone and sandstone.....	290.7	295.5
Cretaceous System - Upper Cretaceous Series - Montana Group:		
Pierre Formation:		
Shale, clay, light medium gray with some yellow and yellowish-brown, noncalcareous; mostly light medium gray below 309 ft; contains a limonitic concretion 312 to 312.5 ft; dark gray below 323 ft; contains a bentonite layer 328.1 to 328.3 ft..	295.5	340.0

12-15-28bdcd
20-B-47
Buffalo County

Location: SE SW SE NW sec 28-12N-15W, approximately 276 ft N and
 868 ft W of center of sec

Ground elevation: 2056.8 ft (i) Pleasanton NW 7.5 minute quadrangle

Depth to water: 6.3 ft (7/15/47)

	<u>Depth, in feet</u>	
	From	To
Quaternary System, undifferentiated:		
Sand, silty, sand is fine to coarse, dark brown-gray.....	0.0	0.5
Sand, slightly silty, sand is fine to medium with scattered coarse to very coarse grains, light yellow- to brown-gray.....	0.5	2.0
Sand, fine to medium with some coarse to very coarse sand.....	2.0	6.0
Sand, a little gravel, sand is fine to coarse with some very coarse sand and fine gravel, light brown-gray to pink, contains a few limy and clay grains.....	6.0	10.0
Sand, medium to coarse with some very coarse sand and fine gravel, medium-gray with brown to green tints, contains a few pelecypods and limy nodular grains; contains scattered medium to coarse gravel and pebbles below 20 ft.....	10.0	23.0
Silt, moderately sandy, sand is very fine to fine, light olive-gray.....	23.0	28.0
Sand, slightly silty, sand is very fine to fine, very light brown to brownish gray.....	28.0	30.0
Silt, moderately sandy, sand is very fine to fine, very light yellow-gray.....	30.0	40.0
Sand, silty in upper part, sand is mostly fine, light brownish gray.....	40.0	47.0
Silt, slightly clayey, slightly to moderately sandy, sand is very fine to fine, very light brownish gray; contains some light gray silt below 50 ft...	47.0	58.0
Sand, silty, very fine to medium, light brown-gray..	58.0	60.0
Sand, in part silty, fine to coarse, contains scattered coarse to very coarse sand grains, light brown-gray, contains common calcareous sandstone and nodular limestone grains; contains a few gravel grains below 70 ft.....	60.0	73.5
Tertiary System - Miocene Series - Ogallala Group:		
Sandstone, sand is very fine to fine, whitish gray, very calcareous; well indurated 73.7 to 77 ft; contains some medium sand below 77 ft.....	73.5	80.0

Sandstone, sand is very fine to medium with some coarse, slightly to moderately calcareous, very light brownish gray; slightly calcareous below 88 ft, poorly indurated, slightly silty.....	80.0	93.0
Sandstone, very fine to medium sand, light medium brown-gray; contains a little coarse sand below 95 ft.....	93.0	100.0
Silt, very clayey, whitish gray, blocky structure, noncalcareous.....	100.0	103.0
Sand, silty in upper part, sand is fine to coarse, very light gray.....	103.0	107.0
Silt, moderately clayey, slightly sandy, whitish gray.....	107.0	113.0
Limestone, white, clayey to crystalline.....	113.0	114.0
Silt, very clayey, white, very calcareous, contains some crystalline limestone below 115.5 ft.....	114.0	116.0
Silt, clayey, whitish gray and white, contains nodular limestone at 117.5 ft, contains some diatomaceous earth.....	116.0	119.5
Sandstone, fine to medium sand, light olive-gray; contains some coarse sand below 126 ft, contains a siltstone layer.....	119.5	130.0
Sand, fine to coarse with a little very coarse; contains some fine gravel below 135 ft; slightly indurated below 141 ft.....	130.0	152.0
Sandstone, sand is very fine to medium, light olive-gray, contains a few rootlets.....	152.0	156.0
Silt, very sandy, slightly clayey, sand is very fine to medium, light greenish gray.....	156.0	160.0
Sandstone, sand is very fine to medium, light brownish gray, moderately calcareous; poorly indurated 170 to 176 ft; very calcareous 180 to 183 ft; contains some thin hard layers below 183 ft, contains some rootlets; slightly calcareous below 205 ft...	160.0	210.0
Sand, very fine to medium, speckled pink and dark gray; contains a little coarse sand below 215 ft and some coarse sand below 220 ft.....	210.0	223.0
Cretaceous System - Upper Cretaceous Series - Montana Group:		
Pierre Formation:		
Shale, clay, light gray with common yellow to orange mottling, contains a few limonite and hematite fragments.....	223.0	238.5
Shale, clay, dark gray, very slightly calcareous, contains several very thin hard limonitic layers in upper part and some bentonite layers in interval 245 to 250 ft.....	238.5	260.0

**12-15-31ddaa
19-B-47
Buffalo County**

Location: NE NE SE SE sec 31-12N-15W, 1007 ft N and 164 ft W of SE
cor sec

Ground elevation: 2133.4 ft (i) Pleasanton NW 7.5 minute quadrangle

Depth to water: 66.1 ft (7/14/47)

	<u>Depth, in feet</u>	
	From	To
Quaternary System, undifferentiated:		
Silt, very sandy, sand is very fine to medium with some coarse, very dark brown-gray.....	0.0	0.5
Sand, slightly silty, sand is fine to coarse, brown-gray.....	0.5	1.0
Sand, fine to medium with a little coarse, slight yellow stain.....	1.0	3.5
Silt, slightly sandy, sand is very fine to fine, very light brownish gray to very light gray, contains some soft limonitic concretions; in part clayey 11 to 16 ft.....	3.5	16.0
Sand, fine to very coarse, contains large limonitic concretion near top; contains common lithic clay grains 25 to 30 ft; slightly finer grained below 30 ft; contains thin silt layer in interval 50 to 55 ft.....	16.0	55.0
Sand, fine to coarse, much medium with a little coarse to very coarse sand.....	55.0	73.0
Sand, fine to medium with some coarse, light gray, contains common medium gray clay grains.....	73.0	80.0
Sand, fine to very coarse; contains a few snail shells and lithic sandstone grains below 85 ft; contains some fine and a little medium gravel below 90 ft.....	80.0	97.5
Silt, medium brown-gray, contains considerable peat and a few shell fragments; slightly sandy below 100 ft, mostly very fine sand.....	97.5	106.5
Sand, fine to medium with some coarse, light gray...	106.5	110.0
Silt, slightly sandy, sand is very fine to fine, medium gray to brown, contains considerable peat..	110.0	114.5
Sand, fine to medium, light gray.....	114.5	118.0
Silt, light brown-gray.....	118.0	119.5
Sand, fine to medium with a little coarse; contains a few greenish coarse to very coarse sand grains below 126 ft.....	119.5	130.0
Sand, fine to very coarse, overall greenish in color; contains a little fine gravel below 135 ft.	130.0	139.5

Tertiary System - Miocene Series - Ogallala Group:

Sand, silty, sand is very fine to medium, whitish gray, contains some siliceous cementation, contains common diatoms and sponge spicules.....	139.5	145.0
Sand, in part slightly silty, sand is very fine to medium, very light olive-brown.....	145.0	155.0
Sand, very fine to medium, considerable medium sand; in part slightly silty below 160 ft; a little coarse sand below 160 ft, a little diatomaceous silt in lower part.....	155.0	174.0
Silt, probably clayey, light greenish gray, blocky..	174.0	175.0
Sandstone-siltstone, sand is very fine to medium, poorly indurated, light brownish gray; mostly a sandstone below 180 ft, contains a few limy areas and diatomaceous silt.....	175.0	190.0
Sandstone-siltstone, mostly very fine to fine sand, light brownish to greenish gray; very calcareous below 197 ft.....	190.0	200.0
Sandstone, very fine to medium with a little coarse sand, interbedded slightly to very calcareous.....	200.0	203.0
Sandstone, very fine to fine with some medium, light olive-gray.....	203.0	214.0
Silt to siltstone, slightly clayey, slightly sandy, sand is very fine, very light olive-gray, micaceous; contains hard limy zone 224 to 225 ft.....	214.0	225.0
Sandstone, sand is very fine to medium, very light brown-gray, slight induration, contains some limy areas; contains a few rootlets, seeds and bone fragment below 235 ft.....	225.0	240.0
Sandstone, sand is very fine to medium, light brownish gray, moderately calcareous, contains common rootlets; mostly noncalcareous below 255 ft.....	240.0	264.0
Sandstone, silty, some clayey to sandy silt, sand is mostly fine, light brown-gray, slightly calcareous, contains a few rootlets.....	264.0	268.0
Sandstone, sand is very fine to medium, very light brown-gray, highly calcareous, contains many rootlets; silty below 285 ft, mostly very fine to fine sand.....	268.0	290.0
Sand, in part slightly silty, sand is mostly very fine to medium, contains a few round limonitic grains below 295 ft.....	290.0	302.0

Cretaceous System - Upper Cretaceous Series - Montana Group:

Pierre Formation:

Shale, clay, light olive-gray to light gray, slightly calcareous; light yellow-gray below 304.5 ft...	302.0	306.0
Shale, clay, medium gray with mottled brown, yellow and orange.....	306.0	310.0

Shale, clay, dark gray, a little yellow-brown; contains thin bentonite layer in interval 315 to 320 ft; contains thin limonitic zones below 320 ft; slightly calcareous below 327 ft..... 310.0 330.0

12-16-19bdda
50-A-54
Buffalo County

Location: NE SE SE NW sec 19-12N-16W, approximately 1660 ft S and
 5270 ft E of NW cor sec (section is 2 miles wide)
 Ground elevation: 2248 ft (t) Hazard 7.5 minute quadrangle
 Depth to water: 117.2 ft (9/17/54)
 Electric log

	<u>Depth, in feet</u>	
	From	To
Quaternary System, undifferentiated:		
Road fill.....	0.0	1.0
Silt, slightly clayey, light yellow-gray, slightly calcareous, contains common limy nodules; contains only a trace of limy nodules below 5 ft; contains small rootlets and snail shells below 7 ft; contains very few snail shells below 10 ft.....	1.0	17.0
Silt, slightly clayey, moderately sandy, sand is very fine with some fine, light yellow-gray, in part slightly calcareous; slightly sandy 18.5 to 20 ft, brown tint.....	17.0	20.0
Silt, very slightly clayey, very slightly sandy, silt is coarse, sand is mostly very fine, light medium yellow-gray, very slightly calcareous to 21 ft; slightly finer grained below 21 ft.....	20.0	24.5
Silt, slightly clayey, moderately sandy, sand is very fine to fine with some medium, light yellowish to brownish gray; slightly to moderately clayey 25 to 27 ft, light brown; very sandy below 27 ft, light brown.....	24.5	29.0
Silt, very slightly clayey, moderately to very sandy, sand is very fine to fine, very light yellow-gray; contains some interbedded silty sand and clayey silt below 33.5 ft, very light gray.....	29.0	35.0
Sand, very silty, very slightly clayey, sand is very fine to fine, very light gray; very slightly clayey below 37.5 ft.....	35.0	38.5
Sand, very silty, sand is very fine to fine, very light gray.....	38.5	41.2
Silt, slightly clayey, moderately sandy, sand is very fine to fine, very light gray; moderately clayey 44 to 45 ft; contains a trace of medium sand below 46.5 ft.....	41.2	48.8
Sand, very silty, sand is very fine to fine with a trace of medium, very light gray.....	48.8	50.5
Silt, slightly clayey, very sandy, sand is very fine to fine, very light gray.....	50.5	52.5

Sand, moderately to very silty, sand is very fine to fine with a little medium, very light yellow-gray; slightly clayey 54.3 to 55 ft.....	52.5	55.0
Sand, moderately to very silty, sand is very fine to fine with some medium, very light yellowish gray..	55.0	60.0
Sand, very fine to fine, very light gray.....	60.0	71.5
Silt, slightly clayey, moderately sandy, sand is mostly very fine, very light yellow-gray; very slightly sandy below 72.3 ft.....	71.5	78.8
Silt, very clayey, very light gray, slight olive tint.....	78.8	80.0
Silt, slightly to moderately clayey, very slightly sandy, silt is coarse, sand is very fine, very light gray; slightly brown tint 85 to 87 ft; slightly sandy, sand is very fine to fine below 95 ft.....	80.0	98.2
Silt, slightly to moderately clayey, very light gray; moderately to very clayey 105.5 to 106.5 and 108.5 to 110 ft; light medium yellow-gray below 108.5 ft.....	98.2	110.0
Silt, moderately clayey, very light yellow-gray, slightly calcareous, contains limy nodules; light medium brown-gray below 110.5 ft, common snail shells 110.5 to 112 ft.....	110.0	114.0
Silt, moderately clayey, very slightly sandy, sand is very fine to medium, very light yellow-gray....	114.0	114.8
Sand, very fine to fine, very light gray, contains common snail shells.....	114.8	118.5
Silt, very clayey, light greenish gray, slightly calcareous; moderately clayey, very light gray below 120 ft; contains snail shell fragments 120 to 125 ft; very light brown-gray below 134 ft.....	118.5	138.6
Silt, moderately to very sandy, sand is very fine to fine, very light brown-gray, slightly calcareous; interbedded silty sand and sandy silt, slightly clayey below 139.3 ft.....	138.6	143.5
Silt, moderately clayey, very light brown-gray, slightly calcareous; slightly clayey below 144 ft; slightly sandy below 145 ft, contains a few shell fragments.....	143.5	147.0
Silt, slightly clayey, very sandy and silty sand, sand is very fine to fine with a trace of medium, very light gray, slightly calcareous.....	147.0	148.5
Silt, moderately clayey, very light brownish gray; sandy 149.1 to 149.4 ft; slightly sandy 150 to 151.4 ft, all slightly calcareous.....	148.5	151.4
Silt, slightly clayey, very sandy, contains silty sand beds, sand is very fine to fine, very light gray, contains shell fragments; light brown below 155.8 ft.....	151.4	160.0
Sand, very fine to fine, some medium, contains some thin silt layers.....	160.0	163.5

Silt, slightly clayey, in part moderately sandy, sand is very fine to fine, light brown, slightly calcareous, contains shell fragments.....	163.5	166.5
Sand, in part silty, sand is very fine to fine with some medium; interbedded with silty sand and sandy silt below 169.5 ft, light brown, slightly calcareous.....	166.5	175.0
Silt, in part slightly sandy, light brown, slightly calcareous; contains some interbedded very sandy silt below 179 ft.....	175.0	181.0
Sand, very fine to fine with a little medium; contains a sandy silt layer 186 to 187 ft, light brown, slightly calcareous.....	181.0	191.5
Silt, slightly clayey, moderately sandy, sand is mostly very fine, medium brown-gray; slightly sandy below 192.5 ft.....	191.5	195.0
Interbedded silt, slightly clayey, moderately to very sandy and silty sand, sand is very fine to fine, light brown, slightly calcareous; contains some limy nodules 202 to 205.5 ft; contains common limy nodules 271.3 to 223 ft; contains a sand 223.5 to 224.5 ft, very fine to fine with some medium; contains a few limy nodules 224.5 to 230 ft; contains common limy nodules below 230 ft.....	195.0	234.5
Sand, very fine to fine, a little medium.....	234.5	236.5
Gravel, quartz with many lithic sandstone grains....	236.5	239.5
Silt, moderately to very clayey, very light gray, slightly calcareous; very clayey 242 to 243.5 ft; slightly sandy 243.5 to 247 ft, sand is very fine to fine; very clayey 247 to 249 ft.....	239.5	249.0
Sand, silty, sand is very fine to fine with some medium; moderately clayey in upper 0.8 foot.....	249.0	252.5
Silt, moderately clayey, very light gray, in part slightly calcareous.....	252.5	255.5
Sand, very fine to fine with some medium and a trace of coarse; contains a clayey silt layer 259 to 259.5 ft; sand is very fine to medium with some coarse to very coarse below 259.5 ft.....	255.5	263.2
Silt, moderately clayey, very slightly sandy, light yellow-gray; slightly clayey, contains some very fine sand below 265 ft.....	263.2	266.5
Sand, very fine to medium, a little coarse to very coarse.....	266.5	268.8
Silt, slightly sandy, silt is coarse, sand is very fine, very light yellow-gray.....	268.8	270.0
Sand and gravel, medium sand to fine gravel, common pink and red silicates; contains a moderately clayey to sandy silt layer 279 to 279.5 ft.....	270.0	282.5

?Tertiary System - Miocene Series - Ogallala Group:

Silt, moderately clayey, moderately sandy, sand is very fine to medium with a trace of coarse and very coarse sand, light brownish gray.....	282.5	286.0
Sand, moderately silty, sand is very fine to fine with a little medium, very light gray; very silty below 290 ft, contains a trace of coarse sand, light greenish gray; slightly silty 295 to 297 ft; moderately silty 297 to 298 ft; slightly silty below 298 ft, sand is very fine to coarse with a little very coarse sand and fine gravel, contains a few rootlets.....	286.0	300.0
Sand, fine to coarse, much medium sand; some very coarse sand and trace of fine gravel below 305 ft.....	300.0	310.0
Sand and gravel, gravel is fine with some medium....	310.0	315.0
Sand, fine to coarse with some very coarse, contains some silt below 316.5 ft.....	315.0	317.0

Tertiary System - Miocene Series - Ogallala Group:

Silt, moderately clayey, moderately sandy, sand is very fine to fine, white, very calcareous, contains some volcanic ash.....	317.0	317.2
Sand, very silty, sand is very fine to fine, a little medium, very light gray, contains a little volcanic ash.....	317.2	320.5
Siltstone-sandstone, sand is very fine to fine, a little medium, white, very calcareous, well indurated in upper 2 feet.....	320.5	327.0
Sand, very silty, sand is very fine to medium, slightly indurated; moderately calcareous, contains some silty marl layers.....	327.0	334.0
Sandstone, very fine to medium, slightly to moderately calcareous; very calcareous, silty 343.7 to 344.2 ft.....	334.0	344.2
Siltstone-sandstone, sand is very fine to fine, whitish gray, moderately calcareous.....	344.2	346.5
Sandstone, sand is very fine to fine, contains limy areas; sand is very fine to medium below 350 ft; very calcareous 352 to 353 ft.....	346.5	353.0
Sandstone, very fine to medium with some coarse sand, contains some small limy areas; contains some very coarse sand in lower foot.....	353.0	356.0
Siltstone-sandstone, white, very calcareous.....	356.0	358.5
Silt, very sandy, sand is very fine to fine with some medium, slightly to moderately calcareous; slightly indurated below 360 ft.....	358.5	366.0
Sandstone, slightly silty, sand is very fine to fine with some medium, very light brownish gray, non-calcareous, well indurated.....	366.0	372.0
Silt, moderately clayey, slightly sandy, sand is fine to coarse, light greenish gray.....	372.0	377.5

Sand, fine to coarse, slightly silty in upper foot; contains much medium sand 380 to 385 ft, dark speckling; contains some lithic clay grains 385 to 392 ft; sand is mostly very fine to medium below 392 ft, slightly silty in upper foot; contains a few chalk grains below 395 ft.....	377.5	397.0
Silt, slightly clayey, very sandy, sand is very fine to fine with a little medium, very light olive-gray, slightly calcareous.....	397.0	403.5
Silt, moderately clayey, slightly sandy, sand is very fine to fine, light brown, slightly calcareous; light medium brown below 405.5 ft, contains white limy areas.....	403.5	406.5
Silt, slightly clayey, very sandy, sand is very fine to fine with some medium, very light brown-gray, moderately calcareous in upper 0.5 ft; light medium brown below 407.5 ft, non calcareous.....	406.5	409.3
Marl, very slightly sandy, very calcareous, some nodular limestone.....	409.3	410.0
Silt, moderately clayey, slightly sandy, sand is very fine to fine, white, very calcareous, contains some nodular limestone; very light brownish gray below 411.1 ft.....	410.0	412.0
Silt, slightly to moderately clayey, light brownish gray, contains limy areas and nodules; rare embedded sand grains below 415 ft, moderately clayey, contains a few ironstone and claystone grains; very clayey below 423.5 ft, slightly calcareous...	412.0	423.7
Cretaceous System - Upper Cretaceous Series - Montana Group:		
Pierre Formation:		
Shale, clay, very light gray and brown-yellow; principally very light and light gray below 429 ft, all noncalcareous.....	423.7	435.0
Shale, light and medium gray with a little brown-yellow; mottled dark gray below 452.5 ft.....	435.0	453.0
Shale, clay, dark gray, noncalcareous.....	453.0	460.0

12-18-5abdd
37-B-48
Buffalo County

Location: SE SE NW NE sec 5-12N-18W, approximately 1000 ft S and 1326 ft W of NE cor sec
 Ground elevation: 2218.2 ft (i) Mason City SW 7.5 minute quadrangle
 Depth to water: 8.6 ft (9/14/48)

	<u>Depth, in feet</u>	
	From	To
Quaternary System, undifferentiated:		
Sand, silty, sand is very fine to fine, light brown-gray.....	0.0	1.0
Silt, very sandy, sand is very fine to coarse, medium dark brown-gray, slightly calcareous.....	1.0	2.5
Sand, silty, mostly very fine to fine sand, light brown-gray, slightly calcareous.....	2.5	3.5
Silt, slightly clayey, very sandy, sand is mostly very fine, medium dark brown-gray, slightly calcareous.....	3.5	4.5
Silt, slightly sandy, silt is coarse, sand is very fine, light brown-gray, slightly to moderately calcareous, contains a few snail shells.....	4.5	6.5
Silt and sandy silt, interbedded, light gray to light bluish gray, calcareous, contains many snail shells.....	6.5	8.5
Sand, very fine to medium, light gray.....	8.5	10.0
Sand, very fine to coarse, contains scattered gravel grains; contains a little very coarse sand and fine gravel below 15 ft.....	10.0	20.0
Sand and gravel, sand and fine to medium gravel, 50 percent gravel, contains a few lithic sandstone grains; 60 percent gravel below 40 ft, contains many sandstone grains; 50 percent gravel 50 to 55 ft; 60 percent gravel 55 to 60 ft, contains some coarse gravel and pebbles.....	20.0	70.5
Tertiary System - Miocene Series - Ogallala Group:		
Sandstone, sand is very fine to fine with some medium, light olive-gray, noncalcareous; mostly very fine to fine sand below 75 ft.....	70.5	82.5
Sandstone, sandy, some silty sand, sand is very fine to fine, contains some thin silty clay layers, light greenish gray.....	82.5	86.5
Sandstone, sand is very fine to medium, light brown-gray, poorly indurated.....	86.5	90.0
Sand, fine to coarse, some very coarse, light brownish gray with pink and greenish silicates; much coarse to very coarse sand below 100 ft.....	90.0	107.0
Sand, some gravel, gravel is fine with some medium; a few limy grains.....	107.0	115.0

Sandstone, sand is very fine to medium, very light brown-gray, moderately calcareous, contains common seeds and rootlets; moderately well indurated 115 to 118.5 ft and 119.8 to 120.4 ft.....	115.0	124.5
Sandstone, fine grained, very light brownish gray and white, interlayered non to very calcareous....	124.5	129.5
Sandstone, fine grained, white, very calcareous, contains many rootlets; well indurated 132 to 134.5 ft.....	129.5	134.5
Sandstone, sand is very fine to medium, light brown-gray.....	134.5	140.0
Sandstone, fine grained, very light brown to brownish gray, moderately calcareous, contains many rootlets; very calcareous, well indurated 149 to 153 ft.....	140.0	155.0
Siltstone, clayey, light greenish gray.....	155.0	158.0
Sandstone, fine grained, light olive-gray.....	158.0	160.0
Sandstone, sand is fine to coarse, very light gray, poorly indurated.....	160.0	175.0
Sandstone, sand is very fine to medium, slightly clayey in part, light olive-gray.....	175.0	186.5
Sandstone, sand is very fine to medium with some coarse, light olive-gray; mostly very fine to medium sand 190 to 196 ft, slightly indurated, contains some rootlets; light olive to greenish gray below 196 ft, in part moderately well indurated.....	186.5	200.0
Sandstone, sand is fine to coarse with a trace of very coarse, light olive-gray, slightly indurated.	200.0	210.0
Sand, very fine to medium, very light brown-gray, very slightly indurated; slightly finer grained below 220 ft; slight induration below 230 ft; contains a few rootlets below 240 ft.....	210.0	257.0
Sandstone, very fine to fine with some medium sand, light brownish gray, slightly calcareous, contains a few rootlets, poorly indurated, contains hard calcareous layer 265 to 265.8 ft.....	257.0	266.0
Sandstone, sand is very fine to medium, very light brownish gray, moderately calcareous, contains a few rootlets; slightly more induration below 275 ft; contains less medium sand below 280 ft.....	266.0	294.5
Sandstone, fine grained with some slightly clayey to sandy silt, light greenish gray, sandstone is very calcareous, well indurated; mostly moderately calcareous, slight induration below 297.5 ft, sand is mostly very fine to fine; some medium sand below 305 ft.....	294.5	308.0
Sand, very fine to medium with some coarse, very light brown-gray; sand is very fine to medium below 310 ft.....	308.0	334.5
Silt, clayey, light olive-gray.....	334.5	337.0

Sand, fine to medium, light brown-gray.....	337.0	340.0
Hole abandoned, apparent temporary artesian flow		

12-18-17dddd
38-A-48
Buffalo County

Location: SE SE SE SE sec 17-12N-18W, 2 ft N and 18 ft W of SW cor
 sec

Ground elevation: 2284.4 ft (i) Mason City SW 7.5 minute quadrangle

Depth to water: 32.6 ft (9/13/48)

	<u>Depth, in feet</u>	
	From	To
Quaternary System, undifferentiated:		
Road fill.....	0.0	1.0
Silt, slightly clayey, medium dark brown-gray; silt is coarse, slightly sandy, below 2.5 ft sand is fine, light brown-gray.....	1.0	7.0
Silt, slightly clayey, coarse, slightly sandy, very fine sand, medium dark brownish gray; light brown-gray below 10 ft.....	7.0	14.0
Silt, slightly to moderately clayey, light to medium brown-gray, contains some very fine to fine sand; light brown-gray below 17 ft; slight yellow staining below 23.5 ft.....	14.0	25.0
Silt, slightly clayey, mottled brown-gray and brown, contains embedded sand and gravel grains.....	25.0	27.0
Silt, clayey, light gray, slight yellow staining, contains a few pelecypod shells.....	27.0	30.0
Sand, very fine to medium, light gray; contains a light bluish gray silt layer, slightly calcareous 33 to 33.5 ft, contains a few wood fragments.....	30.0	35.0
Silt, light bluish gray, slightly calcareous; contains some peat and wood fragments 40 to 45 ft; contains snail and ostracod shells below 45 ft; contains rare limy nodules in lower 0.5 ft.....	35.0	55.0
Silt, sandy, sand is very fine to fine, light bluish gray, slightly calcareous; contains thin peaty zones 60 to 65 ft, contains rare gravel grains; contains limy nodular zone at 65.5 ft; light olive-gray below 65 ft.....	55.0	73.0
Sand and gravel, quartz with pink silicates, contains many lithic grains of sandstone and limestone.....	73.0	75.0
Tertiary System - Miocene Series - Ogallala Group:		
Sandstone, fine grained, very light brown-gray, moderately calcareous, contains siliceous rootlets; contains limy areas 80 to 83 ft and a few clay granules.....	75.0	83.0
Sandstone, fine grained, very light brown, contains rootlets; contains a few clay granules below 90 ft.....	83.0	94.5

Silt, slightly clayey, sandy, sand is mostly fine grained, light olive- to brown-gray.....	94.5	95.5
Sandstone, fine grained, light brownish gray, slightly calcareous, poorly indurated; moderately well indurated below 97 ft, contains hard limy areas.....	95.5	105.0
Sandstone, fine grained, light brown to brownish gray, moderately well indurated.....	105.0	110.0
Sandstone, sand is very fine to medium, light brown-gray, moderately well indurated; contains a few limy areas below 115 ft; mostly fine grained below 120 ft, slightly to in part moderately calcareous.	110.0	125.0
Sandstone, sand is very fine to fine with some medium, light brown-gray, moderately well indurated.....	125.0	130.0
Silt, moderately clayey, sandy, sand is very fine to fine with a little medium, very light yellow- to olive-gray.....	130.0	135.0
Sand, very fine to medium, light brownish gray, slightly indurated, contains a few rootlets.....	135.0	139.0
Sandstone, sand is very fine to fine, light brownish gray, contains a clayey silt layer 142 to 142.5 ft, light yellow-gray; contains some medium sand below 145 ft; slight induration below 150 ft.....	139.0	155.0
Sandstone, fine grained; very calcareous 158 to 160 ft.....	155.0	162.0
Silt, very clayey, very light greenish gray, blocky structure, contains limy nodular areas; contains a limestone layer 164.8 to 165.1 ft.....	162.0	165.1
Silt, very clayey, light brown, blocky structure, contains thin limy layers or nodules.....	165.1	170.0
Sandstone, sand is very fine to fine, very light brownish gray, very calcareous, moderately well indurated, contains rootlets.....	170.0	174.0
Silt, very clayey, calcareous, white.....	174.0	175.0
Sandstone, sand is very fine to fine, light brown to light brownish gray, slightly to in part moderately calcareous, contains rootlets.....	175.0	178.0
Siltstone-sandstone, sand is very fine to fine, very light gray, moderately to highly calcareous; in part light brown below 180 ft.....	178.0	183.0
Silt, slightly clayey, sandy, sand is very fine to fine with some medium, light olive-gray.....	183.0	185.0
Sandstone, sand is very fine to medium; light brown; contains some interbedded very silty sand, light brown-gray.....	185.0	190.0
Sand, very fine to medium, very light brownish gray, contains thin indurated limy layers.....	190.0	210.0
Sandstone, sand is very fine to medium, light brownish gray, moderately to highly calcareous, slight to moderate induration; very slightly indurated 225 to 250 ft.....	210.0	260.0

Sandstone, sand is very fine to medium with scattered coarse sand and gravel grains; contains a white clay layer 260 to 260.5 ft, sandstone is calcareous; only slight induration below 265 ft...	260.0	273.5
Silt, clayey, very light gray.....	273.5	277.0
Sandstone, fine grained, light olive-gray, in part calcareous; slight induration below 280 ft; interbedded with some slightly clayey to sandy silt below 290 ft, contains rare gravel grains.....	277.0	290.0
Sandstone, fine grained, light brown-gray, in part calcareous, slightly indurated.....	290.0	300.0
Sandstone, fine grained, contains some sandy siltstone and thin hard layers, very light olive-gray.	300.0	310.0
Sandstone-siltstone, light brown-gray, slightly to very calcareous, slight induration.....	310.0	320.0
Sandstone, fine grained, light brown-gray, moderately calcareous, slight induration; silty below 330 ft, noncalcareous; sand is very fine to medium below 338 ft.....	320.0	345.0
Sand, very fine to medium, light brown-gray, slightly calcareous; interbedded with some silty sand and sandstone below 350 ft, in part moderately calcareous.....	345.0	360.0
Sand, very fine to medium, light brownish gray.....	360.0	369.0
Siltstone-sandstone, fine grained, light brownish gray, moderately calcareous; moderately well indurated 375 to 380 ft; slightly indurated 380 to 390 ft.....	369.0	390.0
Sandstone, fine grained, light olive-gray.....	390.0	405.0
Siltstone, light greenish gray, in part very calcareous; noncalcareous below 420 ft.....	405.0	430.0
Silt, moderately clayey, sandy, sand is mostly very fine to fine, whitish gray, slightly calcareous, contains thin siltstone layers.....	430.0	450.0
Sand, very fine to medium.....	450.0	461.5
Cretaceous System - Upper Cretaceous Series - Montana Group:		
Pierre Formation:		
Shale, light brownish gray, slightly calcareous; medium gray below 466 ft; moderately calcareous below 470 ft.....	461.5	480.0

**12-18-32addd
37-A-48
Buffalo County**

Location: SE SE SE NE sec 32-12N-18W, approximately 2585 ft S and
27 ft W of NE cor sec
Ground elevation: 2403.6 ft (i) Miller 7.5 minute quadrangle
Depth to water: 127.8 ft (9/10/48)

	<u>Depth, in feet</u>	
	From	To
Quaternary System, undifferentiated:		
Silt, moderately clayey, very slightly sandy, silt is coarse, sand is very fine, very dark brown-gray; medium dark brown-gray below 1 ft.....	0.0	2.5
Silt, moderately to very clayey, very slightly sandy, sand is very fine, medium brown-gray; slightly more clayey below 4 ft.....	2.5	5.0
Silt, slightly clayey, very slightly sandy, silt is coarse, sand is very fine, light brownish to yellowish gray; light yellow-gray 10 to 15 ft; light yellow-gray to light yellow-brown 15 to 20 ft; very light yellow-gray, slight olive tint 20 to 40 ft; very light yellow-brown 40 to 42 ft, all non-calcareous.....	5.0	42.0
Silt, moderately to very clayey, contains a trace of very fine sand, medium dark brown-gray to dark brown.....	42.0	45.0
Silt, slightly to moderately clayey, slightly sandy, mostly very fine sand, light medium brown; moderately sandy below 48 ft, sand is very fine to fine with some medium and rare coarse sand.....	45.0	55.0
Silt, slightly to moderately clayey, slightly sandy, sand is mostly very fine to fine, light brown.....	55.0	60.0
Silt, slightly to moderately clayey, moderately sandy, sand is very fine to fine with a little medium sand, medium brown; moderately to very sandy below 65 ft, sand is very fine to medium....	60.0	68.0
Sand, slightly silty, slightly clayey, sand is very fine to medium, light brown.....	68.0	72.5
Silt, very slightly clayey, very sandy, sand is very fine to medium, medium brown; contains some interbedded very silty sand 72.5 to 75 ft.....	72.5	81.5
Silt, slightly clayey, slightly to in part very sandy, sand is very fine to fine with some medium, light brown-gray to very light yellow-brown; mostly very sandy below 83 ft; contains rare coarse sand grains 83 to 85 ft.....	81.5	91.0
Silt, slightly clayey, moderately sandy, sand is very fine to fine with some medium, light brown-gray.....	91.0	95.0

Silt, moderately clayey, slightly to moderately sandy, sand is very fine to fine with some medium, very light brown-gray to very light brown.....	95.0	98.0
Silt, slightly clayey, very sandy, sand is very fine to medium with a trace of coarse sand and gravel grains, light brown; contains scattered coarse sand and gravel below 105 ft.....	98.0	108.0
Sand, fine to very coarse.....	108.0	119.0
Tertiary System - Miocene Series - Ogallala Group:		
Sand, moderately silty, slightly clayey, sand is mostly very fine to medium, light yellow gray....	119.0	124.0
Sandstone, in part slightly clayey, sand is very fine to medium with some coarser grains, very light yellow-gray, noncalcareous, contains white siliceous root fillings, moderately well indurated.....	124.0	125.0
Sand, fine to coarse, some very coarse, trace of fine gravel.....	125.0	135.0
Sand, fine to very coarse with some fine gravel; slightly finer texture below 150 ft.....	135.0	161.0
Silt, slightly clayey, moderately sandy, sand is very fine to fine, very light brown-gray, moderately calcareous.....	161.0	166.0
Silt, slightly clayey, very sandy, sand is very fine to fine, light brownish gray, very light brown in upper foot.....	166.0	173.5
Sandstone, mostly fine grained, light brown.....	173.5	176.0
Sandstone-siltstone, fine grained, light brownish gray, very calcareous, well indurated.....	176.0	178.5
Silt, slightly clayey, sandy, sand is very fine to fine, very light gray to whitish gray, very calcareous.....	178.5	180.0
Silt, slightly clayey to sandy, contains some gravel, hard calcareous layer in upper 0.5 ft....	180.0	185.0
Sand, fine to very coarse, a few gravel grains.....	185.0	196.0
Sandstone, fine grained, light brown; slightly indurated below 200 ft.....	196.0	205.5
Silt, slightly clayey, sandy, sand is mostly very fine to fine, light gray with some light brown; light gray below 207 ft.....	205.5	210.0
Sandstone, fine grained, light brownish gray; contains thin limy indurated layers at 216 and 217.5 ft.....	210.0	218.5
Silt, slightly clayey, sandy, sand is mostly very fine to medium, light brownish gray, light olive-gray in upper part.....	218.5	222.0
Sand, fine to very coarse with some fine gravel, 15 percent gravel.....	222.0	233.5
Sandy silt and sandstone interbedded, fine grained, very light brown-gray.....	233.5	236.0

Silt, moderately clayey, slightly sandy, sand is very fine to medium with some coarser grains, light yellowish gray; sand is fine to coarse below 240 ft, light olive-gray.....	236.0	244.5
Sand, some gravel, sand is fine to very coarse, gravel is fine with a little medium, light brown-gray to pink.....	244.5	276.0
Sand, very silty, slightly clayey, sand is very fine to medium, light greenish gray.....	276.0	281.5
Sand, fine to very coarse, light brown-gray to pink.	281.5	286.0
Sandstone, fine grained, whitish gray to very light brown-gray, moderately calcareous to 290 ft; contains sandy to clayey silt layer, light olive-gray 297.5 to 300 ft.....	286.0	300.0
Sand, fine to very coarse, light brown-gray to pink.	300.0	319.8
Limestone, sandy, white.....	319.8	322.5
Sandstone, fine grained, very light brown-gray, very calcareous.....	322.5	326.0
Sand, silty, very fine to fine, very light gray.....	326.0	330.0
Sand, slightly silty, sand is very fine to fine, some medium, light brown-gray.....	330.0	335.0
Sand, very fine to medium, slightly silty below 345 ft.....	335.0	350.0
Sand, slightly silty, mostly very fine to fine, slightly indurated 356 to 358 ft.....	350.0	358.0
Sand, very fine to medium, a little coarse sand, light brown-gray.....	358.0	365.0
Sand, slightly silty, sand is very fine to medium, light brown-gray.....	365.0	375.0
Sand, very fine to medium; contains some coarse sand 380 to 386 ft.....	375.0	386.0
Sand, fine to coarse, dark speckling.....	386.0	392.5
Sand, slightly silty, sand is very fine to medium, light brown-gray; very slightly silty below 395 ft.....	392.5	400.0
Sand, very fine to medium; slightly indurated 415 to 420 ft, slightly calcareous, contains limy rootlets; slightly silty 430 to 435 ft; calcareous, indurated 444 to 447.5 ft.....	400.0	458.0
Sandstone, silty, very fine to fine, some medium sand, very light brownish gray to white, very calcareous, contains some well indurated thin limy layers.....	458.0	470.0
Sand, very fine to medium, light brown-gray.....	470.0	476.5
Sandstone, sand is very fine to medium, very light gray, highly calcareous.....	476.5	480.0
Sand, very fine to medium, light brown-gray.....	480.0	487.0
Cretaceous System - Upper Cretaceous Series - Montana Group:		
Pierre Formation:		
Shale, clay, dark gray, noncalcareous.....	487.0	510.0