

3-1999

## Deuel County Test-Hole Logs: Nebraska Water Survey Test-Hole Report No. 25

Robert F. Diffendal Jr.

*University of Nebraska-Lincoln*, [rdiffendal1@unl.edu](mailto:rdiffendal1@unl.edu)

Follow this and additional works at: <http://digitalcommons.unl.edu/diffendal>



Part of the [Geology Commons](#), [Geomorphology Commons](#), [Hydrology Commons](#), and the [Stratigraphy Commons](#)

---

Diffendal, Robert F. Jr., "Deuel County Test-Hole Logs: Nebraska Water Survey Test-Hole Report No. 25" (1999). *Robert F. Diffendal, Jr., Publications*. 44.

<http://digitalcommons.unl.edu/diffendal/44>

This Article is brought to you for free and open access by the Natural Resources, School of at DigitalCommons@University of Nebraska - Lincoln. It has been accepted for inclusion in Robert F. Diffendal, Jr., Publications by an authorized administrator of DigitalCommons@University of Nebraska - Lincoln.

# **DEUEL COUNTY Test-Hole Logs**

**Written in Part and Revised and Compiled in Part from Previous  
Work of Others**

**by**

**R. F. Diffendal, Jr.**

**Nebraska Water Survey  
Test-Hole Report No. 25**

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



**March, 1999**



## TABLE OF CONTENTS

UNIVERSITY OF NEBRASKA-LINCOLN CREDITS .....	iii
ACKNOWLEDGMENTS.....	iv
INTRODUCTION .....	v
SELECTED REFERENCES .....	xi
TEST-HOLE LOGS TABLE OF CONTENTS (by legal description) .....	xii
TEST-HOLE LOGS TABLE OF CONTENTS (by year drilled) .....	xiv
TEST-HOLE LOGS .....	beginning on page 1

## FIGURES

FIGURE 1	Map showing test-hole locations .....	vi
FIGURE 2	Deuel County sample geophysical logs .....	vii
FIGURE 3	System for identifying test-hole according to its location .....	x

UNIVERSITY OF NEBRASKA-LINCOLN CREDITS

UNIVERSITY OF NEBRASKA-LINCOLN

James Moeser - Chancellor

INSTITUTE OF AGRICULTURE AND NATURAL RESOURCES

Irvin T. Omtvedt - Vice Chancellor

CONSERVATION AND SURVEY DIVISION

Mark 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, to make available to the public the results of these investigations, and to assist in the development and conservation of these resources.

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

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

Publication and price lists are furnished upon request.

March 1999

## ACKNOWLEDGMENTS

The author and compiler gratefully acknowledges the contributions of the following Conservation and Survey Division personnel for production of this test-hole log book: Frank Smith, V. Souders, H. DeGraw, D. Uhl, J. Gottula, H.P. Burleigh, R.C. Cady, J.L. Deffenbaugh, V.H. Dreeszen, E.A. Duncan, E.D. Gordon, O.C. Hansen, H.A. Haworth, D.L. Hill, C.F. Keech, R.C. Lawrence, A.L. Lugn, J.W. Nelson, H.W. Pinneker, O.J. Scherer, R.L. Schreurs, G.R. Svoboda, H.S. Unger, H.A. Waite, H. Williamson, and L.K. Wenzel for drilling help and for field and office logs; Duane Mohlman and Rod Vasek for their computer assistance; Amy Mescher for typing some of the logs, Melba Stemm for typing most of the logs; and Jerry Leach and Ann Mack for drafting the illustrations.

Logs of test holes in Deuel County published previously by the Conservation and Survey Division in Logs of Test Holes, Deuel and Garden Counties, Nebraska (1953) and in Ground Water Logs for Deuel County (1966 by F.A. Smith) are included in modified form in this report.

## INTRODUCTION

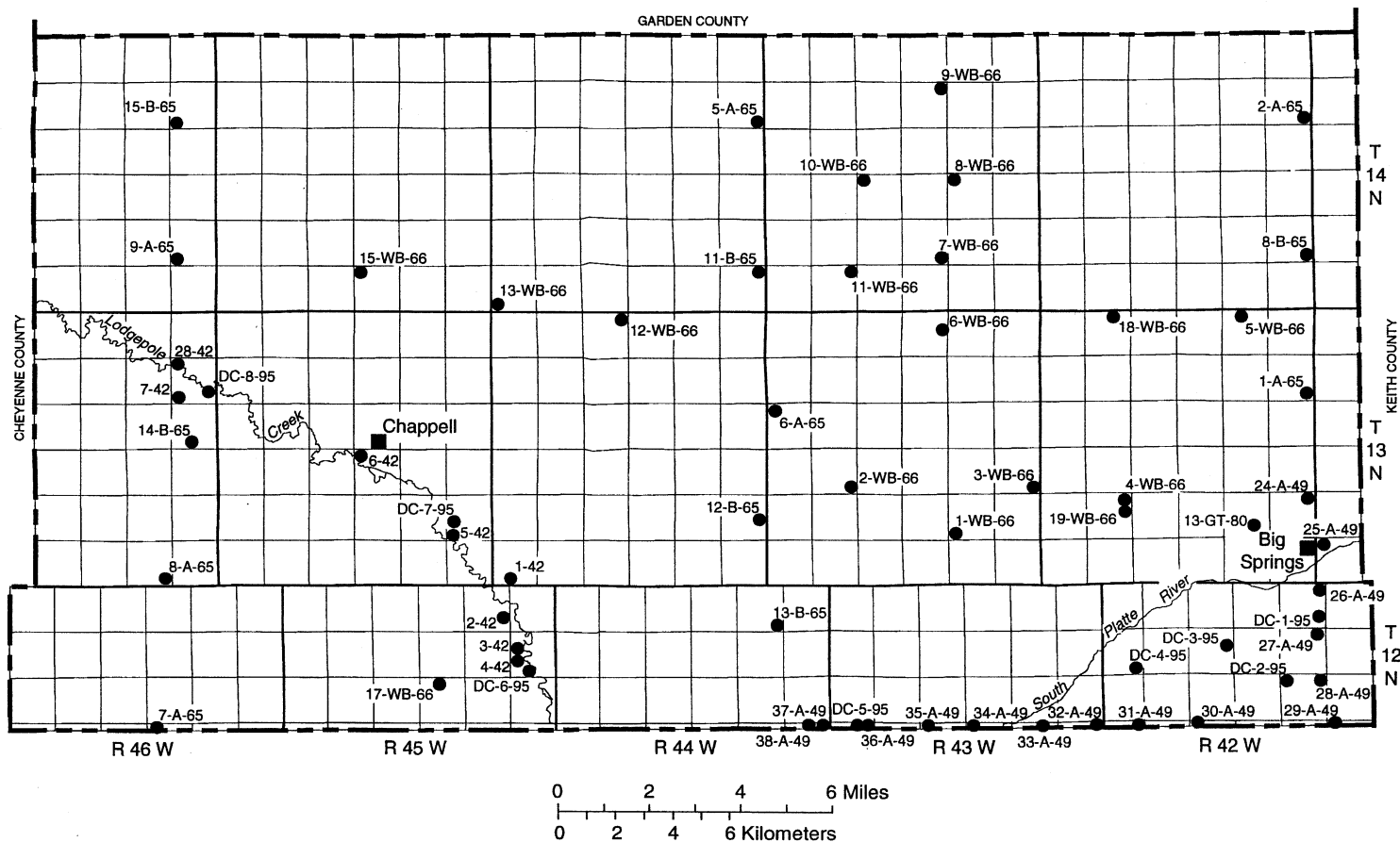
In 1930, the Conservation and Survey Division (CSD) of the University of Nebraska and the U.S. Geological Survey began a program of cooperative groundwater studies in Nebraska. Since then test drilling by use of rotary drilling equipment has been an integral part of that program. This report contains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

The map in this report shows the location of all test holes drilled in the county since 1942 (Figure 1).

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

Beginning in September 1951, some of the test holes have been logged electrically. Geophysical logs (e-logs) often can be used to determine formation boundaries more precisely than by field sampling, especially where differences in rock types from one formation to another occur at the boundary. Figure 2 is an example of geophysical logs of a test hole from Deuel County with formation boundaries shown. Departures of the curves from the center lines generally indicate that the geologic unit is becoming coarser grained. A notation on each test hole log indicates if geophysical logs are part of the original test hole data in the CSD office in Lincoln.

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. In the case of Deuel County, descriptions of strata done in earlier test hole reports are included with some revised formation information in this report.



● Test hole description published in this report

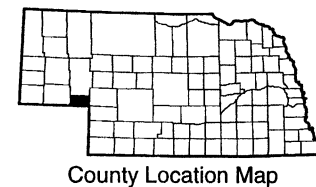
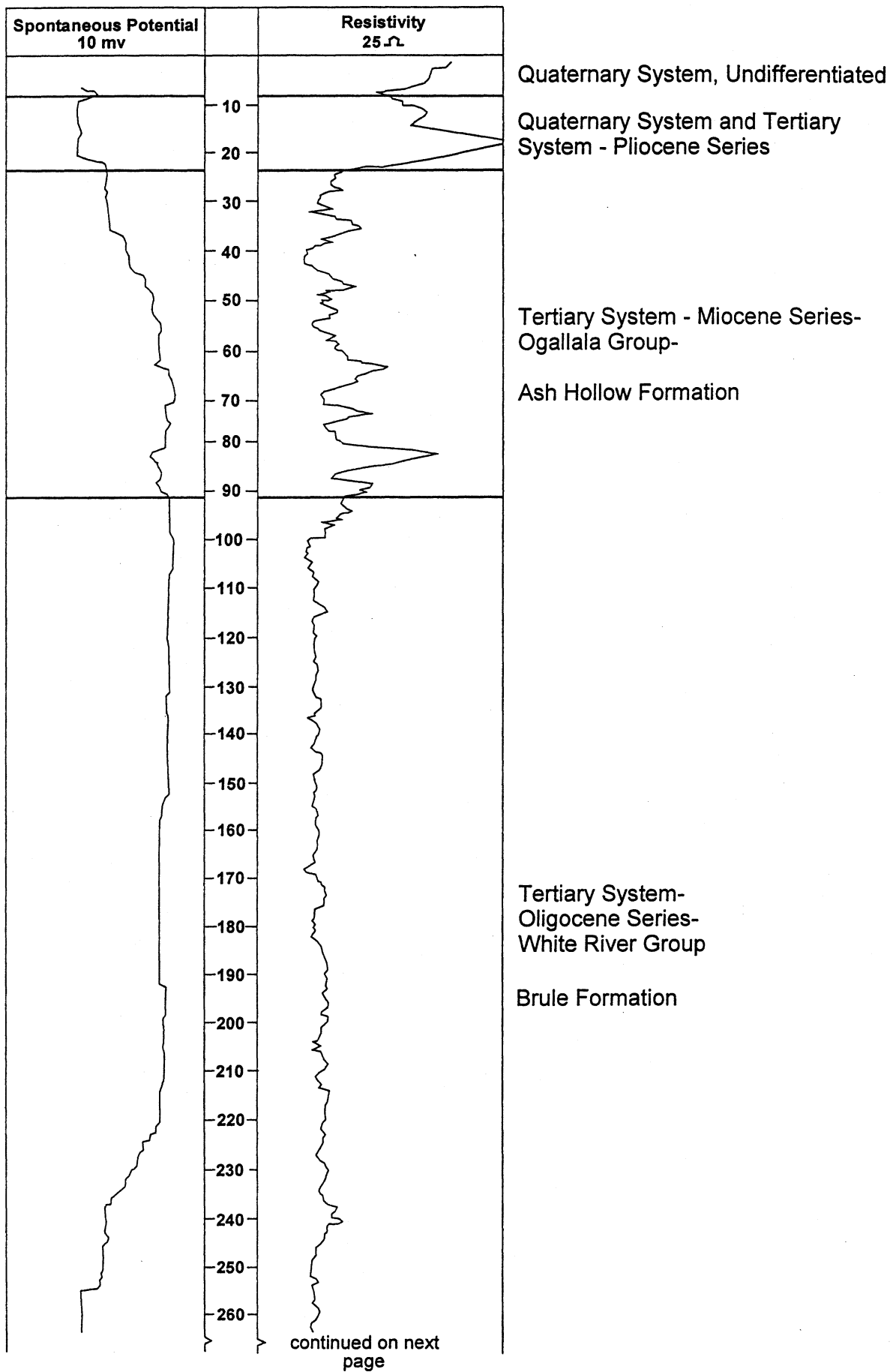
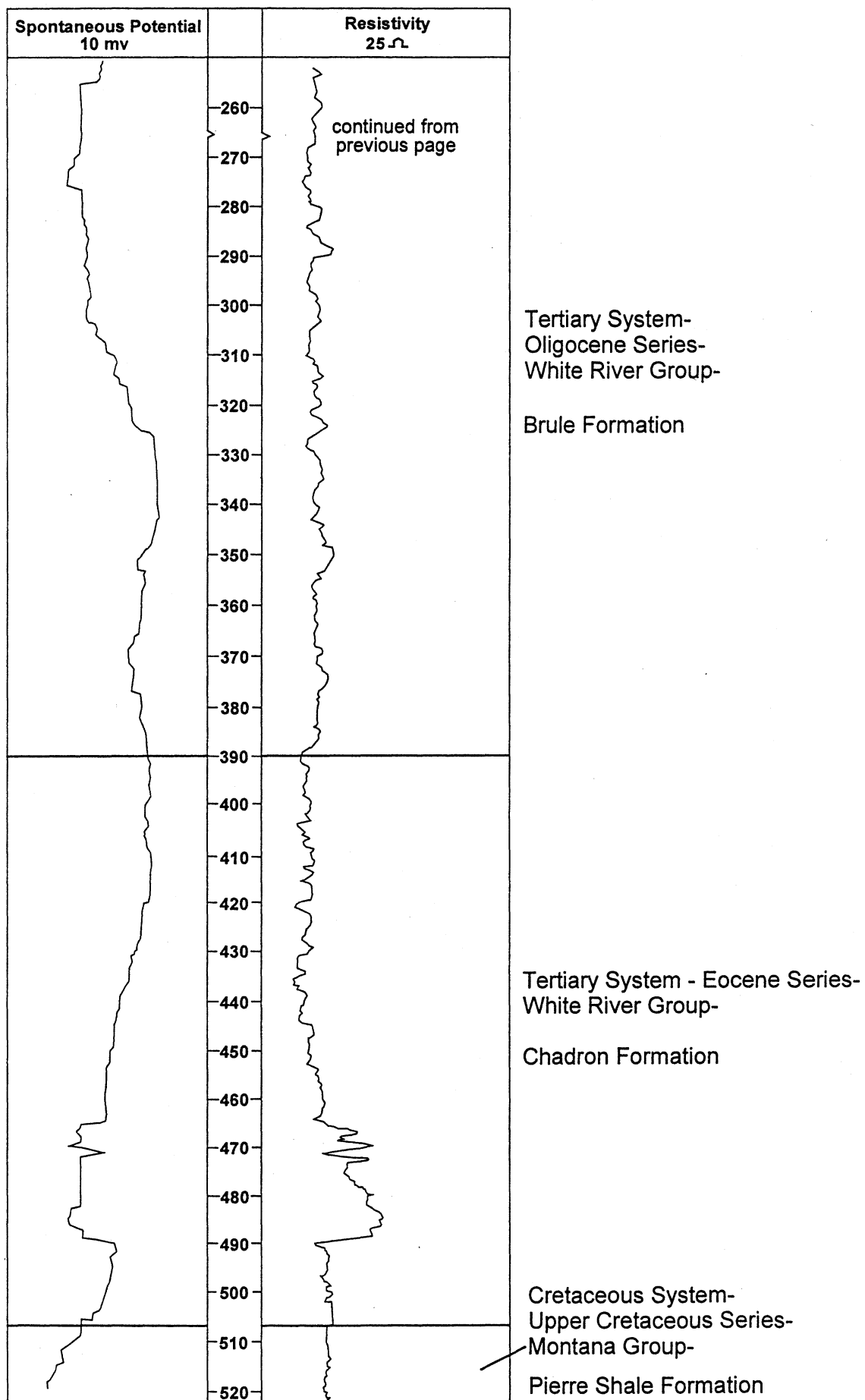


Fig. 1. Test-hole location map of Deuel County.

**Figure 2. Deuel County sample geophysical logs.**





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

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

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 and so on to the quarter-quarter-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-quarter-quarter section if more than one well is present in that area.

Three ways of indicating a location of a test-hole are shown on figure 3. The first, 5N-4E-15CADC, is used by some government agencies. The second shows the relationships of CADC to quarter sections. The third, SW $\frac{1}{4}$  SE $\frac{1}{4}$  NE $\frac{1}{4}$  SW $\frac{1}{4}$  sec. 15, T.5N., R.4E., is the method used by most other people and agencies. All three designate the same area.

A = NE 1/4  
 B = NW 1/4  
 C = SW 1/4  
 D = SE 1/4  
 1 Section =  
 1 Mile<sup>2</sup> =  
 640 Acres

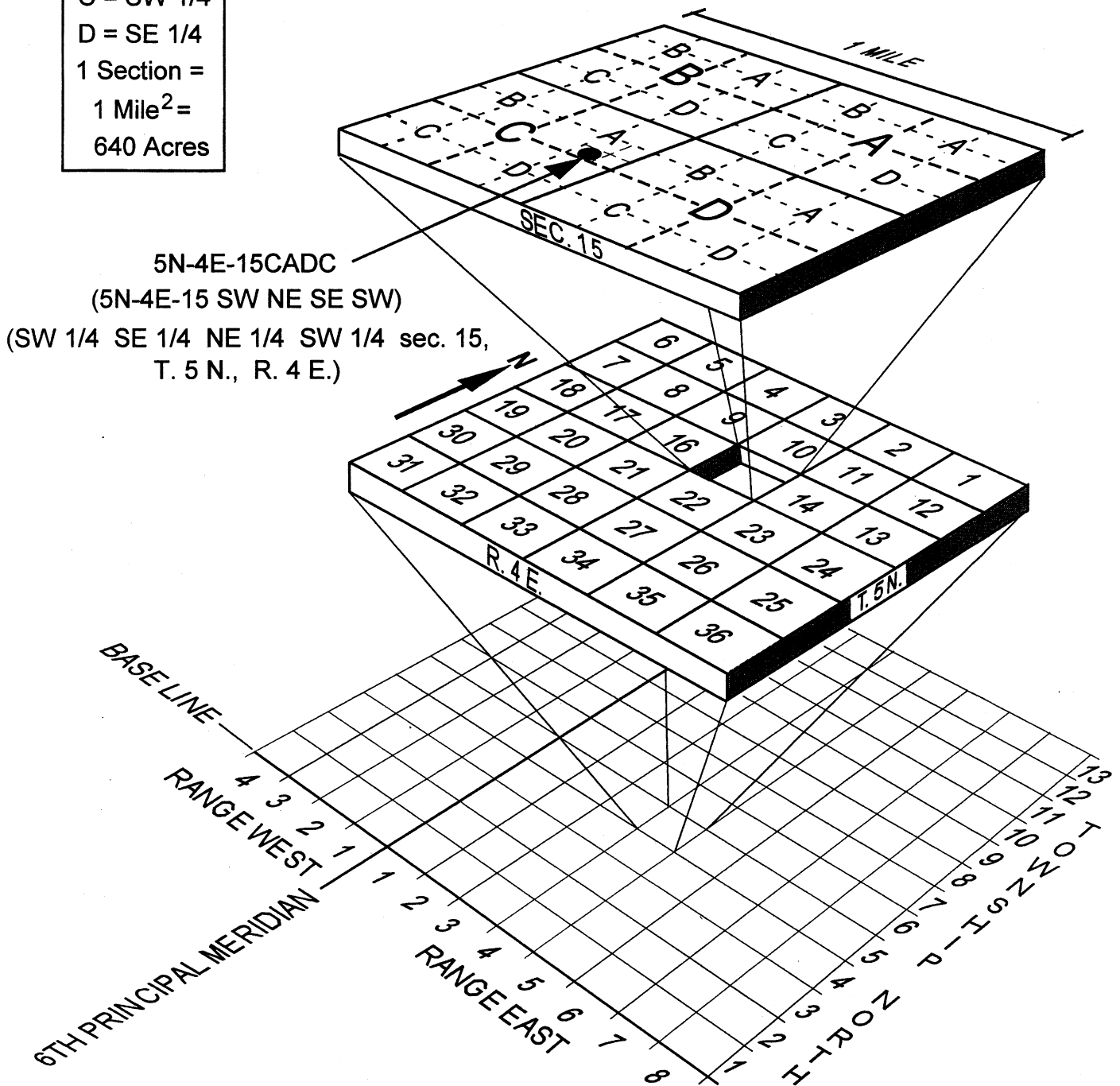


Fig. 3. System for identifying test-hole according to its location

## SELECTED REFERENCES

A few of the most recently published selected references to geology, soils and groundwater resources of Deuel County are included below. The interested reader may find citations to earlier published studies noted in these references.

### Some Publications That Are Guides to Earth Resources of Deuel County

- Swinehart, J.B., and R.F. Diffendal, Jr., 1997, Geologic map of the Scottsbluff 1° x 2° quadrangle, Nebraska and Colorado: U.S. Geological Survey, Geologic Investigations Map I-2545, 1 sheet, scale 1:250,000.
- Sautter, E.H., R.D. Greenwalt, F.D. Bertelson, J.E. Willard, R. Ulrich, and R. Olson, 1965, Soil Survey of Deuel County, Nebraska: U.S. Department of Agriculture, Soil Conservation Service, Series 1960, No. 25, 96 p. and accompanying maps.
- Gottula, J.J., 1993, A study of nonpoint source ground water contamination in Deuel County, Nebraska: A special protection area report: Nebraska Department of Environmental Quality, Water Quality Division, Ground Water Section, 113 p.

**Deuel County**  
**Test-Hole Logs Table of Contents**

Legal Descrip Twp Rge Sec	Test-Hole Number		Page
12N 42W 02AAAA	26-A-49	. . . . .	1
12N 42W 02DADC	DC-1-95	. . . . .	2
12N 42W 07DDDD	DC-4-95	. . . . .	3
12N 42W 09ADDD	DC-3-95	. . . . .	4
12N 42W 11AAAA	27-A-49	. . . . .	5
12N 42W 14AAAA	28-A-49	. . . . .	6
12N 42W 14BBBB	DC-2-95	. . . . .	8
12N 42W 19AAAD	31-A-49	. . . . .	9
12N 42W 21BBAC	30-A-49	. . . . .	12
12N 42W 24BBBC	29-A-49	. . . . .	14
12N 43W 19AAAD	36-A-49	. . . . .	16
12N 43W 19ABBC	DC-5-95	. . . . .	17
12N 43W 21BBBC	35-A-49	. . . . .	18
12N 43W 22BBBD	34-A-49	. . . . .	19
12N 43W 23ABBC	33-A-49	. . . . .	20
12N 43W 24ABBC	32-A-49	. . . . .	21
12N 44W 02DDDA	13-B-65	. . . . .	22
12N 44W 24AAAA	37-A-49	. . . . .	24
12N 44W 24BBBB	38-A-49	. . . . .	26
12N 45W 02DADD	02-42	. . . . .	27
12N 45W 12BCCC	03-42	. . . . .	28
12N 45W 12CBBB	04-42	. . . . .	29
12N 45W 12CDDC	DC-6-95	. . . . .	30
12N 45W 15BAAB	17-WB-66	. . . . .	31
12N 46W 22BBCB	07-A-65	. . . . .	32
13N 41W 31BBCB	25-A-49	. . . . .	33
13N 42W 02BAAA	5-WB-66	. . . . .	34
13N 42W 05ABBD	18-WB-66	. . . . .	37
13N 42W 12DDDA	01-A-65	. . . . .	39
13N 42W 25AAAA	24-A-49	. . . . .	40
13N 42W 26DBAA	13-GT-80	. . . . .	42
13N 42W 29AAAA	04-WB-66	. . . . .	45
13N 42W 29ADDD	19-WB-66	. . . . .	47
13N 43W 03ADDD	06-WB-66	. . . . .	49
13N 43W 18BBBB	06-A-65	. . . . .	51
13N 43W 20DDDD	02-WB-66	. . . . .	52
13N 43W 24DDDD	03-WB-66	. . . . .	54
13N 43W 26CCCC	01-WB-66	. . . . .	56
13N 44W 04AAAA	12-WB-66	. . . . .	58

13N 44W 25ADDA	12-B-65	. . . . .	60
13N 44W 31CDDD	01-42	. . . . .	61
13N 45W 22BBBC	06-42	. . . . .	62
13N 45W 25CBBC	DC-7-95	. . . . .	63
13N 45W 25CCBC	05-42	. . . . .	64
13N 46W 12BBBB	28-42	. . . . .	65
13N 46W 12CCBC	07-42	. . . . .	66
13N 46W 12DADD	DC-8-95	. . . . .	67
13N 46W 13CDCC	14-B-65	. . . . .	68
13N 46W 35DDDD	08-A-65	. . . . .	69
14N 42W 12DDDD	02-A-65	. . . . .	70
14N 42W 25DDAA	08-B-65	. . . . .	71
14N 43W 10AAAA	09-WB-66	. . . . .	73
14N 43W 21BBBB	10-WB-66	. . . . .	76
14N 43W 23BBBB	08-WB-66	. . . . .	78
14N 43W 27DDDD	07-WB-66	. . . . .	81
14N 43W 32AAAA	11-WB-66	. . . . .	84
14N 44W 12DDDD	05-A-65	. . . . .	86
14N 44W 31CCCC	13-WB-66	. . . . .	87
14N 44W 36AAAA	11-B-65	. . . . .	89
14N 45W 34BBCB	15-WB-66	. . . . .	90
14N 46W 12CCDD	15-B-65	. . . . .	92
14N 46W 25CCDC	09-A-65	. . . . .	93

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

Deuel County  
Test-Hole Logs Table of Contents

Arranged by year drilled, test-hole number.

1942

13N 44W 31CDDD	01-42	. . . . .	61
12N 45W 02DADD	02-42	. . . . .	27
12N 45W 12BCCC	03-42	. . . . .	28
12N 45W 12CBBB	04-42	. . . . .	29
13N 45W 25CCBC	05-42	. . . . .	64
13N 45W 22BBBC	06-42	. . . . .	62
13N 46W 12CCBC	07-42	. . . . .	66
13N 46W 12BBBB	28-42	. . . . .	65

1949

13N 42W 25AAAA	24-A-49	. . . . .	40
13N 41W 31BBCB	25-A-49	. . . . .	33
12N 42W 02AAAA	26-A-49	. . . . .	1
12N 42W 11AAAA	27-A-49	. . . . .	5
12N 42W 14AAAA	28-A-49	. . . . .	6
12N 42W 24BBBC	29-A-49	. . . . .	14
12N 42W 21BBAC	30-A-49	. . . . .	12
12N 42W 19AAAD	31-A-49	. . . . .	9
12N 43W 24ABBC	32-A-49	. . . . .	21
12N 43W 23ABBC	33-A-49	. . . . .	20
12N 43W 22BBBD	34-A-49	. . . . .	19
12N 43W 21BBBC	35-A-49	. . . . .	18
12N 43W 19AAAD	36-A-49	. . . . .	16
12N 44W 24AAAA	37-A-49	. . . . .	24
12N 44W 24BBBB	38-A-49	. . . . .	26

1965

13N 42W 12DDDA	01-A-65	. . . . .	39
14N 42W 12DDDD	02-A-65	. . . . .	70
14N 44W 12DDDD	05-A-65	. . . . .	86
13N 43W 18BBBB	06-A-65	. . . . .	51
12N 46W 22BBCB	07-A-65	. . . . .	32
13N 46W 35DDDD	08-A-65	. . . . .	69
14N 42W 25DDAA	08-B-65	. . . . .	71
14N 46W 25CCDC	09-A-65	. . . . .	93



**Test Hole #26-A-49 (No e-logs)**  
**(12N-42W-2aaaa)**  
**Deuel County**

Location: NE NE NE NE sec. 2, T. 12 N., R. 42 W., approximately 51 feet south and 15 feet west of northeast corner.  
 Ground elevation: 3,364.0 ft. (t). (Big Springs 7.5 min. quadrangle).  
 Depth to water: 4.9 ft. (7-21-49).

Depth, in feet  
 From To

**Quaternary System, undifferentiated:**

Soil: silt, sandy, slightly calcareous, dark brownish gray; dark gray below 1.0 ft.....	0.0	3.0
Clay, very light greenish gray with some brownish yellow stain.....	3.0	7.0
Sand and some gravel; texture grades from fine sand to gravel; contains some coarse gravel below 10.0 ft.....	7.0	26.5
Silt, slightly sandy, light brownish buff.....	26.5	30.0
Sand and some gravel, brown, pink and tan; texture grades from very fine sand to gravel.....	30.0	34.3

**Tertiary System - Oligocene Series - White River Group:**

**Brule Formation:**

Silt, slightly sandy, slightly calcareous, light brownish buff.....	34.3	36.5
Sand, interbedded with sandy silt; texture grades from fine to coarse.....	36.5	40.0
Silt, slightly sandy, moderately calcareous, buff-tan.....	40.0	42.0
Silt, slightly clayey, moderately calcareous, brownish gray.....	42.0	45.0
Silt, slightly sandy, moderately to very calcareous, light brownish gray; contains hard limy layers....	45.0	46.5
Silt, sandy, slightly calcareous, light brownish buff.....	46.5	50.0
Sand, very silty, slightly calcareous, light brown; contains hard limy layers.....	50.0	52.0
Sand, interbedded with silt, light brown and tan....	52.0	58.5
Silt, slightly sandy, light brownish gray; slightly calcareous from 58.5 to 60.0 ft; light reddish brown and white below 60.0 ft.....	58.5	64.0
Clay, slightly calcareous, light olive green; slightly silty below 68.0 ft, light brown; contains limy layers.....	64.0	70.0
Silt, slightly sandy, reddish brown; slightly blocky structure from 70.0 to 73.5 ft; moderately calcareous and brownish gray below 73.5 ft.....	70.0	75.0
Silt, slightly clayey to sandy, brown; slightly calcareous from 75.0 to 80.0 ft.....	75.0	85.0
Silt, slightly clayey, brown.....	85.0	90.0

**Test Hole DC-1-95 (No e-logs)**  
**(12N-42W-02dadC)**  
**Deuel County**

Location: SW SE NE SE sec. 2, T. 12 N., R. 42 W., 1,475 feet north  
 and 425 feet west of southeast corner.  
 Ground elevation: 3,378.0 ft. (t). (Big Springs 7.5 min. quadrangle).  
 Depth to water: Unknown. (5-17-95).

	<u>Depth, in feet</u>	
	From	To
<b>Quaternary System, undifferentiated:</b>		
Top soil, silty sand, clayey.....	0.0	5.0
Sand and gravel, granitic.....	5.0	88.0
<b>Tertiary System - Miocene Series - Ogallala Group:</b>		
<b>Ash Hollow Formation:</b>		
Sandstone, silty, white to brown, with calcareous cement.....	88.0	100.0
<b>Tertiary System - Oligocene Series - White River Group:</b>		
<b>Brule Formation:</b>		
Siltstone, sandy, brown, clay cement.....	100.0	120.0

**Test Hole DC-4-95 (No e-logs)**  
**(12N-42W-07dddd)**  
**Deuel County**

Location: SE SE SE SE sec. 7, T. 12 N., R. 42 W., 300 feet north and  
20 feet west of southeast corner.

Ground elevation: 3,407.0 ft. (t). (Barton 7.5 min. quadrangle).

Depth to water: Unknown. (5-18-95).

Depth, in feet  
From To

**Quaternary System, undifferentiated:**

Top soil, dark brown, sandy.....	0.0	5.0
Sand and gravel, granitic.....	5.0	30.0
Sand, silty, with clay, brown.....	30.0	40.0
Sand, coarse, granitic.....	40.0	50.0
Silt, sandy, brown.....	50.0	60.0

**Test Hole DC-3-95 (No e-logs)  
(12N-42W-09add)  
Deuel County**

Location: SE SE SE NE sec. 9, T. 12 N., R. 42 W., 2,700 feet north and 27 feet west of southeast corner.

Ground elevation: 3,400.0 ft. (t). (Big Springs 7.5 min. quadrangle).

Depth to water: Unknown. (5-18-95).

Depth, in feet  
From To

**Quaternary System, undifferentiated:**

Top soil, sandy, dark gray, with light gray silt below.....	0.0	10.0
Sand and gravel, granitic.....	10.0	75.0

**Test Hole #27-A-49 (No e-logs)**  
**(12N-42W-11aaaa)**  
**Deuel County**

Location: NE NE NE NE sec. 11, T. 12 N., R. 42 W., approximately 9 feet south and 69 feet west of northeast corner.  
 Ground elevation: 3,384.0 ft. (i). (Big Springs 7.5 min. quadrangle).  
 Depth to water: 10.3 ft. (7-21-49).

	<u>Depth, in feet</u>	
	From	To
<b>Quaternary System, undifferentiated:</b>		
Road fill.....	0.0	0.5
Silt, clayey, dark brown.....	0.5	2.5
Silt, slightly sandy, black.....	2.5	3.5
Silt, clayey, grayish brown.....	3.5	6.0
Silt, slightly calcareous, light brown.....	6.0	7.5
Sand and some gravel, pink and tan; texture grades from fine sand to gravel.....	7.5	10.0
Sand and gravel, pink and tan, about 40 percent gravel.....	10.0	20.0
Sand and gravel, pink and tan, 60 percent gravel; yellow below 30.0 ft.....	20.0	40.0
Sand and gravel, pink and tan, 40 percent gravel....	40.0	60.0
Sand and some gravel, pink and tan; texture grades from sand to fine gravel; contains less gravel below 70.0 ft.....	60.0	81.5
Clay, slightly silty; light olive green; slightly calcareous.....	81.5	90.0
Clay, bluish green; contains olive green clay below 102.5 ft.....	90.0	110.0
Sand and gravel, yellow, pink and tan; 40 percent gravel.....	110.0	130.0
Sand; texture grades from fine to very coarse; contains a trace of gravel.....	130.0	156.0
<b>Tertiary System - Oligocene Series - White River Group:</b>		
<b>Brule Formation:</b>		
Clay, silty, light brownish buff; blocky structure below 160.0 ft.....	156.0	170.0

**Test Hole #28-A-49 (No e-logs)**  
**(12N-42W-14aaaa)**  
**Deuel County**

Location: NE NE NE NE sec. 14, T. 12 N., R. 42 W., approximately 57 feet south and 9 feet west of northeast corner.

Ground elevation: 3,436.0 ft. (i). (Big Springs 7.5 min. quadrangle).

Depth to water: 57.4 ft. (7-31-49).

	<u>Depth, in feet</u>	
	From	To
<b>Quaternary System, undifferentiated:</b>		
Silt, sandy, dark gray to brown.....	0.0	1.0
Sand and gravel, texture grades from coarse sand to gravel; contains fine sand to gravel below 5.0 ft.	1.0	10.0
Silt, slightly sandy, brown; texture of sand grades from very fine to coarse.....	10.0	14.5
<b>Tertiary System - Miocene Series - Ogallala Group:</b>		
<b>Ash Hollow Formation:</b>		
Silt, sandy, moderately calcareous, white; contains limy layers.....	14.5	16.5
Silt, sandy, slightly calcareous, light brown; contains medium sand below 20.0 ft; noncalcareous from 25.0 to 30.0 ft.....	16.5	30.0
Silt, sandy, slightly calcareous, greenish brown; contains medium sand.....	30.0	35.0
Silt, slightly sandy, grayish white; contains limy layers.....	35.0	37.0
Silt, sandy, light brownish buff.....	37.0	39.0
Silt, slightly sandy, slightly calcareous, grayish white; contains limy layers; reddish brown below 40.0 ft.....	39.0	53.5
Sand, silty, slightly calcareous, light brown; texture of sand grades from medium to coarse; contains more sand and limy layers below 58.0 ft.....	53.5	60.0
Silt, slightly sandy, slightly calcareous, light brownish buff.....	60.0	65.0
Sand, silty, light brown; contains hard layer from 65.0 to 66.5 ft.....	65.0	70.0
Silt, slightly sandy, slightly calcareous, light brown.....	70.0	75.0
Silt, light brownish buff.....	75.0	82.5
Silt, very calcareous, grayish white.....	82.5	85.0
Silt, slightly sandy, light brownish gray; slightly calcareous below 90.0 ft.....	85.0	95.0
Silt, slightly calcareous, light brownish buff.....	95.0	100.0
Silt, very calcareous, grayish white.....	100.0	102.5
Silt, light brownish buff; contains sand below 105.0 ft.....	102.5	110.0
Silt, slightly sandy, very calcareous, grayish white	110.0	115.0
Silt, slightly sandy, light brown to brown.....	115.0	120.0

Silt, sandy, moderately calcareous, light brownish buff.....	120.0	126.0
Sand, gray to yellowish brown; texture of sand grades from fine to coarse.....	126.0	130.0
Silt, grayish brown.....	130.0	143.0
Sand, yellow and pink; texture of sand grades from very fine to coarse.....	143.0	155.5
<b>Tertiary System - Oligocene Series - White River Group:</b>		
<b>Brule Formation:</b>		
Silt, light brown to buff.....	155.5	160.0
Clay, slightly silty, reddish brown; blocky in part.	160.0	180.0

**Test Hole DC-2-95 (No e-logs)**  
**(12N-42W-14bbbb)**  
**Deuel County**

Location: NW NW NW NW sec. 14, T. 12 N., R. 42 W., 40 feet south and  
 20 feet east of northwest corner.

Ground elevation: 3,439.0 ft. (t). (Big Springs 7.5 min. quadrangle).

Depth to water: Unknown. (5-18-95).

	<u>Depth, in feet</u>	
	From	To
<b>Quaternary System, undifferentiated:</b>		
Top soil, sandy, arkosic, brown.....	0.0	5.0
Sand and gravel, granitic.....	5.0	85.0
<b>Tertiary System - Miocene Series - Ogallala Group:</b>		
<b>Ash Hollow Formation:</b>		
Sand, fine, white to brown and sandstone, white, calcareous cement.....	85.0	95.0
Sandstone, silty, brown, reddish brown and white....	95.0	110.0

**Test Hole #31-A-49 (No e-logs)**  
**(12N-42W-19aaad)**  
**Deuel County**

Location: SE NE NE NE sec. 19, T. 12 N., R. 42 W., approximately 643 feet south and 7 feet west of northeast corner.

Ground elevation: 3,485.0 ft. (i). (Barton 7.5 min. quadrangle).

Depth to water: 23.2 ft. (7-31-49).

	<u>Depth, in feet</u>	
	From	To
<b>Quaternary System, undifferentiated:</b>		
Road fill and soil: silt, sandy.....	0.0	1.0
Silt, dark gray; contains a trace of coarse sand; lighter in color from 5.0 to 7.0 ft; grayish brown below 7.0 ft.....	1.0	10.0
<b>Tertiary System - Miocene Series - Ogallala Group:</b>		
<b>Ash Hollow Formation:</b>		
Silt, sandy, moderately calcareous, light pink; contains a few pebbles.....	10.0	13.0
Silt, slightly sandy, moderately calcareous, light brown; contains a few limy layers.....	13.0	22.0
Silt, slightly clayey to slightly sandy, slightly calcareous, reddish brown; contains calcareous nodules below 25.0 ft.....	22.0	27.0
Clay, silty to slightly sandy, brown.....	27.0	30.0
Sand, silty; contains limy layers; texture of sand grades from very fine to medium with a trace of coarse sand; contains a few reddish brown clay fragments.....	30.0	35.0
Silt, sandy, brown; very fine texture sand; contains interbedded coarser sand and some limy layers.....	35.0	40.0
Silt, sandy, very calcareous, light gray; contains very hard limy layers.....	40.0	41.5
Clay, slightly sandy, light brown; contains clay fragments.....	41.5	45.0
Silt, slightly clayey to sandy, slightly calcareous, light brown to buff; contains clay fragments.....	45.0	50.0
Clay, slightly silty, light reddish brown; contains limy nodules.....	50.0	54.0
Silt, moderately calcareous, light brown; contains some limy nodules.....	54.0	60.0
Silt, slightly sandy; light brown; slightly calcareous below 65.0 ft; contains some clay below 67.5 ft.....	60.0	70.0
Sand, brown to pink; texture of sand grades from fine to coarse; contains some limy layers.....	70.0	87.5
Clay, brownish gray.....	87.5	90.0
Sand, brown, tan and pink; texture of sand grades from fine to coarse with some fine to medium gravel.....	90.0	116.5
Silt, light brown.....	116.5	117.5

Silt, slightly sandy, very calcareous, light gray; moderately calcareous and grayish brown below		
125.0 ft.....	117.5	130.0
Silt, slightly calcareous, light gray.....	130.0	135.5
Silt to siltstone, moderately calcareous, brown to gray; contains some gravel.....	135.5	149.0
<b>Tertiary System - Oligocene Series - White River Group:</b>		
<b>Brule Formation:</b>		
Siltstone, brown; blocky structure.....	149.0	155.0
Siltstone, slightly silty, reddish brown; blocky structure; slightly more reddish below 195 ft.....	155.0	230.0
Siltstone, slightly silty to slightly sandy, reddish brown; blocky structure.....	230.0	237.0
Siltstone, slightly silty, reddish brown and olive green; blocky structure.....	237.0	250.0
Siltstone, very silty, light greenish green.....	250.0	255.0
Siltstone, slightly silty, light reddish brown; blocky structure.....	255.0	260.0
<b>Tertiary System - Eocene Series - White River Group:</b>		
<b>Chadron Formation:</b>		
Clay, slightly silty, slightly calcareous, light olive green; lighter color from 270.0 to 275.0 ft; darker color and blocky structure below 275.0 ft..	260.0	280.0
Clay, silty, slightly calcareous, light brown with a green tint; blocky structure in part.....	280.0	290.0
Clay, slightly silty, reddish brown; blocky structure.....	290.0	293.0
Clay, slightly silty to slightly sandy, dark green; contains more sand and light green below 296.0 ft.	293.0	298.0
Sand, light green; texture of sand grades from very fine to medium.....	298.0	300.0
Limestone.....	300.0	303.5
Silt, sandy, light green.....	303.5	305.0
Clay, slightly silty, light to dark green.....	305.0	310.0
Clay, slightly silty, reddish brown; blocky structure; grayish green below 320.0 ft.....	310.0	325.0
Clay, silty to slightly sandy, greenish brown; blocky structure.....	325.0	330.0
Clay, slightly silty, olive green; blocky structure.	330.0	335.0
Clay, silty, light green.....	335.0	345.0
Clay, slightly silty, olive green; blocky structure.	345.0	350.0
Clay, silty, light green.....	350.0	360.0
Clay, silty to sandy, green; contains less sand below 365.0 ft; dark green and blocky structure below 375.0 ft.....	360.0	390.0
Clay, slightly silty, light green.....	390.0	410.0
Clay, slightly silty, light green; blocky structure; contains volcanic ash.....	410.0	415.0
Clay, slightly silty, light green.....	415.0	421.5
Sand, principally quartz; indurated from 421.5 to 423.0 ft.....	421.5	425.0

Sand, light green; texture of sand grades from fine to coarse; contains some black sand and limy layers below 430.0 ft.....	425.0	450.0
Silt, sandy, light green; contains very fine sand...	450.0	460.0
<b>Cretaceous System - Upper Cretaceous Series - Montana Group:</b>		
<b>Pierre Shale Formation:</b>		
Shale, clayey, dark gray.....	460.0	470.0
Shale, clayey, to slightly silty, dark gray.....	470.0	480.0

**Test Hole #30-A-49 (No e-logs)**  
**(12N-42W-21bbac)**  
**Deuel County**

Location: SW NE NW NW sec. 21, T. 12 N., R. 42 W., approximately 528 feet south and 792 feet east of northwest corner.

Ground elevation: 3,495.0 ft. (t). (Barton 7.5 min. quadrangle).

Depth to water: 93.7 ft. (7-31-49).

	<u>Depth, in feet</u>	
	From	To
<b>Quaternary System, undifferentiated:</b>		
Soil: silt, slightly sandy, dark gray.....	0.0	1.5
Silt, black.....	1.5	2.5
Silt, brownish gray.....	2.5	4.5
Sand, brown; texture of sand grades from very fine to coarse with a trace of fine gravel; contains silt layers below 15.0 ft.....	4.5	20.0
Silt, slightly sandy, reddish brown; grayish brown below 25.0 ft.....	20.0	27.5
Silt, sandy, light reddish brown and green.....	27.5	30.0
Sand, slightly silty, slightly calcareous, light brownish buff; texture of sand grades from very fine to medium.....	30.0	35.0
<b>Tertiary System - Miocene Series - Ogallala Group:</b>		
<b>Ash Hollow Formation:</b>		
Sand, slightly silty, light brown; texture of sand grades from very fine to medium; contains indurated layers.....	35.0	40.0
Silt, slightly sandy, slightly calcareous, light tan; contains hard limy layers.....	40.0	45.0
Silt, sandy, moderately calcareous, light brownish buff; contains limy layers; reddish brown below 55.0 ft.....	45.0	60.0
Sand, silty, moderately calcareous, light reddish brown; texture of sand grades from very fine to medium; light brown and very calcareous below 65.0 ft.....	60.0	70.0
Silt, very sandy, to sand, very silty, moderately calcareous, light brown; texture of sand grades from very fine to medium; slightly calcareous below 75.0 ft.....	70.0	80.0
Silt, slightly sandy, greenish gray; contains less sand below 85.0 ft.....	80.0	90.0
Clay, slightly silty, light olive green.....	90.0	91.0
Silt, slightly sandy, moderately calcareous, light gray; contains very fine sand; reddish brown below 95.0 ft; slightly calcareous and hard limy layers below 100.0 ft.....	91.0	110.0
Silt, very sandy, to sand, very silty, reddish brown; texture of sand grades from very fine to coarse with a trace of gravel.....	110.0	120.0

Clay, slightly calcareous, light brownish buff.....	120.0	121.0
Sand; texture of sand grades from medium to very coarse; contains some gravel and calcareous nodules.....	121.0	130.0
Sand and gravel, brown and pink, 30 percent gravel; texture grades from fine sand to gravel; contains calcareous nodules below 140.0 ft; 40 percent gravel below 160.0 ft.....	130.0	170.0
Sand; texture of sand grades from fine to very coarse with a trace of gravel; contains limy layers; contains very hard limy layers below 180.0 ft.....	170.0	185.0
<b>Tertiary System - Oligocene Series - White River Group:</b>		
<b>Brule Formation:</b>		
Silt, slightly clayey, slightly calcareous, light brown; contains hard limy layers.....	185.0	200.0
Clay, slightly silty, greenish brown; blocky structure; brown from 220.0 to 235.0 ft; reddish brown below 235.0 ft.....	200.0	240.0

**Test Hole #29-A-49 (No e-logs)**  
**(12N-42W-24bbbc)**  
**Deuel County**

Location: SW NW NW NW sec. 24, T. 12 N., R. 42 W., approximately 573 feet south and 31 feet east of northwest corner.

Ground elevation: 3,537.0 ft. (i). (Big Springs 7.5 min. quadrangle).

Depth to water: 102.8 ft. (7-31-49).

Depth, in feet  
From                  To

**Quaternary System, undifferentiated:**

Silt, slightly sandy, moderately calcareous, light reddish brown; contains a trace of coarse sand....	0.0	2.5
Sand and gravel; texture grades from fine sand to medium gravel; about 30 percent gravel; slightly finer texture below 5.0 ft.....	2.5	10.0
Gravel and sand, 40 percent sand; contains some pebbles.....	10.0	20.0
Sand and gravel, brown and pink; 40 percent gravel; contains 30 percent gravel below 30.0 ft.....	20.0	40.0

**Tertiary System - Miocene Series - Ogallala Group:**

**Ash Hollow Formation:**

Sand, pinkish brown; texture of sand grades from fine to very coarse; contains some gravel and limy nodules.....	40.0	47.5
Clay, light olive green; slightly silty below 50.0 ft.....	47.5	52.5
Silt, clayey, light reddish brown.....	52.5	56.0
Silt, slightly clayey to slightly sandy, moderately calcareous, pink and reddish brown.....	56.0	60.0
Silt, slightly clayey, light brown; contains calcareous nodules and clay fragments.....	60.0	70.0
Silt, slightly clayey, slightly calcareous, reddish brown.....	70.0	75.0
Silt, slightly clayey, slightly calcareous, light olive green; contains hard limy layer from 78.0 to 78.5 ft.....	75.0	82.5
Silt, brown; contains limy nodules below 85.0 ft....	82.5	90.0
Silt, slightly sandy, slightly calcareous, light buff; contains calcareous nodules.....	90.0	93.5
Clay, slightly silty to sandy, slightly calcareous, light reddish brown.....	93.5	95.0
Clay, slightly silty, reddish brown; blocky structure in part.....	95.0	100.0
Silt, sandy, to slightly clayey, light reddish brown; slightly lighter in color and more clayey below 105.0 ft; slightly calcareous below 110.0 ft.....	100.0	114.0
Sand and gravel, brown and pink; 30 percent gravel; texture grades from fine sand to medium gravel....	114.0	123.0

Sand, slightly silty, tannish buff, very fine grained sand; trace of mica.....	123.0	132.0
Sand, brown and pink; texture of sand grades from very fine to very coarse; contains calcareous nodules.....	132.0	140.0
Sand and gravel, brown and pink; texture grades from fine sand to gravel, 40 percent gravel.....	140.0	158.5
Clay, silty, light tannish buff.....	158.5	160.0
Silt, sandy, light brown; contains limy layers; less sandy and slightly calcareous below 165.0 ft.....	160.0	170.0
Silt, sandy, moderately calcareous, light olive green; contains limy layers; brownish below 175.0 ft.....	170.0	180.0
Silt, slightly sandy, slightly calcareous, light gray; contains limy layers.....	180.0	190.0
Sand, silty, slightly calcareous, light gray; texture of sand grades from very fine to fine; contains limy layers.....	190.0	200.0
<b>Tertiary System - Oligocene Series - White River Group:</b>		
<b>Brule Formation:</b>		
Silt, slightly clayey to slightly sandy, slightly calcareous, light green; contains limy layers.....	200.0	210.0
Clay, silty to sandy, reddish brown; blocky structure; dark brown below 220.0 ft.....	210.0	230.0

**Test Hole #36-A-49 (No e-logs)**  
**(12N-43W-19aaad)**  
**Deuel county**

Location: SE NE NE NE sec. 19, T. 12 N., R. 43 W., approximately 500 feet south and 89 feet west of northeast corner.

Ground elevation: 3,494.0 ft. (t). (Chappell SE 7.5 min. quadrangle).

Depth to water: 35.2 ft. (8-4-49).

	<u>Depth, in feet</u>	
	From	To
<b>Quaternary System, undifferentiated:</b>		
Clay, dark brownish gray.....	0.0	2.5
Silt, slightly clayey, dark brown.....	2.5	5.0
Silt, slightly sandy, moderately calcareous, light brown.....	5.0	9.0
<b>Tertiary System - Miocene Series - Ogallala Group:</b>		
<b>Ash Hollow Formation:</b>		
Sand and gravel; texture grades from very fine sand to gravel, 40 percent gravel; contains limy nodules.....	9.0	20.0
Silt, slightly sandy, tannish buff.....	20.0	35.0
Silt, sandy; contains very fine sand and limy layers	35.0	44.5
Sand and gravel, brownish pink; texture grades from very fine sand to gravel, about 50 percent gravel; contains silt layer from 47.5 to 48.0 ft.....	44.5	50.0
Sand and some gravel, brown to pink; texture grades from very fine sand to some fine gravel; slightly coarser texture below 60.0 ft; slight cementation below 70.0 ft; contains some pebbles below 80.0 ft.....	50.0	90.0
Sand and gravel, brown and pink; texture grades from very fine sand to gravel, 40 percent gravel; contains limy layers below 100.0 ft.....	90.0	135.0
<b>Tertiary System - Oligocene Series - White River Group:</b>		
<b>Brule Formation:</b>		
Clay, slightly silty, light brown; blocky structure below 140.0 ft.....	135.0	150.0

**Test Hole DC-5-95 (No e-logs)**  
**(12N-43W-19abbc)**  
**Deuel County**

Location: SW NW NW NE sec. 19, T. 12 N., R. 43 W., 40 feet north of state line and 2,350 feet west of northeast corner.  
 Ground elevation: 3,502.0 ft. (t). (Chappell SE 7.5 min. quadrangle).  
 Depth to water: Unknown. (5-19-95?).

	<u>Depth, in feet</u>	
	From	To
<b>Quaternary System, undifferentiated:</b>		
Top soil, sandy, brown.....	0.0	5.0
Sand and gravel, granitic.....	5.0	35.0
<b>Tertiary System - Miocene Series - Ogallala Group:</b>		
<b>Ash Hollow Formation:</b>		
Sandstone, granitic, brown.....	35.0	40.0
Sandstone, brown, and clay, white.....	40.0	50.0
Sand and gravel, granitic.....	50.0	90.0
Sand, granitic, brown.....	90.0	100.0
Sand and gravel, granitic.....	100.0	110.0

**Test Hole #35-A-49 (No e-logs)**  
**(12N-43W-21bbbc)**  
**Deuel County**

Location: SW NW NW NW sec. 21, T. 12 N., R. 43 W., approximately 500 feet south and 3 feet east of northwest corner.

Ground elevation: 3,461.0 ft. (t). (Barton 7.5 min. quadrangle).

Depth to water: 13.2 ft. (8-4-49).

	<u>Depth, in feet</u>	
	From	To
<b>Quaternary System, undifferentiated:</b>		
Road fill: silt.....	0.0	2.0
Silt and gravel, dark brown; contains limy nodules below 10.0 ft.....	2.0	20.0
Sand, brown to pink; texture grades from very fine to very coarse; contains some gravel and pebbles..	20.0	30.0
Sand and gravel, brown and pink; 50 percent gravel..	30.0	40.0
Sand, brown and pink; texture grades from very fine to very coarse; contains a trace of gravel.....	40.0	48.0
<b>Tertiary System - Oligocene Series - White River Group:</b>		
<b>Brule Formation:</b>		
Silt, clayey, light tannish buff; light to medium brown below 50.0 ft; blocky structure in part below 60.0 ft; reddish brown below 65.0 ft.....	48.0	70.0

**Test Hole #34-A-49 (No e-logs)**  
**(12N-43W-22bbbd)**  
**Deuel County**

Location: SW NW NW NW sec. 22, T. 12 N., R. 43 W., approximately 629 feet south and 539 feet east of northwest corner.

Ground elevation: 3,446.0 ft. (t). (Barton 7.5 min. quadrangle).

Depth to water: 4.2 ft. (8-4-49).

	<u>Depth, in feet</u>	
	From	To
<b>Quaternary System, undifferentiated:</b>		
Road fill and soil: silt, slightly sandy, moderately calcareous, dark brownish gray.....	0.0	1.0
Silt, sandy, slightly calcareous, grayish brown.....	1.0	2.5
Sand, brown and pink; texture grades from fine to coarse sand with a trace of gravel.....	2.5	5.0
Sand and gravel, brown and pink, about 50 percent gravel; contains some reworked silty clay fragments below 20.0 ft.....	5.0	30.0
Sand, brown and pink; texture grades from very fine to very coarse sand with a trace of fine gravel...	30.0	50.0

**Test Hole #33-A-49 (No e-logs)**  
**(12N-43W-23abbc)**  
**Deuel County**

Location: SW NW NW NE sec. 23, T. 12 N., R. 43 W., approximately 600 feet south and 2,640 feet west of northeast corner.

Ground elevation: 3,447.0 ft. (t). (Barton 7.5 min. quadrangle).

Depth to water: 23.2 ft. (8-4-49).

Depth, in feet  
From                  To

**Quaternary System, undifferentiated:**

Road fill and soil: silt, very sandy, to sand, very silty, dark brownish gray.....	0.0	3.0
Sand, brown and pink; texture grades from very fine to very coarse sand; contains some gravel.....	3.0	10.0
Silt, dark brownish gray; interbedded with gravel, yellow and pink.....	10.0	19.0
Sand, brown and pink; texture grades from very fine to coarse sand.....	19.0	30.0
Sand and gravel, brown and pink; texture grades from very fine sand to gravel, about 40 percent gravel; contains some pebbles.....	30.0	40.0
Sand, brown and pink; texture grades from very fine to very coarse sand with a trace of gravel.....	40.0	50.0
Sand and gravel, yellow and pink; texture grades from very fine sand to gravel, about 40 percent gravel.....	50.0	55.0
Sand, brown and pink; texture grades from very fine to very coarse sand; contains some gravel; coarser texture below 80.0 ft.....	55.0	90.0
Sand and gravel, brown and pink; texture grades from very fine sand to gravel, about 50 percent gravel; contains some pebbles; contains less gravel below 130.0 ft.....	90.0	180.0

**Tertiary System - Oligocene Series - White River Group:**

**Brule Formation:**

Siltstone, slightly clayey, light olive green.....	180.0	195.0
Siltstone, clayey, light buff; blocky structure and reddish brown below 210.0 ft.....	195.0	220.0

**Test Hole #32-A-49 (No e-logs)**  
**(12N-43W-24abbc)**  
**Deuel County**

Location: SW NW NW NE sec. 24, T. 12 N., R. 43 W., approximately 528 feet south and 2,640 feet west of northeast corner.

Ground elevation: 3,450.0 ft. (i). (Barton 7.5 min. quadrangle).

Depth to water: 33.5 ft. (8-4-49).

	<u>Depth, in feet</u>	
	From	To
<b>Quaternary System, undifferentiated:</b>		
Road fill; silt, slightly sandy, dark brown.....	0.0	1.0
Silt, dark brownish gray.....	1.0	5.0
Silt, slightly sandy, brownish gray.....	5.0	8.0
Sand, silty, light brown; texture of sand is very fine grained.....	8.0	10.0
Sand, brown and pink; texture grades from very fine to coarse sand.....	10.0	20.0
Sand and interbedded clay, silty, light brown; texture grades from very fine to very coarse sand....	20.0	30.0
Sand, gravel, and pebbles; about 50 percent gravel..	30.0	50.0
Sand, brown and pink; texture grades from very fine to coarse sand with a trace of gravel.....	50.0	54.0
<b>Tertiary System - Miocene Series - Ogallala Group:</b>		
<b>Ash Hollow Formation:</b>		
Silt, sandy, very calcareous, light gray.....	54.0	55.0
Silt, slightly sandy, buff; contains very fine sand.	55.0	60.0
Silt, slightly sandy, light brown; contains hard limy layers; reddish brown clay fragments below 80.0 ft.....	60.0	90.0
Silt, clayey, light brown.....	90.0	100.0
<b>Tertiary System - Oligocene Series - White River Group:</b>		
<b>Brule Formation:</b>		
Siltstone, slightly clayey, light reddish brown; blocky in part; more reddish brown below 105 ft...	100.0	110.0
Siltstone, clayey, greenish brown; blocky structure; reddish brown below 115.0 ft.....	110.0	120.0

**Test Hole #13-B-65 (E-logs)**  
**(12N-44W-2ddda)**  
**Deuel County**

Location: NE SE SE SE sec. 2, T. 12 N., R. 44 W., approximately 614 ft north and 7 ft west of southeast corner of section.  
 Ground elevation: 3,677.0 ft. (t). (Chappell SE 7.5 min. quadrangle).  
 Depth to water: 103.9 ft. (7-13-65)

	<u>Depth, in feet</u>	
	From	To
<b>Quaternary System, undifferentiated:</b>		
Road fill.....	0.0	4.5
Sand, silty, pale olive to pale brown.....	4.5	10.0
<b>Quaternary System and Tertiary System - Pliocene Series:</b>		
Sand and gravel, granitic, some silty sand interbeds. manganese dioxide coats, some grain surfaces.....	10.0	44.0
<b>Tertiary System - Pliocene Series - Ogallala Group:</b>		
<b>Ash Hollow Formation:</b>		
Sand and sandstone, silty, pale brown to light gray, some strata with discontinuous calcareous cement..	44.0	54.0
Sand and gravel, granitic.....	54.0	61.0
Sand and sandstone gravel present in some samples, silty, light gray, pale brown, light yellowish brown and white, some strata with discontinuous calcareous cement especially below 87 ft.....	61.0	98.0
Sand and gravel, granitic, green reduced iron stain coating grains near top.....	98.0	127.0
<b>Tertiary System - Oligocene Series - White River Group:</b>		
<b>Brule Formation:</b>		
Siltstone, sandy, light gray to light brown, strata with discontinuous calcareous cement 127 to 129 ft, some strata contain concretions with calcareous cement, biotite present, coarser grained from 179 to 195 ft, clay cement.....	127.0	195.0
Sand and sandstone, silty, to siltstone, interbedded, pale brown to brown, some strata with calcareous cement, sands with large biotite fragments.....	195.0	206.0
Siltstone, sandy, brown, pale brown to light yellowish brown, some strata with concretions with calcareous cement, some strata with more sand than others, clay cement .....	206.0	418.0
Siltstone, sandy to siltstone, alternating strata, light olive gray, clay cement.....	418.0	432.0
Sand, sandstone, and siltstone, alternating strata, light olive, many clear quartz sand grains.....	432.0	444.0
Siltstone, sandy, brown to pale brown, some strata contain concretions with calcareous cement, siltstone with clay cement.....	444.0	486.0

**Tertiary System - Eocene Series - White River Group:**

**Chadron Formation:**

Siltstone, clayey to silty claystone, green to blue green to gray to white, bentonite present.....	486.0	536.0
Sand, with some claystone interbeds, blue green to gray, sand mostly transparent to translucent quartz.....	536.0	574.0

**Cretaceous System - Upper Cretaceous Series - Montana Group:**

**Pierre Shale Formation:**

Shale, light gray, pyrite (iron disulfide) present..	574.0	600.5
--	-------	-------

**Test Hole #37-A-49 (No e-logs)**  
**(12N-44W-24aaaa)**  
**Deuel County**

Location: NE NE NE NE sec. 24, T. 12 N., R. 44 W., approximately 164 feet south and 10 feet west of northeast corner.  
 Ground elevation: 3,518.0 ft. (t). (Chappell SE 7.5 min. quadrangle).  
 Depth to water: 44.7 ft. (8-5-49).

	<u>Depth, in feet</u>	
	From	To
<b>Quaternary System, undifferentiated:</b>		
Road fill: silt, sandy, dark brownish gray.....	0.0	1.0
Silt, clayey, slightly sandy, very calcareous, black; brown and slightly calcareous below 2.0 ft.	1.0	6.0
<b>Tertiary System - Miocene Series - Ogallala Group:</b>		
<b>Ash Hollow Formation:</b>		
Sand; texture grades from very fine to very coarse sand with a trace of gravel; contains weathered limy nodules.....	6.0	12.0
Sand, silty, buff; texture grades from very fine to medium sand.....	12.0	20.0
Silt, sandy, very fine-grained, light brownish buff; contains calcareous silt layers from 26.0 to 30.0 ft; moderately calcareous and grayish brown below 30.0 ft; light brown below 32.5 ft.....	20.0	40.0
Silt, light brown to brown; slightly calcareous and contains limy areas below 42.5 ft.....	40.0	45.0
Silt, sandy, very fine-grained, light brown and brown; very calcareous and light gray below 50.0 ft.....	45.0	60.0
Sand, brown and pink; texture grades from very fine to very coarse sand with some gravel; contains about 40 percent gravel below 70.0 ft.....	60.0	74.0
Silt, slightly clayey to slightly sandy, slightly calcareous, buff.....	74.0	76.0
Sand and gravel, brown and pink; texture grades from very fine sand to gravel, about 40 percent gravel.	76.0	78.0
Silt, slightly clayey to sandy, slightly calcareous, buff.....	78.0	80.0
Clay, silty to slightly sandy, slightly calcareous, grayish brown; more brownish and noncalcareous below 85.0 ft.....	80.0	90.0
Silt, slightly clayey to slightly sandy, buff; blocky in part below 95.0 ft.....	90.0	100.0
Sand, light brownish tan; texture grades from very fine to medium; in part silty from 100.0 to 110.0 ft; contains many clay fragments below 110.0 ft; contains some hard limy layers below 115.0 ft.....	100.0	120.0

Silt to siltstone, interbedded with sand, buff and light gray; texture of sand grades from very fine to medium; slightly more sand and coarser texture below 135.0 ft.....	120.0	150.0
Sand, silty, with interbedded siltstone layers; texture grades from very fine to very coarse sand; contains hard layer from 158.0 to 160.0 ft.....	150.0	170.0
<b>Tertiary System - Oligocene Series - White River Group:</b>		
<b>Brule Formation:</b>		
Siltstone, light brown; contains some fine to medium sand; contains limy nodules from 190.0 to 200.0 ft.....	170.0	206.0
Silt, slightly sandy, moderately calcareous.....	206.0	210.0
Silt, slightly clayey, light reddish brown; blocky structure below 215.0 ft.....	210.0	230.0

**Test Hole #38-A-49 (No e-logs)**  
**(12N-44W-24bbbb)**  
**Deuel County**

Location: NW NW NW NW sec. 24, T. 12 N., R. 44 W., approximately 6 feet south and 29 feet east of the northwest corner.  
 Ground elevation: 3,551.0 ft. (i). (Chappell SE 7.5 min. quadrangle).  
 Depth to water: 31.2 ft. (8-5-49).

	<u>Depth, in feet</u>	
	From	To
<b>Quaternary System, undifferentiated:</b>		
Road fill: silt, slightly sandy.....	0.0	2.5
Silt, moderately calcareous, brownish tan.....	2.5	5.5
Sand, brown and pink; texture grades from very fine to coarse sand; contains limy nodules.....	5.5	10.0
Sand, silty, slightly calcareous, buff; contains very fine sand.....	10.0	14.5
Silt, slightly sandy, moderately calcareous, light brownish buff; very calcareous below 17.0 ft.....	14.5	20.0
Sand, brown and pink; texture grades from very fine to very coarse sand with some gravel.....	20.0	30.0
<b>Tertiary System - Oligocene Series - White River Group:</b>		
<b>Brule Formation:</b>		
Siltstone, slightly clayey, reddish brown, blocky structure in part; contains more silt below 45 ft.	30.0	50.0
Siltstone, clayey to slightly sandy, reddish brown..	50.0	60.0
Siltstone, slightly clayey, green to light brown; reddish brown below 62.5 ft.....	60.0	70.0

**Test Hole #2-42 (No e-logs)**  
**(12N-45W-2dadd)**  
**Deuel County**

Location: SE SE NE SE sec. 2, T. 12 N., R. 45 W., approximately 1,584 feet north and 5 feet west of southeast corner.

Ground elevation: 3,610.0 ft. (i). (Chappell 7.5 min. quadrangle).

Depth to water: 5.6 ft. (6-5-42).

Depth, in feet  
From To

**Quaternary System, undifferentiated:**

Road fill.....	0.0	4.0
Silt, sandy, dark brown; brown below 8.0 ft.....	4.0	10.0
Gravel, pink and greenish gray; texture of gravel is coarse.....	10.0	14.0
Gravel, pink; texture grades from fine to coarse....	14.0	21.0

**Tertiary System - Oligocene Series - White River Group:**

**Brule Formation:**

Clay, silty, pinkish buff; hard.....	21.0	29.0
--------------------------------------	------	------

**Test Hole #3-42 (No e-logs)  
(12N-45W-12bccc)  
Deuel County**

Location: SW SW SW NW sec. 12, T. 12 N., R. 45 W., 75 feet northwest of school.

Ground elevation: 3,615.0 ft. (t). (Chappell 7.5 min. quadrangle).

Depth to water: 13.3 ft. (6-4-42).

Depth, in feet  
From To

**Quaternary System, undifferentiated:**

Top soil, sandy, brown.....	0.0	4.0
Sand and gravel, granitic.....	4.0	30.0

**Test Hole #4-42 (No e-logs)**  
**(12N-45W-12cbbb)**  
**Deuel County**

Location: NW NW NW SW sec. 12, T. 12 N., R. 45 W., approximately 2,600 feet north of the southwest corner.

Ground elevation: 3,614.0 ft. (i). (Chappell 7.5 min. quadrangle).

Depth to water: Unknown; test hole caved at 17.0 ft. (6-5-42).

	<u>Depth, in feet</u>	
	From	To
<b>Quaternary System, undifferentiated:</b>		
Sand, silty, brown.....	0.0	4.0
Gravel, pink; texture grades from fine to coarse gravel; contains a few limy pebbles.....	4.0	28.0
Gravel, pink; texture grades from medium to coarse with a little coarse sand; contains coarse gravel below 39.0 ft.....	28.0	42.0
<b>Tertiary System - Oligocene Series - White River Group:</b>		
<b>Brule Formation:</b>		
Siltstone, clayey, pinkish buff.....	42.0	57.0

**Test Hole DC-6-95 (No e-logs)**  
**(12N-45W-12cddc)**  
**Deuel County**

Location: SW SE SE SW sec. 12, T. 12 N., R. 45 W., 50 feet north and  
 2,300 feet east of southwest corner.

Ground elevation: 3,595.0 ft. (t). (Chappell 7.5 min. quadrangle).

Depth to water: Unknown. (5-19-95).

	<u>Depth, in feet</u>	
	From	To
<b>Quaternary System, undifferentiated:</b>		
Top soil, sandy, dark brown.....	0.0	5.0
Sand and gravel, granitic.....	5.0	30.0
<b>Tertiary System - Oligocene Series - White River Group:</b>		
<b>Brule Formation:</b>		
Siltstone, light grayish brown, clay cement.....	30.0	40.0

**Test Hole #17-WB-66 (No e-log)**  
**(12N-45W-15baab)**  
**Deuel County**

Location: NW NE NE NW sec. 15, T. 12 N., R. 25 W., about 3,200 feet west of northeast corner.

Ground elevation: 3,730.0 ft. (t). (Chappell 7.5 min. quadrangle).

Depth to water: 97.0 ft. (10-18-66).

	<u>Depth, in feet</u>	
	From	To
<b>Quaternary System, undifferentiated:</b>		
Top soil: silt, clayey, dark brownish gray.....	0.0	3.0
Silt, slightly clayey, gray.....	3.0	5.0
Silt, slightly clayey, very sand, light brown; sand is very fine to fine; below 10 ft moderately clayey.....	5.0	17.0
<b>Quaternary System and Tertiary System - Pliocene Series:</b>		
Sand, gravelly; fine sand to fine gravel with some medium to coarse gravel; below 20 ft contains fine sand to fine gravel with a little medium gravel...	17.0	33.0
<b>Tertiary System - Miocene Series - Ogallala Group:</b>		
<b>Ash Hollow Formation:</b>		
Clay, silty, sandy, marly, pinkish gray.....	33.0	40.0
Clay, silty, sandy to gravelly, pinkish gray; contains a fine sand to medium gravel; below 45 ft contains less sand and gavel, in part marly.....	40.0	50.0
Clay, silty, sandy, pinkish gray; sand is very fine to medium; contains interbedded limy areas; below 55 ft contains some very fine to very coarse sand with a little fine gravel.....	50.0	68.0
Sand, fine to very coarse with a little fine gravel.	68.0	70.0
Sand, gravelly, fine sand to fine gravel; from 80 to 90 ft contains a little medium gravel; below 90 ft contains possible clay lens.....	70.0	95.0
Sand, fine to very coarse with a little fine gravel; contains thin marly lens.....	95.0	105.0
Sand, slightly gravelly; fine sand to fine gravel a trace of medium gravel.....	105.0	115.0
Sand, fine to very coarse with a little fine gravel.	115.0	128.0
Clay, silty, micaceous, brown.....	128.0	133.0
Sand, fine to very coarse.....	133.0	139.0
Clay, silty, light brown.....	139.0	143.0
Sand, fine to very coarse with a little fine gravel; from 146 to 147 ft contains clay lens.....	143.0	150.0
<b>Tertiary System - Oligocene Series - White River Group:</b>		
<b>Brule Formation:</b>		
Siltstone, clayey, pinkish gray; below 165 ft, silt to siltstone.....	150.0	175.0

**Test Hole #7-A-65 (E-log)**  
**(12N-46W-22bbcb)**  
**Deuel County**

Location: NW SW NW NW sec. 22, T. 12 N., R. 46 W., 778 feet south and 4.5 feet east of northwest section corner.  
 Ground elevation: 3,908.0 ft. (t). (Lodgepole SE 7.5 min. quadrangle).  
 Depth to water: Unknown.

	<u>Depth, in feet</u>	
	From	To
<b>Quaternary System, undifferentiated:</b>		
Road fill.....	0.0	1.0
Sand, silty, dark brown at top to pale brown at base, calcareous from 4 to 6.5 ft.....	1.0	6.5
<b>Quaternary System and Tertiary System - Pliocene Series:</b>		
Sand and gravel, granitic.....	6.5	46.5
<b>Tertiary System - Miocene Series - Ogallala Group:</b>		
<b>Ash Hollow Formation:</b>		
Sand and sandstone, gravel and silt present, reddish brown; opaline silica present.....	46.5	68.0
Sand and gravel, granitic.....	68.0	82.0
Sand and sandstone, light reddish brown to pinkish water, some strata have calcareous cement.....	82.0	119.0
Sand and gravel, granitic.....	119.0	140.0
Sand and sandstone, gravel and silt present, calcareous cement.....	140.0	143.5
Sand and gravel, granitic, calcareous cement.....	143.5	148.0
<b>Tertiary System - Oligocene Series - White River Group:</b>		
<b>Brule Formation:</b>		
Siltstone, reddish brown, some strata contain concretions with calcareous cement.....	148.0	200.5

**Test Hole #17-WB-66 (No e-log)**  
**(12N-45W-15baab)**  
**Deuel County**

Location: NW NE NE NW sec. 15, T. 12 N., R. 25 W., about 3,200 feet west of northeast corner.

Ground elevation: 3,730.0 ft. (t). (Chappell 7.5 min. quadrangle).

Depth to water: 97.0 ft. (10-18-66).

	<u>Depth, in feet</u>	
	From	To
<b>Quaternary System, undifferentiated:</b>		
Top soil: silt, clayey, dark brownish gray.....	0.0	3.0
Silt, slightly clayey, gray.....	3.0	5.0
Silt, slightly clayey, very sand, light brown; sand is very fine to fine; below 10 ft moderately clayey.....	5.0	17.0
<b>Quaternary System and Tertiary System - Pliocene Series:</b>		
Sand, gravelly; fine sand to fine gravel with some medium to coarse gravel; below 20 ft contains fine sand to fine gravel with a little medium gravel...	17.0	33.0
<b>Tertiary System - Miocene Series - Ogallala Group:</b>		
<b>Ash Hollow Formation:</b>		
Clay, silty, sandy, marly, pinkish gray.....	33.0	40.0
Clay, silty, sandy to gravelly, pinkish gray; contains a fine sand to medium gravel; below 45 ft contains less sand and gavel, in part marly.....	40.0	50.0
Clay, silty, sandy, pinkish gray; sand is very fine to medium; contains interbedded limy areas; below 55 ft contains some very fine to very coarse sand with a little fine gravel.....	50.0	68.0
Sand, fine to very coarse with a little fine gravel.	68.0	70.0
Sand, gravelly, fine sand to fine gravel; from 80 to 90 ft contains a little medium gravel; below 90 ft contains possible clay lens.....	70.0	95.0
Sand, fine to very coarse with a little fine gravel; contains thin marly lens.....	95.0	105.0
Sand, slightly gravelly; fine sand to fine gravel a trace of medium gravel.....	105.0	115.0
Sand, fine to very coarse with a little fine gravel.	115.0	128.0
Clay, silty, micaceous, brown.....	128.0	133.0
Sand, fine to very coarse.....	133.0	139.0
Clay, silty, light brown.....	139.0	143.0
Sand, fine to very coarse with a little fine gravel; from 146 to 147 ft contains clay lens.....	143.0	150.0
<b>Tertiary System - Oligocene Series - White River Group:</b>		
<b>Brule Formation:</b>		
Siltstone, clayey, pinkish gray; below 165 ft, silt to siltstone.....	150.0	175.0

**Test Hole #5-WB-66 (E-logs)**  
**(13N-42W-2baaa)**  
**Deuel County**

Location: NE NE NE NW sec. 2, T. 13 N., R. 42 W., 10 feet south  
 and 2,641 feet east of northwest corner.

Ground elevation: 3,640.0 ft. (t). (Big Springs NE 7.5 min.  
 quadrangle).

Depth to water: Unknown, test hole caved at 185 ft. (9-29-66).

	<u>Depth, in feet</u>	
	From	To
<b>Quaternary System, undifferentiated:</b>		
Top soil: silt, slightly clayey, dark brownish gray.	0.0	1.5
Silt, slightly clayey, sandy, moderately calcareous to 5 ft and very calcareous below 5 ft, light brown; sand is very fine to fine; marly below 7 ft	1.5	9.0
Sand, gravelly; fine sand to medium gravel; below 10 ft contains some coarse gravel.....	9.0	13.0
Silt, moderately clayey, marly, light brown.....	13.0	15.0
<b>Quaternary System and Tertiary System - Pliocene Series:</b>		
Sand, gravelly; fine sand to fine gravel.....	15.0	25.0
Gravel, sandy; fine sand to medium gravel with some coarse gravel; at 27 ft contains clay lens.....	25.0	35.0
Silt, moderately clayey, moderately sandy, light brown; sand is very fine to fine.....	35.0	40.0
Gravel, sandy; fine sand to coarse gravel; contains clay lens at 42 ft; below 50 ft contains some coarse gravel with a trace of very coarse gravel..	40.0	56.0
<b>Tertiary System - Miocene Series - Ogallala Group:</b>		
<b>Ash Hollow Formation:</b>		
Silt, moderately clayey, moderately sandy, micaceous, brown; sand is very fine to fine with some coarser grains; below 60 ft pinkish gray.....	56.0	65.0
Sand, gravelly; fine sand to fine gravel with some medium gravel; below 70 ft contains some coarse gravel.....	65.0	72.0
Silt, very clayey to clay, moderately sandy, light brown; sand is very fine to fine; below 80 ft, pink, sand is very fine to medium.....	72.0	88.0
Sand, gravelly; fine sand to medium gravel with some coarse gravel.....	88.0	90.0
Clay, silty, coarse textured, micaceous, reddish brown.....	90.0	94.0
Sand, fine to very coarse with a little fine gravel.	94.0	100.0
Clay, silty, pinkish gray; contains bentonite.....	100.0	110.0
Clay, silty, micaceous, brown.....	110.0	120.0
Silt, moderately clayey, sandy, light brown, pinkish gray; sand is very fine to medium; contains sand- stone lens below 123 ft; contains limy layer at 126 ft; below 145 ft pink.....	120.0	149.0
Sand, gravelly; fine sand to medium gravel.....	149.0	162.0

Clay, silty, coarse textured, slightly calcareous, brown.....	162.0	165.0
Silt, moderately clayey, moderately sandy, light brown with some pink; sand is very fine to fine with some medium; below 170 ft, contains some marly areas.....	165.0	180.0
Clay, silty, light brownish gray.....	180.0	182.0
Sand, fine to very coarse with a little fine gravel.	182.0	185.0
Clay, silty, light gray; below 190 ft, less clayey..	185.0	194.0
Sandstone, moderately consolidated; sand is very fine to fine; below 200 ft, marly.....	194.0	210.0
Siltstone, light brown; contains some silty sandstone; below 218 ft, very sandy, in part sand.....	210.0	220.0
Silt, slightly clayey, moderately to very sandy, brown; sand is very fine to fine; contains some marly areas.....	220.0	230.0
Siltstone, clayey, coarse textured, moderately calcareous, light brown; from 235 to 240 ft, sandy with interbedded silty sandstone; at 241 ft, contains sandstone lens.....	230.0	245.0
Silt, slightly clayey, very sandy, micaceous, light brownish gray; sand is very fine to medium.....	245.0	250.0
Sand, silty, slightly clayey; sand is very fine to fine; below 255 ft, contains marly areas, contains some siltstone.....	250.0	266.0
Sand, fine to very coarse; from 270 to 275 ft, sand is very fine to medium with some coarse; below 275 ft, contains much coarse to very coarse.....	266.0	280.0
Sand, slightly gravelly; fine sand to fine gravel; contains some rounded siltstone and limestone grains.....	280.0	285.0
Sand, very silty, slightly clayey; sand is very fine to fine.....	285.0	300.0
Sand, silty; sand is very fine to fine with some medium.....	300.0	310.0
Sandy silt to silty sand, slightly clayey; sand is very fine to fine.....	310.0	325.0
Siltstone, clayey, sandy, light brown; sand is very fine to fine; contains some silty sandstone.....	325.0	330.0
Sandstone, silty; sand is very fine to fine.....	330.0	340.0
Siltstone, clayey, coarse textured, light brown; contains some silty sandstone.....	340.0	365.0
Silt, slightly clayey, very sandy, light brown; sand is very fine to fine with some medium to coarse...	365.0	380.0
Sand, silty; sand is very fine to fine, some medium.	380.0	395.0
Sand, fine to medium with some coarse.....	395.0	400.0
Sand, gravelly; fine sand to fine gravel; contains some rounded siltstone, sandstone and limestone grains.....	400.0	405.0
Sand, fine to very coarse with a trace of fine gravel.....	405.0	410.0

Sand, slightly gravelly; fine sand to fine gravel; below 415 ft, contains a little medium gravel.....	410.0	420.0
Sand, fine to very coarse with a little fine gravel; in part, contains much coarse to very coarse sand.	420.0	460.0
Sand, fine to very coarse with some limy layers from 460 to 465 ft; below 465 ft, contains a little fine gravel.....	460.0	475.0
Sand, fine to very coarse, in part lime-cemented; from 470 to 480 ft and from 483 to 486 ft, limy layers.....	475.0	490.0
Sand, silty; sand is very fine to fine from 492 to 496 ft, contains a limy layer.....	490.0	500.0
Limestone, marly.....	500.0	510.0
Silt, slightly clayey, light brown.....	510.0	515.0
Silt to siltstone, clayey, slightly sandy, pinkish gray; sand is very fine; below 520 ft, contains some sandstone, marly, sand is very fine to very coarse.....	515.0	525.0
Sand, slightly gravelly; fine sand to fine gravel; below 530 ft, contains some medium gravel.....	525.0	539.0
<b>Tertiary System - Oligocene Series - White River Group:</b>		
<b>Brule Formation:</b>		
Silt to siltstone, clayey, moderately calcareous, pinkish gray; below 540 ft, noncalcareous.....	539.0	560.0

**Test Hole #18-WB-66 (No e-logs)**  
**(13N-42W-5abbd)**  
**Deuel County**

Location: SE NW NW NE sec. 5, T. 13 N., R. 42 W., 33 feet south  
 and 343 feet east of northwest corner of NE 1/4.

Ground elevation: 3,682.0 ft. (t). (Big Springs NW 7.5 min.  
 quadrangle).

Depth to water: 203.5 ft. (10-24-66).

Depth, in feet  
 From                  To

**Quaternary System, undifferentiated:**

Top soil: silt, slightly clayey, dark brownish gray.....	0.0	5.0
Silt, slightly clayey, moderately sandy, light brownish gray; sand is very fine to fine; below 10 ft, light gray.....	5.0	20.0

**Quaternary System and Tertiary System - Pliocene Series:**

Sand, gravelly; fine sand to fine gravel with some medium gravel; from 25 to 35 ft, contains fine sand to medium gravel; below 35 ft, in part contains a little coarse to very coarse gravel....	20.0	65.0
Sand, gravelly; fine sand to medium gravel with a little coarse to very coarse gravel.....	65.0	79.0

**Tertiary System - Miocene Series - Ogallala Group:**

**Ash Hollow Formation:**

Clay, silty, sandy, dark brown to reddish brown; sand is very fine to medium.....	79.0	86.0
Sand, gravelly; fine sand to fine gravel.....	86.0	94.0
Clay, silty, sandy, light brown; sand is very fine to fine; below 100 ft, light brown with pinkish tint.....	94.0	107.0
Sand, gravelly; fine sand to fine gravel.....	107.0	110.0
Clay, silty, sandy, micaceous, dark brown; sand is very fine to fine; from 110 to 115 ft, reddish brown; below 124 ft, light gray.....	110.0	130.0
Clay, silty, sandy, moderately calcareous, pinkish gray; sand is very fine to fine; below 135 ft, brown.....	130.0	140.0
Sand, fine to very coarse with a little fine gravel.	140.0	148.0
Clay, silty, sandy, pinkish gray; sand is very fine; from 150 to 155 ft, contains some interbedded limestone lenses; below 155 ft, brown with slight pinkish tint.....	148.0	160.0
Sand, very fine to very coarse with rare gravel....	160.0	165.0
Sand, gravelly; fine sand to fine gravel; from 175 to 176 ft, contains fine sand to medium gravel with a little coarse gravel.....	165.0	178.0
Clay, silty, sandy, pinkish gray; sand is very fine to fine; contains marly areas.....	178.0	185.0

Sand, gravelly; fine sand to fine gravel with a trace of medium gravel.....	185.0	190.0
Limestone, marly, sandy, light gray.....	190.0	195.0
Clay, silty, sandy, marly, light gray with some pinkish gray; contains some interbedded limestone lenses.....	195.0	217.0
Sand, slightly gravelly; fine sand to fine gravel...	217.0	220.0
Limestone, light gray to light brown.....	220.0	225.0
Clay, silty, sandy, light pinkish gray; sand is very fine to fine; below 235 ft, contains some interbedded siltstone lenses; contains some marly areas.....	225.0	245.0
Sand, gravelly; fine sand to fine gravel; contains limy areas; below 250 ft, coarser textured.....	245.0	255.0
<b>Tertiary System - Miocene Series - Arikaree Group - undifferentiated:</b>		
Silty sand to sandy silt, gray; sand is very fine to fine.....	255.0	260.0
Clay, silty, sandy, micaceous, brown; sand is very fine.....	260.0	265.0
Silty sand to sandy silt, gray; sand is very fine to fine.....	265.0	270.0
Silt to siltstone, grayish brown; in part sandy, sand is very fine; below 280 ft, some marly areas.	270.0	285.0
Limestone, light gray.....	285.0	290.0
<b>Tertiary System - Oligocene Series - White River Group:</b>		
<b>Brule Formation:</b>		
Silt to siltstone, reddish brown.....	290.0	320.0

**Test Hole #1-A-65 (No e-logs)**  
**(13N-42W-12ddda)**  
**Deuel County**

Location: NE SE SE SE sec. 12, T. 13 N., R. 42 W., 466 feet north and 9 feet west of southeast corner.

Ground elevation: 3,572.0 ft. (t). (Big Springs 7.5 min. quadrangle).

Depth to water: Unknown; test hole open to 155 ft.

Depth, in feet  
From                  To

**Quaternary System, undifferentiated:**

Road fill.....	0.0	0.6
Sand and silt, pale brown, includes coarse sand.....	0.6	1.5
Sand, silty, dark grayish brown, paleosol.....	1.5	2.0
Sand, pale brown, calcareous cement toward base.....	2.0	11.2
Sand, silty, calcareous cement at top.....	11.2	14.5

**Quaternary System and Tertiary System - Pliocene Series:**

Sand and gravel, granitic, manganese oxide stained 15 ft to 30 ft; coarsest in test hole samples.....	14.5	57.8
--	------	------

**Tertiary System - Miocene Series - Ogallala Group:**

**Ash Hollow Formation:**

Sand, silty, light pinkish brown, with some granules to small pebbles.....	57.8	63.0
Sand and gravel, granitic.....	63.0	70.3
Sandstone, light brown to brown, pebbly, calcareous cement throughout, increasing 74 to 80 ft.....	70.3	95.0
Sand and gravel, granitic, silica and manganese oxide coat some grains.....	95.0	121.8
Sand, silty, light brown to light brownish gray, some horizons with calcareous cement.....	121.8	137.0
Sand and gravel, granitic.....	137.0	144.5
Sandstone, pebbly, light brown.....	144.5	150.5
Sand and gravel, granitic, calcareous cement 175 - 179.5.....	150.5	179.5
Sand, silty, very light gray, with much calcareous cement.....	179.5	184.5

**Tertiary System - Oligocene Series - White River Group:**

**Brule Formation:**

Siltstone, light brown to brown, with some calcar- eous cemented horizons.....	184.5	410.0
---	-------	-------

**Test Hole #24-A-49 (No e-logs)**  
**(13N-42W-25adad)**  
**Deuel County**

Location: SE NE SE NE sec. 25, T. 13 N., R. 42 W., approximately 1800 feet south and 27 feet west of northeast corner.

Ground elevation: 3,471.0 ft. (i). (Big Springs 7.5 min. quadrangle).

Depth to water: Unknown; test hole caved at 80.0 ft. (7-31-49).

Depth, in feet  
From                      To

**Quaternary System, undifferentiated:**

Silt, slightly sandy, light tannish brown..... 0.0                      0.5

**Quaternary System and Tertiary System - Pliocene Series:**

Sand; texture grades from medium to very coarse sand with some gravel..... 0.5                      5.5

Silt, slightly sandy, moderately calcareous, light brownish buff..... 5.5                      8.0

Sand; texture grades from medium to coarse sand; contains reddish brown clay fragments..... 8.0                      10.0

Sand, brown and pink; texture grades from fine to coarse sand; contains reddish brown clay fragments with hard layer from 10.0 to 11.0 ft..... 10.0                      15.0

Sand, brown and pink; texture grades from fine to coarse sand..... 15.0                      21.0

Silt, slightly sandy, brown..... 21.0                      25.0

Silt, sandy, slightly calcareous, grayish brown..... 25.0                      28.5

Sand, light tannish gray; texture grades from fine to very coarse sand with some fine gravel..... 28.5                      34.5

Silt, clayey, grayish brown to green..... 34.5                      41.5

Sand and gravel, pink, tan and green; about 50 per cent gravel..... 41.5                      50.0

**Tertiary System - Miocene Series - Ogallala Group:**

**Ash Hollow Formation:**

Sand, brown and pink; texture grades from fine to coarse sand; some gravel..... 50.0                      54.5

Silt, slightly clayey, slightly calcareous, light pink and brown..... 54.5                      57.5

Silt, slightly sandy, slightly calcareous, light brown; contains limy areas from 57.5 to 60.0 ft. and from 65.0 to 70.0 ft..... 57.5                      70.0

Sand, brown and pink; texture grades from very fine to coarse sand..... 70.0                      76.5

Silt, slightly sandy, slightly calcareous, light brown..... 76.5                      78.5

Silt, sandy, dark brownish buff..... 78.5                      80.0

Sand, brown and pink; texture grades from fine to coarse sand; medium sand to fine gravel with hard limy areas from 84.5 to 90.0 ft..... 80.0                      90.0

Sand, interbedded with silt, moderately calcareous, light tan and light gray; contains hard limy areas 90.0                      100.0

Silt, slightly sandy, very calcareous, light gray; marl below 104.5 ft.....	100.0	106.5
Silt, very slightly sandy, moderately calcareous, light olive green; contains limy layers below 110.0 ft.....	106.5	120.0
Silt, slightly sandy, slightly calcareous, greenish gray; contains reddish brown clay fragments.....	120.0	125.0
Silt, slightly clayey to slightly sandy, light brown to brown; contains clay fragments and limy areas..	125.0	130.0
Silt, slightly sandy, dark brown; contains clay fragments and some limy areas; moderately calcareous and grayish green below 135.0 ft.....	130.0	145.0
<b>Tertiary System - Oligocene Series - White River Group:</b>		
<b>Brule Formation:</b>		
Silt, slightly sandy, dark brown; some consolidation; contains limy areas.....	145.0	150.0
Clay, slightly silty, reddish brown, blocky structure, slightly calcareous; light reddish brown below 184.5 ft.....	150.0	190.0
Clay, slightly silty to slightly sandy, slightly calcareous, reddish brown; blocky structure in part; light reddish brown below 215.0 ft; red and noncalcareous below 230.0 ft; very hard layer from 244.5 to 245.0 ft.....	190.0	253.0
Silt, slightly sandy, greenish brown; slightly calcareous below 260.0 ft; light brownish tan below 270.0 ft.....	253.0	280.0

**Test Hole #13-GT-80 (E-logs)**  
**(13N-42W-26dbaa)**  
**Deuel County**

Location: NE NE NW SE sec. 26, T. 13 N., R. 42 W., approximately 2,660 feet south of north section line and 1,360 feet west of east section line.

Ground elevation: 3,455.0 ft. (t). (Big Springs 7.5 min. quadrangle).

Depth to water: Unknown.

	<u>Depth, in feet</u>	
	From	To
<b>Quaternary System, undifferentiated:</b>		
Sand, dull reddish brown, medium grained with traces of fine and coarse to very coarse.....	0.0	8.0
<b>Quaternary System and Tertiary System - Pliocene Series:</b>		
Sand and gravel, brown, sand very coarse with traces of medium to coarse, gravel fine, with medium to coarse at 8.0 to 10.0.....	8.0	15.0
Gravel, orangish brown, fine with traces of medium; contains sand, coarse to very coarse; contains silt, light brown, clayey.....	15.0	25.0
<b>Tertiary System - Miocene Series - Ogallala Group - undifferentiated:</b>		
Sand and gravel, orangish brown, sand coarse to very coarse, gravel fine to medium; contains sandstone interbeds, light pinkish brown, very fine to fine grained.....	25.0	30.0
Sand, brown, fine grained with traces of very fine to coarse, moderately clayey in part.....	30.0	35.0
Sand to sandstone, very pale brown, very fine to fine grained, very slightly clayey in part.....	35.0	38.0
Sand, brown, very fine to fine grained with small fraction medium to coarse, moderately clayey in part.....	38.0	55.0
Sand to sandstone, very pale brown to pinkish brown, very fine to fine grained, slightly to moderately clayey.....	55.0	75.0
Sandstone, very pale brown, very fine to fine grained, very slightly to slightly clayey.....	75.0	91.0
<b>Tertiary System - Oligocene Series - White River Group:</b>		
<b>Brule Formation:</b>		
Sand to sandstone, very pale brown to brown, very fine to fine grained, slightly clayey.....	91.0	100.0
Silt to siltstone, brown, moderately clayey.....	100.0	120.0
Silt to siltstone, brown to light brown, moderately clayey.....	120.0	135.0
Silt to siltstone, light brown with yellowish tint, moderately clayey.....	135.0	158.0
Silt to siltstone, brown, moderately clayey.....	158.0	165.0
Silt to siltstone, yellowish red, moderately clayey.	165.0	180.0
Silt to siltstone, light yellowish brown with reddish tint, moderately clayey.....	180.0	188.0

Silt to siltstone, light reddish brown, moderately clayey.....	188.0	196.0
Siltstone to silt, brown, moderately clayey; contains siltstones, light olive brown at 199.0 to 202.0.....	196.0	202.0
Silt to siltstone, light yellowish brown with reddish tint, moderately clayey; contains thinly interbedded brown siltstones.....	202.0	225.0
Silt to siltstone, yellowish brown, moderately clayey.....	225.0	242.0
Silt to siltstone, light yellowish brown with reddish tint, moderately clayey.....	242.0	255.0
Silt to siltstone, light yellowish brown, moderately clayey.....	255.0	290.0
Silt to siltstone, light yellowish brown with reddish tint, moderately to very clayey.....	290.0	300.0
Silt to siltstone, light yellowish brown, moderately clayey.....	300.0	308.0
Silt to siltstone, pale brown to light yellowish brown, moderately to very clayey.....	308.0	340.0
Silt, light yellowish brown, moderately to very clayey; contains scattered siltstones.....	340.0	390.0
<b>Tertiary System - Eocene Series - White River Group:</b>		
<b>Chadron Formation:</b>		
Silt, light yellowish brown, moderately to very clayey; contains "floating" quartz grains, quartz milky white, rounded overgrowths, becoming very abundant lower third.....	390.0	452.5
Sand, very light greenish gray, very fine grained, moderately to very clayey.....	452.5	455.0
Sand, very light gray to white, medium grained; interbedded with sand, very fine grained, very clayey.....	455.0	456.0
Sand, very light gray to greenish gray, very fine grained, moderately to very clayey; contains yellowish orange iron staining in part.....	456.0	474.0
Sand, very pale brown, medium to coarse grained.....	474.0	476.0
Sand, light yellowish brown, medium to coarse grained.....	476.0	479.0
Sand, light to pale brown, medium to very coarse....	479.0	480.0
Sand, very pale gray to brown, medium to coarse grained; contains fine grained sandy clays.....	480.0	485.0
Sand, very pale brown, very fine to fine grained; slightly to moderately clayey.....	485.0	486.0
Sand, yellowish red, medium to coarse grained with traces of fine.....	486.0	487.5
Sand, very pale brown, medium to coarse grained with traces of fine.....	487.5	488.5

Sand, very pale brown mottled with yellowish red and brownish yellow, very fine to fine grained, slightly to moderately clayey; contains traces of chert, black, rounded; varicolored at bottom.....	488.5	495.0
Silt, olive gray to gray, moderately clayey; contains reworked shale.....	495.0	508.0
<b>Cretaceous System - Upper Cretaceous Series - Montana Group:</b>		
<b>Pierre Shale Formation:</b>		
Shale, gray to olive, weathered.....	508.0	510.0
Shale, dark gray.....	510.0	520.0

**Test Hole #4-WB-66 (E-logs)**  
**(13N-42W-29aaaa)**  
**Deuel County**

Location: NE NE NE NE sec. 29, T. 13 N., R. 42 W.  
 Ground elevation: 3,608.0 ft. (t). (Barton 7.5 min. quadrangle).  
 Depth to water: 125.7 ft. (9-24-66).

	<u>Depth, in feet</u>	
	From	To
<b>Quaternary System, undifferentiated:</b>		
Top soil: silt, slightly clayey, slightly sandy, dark grayish brown; sand is very fine.....	0.0	3.0
Silt, slightly clayey, light brownish gray; below 5 ft, very sandy; very fine sand.....	3.0	11.0
<b>Quaternary system and Tertiary System - Pliocene Series:</b>		
Gravel, sandy; fine sand to coarse gravel; below 20 ft, contains less coarse gravel.....	11.0	25.0
Sand and gravel; fine sand to medium gravel with some coarse gravel; below 25 ft, contains less coarse gravel.....	25.0	30.0
Sand, fine to very coarse with a little fine gravel.	30.0	35.0
Sand, gravelly; fine sand to medium gravel with a little coarse gravel; below 40 ft, contains much gravel.....	35.0	56.0
<b>Tertiary System - Miocene Series - Ogallala Group:</b>		
<b>Ash Hollow Formation:</b>		
Silt, very clayey, moderately sandy, light brown; sand is very fine to medium.....	56.0	63.0
Sand, gravelly; fine sand to fine gravel with some medium gravel.....	63.0	75.0
Silt, very clayey, coarse textured, reddish brown...	75.0	87.0
Sand, slightly gravelly; fine sand to fine gravel; from 100 to 120 ft, contains slightly more fine gravel.....	87.0	124.0
Silt, very clayey, micaceous, pale yellow; below 125 ft, slightly less clayey; below 125 ft, brown with some yellowish brown.....	124.0	133.0
Sand, fine to very coarse; below 135 ft, contains a little fine gravel.....	133.0	137.0
Silt, slightly clayey, very sandy, brown; sand is very fine to coarse.....	137.0	140.0
Sand, fine to very coarse.....	140.0	145.0
Silt, moderately clayey, sandy, pinkish gray; sand is very fine to coarse.....	145.0	150.0
Sand, gravelly; medium sand to fine gravel; from 160 to 165 ft, contains a trace of fine gravel, contains a thin silt lens; below 165 ft, contains a little medium gravel.....	150.0	184.0
Silt, moderately clayey, very sandy, pinkish gray; sand is very fine to fine; below 185 ft, light brown; below 190 ft, contains marly areas.....	184.0	198.0

Sand, fine top very coarse with a little fine gravel; below 200 ft, slightly cemented.....	198.0	211.0
Limestone, marly, light gray; below 215 ft, in part sandy, sand is very fine to fine.....	211.0	233.0
Sand, slightly gravelly; fine sand to fine gravel; below 235 ft, contains a trace of fine gravel.....	233.0	240.0
Sand, slightly gravelly; fine sand to fine gravel with a trace of medium gravel; from 240 to 245 ft, contains interbedded limy layers; below 245 ft, contains no medium gravel; below 248 ft, in part slightly cemented.....	240.0	268.0
Sandstone; sand is very fine to fine; below 270 ft, silty; from 270 to 275 ft, contains a trace of rootlets; below 275 ft, contains some medium sand.	268.0	280.0
Sandstone, lime-cemented; sand is very fine to fine, principally very fine.....	280.0	294.0
<b>Tertiary System - Oligocene Series - White River Group:</b>		
<b>Brule Formation:</b>		
Silt to siltstone, clayey, coarse textured, light brown.....	294.0	320.0

**Test Hole #19-WB-66 (No e-logs)**  
**(13N-42W-29addd)**  
**Deuel County**

Location: SE SE SE NE sec. 29, T. 13 N., R. 42 W., 243 feet north and 175 feet west of southeast corner of northeast section.

Ground elevation: 3,565.0 ft. (t). (Barton 7.5 min. quadrangle).

Depth to water: 115.9 ft. (10-24-66).

	<u>Depth, in feet</u>	
	From	To
<b>Quaternary System, undifferentiated:</b>		
Top soil: silt, slightly clayey, very sandy, dark brownish gray; sand is very fine to medium.....	0.0	5.0
Silt, slightly clayey, very sandy, light gray; sand is very fine to fine with some medium.....	5.0	10.0
<b>Quaternary System and Tertiary System - Pliocene Series:</b>		
Sand, very silty, slightly clayey; sand is very fine to fine.....	10.0	30.0
Sand, fine to very coarse.....	30.0	35.0
Silt, very clayey, very sandy, pinkish gray; sand is very fine to medium with a trace of coarse.....	35.0	40.0
Sand, fine to very coarse with some fine gravel.....	40.0	42.0
Clay, silty, pinkish gray; from 45 to 50 ft, light yellowish brown; below 50 ft, brown.....	42.0	58.0
Sand, fine to very coarse with a little fine gravel; below 60 ft, contains some clay lenses.....	58.0	65.0
Sand, gravelly; fine sand to fine gravel; from 75 to 79 ft, contains clay layer; below 75 ft, contains some medium gravel; below 85 ft, contains some coarse gravel.....	65.0	95.0
Clay, silty, sandy, light brown; sand is very fine to fine; contains mica flakes.....	95.0	103.0
Sand, gravelly; fine sand to fine gravel with some medium gravel; below 105 ft, contains some coarse to very coarse gravel.....	103.0	112.0
<b>Tertiary System - Miocene Series - Ogallala Group:</b>		
<b>Ash Hollow Formation:</b>		
Clay, silty, sandy, light pinkish gray; sand is very fine to fine.....	112.0	115.0
Limestone, marly, sandy, light gray to light pinkish gray; sand is very fine.....	115.0	120.0
Clay, silty, sandy, marly, light gray with some light brown; sand is very fine to fine.....	120.0	125.0
Limestone, sandy, light brown; sand is very fine....	125.0	134.0
Sand, very fine to very coarse with a little fine gravel.....	134.0	135.0
Clay, silty, sandy, marly, light gray; sand is very fine to fine; contains limy areas.....	135.0	140.0
Limestone, marly, sandy, light gray; sand is very fine.....	140.0	155.0

Clay, silty, sandy, marly, light pinkish gray; sand is very fine; contains interbedded sandstone lenses; below 163 ft, contains some fine to very coarse sand with a trace of fine gravel.....	155.0	165.0
<b>Tertiary System - Oligocene Series - White River Group:</b>		
<b>Brule Formation:</b>		
Silt to siltstone, brown.....	165.0	180.0

**Test Hole #6-WB-66 (E-logs)**  
**(13N-43W-3addd)**  
**Deuel County**

Location: SE SE SE NE sec. 3, T. 13 N., R. 43 W., 18 feet north and 68 feet west of southeast corner of northeast quarter.

Ground elevation: 3,691.0 ft. (t). (Big Springs NW 7.5 min. quadrangle).

Depth to water: Unknown; test hole caved at 181.5 ft. (9-29-66).

	<u>Depth, in feet</u>	
	From	To
<b>Quaternary System, undifferentiated:</b>		
Top soil: silt, slightly clayey, dark brownish gray.	0.0	1.6
<b>Quaternary System and Tertiary System - Pliocene Series:</b>		
Sand and gravel; fine sand to fine gravel with some medium gravel; from 6 to 7 ft, contains clay layer; below 10 ft, coarser textured and contains some coarse to very coarse gravel; below 19 ft, contains some clay layers.....	1.6	35.0
Gravel, sandy; fine sand to coarse gravel with some very coarse gravel and pebbles; below 40 ft, finer textured, contains fine sand to coarse gravel with some very coarse gravel.....	35.0	55.0
<b>Tertiary System - Miocene Series - Ogallala Group:</b>		
<b>Ash Hollow Formation:</b>		
Clay, silty, sandy, light brown; sand is very fine to medium with some coarser grains.....	55.0	61.0
Gravel, sandy; fine sand to coarse gravel.....	61.0	66.0
Sand, gravelly; fine sand to coarse gravel; below 70 ft, slightly finer textured.....	66.0	75.0
Clay, silty, brown with reddish tint.....	75.0	85.0
Silt, very clayey, very sandy, light brown; sand is very fine to fine; below 100 ft, in part sandy to gravelly; below 109 ft, marly, brown with reddish tint.....	85.0	110.0
Silt, very clayey, pinkish gray; contains marly areas; below 115 ft, sandy, sand is very fine to fine with some medium.....	110.0	120.0
Silt, moderately clayey, moderately calcareous, light brown with reddish tint; contains limy areas; from 120 to 125 ft, in part bentonitic.....	120.0	135.0
Silt, slightly clayey, moderately sandy, light brown; sand is very fine to fine.....	135.0	140.0
Sand, slightly gravelly; fine sand to fine gravel; below 145 ft, contains some clay lenses; below 150 ft, contains some medium gravel.....	140.0	157.0
Silt, very clayey, moderately sandy, pinkish gray; sand is very fine to fine with some coarser grains.....	157.0	161.0
Sand, slightly gravelly; fine sand to fine gravel with a trace of medium gravel.....	161.0	176.0

Clay, silty, sandy, pinkish gray; sand is very fine to medium; from 186 to 187 ft, contains sand and gravel lens.....	176.0	192.0
Sand, slightly gravelly; fine sand to fine gravel with some medium gravel.....	192.0	195.0
Clay, silty, sandy, in part marly, pinkish white; sand is very fine to fine.....	195.0	200.0
Silt to siltstone, in part marly, light brown; contains interbedded sandstone lenses.....	200.0	206.5
Limestone, marly, light brown.....	206.5	213.0
Silt, moderately clayey, sandy, light pinkish gray; sand is very fine to fine.....	213.0	215.0
Silt to siltstone, clayey, light brown.....	215.0	220.0
<b>Tertiary System - Miocene Series - Arikaree Group, undifferentiated:</b>		
Silt, moderately clayey, very sandy, light gray; sand is very fine to fine; from 238 to 240 ft and below 250 ft, contains marly areas; below 240 ft, contains some silty sandstone.....	220.0	252.0
Sand to sandstone; sand is very fine to medium with some coarse.....	252.0	255.0
Silt to siltstone, clayey, light brown; contains bentonite.....	255.0	257.5
Limestone, marly, light gray to light brown.....	257.5	263.0
Silt to siltstone, clayey, light brown; contains some very fine sand; from 265 to 270 ft, contains some limy areas.....	263.0	275.0
<b>Tertiary System - Oligocene Series - White River Group:</b>		
<b>Brule Formation:</b>		
Silt to siltstone, clayey, light brown.....	275.0	300.0

**Test Hole #6-A-65 (E-log)**  
**(13N-43W-18bbbb)**  
**Deuel County**

Location: NW NW NW NW sec. 18, T. 13 N., R. 43 W., 63 feet south and 16.5 feet east of northwest corner.

Ground elevation: 3,753.0 ft. (t). (Chappell SE 7.5 min. quadrangle).

Depth to water: 169.6 ft.

	<u>Depth, in feet</u>	
	From	To
<b>Quaternary System, undifferentiated:</b>		
Road fill.....	0.0	0.5
Sand, silty, dark grayish brown at top, brown and calcareous at base.....	0.5	4.8
<b>Quaternary System and Tertiary System - Pliocene Series:</b>		
Sand and gravel, granitic.....	4.8	42.0
<b>Tertiary System - Miocene Series - Ogallala Group:</b>		
<b>Ash Hollow Formation:</b>		
Sand and sandstone, silty, some fine gravel, reddish brown, calcareous at 55 ft.....	42.0	81.5
Sand and gravel, granitic.....	81.5	94.2
Sand and sandstone, silty, some fine gravel.....	94.2	102.0
Sand and gravel, granitic.....	102.0	118.0
Silt, sandy, brown to gray, some strata with calcareous cement.....	118.0	127.0
Sand and gravel, granitic.....	127.0	132.0
Sand and sandstone, silty, some strata have included mostly light brown with some white and pale olive, fine gravel, some strata with calcareous cement...	132.0	217.0
Sand with some gravel.....	217.0	241.0
Sandstone, silty, some strata have included fine gravel, some strata with calcareous cement.....	241.0	257.5
Sand.....	257.5	268.0
Sandstone, white, calcareous cement.....	268.0	272.0
Sand, with minor gravel.....	272.0	302.0
Sandstone, pale olive, silica cemented.....	302.0	304.0
<b>Tertiary System - Oligocene Series - White River Group:</b>		
<b>Brule Formation:</b>		
Siltstone, reddish brown, some strata include calcareous cemented concretions.....	304.0	360.5

**Test Hole #2-WB-66 (E-logs)**  
**(13N-43W-20dddd)**  
**Deuel County**

Location: SE SE SE SE sec. 20, T. 13 N., R. 43 W., 21.5 feet north  
and 28 feet west of southeast corner.

Ground elevation: 3,648.0 ft. (t). (Chappell SE 7.5 min. quadrangle).

Depth to water: Unknown; test hole caved at 82 ft.

Depth, in feet  
From To

**Quaternary System, undifferentiated:**

Silt, slightly clayey, moderately sandy, slightly calcareous, dark brownish gray with some pale brown; below 5 ft, marly.....	0.0	7.0
---	-----	-----

**Quaternary System and Tertiary System - Pliocene Series:**

Sand, gravelly; fine sand to fine gravel.....	7.0	10.0
Gravel, sandy; medium sand to medium gravel with a trace of coarse gravel; below 15 ft, slightly finer textured.....	10.0	20.0
Gravel, sandy, fine sand to fine gravel with some medium gravel; below 30 ft, contains some coarse gravel.....	20.0	40.0
Sand, gravelly; fine sand to fine gravel with some medium gravel.....	40.0	55.0
Gravel, sandy; fine sand to very coarse gravel.....	55.0	64.0

**Tertiary System - Miocene Series - Ogallala Group:**

**Ash Hollow Formation:**

Silt, moderately clayey, sandy, light brown; sand is very fine to fine with a little medium; below 65 ft, contains limy layers.....	64.0	70.0
Clay, silty, light brown; contains limy layers; below 75 ft, moderately sandy, sand is very fine to fine.....	70.0	77.0
Sand, slightly gravelly; very fine sand to fine gravel.....	77.0	86.0
Clay, silty, pinkish gray; below 90 ft, sandy, sand is very fine to fine; from 100 to 105 ft and below 112 ft, marly areas.....	86.0	117.0
Silt, very clayey, sandy, coarse textured, light brownish gray; sand is very fine to fine.....	117.0	120.0
Silt to siltstone, clayey, coarse textured, light gray with some pink contains some marly areas; from 130 to 145 ft, pale olive with some pink; below 145 ft, light brownish gray.....	120.0	153.0
Sand, slightly consolidated, silty; sand is very fine to fine.....	153.0	155.0
Sand, very fine to medium with a little coarse; below 157 ft, in part well consolidated.....	155.0	159.0
Silt, very clayey, coarse textured, pale yellow.....	159.0	160.0

Sand, very fine to very coarse; from 160.6 to 164 ft, consolidated; from 168 to 171 ft, contains silt layer, pale yellow; below 171 ft, contains a little fine gravel.....	160.0	175.0
<b>Tertiary System - Oligocene Series - White River Group:</b>		
<b>Brule Formation:</b>		
Silt to siltstone, clayey, coarse textured, slightly calcareous, light brown with reddish tint.....	175.0	200.0

**Test Hole #3-WB-66 (E-logs)**  
**(13N-43W-24ddddd)**  
**Deuel County**

Location: SE SE SE SE sec. 24, T. 13 N., R. 43 W., 39 feet north and 29 feet west of southeast corner.

Ground elevation: 3,626.0 ft. (t). (Barton 7.5 min. quadrangle).

Depth to water: 124.0 ft. (9-29-66).

Depth, in feet  
From                  To

**Quaternary System, undifferentiated:**

Top soil: silt, slightly clayey, moderately sandy, dark brownish gray.....	0.0	1.0
Silt, slightly clayey, moderately sandy, moderately calcareous, pale brown; and is very fine to fine with a trace of medium below 5 ft, very clayey, slightly calcareous, light brownish gray.....	1.0	9.0

**Quaternary System and Tertiary System - Pliocene Series:**

Sand, gravelly; fine sand to fine gravel with some medium gravel; below 20 ft, contains less medium gravel.....	9.0	25.0
Sand, fine to very coarse.....	25.0	29.0
Gravel, sandy, fine sand to coarse gravel; below 30 ft, contains a trace of coarse gravel.....	29.0	40.0
Sand, gravelly; fine sand to fine gravel with a little medium to coarse gravel; from 45 to 50 ft, contains some coarse to very coarse gravel.....	40.0	62.0

**Tertiary System - Miocene Series - Ogallala Group:**

**Ash Hollow Formation:**

Silt, very clayey, moderately sandy, light brown with reddish tint; sand is very fine to medium; below 65 ft, in part marly.....	62.0	76.0
Sand, gravelly; fine sand to fine gravel with a little medium to coarse gravel; below 80 ft, contains some clay lenses.....	76.0	87.0
Clay, silty, sandy, light brown with pinkish tint; sand is very fine to fine.....	87.0	90.0
Sand, gravelly; fine sand to medium gravel with a little coarse gravel.....	90.0	99.0
Clay, silty, moderately sandy, light brown with pinkish tint; sand is very fine to medium; below 100 ft, micaceous, pinkish gray.....	99.0	112.0
Sand, gravelly; fine sand to medium gravel with a little coarse gravel.....	112.0	117.0
Silt, very clayey, slightly to moderately sandy, micaceous, pinkish gray; sand is very fine to fine, some medium.....	117.0	125.5
Limestone, marly, sandy, light gray; sand is very fine to fine; below 135 ft, contains some gravel..	125.5	138.0
Clay, silty, moderately calcareous, light yellowish brown with pinkish tint.....	138.0	140.0

Silt to siltstone, clayey, coarse textured, pinkish gray; from 148 to 149.5 ft, contains limy layer...	140.0	151.0
Sand, fine to very coarse with a trace of fine gravel.....	151.0	159.5
Silt to siltstone, clayey, coarse textured, marly, very calcareous, pinkish gray.....	159.5	163.0
Sand, fine to very coarse with a trace of fine gravel; below 165 ft, contains a little more gravel.....	163.0	169.0
Clay, silty, coarse textured, moderately calcareous, pinkish gray.....	169.0	171.0
Sand, fine to very coarse with a little fine gravel.	171.0	179.0
<b>Tertiary System - Oligocene Series - White River Group:</b>		
<b>Brule Formation:</b>		
Silt, moderately clayey, slightly sandy, light brown; sand is very fine to fine.....	179.0	180.0
Silt to siltstone, clayey, coarse textured, moderately calcareous, pinkish gray.....	180.0	195.0
Silt, moderately clayey, slightly sandy, micaceous, slightly calcareous, pinkish gray; sand is very fine to fine.....	195.0	200.0
Silt to siltstone, clayey, sandy, light brown to pinkish gray; sand is very fine to fine.....	200.0	205.0
Silt to siltstone, clayey, coarse textured, light brown with some pinkish gray; below 210 ft, contains some very fine sand.....	205.0	240.0

**Test Hole #1-WB-66 (E-logs)**  
**(13N-43W-26cccc)**  
**Deuel County**

Location: SW SW SW SW sec. 26, T. 13 N., R. 43 W., 41 feet north and 37 feet east of southwest corner.

Ground elevation: 3,649.0 ft. (t). (Barton 7.5 min. quadrangle).

Depth to water: Unknown; test hole caved at 131 ft. (9-14-66).

	<u>Depth, in feet</u>	
	From	To
<b>Quaternary System, undifferentiated:</b>		
Top soil.....	0.0	2.7
Silt, slightly clayey, very sandy, slightly calcar- eous, very pale brown.....	2.7	7.0
<b>Quaternary System and Tertiary System - Pliocene Series:</b>		
Gravel, sandy; fine sand to medium gravel with a little coarse gravel; below 10 ft, contains no coarse gravel.....	7.0	20.0
Sand, gravelly; fine sand to fine gravel; below 25 ft, contains some medium gravel; below 35 ft, contains some coarse gravel; from 33 to 34 ft and at 38 ft, contains clay layers.....	20.0	40.0
Sand, gravelly; very fine sand to fine gravel with some interbedded clay layers.....	40.0	45.0
Sand, gravelly; fine sand to medium gravel with some coarse gravel.....	45.0	47.0
<b>Tertiary System - Miocene Series - Ogallala Group:</b>		
<b>Ash Hollow Formation:</b>		
Silt, moderately clayey, moderately sandy, micaceous, yellowish brown; sand is very fine to medium; below 50 ft, contains marly areas.....	47.0	53.0
Sand, slightly silty; sand is very fine to coarse with some very coarse.....	53.0	55.0
Sand, fine to very coarse.....	55.0	61.0
Silt, moderately clayey, very sandy, micaceous, light reddish brown with pinkish tint.....	61.0	70.0
Sand, slightly gravelly; fine sand to fine gravel with silt layer at 75 ft.....	70.0	75.0
Silt, slightly clayey, very sandy, light brown with pinkish tint; sand is very fine to coarse; below 80 ft, slightly less sandy, sand is very fine to fine with some medium.....	75.0	85.0
Sand, gravelly; fine sand to fine gravel; below 93 ft, fine sand to medium gravel with some coarse gravel.....	85.0	95.0
Gravel, sandy; medium sand to coarse gravel with some very coarse gravel.....	95.0	100.0
Sand, gravelly; medium sand to fine gravel with some medium gravel; contains rare claystone grains.....	100.0	106.0

Silt, slightly clayey, very sandy, pinkish gray; sand is very fine with some fine; below 110 ft, contains interbedded limestone lenses.....	106.0	115.0
Sandstone, lime cemented; sand is very fine to fine.	115.0	117.0
Limestone, sandy, light gray; contains marly areas..	117.0	120.0
Sand, gravelly; fine sand to fine gravel.....	120.0	125.0
Silt, moderately clayey, moderately sandy, pinkish gray; sand is very fine to medium; contains some marly areas.....	125.0	138.0
Sand, fine to very coarse; below 140 ft, contains a little fine gravel, contains interbedded lime- stone lenses.....	138.0	144.0
<b>Tertiary System - Oligocene Series - White River Group:</b>		
<b>Brule Formation:</b>		
Clay, silty, slightly sandy, micaceous, moderately calcareous, pinkish gray; sand is very fine.....	144.0	155.0
Silt, moderately to very clayey, sandy, micaceous, moderately to slightly calcareous, in part very sandy, pinkish gray; contains marly areas.....	155.0	185.0
Silt, very clayey, coarse textured, moderately calcareous, pale brown.....	185.0	190.0
Silt to siltstone, clayey, coarse textured, very calcareous, pinkish white.....	190.0	200.0
Silt to siltstone, clayey, sandy, moderately cal- careous, pinkish gray; sand is very fine to fine with a little medium.....	200.0	210.0
Clay, silty, moderately calcareous, light gray.....	210.0	215.0
Silt to siltstone, clayey, moderately calcareous, light gray to light brownish gray.....	215.0	220.0
Silt to siltstone, clayey, sandy, in part moderately sandy, very calcareous, pinkish gray; sand is very fine to fine.....	220.0	225.0
Silt to siltstone, clayey, very calcareous, pinkish gray; contains limy areas.....	225.0	230.0
Siltstone, clayey, sandy, moderately calcareous, light brown; sand is very fine to fine.....	230.0	235.0
Silt to siltstone, clayey, sandy, moderately calcar- eous, pinkish gray; sand is very fine to fine.....	235.0	245.0
Silt to siltstone, clayey, in part sandy, light brown.....	245.0	280.0

**Test Hole #12-WB-66 (No e-logs)**  
**(13N-44W-4aaaa)**  
**Deuel County**

Location: NE NE NE NE sec. 4, T. 13 N., R. 44 W., 197 feet south and 56 feet west of northeast corner.

Ground elevation: 3,791.0 ft. (t). (Chappell NE 7.5 min. quadrangle).

Depth to water: 162.8 ft. (10-24-66).

	<u>Depth, in feet</u>	
	From	To
<b>Quaternary System, undifferentiated:</b>		
Sand, silty, slightly clayey; sand is very fine to fine; contains limy grains.....	0.0	10.0
<b>Quaternary System and Tertiary Systems - Pliocene Series:</b>		
Sand, silty, lime cemented; sand is very fine to fine; contains limy grains.....	10.0	35.0
Silt, slightly clayey, very sandy, pinkish gray; Sand is very fine to fine.....	35.0	40.0
Sand, silty to silt, sandy, light gray to pinkish gray; sand is very fine to fine; contains limy areas.....	40.0	45.0
Sand, silty; sand is very fine to very coarse with a trace of fine gravel.....	45.0	50.0
Sand, gravelly; fine sand to coarse gravel.....	50.0	55.0
Gravel, sandy; medium sand to very coarse gravel....	55.0	61.0
<b>Tertiary System - Miocene Series - Ogallala Group:</b>		
<b>Ash Hollow Formation:</b>		
Silt, slightly clayey, very sandy, light gray; sand is very fine to fine with a few coarser grains; below 65 ft, contains some limy areas; below 80 ft, light brown.....	61.0	87.0
Sand, gravelly; fine sand to medium gravel with a little coarse gravel; below 90 ft, contains fine sand to fine gravel with some medium gravel.....	87.0	93.0
Silt, slightly clayey, very sandy, light brown; sand is very fine to fine with some medium and coarser grains.....	93.0	95.0
Sand, silty, slightly clayey; sand is very fine to fine with some medium.....	95.0	100.0
Sand, very fine to very coarse.....	100.0	105.0
Sand, gravelly; fine sand to fine gravel with some medium gravel; below 110 ft, contains a trace of coarse gravel.....	105.0	115.0
Silt, slightly clayey, very sandy, slightly calcareous, pinkish gray; sand is very fine to very coarse; contains limy areas; contains a little fine to medium gravel.....	115.0	125.0
Silt, slightly clayey, very sandy, pinkish gray; sand is very fine to medium with a little coarse; contains limy areas.....	125.0	130.0
Gravel, sandy; medium sand to coarse gravel.....	130.0	135.0

Silt, slightly clayey, very sandy, pinkish gray; sand is very fine with some fine; below 110 ft, contains interbedded limestone lenses.....	106.0	115.0
Sandstone, lime cemented; sand is very fine to fine.	115.0	117.0
Limestone, sandy, light gray; contains marly areas..	117.0	120.0
Sand, gravelly; fine sand to fine gravel.....	120.0	125.0
Silt, moderately clayey, moderately sandy, pinkish gray; sand is very fine to medium; contains some marly areas.....	125.0	138.0
Sand, fine to very coarse; below 140 ft, contains a little fine gravel, contains interbedded lime- stone lenses.....	138.0	144.0
<b>Tertiary System - Oligocene Series - White River Group:</b>		
<b>Brule Formation:</b>		
Clay, silty, slightly sandy, micaceous, moderately calcareous, pinkish gray; sand is very fine.....	144.0	155.0
Silt, moderately to very clayey, sandy, micaceous, moderately to slightly calcareous, in part very sandy, pinkish gray; contains marly areas.....	155.0	185.0
Silt, very clayey, coarse textured, moderately calcareous, pale brown.....	185.0	190.0
Silt to siltstone, clayey, coarse textured, very calcareous, pinkish white.....	190.0	200.0
Silt to siltstone, clayey, sandy, moderately cal- careous, pinkish gray; sand is very fine to fine with a little medium.....	200.0	210.0
Clay, silty, moderately calcareous, light gray.....	210.0	215.0
Silt to siltstone, clayey, moderately calcareous, light gray to light brownish gray.....	215.0	220.0
Silt to siltstone, clayey, sandy, in part moderately sandy, very calcareous, pinkish gray; sand is very fine to fine.....	220.0	225.0
Silt to siltstone, clayey, very calcareous, pinkish gray; contains limy areas.....	225.0	230.0
Siltstone, clayey, sandy, moderately calcareous, light brown; sand is very fine to fine.....	230.0	235.0
Silt to siltstone, clayey, sandy, moderately calcar- eous, pinkish gray; sand is very fine to fine.....	235.0	245.0
Silt to siltstone, clayey, in part sandy, light brown.....	245.0	280.0

**Test Hole #12-B-65 (E-logs)**  
**(13N-44W-25adda)**  
**Deuel County**

Location: NE SE SE NE sec. 25, T. 13 N., R. 44W., 2,112 feet south  
and 6 ft west of northeast corner.

Ground elevation: 3,705.0 ft. (t). (Chappell SE 7.5 min. quadrangle).

Depth to water: 119.5 ft.

	<u>Depth, in feet</u>	
	From	To
<b>Quaternary System, undifferentiated:</b>		
Road fill.....	0.0	3.5
Sand, silty, with some gravel, light olive brown, local calcareous cement.....	3.5	14.0
<b>Quaternary System and Tertiary System - Pliocene Series:</b>		
Sand and gravel, granitic.....	14.0	16.5
<b>Tertiary System - Pliocene Series - Ogallala Group:</b>		
<b>Ash Hollow Formation:</b>		
Caliche, sandy, white to light olive, calcareous cement.....	16.5	19.0
Sand and sandstone, silty, light olive brown to pale olive, some strata with calcareous cement.....	19.0	48.0
Sand and gravel, granitic, iron oxide on grain surfaces.....	48.0	81.0
Silt, clayey, light yellowish brown.....	81.0	84.0
Sand and gravel, granitic.....	84.0	130.0
Sand, silty, brown to pale brown to pale olive, some strata with calcareous cement.....	130.0	170.0
Sand and gravel, granitic, calcareous cement below 172.5 ft.....	170.0	177.0
Sand, silty, light gray to pale olive.....	177.0	184.0
Sand, gravelly, with sandy silt stratum at 200 to 201.5 ft.....	184.0	204.0
Silt, sandy, and sand, silty, olive to pale olive, some strata with calcareous cement.....	204.0	217.0
Sand, granitic, gravelly, with some interbedded silt, pale olive.....	217.0	222.0
<b>Tertiary System - Oligocene Series - White River Group:</b>		
<b>Brule Formation:</b>		
Siltstone, pale olive 222.0 to 225.0 ft, brown to light brown, some strata contain concretions with calcareous cement.....	220.0	235.0

**Test Hole #1-42 (No e-logs)**  
**(13-44-31cddd)**  
**Deuel County**

Location: SE SE SE SW sec. 31, T. 13 N., R. 44 W., approximately 1,700 feet east and 35 feet north of the southwest corner.

Ground elevation: 3,624.0 ft. (i). (Chappell 7.5 min. quadrangle).

Depth to water: 10.3 ft. (6-5-42)

	<u>Depth, in feet</u>	
	From	To
<b>Quaternary System, undifferentiated:</b>		
Soil: silt, sandy, dark brown; fine texture sand...	0.0	4.0
Gravel, pink; texture grades from fine to coarse gravel; texture grades from fine to medium gravel from 10.0 to 20.0 ft. and from fine to coarse from 20.0 to 29.0 ft.....	4.0	29.0
<b>Tertiary System - Oligocene Series - White River Group:</b>		
<b>Brule Formation:</b>		
Clay, silty, light pink to buff.....	29.0	49.0

**Test Hole #6-42 (No e-logs)**  
**(13N-45W-22bbbc)**  
**Deuel County**

Location: SW NW NW NW sec. 22, T. 13 N., R. 45 W., approximately 530 feet south and 10 feet east of northwest corner.

Ground elevation: 3,680.0 ft. (i). (Chappell 7.5 min. quadrangle).

Depth to water: 5.1(?) ft. (6-6-42).

	<u>Depth, in feet</u>	
	From	To
<b>Quaternary System, undifferentiated:</b>		
Silt, sandy, brownish gray.....	0.0	6.0
Gravel, pink; texture grades from fine to coarse; contains some pebbles in lower part.....	6.0	13.0
Gravel, pink; texture grades from fine to coarse; contains some coarse sand.....	13.0	21.0
<b>Tertiary System - Oligocene Series - White River Group:</b>		
<b>Brule Formation:</b>		
Siltstone, sandy; moderately hard.....	21.0	28.0
Siltstone, sandy; pinkish buff and gray; hard.....	28.0	29.0

**Test Hole DC-7-95 (No e-logs)**  
**(13N-45W-25cbbc)**  
**Deuel County**

Location: SW NW NW SW sec. 25, T. 13 N., R. 45 W., 2,200 feet north  
 and 50 feet east of southwest corner.

Ground elevation: 3,649.0 ft. (t). (Chappell 7.5 min. quadrangle).

Depth to water: Unknown. (5-19-95).

	<u>Depth, in feet</u>	
	From	To
<b>Quaternary System, undifferentiated:</b>		
Top soil, gray, silty clay.....	0.0	5.0
Clay, silty, black to olive.....	5.0	11.0
Sand and gravel, granitic.....	11.0	23.0
<b>Tertiary System - Oligocene Series - White River Group:</b>		
<b>Brule Formation:</b>		
Siltstone, brown, clay cement.....	23.0	30.0

**Test Hole #5-42  
(13-45-25ccbc)  
Deuel County**

Location: SW NW SW SW sec. 25, T. 13 N., R. 45 W., approximately 780 feet north and 10 feet east of southwest corner.

Ground elevation: 3,648.0 ft. (i). (Chappell 7.5 min. quadrangle).

Depth to water: 8.3 ft. (6-5-42).

	<u>Depth, in feet</u>	
	From	To
<b>Quaternary System, undifferentiated:</b>		
Road fill: silt, sandy and gravelly, brownish gray.	0.0	5.0
Silt, sandy, brownish gray.....	5.0	11.0
Gravel and sand, pink; texture grades from coarse sand to coarse gravel; contains some reworked brown clay from 16.0 to 22.0 ft.....	11.0	22.0
<b>Tertiary System - Oligocene Series - White River Group:</b>		
<b>Brule Formation:</b>		
Siltstone, clayey, light pink and buff.....	22.0	39.0

**Test Hole #28-42 (No e-logs)**  
**(13N-46W-12bbbb)**  
**Deuel County**

Location: NW NW NW NW sec. 12, T. 13 N., R. 46 W., approximately 24 feet east of northwest corner.

Ground elevation: 3,756.0 ft. (i). (Lodgepole SE 7.5 min. quadrangle).

Depth to water: Undetermined.

Depth, in feet  
From                  To

**Quaternary System, undifferentiated:**

Soil: silt, sandy, dark brownish gray; contains sand and gravel.....	0.0	1.5
Sand and gravel, gray and pink; texture grades from sand to medium gravel.....	1.5	12.0
Gravel and sand, pink; texture grades from sand to medium gravel; contains some coarse gravel; contains some clayey silt fragments.....	12.0	20.0

**Tertiary System - Oligocene Series - White River Group:**

**Brule Formation:**

Siltstone, clayey, pinkish gray; indurated; pink below 75 ft.....	20.0	90.0
---	------	------

**Test Hole #7-42 (No e-logs)**  
**(13N-46W-12ccbc)**  
**Deuel County**

Location: SW NW SW SW sec. 12, T. 13 N., R. 46 W., approximately 725 feet north and 10 feet east of southwest corner.

Ground elevation: 3,792.0 ft. (i). (Lodgepole SE 7.5 min. quadrangle).

Depth to water: Unknown; test hole caved at 32.3 ft. (6-9-42).

	<u>Depth, in feet</u>	
	From	To
<b>Quaternary System, undifferentiated:</b>		
Road fill: sand and gravel, pink.....	0.0	3.0
Sand and gravel, pink; texture grades from medium sand to medium gravel; poorly sorted.....	3.0	13.0
Sand, pink; texture grades from medium to coarse sand, some fine gravel; somewhat finer texture in lower part.....	13.0	35.0
Gravel, pink; fine texture; contains some reworked sandstone.....	35.0	50.0
<b>Tertiary System - Oligocene Series - White River Group:</b>		
<b>Brule Formation:</b>		
Siltstone, sandy, pinkish gray; hard limy areas.....	50.0	59.0

**Test Hole DC-8-95 (No e-logs)**  
**(13N-46W-12dadd)**  
**Deuel County**

Location: SE SE NE SE sec. 12, T. 13 N., R. 46 W., 100 feet west and  
 1,425 feet north of southeast corner.  
 Ground elevation: 3,740.0 ft. (t). (Lodgepole SE 7.5 min. quadrangle).  
 Depth to water: Unknown. (5-19-95).

	<u>Depth, in feet</u>	
	From	To
<b>Quaternary System, undifferentiated:</b>		
Top soil, sandy, brown.....	0.0	0.5
Sand, brown, granitic.....	0.5	5.0
Sand and gravel, granitic.....	5.0	25.0
Sand, brown, with local sandstone bedrock fragments.	25.0	33.0
Sand and gravel, granitic.....	33.0	35.0
<b>Tertiary System - Oligocene Series - White River Group:</b>		
<b>Brule Formation:</b>		
Siltstone, brown, clay cement.....	35.0	40.0

**Test Hole #14-B-65 (E-log)**  
**(13N-46W-13cdcc)**  
**Deuel County**

Location: SW SW SE SW sec, 13, T. 13 N., R. 46 W., 1,413 feet east and 10 feet north of southwest corner.

Ground elevation: 3,843.0 ft. (t). (Lodgepole SE 7.5 min. quadrangle).

Depth to water: 36.8 ft. (7-19-65).

	<u>Depth, in feet</u>	
	From	To
<b>Quaternary System, undifferentiated:</b>		
Road fill.....	0.0	6.0
<b>Tertiary System - Miocene Series - Ogallala Group:</b>		
<b>Ash Hollow Formation:</b>		
Sand and sandstone, silty, micaceous fine gravel present in some strata, light brown to brown, some strata have discontinuous calcareous cement.....	6.0	28.0
Sand and gravel, granitic.....	28.0	34.0
Sand and sandstone, variably silty, fine gravel present in some strata, pale brown to light yellowish brown, discontinuous calcareous cement..	34.0	48.0
Sand and gravel, granitic, discontinuous calcareous cement.....	48.0	62.0
Sand and sandstone, variably silty, brown, pale brown, light yellowish brown, alternating finer to coarser strata, some strata with discontinuous calcareous cement. Rhizoliths from 160 to 177 ft..	62.0	177.0
<b>Tertiary System - Oligocene Series - White River Group:</b>		
<b>Brule Formation:</b>		
Siltstone, sandy, brown to light brown, some strata contain concretions with calcareous cement, siltstone with clay cement.....	177.0	230.5

**Test Hole #8-A-65 (E-logs)**  
**(13N-46W-35dddd)**  
**Deuel County**

Location: SE SE SE SE sec. 35, T. 13 N., R. 46 W., 155 feet north and 5.5 feet west of southeast corner.  
 Ground elevation: 3,943.0 ft. (t). (Lodgepole SE 7.5 min. quadrangle).  
 Depth to water: Unknown.

	<u>Depth, in feet</u>	
	From	To
<b>Quaternary System, undifferentiated:</b>		
Road fill.....	0.0	1.0
Sand, silty, dark brown at top to grayish brown, calcareous below 3 ft, gravel present below 3 ft..	1.0	5.0
<b>Tertiary System - Miocene Series - Ogallala Group:</b>		
<b>Ash Hollow Formation:</b>		
Sand and sandstone, gravel and silt present, calcareous cement.....	5.0	8.5
Sand and gravel, granitic, manganese oxide coats some grains.....	8.5	15.0
Sand and sandstone, some gravel clasts present, light brown to pale brown.....	15.0	49.0
Sand and gravel, granitic.....	49.0	74.0
Sand and sandstone, silty, gravel clasts in some strata, brown to reddish brown.....	74.0	92.0
Sand and gravel, granitic, some manganese oxide stain on grain surfaces.....	92.0	122.0
Sand and sandstone, silty, yellowish brown.....	122.0	125.0
Sand and gravel, granitic.....	125.0	138.0
Sand and sandstone, silty, some strata with fine gravel, pinkish white to light brown and light reddish brown, some strata with calcareous cement.	138.0	214.0
Sand and gravel, granitic, some sandy interbeds.....	214.0	226.0
Sand and sandstone, silty, some strata with fine gravel, some with calcareous cement.....	226.0	244.0
Sand and gravel, granitic with calcareous cement....	244.0	252.0
<b>Tertiary System - Oligocene Series - White River Group:</b>		
<b>Brule Formation:</b>		
Siltstone, light brown to brown, very calcareous 252 to 260 ft; below 260 ft calcareous cement in some strata.....	252.0	310.5

**Test Hole #2-A-65 (E-logs)**  
**(14N-42W-12ddddd)**  
**Deuel County**

Location: SE SE SE SE sec. 12, T. 14 N., R. 42 W., 4.5 feet north and 253 feet west of southeast corner.

Ground elevation: 3,673.0 ft. (a). (Big Springs NE 7.5 min. quadrangle).

Depth to water: Unknown; test hole open to 258 ft. (6-29-65).

	<u>Depth, in feet</u>	
	From	To
<b>Quaternary System, undifferentiated:</b>		
Road fill.....	0.0	0.5
Silt, dark grayish brown, with sand and clay.....	0.5	2.0
Silt, sandy, pale brown to light brown, with some Mn and Fe staining, calcareous.....	2.0	40.0
Silt, sandy, gray brown, calcareous.....	40.0	57.5
<b>Tertiary System - Miocene Series - Ogallala Group:</b>		
<b>Ash Hollow Formation:</b>		
Sandstone and sand, light brown to grayish brown, rhizoliths present, calcareous cement.....	57.5	80.0
Sand and gravel, granitic, some manganese oxide staining on grain surfaces.....	80.0	103.0
Sandstone, light pinkish brown.....	103.0	106.0
Sand and gravel, granitic.....	106.0	118.0
Sand, light brown.....	118.0	119.0
Sandstone, white, calcareous cement abundant.....	119.0	120.0
Sand and sandstone, light brown to light reddish brown, silty, some strata with calcareous cement..	120.0	168.0
Sand and gravel, granitic.....	168.0	178.0
Sand and sandstone, light brown to pinkish gray, some strata with calcareous cement.....	178.0	191.5
Sand and gravel, granitic.....	191.5	204.5
Sand and sandstone, light brown to pinkish white, some strata with calcareous cement.....	204.5	212.0
Sand and gravel, granitic, some parts with more sand.....	212.0	276.0
Sand and sandstone, light gray to pale grayish brown, silty, some strata with calcareous cement..	276.0	310.0
Silt, white to light gray to pale olive, very calcareous.....	310.0	316.0
<b>Tertiary System - Oligocene Series - White River Group:</b>		
<b>Brule Formation:</b>		
Siltstone, pale to reddish brown, with some strata with calcareous cement.....	316.0	370.5

**Test Hole #8-B-65 (E-logs)**  
**(14N-42W-25ddaa)**  
**Deuel County**

Location: NE NE SE SE sec. 25, T. 14 N., R. 42 W., 1,155 feet north  
and 7 feet west of southeast corner.

Ground elevation: 3,635.0 ft. (t). (Big Springs NE 7.5 min.  
quadrangle).

Depth to water: Unknown; test hole open to 131 ft. (6-29-65).

	<u>Depth, in feet</u>	
	From	To
<b>Quaternary System, undifferentiated:</b>		
Road fill.....	0.0	2.5
Sand, silty, with lime nodules.....	2.5	8.0
<b>Quaternary System and Tertiary System - Pliocene Series:</b>		
Sand, silty, gravelly, pale brown to yellowish brown, calcareous.....	8.0	11.5
Sand and gravel, granitic.....	11.5	19.5
Sand, silty, light gray.....	19.5	20.5
Sand and gravel, granitic, some interbedded silty sandy, brown, at 48 to 50 ft.....	20.5	71.6
<b>Tertiary System - Miocene Series - Ogallala Group:</b>		
<b>Ash Hollow Formation:</b>		
Sand and sandstone, silty, with some gravel, pale brown, yellowish brown, some strata with calcar- eous cement, rhizoliths and opaline silica in some strata.....	71.6	80.0
Sand and gravel, granitic, sandier at 100 to 103 ft.	80.0	106.0
Sand, silty, with some gravel, light brown.....	106.0	120.0
Sand and gravel, granitic.....	120.0	139.8
Silt, sandy, with some gravel, yellowish brown to brown, with some opaline silica.....	139.8	159.0
Sand and gravel, granitic.....	159.0	164.0
Silt, sandy, micaceous, light yellowish brown to pale brown.....	164.0	182.0
Sand and gravel.....	182.0	190.0
Sand, silty, light brown to brown, some strata with calcareous cement.....	190.0	203.0
Sand and gravel, granitic.....	203.0	215.0
Silt, sandy, brown to light gray, some strata with calcareous cement.....	215.0	224.0
Sand, silty, light yellowish brown, calcareous cement near base.....	224.0	230.0
Sand, silty sand, interbedded, light yellow, pale brown to light brown, some strata with calcareous cement.....	230.0	340.0
Sand, very fine to coarse.....	340.0	350.0
Silt, sandy, light yellowish brown.....	350.0	356.0
Sand, very fine to coarse, some gravel.....	356.0	395.0

**Tertiary System - Oligocene Series - White River Group:**

**Brule Formation:**

Siltstone, light brown to very pale brown, some  
strata with concretions with calcareous cement.... 395.0 450.0

**Test Hole #9-WB-66 (No e-logs)**  
**(14N-43W-10aaaa)**  
**Deuel County**

Location: NE NE NE NE sec. 10, T. 14 N., R. 43 W.

Ground elevation: 3,738.0 ft. (a). (Big Springs NW 7.5 min. quadrangle).

Depth to water: Unknown; test hole caved at 235 ft. (10-4-66).

	<u>Depth, in feet</u>	
	From	To
<b>Quaternary System, undifferentiated:</b>		
Top soil: silt, slightly clayey, dark grayish brown.	0.0	5.0
Silt, slightly clayey, slightly sandy, slightly calcareous, grayish brown; sand is very fine; below 10 ft, slightly more clayey.....	5.0	19.0
Sand, silty; sand is fine to coarse.....	19.0	20.0
<b>Quaternary System and Tertiary System - Pliocene Series:</b>		
Sand, gravelly; fine sand to fine gravel; below 25 ft, contains some medium gravel with a trace of coarse.....	20.0	30.0
Sand, fine to very coarse with a little fine gravel.	30.0	32.0
Silt, moderately clayey, slightly sandy, micaceous, light brown; sand is very fine; below 35 ft, sand is very fine to coarse.....	32.0	39.5
Sand, gravelly; fine sand to fine gravel with a little medium gravel; below 45 ft, fine sand to medium gravel with some coarse to very coarse gravel and a trace of pebbles.....	39.5	49.0
<b>Tertiary System - Miocene Series - Ogallala Group:</b>		
<b>Ash Hollow Formation:</b>		
Silt, slightly clayey, very sandy, pinkish gray; below 52 ft, marly.....	49.0	55.0
Silt, very clayey, sandy, light brown with reddish tint; sand is very fine to fine with some medium; below 60 ft, marly, pinkish gray.....	55.0	65.0
Marl, silty, sandy, light gray, very fine to medium sand.....	65.0	70.0
Silt, moderately clayey, moderately sandy, coarse textured, reddish brown.....	70.0	74.0
Sand, gravelly; fine sand to fine gravel with some medium gravel.....	74.0	87.0
Sandstone, lime cemented; sand is very fine; contains rootlets.....	87.0	97.0
Silt, slightly clayey, very sandy, marly, light brown; sand is very fine to fine; contains some sandstone; contains rootlets.....	97.0	100.0
Sandstone, silty, lime cemented; sand is very fine to fine; below 105 ft, much medium to coarse sand.	100.0	110.0
Sand, gravelly, lime cemented; fine sand to medium gravel with a little coarse gravel.....	110.0	115.0

Clay, silty, sandy, marly, brown to pinkish gray; sand is very fine to fine; below 120 ft pinkish gray, contains interbedded sandstone lenses.....	115.0	133.0
Sand, gravelly; fine sand to fine gravel with a little medium gravel.....	133.0	136.0
Silt, moderately clayey, light brownish gray.....	136.0	140.0
Clay, silty, sandy, micaceous, light gray; sand is very fine to fine.....	140.0	145.0
Clay, silty, with some siltstone, pinkish gray; from 155 to 170 ft, brown; below 170 ft, sandy.....	145.0	176.0
Sandstone, lime cemented; sand is very fine to medium.....	176.0	178.0
Sand, fine to very coarse, in part lime cemented....	178.0	180.0
Silt, very clayey, sandy, pinkish gray.....	180.0	183.0
Sand, gravelly; fine sand to fine gravel with some medium to coarse gravel; from 185 to 190 ft and below 195 ft, contains fine sand to medium gravel with some coarse gravel.....	183.0	198.0
Clay, silty, sandy, pinkish gray; sand is very fine to medium.....	198.0	200.0
Sand, gravelly; fine sand to fine gravel with some medium and a trace of coarse gravel; from 200 to 205 ft, contains thin clay lenses; below 220 ft, contains less medium gravel.....	200.0	223.0
Clay, silty, sandy, light brown with some pink sand is very fine to fine; contains some marly areas...	223.0	229.0
Sand, gravelly; fine sand to fine gravel; from 230 to 240 ft, contains a little medium gravel.....	229.0	248.0
Clay, silty, pale brown; below 250 ft, light gray...	248.0	254.0
Limestone, marly, sandy, light gray; sand is very fine to fine; from 258 to 260 ft, contains a clay layer, sandy, pale yellow.....	254.0	270.0
Sandstone, well consolidated; sand is very fine to fine; contains marly areas; below 277 ft, less consolidated, sand is fine to coarse.....	270.0	280.0
Limestone, sandy, marly, light gray to pale yellow; sand is very fine to fine.....	280.0	285.0
Sandstone, moderately consolidated, marly, light gray; sand is very fine to fine.....	285.0	290.0
Clay, silty, sandy, marly, pinkish gray; sand is very fine to fine; contains interbedded lime cemented sandstone.....	290.0	335.0
Sandstone, lime cemented; sand is very fine to fine.	335.0	340.0
Clay, silty, slightly calcareous, reddish brown; contains interbedded sandstone lenses, sand is very fine to fine.....	340.0	355.0
Clay, silty, in part sandy, micaceous, pale brown with olive tint; sand is very fine to fine; below 356 ft, pale yellow; from 375 to 380 ft, in part marly; below 385 ft, in part very sandy.....	355.0	400.0

Sand, fine to coarse with some very coarse; from 405 to 410 ft, slightly gravelly, fine sand to fine gravel; below 410 ft, contains a little fine gravel.....	400.0	414.0
Clay, silty, pale yellow.....	414.0	423.0
Sand, fine to very coarse.....	423.0	427.0
Clay, silty, pale yellow.....	427.0	430.0
Limestone, cherty.....	430.0	430.1

**Test Hole #10-WB-66 (E-logs)**  
**(14N-43W-21bbbb)**  
**Deuel County**

Location: NW NW NW NW sec. 21, T. 14 N., R. 43 W., 30 feet south and 29 feet east of northwest corner.

Ground elevation: 3,751.0 ft. (t). (Chappell NE 7.5 min. quadrangle).

Depth to water: Unknown; test hole plugged at 43 ft. (10-14-66).

	<u>Depth, in feet</u>	
	From	To
<b>Quaternary System, undifferentiated:</b>		
Top soil: silt, slightly clayey, dark brownish gray.	0.0	2.5
Silt, slightly clayey, sandy, light gray; sand is very fine to fine.....	2.5	5.0
Silt, slightly clayey, very sandy, light reddish brown; sand is very fine to medium with some gravel grains.....	5.0	15.0
Clay, silty, light gray; contains marly areas; below 20 ft, pale brown, contains no marly areas.....	15.0	23.0
<b>Quaternary System and Tertiary System - Pliocene Series:</b>		
Sand, gravelly; fine sand to coarse gravel with some pebbles.....	23.0	28.0
<b>Tertiary System - Miocene Series - Ogallala Group:</b>		
<b>Ash Hollow Formation:</b>		
Clay, silty, sandy, reddish brown; sand is very fine; below 30 ft, in part marly; below 31 ft, contains some medium sand; from 35 to 40 ft, pinkish gray.....	28.0	50.0
Clay, silty, very sandy, marly, pinkish gray; sand is very fine to medium; below 55 ft, brown, coarse textured, micaceous.....	50.0	63.0
Sandstone, silty; sand is very fine to fine with a little medium; below 70 ft, contains marly areas..	63.0	78.0
Clay, silty, moderately sandy, pinkish gray; sand is very fine to fine.....	78.0	80.0
Sandstone, moderately consolidated; sand is very fine to fine with a little medium; below 90 ft, contains marly limestone.....	80.0	95.0
Clay, silty, sandy, light gray; contains marly areas.....	95.0	100.0
Sandstone, moderately consolidated; sand is very fine to fine with a little medium; below 105 ft, texture grades to fine gravel.....	100.0	110.0
Silt, very clayey, sandy, micaceous, brown; sand is very fine to fine.....	110.0	118.0
Sand, gravelly; fine sand to fine gravel with some medium gravel; below 130 ft, fine sand to medium gravel with a little coarse to very coarse gravel.	118.0	136.0
Clay, silty, sandy, dark grayish brown; sand is very fine to fine; below 140 ft, pinkish gray.....	136.0	143.0

Sand, gravelly; fine sand to fine gravel with a little medium gravel; below 145 ft, contains no medium gravel.....	143.0	147.0
Clay, silty, light gray with pinkish tint; contains marly areas; below 160 ft, very sandy, sand is very fine to fine.....	147.0	173.0
Sand, gravelly; fine sand to fine gravel with a little medium gravel; from 180 to 185 ft, contains fine sand to medium gravel with some coarse and a trace of very coarse gravel.....	173.0	189.0
Clay, silty, sandy, pinkish gray; sand is very fine to fine.....	189.0	196.0
Sand, slightly gravelly; fine sand to medium gravel with a trace of coarse gravel.....	196.0	215.0
Clay, silty, sandy, brown; sand is very fine; below 217 ft, contains some marly areas; from 220 to 225 ft and below 230 ft, pinkish gray; from 225 to 230 ft, light gray.....	215.0	235.0
Marl, silty, sandy, light gray to light pinkish gray; sand is very fine to fine.....	235.0	236.0
Clay, silty, sandy, slightly calcareous, pinkish gray; sand is very fine to fine; contains marly areas; contains interbedded limestone and sandstone lenses; from 255 to 260 ft, light brown.....	236.0	270.0
Clay, silty, sandy, light brown; sand is very fine; below 275 ft, contains marly areas; from 280 to 285 ft, light gray to pinkish gray; below 285 ft, light brown to pinkish gray.....	270.0	290.0
Clay, silty, pinkish gray; contains interbedded sandstone lenses; sand is very fine to fine.....	290.0	297.0
Silt to siltstone, pinkish gray.....	297.0	300.0
Sand, fine to very coarse.....	300.0	305.0
Clay, silty, sandy, moderately calcareous, light brown; contains marly areas; contains some lime cemented sandstone.....	305.0	310.0
Sand, very fine to coarse with a trace of very coarse; from 315 to 320 ft, sand is fine to very coarse with a trace of fine gravel; below 320 ft, contains no fine gravel.....	310.0	324.0
Silt to siltstone, sandy, pale brown; sand is very fine; below 325 ft, contains limy areas.....	324.0	340.0
Clay, silty, sandy, light brown with pinkish tint; sand is very fine; below 345 ft, contains limy areas.....	340.0	350.0
<b>Tertiary System - Oligocene Series - White River Group:</b>		
<b>Brule Formation:</b>		
Silt to siltstone, light brown to pinkish gray.....	350.0	360.0

**Test Hole #8-WB-66 (E-logs)**  
**(14N-43W-23bbbb)**  
**Deuel County**

Location: NW NW NW NW sec. 23, T. 14 N., R. 43 W., 42 feet south and 7 feet east of northwest corner.

Ground elevation: 3,745.0 ft. (a). (Big Springs NW 7.5 min. quadrangle).

Depth to water: Unknown; test hole caved at 232 ft. (9-29-66).

	<u>Depth, in feet</u>	
	From	To
<b>Quaternary System, undifferentiated:</b>		
Top soil: silt, slightly clayey, sandy, dark brownish gray.....	0.0	2.0
Silt, slightly clayey, moderately sandy, moderately calcareous, light gray; sand is very fine; below 5 ft, pale brown.....	2.0	20.0
Silt, slightly clayey, sandy, moderately calcareous, light yellowish brown; sand is very fine; below 25 ft, moderately clayey, slightly sandy, light brownish gray.....	20.0	36.0
<b>Quaternary System and Tertiary System - Pliocene Series:</b>		
Silt, slightly clayey, very sandy, pinkish gray; sand is very fine to medium with a trace of coarse.....	36.0	40.0
Gravel, sandy; fine sand to medium gravel with some coarse gravel; below 45 ft, contains some very coarse gravel and a trace of pebbles.....	40.0	54.0
<b>Tertiary System - Miocene Series - Ogallala Group:</b>		
<b>Ash Hollow Formation:</b>		
Clay, silty, light reddish brown; below 60 ft, in part very sandy and marly; below 65 ft, pinkish gray.....	54.0	70.0
Clay, silty, sandy, marly, light gray; from 72.5 to 80 ft, reddish brown with some pinkish green below 75 ft.....	70.0	80.0
Clay, silty, sandy, marly, pinkish gray; below 95 ft, light gray to light brownish gray.....	80.0	110.0
Silt, very clayey, very sandy, pale yellow; sand is very fine to fine; contains marly areas; from 115 to 120 ft, light olive gray; below 120 ft, light gray with olive tint.....	110.0	130.0
Sand, silty, in part consolidated; sand is very fine to fine; below 135 ft, marly.....	130.0	140.0
Clay, silty, pale olive; contains some marly areas; contains lime cemented sandstone.....	140.0	145.0
Silt, slightly clayey, very sandy, pinkish gray; contains marly areas; contains lime cemented sandstone.....	145.0	155.0

Clay, silty, sandy, pinkish gray; contains inter-bedded sandstone; sand is very fine to very coarse with a trace of fine gravel.....	155.0	167.0
Sand, gravelly; fine sand to fine gravel with some medium gravel; from 170 to 175 ft, contains a trace of coarse gravel.....	167.0	180.0
Sand, gravelly; fine sand to medium gravel; from 180 to 185 ft and below 192 ft, contains some clay lenses.....	180.0	200.0
Sand, slightly gravelly; fine sand to fine gravel...	200.0	205.0
Sand, gravelly; fine sand to medium gravel.....	205.0	210.0
Gravel, sandy; fine sand to coarse gravel with a trace of pebbles; below 215 ft, contains less coarse gravel and pebbles.....	210.0	218.0
Clay, silty, sandy, moderately calcareous, pinkish gray; sand is very fine to medium with a little coarse.....	218.0	224.0
Sand, gravelly; fine sand to medium gravel; from 225 to 230 ft, contains some coarse gravel and a trace of very coarse; below 230 ft, contains fine sand to fine gravel with some medium to coarse gravel..	224.0	236.0
Clay, silty, sandy, brown; sand is very fine to medium with a few coarser grains; below 240 ft, very sandy.....	236.0	245.0
Sand, gravelly; fine sand to fine gravel.....	245.0	254.0
Clay, silty, very sandy, in part marly, pinkish gray; sand is very fine to medium with a little coarse.....	254.0	267.0
Sand, gravelly; fine sand to fine gravel with some medium to coarse gravel; from 270 to 275 ft, fine sand to medium gravel with some coarse and a little very coarse gravel.....	267.0	288.0
Sand, gravelly; fine sand to medium gravel with a trace of coarse gravel; contains some interbedded marly clay lenses; below 295 ft, fine sand to fine gravel with some medium gravel.....	288.0	304.0
Clay, silty, sandy, pinkish gray; sand is very fine to medium with some coarse; contains some marly areas and interbedded lime cemented sandstone lenses.....	304.0	315.0
Clay, silty, in part siltstone, brown with reddish tint.....	315.0	320.0
Clay, silty, moderately to very sandy, pinkish gray; sand is very fine to fine with some medium; contains marly areas to 325 ft; below 325 ft, brown with pinkish tint.....	320.0	330.0
Clay, silty, with some siltstone, brown with reddish tint; below 335 ft, slightly sandy to in part very sandy, sand is very fine to fine.....	330.0	345.0

Clay, silty, with some siltstone, light gray with olive tint; below 35 ft, in part sandy, light gray, sand is very fine to fine.....	345.0	355.0
Sand, fine to very coarse.....	355.0	358.0
Clay, silty, pinkish gray.....	358.0	366.0
Sand, fine to very coarse with a little fine gravel.	366.0	374.0
Silt, very clayey, sandy, light brown with reddish tint; contains interbedded lime cemented sandstone; below 380 ft, contains some fine to coarse sand.....	374.0	384.0
Sand, fine to very coarse with some fine gravel.....	384.0	392.0
<b>Tertiary System - Oligocene Series - White River Group:</b>		
<b>Brule Formation:</b>		
Siltstone, clayey, coarse textured, light brown; contains a little bentonite to 395 ft.....	392.0	395.0
Siltstone, clayey, coarse textured, pinkish gray; contains marly areas.....	395.0	400.0
Siltstone, clayey, coarse textured, light brown; below 405 ft some pinkish gray.....	400.0	410.0

**Test Hole #7-WB-66 (E-logs)**  
**(14N-43W-27dddd)**  
**Deuel County**

Location: SE SE SE SE sec. 27, T. 14 N., R. 43 W., 55 feet north and 24 feet west of southeast corner.

Ground elevation: 3,710.0 ft. (t). (Big Springs NW 7.5 min. quadrangle).

Depth to water: Unknown; test hole caved at 165 ft.

	<u>Depth, in feet</u>	
	From	To
<b>Quaternary System, undifferentiated:</b>		
Top soil: silt, slightly clayey, dark brownish gray.	0.0	3.0
Silt, slightly clayey, slightly sandy, light brownish gray; sand is very fine; below 5 ft, moderately clayey, moderately to very sandy, in part pinkish gray, contains some marly areas.....	3.0	20.0
Clay, silty, in part sandy, moderately calcareous, light brown; sand is very fine.....	20.0	26.0
<b>Quaternary System and Tertiary System - Pliocene Series:</b>		
Sand, gravelly; fine sand to medium gravel with a trace of coarse gravel; below 30 ft, coarser textured, contains some coarse gravel with some pebbles.....	26.0	55.0
Gravel, sandy; fine sand to very coarse gravel; contains some interbedded silty clay lenses.....	55.0	60.0
<b>Tertiary System - Miocene Series - Ogallala Group:</b>		
<b>Ash Hollow Formation:</b>		
Clay, silty, very sandy, light brown; sand is very fine to medium with some coarse.....	60.0	70.0
Sand, gravelly; fine sand to medium gravel with some coarse gravel and a trace of pebbles; below 75 ft, slightly coarser textured.....	70.0	80.0
Clay, silty, slightly sandy, brown with a pinkish tint; sand is very fine to fine; contains some marly areas; below 90 ft, dark brown with some reddish brown.....	80.0	99.0
Sand and gravel; fine sand to medium gravel; from 102 to 104 ft, contains clay layer; below 105 ft, slightly coarser textured; below 118 ft, contains some clay lenses and marly areas.....	99.0	126.0
Clay, silty, moderately sandy, pinkish gray; very fine to fine with some medium.....	126.0	133.0
Sand, gravelly; fine sand to medium gravel with some coarse gravel; below 145 ft, clayey.....	133.0	151.0
Clay, silty, sandy, pinkish gray; sand is very fine to medium with a little coarse; below 155 ft, contains thin marly areas.....	151.0	158.0
Sand, gravelly; fine sand to fine gravel with some medium to coarse gravel.....	158.0	168.0

Clay, silty, sandy, pinkish gray; sand is very fine to fine with some medium.....	168.0	170.0
Gravel, sandy; fine sand to medium gravel; below 180 ft, fine sand to fine gravel with some medium to coarse gravel.....	170.0	193.0
Silt, moderately clayey, sandy, marly, brown; sand is very fine to medium; from 195 to 200 ft, pinkish gray.....	193.0	210.0
Clay, silty, sandy, marly, light brown to light pinkish gray; contains interbedded limestone lenses.....	210.0	216.0
Silt, in part sandy siltstone, clayey, moderately calcareous, light brown; and is very fine to fine; contains marly areas.....	216.0	220.0
Clay, silty, moderately calcareous, light brown; contains limy areas; below 225 ft, moderately sandy, pinkish gray, sand is very fine to fine with a little medium.....	220.0	233.0
Sand, fine to very coarse with a trace of fine gravel.....	233.0	237.0
Clay, silty, marly, sandy, very calcareous, pinkish gray; sand is very fine to medium.....	237.0	240.0
Sand, fine to very coarse with a little fine gravel.	240.0	245.0
Clay, silty, sandy, light brown to pinkish gray; sand is very fine to fine; contains limy areas; below 250 ft, light gray.....	245.0	255.0
Silt, slightly clayey, very sandy, slightly calcareous, light gray; sand is very fine.....	255.0	260.0
Silt, very clayey, sandy, moderately calcareous, pinkish gray; sand is very fine to fine; contains marly areas; below 270 ft, contains some interbedded sandstone lenses.....	260.0	275.0
Sandstone, moderately consolidated; sand is very fine to fine with a trace of medium; below 280 ft, sand is very fine to very coarse, in part lime cemented; below 291 ft, in part silty.....	275.0	295.0
Silt, moderately clayey, very sandy, light gray to light pinkish gray; sand is very fine to fine; contains some interbedded silty sandstone.....	295.0	300.0
Sand, fine to very coarse with a little fine gravel; below 305 ft, slightly coarser textured...	300.0	318.0
Silt, moderately clayey, very sandy, light pinkish gray to light brown; sand is very fine to fine; below 320 ft, contains interbedded silty sandstone.....	318.0	330.0
Limestone, marly, white to pinkish gray; below 335 ft, sandy, sand is very fine to fine.....	330.0	340.0
Sand, fine to very coarse with a little fine to medium gravel; below 345 ft, contains no gravel...	340.0	355.0

**Tertiary System - Oligocene Series - White River Group:**

**Brule Formation:**

Silt to siltstone, clayey, light brown to light  
pinkish brown; below 360 ft, light brown with some  
light reddish brown below 365 ft..... 355.0 380.0

**Test Hole #11-WB-66 (E-logs poor)**  
**(14N-43W-32aaaa)**  
**Deuel County**

Location: NE NE NE NE sec. 32, T. 14 N., R. 43 W., 72 feet south and 23 feet west of northeast corner.

Ground elevation: 3,733.0 ft. (t). (Chappell NE 7.5 min. quadrangle).

Depth to water: Unknown; test hole caved at 175 ft. (10-24-66).

Depth, in feet  
From                  To

**Quaternary System, undifferentiated:**

Top soil: silt, slightly clayey, very sandy, dark brownish gray; sand is very fine to fine.....	0.0	5.0
Silt, very clayey, sandy, marly, pinkish gray; sand is very fine to fine; from 10 to 15 ft, light reddish brown; below 15 ft, sand is very fine to fine with some medium.....	5.0	25.0
Sandstone, silty; sand is very fine to medium with a trace of coarse; below 30 ft, marly.....	25.0	35.0
Silt, very clayey, very sandy, light gray; sand is very fine to fine with some medium; from 35 to 40 ft, contains interbedded sandstone.....	35.0	46.0

**Quaternary System and Tertiary System - Pliocene Series:**

Sand, gravelly; fine sand to medium gravel with a trace of coarse gravel; from 50 to 55 ft, finer textured; below 55 ft, fine sand to coarse gravel with a trace of very coarse gravel.....	46.0	62.0
Clay, silty, sandy, brown; sand is very fine to fine; below 65 ft, contains some medium sand.....	62.0	69.0
Sand and gravel; medium sand to coarse gravel with a few pebbles.....	69.0	70.0

**Tertiary System - Miocene Series - Ogallala Group:**

**Ash Hollow Formation:**

Clay, silty, very sandy, pink; sand is very fine to fine.....	70.0	90.0
Sand, gravelly; fine sand to fine gravel with some medium gravel; from 95 to 100 ft, fine sand to medium gravel with some coarse gravel.....	90.0	106.0
Clay, silty, very sandy, pinkish gray; sand is very fine to fine with some medium; below 110 ft, contains marly areas and interbedded sandstone lenses.....	106.0	133.0
Sand, gravelly; fine sand to fine gravel; below 135 ft, contains a little medium gravel.....	133.0	143.0
Clay, silty, sandy, pinkish gray; sand is very fine to fine with some medium and a trace of coarse; below 145 ft, contains marly areas and interbedded sandstone.....	143.0	152.0
Sand, gravelly; fine sand to medium gravel with a little coarse and a trace of very coarse gravel; below 160 ft, contains fine sand to medium gravel.	152.0	170.0

Clay, silty, very sandy, pinkish gray; sand is very fine to medium with some coarse.....	170.0	183.0
Sand, silty; sand is very fine to very coarse; below 185 ft, contains a little fine gravel.....	183.0	188.0
Clay, silty, pinkish gray; contains some marly areas; contains some sandstone lenses; from 196 to 198 ft, sandy to gravelly.....	188.0	200.0
Sand, gravelly marly; fine sand to fine gravel with some medium gravel.....	200.0	205.0
Clay, silty, sandy, marly, pinkish gray to brown; contains interbedded sandstone.....	205.0	210.0
Sand, gravelly; fine sand to fine gravel; below 215 ft, contains some medium gravel; from 217 to 219 ft, contains clay layer.....	210.0	223.0
Clay, silty, sandy, marly, light gray; sand is very fine to fine; in part contains some interbedded sandstone lenses; from 230 to 235 ft, light brown with pinkish tint; below 255 ft, pinkish gray.....	223.0	275.0
Clay, silty, sandy, micaceous, light brownish gray; sand is very fine to fine.....	275.0	283.0
Sand, fine to coarse with some very coarse.....	283.0	285.0
Clay, silty, light gray.....	285.0	290.0
Sand, slightly gravelly; medium sand to fine gravel.....	290.0	300.0
Sand, fine to very coarse.....	300.0	307.0
Clay, silty, light gray; below 310 ft, contains some marly areas; below 310 ft, contains some very fine to fine sand.....	307.0	320.0
Clay, silty, micaceous, moderately calcareous, pale olive; below 325 ft, in part siltstone.....	320.0	333.0
Sand, fine to very coarse with a trace of fine gravel to 335 ft; from 341 to 343 ft, contains marly area.....	333.0	347.0
Clay, silty, light gray.....	347.0	350.0
Sand, fine to very coarse; contains clay lenses.....	350.0	358.0
<b>Tertiary System - Oligocene Series - White River Group:</b>		
<b>Brule Formation:</b>		
Silt and siltstone, pale yellow.....	358.0	362.0
Silt to siltstone, pinkish gray; from 365 to 370 ft, reddish brown.....	362.0	380.0
Silt to siltstone, yellowish red; below 395 ft, marly areas, in part pinkish gray.....	380.0	400.0

**Test Hole #5-A-65 (E-logs)**  
**(14N-44W-12dddd)**  
**Deuel County**

Location: SE SE SE SE sec. 12, T. 14 N., R. 44 W., 4 feet north and 100 feet west of southeast corner.

Ground elevation: 3,773.0 ft. (t). (Chappell NE 7.5 min. quadrangle).

Depth to water: 204.1 ft. (7-9-65).

	<u>Depth, in feet</u>	
	From	To
<b>Quaternary System, undifferentiated:</b>		
Road fill.....	0.0	0.5
<b>Tertiary System - Miocene Series - Ogallala Group:</b>		
<b>Ash Hollow Formation:</b>		
Sand, silty, brown, soil.....	0.5	4.5
Sand and sandstone, light brown to reddish brown to light gray, silty, some strata contain rhizoliths, some strata with calcareous cement.....	4.5	20.0
Sandstone, pebbly, light brown to pinkish brown, upper strata with calcareous cement.....	20.0	25.0
Sand and gravel, granitic.....	25.0	51.0
Sand and sandstone, pale brown to grayish brown, some strata with calcareous cement.....	51.0	66.0
Sand and sandstone, pinkish gray to reddish brown, some strata with calcareous cement.....	66.0	80.0
Sandstone, pebbly, brown.....	80.0	88.0
Sand and gravel, granitic.....	88.0	104.0
Sand and sandstone, silty, reddish brown, brown, and white, some strata with calcareous cement.....	104.0	115.0
Sand and gravel, granitic.....	115.0	125.0
Sand and sandstone, silty, brown, more calcareous toward top.....	125.0	130.5
Sand and gravel, granitic, finer grained at 137', 144', 162', 170', 174', 180', and 184'.....	130.5	192.0
Sand and sandstone, silty, reddish brown, some strata with calcareous cement.....	192.0	203.5
Sand and sandstone, silty, calcareous cement.....	203.5	214.0
Silt and siltstone, sandy, red to brown, calcareous.	214.0	218.0
Silt and siltstone, sandy, white and light gray, mostly highly calcareous.....	218.0	230.0
<b>Tertiary System - Oligocene Series - White River Group:</b>		
<b>Brule Formation:</b>		
Siltstone, brown with some calcareous concretions and strata.....	230.0	300.5

**Test Hole #13-WB-66 (No e-logs)**  
**(14N-44W-31CCCC)**  
**Deuel County**

Location: SW SW SW SW sec. 31, T. 14 N., R. 44 W., 7 feet north and 85 feet east of southwest corner.

Ground elevation: 3,869.0 ft. (t). (Chappell NW 7.5 min. quadrangle).

Depth to water: Unknown; test hole caved at 183.5 ft. (10-24-66).

Depth, in feet  
From                  To

**Quaternary System, undifferentiated:**

Sand, silty; sand is very fine to medium with a trace of coarse; below 5 ft, sand is very fine to fine.....	0.0	10.0
Silt, slightly clayey, sandy, moderately calcareous; sand is fine to coarse; contains limestone fragments; below 15 ft, contains more coarse sand.....	10.0	20.0
Silt, clayey, micaceous.....	20.0	25.0
Silt, slightly clayey, very sandy, pinkish gray; sand is very fine to medium; below 30 ft, contains a trace of coarse sand.....	25.0	40.0
Silt, slightly clayey, moderately calcareous, reddish brown; contains very fine to fine with a trace of medium sand.....	40.0	51.0

**Quaternary System and Tertiary System - Pliocene Series:**

Sand, gravelly, silty; medium sand to coarse gravel with a trace of fine gravel.....	51.0	55.0
Silt, moderately clayey, sandy, calcareous, reddish brown; sand is very fine to fine.....	55.0	60.0
Silt, slightly clayey, sandy, calcareous, light pinkish gray; sand is very fine to fine with some medium; below 70 ft, slightly more clayey, moderately calcareous, light brown.....	60.0	77.0
Gravel, sandy, silty; medium sand to coarse gravel; contains interbedded silt layers.....	77.0	80.0
Gravel, sandy, silty; fine sand to medium gravel with a trace of coarse gravel.....	80.0	95.0
Sand, gravelly; fine sand to coarse gravel with some very coarse gravel; below 105 ft, contains less coarse gravel.....	95.0	110.0
Gravel, sandy; fine sand to coarse gravel with some very coarse gravel; below 120 ft, sample missing, probably same as above.....	110.0	125.0
Sand and gravel; fine sand to coarse gravel.....	125.0	129.0

**Tertiary System - Miocene Series - Ogallala Group:**

**Ash Hollow Formation:**

Silt, slightly clayey, sandy, reddish brown; sand is very fine to medium.....	129.0	130.0
Sand, gravelly; fine sand to coarse gravel; contains some interbedded sandy silt lenses to 135 ft; below 135 ft, silty.....	130.0	145.0

Gravel, sandy; medium sand to coarse gravel with some very coarse gravel.....	145.0	150.0
Sand, gravelly; fine sand to very coarse gravel.....	150.0	160.0
Silt, moderately clayey, very sandy, slightly cal- careous, light pinkish gray.....	160.0	165.0
Sand, gravelly; very fine sand to coarse gravel; contains some sandy silt; below 165 ft, contains some lime cemented sand and silt.....	165.0	168.0
Silt, slightly clayey, sandy, very calcareous, light pinkish gray; sand is very fine to fine; contains limy areas; below 180 ft, contains limestone fragments.....	168.0	195.0
<b>Tertiary System - Oligocene Series - White River Group:</b>		
<b>Brule Formation:</b>		
Silt and siltstone, slightly clayey, slightly calcar- eous, light gray; contains some very fine sand; below 215 ft, contains some limestone fragments...	195.0	235.0
Siltstone, moderately clayey, slightly calcareous, light brownish gray; contains some very fine sand.	235.0	260.0

**Test Hole #11-B-65 (E-logs)**  
**(14N-44W-36aaaa)**  
**Deuel County**

Location: NE NE NE NE sec. 36, T. 14 N., R. 44W., 124 feet south and 8 feet west of northeast corner.

Ground elevation: 3,739.0 ft. (t). (Chappell NE 7.5 min. quadrangle).

Depth to water: Unknown; test hole open to 28 ft. (7-9-65).

Depth, in feet  
From                  To

**Quaternary System, undifferentiated:**

Top soil: sand, silty, brown, calcareous cement.....	0.0	0.3
Sand, silty, very pale brown, calcareous cement.....	0.3	7.5

**Tertiary System - Miocene Series - Ogallala Group:**

**Ash Hollow Formation:**

Caliche, calcareous.....	7.5	9.0
Sandstone, very pale brown, calcareous cement.....	9.0	20.5
Sand, slightly silty.....	20.5	31.0
Sand, silty, light yellowish brown.....	31.0	34.0
Sand and gravel, granitic.....	34.0	59.0
Sand, silty, with some fine gravel, mostly light yellowish brown, but pale olive at 60.3 ft to 61.5 ft.....	59.0	80.0
Sand and gravel, granitic.....	80.0	89.6
Sand and sandstone, silty, brown to light yellowish brown to pale olive, some strata with calcareous cement.....	89.6	121.0
Sand and gravel, granitic.....	121.0	153.0
Sand, silty, very pale brown.....	153.0	156.0
Sand and gravel, granitic.....	156.0	167.0
Sand and sandstone; silty, some strata contain gravel clasts, very pale brown to light olive, some strata with calcareous cement.....	167.0	208.0
Sand, pale olive.....	208.0	212.0
Sand and sandstone; silty, very pale brown to pale olive.....	212.0	279.0
Sand and gravel, granitic.....	279.0	321.0
Sand and sandstone, silty, pale olive.....	321.0	345.0
Orthoquartzite, with siliceous and calcareous cements, claystones, and sandstones, pale olive...	345.0	355.0

**Tertiary System - Oligocene Series - White River Group:**

**Brule Formation:**

Siltstone, pale olive in top 2 ft, brown below, with some strata contouring concretions with calcareous cement.....	355.0	380.0
---	-------	-------

**Test Hole #15-WB-66 (No e-logs)**  
**(14N-45W-34bbcb)**  
**Deuel County**

Location: NW SW NW NW sec. 34, T. 14 N., R. 45 W., 748 feet south and 73 feet east of northwest corner.

Ground elevation: 3,912.0 ft. (a). (Chappell NW 7.5 min. quadrangle).

Depth to water: Unknown; test hole caved at 157 ft. (10-24-66).

Depth, in feet  
From To

**Quaternary System, undifferentiated:**

Top soil: silt, moderately clayey, slightly sandy, dark brownish gray; sand is very fine to medium...	0.0	5.0
---	-----	-----

**Quaternary System and Tertiary System - Pliocene Series:**

Sand, fine to very coarse with a trace of fine gravel.....	5.0	10.0
--	-----	------

Sand, gravelly; fine sand to fine gravel with a little medium gravel; from 15 to 20 ft, contains slightly more medium gravel with a trace of coarse gravel.....	10.0	25.0
---	------	------

**Tertiary System - Miocene Series - Ogallala Group:**

**Ash Hollow Formation:**

Sand, silty; sand is very fine to fine; below 30 ft, slightly consolidated.....	25.0	35.0
---	------	------

Sandstone, in part lime cemented; sand is very fine to fine with some medium; below 40 ft, contains some fine to medium gravel.....	35.0	45.0
---	------	------

Clay, silty, sandy, micaceous, moderately calcareous, pinkish gray.....	45.0	53.0
---	------	------

Sandstone, silty; sand is very fine to fine; from 55 to 60 ft, contains some medium to coarse sand; below 65 ft, some fine to coarse gravel, contains limy areas.....	53.0	65.0
---	------	------

Sand, slightly gravelly; fine sand to fine gravel; below 70 ft, contains a little medium gravel.....	65.0	80.0
--	------	------

Gravel, sandy, fine sand to medium gravel with some coarse gravel.....	80.0	85.0
--	------	------

Sand, gravelly; fine sand to fine gravel with some medium and a trace of coarse gravel.....	85.0	102.0
---	------	-------

Clay, silty, sandy, micaceous, light brown; sand is very fine to medium; below 105 ft, contains limy areas.....	102.0	109.0
---	-------	-------

Sand, gravelly; fine sand to fine gravel.....	109.0	122.0
---	-------	-------

Silt, moderately clayey, sandy, light brown; sand is very fine to medium.....	122.0	127.0
---	-------	-------

Sand, gravelly; fine sand to fine gravel with a trace of medium gravel; below 130 ft, contains a trace of coarse gravel.....	127.0	135.0
--	-------	-------

Sand, gravelly; fine sand to coarse gravel; from 138 to 140 ft, contains thin clay lenses; from 140 to 145 ft, contains fine sand to fine gravel; below 145 ft, contains some very coarse gravel.....	135.0	152.0
Clay, silty, sandy, pinkish gray; sand is very fine to fine; below 155 ft, sand is very fine to medium.....	152.0	161.0
Sand, gravelly; fine sand to medium gravel with a little coarse gravel; below 165 ft, contains fine sand to fine gravel with some medium to coarse gravel.....	161.0	175.0
Clay, silty, sandy, marly, pinkish white; sand is very fine to fine; contains some interbedded sandy limestone lenses.....	175.0	185.0
Clay, silty, sandy, light brown; sand is very fine to fine; contains limy areas; from 187 to 189 ft, contains sand layer, sand is fine to very coarse with a little fine gravel.....	185.0	195.0
Clay, silty, in part sandy, pinkish gray; sand is very fine to fine; contains limy areas; below 201 ft, sand is fine to very coarse.....	195.0	205.0
Sandstone, moderately consolidated; sand is very fine to fine.....	205.0	218.0
<b>Tertiary System - Oligocene Series - White River Group:</b>		
<b>Brule Formation:</b>		
Siltstone, light gray; contains a little sandstone; below 225 ft, contains some silty sandstone, sand is very fine to fine.....	218.0	240.0
Siltstone, sandy, micaceous, light gray with brownish tint; sand is very fine to fine; below 245 ft, pinkish gray.....	240.0	250.0
Silt to siltstone, very slightly sandy, brown; below 255 ft, contains limy areas; below 260 ft, some pinkish gray.....	250.0	280.0

**Test Hole #15-B-65 (E-logs)**  
**(14N-46W-12ccdd)**  
**Deuel County**

Location: SE SE SW SW sec. 12, T. 14 N., R. 46 W., 1,286 feet east and 7.5 feet north of southwest corner.

Ground elevation: 3,948.0 ft. (a). (Mount Vernon 7.5 min. quadrangle).

Depth to water: 177.7 ft. (7-23-65).

	<u>Depth, in feet</u>	
	From	To
<b>Quaternary System, undifferentiated:</b>		
Road fill.....	0.0	4.7
Sand, very silty, light olive brown, slightly calcareous.....	4.7	5.2
<b>Quaternary System and Tertiary System - Pliocene Series:</b>		
Sand and gravel, granitic.....	5.2	15.5
<b>Tertiary System - Miocene Series - Ogallala Group:</b>		
<b>Ash Hollow Formation:</b>		
Sand, silty, with coarse sand and fine gravel in some strata, light brown to yellowish brown, some strata with discontinuous calcareous cement.....	15.5	29.0
Sand and gravel, granitic.....	29.0	32.0
Sand, silty, light yellowish brown.....	32.0	37.0
Sand and gravel, granitic, some grains coated with manganese dioxide, with some sand and sandstone strata interbedded.....	37.0	47.0
Sand, silty, light yellowish brown to olive.....	47.0	55.0
Sand and gravel, granitic.....	55.0	72.0
Sand and sandstone, silty, light yellowish brown, strata with discontinuous calcareous cement.....	72.0	90.0
Sand and gravel, granitic.....	90.0	107.0
Sand, silty, light yellowish brown.....	107.0	120.0
Sand and gravel, granitic.....	120.0	140.0
Sand, gravelly, granitic.....	140.0	150.0
Sand and gravel, granitic.....	150.0	155.0
Sand, gravelly, granitic.....	155.0	168.0
Sandstone, silty, light yellowish brown, calcareous cement.....	168.0	174.0
Sand and gravel, granitic.....	174.0	182.0
<b>Tertiary System - Oligocene Series - White River Group:</b>		
<b>Brule Formation:</b>		
Siltstone, sandy, light yellowish brown, some strata contain concretions with calcareous cement.....	182.0	270.5

**Test Hole #9-A-65 (E-logs)**  
**(14N-46W-25ccdc)**  
**Deuel County**

Location: SW SE SW SW sec. 25, T. 14 N., R. 46 W., 750 feet east and 6.5 feet north of southwest corner.  
 Ground elevation: 3,960.0 ft. (a). (Mount Vernon 7.5 min. quadrangle).  
 Depth to water: Unknown; test hole open to 172 ft. (7-29-65).

	<u>Depth, in feet</u>	
	From	To
<b>Quaternary System, undifferentiated:</b>		
Road fill.....	0.0	1.0
Sand, silty, dark brown to grayish brown, calcareous.....	1.0	3.0
<b>Tertiary System - Miocene Series - Ogallala Group:</b>		
<b>Ash Hollow Formation:</b>		
Sandstone, silty, pinkish gray to brown, some strata with calcareous cement.....	3.0	10.8
Conglomerate, granitic, calcareous cement.....	10.8	11.5
Sandstone, silty, with some fine gravel, light gray to brown to reddish brown, some horizons with calcareous cement, rhizoliths and siliceous "seed" fossils of grasses and shrubs.....	11.5	37.0
Pebbly sandstone and conglomerate, white to reddish brown, calcareous cement.....	37.0	51.0
Sandstone, pebbly, dark brown.....	51.0	52.0
Pebbly sandstone and sand and gravel, manganese oxide coats grains toward base.....	52.0	79.0
Sand, silty, with some gravel, light reddish brown to pinkish gray.....	79.0	80.0
Sand and gravel, granitic.....	80.0	108.0
Sand, silty, yellowish brown to brown.....	108.0	118.0
Sand and gravel, granitic.....	118.0	163.0
Sand and sandstone, brown.....	163.0	173.0
Sandstone, silty, pink to pale brown, calcareous cement, rhizoliths present.....	173.0	189.0
Sandstone, silty, white to light brown, calcareous cement.....	189.0	196.0
Sand and gravel, granitic, with calcareous silty sand interbed.....	196.0	210.0
Silt, sandy, calcareous, light reddish brown to pink with much reworked silt.....	210.0	223.0
<b>Tertiary System - Oligocene Series - White River Group:</b>		
<b>Brule Formation:</b>		
Siltstone, light brown to brown, some strata with localized calcareous cement.....	223.0	280.5