

10-1998

## Antelope County Test-Hole Logs: Nebraska Water Survey Test-Hole Report No. 2

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Lackey, Sue Olafsen; Smith, Frank A.; and Diffendal, Robert F. Jr., "Antelope County Test-Hole Logs: Nebraska Water Survey Test-Hole Report No. 2" (1998). *Robert F. Diffendal, Jr., Publications*. 40.  
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# **ANTELOPE COUNTY Test-Hole Logs**

**Sue Olafsen Lackey, Frank A. Smith and R. F. Diffendal Jr.**

**Nebraska Water Survey  
Test-Hole Report No. 2**

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



**October, 1998**



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

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

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

Publication and price lists are furnished upon request.

October 1998

## ACKNOWLEDGMENTS

The authors gratefully acknowledge the contributions of the following Conservation and Survey Division personnel for production of this test-hole log book: Amy Mescher for typing the logs and Jerry Leach for drafting the illustrations.

## INTRODUCTION

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

The map in this report shows the location of all test holes drilled in the county since 1930.

Present techniques of test-hole logging and sampling include use of drilling mud suitable to drilling conditions, timing by stopwatch of the drilling of each 5-foot increment of depth, and removal of all cuttings from the test hole at intervals of 5 feet or less. During the drilling of the hole, cuttings from each interval are examined immediately; samples representing each 5-foot interval and each recognizable change in material are retained. After samples are washed, they are described lithologically and the color is evaluated by comparison with standard color charts. The samples then are dried, stored, and cataloged. Beginning in September 1951, the test holes have been logged electrically. 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.

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

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

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

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 1, the letters that follow the section number indicate the location of the test hole within the section, the first letter indicating the quarter section and the second letter indicating the quarter-quarter section. The letters A, B, C, and D are applied in counterclockwise direction beginning with A in the northeast quadrant. The last numeral is the serial number of the test hole within the quarter-quarter section. No number is shown unless more than one test hole is within the given quarter-quarter section.

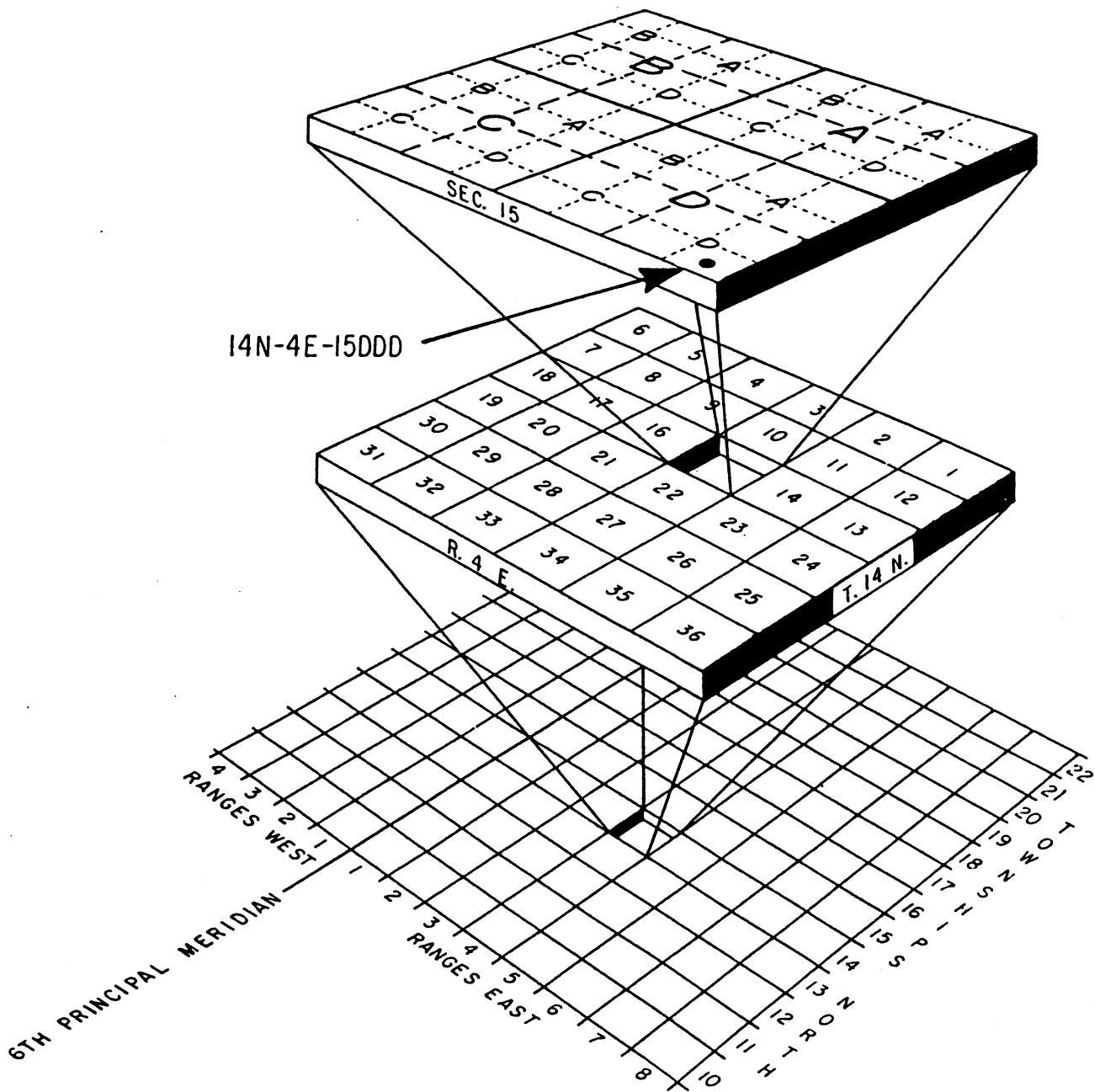
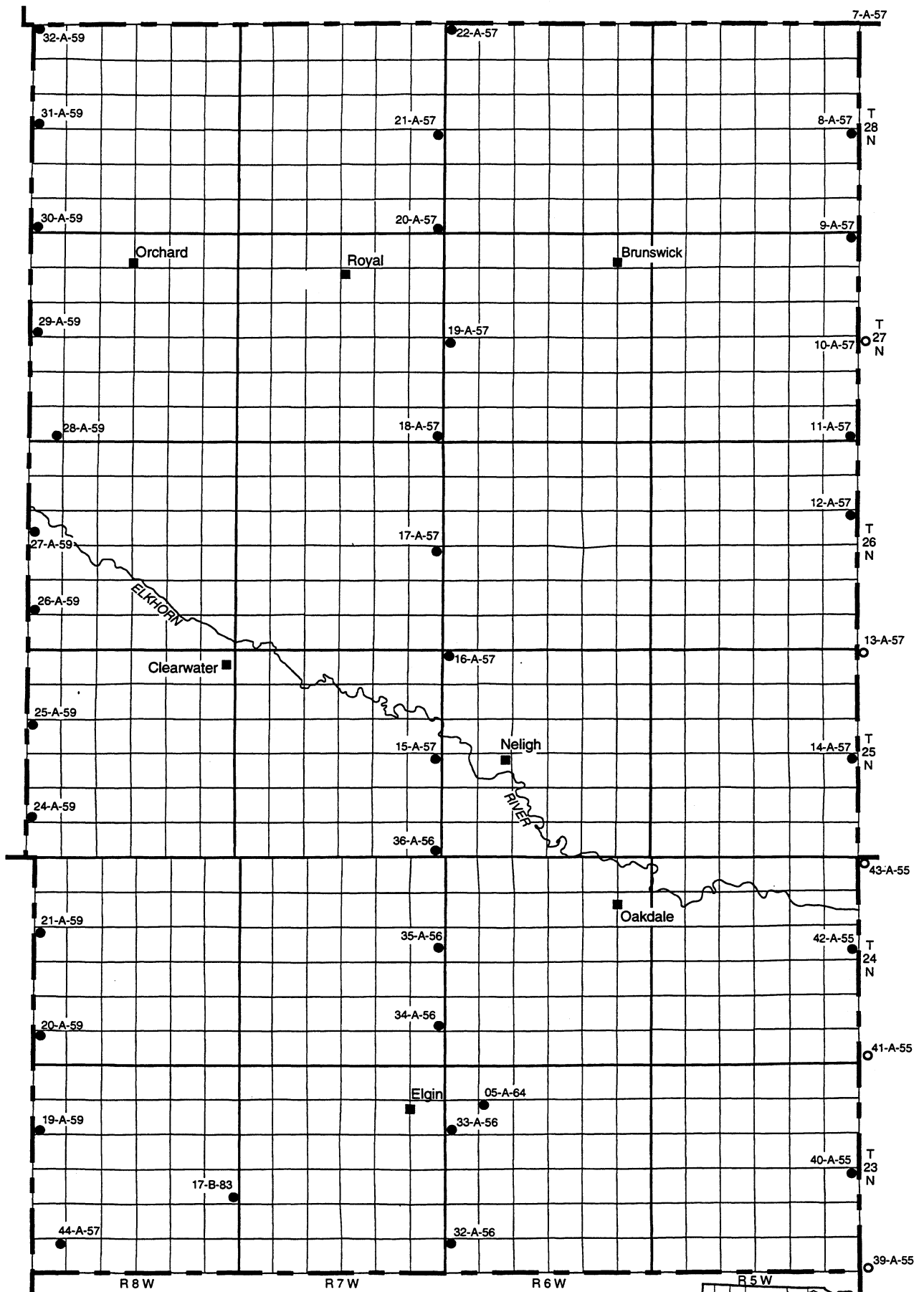


Fig. 1. System for identifying test-holes according to their location.

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- Test hole description published in this report
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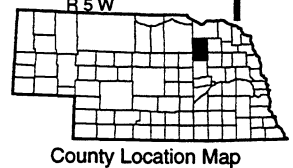
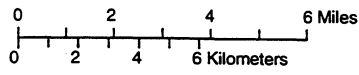


Fig. 2. Test-hole location map of Antelope County.



**Test Hole #40-A-55  
(23N-5W-24aaaa)  
Antelope County**

Location: NE NE NE NE Sec. 24, T. 23 N., R. 5 W., approximately 72 feet south and 20 feet west of the northeast corner.

Ground elevation: 1, 780 ft. (t). (Closter NE, 7.5 min. quadrangle)

Depth to water: 37.37 ft (9-19-55)

	<u>Depth, in feet</u>	
	From	To
<b>Quaternary System, undifferentiated:</b>		
Ditch fill; no sample.....	0.0	1.0
Silt, moderately clayey, light medium yellow gray...	1.0	5.0
Silt, slightly clayey, slightly calcareous, light yellow gray; few limy nodes to 10 ft; below 10 ft, light medium yellow gray.....	5.0	18.0
Silt, slightly clayey, slightly calcareous, light medium brown gray; below 20.5 ft, light yellow and light brownish gray.....	18.0	30.0
Silt, slightly clayey, coarse textured, light yellow and light olive gray.....	30.0	46.0
Sand, very fine to fine.....	46.0	50.0
Sand, very fine to medium; below 62 ft, sand is very silty.....	50.0	65.0
Silt, very sandy, slightly clayey; sand is very fine to fine, some medium; below 70 ft, sand is very fine to medium, trace of coarse.....	65.0	72.5
Sand and gravel, fine sand to fine gravel, little medium gravel.....	72.5	75.0
Sand, gravelly; fine sand to fine gravel, trace medium gravel, some iron staining.....	75.0	148.0
Silt, slightly clayey, coarse textured, light brown gray; contains a little very fine sand; below 150 ft, moderately clayey, slightly sandy, sand is fine to coarse.....	148.0	154.0
Sand and gravel, medium sand to medium gravel; from 157 to 157.3 ft, clay lens.....	154.0	163.0
Silt, moderately clayey, light olive gray; below 165 ft, slightly more clayey, light gray.....	163.0	170.0
Silt, moderately clayey, slightly sandy, slightly calcareous, light gray; sand is fine to coarse; below 172 ft, some limy nodes.....	170.0	173.0
Silt, very sandy, slightly clayey, slightly calcareous, light olive gray; sand is very fine to medium.....	173.0	175.0

Sand, fine to coarse, some very coarse.....	175.0	176.0
Silt, moderately sandy, slightly clayey, light gray; sand is fine to coarse; from 176 to 180 ft, sand is fine to coarse with some very coarse, some interbedded silty sand; below 180 ft, some fine gravel.....	176.0	181.0
Sand, gravelly; medium sand to fine gravel, some medium gravel.....	181.0	187.0
<b>Tertiary System - Miocene Series - Ogallala Group:</b>		
Silt and siltstone, interbedded; sandy, in part marly; sand is very fine to fine.....	187.0	190.0
Silt, moderately sandy, slightly clayey, moderately calcareous, very light gray; sand is fine, some limy areas; from 192 to 195 ft, light olive gray..	190.0	196.0
Silt, slightly sandy, slightly clayey, light green gray; sand is medium; below 198 ft, moderately to very sandy.....	196.0	200.0
Sand to sandstone, silty, very light greenish gray; sand is very fine to fine.....	200.0	205.0
Sand, slightly silty; sand is very fine to coarse...	205.0	206.0
Silt, moderately sandy, slightly clayey, very light olive gray; sand is very fine to fine, some medium; below 210 ft, very sandy; sand is very fine to medium.....	206.0	213.0
Sand, slightly silty; sand is very fine to coarse; below 215 ft, thin silty sand lenses.....	213.0	225.0
Sand, in part slightly silty; sand is very fine to medium, trace of coarse.....	225.0	230.0
Sandstone, slightly silty; sand is very fine to fine, some medium; below 235 ft, slightly coarser.	230.0	245.0
Sand to sandstone, silty; sand is very fine to fine, some medium.....	245.0	250.0
Sand, very fine to fine, trace medium; below 255 ft, medium sand absent.....	250.0	270.0
Sand, very fine to fine, some coarse to very coarse.	270.0	299.0
<b>Cretaceous System - Upper Cretaceous Series - Montana Group:</b>		
<b>Pierre Formation:</b>		
Clay, light gray and yellow, very calcareous.....	299.0	300.0
Clay, light yellow, some very light gray; below 301 ft, medium light gray to white, some yellow brown; contains thin bentonite lens.....	300.0	310.0
Shale, clayey, medium light to very light gray and brownish yellow; contains some ironstone; contains thin bentonite seam at 312.5 ft; below 315 ft, mottled medium gray and dark gray.....	310.0	320.0

Shale, medium dark and dark gray.....	320.0	339.0
Shale, clayey, light gray, bentonitic; below 340 ft, dark gray.....	339.0	341.0
<b>Cretaceous System - Upper Cretaceous Series - Colorado Group:</b>		
<b>Niobrara Formation:</b>		
Shale, chalky, medium brownish gray, thin bentonite lenses; contains pyrite.....	341.0	345.0
Shale, chalky, medium light brownish gray; contains blueish gray bentonite; from 350 to 355 ft, no bentonite; below 355 ft, light yellowish brown, at 358 ft, bentonite layer.....	345.0	360.0

**Test Hole #33-A-56  
(23N-6W-7cccc)  
Antelope County**

Location: SW SW SW SW Sec. 7, T 23 N., R. 6 W., 75 feet north and 22 feet east of southwest corner.

Ground elevation: 1,980 ft. (t). (Elgin, 7.5 min. quadrangle)

Depth to water: Unknown. Test hole caved at 141.5 ft. (8-31-56)

	<u>Depth, in feet</u>	
	From	To
<b>Quaternary System, undifferentiated:</b>		
Soil; silt, dark brownish gray.....	0.0	1.0
Silt, slightly clayey, slightly calcareous, light yellowish gray; noncalcareous medium brown with gray tint from 1 to 5 ft; very clayey from 2 to 5 ft; slightly more clayey from 15 to 30 ft; contains some limy nodules from 5 to 20 ft; contains a few snail shells from 25 to 30 ft; mottled with some light gray and a trace of yellowish brown below 40 ft.....	1.0	49.5
Silt, slightly clayey, slightly sandy, slightly calcareous, light brownish gray; moderately sandy and in part very sandy below 50 ft, contains very fine to very coarse sand.....	49.5	55.0
Sand, silty; sand is very fine to medium with some coarse and a trace of very coarse; slightly fine textured below 60 ft.....	55.0	65.0
Sand, very fine to medium with a trace of coarse; slightly finer from 70 to 80 ft; contains a few thin sandy silt layers from 75 to 90 ft; contains a trace of very coarse sand from 85 to 90 ft; contains a few thin clay layers from 95 to 100 ft; texture grades from very fine to medium from 100 to 110 ft; contains some thin, light gray, sandy clay layers from 110 to 120 ft; contains light gray clayey silt layer from 122 to 123.5 ft; contains no coarse sand and less medium sand from 125 to 130 ft and below 135 ft; contains some thin, very sandy silt layers from 130 to 135 ft...	65.0	137.5
Silt, moderately clayey, light brown; contains a trace of very fine to fine sand.....	137.5	140.0
Sand, slightly silty; sand is very fine to coarse...	140.0	144.0
Silt, slightly clayey, moderately sandy, light brownish gray; sand is very fine to coarse.....	144.0	147.2
Sand, slightly silty; sand is very fine to coarse;		

contains some very coarse sand from 150 to 155 ft; contains no coarse sand from 155 to 159 ft; contains a slightly clayey, moderately sandy, silt layer from 159 to 160 ft; contains no silt and less coarse sand below 160 ft.....	147.2	164.5
Silt, slightly clayey, slightly sandy, light brown gray; very clayey, moderately sandy in part from 164.5 to 169.8 ft; contains a moderately silty sand layer from 169.8 to 170.7 ft, sand is very fine to fine with some medium; moderately sandy below 170.7 ft.....	164.5	172.3
Sand, moderately silty, sand is very fine to fine with some medium; contains slightly clayey, very sandy, light brownish gray silt layer from 175.8 to 177.5 ft; contains more medium sand and no silt below 177.5 ft.....	172.3	179.8
Sand and some gravel, quartz with some brown and yellowish gray silicates; fine sand to medium gravel, contains 20% gravel; contains pink silicates below 185 ft; contains much very coarse sand and no fine sand below 185 ft.....	179.8	190.0
Sand, quartz with brown, yellow gray, and pink silicates; sand is fine to very coarse with 5% fine gravel.....	190.0	195.0
Sand and some gravel, quartz with some brown and yellowish gray silicates; medium sand to medium gravel; contains 30% gravel from 195 to 205 ft; contains 50% gravel from 205 to 235 ft; finer textured from 235 to 245 ft and below 255 ft, fine sand to fine gravel with a trace of medium gravel, contains 20% to 30% gravel; contains a trace of brown silt from 255 to 255.7 ft.....	195.0	268.3
Clay, slightly silty, light gray; very silty in part; contains some yellow and dark brownish gray from 268.3 to 270.0 ft.....	268.3	273.0
Silt, very clayey, slightly sandy, light gray with a trace of medium gray and yellowish brown; sand is very fine to medium.....	273.0	275.0
Sand, quartz with yellowish brown silicates; sand is very fine to medium with some coarse.....	275.0	280.0
Sand, quartz with yellowish brown silicates; sand is medium to coarse with some very coarse and a trace of fine gravel.....	280.0	285.0
Sand, slightly gravelly; sand is fine to very coarse with some fine gravel; contains granite,		

feldspar, weathered pyroxine, and chert; below 290 ft, much very coarse sand to fine gravel.....	285.0	295.0
Sand, very fine to coarse with a trace of very coarse; contains quartz with yellowish brown silicates.....	295.0	302.5
Silt, slightly clayey, slightly sandy, light brownish gray; contains very fine sand.....	302.5	305.0
Sand and some gravel, medium sand to fine gravel; contains 45% very coarse sand to fine gravel; contains a light gray, silty clay layer at 306 ft; slightly finer and contains a trace of light gray silty clay from 310 to 315 ft; coarser and contains some medium gravel from 315 to 320 ft, about 35% gravel; slightly silty from 315 to 320 ft.....	305.0	323.4
<b>Tertiary System - Miocene Series - Ogallala Group:</b>		
Silt, moderately clayey, moderately sandy, light olive gray; contains coarse silt and very fine sand.....	323.4	325.0
Sand, clayey in part, very silty; sand is very fine to fine with some medium.....	325.0	330.0
Silt, slightly clayey, light olive gray, moderately clayey in part; contains silt and very fine sand; slightly consolidated in part.....	330.0	340.0
Sand, silty, slightly consolidated; sand is very fine to fine; contains a trace of medium sand below 350 ft; contains a thin limy nodular layer and a trace of rootlets from 350 to 355 ft; contains some marly silt from 355 to 370 ft; slightly more consolidated from 365 to 370 ft; unconsolidated below 370 ft.....	340.0	372.0
Silt, slightly clayey, slightly sandy, marly, light olive gray; contains very fine to medium sand; slightly consolidated in part; less marly from 375 to 380 ft; moderately sandy from 380 to 385 ft; very sandy below 385 ft.....	372.0	387.5
Sand, slightly silty, quartz with some dark silicates; sand is very fine to medium; very silty and light olive gray from 390 to 393.2 ft; contains some coarse sand below 393.2 ft.....	387.5	431.0
Silt, slightly clayey, very sandy, light olive gray; sand is very fine to fine; slightly sandy, slightly calcareous in part from 431 to 435 ft; moderately clayey, contains no sand below 435 ft; granular structure below 435 ft; contains limy		

nodular layer at 444.3 ft..... 431.0 445.0

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

**Chadron Formation:**

Clay, silty, light olive gray; contains small limy nodules from 445 to 450 ft; light gray from 450 to 452 ft; contains many thin marly layers below 452 ft; contains some weathered shale fragments below 455 ft..... 445.0 456.0

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

**Pierre Formation:**

Shale, clayey, light yellowish brown with light gray and some white; contains a trace of bentonite from 460 to 465 ft and from 470 to 472 ft; contains much bentonite from 472 to 479 ft; light gray with some yellowish brown from 472 to 479 ft; contains a little dark gray from 478 to 478.5 ft; some yellow from 479 to 481.7 ft; medium gray and contains some pyrite below 481.7 ft..... 456.0 482.0

**Test Hole #5-A-64  
(23N-6W-8bbab)  
Antelope County**

Location: NW NE NW NW Sec. 8, T. 23 N., R. 6 W., approximately 767 feet east and 53 feet south of the northwest corner.  
 Ground elevation: 1,925 ft. (t). (Elgin, 7.5 min. quadrangle)  
 Depth to water: 94.85 (10-7-64)

	<u>Depth, in feet</u>	
	From	To
<b>Quaternary System, undifferentiated:</b>		
Topsoil; silt, slightly clayey, very dark brownish gray.....	0.0	1.5
Silt, slightly clayey, coarse texture, dark brown.....	1.5	3.0
Silt, slightly clayey, coarse texture, moderately calcareous, brown; contains limy nodes.....	3.0	5.0
Silt, slightly clayey, coarse texture, slightly calcareous, light olive brown; contains trace of shell fragments and limy nodes.....	5.0	15.0
Silt, slightly clayey, slightly sandy, very calcareous, olive; coarse silt to very fine sand; from 20 to 25 ft, moderately calcareous.....	15.0	27.0
No sample, circulation loss.....	27.0	30.0
Silt, moderately clayey, very calcareous, olive; below 45 ft, sandy, sand is very fine to medium with some coarse.....	30.0	50.0
Silt, very sandy, slightly clayey, slightly calcareous; sand is very fine to medium.....	50.0	55.0
Sand, slightly clayey; sand is very fine to medium..	55.0	65.0
Silt, very sandy, moderately clayey, pale olive; sand is very fine to fine, some medium.....	65.0	75.0
Sand, silty; sand is very fine to medium; below 80 ft, less medium sand.....	75.0	85.0
Silt, very sandy, slightly clayey, pale olive; sand is very fine to fine, some medium.....	85.0	90.0
Sand, silty; sand is very fine to medium; below 100 ft, sand is very fine to fine, some medium.....	90.0	120.0
Silty sand to sandy silt, slightly clayey; sand is very fine to fine, some medium.....	120.0	133.0
Sand, gravelly; fine sand to fine gravel; below 140 ft, some medium gravel; below 190 ft, coarse to very coarse gravel.....	133.0	200.0



**Test Hole #32-A-56  
(23N-6W-31bbbb)  
Antelope County**

Location: NW NW NW NW Sec. 31, T. 23 N., R. 6 W., 12 feet south of  
and 100 feet east of northwest corner.

Ground elevation: 1,924 ft. (t). (Elgin, 7.5 min. quadrangle)

Depth to water: Unknown. Test hole caved at 86.9 ft. (8-27-56)

	<u>Depth, in feet</u>	
	From	To
<b>Quaternary System, undifferentiated:</b>		
Roadway fill.....	0.0	0.5
Soil; silty, slightly clayey, light brownish gray...	0.5	1.0
Silt, slightly clayey, slightly calcareous, light yellowish gray; contains limy concretions and snail shells; medium yellowish gray from 12 to 17 ft; slightly more clayey below 25 ft; light brown gray and light gray from 30 to 39 ft; principally light gray from 39 to 43.5 ft; slightly sandy below 43.5 ft, contains very fine to fine sand; contains a trace of medium sand below 45 ft.....	1.0	50.0
Silt, slightly sandy to interbedded sand, light yellowish gray; contains very fine to medium sand; slightly calcareous from 50 to 55 ft; light olive gray below 55 ft.....	50.0	59.0
Sand, light gray; sand is very fine to medium with some coarse; trace very coarse sand below 65 ft...	59.0	68.0
Silt, slightly clayey, very sandy, light gray; contains very fine to fine sand.....	68.0	70.0
Sand, light gray; sand is very fine to medium with a little coarse; contains no coarse sand below 75 ft; less medium sand below 80 ft.....	70.0	82.0
Silt, slightly clayey, moderately sandy, light gray; contains very fine sand.....	82.0	84.5
Sand, light brownish gray; sand is very fine to medium with a trace of coarse; contains a thin silt layer around 92.5 ft; contains more coarse sand below 95 ft; contains a trace of very coarse sand from 95 to 100 ft.....	84.5	110.0
Silt, slightly clayey, very sandy, light brownish gray; contains very fine sand; moderately clayey, slightly sandy, light gray below 112 ft.....	110.0	115.0
Sand, light brownish gray; sand is fine to medium with some very fine and coarse; contains silty sand layers from 120 to 124 ft, from 127 to 128.5		

ft, and from 132.5 to 140 ft; contains no coarse sand from 124 to 127 ft; contains a little coarse to very coarse sand from 140 to 145 ft; very fine to coarse sand with some very coarse sand and a trace of fine gravel below 145; contains 25% very coarse sand to fine gravel below 150 ft.....	115.0	155.0
Sand and gravel, medium sand to fine gravel with some medium gravel; 50% gravel; contains much very coarse sand and fine gravel below 175 ft; contains moderately clayey, very sandy, silt layer from 220 to 221.5 ft; contains more medium gravel below 221.5 ft.....	155.0	239.0
Silt, very clayey, slightly sandy, light yellowish gray; contains fine to medium sand; light brown below 240 ft; less sandy from 240 to 247 ft; slightly clayey and moderately sandy below 247 ft; very sandy in part below 247 ft, contains very fine to coarse sand.....	239.0	248.5
Sand and some gravel, fine sand to fine gravel; contains 10% to 15% gravel.....	248.5	251.0
Silt, moderately clayey, light brown; contains some very fine to medium sand.....	251.0	257.5
Sand and gravel, fine sand to fine gravel; contains 25% to 30% gravel.....	257.5	262.0
<b>Tertiary System - Miocene Series - Ogallala Group:</b>		
Silt, slightly clayey, moderately sandy, light olive gray; very sandy in part; contains very fine to fine sand; trace of rootlets.....	262.0	268.0
Sandstone, slightly silty, light olive gray; sand is very fine to medium.....	268.0	273.5
Silt, slightly clayey, very sandy; interbedded with some very silty sand; very fine to medium sand; some rootlets; slightly consolidated in part.....	273.5	280.0
Sandstone, slightly silty, poorly consolidated; sand is very fine to fine with some medium.....	280.0	287.5
Silt, moderately clayey, moderately sandy, light olive gray; very sandy in part from 287.5 to 290 ft, contains very fine to fine sand with some medium.....	287.5	300.0
Sandstone, moderately consolidated, light olive gray; sand is very fine to medium; contains rootlets; slightly silty below 310 ft.....	300.0	316.5
Silt, moderately clayey, moderately sandy, light olive gray; contains very fine to medium sand; contains a few white limy areas from 316.5 to		

330 ft; very sandy and very clayey in part below 325 ft; slightly consolidated from 328.8 to 329.5 ft.....	316.5	340.0
Sandy silt and silty sandstone, interbedded; light olive gray; sand is very fine to medium.....	340.0	345.0
Sandstone, poorly consolidated, light brown; sand is very fine to medium; contains rootlets.....	345.0	350.0
Sand, very fine to medium with a trace of coarse; slightly consolidated in part from 350 to 355 ft..	350.0	390.6
Silt, moderately clayey, light olive gray; contains thin limy layers from 390.6 to 391.5 ft; very clayey and granular from 391.5 to 395 ft; contains some very fine sand below 391.5 ft; slightly consolidated in part below 395 ft.....	390.6	403.0
<b>Tertiary System - Oligocene Series - White River Group:</b>		
<b>Chadron Formation:</b>		
Clay, silty, light olive gray and white; contains limy areas, marly in part.....	403.0	406.0
Gravel; consists of reworked clay, shale, limestone and siliceous limestone.....	406.0	408.0
<b>Cretaceous System - Upper Cretaceous Series - Montana Group:</b>		
<b>Pierre Formation:</b>		
Shale, clayey, slightly calcareous, light olive gray, mottled with yellowish brown.....	408.0	410.0
Shale, clayey, slightly calcareous, white to light brownish gray and light brownish yellow; mottled with light gray from 410.5 to 415 ft; more light gray from 415 to 430 ft; light gray with some light yellowish brown and noncalcareous below 430 ft.....	410.0	440.0

**Test Hole #19-A-59  
(23N-8W-7dccc)  
Antelope County**

Location: SW SW SW SE Sec. 7, T. 23 N, R. 8 W., approximately 2,593 feet west and 6 feet north of the southeast corner.

Ground elevation: 2,160 ft (t). (Spalding 2 NE, 7.5 min. quadrangle)

Depth to water: Unknown. Test hole caved at 141 ft (8-7-59)

	<u>Depth, in feet</u>	
	From	To
<b>Quaternary System, undifferentiated:</b>		
Road fill; no sample.....	0.0	0.5
Silt, very sandy, moderately clayey, dark yellowish brown; sand is very fine to fine.....	0.5	1.0
Silt, coarse textured, yellowish brown; below 2 ft, some limy nodules; below 18 ft, trace of very fine to fine sand.....	1.0	20.0
Silt, very sandy, moderately clayey, very pale brown; sand is very fine to medium, trace of coarse.....	20.0	30.0
Sand, very silty, slightly clayey; sand is very fine to medium, trace of coarse.....	30.0	40.0
Silt, very sandy, slightly clayey, light yellowish brown; sand is very fine to medium; below 55 ft, some iron staining.....	40.0	60.0
Sand, very silty; slightly clayey.....	60.0	83.0
Silty sand to sandy silt, very pale brown; sand is very fine to medium.....	83.0	90.0
Sand, very silty; sand is very fine to medium.....	90.0	94.0
Silty sand to sandy silt, yellowish brown; sand is very fine to medium.....	94.0	100.0
Sand, very silty; sand is very fine to medium.....	100.0	129.0
Silt, moderately clayey, moderately sandy, light yellowish brown; sand is very fine.....	129.0	144.0
Silt, moderately clayey, moderately sandy, light yellowish brown to brownish yellow; sand is very fine.....	144.0	187.0
Sand, very silty; sand is very fine to fine, trace of medium; below 190 ft, sand is very fine to fine.....	187.0	194.0
Sand, very silty; sand is very fine to medium; below 209 ft, trace coarse sand.....	194.0	210.0
Sand, moderately silty; sand is very fine to fine, some medium; some interbedded silt zones.....	210.0	252.0
Sand, very fine to medium, little coarse; from 275		

to 280 ft, sand is very fine to coarse, some very coarse; below 286 ft, sand is silty and clayey....	252.0	289.0
Sand, gravelly; fine sand to medium gravel.....	289.0	310.0
Gravel, sandy; fine sand to medium gravel; below 315 ft, little coarse gravel.....	310.0	335.0
Clay, silty, dark yellowish brown.....	335.0	342.0
Gravel, sandy; fine sand to medium gravel, trace of coarse gravel.....	342.0	355.0
Silt, moderately clayey, sandy, light yellowish brown; sand is very fine to medium.....	355.0	362.0
Sand and gravel; very fine sand to medium gravel, silty at base.....	362.0	370.0
Gravel, sandy; fine sand to medium gravel.....	370.0	388.0
<b>Tertiary System - Miocene Series - Ogallala Group:</b>		
Silt to very silty sandstone, slightly clayey, grayish brown; sand is very fine to fine; below 395 ft, marly.....	388.0	396.0
Silt, clayey, sandy; limy to 399.5 ft, yellowish brown; sand is very fine to fine; below 406.5 ft, olive gray.....	396.0	410.0
Sand, slightly silty; sand is very fine to fine, some interbedded silt lenses.....	410.0	435.0
Silt, clayey, moderately sandy, light gray; sand is very fine to fine.....	435.0	440.0
Sand, slightly silty; sand is very fine to fine, some interbedded silt lenses; from 496 to 498 ft and below 496, marl and marly lenses.....	440.0	512.0
Sandstone, very silty; sand is very fine to fine....	512.0	513.0
Silty sand to sandy silt, clayey; sand is very fine to fine; below 515 ft, sand is very fine to medium.....	513.0	532.0
Silt, moderately clayey, pale yellow; sand is very fine to medium.....	532.0	550.0

**Test Hole #17-B-83  
(23N-8W-24ddda)  
Antelope County**

Location: NE SE SE SE Sec. 24, T. 23 N., R. 8 W., approximately 562 feet north and 32 feet west of the southeast corner.  
 Ground elevation: 2,045 ft. (t). (Elgin NW, 7.5 min. quadrangle)  
 Depth to water: Unknown. Test hole caved; electric log indicates water level above 145 ft.

	<u>Depth, in feet</u>	
	From	To
<b>Quaternary System, undifferentiated:</b>		
Sand, slightly clayey; sand is fine.....	0.0	5.0
Sand, fine to medium; below 10 ft, contains interbedded silt lenses.....	5.0	20.0
Silt, very sandy, light yellow brown; sand is fine to medium.....	20.0	33.0
Silt, slightly clayey, yellow brown; below 40 ft, very calcareous, light olive brown; below 60 ft, some yellow and brown mottling.....	33.0	90.0
Silt, slightly clayey, sandy, slightly calcareous, light yellow brown; sand is fine.....	90.0	95.0
Sand, very silty; sand is fine; below 105 ft, less silt; below 107 ft, sand is very fine to fine.....	95.0	109.0
Silt, very sandy, pale olive; sand is very fine to fine; contains some organic material.....	109.0	111.0
Sand, slightly silty; sand is fine to medium; from 113 to 115 ft, some thin silt lenses; below 120 ft, sand is very fine to fine.....	111.0	124.0
Silt, very sandy, light yellow brown; sand is fine to medium; below 125 ft, slightly calcareous; below 135 ft, light brownish gray.....	124.0	140.0
Sand, slightly silty; sand is very fine to fine; below 140 ft, some medium sand; below 155 ft, some coarse sand.....	140.0	166.0
Silt, slightly clayey, light yellow brown.....	166.0	169.0
Sand, very silty; sand is very fine to fine; below 170 ft, sand is fine to medium; from 178 to 179 ft, very silty; from 185 to 190 ft, some coarse sand grains.....	169.0	202.0
Silt, very sandy, slightly clayey, mottled gray, dark brown and yellow brown; sand is very fine to fine.....	202.0	205.0
Sand, very silty; sand is very fine to medium; below 215 ft, sand is medium to coarse.....	205.0	220.0

Sand, gravelly; fine sand to fine gravel.....	220.0	229.0
Clay, silty, sandy, slightly calcareous, light olive brown.....	229.0	230.0
Sand, gravelly; very fine sand to medium gravel.....	230.0	278.0
Clay, silty, mottled light olive brown and light yellow brown; below 280 ft, sandy, pale brown.....	278.0	287.0
Sand, gravelly; fine sand to fine gravel.....	287.0	294.0
Silt, very sandy, slightly clayey, slightly calcareous; sand is fine to medium.....	294.0	305.0
Sand, gravelly; fine sand to fine gravel.....	305.0	335.0
Silt, very clayey, slightly sandy, light brownish gray; sand is very fine to fine.....	335.0	336.0
<b>Tertiary System - Miocene Series - Ogallala Group:</b>		
Clay, sandy, silty, brown; below 340 ft, pale olive to light olive gray.....	336.0	348.0
Silt, sandy, clayey, yellow brown; from 348.3 to 348.5 ft, some fine gravel; below 355 olive.....	348.0	360.0
Sand, medium to very coarse, some very fine gravel..	360.0	365.0
Sand, fine to very coarse; in part silty.....	365.0	370.0
Sand, fine to coarse; below 375 ft, sand is very fine to medium.....	370.0	390.0
Sand, very silty; sand is very fine to fine.....	390.0	395.0
Silt, sandy, slightly calcareous, olive yellow; sand is very fine to fine; contains some claystone fragments.....	395.0	400.0
Sand, silty; sand is very fine to medium; contains claystone fragments.....	400.0	420.0
Silt, very sandy, marly, moderately calcareous, pale yellow; sand is very fine to fine.....	420.0	430.0
Silt, very sandy, slightly clayey, moderately calcareous, pale olive; sand is very fine to fine; below 440 ft, interbedded marl and brown siltstone lenses.....	430.0	450.0
Sand to sandstone, silty; sand is very fine to medium.....	450.0	455.0
Sand to sandstone, very silty; sand is very fine to coarse; from 460 to 465 ft, marl fragments.....	455.0	475.0
Clay, silty, marly, moderately calcareous, brownish yellow.....	475.0	480.0
<b>Cretaceous System - Upper Cretaceous Series - Montana Group:</b>		
<b>Pierre Formation:</b>		
Shale, clayey, very calcareous, brownish yellow.....	480.0	495.0
Shale, clayey, moderately calcareous, pale yellow...	495.0	500.0

**Test Hole #44-A-57  
(23N-8W-31aaad)  
Antelope County**

Location: SE NE NE NE Sec. 31 T. 23 N., R. 8 W., 382 feet south  
and 9 feet west of northeast corner.

Ground elevation: 1,998 ft. (t). (Spalding 2 NE, 7.5 min. quadrangle)

Depth to water: Unknown. Test hole caved at 119.0 ft (8-26-57)

	<u>Depth, in feet</u>	
	From	To
<b>Quaternary System, undifferentiated:</b>		
Sand, slightly silty; sand is very fine to coarse with some very coarse; contains very fine to medium with some coarse sand below 5 ft.....	0.0	10.0
Sand, very fine to coarse; contains no coarse sand below 20 ft.....	10.0	23.5
Silt, very sandy, light yellowish gray; contains very fine to fine sand; slightly clayey below 25.5 ft; contains iron concretions below 30 ft.....	23.5	32.0
Sand, very fine to medium with a trace of coarse; slightly coarser below 35 ft.....	32.0	36.3
Silt, slightly clayey, slightly sandy, light yellowish gray; contains coarse silt to very fine sand.....	36.3	39.0
Sand, very fine to medium.....	39.0	43.5
Silt, very clayey, light brown, contains a trace of very fine sand; moderately clayey, slightly sandy, light yellowish gray below 44.3 ft, contains very fine sand.....	43.5	46.0
Silt, slightly clayey, moderately sandy, light yellowish gray; contains very fine to fine sand; slightly less clayey from 49 to 50 ft; moderately clayey below 50 ft.....	46.0	54.2
Silt, slightly clayey, moderately sandy, light yellowish gray; contains very fine to fine sand; slightly sandy from 55 to 58.5 ft; slightly more clayey from 56.5 to 58.5 ft; moderately clayey below 58.5 ft, contains a trace of very fine sand.....	54.2	62.8
Sand, slightly silty; sand is very fine to fine with some coarse; contains very fine to medium sand from 70 to 75 ft; contains very fine to coarse sand with some iron concretions below 75 ft; contains silt layer from 78.5 to 79 ft.....	62.8	81.8
Silt, slightly clayey, light yellowish gray;		



contains a trace of very fine sand.....	81.8	83.5
Sand, very fine to medium with some coarse; contains no coarse sand from 90 to 95 ft; contains very fine to coarse sand from 95 to 100 ft; contains slightly less coarse sand from 100 to 105 ft; contains silt layer at 102.8 ft.....	83.5	105.0
Sand, very fine to coarse; contains no coarse sand below 110 ft; contains a silt layer at 110.2 ft...	105.0	118.0
Silt, slightly clayey, very sandy, light yellowish gray; contains very fine to fine sand.....	118.0	121.0
Sand, very fine to medium.....	121.0	123.8
Silt, slightly clayey, slightly sandy, light yellowish gray; contains very fine to fine sand; slightly more clayey below 125 ft.....	123.8	127.0
Sand, very fine to medium with a trace of very coarse sand and fine gravel.....	127.0	130.0
Sand and gravel, very fine sand to medium gravel; contains 45% gravel.....	130.0	136.8
Sand, very fine to coarse with a trace of very coarse.....	136.8	140.0
Sand and gravel, very fine sand to medium gravel; contains 30% gravel to 155 ft; contains 50% gravel from 155 to 170 ft; contains 30% gravel from 170 to 180 ft; contains 60% gravel below 180 ft.....	140.0	190.0
Sand, very fine to coarse.....	190.0	193.0
Silt, moderately clayey, light brownish yellow; coarse texture; light brown to light gray from 196.5 to 198 ft; pinkish gray from 198 to 200.1 ft; slightly clayey below 200.1 ft; light brown with pinkish gray tint from 200.1 to 202.5 ft; contains some limy areas, mottled light gray to light grayish brown below 202.5; contains limestone layer from 204.7 to 205 ft.....	193.0	207.9
Silt, moderately clayey, medium brown; coarse texture; contains a limestone layer from 209 to 209.4 ft; mottled medium brown, light gray, and medium gray from 210 to 215 ft, contains a trace of very fine sand, contains limy areas.....	207.9	215.0
Silt, slightly clayey, slightly sandy, light pinkish gray; contains coarse silt to very fine sand; slightly less sandy below 216.5 ft.....	215.0	217.5
Sand and gravel, well sorted; grades from very fine sand to medium gravel; contains 70% gravel to 220 ft, contains 80% gravel below 220 ft.....	217.5	227.0
Silt, moderately clayey, light pinkish gray,		

slightly sandy; mottled medium gray to dark gray below 228.2 ft.....	227.0	229.5
Sand and gravel, very fine sand to medium gravel; contains 80% gravel to 235 ft; contains 20% gravel below 235 ft; contains thin silt layers from 236.8 to 237 ft and from 238 to 238.3 ft.....	229.5	242.2
<b>Tertiary System - Miocene Series - Ogallala Group:</b>		
Silt, moderately clayey, mottled light pinkish gray, with some dark gray; slightly clayey, light olive gray below 243 ft; coarse textured from 243 to 245 ft; contains limy areas below 245 ft; contains very fine to fine sand from 245 to 250 ft; no fine sand from 250 to 253 ft; moderately clayey, moderately sandy from 252 to 253 ft.....	242.2	255.0
Sandstone, moderately consolidated; sand is very fine to fine; contains rootlets below 260 ft; contains silt layer from 271 to 272.2 ft; contains imbedded sandy silts below 290 ft.....	255.0	295.0
Sandstone, moderately consolidated, silty, light olive gray; sand is very fine to fine; contains rootlets; slightly more silty below 305 ft.....	295.0	310.0
Sandstone to siltstone, moderately consolidated; coarse silt to fine sand with some medium sand....	310.0	313.3
Silt, slightly consolidated, very sandy, light gray; marly.....	313.3	317.7
Sandstone to siltstone, moderately consolidated, light gray to light olive gray; coarse silt to very fine sand.....	317.7	326.0
Silt, very sandy, marly, light gray; contains very fine to fine sand; slightly clayey below 328.5 ft, contains limy areas.....	326.0	330.0
Sandstone to siltstone, poorly consolidated, light gray; very fine to fine sand.....	330.0	333.0
Siltstone, moderately consolidated, very sandy, light olive gray to light gray; consolidated from 337 to 340 ft, contains some rootlets.....	333.0	340.0
Sand, silty; sand is very fine to medium; contains silt layer at 348 ft.....	340.0	351.0
Sandstone to siltstone, poorly consolidated; coarse silt to fine sand.....	351.0	353.5
Silt, slightly consolidated, slightly clayey, very sandy, light olive gray.....	353.5	354.5
Sand, very fine to medium with some coarse sand to fine gravel; contains some reworked claystone to siltstone.....	354.5	360.0

Sandstone, poorly consolidated; sand is very fine to medium; contains slightly less medium sand below 365 ft.....	360.0	366.3
Silt, slightly clayey, moderately sandy, light olive gray; contains very fine to fine sand; slightly sandy below 373.5 ft.....	366.3	380.0
Sandstone to siltstone, moderately consolidated, slightly sandy, light olive gray; coarse silt to very fine sand; contains some poorly consolidated siltstone below 385 ft.....	380.0	387.0
Silt, slightly sandy, light olive gray; contains very fine to fine sand; slightly clayey from 390 to 392 ft and from 395 to 408.3 ft; moderately clayey from 392 to 395 ft and from 408.3 to 413.1 ft; contains limestone layer below 413.1 ft.....	387.0	413.4
<b>Cretaceous System - Upper Cretaceous Series - Montana Group:</b>		
<b>Pierre Formation:</b>		
Shale, clayey, very calcareous, mottled light gray to brownish yellow; slightly more yellow with a red tint from 415 to 422 ft.....	413.4	440.0

**Test Hole #42-A-55  
(24N-5W-13dddc)  
Antelope County**

Location: SW SE SE SE Sec. 13, T. 24 N., R. 5 W., approximately 464 feet west and 46 feet north of the southeast corner.

Ground elevation: 1,681 ft. (t). (Tilden, 7.5 min. quadrangle)

Depth to water: 16.04 ft. (8-23-55)

	<u>Depth, in feet</u>	
	From	To
<b>Quaternary System, undifferentiated:</b>		
Road fill; no sample.....	0.0	2.0
Silt, slightly clayey, slightly sandy, very dark brownish gray; sand is very fine to fine, some coarser.....	2.0	5.0
Silt, slightly clayey, in part slightly sandy, very dark brownish gray.....	5.0	8.0
Silt, slightly clayey, in part sandy, medium brown gray; sand is very fine to medium.....	8.0	10.0
Silt, slightly clayey, in part sandy, interbedded with sandy silt, medium brownish gray; sand is very fine to medium.....	10.0	12.0
Sand, fine to coarse.....	12.0	23.0
Silt, slightly clayey, slightly sandy, dark gray; sand is very fine to fine; below 25 ft, medium to dark gray.....	23.0	32.0
Sand, very fine to medium, some coarse; below 40 ft, slightly more coarse sand.....	32.0	45.0
Sand, fine to coarse, little very coarse; contains reworked clay fragments; below 55 ft, sand is fine to very coarse.....	45.0	60.0
Sand, very fine to medium, some coarse; below 65 ft, sand is very fine to coarse.....	60.0	70.0
Sand, fine to very coarse, trace of fine gravel.....	70.0	75.0
Sand, slightly gravelly; fine sand to medium gravel.	75.0	80.0
Sand, very fine to medium.....	80.0	85.0
Sand and gravel, medium sand to fine gravel, trace of medium gravel; below 90 ft, slightly more medium gravel.....	85.0	105.0
Gravel, some sand; fine to medium gravel.....	105.0	110.0
<b>Tertiary System - Miocene Series - Ogallala Group:</b>		
Silt, slightly clayey, very light gray.....	110.0	115.0
Sand, slightly to moderately silty; sand is very fine to fine.....	115.0	121.0
Silt, sandy light gray to light brownish gray;		

contains marl, sand is very fine to fine.....	121.0	125.0
Silt, very sandy, light brownish gray; sand is very fine to fine, some siltstone.....	125.0	130.0
Sand to sandstone, sand is very fine to fine, trace medium; below 140 ft, slightly silty; sand is very fine to medium; from 155 to 160 ft, trace coarse sand; below 160 ft, some coarse sand.....	130.0	165.0
Sand, fine to medium, some coarse; below 170 ft, sand is very fine to medium, little coarse.....	165.0	173.0
Silt, moderately clayey, slightly sandy, light gray; sand is very fine to fine, little medium; from 175 to 177 ft, slightly more sandy; below 177 ft, slightly more clayey.....	173.0	180.0
Silt, moderately sandy, slightly clayey, pink; sand is very fine to fine, some medium; below 185 ft, in part very sandy.....	180.0	190.0
Sand, slightly silty, slightly clayey; sand is very fine to medium, trace coarse; from 195 to 200 ft, sand is very fine to medium; below 200 ft, sand is very fine to fine, some silt and siltstone layers; below 215 ft, some reworked material.....	190.0	220.0
Sand, very fine to medium, trace of coarse; some reworked material.....	220.0	236.0
Silt, slightly clayey, slightly sandy, light brownish gray; sand is very fine.....	236.0	243.0
Sand, fine to coarse, trace very coarse; thin light gray silt layers at base.....	243.0	255.0
Silt, moderately clayey, light gray; below 263.5 ft, some interbedded very fine to fine sand.....	255.0	281.0
Sand, slightly silty; sand is fine to very coarse, some gravel; below 285 ft, moderately silty, some medium to coarse gravel.....	281.0	290.0
Sand, slightly silty; sand is very fine to coarse; below 295 ft, very silty, sand is very fine to medium.....	290.0	300.0
<b>Tertiary System - Oligocene Series - White River Group:</b>		
<b>Chadron Formation:</b>		
Sand is very fine to fine, trace of medium.....	300.0	305.0
Silt, moderately sandy, slightly clayey, light brown gray; sand is very fine to fine; below 310 ft, slightly sandy.....	305.0	315.0
<b>Cretaceous System - Upper Cretaceous Series - Colorado Group:</b>		
<b>Niobrara Formation:</b>		
Shale, clayey, light gray, very calcareous; contains thin bentonite lens.....	315.0	316.0

Shale, clayey, medium grayish brown, chalky, very calcareous.....	316.0	318.0
Shale, chalky, medium dark gray; contains bentonite; below 320 ft, medium brownish gray.....	318.0	340.0

**Test Hole #35-A-56  
(24N-7W-13daaa)  
Antelope County**

Location: NE NE NE SE Sec. 13, T. 24 N., R 7 W., 2,461 feet north and 22 feet west of southeast corner.

Ground elevation: 1,905 ft. (a). (Neligh SE, 7.5. min. quadrangle)

Depth to water: 61 ft. (9-7-56)

	<u>Depth, in feet</u>	
	From	To
<b>Quaternary System, undifferentiated:</b>		
Soil; silt, very sandy, dark gray, sand is very fine to medium.....	0.0	2.0
Silt, very sandy, medium grayish brown.....	2.0	5.0
Sand, very silty, light yellowish gray; sand very fine to medium.....	5.0	8.0
Silt, moderately clayey, slightly sandy, medium yellowish gray; moderately sandy in part from 8 to 10 ft; less clayey below 10 ft; slightly calcareous from 10 to 20 ft and below 31.5 ft; very sandy from 10 to 17.5 ft; contains some small limy nodules from 10 to 15 ft; some mottled medium brown from 17.5 to 22 ft; light yellowish gray from 22 to 65.5 ft; contains a trace of very fine to fine sand below 24 ft; mottled with light gray from 24 to 30 ft, from 38.5 to 42 ft, and from 55 to 56 ft; light yellowish gray with some brownish yellow from 60 to 65.5 ft; light gray with brownish yellow and yellowish brown from 65.5 to 75 ft; light brownish gray with yellow tint below 75 ft; mottled light gray from 75 to 77 ft.....	8.0	81.5
Silt, slightly clayey, slightly sandy, slightly calcareous, medium gray; contains very fine sand; slightly more clayey below 95 ft, contains no sand.....	81.5	102.5
Sand, quartz with many dark and green silicates, sand is very fine to medium, trace of coarse; contains more coarse sand from 105 to 110 ft; texture grades from medium to very coarse sand with a trace of fine gravel below 110 ft; contains much coarse sand below 110 ft.....	102.5	115.0
Sand and some gravel, quartz with many dark and green silicates; texture grades from coarse sand to medium gravel; contains 15% to 20% gravel; slightly finer from 120 to 125 ft, contains 5% to		

10% gravel.....	115.0	130.0
Sand, quartz with some dark and green silicates; sand is fine to very coarse with a trace of fine gravel; contains 5% gravel below 135 ft; contains a few yellowish brown silicates below 140 ft.....	130.0	143.5
Silt, moderately clayey, light gray; very clayey and light olive gray from 148.5 to 150 ft; light brown below 150 ft; contains a few small limy nodules from 153 to 156 ft; slightly clayey below 156 ft; moderately calcareous from 156 to 160 ft; granular textured below 160 ft and in part from 156 to 160 ft.....	143.5	172.0
Clay, silty, light brownish gray; contains thin sand layers below 176.5 ft.....	172.0	180.0
Sand and gravel, quartz with yellowish brown and light green silicates; texture grades from coarse sand to fine gravel with much very coarse sand; contains 10% gravel from 180 to 185 ft, about 40% gravel from 185 to 210 ft; contains a few dark silicates, some medium gravel from 190 to 210 ft; some medium sand from 195 to 210 ft; more yellowish brown and dark silicates below 210 ft; contains about 30% gravel below 210 ft; contains some medium gravel below 215 ft.....	180.0	232.0
Silt, clayey, light gray; interbedded with sand and gravel, coarse sand to fine gravel.....	232.0	235.0
Sand and a little gravel; texture grades from fine sand to medium gravel; contains about 5% to 10% gravel; slightly coarser below 245 ft.....	235.0	250.0
<b>Tertiary System - Miocene Series - Ogallala Group:</b>		
Silt, moderately clayey, slightly sandy, light olive gray; contains very fine to medium sand.....	250.0	255.0
Sand, very fine to medium; slightly consolidated below 260 ft.....	255.0	266.0
Silt, slightly clayey, slightly sandy, light olive gray; sand is very fine to fine; contains rootlets.....	266.0	270.0
Sand, moderately silty; interbedded with silt, moderately sandy, light olive gray; sand is very fine to medium.....	270.0	275.0
Sandstone, moderately consolidated; sand is very fine to fine; contains rootlets; poorly consolidated from 280 to 290 ft and below 300 ft; contains some medium sand below 295 ft.....	275.0	310.0
Silt, moderately clayey, slightly sandy, light olive		



gray.....	310.0	312.0
Sand, quartz; grades from very fine to medium sand; contains a trace of coarse sand from 315 to 325 ft; contains a trace of light olive gray silt and some dark silicates from 320 to 325 ft; contains more silt and a trace of clay and blocky siltstone from 325 to 330 ft; contains coarse sand from 325 to 335 ft and from 345 to 360 ft; iron stained below 340 ft.....	312.0	367.8
Silt, slightly clayey, moderately sandy, light olive gray; contains very fine to fine sand and a few thin clay layers.....	367.8	375.0
Sand, very fine to fine with some medium; contains a little very fine grained sandstone and some silt..	375.0	380.0
Silt, slightly clayey, moderately sandy, light olive gray.....	380.0	386.0
Sandstone, very silty, moderately consolidated; sand is very fine to fine with some medium; less silty and poorly consolidated below 390 ft.....	386.0	395.0
Sand, very silty; sand is very fine to fine with some medium; slightly consolidated in part.....	395.0	405.0
Sandstone, poorly consolidated, light olive gray....	405.0	410.0
Sand, moderately silty; sand is very fine to fine with a little medium; slightly consolidated in part from 410 to 425 ft.....	410.0	430.0
Silt, slightly sandy, light olive gray; moderately sandy in part, granular textured; contains coarse silt and very fine sand.....	430.0	440.0
Sand, moderately silty; sand is very fine to fine; slightly consolidated in part.....	440.0	450.0
Silt, slightly clayey, slightly sandy, light olive gray; contains very fine to fine sand; granular and very sandy in part from 450 to 455 ft; very sandy below 455 ft.....	450.0	460.0
Sand, moderately silty; sand is very fine to fine; slightly consolidated in part; contains less silt below 465 ft; slightly coarser from 465 to 470 ft.	460.0	480.0
Sand, very fine to coarse.....	480.0	488.0
Silt, slightly clayey, slightly sandy, light olive gray; contains very fine to fine sand and many rootlets; white in part from 488 to 490 ft.....	488.0	493.0
Sand, very fine to medium with a trace of coarse....	493.0	496.0
<b>Tertiary System - Oligocene Series - White River Group:</b>		
<b>Chadron Formation:</b>		
Silt, slightly clayey, slightly sandy, light olive		

gray; contains sand layer from 497 to 498 ft, sand is very fine to fine.....	496.0	500.0
Clay, silty, sandy, light gray, slightly calcareous; sand is very fine to fine; contains some volcanic ash, contains bentonitic clay; below 525 ft, some quartz grains.....	500.0	530.0
<b>Cretaceous System - Upper Cretaceous Series - Montana Group:</b>		
<b>Pierre Formation:</b>		
Shale, clayey, dark gray.....	530.0	550.0

**Test Hole #34-A-56  
(24N-7W-25dddd)  
Antelope County**

Location: SE SE SE SE Sec. 25, T. 24 N., R. 7 W., 100 feet north and 10 feet west of southeast corner.

Ground elevation: 1,905 ft. (a). (Neligh SE, 7.5. min. quadrangle)

Depth to water: Unknown. Test hole caved at 61.6 ft. (9-4-56)

Depth, in feet  
From To

**Quaternary System, undifferentiated:**

Road fill; silt, slightly clayey, medium brownish gray.....	0.0	1.0
Soil, silty, moderately clayey, medium gray with some light yellowish gray.....	1.0	2.0
Silt, slightly clayey, slightly calcareous, light yellowish gray; some light gray and contains some limy concretions from 2 to 5 ft; slightly darker in color from 7.6 to 9.4 ft and from 12.5 to 25 ft; granular textured from 7.6 to 9.4 ft; contains a few snail shells from 9.4 to 10 ft; contains limy rootlets below 15 ft; slightly more yellowish from 25 to 35 ft; less calcareous from 35 to 45 ft; moderately clayey from 39.5 to 40.2 ft; mottled light gray and yellowish gray with a brown tint from 40 to 43 ft; light brownish yellow with some light gray and yellowish gray below 45 ft; moderately clayey in part below 45 ft.....	2.0	50.0
Sand, interbedded with silt; moderately clayey, slightly calcareous, brownish yellow with some gray; sand is very fine to medium.....	50.0	60.0
Silty sand and sandy silt, light brown; texture grades from coarse silt to very fine sand; contains a few thin light gray silt layers.....	60.0	65.0
Sand, very fine to medium; slightly silty from 65 to 70 ft; contains some thin, light gray, slightly sandy silt layers from 65 to 67.5 ft, from 72.5 to 73.2 ft, from 100 to 105 ft, and from 106 to 106.5 ft; contains some coarse sand from 75 to 90 ft and below 105 ft; contains a trace of coarse sand from 90 to 100 ft. ....	65.0	107.5
Sand, quartz with green silicates; sand is medium to coarse with a trace of coarse; contains much very coarse sand to fine gravel from 110 to 115 ft, contains 30% gravel; very coarse sand to fine		

gravel from 110 to 115 ft; contains some fine sand and a trace of fine gravel below 115 ft.....	107.5	120.0
Sand and gravel, quartz with yellowish brown and green silicates; texture grades from coarse sand to fine gravel with some medium gravel; 20% to 30% gravel; coarser textured from 125 to 130 ft and below 150 ft, contains 60% gravel; contains thin, light gray silt layer at 129.9 ft; contains some medium sand below 140 ft.....	120.0	161.0
Clay, silty, light gray; contains embedded sand grains from 161 to 162 ft; very calcareous, slightly sandy and granular below 162 ft.....	161.0	162.5
Silt, moderately clayey, moderately sandy, light brownish gray.....	162.5	167.5
Sand, brownish gray; sand is very fine to coarse with some very coarse and some fine gravel; contains no very fine to fine sand and more coarse sand below 170 ft; contains 5% fine gravel from 170 to 175 ft; slightly coarser and contains 10% fine gravel below 175 ft.....	167.5	177.7
Clay, silty, light brownish gray with some yellowish brown.....	177.7	179.0
Sand, slightly silty, sand is fine to coarse.....	179.0	180.0
Silt, moderately clayey, moderately sandy, light brown.....	180.0	181.5
Sand, fine to very coarse with some fine gravel, 10% gravel.....	181.5	185.0
Sand and some gravel, texture grades from coarse sand to fine gravel with some medium sand and medium gravel (25%); contains light brown clayey silt layer from 188 to 189.5 ft; coarser sand with 30% to 40% gravel below 195 ft; contains some fine sand and more medium gravel below 200 ft; contains light brown silt layers from 202 to 203.5 ft and at 204.5 ft.....	185.0	205.0
Sand, very fine to coarse with a trace of very coarse; contains a few light gray and light brown silt layers.....	205.0	210.0
<b>Tertiary System - Miocene Series - Ogallala Group:</b>		
Sand, very fine to fine with a little medium; slightly consolidated in part from 210 to 215 ft, from 220 to 225 ft, and below 230 ft; contains rootlets from 210 to 215 ft and from 220 to 230 ft; contains light olive gray clay grains from 215 to 225 ft; contains some light olive gray silt		

below 227 ft; contains more medium sand below 230 ft; contains thin, light gray, sandy silt layers at 238 and 239.5 ft.....	210.0	245.0
Sandstone, moderately consolidated, sand is very fine to medium.....	245.0	255.0
Sand, very fine to medium; slightly consolidated from 255 to 256.5 ft.....	255.0	261.5
Silt, moderately clayey, slightly sandy, light olive gray with light gray; contains very fine to fine sand.....	261.5	266.0
Sandstone, poorly consolidated; sand is very fine to fine with some medium; coarse grained siltstone from 268 to 269.7 ft; blocky siltstone at 269.3 ft; contains light olive gray silty clay from 270 to 280 ft; contains a little light olive gray silt from 270 to 277 ft, with more silt from 277 to 280 ft; unconsolidated in part and contains some rounded clay grains from 280 to 285 ft; contains more medium sand below 285 ft; contains rootlets from 285 to 290 ft; contains some slightly clayey, slightly sandy, light olive gray silt below 298 ft.....	266.0	300.0
Silt, slightly clayey, moderately sandy, light gray; very sandy in part; sand is very fine to fine.....	300.0	306.0
Sand, very fine to medium; slightly consolidated from 310 to 318 ft; contains a trace of coarse sand below 315 ft; contains a trace of light gray silt from 318 to 320 ft; light gray and moderately silty from 321.5 to 324 ft.....	306.0	328.0
Silt, very sandy, light gray; contains very fine to fine sand.....	328.0	332.0
Sand, very fine to medium with a trace of coarse; contains a little brown siltstone from 340 to 345 ft; contains some brown, coarse grained siltstone below 345 ft.....	332.0	353.0
Sand, silty; interbedded with light gray sandy silt and some brown, very fine to fine grained sandstone.....	353.0	360.0
Sandstone, poorly consolidated; sand is very fine to fine.....	360.0	365.0
Sand, very fine to medium; slightly consolidated in part from 365 to 380 ft; contains light gray, sandy silt layer at 378 ft; contains a little gravel composed of rounded clay grains from 380 to 385 ft, with many rounded clay grains from 385 to		

390 ft; contains some coarse sand from 385 390 ft; trace of coarse sand from 395 to 415 ft; contains some coarse sand and poorly consolidated sandstone below 415 ft.....	365.0	425.0
Sandstone, silty, light brown, poorly consolidated; sand is very fine to fine; contains rootlets.....	425.0	430.0
Sand, very fine to medium; contains some rounded clay grains, slightly consolidated.....	430.0	445.0
Siltstone, interbedded with some sand; sand is very fine to medium with some coarse; contains some gravel composed of many granular, rounded, clay grains; contains more sand below 450 ft.....	445.0	455.0
Sand, very fine to fine with some medium; contains some dark gray and light yellow siltstone and a few rounded clay grains from 460 to 465 ft; contains less siltstone and more clay grains from 465 to 470.0 ft; contains more medium sand below 470 ft.....	455.0	476.5
<b>Tertiary System - Oligocene Series - White River Group:</b>		
<b>Chadron Formation:</b>		
Silt, slightly clayey, slightly sandy, light brown; contains some rounded clay grains from 460 to 465 ft; granular textured from 480 to 485 ft; very fine grained sandstone in part below 485 ft.....	476.5	490.0
Shale and siltstone, reworked; white and light yellowish brown with some brown and a trace of light gray; contains some quartz gravel; some dark gray shell fragments below 494.5 ft.....	490.0	495.0
<b>Cretaceous System - Upper Cretaceous Series - Montana Group:</b>		
<b>Pierre Formation:</b>		
Shale, clayey, dark gray.....	495.0	510.0

**Test Hole #21-A-59  
(24N-8W-18bbbb)  
Antelope County**

Location: NW NW NW NW Sec. 18, T. 24 N., R. 8 W., approximately 304 feet south and 12 feet east of the northwest corner.  
 Ground elevation: 2,030 ft. (t). (Deloit, 7.5 min. quadrangle)  
 Depth to water: 71.38 ft (8-14-59)

	Depth, in feet	
	From	To
<b>Quaternary System, undifferentiated:</b>		
Topsoil; silt, very sandy, coarse textured, very dark brown; sand is very fine to medium.....	0.0	0.5
Sand, slightly silty; sand is very fine to medium, trace of coarse to very coarse; below 5 ft, sand is very fine to fine, trace of medium, some interbedded silts.....	0.5	10.0
Sand, very fine to medium, trace coarse to very coarse; below 15 ft, moderately silty, no very coarse sand.....	10.0	20.0
Sand, moderately to in part very silty; sand is very fine to fine, trace of medium.....	20.0	42.0
Silt, slightly clayey, light medium yellow gray.....	42.0	55.0
Silt, moderately clayey, yellowish brown; below 70 ft, some very fine sand; below 77 ft, dark yellowish brown.....	55.0	88.5
Silt, coarse texture, slightly clayey, slightly sandy, light brown with light gray; sand is very fine; below 90 ft, light gray, some carbon fragments.....	88.5	101.0
Sand, very fine to fine, some medium; below 105 ft, sand is fine to coarse, some very coarse, trace of fine gravel.....	101.0	110.0
Sand, slightly gravelly; fine sand to fine gravel; below 120 ft, some medium gravel with a trace of coarse gravel.....	110.0	125.0
Sand, slightly gravelly; fine sand to fine gravel, some medium gravel, less medium gravel below 130 ft.....	125.0	140.0
Sand, very fine to coarse, some very coarse sand to fine gravel.....	140.0	145.0
Sand, slightly gravelly; fine sand to medium gravel; below 150 ft, no medium gravel.....	145.0	155.0
Sand, gravelly; fine sand to medium gravel, trace coarse gravel.....	155.0	161.0

Silt, coarse textured, slightly clayey, light brownish gray.....	161.0	162.0
Sand, silty; sand is very fine to coarse, some very coarse.....	162.0	165.0
Sand, silty; sand is very fine to medium; below 170 ft, sand is very fine.....	165.0	192.0
Silt, moderately clayey, very pale brown.....	192.0	194.0
Sand, fine to coarse, some very coarse, trace of fine gravel.....	194.0	200.0
Sand, slightly gravelly; fine sand to medium gravel; below 215 ft, trace of medium gravel.....	200.0	220.0
Sand, medium to very coarse, little fine gravel.....	220.0	235.0
Sand, slightly gravelly; fine sand to medium gravel, trace coarse gravel.....	235.0	237.0
Sand, slightly silty; sand is very fine to medium, trace coarse.....	237.0	246.0
Sand, fine to very coarse, little fine gravel.....	246.0	250.0
Sand, very fine to fine, trace of medium.....	250.0	259.0
<b>Tertiary System - Miocene Series - Ogallala Group:</b>		
Sand, very fine to fine, some medium.....	259.0	270.0
Sand, slightly silty; sand is very fine to fine, some rootlets; from 295 to 300 ft, sand is very fine to medium.....	270.0	305.0
Sand, very fine to medium; below 310 ft, sand is very fine to fine; below 320 ft, very silty.....	305.0	325.0
Sandstone, sand is very fine to fine.....	325.0	335.0
Sand, very fine to fine, some rootlets; below 374 ft, moderately silty.....	335.0	385.0
Sand, very fine to medium, some limy zones.....	385.0	445.0
Sand, very fine to fine, trace of medium; below 450 ft, slightly silty; from 455 to 460 ft, and below 495 ft, some rootlets.....	445.0	525.0
Sand, very fine to fine, some interbedded silt and siltstone lenses.....	525.0	535.0
Sand, very fine to medium, trace coarse.....	535.0	541.0
<b>Cretaceous System - Upper Cretaceous Series - Montana Group:</b>		
<b>Pierre Formation:</b>		
Shale, clayey, black.....	541.0	560.0



**Test Hole #20-A-59  
(24N-8W-31bbbb)  
Antelope County**

Location: NW NW NW NW Sec. 31, T. 24 N., R. 8 W., approximately 192 feet south and 4 feet east of the northwest corner.  
 Ground elevation: 2,042 ft. (t). (Deloit, 7.5 min. quadrangle)  
 Depth to water: 84.90 ft (8-7-59)

	<u>Depth, in feet</u>	
	From	To
<b>Quaternary System, undifferentiated:</b>		
Sand, very silty; sand is very fine to medium; at 0.3 ft thin very dark gray clay lens.....	0.0	5.0
Sand, moderately silty; sand is very fine to medium, some coarse; below 10 ft, trace coarse sand.....	5.0	13.0
Sand, very silty; sand is very fine to medium; silty layer about 18.5 ft.....	13.0	30.0
Sand, very fine to medium; below 45 ft, very silty; sand is very fine to fine; below 50 ft, trace of medium sand.....	30.0	80.0
Silt, very sandy, slightly clayey, light olive gray; sand is very fine to fine.....	80.0	90.0
Sand, very silty; sand is very fine to fine; below 95 ft, slightly clayey.....	90.0	100.0
Sand, very fine to medium, some coarse; below 110 ft, moderately to very silty.....	100.0	135.0
Sand, slightly to in part moderately silty, slightly clayey; sand is very fine, some medium.....	135.0	155.0
Sand, moderately silty; sand is very fine, some medium to very coarse.....	155.0	160.0
Sand, moderately silty; sand is very fine to coarse, some very coarse; below 165 ft, fine to very coarse, trace of gravel.....	160.0	175.0
Sand, slightly gravelly; fine sand to fine gravel...	175.0	180.0
Gravel, sandy; fine sand to medium gravel; below 185 ft, interbedded silt lenses.....	180.0	190.0
Sand, very fine to medium, trace coarse to very coarse.....	190.0	200.0
Silt, very sandy, moderately clayey, slightly calcareous; sand is very fine to medium.....	200.0	215.0
Sand, very silty; sand is fine to very coarse, below 220 ft, trace fine gravel.....	215.0	226.0
<b>Tertiary System - Miocene Series - Ogallala Group:</b>		
Silt, marly, light gray.....	226.0	235.0
Silt, very sandy, slightly clayey, light brown,		

slightly calcareous; sand is very fine to fine; below 240 ft, moderately sandy.....	235.0	252.0
Sand, fine to medium, some coarse.....	252.0	255.0
Silt, very sandy, slightly clayey, slightly calcareous, mottled light to medium brown.....	255.0	256.0
Sand, very fine to medium, little coarse; some rootlet fragments; below 280 ft, limy zones.....	256.0	305.0
Sandstone to sand, sand is very fine to medium, from 310 to 317 ft, and below 350 ft, some interbedded silty sand lenses.....	305.0	375.0
Sand, very fine to medium; below 380 ft, some volcanic ash.....	375.0	390.0
Sand, very fine to medium; from 395 to 405 ft, rootlet fragments; below 405 ft, some volcanic ash.....	390.0	420.0
Sand, very fine to medium, little coarse; from 430 to 435 ft, rootlet fragments.....	420.0	450.0
Sand, fine to coarse, some very coarse, some rootlets, below 455 ft, sand is very fine to medium, some coarse.....	450.0	460.0
Sand, very fine to fine, trace of medium.....	460.0	465.0
Silt, very sandy, slightly clayey, light olive gray; sand is very fine to medium; below 470 ft, sand is very fine to fine.....	465.0	480.0
Sand, very silty; sand is very fine to fine; below 495 ft, moderately to slightly silty.....	480.0	510.0
Sand, very fine to fine, some medium.....	510.0	523.0
<b>Cretaceous System - Upper Cretaceous Series - Montana Group:</b>		
<b>Pierre Formation:</b>		
Shale, clayey, black.....	523.0	540.0

**Test Hole #14-A-57  
(25N-5W-24aaaa)  
Antelope County**

Location: NE NE NE NE Sec. 24, T. 25 N., R. 5 W., 61 feet south and 41 feet west of northeast corner.

Ground elevation: 1,754 ft. (t). (Tilden NE, 7.5 quadrangle)

Depth to water: 26.06 ft. (7-3-57)

	<u>Depth, in feet</u>	
	From	To
<b>Quaternary System, undifferentiated:</b>		
Soil, silt, very sandy, dark brown; contains very fine to coarse sand.....	0.0	1.0
Sand, very silty, sand is very fine to coarse.....	1.0	4.0
Silt, slightly clayey, slightly sandy, light brown; contains very fine to fine with a trace of coarse sand; slightly less clayey below 5 ft.....	4.0	6.7
Sand, slightly silty; sand is very fine to medium with a trace of coarse; contains more coarse sand from 10 to 15 ft; contains very fine to coarse sand with a trace of fine gravel from 15 to 20 ft; contains silt layer at 20.8 ft.....	6.7	25.3
Silt, slightly clayey, slightly sandy, light gray; contains very fine to fine sand; slightly more sandy below 26.3 ft.....	25.3	30.0
Sand and gravel, very fine sand to medium gravel; coarse sand to medium gravel from 45 to 50 ft; contains 15% gravel from 30 to 35 ft; contains 30% gravel from 35 to 40 ft; contains 50% gravel below 40 ft; contains a silt layer from 58 to 58.2 ft...	30.0	70.0
<b>Tertiary System - Miocene Series - Ogallala Group:</b>		
Silt, slightly clayey, slightly sandy, light yellow gray; contains very fine to fine sand.....	70.0	73.5
Siltstone, slightly consolidated, sandy, light olive gray; contains very fine to fine sand; contains some rootlets below 76 ft.....	73.5	85.0
Sand, slightly silty, slightly consolidated; sand is very fine to fine with some medium; slightly more silty and consolidated below 92 ft.....	85.0	100.3
Silt, slightly clayey, slightly sandy, light gray; contains very fine to fine sand.....	100.3	115.0
Sandstone, slightly consolidated; sand is very fine to fine with some medium; contains some rootlets..	115.0	120.0
Sand, slightly silty; sand is very fine to fine with some medium; contains some rootlets; slightly		

consolidated below 135 ft; texture grades from very fine to medium with a trace of coarse sand from 135 to 140 ft; contains more coarse sand from 140 to 145 ft; texture grades from very fine to fine below 145 ft; contains claystone particles and a trace of medium sand with green silicates from 165 to 170 ft.....	120.0	175.0
Silt, slightly clayey, slightly sandy, light olive gray; contains very fine to fine sand; slightly calcareous from 177 to 185 ft; moderately calcareous below 185 ft; contains some limy areas below 175 ft; slightly more clayey from 177 to 185 ft.....	175.0	200.0
Sand, very fine to medium with a trace of coarse to 210 ft; very fine to fine below 210 ft; contains a trace of coarse sand from 220 to 225 ft and from 230 to 235 ft; contains a trace of pyrite below 225 ft.....	200.0	247.5
Silt, slightly clayey, slightly sandy, light gray; contains very fine to fine sand to 250 ft; contains coarse silt to very fine sand with limy grains below 250 ft.....	247.5	267.0
<b>Tertiary System - Oligocene Series - White River Group:</b>		
<b>Chadron Formation:</b>		
Silt, slightly clayey, light gray; contains some very coarse silt; slightly consolidated and limy..	267.0	270.0
Silt, slightly clayey, moderately calcareous, light gray; contains limestone fragments; slightly more clayey from 274 to 275 ft; slightly calcareous from 275 to 280 ft.....	270.0	280.0
Silt, slightly clayey, light grayish brown; contains limestone fragments; contains reworked siltstone and claystone grains below 286.5 ft; slightly more clayey from 289 to 290 ft; slightly calcareous from 290 to 295.5 ft; light gray to light brownish gray below 295.5 ft.....	280.0	300.0
Silt, moderately clayey, light gray brown; contains some carbonaceous material and limy areas.....	300.0	306.5
Silt, very clayey, moderately calcareous, light gray to brownish gray with greenish tints; contains reworked limestone and claystone grains, some quartz grains .....	306.5	310.0
<b>Cretaceous System - Upper Cretaceous Series - Montana Group:</b>		
<b>Pierre Formation:</b>		
Shale, clayey, light gray to brownish yellow;		

contains some iron concretions from 315 to 326 ft;		
slightly calcareous from 320 to 326 ft.....	310.0	330.5
Shale, clayey, dark gray.....	330.5	350.0

**Test Hole #16-A-57  
(25N-6W-6bbab)  
Antelope County**

Location: NW NE NW NW Sec. 6, T. 25 N., R. 6 W., 17 feet south and 893 feet east of northwest corner.

Ground elevation: 1,925 ft. (t). (Neligh, 7.5 min. quadrangle)

Depth to water: Unknown. Test hole caved at 117.0 ft. (7-11-57)

Depth, in feet  
From To

**Quaternary System, undifferentiated:**

Soil; sandy, very silty, dark brownish gray; contains very fine to medium with some coarse sand; slightly less silty, brownish gray below 1 ft.....	0.0	2.0
Silt, slightly clayey, slightly calcareous, light yellow gray; contains some limy nodules; light brownish yellow from 5 to 10 ft; contains no limy nodules below 10 ft; light yellow gray from 10 to 20 ft; slightly more clayey from 18 to 20 ft; light brownish yellow below 20 ft.....	2.0	31.5
Silt, very sandy, slightly calcareous, light gray; contains very fine to fine sand.....	31.5	34.5
Silt, slightly clayey, light brownish gray with some mottled brownish yellow.....	34.5	38.0
Soil, slightly clayey, dark brownish gray; contains a trace of fine to medium sand; very clayey below 40.0 ft.....	38.0	41.0
Silt, very clayey, light brown; contains a trace of sand; moderately sandy from 43.5 to 45 ft, sand is very fine to coarse; slightly clayey, very sandy from 45 to 49 ft, contains no coarse sand; moderately clayey below 50 ft.....	41.0	54.0
Silt, moderately clayey, moderately sandy, light brown; very sandy, light brownish gray from 56.5 to 60 ft; sand is very fine to medium.....	54.0	63.0
Silt, slightly clayey, very sandy, light brown; contains very fine to fine with some medium sand..	63.0	63.5
Silt, moderately clayey, light gray with some mottled yellow gray.....	63.5	65.0
Sand, slightly clayey, very silty; sand is very fine to medium with a little coarse and a trace of very coarse; contains no very coarse sand below 60 ft; contains very fine with some fine sand below 76 ft.....	65.0	78.5

Sand, very fine to coarse with a trace of very coarse.....	78.5	82.5
Silt, very sandy, light gray; contains very fine sand with some fine sand; yellowish gray and light gray below 85 ft.....	82.5	87.5
Sand, very silty; sand is very fine to medium.....	87.5	88.0
Sand, very fine to medium with a trace of coarse; contains some coarse sand below 95 ft.....	88.0	97.0
Silt, very sandy, light brownish gray; contains very fine to fine with some medium sand.....	97.0	105.5
Sand, very fine to medium with a trace of coarse sand and fine gravel.....	105.5	106.5
Silt, slightly clayey, very sandy, light gray; contains very fine to medium sand with a trace of fine gravel.....	106.5	108.0
Sand and gravel, quartz with pink silicates; texture grades from very fine sand to very fine gravel; contains 25% gravel.....	108.0	120.0
Sand and gravel, medium sand to medium gravel; contains 40% gravel; contains 5% gravel below 125 ft.....	120.0	135.5
Silt, very sandy, light yellow gray; contains very fine sand.....	135.5	139.0
Sand, very fine to coarse with some very coarse sand and a trace of fine gravel; contains 15% gravel below 145 ft.....	139.0	150.0
Sand and gravel, fine sand to medium gravel; contains less medium gravel below 160 ft; contains 30% gravel from 150 to 155 ft; contains 50% gravel below 155 ft.....	150.0	165.0
Sand and gravel, fine sand to medium gravel; contains 20% gravel from 165 to 170 ft; contains 10% gravel below 170 ft.....	165.0	172.5
Sand and gravel, fine sand to medium gravel; contains 40% gravel; contains a trace of light green silicates below 175 ft.....	172.5	176.5
Silt, light gray.....	176.5	178.0
Sand, very fine to coarse with some very coarse.....	178.0	183.5
Silt, moderately sandy, light gray; contains very fine sand.....	183.5	185.0
Sand and gravel, fine sand to fine gravel; contains some green silicates.....	185.0	186.5
<b>Tertiary System - Miocene Series - Ogallala Group:</b>		
Silt, slightly clayey, light olive gray, slightly calcareous; light brownish gray below 190 ft,		

contains some limy areas; contains very fine to medium sand below 208 ft.....	186.5	210.0
Silt, slightly clayey, sandy, light gray; contains very fine to medium sand; contains no medium sand below 211 ft.....	210.0	215.5
Sand, very fine to medium.....	215.5	221.2
Silt, slightly sandy, light brownish gray; contains very fine sand; light gray below 225 ft; slightly more sandy below 230 ft, contains coarse silt to very fine sand; contains some fine sand below 236 ft.....	221.2	240.0
Sand and some gravel; grades from very fine sand to fine gravel; slightly silty to 242 ft.....	240.0	244.0
Sand, very fine to medium; contains some poorly consolidated sandstone; slightly silty below 250 ft, contains less medium sand.....	244.0	255.0
Sandstone, sand is very fine to medium; poorly consolidated.....	255.0	260.0
Sand, slightly silty; sand is very fine to medium...	260.0	265.0
Silt, very sandy, slightly clayey, light olive gray; contains very fine to fine sand.....	265.0	270.0
Sand, very silty; sand is very fine to fine; partially consolidated; slightly more consolidated below 275 ft.....	270.0	280.0
Sandy silt and silty sand, interbedded, light olive gray; contains very fine to fine sand; slightly consolidated.....	280.0	285.0
Siltstone, sandy; contains very fine sand; moderately consolidated.....	285.0	290.0
Silt, slightly clayey, moderately sandy; contains very fine to fine sand; partially consolidated....	290.0	295.0
Sand, very fine to fine; slightly consolidated.....	295.0	307.0
Clay, slightly sandy, moderately calcareous, light olive gray; contains very fine to fine sand; in part marly.....	307.0	307.5
Silt, moderately clayey, slightly sandy, light olive gray; contains very fine to fine sand; contains white limy area, moderately sandy from 315 to 325 ft, contains some small limy nodules; slightly calcareous below 320 ft; very sandy below 325 ft.....	307.5	331.0
Sand, very fine to medium; slightly consolidated; contains less medium sand below 340 ft; slightly less consolidated below 345 ft.....	331.0	350.0
Sand, very fine to medium; contains a trace of		



rounded clay grains.....	350.0	357.0
Sandstone, silty, poorly consolidated; sand is very fine to fine with some medium; slightly consolidated from 360 to 365 ft; moderately consolidated below 365 ft.....	357.0	370.0
Sand, very fine to medium; slightly calcareous, slightly consolidated; slightly silty below 380 ft.....	370.0	383.0
<b>Tertiary System - Oligocene Series - White River Group:</b>		
<b>Chadron Formation:</b>		
Silt, moderately clayey, light gray; slightly less clayey, slightly sandy below 385 ft, contains very fine sand; contains a few limy nodules from 400 to 405 ft; contains no limy nodules from 405 to 415 ft; very clayey below 413.5 ft; contains some ironstone and dense limy nodules below 415 ft.....	383.0	420.0
Clay, silty, slightly calcareous, light brown.....	420.0	421.0
<b>Cretaceous System - Upper Cretaceous Series - Montana Group:</b>		
<b>Pierre Formation:</b>		
Shale, clayey, moderately calcareous, yellow with some yellowish gray and light gray.....	421.0	430.0

**Test Hole #15-A-57  
(25N-7W-24aada)  
Antelope County**

Location: NE SE NE NE Sec. 24, T. 25 N., R. 7 W., 921 feet south  
and 108 feet west of northeast corner.  
Ground elevation: 1,750 ft. (t). (Neligh, 7.5 min. quadrangle)  
Depth to water: 10.0 ft. (7-15-57)

Depth, in feet  
From To

**Quaternary System, undifferentiated:**

Sand, very silty; sand is very fine to fine with some medium and a trace of coarse; slightly silty from 3.5 to 10 ft, contains some coarse sand; contains less coarse sand below 10 ft; contains silt layer at 11.7 ft; contains some reworked clay grains below 25 ft.....	0.0	30.0
Sand and gravel, poorly sorted, texture grades from very fine sand to fine gravel; contains 10% medium gravel below 40 ft.....	30.0	45.0
Sand, very fine to medium with some coarse; contains reworked clay grains; contains a trace of fine gravel and some sandstone and claystone grains from 50 to 55 ft; contains more coarse sand below 55 ft.....	45.0	60.0
Sand and gravel, poorly sorted, texture grades from very fine sand to fine gravel; contains medium gravel, sandstone, and claystone grains below 65 ft; contains 15% gravel from 60 to 65 ft; contains 35% gravel below 65 ft.....	60.0	91.0

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

Ash, slightly consolidated, light gray; contains some sandstone from 95 to 95.7 ft.....	91.0	110.0
Sandstone, poorly consolidated; sand is very fine to fine; contains some siltstone and rootlets.....	110.0	114.5
Silt, slightly clayey, greenish gray.....	114.5	118.0
Sand, very fine to fine; contains some rootlets; contains some medium sand from 125 to 130 ft.....	118.0	135.0
Silt, slightly clayey, light gray; moderately clayey below 140 ft; slightly consolidated with blocky structure from 140 to 145 ft.....	135.0	146.0
Sand, very fine to fine with some medium; contains some sandstone and siltstone.....	146.0	150.0
Silt, slightly clayey, slightly consolidated, light gray; contains some very coarse silt to very fine		

sand.....	150.0	157.0
Sand, very fine to medium; slightly consolidated; contains some rootlets from 160 to 165 ft; moderately silty below 165.0 ft.....	157.0	166.6
Silt, moderately clayey, light gray.....	166.6	175.0
Sand, very fine to medium, contains some coarse to very coarse sand; slightly consolidated; contains 10% gravel from 190 to 200 ft; contains some claystone grains from 195 to 200 ft; contains less coarse sand below 200 ft.....	175.0	215.0
Sand, silty, sand is very fine to fine.....	215.0	216.0
Silt, moderately clayey, slightly sandy, light olive gray; contains very fine to fine sand; contains limy nodules below 225 ft; slightly less clayey below 227 ft.....	216.0	230.0
Silt, slightly sandy, light gray; contains very fine to fine sand; contains limy nodules from 230 to 231.5 ft; moderately clayey to 233.5 ft and from 238 to 242.8 ft; slightly clayey from 233.5 to 238 ft and below 242.8 ft; contains some ash below 242.8 ft.....	230.0	245.0
Silt, moderately clayey, medium brownish gray.....	245.0	246.0
Silt, moderately clayey, light olive gray; slightly clayey, slightly sandy, below 250.5 ft, sand is very fine to fine.....	246.0	260.5
Sand, very fine to medium with a trace of coarse; slightly consolidated to 265 ft; contains a silt layer from 267 to 267.9 ft.....	260.5	275.0
Sand, very fine to medium; contains some clay.....	275.0	281.3
Silt, slightly clayey, light olive gray; slightly sandy below 285 ft, sand is very fine to fine, some limy areas.....	281.3	290.0
Silt, moderately clayey, slightly sandy, medium gray; contains very fine to fine sand; slightly less clayey with granular texture below 295 ft....	290.0	296.0
Siltstone, slightly sandy, medium gray, moderately consolidated; contains very fine to fine sand.....	296.0	300.0
Sand, very fine to fine with some medium and a trace of coarse; slightly consolidated; contains slightly more coarse sand with some reworked claystone, siltstone, and rootlets below 305 ft.....	300.0	316.0
Sandstone, poorly consolidated; sand is very fine to medium; contains some reworked siltstone and rootlets.....	316.0	318.0
Shale, clayey, reworked, medium gray; contains some		

siltstone and sandstone.....	318.0	320.0
<b>Cretaceous System - Upper Cretaceous - Montana Group:</b>		
<b>Pierre Formation:</b>		
Shale, clayey, slightly calcareous, dark gray; moderately calcareous below 321 ft; contains bentonitic layer at 322 ft; contains some limonitic layers below 332 ft.....	320.0	350.0

**Test Hole #36-A-56  
(25N-7W-36dddd)  
Antelope County**

Location: SE SE SE SE Sec. 36, T. 25 N., R. 7 W., 5 feet north of southeast corner.

Ground elevation: 1,832 ft.(a). (Neligh SE, 7.5. min. quadrangle)

Depth to water: 10.9 ft. (9-13-56)

	<u>Depth, in feet</u>	
	From	To
<b>Quaternary System, undifferentiated:</b>		
Sand, slightly silty, sand is very fine to medium...	0.0	9.0
Silt, slightly clayey, very sandy, light brownish gray; contains very fine to medium sand.....	9.0	10.0
Sand, very fine to medium with some coarse; contains no coarse sand and less medium sand below 25 ft...	10.0	36.2
Silt, moderately clayey, light yellowish brown with some light gray; more light gray and less yellowish brown from 36.4 to 39.8 ft, light gray below 39.8 ft.....	36.2	45.1
Silt, slightly clayey, slightly sandy, dark olive gray; slightly peaty.....	45.1	45.5
Sand, very fine to medium with some coarse; contains a trace of very coarse sand from 55 to 60 ft; contains no coarse or very coarse sand below 60 ft.....	45.5	68.5
Silt, moderately clayey, light brownish gray; contains some very fine sand; contains some light yellowish brown from 70 to 79 ft; trace of medium gray from 79 to 95 ft; slightly sandy and in part very sandy from 85 to 89.5 ft, contains very fine to medium sand; peaty from 89.5 to 95 ft; light gray below 95 ft.....	68.5	97.5
Sand, quartz with some dark and green silicates, sand is very fine to coarse with some very coarse; contains no coarse or very coarse sand from 97.5 to 100 ft; contains thin silt layers at 98.4 ft and 99.3 ft; slightly coarser below 100 ft.....	97.5	119.5
<b>Tertiary System - Miocene Series - Ogallala Group:</b>		
Silt, moderately clayey, moderately sandy, light gray; contains very fine to medium sand; contains many rootlets below 120 ft.....	119.5	122.8
Sand, very fine to medium.....	122.8	125.0
Silt, slightly clayey, slightly sandy, light gray;		

very sandy with some sandstone and many rootlets from 125 to 125.3 ft; contains a few rootlets below 125.3 ft.....	125.0	130.0
Sand and siltstone, interbedded; very calcareous; sand is very fine to medium; contains many rootlets and some very fine grained sandstone.....	130.0	136.2
Silt, slightly clayey, very sandy, light gray; contains very fine to medium sand; contains white limy areas and nodules.....	136.2	140.0
Sand, very fine to medium with a trace of coarse; contains rootlets and several thin silt and siltstone layers from 140 to 145 ft; finer textured, light brown and slightly consolidated below 155 ft.....	140.0	156.2
Silt, moderately clayey, slightly sandy, light yellowish gray; sand is very fine to medium; moderately sandy below 161 ft; contains thin siltstone layers at 162.3 ft, 163.5 ft and 164.4 ft.....	156.2	165.0
Sandstone, moderately consolidated, light brown; sand is very fine to medium; contains rootlets; contains a thin silt layer at 174 ft.....	165.0	175.0
Sand, light brown, grades from very fine to medium; moderately consolidated in part.....	175.0	178.3
Silt, moderately clayey, moderately sandy, light yellowish gray; sand is very fine to medium; very sandy below 180 ft.....	178.3	183.0
Sandstone, slightly consolidated, light olive gray; sand is very fine to medium; contains rootlets from 183 to 185 ft; contains a thin, light gray siliceous limy layer at about 188.5 ft; unconsol- idated in part from 200 to 205 ft; contains some silt below 205 ft.....	183.0	213.0
Silt, moderately clayey, moderately sandy, light olive gray; sand is very fine to medium with a little very coarse; contains poorly consolidated siltstone and very fine to fine grained sandstone.	213.0	220.0
Sand, very fine to fine with some medium; contains more medium sand and some coarse sand below 230 ft; slightly consolidated in part below 230 ft; contains some coarse silt from 235 to 245 ft; contains rootlets below 240 ft.....	220.0	250.0
Sand, very fine to coarse; contains a trace of light olive gray silt from 250 to 260 ft; contains a trace of very coarse sand from 260 to 270 ft;		

contains more very coarse sand and a trace of fine gravel below 270 ft; contains some rounded clay grains below 270 ft.....	250.0	275.0
Sand, interbedded with light brownish gray siltstone and light olive gray silt; sand grades from very fine to very coarse with a little fine gravel.....	275.0	280.0
Sandy silt and silty sand, interbedded; light olive gray; sand is very fine to medium with a very fine to coarse sandy layer from 289 to 289.5 ft; contains a trace of blocky siltstone below 285 ft.	280.0	290.0
Sand, very fine to medium with a trace of coarse; contains a brownish gray, blocky silt layer at 292.5 ft; slightly consolidated in part and contains no coarse sand below 295 ft, contains a trace of light gray silt.....	290.0	300.0
Sandstone, poorly consolidated, sand is very fine to fine with some medium; contains many rootlets from 300 to 310 ft; contains a few rounded clay grains from 305 to 310 ft; less consolidated below 307.5 ft; contains some light gray silt below 310 ft.....	300.0	317.5
Sand, very fine to fine; contains some light brown, moderately consolidated siltstone below 325 ft....	317.5	328.0
Siltstone, slightly sandy, moderately consolidated, light brown; sand is very fine to fine.....	328.0	330.0
Sandstone, poorly consolidated, sand is very fine to fine; moderately consolidated from 335 to 345 ft; contains very fine to medium sand and a few rounded clay grains from 335 to 340 ft; contains some light gray silt below 345 ft.....	330.0	350.0
Sand, very fine to fine; slightly consolidated in part; contains some very coarse siltstone from 350 to 355 ft; slightly coarser and contains a few rounded clay grains below 355 ft.....	350.0	360.0
Sandstone, moderately consolidated, sand is very fine to medium; contains a trace of light gray silt from 360 to 370 ft; light brownish gray, moderately silty, coarse and granular in part below 370 ft.....	360.0	378.0
Silt, slightly clayey, slightly sandy, light brownish gray; contains granular and blocky silt..	378.0	381.0
Sand, slightly silty, sand is very fine to medium; contains light brown reworked, granular silt; contains silt layer at 394 ft.....	381.0	395.0
Sand, very fine to fine; contains some medium sand		

from 400 to 405 ft; contains more medium sand and some coarse sand below 405 ft; contains some thin poorly consolidated siltstone layers and rootlets from 420 to 425 ft.....	395.0	434.5
Silt, sandy, light brown; sand is very fine to fine sand; contains a trace of shale fragments below 445 ft.....	434.5	451.0
<b>Cretaceous System - Upper Cretaceous Series - Montana Group:</b>		
<b>Pierre Formation:</b>		
Shale, clayey, dark gray.....	451.0	470.0



**Test Hole #25-A-59  
(25N-8W-18bbbb)  
Antelope County**

Location: NW NW NW NW Sec. 18, T. 25 N., R. 8 W., approximately 233 feet south and 8 feet east of the northwest corner.

Ground elevation: 1,992 ft. (t). (Deloit NE, 7.5 min. quadrangle)

Depth to water: Unknown. Test hole caved at 172 ft. (8-79)

	<u>Depth, in feet</u>	
	From	To
<b>Quaternary System, undifferentiated:</b>		
Soil; silt, very sandy, dark yellowish brown.....	0.0	0.5
Sand, silty; sand is very fine to fine; below 4 ft, very fine to medium, some coarse, trace very coarse.....	0.5	6.0
Silt, slightly clayey, slightly sandy, yellowish brown; sand is very fine; below 9 ft, light olive brown.....	6.0	14.0
Silt, slightly clayey, slightly calcareous, light brownish yellow; from 15 to 25 ft, pale yellow; below 25 ft, light yellowish brown.....	14.0	32.0
Silt, clayey, dark grayish brown; from 34 to 34.5 ft, medium dark brown; below 34.5 ft, medium brown.....	32.0	36.0
Silt, moderately clayey, light yellowish brown.....	36.0	38.0
Silt, very sandy, slightly clayey, pale brown; sand is very fine to fine.....	38.0	40.0
Sand, very silty; sand is very fine to fine.....	40.0	47.0
Silt, moderately clayey, slightly sandy, light olive gray; sand is very fine to fine; below 49 ft, very sandy.....	47.0	50.0
Sand, very silty; sand is very fine to fine, trace of medium.....	50.0	53.0
Silt, slightly sandy, slightly clayey, pale yellow; sand is very fine; below 54 ft, moderately clayey.	53.0	56.0
Clay, yellowish brown; below 60 ft, yellowish brown.....	56.0	66.0
Clay, pale yellow, moderately calcareous, some limy zones; below 67 ft, very calcareous; below 71 ft, sandy; sand is very fine to fine.....	66.0	76.0
Sand, gravelly; fine sand to medium gravel; below 95 ft, some coarse gravel.....	76.0	100.0
Sand, gravelly; fine sand to fine gravel; below 105 ft, some coarse gravel.....	100.0	110.0
Sand, gravelly; fine sand to coarse gravel.....	110.0	120.0

Sand, gravelly; fine sand to fine gravel.....	120.0	124.0
Silt, slightly clayey, slightly sandy, light yellow brown; sand is very fine to fine; below 125 ft, no sand.....	124.0	135.0
Sand, very fine to fine, trace of coarse; below 142.8 ft, silt lens.....	135.0	143.0
Sand, very fine to medium, some coarse.....	143.0	145.0
Sand, gravelly; fine sand to coarse gravel.....	145.0	156.0
Silt, slightly sandy, pale olive; sand is very fine.	156.0	163.0
Sand, gravelly; fine sand to fine gravel, some medium gravel.....	163.0	165.0
Sand, gravelly; fine sand to medium gravel.....	165.0	170.0
Sand, very fine to very coarse, some fine gravel....	170.0	173.0
<b>Tertiary System - Miocene Series - Ogallala Group:</b>		
Silt, slightly clayey, pale olive; sand is very fine.....	173.0	174.0
Sand, very fine to fine, some medium; some rootlets.	174.0	200.0
Sand, silty; sand is very fine to fine, some medium, some rootlets; below 205 ft, no silt.....	200.0	210.0
Sand, very fine to medium, some rootlets; below 218 ft, interbedded silts; from 220 to 225 ft, some volcanic ash.....	210.0	235.0
Sand, very fine to fine, some medium; below 242 ft, more medium sand with a trace of coarse.....	235.0	260.0
Sand, very fine to fine, some medium; contains rootlets and silt lenses.....	260.0	270.0
Sand, very fine to medium; contains rootlets and interbedded silt lenses.....	270.0	280.0
Silt, slightly clayey, reddish yellow; contains interbedded silty sand lens.....	280.0	285.0
Sand, very silty; sand is very fine to fine; below 290 ft, sand is very fine to medium.....	285.0	299.0
Silt, very sandy, pale olive; sand is very fine to fine, some medium.....	299.0	300.0
Sandstone, sand is very fine to fine.....	300.0	305.0
Sand, very fine to medium, some coarse, trace very coarse; some interbedded silt.....	305.0	310.0
Sand, very fine to very coarse, trace fine gravel; below 316 ft, sand is very fine to medium, some coarse; some rootlets.....	310.0	320.0
Sand, very fine to fine, some rootlets.....	320.0	325.0
Sand, very fine to fine, some medium, some limy zones and interbedded silt.....	325.0	330.0
Sand, very fine to fine; interbedded limy lenses; below 335 ft, no limy lenses, trace of medium		

sand.....	330.0	340.0
Silt, very sandy, light olive gray; sand is very fine to fine.....	340.0	345.0
Sand, very fine to medium; rootlets and interbedded silts; below 365 ft, silt lenses absent.....	345.0	370.0
Sand, very fine to medium, some coarse; contains rootlets and seedlets.....	370.0	400.0
Sand, very fine to fine, trace of medium; contains rootlets; below 410 ft, more medium sand.....	400.0	425.0
Silt, very sandy, light gray; sand is very fine.....	425.0	430.0
Sand, very fine to fine, contains interbedded silt lenses; below 435 ft, some rootlets; below 445 ft, some medium sand.....	430.0	450.0
Sand, very fine to fine, trace medium; below 460 ft, more medium sand, with some reworked siltstone.....	450.0	495.0
Sand, very fine to fine, some medium; contains rootlets and reworked siltstone.....	495.0	505.0
Sand, very fine to medium; contains rootlets and interbedded siltstone; below 540 ft, trace coarse sand.....	505.0	545.0
Sand, very fine to medium, trace coarse; contains rootlets and reworked siltstone.....	545.0	550.0
Sand, very fine to coarse.....	550.0	555.0
Sand, very fine to medium, trace coarse; contains rootlets and interbedded silt lenses.....	555.0	560.0
<b>Tertiary System - Oligocene Series - White River Group:</b>		
<b>Chadron Formation:</b>		
Sand, very fine to fine; below 565 ft, some medium sand.....	560.0	570.0
Silt to siltstone, light olive gray; below 575 ft, slightly calcareous, much reworked bentonitic clay; below 580 ft, moderately calcareous, medium yellow gray; below 590 ft, some rootlet fragments.	570.0	600.0
Siltstone, reworked, principally quartz and ironstone.....	600.0	609.0
<b>Cretaceous System - Upper Cretaceous Series - Montana Group:</b>		
<b>Pierre Formation:</b>		
Shale, clayey, slightly calcareous to 615 ft, black.	609.0	620.0

**Test Hole #24-A-59  
(25N-8W-30cccc)  
Antelope County**

Location: SW SW SW SW Sec. 30, T. 25 N., R. 8 W., approximately 207 feet east and 7 feet north of the southwest corner.  
 Ground elevation: 1,946 ft. (t). (Deloit, 7.5 min. quadrangle)  
 Depth to water: 42 ft. (estimate 1996)

	<u>Depth, in feet</u>	
	From	To
<b>Quaternary System, undifferentiated:</b>		
Sand, very silty; sand is very fine to medium, trace of coarse.....	0.0	3.5
Silt, very sandy, slightly clayey, dark yellowish brown; sand is very fine to medium, trace coarse..	3.5	6.0
Sand, very fine to medium, trace of coarse.....	6.0	9.0
Silt, very sandy, slightly clayey, medium brown; sand is very fine to medium, trace of coarse.....	9.0	25.0
Silt, slightly clayey, coarse texture, sandy, light olive brown; sand is very fine; below 30 ft, slightly calcareous.....	25.0	39.0
Silt, moderately clayey, coarse textured, sandy, slightly calcareous; sand is very fine; from 50 to 52.5 ft, light brownish gray; below 52.5 ft, olive gray.....	39.0	55.0
Silt, moderately clayey, coarse texture, sandy, brown; sand is very fine; below 67 ft, very sandy, olive gray.....	55.0	70.0
Sand, very fine to fine.....	70.0	72.0
Silt, moderately sandy, slightly clayey, olive; sand is very fine.....	72.0	75.0
Sand, fine to very coarse, little fine gravel, below 80 ft, trace fine gravel.....	75.0	82.0
Silt, moderately clayey, coarse textured, yellowish brown; below 95 ft, contains very fine to coarse sand, contains interbedded silt lenses.....	82.0	103.0
Clay, sandy, very calcareous, light yellowish brown; sand is very fine to coarse; contains interbedded sandy silt lenses.....	103.0	110.0
Silt, very clayey, slightly sandy, light yellowish brown; sand is very fine to coarse; below 116 ft, moderately sandy, olive yellow, sand is very fine to medium.....	110.0	117.0
Gravel, sandy; medium sand to medium gravel.....	117.0	125.0
Sand, very fine to coarse, trace fine gravel.....	125.0	128.0

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

Silt, slightly clayey, sandy, bluish green; sand is very fine to fine; below 131 ft, very sandy.....	128.0	134.0
Sand, very fine to fine; contains rootlets and shells; from 145 to 155 ft, some medium sand.....	134.0	170.0
Silt, very sandy, pinkish gray; sand is very fine to fine.....	170.0	171.0
Sandstone, sand is very fine to fine, some medium; contains interbedded silt lenses and rootlets.....	171.0	175.0
Sand to sandstone; very fine to fine, some medium...	175.0	198.0
Silt, moderately clayey, slightly sandy, light grayish green; sand is very fine to medium.....	198.0	199.0
Sand, very fine to medium, some coarse; contains rootlets; below 205 ft, no coarse sand.....	199.0	215.0
Sand, very fine to medium, trace coarse; below 230 ft, sand is very fine to fine, trace of medium....	215.0	246.0
Silt, very sandy, moderately clayey, pale yellow; sand is very fine to medium.....	246.0	253.0
Sand, very fine to fine, contains rootlets; below 260 ft, some medium sand; below 265 ft, some interbedded silt lenses.....	253.0	270.0
Sand, very fine to medium; below 275 ft, trace coarse.....	270.0	280.0
Sand, very fine to fine; interbedded silt lenses from 280 to 285 ft and below 295 ft.....	280.0	300.0
Sandstone, sand is very fine to fine, some medium...	300.0	310.0
Sand, very silty; sand is very fine to fine, some medium; below 315 ft, sand is very fine to medium, trace of coarse.....	310.0	322.0
Silt, very sandy, light olive gray; sand is very fine to medium, trace coarse.....	322.0	325.0
Sand, very fine to fine, trace of medium and coarse; some rootlets; below 330 ft, very fine to medium, some coarse, some seedlets; below 342 ft, marl....	325.0	343.0
Sand, very silty; sand is very fine to fine, trace of medium.....	343.0	345.0
Sand, very fine to medium, trace coarse to 350 ft; below 365 ft, rootlets; from 365 to 365.2 ft, silty.....	345.0	374.0
Silt, moderately clayey, slightly sandy, light green; sand is very fine to fine.....	374.0	377.0
Sand to sandstone, very fine to fine; from 385 to 390 ft, trace of rootlets; from 390 to 400 ft, interbedded silt lenses.....	377.0	405.0
Sand, very fine to fine, trace medium; below 410 ft,		

interbedded silt and limy lenses; from 415 to 425 ft, contains rootlets.....	405.0	438.0
Silt, very sandy, very pale brown; sand is very fine to fine, trace of medium; below 440 ft, some rootlets.....	438.0	445.0
Sand, very fine to fine; some rootlets; below 450 ft, very fine to medium; below 480, trace of coarse.....	445.0	495.0
Sand, very fine to medium; some reworked siltstone and rootlets; from 497 to 499 ft, silt lenses.....	495.0	500.0
Silt to siltstone, clayey, silty, light grayish green; below 505 ft, some olive gray.....	500.0	522.0
Sandstone, sand is very fine to fine, trace of medium; contains interbedded silt lenses.....	522.0	525.0
Sand to sandstone, very fine to fine, some medium; below 535 ft, no medium sand.....	525.0	540.0
Sand, very fine to medium, some coarse, trace very coarse.....	540.0	550.0
<b>Tertiary System - Oligocene Series - White River Group:</b>		
<b>Chadron Formation:</b>		
Clay, silty to siltstone; contains much reworked bentonite clay, quartz grains, limestone and ironstone fragments.....	550.0	564.0
Siltstone to silt, much reworked bentonitic clay, some ironstone.....	564.0	567.0
<b>Cretaceous System - Upper Cretaceous Series - Montana Group:</b>		
<b>Pierre Formation:</b>		
Shale, clayey, black.....	567.0	580.0

**Test Hole #12-A-57  
(26N-5W-13dddd)  
Antelope County**

Location: SE SE SE SE Sec. 13, T. 26 N., R. 5 W., 11 feet north and 115 feet west of southeast corner.

Ground elevation: 1,730 ft. (t) (Tilden NE, 7.5 min. quadrangle)

Depth to water: Unknown. Test hole caved at 51.0 ft. (7-3-57)

	<u>Depth, in feet</u>	
	From	To
<b>Quaternary System, undifferentiated:</b>		
Soil; slightly silty, moderately sandy, dark gray; contains fine to medium with a trace of coarse sand.....	0.0	1.4
Sand, sand is very fine to medium with a trace of coarse.....	1.4	5.0
Sand and gravel, quartz with green and pink silicates; very fine sand to medium gravel with some very coarse sand to 15 ft; contains 15% gravel from 10 to 15 ft; contains 30% gravel from 15 to 30 ft; contains 40% gravel below 34.2 ft....	5.0	35.0
Silt, slightly clayey, light gray; light brown below 37 ft; slightly consolidated from 40 to 45 ft.....	35.0	55.0
<b>Tertiary System - Miocene Series - Ogallala Group:</b>		
Silt, slightly clayey, moderately sandy, light gray; contains very fine to fine sand, in part slightly consolidated; slightly more clayey and sandy below 63.5 ft.....	55.0	66.5
Sand, very fine to medium with a trace of coarse; slightly consolidated, contains some rootlets; contains no coarse sand below 70 ft.....	66.5	83.0
Sandstone, moderately consolidated, sand is very fine to fine.....	83.0	85.0
Sand, very fine to fine with some medium; slightly consolidated, contains some rootlets; slightly silty below 115 ft.....	85.0	117.5
Silt, slightly clayey, moderately sandy, light gray; contains very fine to fine sand.....	117.5	120.0
Sand, very fine to fine with some medium; slightly consolidated; slightly silty below 140 ft; contains siltstone and claystone grains below 160 ft; slightly coarser below 170 ft.....	120.0	190.0
Sand, very fine to medium with a trace of coarse; contains some sandstone and siltstone grains with some rootlets below 210 ft.....	190.0	220.0

Sand, slightly silty, sand is very fine to fine with a trace of medium; contains more medium sand below 235 ft; slightly clayey below 248 ft.....	220.0	260.0
Silt, slightly clayey, slightly sandy, light gray; contains very fine to fine sand; contains limestone layers at 266.5 and 268.5 ft; contains limy areas below 271.5 ft.....	260.0	275.0
Sandstone, moderately consolidated, light gray; sand is very fine to fine.....	275.0	280.0
Silt, slightly clayey, light gray, mottled light gray to light brownish gray; moderately sandy from 283.7 to 295 ft, contains fine to medium with some coarse sand.....	280.0	295.0
<b>Tertiary System - Oligocene Series - White River Group:</b>		
<b>Chadron Formation:</b>		
Silt, moderately clayey, mottled light gray to light brownish gray; light gray below 305 ft; contains some limy areas.....	295.0	310.0
Silt, moderately clayey, mottled light gray to light brownish gray; light gray below 315 ft.....	310.0	337.5
Silt, slightly clayey, slightly sandy, light gray; sand is very fine to fine; contains sandstone, siltstone, claystone grains from 340 to 341.4 ft; contains some limy areas below 340 ft; moderately sandy below 350 ft.....	337.5	351.2
Clay, moderately sandy, mottled light gray, yellow brown, and dark gray; contains very fine to fine sand.....	351.2	352.2
<b>Cretaceous system - Upper Cretaceous Series - Montana Group:</b>		
<b>Pierre Formation:</b>		
Shale, clayey, dark gray with some light gray and yellowish brown; contains limy areas from 352.2 to 360 ft; dark gray below 360 ft; contains pyrite nodules from 355 to 360 ft; contains some bentonite from 355 to 365 ft.....	352.2	380.0



**Test Hole #17-A-57  
(26N-7W-24aaaa)  
Antelope County**

Location: NE NE NE NE Sec. 24, T. 26 N., R. 7 W., 221 feet south and 9 feet west of northeast corner.

Ground elevation: 1,921 ft. (t). (Neligh, 7.5 min. quadrangle)

Depth to water: Unknown. Test hole caved at 9.0 ft. (7-15-57)

Depth, in feet  
From To

**Quaternary System, undifferentiated:**

Soil; slightly silty, moderately sandy, brownish gray; contains very fine to medium with some coarse sand.....	0.0	5.5
Silt, moderately clayey, medium brownish gray; slightly clayey, moderately sandy below 6.3 ft, contains very fine to coarse with some very coarse sand.....	5.5	7.0
Sand, slightly silty, sand is very fine to coarse with some very coarse; contains no very coarse below 10 ft.....	7.0	11.5
Silt, moderately clayey, medium to dark brown; moderately calcareous from 17 to 25 ft; slightly calcareous below 25 ft; light brown from 17 to 25 ft, contains some yellow gray from 20 to 21 ft; medium yellowish brownish gray from 25 to 35 ft; slightly more clayey from 33 to 35 ft; brownish gray to yellow gray from 35 to 42 ft; yellowish gray from 42 to 49 ft; light gray below 49 ft.....	11.5	50.0
Silt, slightly clayey, medium brown; contains some limonitic layers to 51 ft; brownish yellow below 51 ft.....	50.0	52.0
Silt, moderately clayey, slightly sandy, light brownish gray; contains very fine to fine sand; light gray from 54 to 60 ft; slightly calcareous from 60 to 67 ft; moderately calcareous below 67 ft.....	52.0	74.0
Sand, slightly silty; sand is very fine to fine; contains coarse with some very coarse sand from 75 to 80 ft; contains fine to medium with some coarse sand from 80 to ft; contains no medium sand below 90 ft.....	74.0	95.0
Sand and gravel, very fine sand to medium gravel; contains 5% gravel from 95 to 100 ft and from 105 to 110 ft; contains 70% gravel from 100 to 105 ft;		

contains 25% gravel from 110 to 115 ft; contains 60% gravel from 115 to 130 ft; trace of coarse gravel from 115 to 120 ft; contains 35% gravel below 130 ft.....	95.0	134.5
Silt, slightly clayey, moderately sandy; contains very fine to medium sand.....	134.5	134.8
Sand and gravel, very fine sand to medium gravel; contains 35% gravel from 134.8 to 135.0 ft; contains 70% gravel below 135 ft.....	134.8	150.0
Silt, slightly clayey, light yellow gray; moderately clayey, light gray below 151.5 ft; slightly calcareous, moderately sandy below 155 ft, contains very fine to fine sand.....	150.0	160.0
Silt, slightly clayey, moderately sandy, slightly calcareous, light gray; contains very fine to fine sand; noncalcareous from 162 to 165 ft; contains some limy grains from 162 to 164 ft; contains some limy areas below 165 ft.....	160.0	174.0
Silt, slightly clayey, moderately sandy, slightly calcareous, light yellow gray; contains very fine with a trace of medium sand; noncalcareous, light brown from 175 to 176 ft; moderately calcareous, light gray below 176 ft, contains some limy areas.	174.0	177.0
Sand and gravel, very fine sand to medium gravel; contains 30% gravel.....	177.0	180.0
Sand, slightly silty, sand is very fine to very coarse.....	180.0	181.0
<b>Tertiary System - Miocene Series - Ogallala Group:</b>		
Silt, slightly clayey, light gray.....	181.0	185.0
Sand, slightly silty; sand is very fine to fine; contains silt layer from 189 to 190 ft, slightly clayey, moderately sandy.....	185.0	190.0
Sand, slightly silty, sand is very fine to fine; contains some medium sand below 191 ft; slightly consolidated below 195 ft; contains some silt layers from 207 to 209 ft.....	190.0	211.7
Silt, slightly clayey, moderately sandy, light gray; contains very fine to fine sand.....	211.7	215.0
Sand, very fine to fine with some medium; slightly consolidated; contains some silt layers from 215 to 220 ft.....	215.0	223.0
Silt, slightly clayey, moderately sandy, light gray; contains very fine to fine sand.....	223.0	226.8
Sand, very fine to fine; slightly consolidated, contains some silt layers.....	226.8	249.0

Silt, slightly clayey, moderately sandy, light gray; contains very fine to fine sand.....	249.0	250.0
Sand, very fine to fine with some medium; slightly consolidated, contains some rootlets; slightly silty from 265 to 270 ft, contains no medium sand; contains some medium sand below 285 ft.....	250.0	286.5
Silt, slightly clayey, slightly sandy, light olive gray; contains very fine sand; contains some limy grains below 290 ft.....	286.5	292.0
Silt, moderately clayey, moderately sandy, slightly calcareous, light olive gray; contains very fine to fine sand; contains some limy areas, contains some limestone grains; noncalcareous from 300 to 305 ft.....	292.0	310.0
Sand, slightly clayey, slightly silty, sand is very fine to fine with some medium; contains some limy grains.....	310.0	320.0
Sand, very fine to medium; slightly consolidated, contains some rootlets; contains some coarse sand below 330 ft; slightly silty below 340 ft; contains a bentonitic layer about 342 ft.....	320.0	345.0
Silt, slightly clayey, slightly sandy, slightly calcareous, light gray; contains very fine to fine sand; contains some limy grains.....	345.0	347.0
Siltstone, moderately clayey, slightly sandy, light gray; sand is very fine below 360 ft; slightly calcareous below 363 ft; some limestone fragments below 370 ft, moderately calcareous, contains much reworked shale.....	347.0	377.0
<b>Cretaceous System - Upper Cretaceous Series - Montana Group:</b>		
<b>Pierre Formation:</b>		
Shale, clayey, slightly calcareous, brownish yellow, with some light gray; some limy areas; noncalcareous from 380 to 385 ft; light brownish yellow with some dark gray from 390 to 395 ft; light yellowish gray below 395 ft; some bentonite and ferruginous material from 395 to 400 ft; mottled black and olive gray below 400 ft.....	377.0	405.0
Shale, clayey, moderately calcareous, dark gray; slightly calcareous from 405 to 410 ft.....	405.0	420.0

**Test Hole #27-A-59  
(26N-8W-18cbbb)  
Antelope County**

Location: NW NW NW SW Sec. 18, T. 26 N., R. 8 W., approximately  
2,538 feet north and 25 feet east of the southwest corner.  
Ground elevation: 1,827 ft. (t). (Deloit NE, 7.5 min. quadrangle)  
Depth to water: Unknown. Test hole caved at 2.40 ft. (8-24-59)

	Depth, in feet	
	From	To
<b>Quaternary System, undifferentiated:</b>		
Topsoil; silt, very sandy, slightly clayey, very dark gray; sand is very fine to medium.....	0.0	0.5
Sand, very fine to medium, trace of coarse; from 6.7 to 7 ft, silt zone.....	0.5	10.0
Sand, very fine to medium, trace coarse.....	10.0	20.0
Sand, fine to very coarse; from 20 to 25 ft, some silt lenses.....	20.0	30.0
Sand, gravelly; fine sand to fine gravel.....	30.0	40.0
Sand and gravel, very fine sand to medium gravel....	40.0	49.0
<b>Tertiary System - Miocene Series - Ogallala Group:</b>		
Silt, very sandy, slightly clayey, light olive gray; sand is very fine to medium, below 58 ft, light gray.....	49.0	60.0
Sandstone, slightly silty; sand is very fine to fine; contains some rootlets.....	60.0	65.0
Sand, very fine to fine; contains rootlets; below 70 ft, very fine to medium.....	65.0	75.0
Silt to siltstone, clayey, light olive gray; below 80 ft, sandy; sand is very fine to fine.....	75.0	83.0
Sandstone, slightly silty; sand is very fine to fine, trace of medium.....	83.0	94.0
Silt to siltstone, sandy, light olive gray; sand is very fine to fine; below 98 ft, marly zones.....	94.0	100.0
Sand, very fine to medium; contains rootlets; from 105 to 110 ft, slightly silty, sand is very fine to fine.....	100.0	115.0
Sandstone to sand, sand is very fine to medium.....	115.0	125.0
Sand, slightly silty; sand is very fine to fine.....	125.0	127.0
Silt, very sandy, slightly clayey, light olive gray; sand is very fine to fine.....	127.0	134.0
Sand, slightly silty; sand is very fine to fine; below 135 ft, some marly lenses.....	134.0	140.0
Sandstone, slightly silty; sand is very fine to medium; contains limy zones; below 155 ft,		

rootlets and reworked siltstone.....	140.0	160.0
Sand, very fine to medium; contains rootlets and reworked siltstone and claystone.....	160.0	171.0
Silt, very sandy, slightly clayey, light olive gray; below 175 ft, moderately clayey.....	171.0	180.0
Sand, very silty; sand is very fine to medium, trace of coarse.....	180.0	186.0
Sand, fine to very coarse; below 195 ft, sand is very fine to medium, some coarse; below 200 ft, some siltstone lenses and rootlets.....	186.0	205.0
Sand, very fine to medium; contains reworked siltstone and claystone.....	205.0	245.0
Sand, very fine to fine, some medium.....	245.0	250.0
Sandstone, silty; sand is very fine to fine, little medium.....	250.0	253.0
Silt, moderately sandy, slightly clayey, light olive gray; sand is very fine to fine; from 260 to 264 ft, some pinkish gray; below 264 ft, some interbedded sandstone lenses; below 265 ft, some siltstone.....	253.0	267.0
Sandstone; very fine to fine, some medium; below 270 ft, sand is very fine to fine; below 280 ft, some rootlets.....	267.0	285.0
Silt, moderately sandy, moderately clayey, pale yellow; sand is very fine to medium; from 290 to 293 ft, interbedded sandstone lenses.....	285.0	293.0
Silt, moderately clayey, moderately sandy, pale yellow; sand is very fine to fine.....	293.0	296.0
Sandstone, moderately silty; sand is very fine to fine, at 296 ft, silt lens.....	296.0	304.0
<b>Tertiary System - Oligocene Series - Arikaree Group:</b>		
<b>Rosebud Formation:</b>		
Silt, slightly clayey, medium yellow gray, some very fine sand; at 305 ft, limestone lens.....	304.0	312.0
Silt, moderately clayey, slightly sandy, slightly calcareous, light pinkish gray; sand is very fine.	312.0	315.0
Silt, moderately clayey, slightly sandy, slightly calcareous, pinkish gray; sand is very fine; below 325 ft, some limestone lenses and some light yellowish gray .....	315.0	330.0
<b>Tertiary System - Oligocene Series - White River Group:</b>		
<b>Chadron Formation:</b>		
Sand, silty; sand is very fine to medium.....	330.0	332.0
Silt, slightly clayey, slightly sandy; sand is very fine to fine.....	332.0	334.0

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

**Pierre Formation:**

Shale, clayey, moderately calcareous, light brownish yellow; below 335 ft, mottled light brownish gray to light brownish yellow.....	334.0	344.0
Shale, clayey, moderately calcareous, very dark gray.....	344.0	350.0

**Test Hole #26-A-59  
(26N-8W-30cccc)  
Antelope County**

Location: SW SW SW SW Sec. 30, T. 26 N., R. 8 W., approximately 15 feet east and 24 feet north of the southwest corner.  
 Ground elevation: 1,868 ft. (t). (Deloit NE, 7.5 min. quadrangle)  
 Depth to water: Unknown. Estimated at 22 ft.

	<u>Depth, in feet</u>	
	From	To
<b>Quaternary System, undifferentiated:</b>		
Topsoil; silt, very sandy, dark brownish gray; sand is very fine to medium.....	0.0	0.5
Sand, very fine to medium, little medium to coarse..	0.5	3.0
Silt, very sandy, slightly clayey, dark brownish gray; sand is very fine to medium.....	3.0	3.5
Silt, very sandy, slightly clayey, light medium gray; sand is very fine to fine; below 5 ft, light medium olive gray.....	3.5	6.0
Sand, very fine to coarse; below 10 ft, very fine to fine, some medium.....	6.0	20.0
Sand, very fine to medium, trace coarse; below 25 ft, very fine to fine with medium; below 30 ft, moderately silty, from 40 to 50 ft, interbedded silty clay layers, dark gray.....	20.0	45.0
Sand, moderately silty; sand is very fine to fine, some medium; below 65 ft, interbedded silty clayey layer, some coarse sand.....	45.0	70.0
Sand, fine to very coarse.....	70.0	73.0
<b>Tertiary System - Miocene Series - Ogallala Group:</b>		
Silt to siltstone, sandy, medium dark gray; sand is very fine to fine; contains interbedded sandstone.	73.0	80.0
Silt, moderately sandy, slightly clayey, light medium gray; sand is very fine to fine; below 83 ft, very light yellow gray.....	80.0	87.0
Silt, very sandy, slightly clayey, light medium gray; sand is very fine to fine; below 90 ft, light gray.....	87.0	94.0
Sandstone, very silty; sand is very fine to fine; below 95 ft, moderately silty.....	94.0	100.0
Sandstone, sand is very fine to fine, contains rootlets below 110 ft, sand is very fine to medium; below 127 ft, interbedded silt lenses.....	100.0	130.0
Sandstone, sand is very fine to fine; contains interbedded silty sand and rootlets; below 145		

ft, some volcanic ash.....	130.0	150.0
Silt to siltstone, light olive gray.....	150.0	155.0
Siltstone to sandstone, sand is very fine to fine, contains rootlets.....	155.0	158.0
Silt, very sandy, slightly clayey, pale yellow; sand is very fine to fine; contains interbedded siltstone and sandstone lenses.....	158.0	160.0
Sand to sandstone, sand is very fine to fine; contains rootlets.....	160.0	170.0
Silt, very sandy, slightly clayey, light olive gray; sand is very fine to fine, trace medium; contains interbedded silty sandstone lenses and rootlets...	170.0	180.0
Sandstone, sand is very fine to fine; contains interbedded marl, silt lenses, and rootlets; below 194.5 ft, silty.....	180.0	195.0
Sandstone, sand is very fine to fine; contains rootlets.....	195.0	198.0
Silt to siltstone, moderately clayey, contains interbedded sandstone lenses.....	198.0	200.0
Sandstone, sand is very fine to fine; contains rootlets and marl lenses.....	200.0	204.0
Silt, marly, moderately clayey, light olive gray; sand is very fine to fine, trace of medium.....	204.0	205.0
Silt, very sandy, moderately clayey, light olive gray.....	205.0	220.0
Sand, slightly clayey; sand is fine to coarse, trace very coarse; below 235 ft, very fine to medium....	220.0	240.0
Sand, fine to coarse; below 245 ft, very fine to medium, trace of coarse; below 254.5 ft, silty....	240.0	255.0
Sand, very fine to fine, trace medium.....	255.0	265.0
Sandstone, moderately silty; sand is very fine to fine; from 273.2 to 273.8 ft and from 274.2 to 274.4 ft, silty .....	265.0	280.0
Sand, very fine to medium, trace rootlets; from 281.5 to 282.1 ft, silty.....	280.0	288.0
Silt to siltstone, mottled light olive gray to gray.	288.0	290.0
Sandstone, sand is very fine to fine; from 293 to 293.1 ft, silt lens; contains rootlets.....	290.0	295.0
Sand, fine to very coarse, principally reworked siltstone and shale.....	295.0	299.0
Gravel, fine to medium; principally reworked siltstone and claystone.....	299.0	305.0
Sand very fine to medium, principally reworked siltstone and claystone.....	305.0	320.0
Sand, very fine to medium, trace of coarse; below		



325 ft, fine to very coarse, trace very fine gravel; principally reworked siltstone and claystone.....	320.0	339.0
Silt, moderately clayey, light gray with brownish tint.....	339.0	340.0
<b>Tertiary System - Oligocene Series - Arikaree Group:</b>		
<b>Rosebud Formation:</b>		
Siltstone, pale yellow and light gray; below 342 ft, some limestone lenses.....	340.0	349.0
Siltstone, mottled olive gray to pinkish gray; contains very fine sand; below 352.5 ft, light pinkish gray.....	349.0	360.0
Silt to silty sandstone, light medium gray; sand is very fine.....	360.0	368.0
Siltstone, sandy; light yellow gray; sand is very fine; below 370 ft, light olive gray.....	368.0	371.0
<b>Cretaceous System - Upper Cretaceous Series - Montana Group:</b>		
<b>Pierre Formation:</b>		
Shale, clayey, moderately calcareous, yellowish brown, some light gray.....	371.0	383.0
Shale, clayey, slightly calcareous in part moderately calcareous, dark gray.....	383.0	391.0

**Test Hole #9-A-57  
(27N-5W-1aaaa)  
Antelope County**

Location: NE NE NE NE Sec. 1, T. 27 N., R. 5 W., 104 feet south and  
23 feet west of northeast corner.  
Ground elevation: 1,723 ft. (t). (Plainview, 7.5 min. quadrangle)  
Depth to water: 5.0 ft. (6-19-57)

	<u>Depth, in feet</u>	
	From	To
<b>Quaternary System, undifferentiated:</b>		
Sand, slightly silty; sand is fine to coarse with a trace of very coarse.....	0.0	7.0
Silt, moderately clayey, light gray; slightly clayey, light brown below 7.3 ft.....	7.0	10.0
Sand, slightly silty; sand is fine to coarse with a trace of fine gravel.....	10.0	12.0
Silt, slightly clayey, light brown; contains fine to coarse with a trace of very coarse sand below 15 ft.....	12.0	17.0
Sand, fine to coarse; contains some very coarse sand and a trace of fine gravel.....	17.0	24.0
Sand and gravel, fine sand to medium gravel; contains 30% gravel.....	24.0	34.3
<b>Tertiary System - Miocene Series - Ogallala Group:</b>		
Siltstone, poorly consolidated, slightly clayey, slightly sandy, light olive; contains fine sand...	34.3	35.5
Silt, moderately clayey, slightly sandy, light gray; contains fine to medium with a trace of coarse sand; slightly less clayey, slightly more sandy below 40 ft.....	35.5	45.0
Sandstone, poorly consolidated, silty; fine to medium sand; slightly less silty below 50 ft; slightly more sandy from 53.5 to 55.0 ft; contains some rootlets from 50 to 55 ft; contains no medium sand from 55 to 65 ft; slightly coarser below 65 ft.....	45.0	70.0
Sandstone to siltstone, moderately consolidated; contains very fine to fine sand.....	70.0	80.0
Sandstone, moderately consolidated; sand is very fine to fine with a trace of medium sand; contains some rootlets below 90 ft.....	80.0	96.0
Silt, slightly clayey, light gray; contains very fine to fine sand.....	96.0	102.0
Sandstone, moderately consolidated; very fine to		

fine sand.....	102.0	104.5
Silt, very clayey, slightly sandy; sand is very fine to fine; moderately clayey below 110 ft, contains some limy nodules.....	104.5	118.0
Sandstone, moderately consolidated, very fine to fine sand.....	118.0	120.0
Silt, slightly clayey, slightly sandy, light gray; very fine to fine sand, some consolidated limy areas.....	120.0	125.0
Sandstone, moderately consolidated, silty; very fine to fine sand, some silty layers; no silt below 130 ft; medium sand below 130 ft; a trace of coarse sand below 135 ft.....	125.0	145.0
Sand, very fine to medium; trace of coarse below 160 ft.....	145.0	186.0
Silt, moderately clayey, moderately sandy, light gray; very fine to fine sand.....	186.0	195.0
Sandstone, poorly consolidated, very fine grained; contains coarse to very coarse sand, slightly consolidated, below 205 ft.....	195.0	211.0
<b>Tertiary System - Oligocene Series - White River Group:</b>		
<b>Chadron Formation:</b>		
Silt, moderately clayey, light gray, contains a trace of limy nodules; contains limy nodular layer from 219 ft to 219.2 ft; slightly less clayey below 220 ft, contains granular structure.....	211.0	220.5
Silt, moderately clayey, light olive gray; light brown from 226 ft to 235 ft; light gray below 235 ft; light brown and light brownish gray from 242 ft to 245 ft; some consolidated limy areas below 250 ft.....	220.5	255.0
Silt, slightly clayey, light gray to light brown; very clayey below 255.5 ft; light brown from 255.5 ft to 263 ft, contains limy pebbles below 255.5 ft; slightly sandy below 260 ft, contains fine to medium sand.....	255.0	263.0
Silt, slightly clayey, light gray to dark gray; limy green grains below 263.8 ft.....	263.0	264.5
<b>Cretaceous system - Upper Cretaceous Series - Montana Group:</b>		
<b>Pierre Formation:</b>		
Shale, clayey, light gray with brownish yellow, slightly calcareous; trace of bentonite below 270 ft.....	264.5	274.8
Shale, clayey, slightly calcareous, mottled medium to dark gray to yellow gray; dark gray below 277		

ft; chalky below 280 ft.....	274.8	281.0
Shale, clayey, slightly calcareous, dark gray; chalky from 281.5 ft to 285 ft, contains a bentonitic layer at 287.5 ft.....	281.0	300.0

**Test Hole #11-A-57  
(27N-5W-36dddd)  
Antelope County**

Location: SE SE SE SE Sec. 36, T. 27 N., R. 5 W., 57 feet north and 27 feet west of southeast corner.

Ground elevation: 1,750 ft. (t). (Plainview, 7.5 min. quadrangle)

Depth to water: 17.0 ft. (6-28-57)

	<u>Depth, in feet</u>	
	From	To
<b>Quaternary System, undifferentiated:</b>		
Soil; silty, sandy, dark gray; very fine to medium sand.....	0.0	3.5
Sand, silty; sand is very fine to medium with some coarse.....	3.5	4.2
Silt, sandy, brownish yellow; contains very fine to medium with a trace of coarse sand.....	4.2	4.6
Sand, fine to coarse with some very coarse; moderately silty below 5 ft; very fine to fine with a trace of medium sand from 5 to 6.5 ft; fine to medium sand below 6.5 ft.....	4.6	10.0
Silt, moderately clayey, sandy, medium brown; sand is very fine to fine with a trace of medium.....	10.0	12.5
Sand, slightly silty; sand is fine to medium.....	12.5	14.5
Silt, slightly clayey, medium brown; moderately clayey from 15 to 19.5 ft and below 22 ft; slightly calcareous below 17 ft; mottled medium gray to brownish yellow from 20 to 22 ft; brownish yellow to brown from 22 to 23.5 ft.....	14.5	23.5
Silt, slightly clayey, slightly calcareous, medium brown; mottled light gray to medium brown from 25 to 26 ft; light gray below 26 ft; moderately clayey below 27.5 ft.....	23.5	30.2
Sand, fine to coarse; contains very coarse sand below 45 ft.....	30.2	46.8
Silt, moderately clayey, sandy, medium gray; sand is fine to coarse; contains a trace of very coarse sand from 47.5 to 48.5 ft; contains no coarse sand below 48.9 ft.....	46.8	50.0
Silt, moderately clayey, medium brown; light brown below 53.3 ft.....	50.0	55.3
Sand and gravel, fine sand to medium gravel; contains 5% gravel to 60 ft; contains 40% gravel from 60 to 65 ft; contains 10% gravel below 65 ft, contains some very coarse sand.....	55.3	70.0

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

Sand, very fine to fine with some medium and a trace of fine gravel.....	70.0	75.8
Siltstone, poorly consolidated, greenish gray; contains very fine to fine sand.....	75.8	81.0
Sand, very fine to medium; contains some partially consolidated sandstone from 90 to 95 ft.....	81.0	100.0
Sand, very fine to fine with a trace of medium; contains some rootlets and partially consolidated sandstone and siltstone; slightly coarser below 135 ft.....	100.0	143.5
Sandstone, moderately consolidated, sand is very fine to fine with some medium; contains some rootlets.....	143.5	145.0
Silt, slightly clayey, moderately sandy, medium gray; contains very fine to fine sand.....	145.0	147.8
Sand, very fine to medium; contains a trace of coarse sand from 150 to 155 ft; contains silt layers below 155 ft.....	147.8	156.8
Siltstone, poorly consolidated, slightly sandy, light gray; sand is very fine to medium; some limy areas; contains no medium sand below 165 ft; moderately clayey below 170 ft.....	156.8	175.0
Silt, slightly clayey, slightly sandy, light gray; contains very fine to fine sand; some limy areas; moderately clayey, moderately sandy below 177 ft..	175.0	185.0
Sand, very fine to medium; contains some silt layers.....	185.0	210.0
Sand, very fine to fine with a trace of medium; contains some silt layers, reworked sandstone.....	210.0	235.0
Silt, slightly clayey, moderately calcareous, moderately sandy, light gray; sand is very fine to fine; contains sand layers from 238 to 239 ft and below 240 ft.....	235.0	241.8
Siltstone, poorly consolidated, moderately sandy, light gray; sand is very fine to fine; some limy grains and reworked sandstone.....	241.8	245.0
Sand, very fine to fine with some medium; contains limy grains and silty areas; contains a silt layer from 249 to 250 ft; below 250 ft, slightly clayey, moderately calcareous, moderately sandy.....	245.0	253.0
Silt, slightly clayey, moderately calcareous, slightly sandy, light gray; sand is very fine to fine; slightly more clayey from 254 to 255 ft; in part slightly consolidated below 255 ft.....	253.0	257.5

Silt, slightly clayey, moderately calcareous, medium gray.....	257.5	260.0
Siltstone, poorly consolidated, slightly sandy, slightly clayey, medium gray; contains very fine to fine sand with some limy areas; moderately calcareous from 260 to 260.4 ft; contains a silt layer from 263.3 to 265 ft; slightly clayey, moderately sandy, slightly more consolidated below 267.5 ft.....	260.0	270.0
Silt, slightly consolidated, slightly clayey, slightly sandy, light gray; sand is very fine to fine, slightly more consolidated below 272 ft.....	270.0	274.0
Silt, slightly clayey, slightly sandy, medium gray; contains very fine to fine sand; some consolidation from 275 to 279 ft; contains a siltstone layer below 279 ft.....	274.0	280.0
Sand, very silty, sand is very fine to fine; contains a silt layer from 284.8 to 285 ft, slightly clayey, moderately sandy.....	280.0	285.0
Sand, slightly silty, sand is very fine to fine; contains some sandstone, siltstone, and claystone.	285.0	295.0
Sand, very silty, sand is very fine to medium; contains some limy grains; slightly silty from 297 to 305 ft.....	295.0	311.0
<b>Tertiary System - Oligocene Series - White River Group:</b>		
<b>Chadron Formation:</b>		
Silt, very clayey, light gray; contains limy areas below 315 ft; light brown from 320 to 325 ft; contains claystone layers at 321.8 and 323.7 ft; contains some reworked silt and limestone below 345 ft.....	311.0	355.0
<b>Cretaceous System - Upper Cretaceous Series - Montana Group:</b>		
<b>Pierre Formation:</b>		
Shale, clayey, mottled light gray to light yellowish gray.....	355.0	360.2
Shale, clayey, slightly calcareous; mottled light yellow to dark gray from 360.2 to 365 ft; dark gray below 365 ft; slightly calcareous below 375 ft.....	360.2	380.0

**Test Hole #19-A-57  
(27N-6W-19bbbb)  
Antelope County**

Location: NW NW NW NW Sec. 19, T. 27 N., R. 6 W. 49 feet south  
and 10 feet east of northwest corner.  
Ground elevation: 1,896 ft. (t). (Royal, 7.5 min. quadrangle)  
Depth to water: Unknown. Test hole caved at 69.0 ft. (7-15-57)

	Depth, in feet	
	From	To
<b>Quaternary System, undifferentiated:</b>		
Road fill.....	0.0	1.0
Sand, very silty; sand is fine to coarse; contains a trace of very coarse sand below 4 ft.....	1.0	6.5
Silt, moderately clayey, very sandy, brownish gray; contains fine to coarse sand; contains sand layer from 7.3 to 8 ft; slightly clayey, moderately sandy, yellow brown with brown tint below 8 ft....	6.5	8.2
Sand, silty; sand is very fine to coarse; contains a silt layer from 12 to 13 ft and from 14 to 15.5 ft.....	8.2	16.0
Silt, moderately clayey, yellow gray; very sandy from 17.2 to 20 ft, contains very fine sand; slightly clayey below 20 ft; slightly calcareous below 25 ft; yellow gray with a little light gray from 40 to 45 ft; contains some limonitic nodules and rootlets below 47 ft.....	16.0	48.0
Sand, fine to coarse with some very coarse.....	48.0	50.5
Limestone, white.....	50.5	51.0
Silt, slightly clayey, light brown; moderately clayey, slightly sandy below 52.5 ft, sand is very fine to medium.....	51.0	55.0
Silt, slightly clayey, slightly sandy, light brown; contains fine to coarse sand; contains some rare sand grains below 60 ft.....	55.0	63.0
Clay, silty, sandy to gravelly, light brown; contains very fine sand to very fine gravel.....	63.0	67.0
Sand and gravel, fine sand to fine gravel; contains 30% gravel.....	67.0	130.0
Silt, slightly clayey, moderately sandy; contains very fine to fine with a trace of medium sand; contains no medium sand below 135 ft.....	130.0	143.0
Silt, moderately clayey; contains some very fine sand, moderately sandy from 147.5 to 150 ft; very sandy below 150 ft, contains very fine to medium		



sand.....	143.0	152.0
Sand, very silty, slightly clayey; sand is very fine to medium with a trace of coarse; slightly coarser below 156.8 ft.....	152.0	160.0
<b>Tertiary System - Miocene Series - Ogallala Group:</b>		
Siltstone to sandstone, moderately consolidated; contains very fine to fine with some medium sand..	160.0	165.0
Silt, slightly clayey, moderately sandy, light olive gray; sand is very fine to fine with some medium; very sandy below 170 ft, slightly consolidated....	165.0	176.0
Sandstone, moderately silty, moderately consolidated; sand is very fine to fine with some medium..	176.0	180.0
Sand, very fine to fine with some medium; slightly consolidated; very silty below 185.5 ft.....	180.0	186.5
Sandstone, moderately silty, well consolidated; sand is very fine to fine.....	186.5	192.0
Silt, moderately sandy, light olive gray; contains very fine to medium sand; contains some interbedded sand from 195 to 200 ft; moderately clayey below 200 ft.....	192.0	205.0
Sand, very fine to medium; slightly consolidated; very silty below 208 ft.....	205.0	210.0
Sandstone, moderately silty, moderately consolidated; sand is very fine to medium; contains some interbedded silt below 220 ft.....	210.0	222.0
Silt, moderately clayey, light gray, slightly consolidated.....	222.0	225.5
Silt, moderately clayey, sandy, light gray; contains very fine to fine sand; slightly clayey, slightly consolidated below 229 ft; contains very fine to medium sand from 229 to 235 ft; slightly less sandy from 245 to 255 ft; very clayey from 251.5 to 255 ft; very sandy below 255 ft.....	225.5	256.0
Silty sand to sandy silt, slightly consolidated; contains very fine to fine sand; slightly sandy below 262 ft.....	256.0	265.5
Silt, moderately clayey, slightly sandy, marly; sand is very fine to medium.....	265.5	266.0
Siltstone, well consolidated, moderately calcareous; slightly calcareous below 268 ft, contains very fine sand.....	266.0	270.0
Sand, very fine to medium; contains a trace of coarse to very coarse sand with a few rounded clay and sandstone grains from 275 to 280 ft; contains a trace of calcareous material below 280 ft.....	270.0	283.0

Silt, slightly clayey, very sandy, slightly calcareous, slightly consolidated, light gray; contains very fine to medium sand.....	283.0	285.0
Siltstone to sandstone, moderately consolidated; contains very fine to medium sand; in part marly; slightly less consolidated below 290 ft.....	285.0	294.0
Sand, very silty; sand is very fine to medium; moderately silty from 295 to 300 ft; contains a thin clay layer from 295.5 to 296 ft; slightly silty below 300 ft; contains some rounded silty clay grains below 330 ft.....	294.0	335.0
Sand, moderately silty; sand is very fine to medium; contains a trace of clay grains; slightly silty below 345 ft; slightly finer texture below 347 ft.	335.0	349.5
Sand, very fine to fine with some medium.....	349.5	352.0
Silt, very clayey, moderately sandy, light olive gray; contains very fine to fine with some medium sand; moderately clayey below 355 ft; partially consolidated below 358.5 ft.....	352.0	360.0
Silt, slightly clayey, very sandy, light olive gray; contains very fine to fine with some medium sand; partially consolidated below 363 ft, contains no medium sand.....	360.0	365.0
Sandstone, moderately consolidated, very silty; sand is very fine to fine.....	365.0	374.0
Silt, coarse texture, light olive gray; contains very fine to fine sand; contains siltstone layer from 375 to 376 ft; moderately clayey from 376 to 381 ft; very sandy below 381 ft.....	374.0	383.5
Sand, very fine to fine; contains some medium sand below 385 ft; contains some reworked clay grains below 395 ft; contains a thin silt layer at 399.2 ft; contains some coarse sand below 399.2 ft.....	383.5	400.3
<b>Tertiary System - Oligocene Series - Arikaree Group:</b>		
<b>Rosebud Formation:</b>		
Silt, slightly clayey, moderately sandy, light brownish gray; contains very fine to fine sand; moderately clayey from 403 to 405 ft, contains no fine sand; light brown below 405 ft, in part very sandy and consolidated.....	400.3	407.0
Silt, moderately clayey, slightly sandy, light olive gray; contains very fine to fine sand; very clayey from 411.5 to 412 ft, contains a trace of sand; moderately sandy below 412 ft.....	407.0	413.5
<b>Tertiary System - Oligocene Series - White River Group:</b>		

**Chadron Formation:**

Clay, silty, light olive gray; contains a trace of very fine sand; slightly sandy, less clayey below 415 ft.....	413.5	420.0
Silt, very clayey, moderately sandy, light olive gray; contains very fine to fine sand; slightly more sandy from 430 to 433.5 ft, contains medium sand; slightly calcareous below 440 ft, contains a few limy nodules and a trace of reworked shale....	420.0	443.0
Silt, very clayey, slightly sandy, moderately calcareous, light gray; contains very fine to fine sand; slightly calcareous, moderately clayey below 445 ft; light grayish brown from 445 to 448 ft; contains a few limy nodules and reworked shale below 445 ft, contains medium sand with a trace of coarse.....	443.0	450.0

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

**Pierre Formation:**

Shale, clayey, moderately calcareous, yellow gray with some light gray.....	450.0	460.0
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**Test Hole #18-A-57  
(27N-7W-36dddd)  
Antelope County**

Location: SE SE SE SE Sec. 36, T. 27 N., R. 7 W., 309 feet north and 10 feet west of southeast corner.

Ground elevation: 1,923 ft. (t). (Royal, 7.5 min. quadrangle)

Depth to water: Unknown. Test hole caved at 88.0 ft. (7-15-57)

	<u>Depth, in feet</u>	
	From	To
<b>Quaternary System, undifferentiated:</b>		
Soil; slightly silty, moderately sandy, dark gray; contains very fine to fine with some medium sand..	0.0	2.0
Silt, slightly clayey, moderately sandy, medium brown; contains very fine to fine sand.....	2.0	5.0
Sand, slightly silty; sand is very fine to medium with some coarse.....	5.0	6.5
Silt, slightly clayey, moderately sandy, medium brown; contains very fine to fine sand; slightly less sandy below 9.5 ft.....	6.5	10.0
Silt, slightly clayey, light yellow gray; contains some light gray from 11.8 to 12.5 ft.....	10.0	15.0
Silt, very fine, brownish yellow.....	15.0	28.0
Silt, slightly clayey, brownish yellow; slightly calcareous below 30 ft; light brown and slightly more clayey below 38 ft.....	28.0	40.0
Silt, slightly clayey, slightly sandy, slightly calcareous, light brown; contains very fine to fine sand; moderately sandy from 42.8 to 45.5 ft, contains very fine to medium sand with a trace of coarse.....	40.0	50.0
Silt, slightly clayey, slightly calcareous, medium brown; light brown below 60 ft; moderately clayey from 58 to 60 ft and below 63.5 ft.....	50.0	64.5
Clay, slightly silty, medium brown.....	64.5	72.0
Silt, slightly clayey, light grayish brown; contains some limy areas, very calcareous; light gray from 73.5 to 75.3 ft; light brown below 75.3 ft; moderately clayey from 75.3 to 76 ft and from 80 to 84 ft.....	72.0	84.7
Sand, slightly silty, sand is very fine to fine.....	84.7	85.5
Silt, slightly sandy, gray; contains very fine to fine sand; moderately sandy below 87 ft, contains some medium sand.....	85.5	90.0
Sand, very fine to medium with some coarse; contains		

some silt layers; contains coarse with some very coarse sand and a trace of fine to medium gravel below 95 ft.....	90.0	100.0
Sand and gravel, very fine sand to medium gravel; contains 5% gravel from 100 to 105 ft; 10% gravel from 105 to 125 ft; 70% gravel from 125 to 135 ft; 30% gravel below 135 ft.....	100.0	145.0
Sand, slightly silty; sand is very fine to coarse with some very coarse; contains a trace of fine gravel to 155 ft; texture of sand grades from very fine to medium below 155 ft.....	145.0	159.0
<b>Tertiary System - Miocene Series - Ogallala Group:</b>		
Silt, slightly clayey, moderately sandy, light olive gray; contains very fine to fine sand; contains medium sand below 160 ft; contains some rootlets from 160 to 161.5 ft.....	159.0	167.0
Sandstone, poorly consolidated; contains coarse silt to very fine sand.....	167.0	170.0
Sandstone, slightly silty, moderately consolidated; sand is very fine to fine; contains some rootlets.	170.0	175.0
Sand, very fine to fine; contains some rootlets, slightly consolidated; sand is very fine to medium below 180 ft.....	175.0	183.0
Silt, slightly sandy, light olive gray; contains very fine to fine sand; contains some coarse silt and rootlets; slightly clayey below 185 ft.....	183.0	193.0
Silt, slightly clayey, light gray; slightly more clayey below 197 ft.....	193.0	200.0
Silt, slightly clayey, slightly sandy, light olive gray; contains coarse silt to very fine sand; moderately clayey below 203 ft.....	200.0	204.5
Sand, very fine to fine with some medium; slightly consolidated; contains no medium sand below 210 ft; contains a thin interbedded silt layer from 210 to 212 ft.....	204.5	217.1
Silt, slightly clayey, slightly sandy, light olive gray; contains very fine sand; moderately clayey below 220 ft.....	217.1	225.0
Sand, slightly silty; sand is very fine to fine; slightly consolidated.....	225.0	227.0
Silt, moderately clayey, moderately sandy, light olive gray; contains very fine to fine sand; slightly clayey and slightly sandy below 230 ft...	227.0	231.9
Sand, slightly silty; sand is very fine to fine; slightly consolidated.....	231.9	235.0

Silt, slightly clayey, slightly sandy, light olive gray; contains very fine sand; contains some sandstone and siltstone particles.....	235.0	236.7
Sand, very fine to fine with some medium; slightly consolidated, contains some rootlets; very fine to medium sand from 245 to 250 ft; contains no medium sand below 250 ft.....	236.7	254.7
Silt, slightly clayey, moderately sandy, light olive gray; contains very fine to fine sand; contains some sandstone and siltstone.....	254.7	256.3
Sand, slightly silty; sand is very fine to fine; slightly consolidated, contains some rootlets; unconsolidated from 260 to 265 ft and below 270 ft; contains reworked siltstone and claystone grains from 260 to 265 ft.....	256.3	273.5
Silt, slightly clayey, moderately sandy, light yellow gray; contains very fine to fine sand; slightly consolidated below 280 ft, contains some rootlets.....	273.5	285.0
Sand, slightly silty; sand is very fine to fine; slightly consolidated.....	285.0	286.5
Silt, slightly clayey, moderately sandy, light olive gray; contains very fine to fine sand; slightly consolidated, contains some reworked sandstone, siltstone, and claystone.....	286.5	290.0
Sandstone to siltstone, slightly consolidated; sand is very fine to fine; contains some ash; contains some rootlets from 293 to 295 ft; contains some reworked limy grains below 295 ft.....	290.0	297.0
Silt, slightly clayey, slightly sandy, light olive gray; contains very fine to fine sand; contains some reworked sandstone and siltstone; moderately sandy from 300 to 308 ft, contains some rootlets; slightly sandy below 308 ft, contains coarse silt to very fine sand.....	297.0	310.0
Sand, moderately silty; sand is very fine to fine; contains some rootlets.....	310.0	312.5
Silt, slightly clayey, moderately sandy, light olive gray; contains very fine to fine sand; light gray below 315 ft; slightly sandy below 320 ft.....	312.5	325.0
Sand, slightly silty; sand is very fine to fine; contains some reworked claystone and rootlets from 330 to 335 ft; contains very fine to fine with some medium sand below 335 ft; contains some well rounded and very calcareous sandstone and		

claystone below 365 ft.....	325.0	377.5
Silt, slightly clayey, slightly sandy, light gray; contains very fine to fine sand; moderately sandy from 380 to 390 ft; contains a trace of siltstone grains from 385 to 387.5 ft; moderately clayey below 387.5 ft.....	377.5	390.0
<b>Tertiary System - Oligocene Series - White River Group:</b>		
<b>Chadron Formation:</b>		
Silt, slightly clayey, light gray; contains some dark areas, noncalcareous, some reworked claystone to 392.5 ft; moderately clayey, slightly sandy, slightly calcareous, brownish yellow to light gray below 392.5 ft, contains very fine sand and some limy areas.....	390.0	393.0
Clay, slightly calcareous, light gray; contains some limy areas, claystone grains, and bentonite; very calcareous below 395 ft.....	393.0	396.0
<b>Cretaceous System - Upper Cretaceous Series - Montana Group:</b>		
<b>Pierre Formation:</b>		
Shale, clayey, slightly calcareous, mottled brownish yellow to light gray; light yellow gray from 410 to 415 ft; moderately calcareous from 420 to 430 ft and below 435 ft; contains some mottled dark gray below 435 ft.....	396.0	438.0
Shale, clayey, moderately calcareous, dark gray; slightly calcareous below 445 ft.....	438.0	450.0

**Test Hole #29-A-59  
(27N-8W-18ccdd)  
Antelope County**

Location: SE SE SW SW Sec. 18, T. 27 N., R. 8 W., approximately  
1,075 feet east and 7 feet north of the southwest corner.

Ground elevation: 1,961 ft. (t). (Ewing, 7.5 min. quadrangle)

Depth to water: Estimate 81 ft, 1996

	<u>Depth, in feet</u>	
	From	To
<b>Quaternary System, undifferentiated:</b>		
Road fill; no sample.....	0.0	0.5
Sand, very silty; sand is very fine to medium, trace coarse; below 3 ft, sand is very fine to coarse, trace very coarse.....	0.5	10.0
Sand, moderately silty; sand is very fine to coarse.	10.0	13.0
Silt, slightly clayey, medium yellow gray; contains iron staining; from 20 to 23 ft, medium brownish yellow.....	13.0	34.0
Silt, moderately clayey, slightly sandy, medium yellow gray; sand is very fine; below 37 ft, medium brownish gray, moderately sandy; sand is very fine to medium.....	34.0	38.0
Clay, medium brownish gray, moderately calcareous; contains limy silt lens.....	38.0	43.0
Silt, very sandy, slightly clayey, moderately cal- careous, light gray to medium brown; sand is very fine to medium; below 44 ft, medium yellow gray...	43.0	45.0
Sand, very silty, moderately clayey; sand is very fine to very coarse, trace fine gravel.....	45.0	55.0
Sand, gravelly; fine sand to fine gravel.....	55.0	70.0
Gravel, sandy; fine sand to fine gravel, trace medium gravel; from 72 to 73.2 ft, silt layer.....	70.0	75.0
Sand and gravel, fine sand to fine gravel, trace medium gravel.....	75.0	80.0
Sand and gravel, fine sand to fine gravel; below 90 ft, trace medium gravel.....	80.0	120.0
<b>Tertiary System - Miocene Series - Ogallala Group:</b>		
Sand, very fine to fine, trace medium; contains rootlets; below 125 ft, interbedded silt layer....	120.0	135.0
Sand, very fine to medium, trace of coarse; contains rootlets; from 143 to 143.6 ft, silt lens.....	135.0	150.0
Sand, very fine to medium; contains rootlets and reworked siltstone and claystone fragments; below 175 ft, sand is fine to coarse.....	150.0	190.0



Sand to sandstone, sand is very fine to medium; contains rootlets.....	190.0	199.0
Silt, very sandy, slightly clayey, light olive gray; sand is very fine to medium.....	199.0	200.0
Sandstone, slightly silty; sand is very fine to fine; contains rootlets and interbedded silt lenses.....	200.0	205.0
Sandstone to sand, sand is very fine to medium; contains rootlets; below 210 ft, sand is very fine to fine, some medium.....	205.0	230.0
Sand, very fine to medium, trace of coarse; contains rootlets and reworked siltstone and claystone fragments; from 238.3 to 238.5 ft, marl zones.....	230.0	240.0
Sandstone, sand is very fine to fine, trace medium; contains rootlets; below 250 ft, marl zones.....	240.0	257.0
Silt, very sandy, slightly clayey, light medium gray; sand is very fine to fine, trace medium; below 262 ft, interbedded sandstone lenses; below 265 ft, light olive gray.....	257.0	275.0
Sand, very silty; sand is very fine to fine, some medium.....	275.0	285.0
Silt, moderately sandy, slightly clayey, olive gray; sand is very fine to medium.....	285.0	290.0
Sand, marly; sand is very fine to fine, some medium; contains interbedded limestone lenses.....	290.0	295.0
Sand, very fine to medium; below 300 ft, trace coarse sand.....	295.0	305.0
Sand, fine to coarse; below 310 ft, sand is very fine to medium, trace coarse.....	305.0	314.0
Silt, moderately clayey, pink; contains limestone lens from 314 to 314.1 ft.....	314.0	315.0
Sand, very fine to medium, trace coarse; below 320 ft, no coarse sand.....	315.0	325.0
Sand, fine to coarse; below 330 ft, sand is fine to medium, trace of coarse.....	325.0	339.0
Silt, moderately clayey, slightly sandy, pink; sand is very fine.....	339.0	340.0
Sand, very fine to medium; below 346 ft, silty to clayey.....	340.0	353.0
Silt, slightly clayey, slightly sandy, marly, pale yellow; sand is very fine to medium.....	353.0	355.0
<b>Tertiary System - Oligocene Series - White River Group:</b>		
<b>Chadron Formation:</b>		
Silt to siltstone, clayey, in part marly, gray to white.....	355.0	359.0

Silt, moderately clayey, pink; contains very fine sand; below 360 ft, contains interbedded limestone lenses; contains reworked limestone and siltstone fragments.....	359.0	370.0
Clay, moderately sandy, pink; sand is fine; contains limestone lens; below 375 ft, reworked limestone fragments.....	370.0	381.0
<b>Cretaceous System - Upper Cretaceous Series - Montana Group:</b>		
<b>Pierre Formation:</b>		
Shale, clayey, moderately calcareous mottled light yellow to light gray; below 385 ft, slightly calcareous, light brownish yellow.....	381.0	390.0
Shale, clayey, light yellow to light gray; below 395 ft, light medium brownish gray to light medium brownish yellow.....	390.0	400.0

**Test Hole #28-A-59  
(27N-8W-31dddc)  
Antelope County**

Location: SW SE SE SE Sec. 31, T. 27 N., R. 8 W., approximately 438 feet west and 8 feet north of the southeast corner.

Ground elevation: 1,927 ft. (t). (Ewing, 7.5 min. quadrangle)

Depth to water: 74.43 ft. (8-24-59)

	<u>Depth, in feet</u>	
	From	To
<b>Quaternary System, undifferentiated:</b>		
Topsoil; silt, very sandy, medium dark yellow gray; sand is very fine to fine.....	0.0	1.0
Sand, very silty; sand is very fine to medium, trace of coarse.....	1.0	2.0
Sand, moderately silty; sand is very fine to coarse, some very coarse.....	2.0	5.0
Sand, very silty; sand is very fine to medium, some coarse.....	5.0	13.0
Silt, slightly clayey, light medium brownish yellow; below 15 ft, light medium yellow gray with some iron staining; below 25 ft, slightly calcareous; below 39 ft, medium brownish yellow.....	13.0	40.0
Silt, slightly clayey, slightly calcareous, medium yellow gray; contains iron staining.....	40.0	45.0
Gravel, sandy; fine sand to medium gravel, some coarse gravel.....	45.0	70.0
Sand, gravelly; fine sand to fine gravel, less fine gravel below 80 ft.....	70.0	110.0
Sand, gravelly; fine sand to fine gravel, trace of medium gravel.....	110.0	114.0
Silt, very sandy, slightly clayey, medium brownish yellow; sand is very fine to medium.....	114.0	115.0
Sand, slightly gravelly; fine sand to medium gravel.	115.0	135.0
Sand, very fine to coarse, some very coarse sand to fine gravel.....	135.0	140.0
<b>Tertiary System - Miocene Series - Ogallala Group:</b>		
Sand, very fine to coarse; contains rootlets and reworked siltstone; below 145 ft, some very coarse sand; below 155, trace of fine gravel.....	140.0	160.0
Sand, very fine to coarse, trace of very coarse; contains rootlets and seeds.....	160.0	170.0
Sand, very fine to medium; below 180 ft, sand is very fine to fine, trace of medium.....	170.0	195.0
Sandstone, sand is very fine to fine; contains		

rootlets; at 228.5 ft, silt lens.....	195.0	230.0
Sand, very fine to fine; contains interbedded siltstones.....	230.0	245.0
Sandstone, sand is very fine to fine; contains interbedded siltstone and limy lenses.....	245.0	255.0
Silt, very sandy, slightly clayey, marly, light gray to white; sand is very fine to fine; contains interbedded sandstone and siltstone.....	255.0	260.0
Sand, very fine to fine, trace medium; contains rootlets.....	260.0	265.0
Sand, very fine to medium; below 270 ft, trace coarse sand, some siltstone.....	265.0	330.0
Sand, very fine to fine; from 332.2 to 333 ft, limy.	330.0	333.0
Silt, moderately sandy, slightly clayey; sand is very fine to fine.....	333.0	340.0
Sand, very fine to fine; contains rootlets, siltstone, and limy zones.....	340.0	345.0
Sandstone, sand is very fine to fine; contains siltstone and rootlets; below 360 ft, marly.....	345.0	365.0
<b>Tertiary System - Oligocene Series - White River Group:</b>		
<b>Chadron Formation:</b>		
Silt, marly; contains interbedded sandstone.....	365.0	370.0
Silt to siltstone, clayey, limy, light gray to tan; below 375 ft, interbedded limestone, some reworked siltstone, some quartz grains.....	370.0	382.0
<b>Cretaceous System - Upper Cretaceous Series - Montana Group:</b>		
<b>Pierre Formation:</b>		
Clay, shale, mottled light yellow to gray.....	382.0	400.0

**Test Hole #8-A-57  
(28N-5W-24aaad)  
Antelope County**

Location: SE NE NE NE Sec. 24, T. 28 N., R. 5 W., approximately 490 feet south and 10 feet west of the northeast corner.  
 Ground elevation: 1,732 ft. (t). (Plainview NE, 7.5 min. quadrangle)  
 Depth to water: Unknown. Test hole caved at 60 ft (6-28-57)

	<u>Depth, in feet</u>	
	From	To
<b>Quaternary System, undifferentiated:</b>		
Silt, very sandy, very dark grayish brown; sand is very fine to fine; below 3 ft, trace coarse.....	0.0	4.0
Sand, slightly silty; sand is fine to coarse, trace of very coarse; below 5 ft, no very coarse sand...	4.0	7.0
Silt, sandy, light medium gray; sand is very fine to fine, trace medium; below 7.3 ft, light gray; below 9 ft, some limy grains.....	7.0	10.0
Silt, moderately clayey, light medium gray, trace brown.....	10.0	11.0
Clay, slightly silty, light medium gray.....	11.0	13.0
Silt, slightly clayey, light medium gray; below 15.2 ft, light gray with some sandstone.....	13.0	15.4
Clay, silty, yellowish gray; below 15.8 ft, light gray.....	15.4	17.9
Silt, moderately clayey, mottled light gray to medium dark gray with brown.....	17.9	18.3
Clay, slightly silty, light gray; below 19.7 ft, brownish gray.....	18.3	20.4
Silt, moderately clayey, slightly calcareous, light medium gray; below 21 ft, moderately calcareous...	20.4	25.0
Silt, moderately clayey, light gray; below 27.7 ft, light medium gray.....	25.0	28.0
Clay, slightly silty, light medium gray.....	28.0	30.0
Silt, moderately sandy, slightly clayey, light gray; sand is very fine to fine; below 34 ft, moderately clayey, slightly calcareous.....	30.0	40.0
Silt, moderately clayey, slightly calcareous, light medium gray; contains limy grains.....	40.0	48.0
Silt, slightly clayey, slightly sandy, light gray, slightly calcareous; sand is very fine.....	48.0	51.0
Silt, slightly clayey, slightly sandy, light medium gray; sand is very fine.....	51.0	54.0
Sand, slightly silty; sand is very fine to fine; below 55.3 ft, contains many interbedded silt		

lenses, moderately clayey, light medium gray.....	54.0	68.0
Sand, silty; sand is very fine to fine; from 73 to 75.6 ft, silt layer.....	68.0	78.0
Silt, moderately clayey, light gray.....	78.0	84.0
Sand, slightly silty; sand is very fine to fine; from 86.5 to 88.3 ft, silt layer.....	84.0	89.0
Clay, silty, medium brownish gray; below 90 ft, slightly clayey, medium dark gray, slightly calcareous.....	89.0	91.0
Clay, moderately sandy, dark gray, speckled, slightly calcareous; below 94 ft, moderately calcareous, trace of shells.....	91.0	96.0
Clay, olive gray, speckled, moderately calcareous; contains shells to 98 ft.....	96.0	103.0
Sand, very fine to fine.....	103.0	107.0
Clay, slightly silty, slightly calcareous, medium dark gray.....	107.0	110.0
Sand, very fine to fine.....	110.0	125.0
Sand, fine to coarse, trace very coarse.....	125.0	140.0
Sand, gravelly; fine sand to fine gravel.....	140.0	160.0
Sand, gravelly; medium sand to fine gravel, trace medium gravel.....	160.0	170.0
Sand, fine to very coarse, trace fine gravel.....	170.0	175.0
Gravel, sandy; fine sand to medium gravel.....	175.0	180.0
Sand, fine to medium.....	180.0	193.0
<b>Tertiary System - Miocene Series - Ogallala Group:</b>		
Silt, slightly clayey, light medium gray; below 197 ft, light gray, moderately calcareous.....	193.0	200.0
Sandstone, silty; sand is very fine to fine.....	200.0	204.3
<b>Tertiary System - Oligocene Series - White River Group:</b>		
<b>Chadron Formation:</b>		
Silt, slightly clayey, light gray, slightly calcareous; some very fine to fine sand.....	204.3	205.0
Clay, silty, light medium gray; contains trace limestone and quartz grains, bentonitic fragments, some very fine sand.....	205.0	215.0
Clay, light medium brown, some limestone fragments..	215.0	216.5
<b>Cretaceous System - Upper Cretaceous Series - Montana Group:</b>		
<b>Pierre Formation:</b>		
Shale, clayey, medium gray, some yellow brown.....	216.5	218.0
Shale, clayey, yellow brown, moderately calcareous..	218.0	246.0
Shale clayey, light gray.....	246.0	262.0
Shale, clayey, medium brownish gray, slightly calcareous; below 266 ft, medium dark gray to dark gray.....	262.0	280.0

**Test Hole #22-A-57  
(28N-6W-6bbbc)  
Antelope County**

Location: SW NW NW NW Sec. 6, T. 28 N., R. 6 W., 356 feet south and 22 feet east of northwest corner.  
 Ground elevation: 1,751 ft. (t). (Orchard NE, 7.5 min. quadrangle)  
 Depth to water: 128 ft. (7-18-57)

	<u>Depth, in feet</u>	
	From	To
<b>Quaternary System, undifferentiated:</b>		
Soil; silty, slightly clayey, dark gray.....	0.0	0.5
Silt, slightly clayey, medium dark gray.....	0.5	2.0
Sand, very fine to medium with some coarse to very coarse.....	2.0	3.6
Silt, slightly clayey, moderately calcareous, light gray; contains limy areas; light grayish brown from 5 to 6 ft; slightly calcareous below 6 ft, contains some limy grains.....	3.6	7.8
Sand, very fine to medium with some coarse to very coarse sand and trace of gravel.....	7.8	10.0
Sand and gravel, very fine sand to medium gravel; contains 10% gravel to 15 ft; contains 70% gravel from 15 to 30 ft; contains silt layer from 28.5 to 28.9 ft; contains 30% gravel below 30 ft.....	10.0	39.0
Silt, slightly clayey, moderately sandy, light yellow gray; contains very fine to fine sand; slightly sand below 39.5 ft; moderately clayey, light brown below 41.5 ft; contains sand layer from 44 to 44.7 ft, moderately silty.....	39.0	45.0
Silt, moderately clayey, light brown.....	45.0	46.5
<b>Tertiary System - Miocene Series - Ogallala Group:</b>		
Silt, slightly sandy, slightly clayey, light gray to light olive gray; contains very fine to fine sand; contains volcanic ash to 50 ft; moderately sandy, medium brownish gray from 51.5 to 55 ft; slightly clayey, light gray below 55 ft.....	46.5	56.3
Sand, slightly silty; sand is very fine to medium; in part slightly consolidated, contains some rootlets; contains some coarse sand below 60 ft...	56.3	68.5
Silt, slightly clayey, slightly sandy, light olive gray; contains very fine to fine sand; moderately sandy, light gray below 70 ft.....	68.5	72.0
Sand, slightly silty; sand is very fine to fine; in part slightly consolidated.....	72.0	79.0

Silt, slightly clayey, slightly sandy, light olive gray; contains very fine to fine sand; contains some limy grains from 80 to 82.5 ft and below 85 ft; moderately sandy, slightly consolidated from 82.5 to 83.5 ft; slightly more clayey from 95.5 to 100 ft; slightly consolidated below 103.5 ft...	79.0	105.0
Sand, slightly silty; sand is very fine to medium with a trace of coarse; in part consolidated, contains some rootlets.....	105.0	108.5
Silt, slightly clayey, moderately sandy, moderately calcareous, light gray; in part slightly consolidated.....	108.5	110.0
Sand, slightly silty; sand is very fine to medium; in part consolidated; contains siltstone from 114.5 to 115 ft; contains some rootlets from 115 to 120 ft; sand is very fine to fine with a trace of medium from 135 to 140 ft; contains some sandstone and claystone, slightly consolidated from 145 to 150 ft; in part consolidated from 150 to 155 ft, contains some rootlets; contains a silt layer from 160.5 to 161 ft.....	110.0	163.3
Silt, slightly clayey, slightly sandy, light olive gray; contains very fine to fine sand; contains coarse silt to very fine sand with some rootlets from 165 to 166 ft; slightly more clayey below 166 ft.....	163.3	167.5
Sand, very fine to fine with some medium; slightly silty below 170 ft, contains no medium sand.....	167.5	172.0
Silt, slightly clayey, slightly sandy, light olive gray; contains very fine to fine sand; in part consolidated below 174 ft.....	172.0	175.0
Sandstone, moderately consolidated; sand is very fine to fine; contains some rootlets below 180 ft.	175.0	185.0
Sand, very fine to fine with a trace of medium; in part consolidated from 195 to 215 ft; sand is very fine to medium below 195 ft; contains a trace of coarse sand below 205 ft; contains some claystone from 210 to 215 ft.....	185.0	218.5
Silt, slightly clayey, moderately sandy, light olive gray; contains very fine to fine sand.....	218.5	220.0
Sand, very fine to fine; in part consolidated; contains some rootlets and claystone grains.....	220.0	229.0
Silt, slightly clayey, moderately sandy, light olive gray; contains very fine to fine sand; in part slightly consolidated.....	229.0	230.0



Sand, very fine to medium; in part consolidated, contains some claystone grains; contains a silt layer from 233.5 to 235 ft; moderately clayey, moderately sandy, contains no medium sand from 235 to 240 ft; in part slightly consolidated below 240 ft, contains some claystone grains.....	230.0	245.0
Silt, slightly clayey, slightly sandy, light olive gray; contains very fine to fine sand; moderately clayey, light gray from 245.2 to 250 ft; moderately sandy below 250 ft, contains some ironstone.	245.0	251.0
Sand, very fine to medium.....	251.0	256.0
<b>Tertiary System - Oligocene Series - White River Group:</b>		
<b>Chadron Formation:</b>		
Silt, moderately clayey, slightly sandy, light gray; contains some clay balls; contains some limy areas from 256.5 to 260 ft; light yellow gray below 265 ft; contains some limestone and quartz grains below 270 ft.....	256.0	272.0
<b>Cretaceous System - Upper Cretaceous Series - Montana Group:</b>		
<b>Pierre Formation:</b>		
Shale, clayey, slightly calcareous, brownish yellow; mottled yellow brown to medium gray from 275 to 277 ft; yellow brown with some dark gray from 277 to 280 ft; dark gray below 280 ft, contains some bentonite.....	272.0	290.0

**Test Hole #21-A-57  
(28N-7W-24aaaa)  
Antelope County**

Location: NE NE NE NE Sec. 24, T. 28 N., R. 7 W., 67 feet south and  
23 feet west of northeast corner.  
Ground elevation: 1,782 ft. (t). (Orchard NE, 7.5 min. quadrangle)  
Depth to water: 33 ft. (7-18-57)

	Depth, in feet	
	From	To
<b>Quaternary System, undifferentiated:</b>		
Soil; silty, slightly sandy, dark brownish gray; Sand is very fine to medium; slightly clayey, medium brownish gray below 1.5 ft, contains fine to coarse sand.....	0.0	2.5
Sand, slightly silty; sand is very fine to coarse; slightly clayey below 3 ft, contains a trace of gravel.....	2.5	5.0
Sand and gravel, slightly silty; grades from very fine sand to fine gravel; contains 15% gravel.....	5.0	8.3
Silt, slightly clayey, very sandy, light gray; contains very fine to fine sand, trace of coarse..	8.3	10.0
Sand, slightly silty, sand is very fine to medium with some coarse.....	10.0	13.5
Soil, silty, slightly clayey, dark brownish gray; contains some very fine to medium sand.....	13.5	14.0
Silt, moderately clayey, moderately sandy, light brownish gray; contains very fine to medium sand..	14.0	15.0
Silt, slightly clayey, slightly sandy, light gray; contains very fine to fine sand; very sandy from 16.7 to 25 ft; contains very fine to medium sand from 20 to 25 ft; moderately clayey, light brownish gray from 25 to 27.5 ft; very clayey below 27.5 ft.....	15.0	30.0
Silt, moderately clayey, slightly sandy, white; sand is very fine to fine; below 32 ft, very pale yellow.....	30.0	33.0
<b>Tertiary System - Miocene Series - Ogallala Group:</b>		
Silt, moderately clayey, slightly sandy, light brown; below 35 ft pinkish gray; sand is very fine to fine.....	33.0	40.0
Silt, moderately clayey, slightly sandy, very light olive gray, trace light brown; sand is very fine to fine, trace of medium; contains a few rootlets.	40.0	50.0
Silt, very clayey, light olive gray.....	50.0	51.8

Clay, silty, light olive gray; contains a silt layer from 54.5 to 57 ft; very silty, moderately sandy below 57 ft.....	51.8	60.0
Silt, moderately clayey, light olive gray; contains a trace of very fine to fine sand.....	60.0	63.0
Siltstone, moderately consolidated, slightly clayey, light olive gray; contains a trace of very fine sand.....	63.0	65.0
Silt, slightly clayey, very sandy, light olive gray; contains very fine sand; in part slightly consolidated, contains a few rootlets.....	65.0	67.5
Sand, very fine to fine.....	67.5	70.0
Sandstone, moderately consolidated, moderately silty; sand is very fine to fine with some medium; contains a few rootlets; slightly silty below 75 ft; contains very fine to medium sand below 80 ft.....	70.0	93.0
Silt, slightly clayey, moderately sandy, light olive gray; contains very fine to fine with some medium sand; in part slightly consolidated.....	93.0	95.0
Sandstone, moderately consolidated, moderately silty; sand is very fine to fine with a little medium; contains a few rootlets; poorly consolidated from 97 to 100 ft.....	95.0	105.0
Silt, moderately clayey, light olive gray; in part consolidated.....	105.0	107.0
Sandstone, moderately consolidated, slightly silty; sand is very fine to medium; contains some thin silt layers from 110 to 115 ft.....	107.0	119.0
Silt, very clayey, slightly sandy, light olive gray; contains very fine to fine sand; contains limy nodules from 120 to 124.5 ft; moderately clayey, moderately sandy from 124.5 to 125 ft; very sandy below 125 ft.....	119.0	127.0
Sandstone, moderately consolidated, slightly silty; sand is very fine to fine; slightly less silty and less consolidated below 135 ft.....	127.0	140.0
Sandstone, poorly consolidated; sand is very fine to medium; contains some pink ash.....	140.0	150.0
Sand, very fine to medium; contains a few rounded silt grains; contains a little coarse sand below 165 ft; slightly silty from 172 to 173.5 ft and from 177 to 178.5 ft; in part slightly silty from 180 to 185 ft.....	150.0	207.0
Silt, slightly clayey, moderately sandy, light olive		

gray; contains very fine to medium sand.....	207.0	210.0
Sandstone, poorly consolidated, moderately silty, slightly clayey; sand is very fine to fine.....	210.0	215.0
Silt, very clayey, light olive gray; contains granular silt.....	215.0	218.0
Sandstone, poorly consolidated, slightly silty; sand is very fine to fine.....	218.0	220.0
Sand, slightly silty, sand is very fine to medium...	220.0	225.0
Sandstone, poorly consolidated, slightly silty, sand is very fine to fine.....	225.0	228.0
Silt, moderately clayey, moderately sandy, slightly consolidated, light olive gray; contains very fine to fine sand; slightly less clayey below 230 ft; slightly more sandy from 230 to 235 ft; very sandy from 235 to 245 ft.....	228.0	250.0
Sandstone, moderately consolidated, slightly silty, in part moderately silty; sand is very fine to fine.....	250.0	255.0
Silt, slightly clayey, very sandy, light olive gray; contains very fine to fine sand; slightly consolidated, moderately sandy, moderately clayey below 260 ft.....	255.0	262.5
Sandstone, poorly consolidated, slightly silty; sand is very fine to fine with some medium; slightly consolidated below 265 ft.....	262.5	267.5
Silt, slightly clayey, light olive gray, in part sandy; contains some interbedded sand.....	267.5	271.0
Sand, slightly silty; sand is very fine to fine with some medium; contains no medium sand below 280 ft.	271.0	287.0
<b>Tertiary System - Oligocene Series - White River Group:</b>		
<b>Chadron Formation:</b>		
Clay, slightly sandy, slightly calcareous; contains very fine sand, contains limy nodules; light brown below 289.5 ft.....	287.0	290.5
Clay, slightly sandy, in part very sandy; contains very fine to coarse sand; contains a few limonitic grains and limy nodules, contains interbedded clay and sand; contains a trace of gravel below 295 ft; slightly less sandy below 300.8 ft.....	290.5	303.0
Silt, moderately clayey, moderately sandy, light gray with some dark mottling; contains very fine to medium sand.....	303.0	303.5
<b>Cretaceous System - Upper Cretaceous Series - Montana Group:</b>		
<b>Pierre Formation:</b>		
Shale, clayey, slightly calcareous, brownish yellow		

with some light gray; moderately calcareous below  
305 ft; contains a trace of limy nodules from 305  
to 306 ft; contains thin bentonitic layers from  
305 to 307 ft; slightly lighter in color from 320  
to 331.5 ft; dark gray below 331.5 ft..... 303.5 340.0

**Test Hole #20-A-57  
(28N-7W-36dddd)  
Antelope County**

Location: SE SE SE SE Sec. 36, T. 28 N., R. 7 W., 20 feet north and  
266 feet west of southeast corner.  
Ground elevation: 1,859 ft. (t). (Royal, 7.5 min. quadrangle)  
Depth to water: 71.0 ft. (7-18-57)

	<u>Depth, in feet</u>	
	From	To
<b>Quaternary System, undifferentiated:</b>		
Soil; slightly silty, moderately sandy, medium to dark brownish gray.....	0.0	2.0
Sand, slightly silty; sand is very fine to coarse...	2.0	4.0
Silt, slightly clayey, light yellow gray; contains a trace of very fine sand from 25 to 30 ft; slightly calcareous from 25 to 35 ft; slightly sandy from 30 to 32 ft; slightly more clayey below 32 ft.....	4.0	35.0
Silt, slightly clayey, medium brownish gray; moderately sandy below 36.5 ft, contains very fine to fine sand.....	35.0	38.5
Sand, slightly clayey; sand is very fine to medium; contains some iron concretions; contains silt layer from 39 to 40 ft and from 44 to 44.3 ft; slightly clayey, moderately sandy from 39 to 40 ft; contains some coarse sand below 42.5 ft.....	38.5	45.0
Sand and gravel, very fine sand to medium gravel; contains a silt layer from 46.8 to 47.2 ft; contains 60% gravel to 60 ft; contains 40% gravel below 60 ft.....	45.0	65.5
Silt, slightly clayey, moderately sandy, light gray; contains very fine to fine with some medium sand; contains some dark areas from 69 to 70 ft; slightly sandy below 70 ft, no medium sand.....	65.5	71.5
Sand, fine to medium with some coarse; contains some very coarse sand with trace of gravel below 75 ft.	71.5	80.0
Sand and gravel, poorly sorted; texture grades from very fine sand to medium gravel; contains 5% gravel to 85 ft; contains 20% to 30% gravel from 85 to 120 ft; contains 60% gravel below 120 ft....	80.0	125.0
<b>Tertiary System - Miocene Series - Ogallala Group:</b>		
Sand, very fine to medium; in part slightly consolidated, contains some rootlets.....	125.0	135.0
Sandstone, moderately consolidated; sand is very fine to fine; contains some medium sand and		

rootlets below 145 ft.....	135.0	148.5
Ash, silty, light gray.....	148.5	150.0
Silt, slightly clayey, light gray; some ash.....	150.0	152.7
Sand, very fine to medium; in part slightly consolidated; slightly silty below 157 ft, contains no medium sand.....	152.7	157.5
Silt, slightly clayey, moderately sandy, light olive gray; contains very fine to fine with a trace of medium sand below 165 ft; slightly more sandy below 168 ft.....	157.5	170.0
Sand, very fine to medium; in part slightly consolidated; contains some silt layers from 181 to 190 ft, slightly clayey, moderately silty; contains some ash from 189.5 to 190 ft; contains some rootlets below 190 ft.....	170.0	195.0
Sandstone, moderately consolidated; sand is very fine to fine.....	195.0	196.0
Silt, slightly clayey, moderately sandy, moderately calcareous, light gray; contains very fine to fine sand; very sandy below 200 ft, contains some marl.	196.0	205.0
Sandstone, slightly silty, moderately consolidated; sand is very fine to fine; slightly more silty below 206.4 ft; contains bone fragments below 207.2 ft.....	205.0	208.3
Siltstone, poorly consolidated, slightly clayey, moderately sandy, light gray; contains very fine to fine with a trace of medium sand; contains some limy areas to 210 ft; contains some marl below 210 ft; very sandy from 210 to 214.5 ft; contains some limestone grains below 220 ft.....	208.3	225.0
Sandstone, poorly consolidated, slightly silty; sand is very fine to fine.....	225.0	226.8
Silt, slightly clayey, moderately sandy, light gray; contains very fine to fine sand; contains some limy areas; contains some medium sand from 230 to 237.5 ft; moderately clayey from 237.5 to 243.5 ft and below 245 ft; very clayey from 243.5 to 245 ft; contains very fine to medium sand from 240 to 245 ft.....	226.8	247.0
Clay, light gray, marly.....	247.0	250.0
Silt, moderately clayey, slightly sandy, moderately calcareous, light gray; contains very fine to fine sand; slightly more clayey, slightly calcareous from 251 to 253 ft; slightly clayey, moderately sandy from 253 to 255 ft, contains coarse silt to		

very fine sand.....	250.0	255.0
Sand, very fine to fine with some coarse silt; contains very fine to medium sand below 260 ft; slightly silty below 265 ft; contains some limy grains from 290 to 294.8 ft; slightly consolidated from 294.8 to 296.5 ft; contains silt layer from 296.5 to 298.8 ft.....	255.0	302.0
Silt, slightly clayey, slightly sandy, light gray; contains coarse silt to very fine sand; contains a sand layer from 305 to 307 ft; slightly silty, slightly consolidated below 307 ft.....	302.0	310.0
Sand, slightly silty; sand is very fine to fine; slightly consolidated, contains some rootlets.....	310.0	315.0
Sandstone, moderately consolidated, sand is very fine to medium; contains some rootlets; slightly consolidated below 325 ft, contains reworked claystone and ironstone grains.....	315.0	325.5
Sand, slightly silty, sand is very fine to fine; contains some rootlets; moderately silty below 335 ft.....	325.5	337.0
Silt, moderately clayey, moderately sandy, light olive gray; contains very fine to fine sand; slightly consolidated, contains some rootlets and sandstone grains; slightly more consolidated from 340 to 345 ft; slightly sandy below 350 ft, contains coarse silt to very fine sand.....	337.0	356.7
Sand, slightly silty, sand is very fine to fine; slightly consolidated; contains some medium sand from 360 to 365 ft; moderately silty below 367 ft.....	356.7	370.0
Sand, very fine to fine with some medium; contains some rootlets; contains some silt layers from 384.5 to 391.8 ft; contains no medium sand below 391.8 ft.....	370.0	394.3
Silt, very clayey, light gray; contains some limy pebbles below 400 ft.....	394.3	402.5
Clay, slightly silty, light gray; contains some limy grains; light grayish brown from 405 to 410 ft; contains some dark areas from 410 to 435 ft; contains very fine to fine sand from 420.5 to 425 ft; light yellow gray from 425 to 440 ft; moderately silty from 435 to 440 ft; light gray to light olive gray below 440 ft, contains some coarse sand to medium gravel with some limestone and claystone grains; slightly finer material		



below 445 ft.....	402.5	450.5
<b>Cretaceous System - Upper Cretaceous Series - Montana Group:</b>		
<b>Pierre Formation:</b>		
Shale, clayey, slightly calcareous, medium to dark gray.....	450.5	460.0

**Test Hole #32-A-59  
(28N-8W-6bbbb)  
Antelope County**

Location: NW NW NW NW Sec. 6, T. 28 N., R. 8 W., approximately 117 feet south and 17 feet east of the northwest corner.

Ground elevation: 1,874 ft. (t). (Venus, 7.5 min. quadrangle)

Depth to water: 62.20 ft. (8-26-59)

	<u>Depth, in feet</u>	
	From	To
<b>Quaternary System undifferentiated:</b>		
Topsoil; silt, slightly clayey, medium dark gray....	0.0	0.5
Silt, slightly clayey, medium dark gray; from 1 to 2 ft, medium brown; below 2 ft, moderately sandy, medium dark yellow gray; sand is very fine.....	0.5	4.0
Sand, slightly silty, sand is very fine to coarse, some very coarse, some fine gravel.....	4.0	5.5
Silt, slightly clayey, light yellow gray; below 6 ft, very sandy.....	5.5	6.5
Silt, moderately clayey, light medium olive gray; below 8 ft, moderately calcareous, light yellow gray.....	6.5	9.0
Silt, slightly clayey, slightly sandy, light brown; sand is very fine; below 10 ft, contains no sand..	9.0	12.0
Silt, moderately clayey, slightly sandy, light yellow gray; sand is very fine; below 13 ft, light brown.....	12.0	16.5
<b>Tertiary System - Miocene Series - Ogallala Group:</b>		
Silt, slightly clayey, light olive gray.....	16.5	19.0
Sandstone, sand is very fine to fine; contains interbedded silt lenses.....	19.0	20.0
Sandstone, sand is very fine to fine; contains rootlets.....	20.0	27.0
Sand, very silty; sand is very fine to fine, trace of medium.....	27.0	30.0
Silt, very sandy, slightly clayey; sand is very fine to fine; contains rootlets; below 35 ft, some medium sand.....	30.0	38.0
Sand, very fine to medium; contains rootlets.....	38.0	40.0
Silt, very sandy, light olive gray; sand is very fine to fine; contains rootlets.....	40.0	48.0
Sand, very fine to fine, some medium; contains rootlets; from 50 to 55 ft, contains interbedded silt lenses.....	48.0	62.0

Silt, very sandy, light olive gray; sand is very fine to fine; contains rootlets.....	62.0	70.0
Sandstone, sand is very fine to fine; contains rootlets and interbedded silt lenses.....	70.0	80.0
Sand, very fine to fine; contains rootlets and some interbedded silt lenses.....	80.0	85.0
Silt, moderately sandy, slightly clayey, light olive gray.....	85.0	88.0
Sand, very fine to fine; contains rootlets; from 96 to 101 ft, very silty; below 110 ft, contains trace of volcanic ash.....	88.0	117.0
Silt, slightly clayey, light olive gray; contains volcanic ash.....	117.0	123.0
Sandstone, sand is very fine to fine; contains rootlets; below 130 ft, sand is very fine to medium.....	123.0	140.0
Sand, very fine to fine, some medium; contains rootlets and seeds.....	140.0	143.0
Silt, very sandy, light olive gray; sand is very fine to fine.....	143.0	145.0
Silt, very sandy, light olive gray; sand is very fine to fine, some medium; contains interbedded sandstone lenses.....	145.0	156.0
Sandstone, sand is very fine to fine; contains rootlets.....	156.0	158.0
Silt, very sandy, slightly clayey, slightly calcareous, light olive green; sand is very fine to fine; contains interbedded marly limestone lens...	158.0	162.0
Silt, very sandy, light olive green.....	162.0	171.0
Sandstone, sand is very fine to fine; below 175 ft, trace of medium.....	171.0	180.0
Sand, very fine to medium; contains rootlets; below 185 ft, sand is very fine to fine, some medium; below 205 ft, trace coarse sand; from 210 to 215 ft, interbedded silt lenses.....	180.0	220.0
Sand, very fine to fine, some medium; contains interbedded silt lenses and rootlets.....	220.0	225.0
Sand, very silty; sand is very fine to fine, trace of medium.....	225.0	230.0
Silt, very sandy, slightly clayey, light gray; sand is very fine to fine, trace medium.....	230.0	235.0
Sand, very fine to fine; contains interbedded silt lenses from 235 to 240 ft; contains rootlets.....	235.0	250.0
Sand, very fine to fine; contains rootlets and interbedded silt lenses.....	250.0	265.0

Silt, moderately clayey, slightly sandy, light olive gray; sand is very fine to fine; contains interbedded sand lenses.....	265.0	275.0
Sand, very fine to fine, trace medium; contains rootlets and reworked siltstone.....	275.0	285.0
Sand, very fine to fine, trace of medium; contains interbedded silt lenses.....	285.0	295.0
Sand, very fine to medium, trace of coarse; below 300 ft; sand is very fine to fine, some medium; contains reworked siltstone.....	295.0	308.0
Silt to siltstone, light olive gray.....	308.0	313.0
Sand, slightly silty; sand is very fine to fine, some medium.....	313.0	316.0
<b>Tertiary System - Oligocene Series - White River Group:</b>		
<b>Chadron Formation:</b>		
Silt to siltstone, slightly calcareous, light olive gray; at 316 ft, marl lens.....	316.0	330.0
Sand, fine to coarse; contains some interbedded silts, reworked siltstone, and very coarse quartz.	330.0	335.0
Silt to siltstone, light olive gray; below 360 ft, some light green and yellow .....	335.0	370.0
Sand, gravelly; very fine sand to fine gravel; contains reworked ironstone, quartz, limestone, siltstone, claystone; below 375 ft, some clayey silt lenses.....	370.0	377.0
<b>Cretaceous System - Upper Cretaceous Series - Montana Group:</b>		
<b>Pierre Formation:</b>		
Shale, clayey, black.....	377.0	390.0

**Test Hole #31-A-59  
(28N-8W-18ccdc)  
Antelope County**

Location: SW SE SW SW Sec. 18, T. 28 N., R. 8 W., approximately 780 feet east and 8 feet north of the southwest corner.  
 Ground elevation: 1,881 ft. (t). (Venus, 7.5 min. quadrangle)  
 Depth to water: 29.70 ft. (8-27-59)

	Depth, in feet	
	From	To
<b>Quaternary System, undifferentiated:</b>		
Topsoil; no sample.....	0.0	1.0
Sand, slightly silty; sand is fine to medium, some coarse.....	1.0	3.0
Silt, moderately sandy, slightly clayey, medium brown; sand is very fine to fine; below 4.5 ft, moderately clayey.....	3.0	5.0
Sand, gravelly; fine sand to fine gravel, trace medium gravel; at 8.5 ft silt lens.....	5.0	21.0
Silt, very sandy, slightly clayey, light yellow gray; sand is very fine to medium, trace of coarse.....	21.0	23.0
Sand, very fine to medium, trace of coarse.....	23.0	25.0
Sand, gravelly; fine sand to fine gravel; below 29.9 ft, silt lens.....	25.0	30.0
Sand, very silty, slightly clayey, light medium yellow gray; sand is very fine to medium.....	30.0	35.0
Sand, gravelly; fine sand to fine gravel; below 45 ft, some medium gravel.....	35.0	55.0
Silt, moderately sandy, slightly clayey, light brown; sand is very fine to medium.....	55.0	59.0
<b>Tertiary System - Miocene Series - Ogallala Group:</b>		
Silt, moderately sandy, slightly clayey, light yellow gray; sand is very fine to medium; below 69 ft, mottled light yellow gray to light brown...	59.0	75.0
Sandstone, very silty; sand is very fine to medium; contains interbedded silt lenses; below 80 ft, no silt lenses; contains rootlets.....	75.0	90.0
Sand, very fine to medium; contains rootlets; from 95 to 100 ft, some coarse sand; below 100 ft, volcanic ash.....	90.0	105.0
Sand, very fine to medium; contains volcanic ash; below 115 ft; some coarse sand.....	105.0	119.0
Silt to siltstone, light yellow gray; contains volcanic ash.....	119.0	122.0

Sand, very fine to coarse; contains rootlets.....	122.0	135.0
Sand, fine to coarse; contains volcanic ash, reworked claystone and siltstone; contains interbedded silt lenses.....	135.0	140.0
Sandstone, sand is very fine to medium.....	140.0	149.0
Sand, very silty, slightly clayey; sand is very fine to medium.....	149.0	150.0
Sandstone to sand, sand is very fine to medium, trace of coarse; contains rootlets; below 155 ft, sand is very fine to coarse.....	150.0	160.0
Sand, moderately silty; sand is very fine to medium.	160.0	165.0
Silt, very sandy, slightly clayey, light yellow gray; sand is very fine to medium.....	165.0	172.0
Sand, very fine to medium; some rootlets; below 175 ft, marl zones.....	172.0	188.0
Silt, moderately clayey, light olive gray; below 190 ft, volcanic ash.....	188.0	195.0
Silt, moderately clayey, slightly sandy, light olive gray; sand is very fine to medium, some coarse; contains marl and limestone lenses.....	195.0	200.0
Sandstone, sand is very fine to medium, some coarse.	200.0	210.0
Sand, marly; sand is very fine to coarse; contains interbedded silt lenses.....	210.0	220.0
Sand, very fine to medium, trace coarse; contains reworked siltstone and claystone.....	220.0	235.0
Sand, very fine to medium, trace of coarse.....	235.0	249.0
Sand, moderately silty, slightly clayey; sand is very fine to medium.....	249.0	250.0
Sand, very fine to fine, some medium; contains interbedded silt lenses.....	250.0	260.0
Sand, very fine to fine, some medium; below 270 ft; contains rootlets, reworked siltstone and claystone.....	260.0	275.0
Sandstone, sand is very fine to fine, some medium...	275.0	280.0
Sand, very fine to fine, trace of medium; below 288 ft, sand is very fine to medium, silty and clayey.	280.0	290.0
Silt, very sandy, slightly clayey, light yellow gray; sand is very fine to medium; contains interbedded sandstone lenses.....	290.0	300.0
Sandstone, silty; sand is very fine to medium.....	300.0	301.0
Silt, slightly clayey, very sandy, light yellow gray; sand is very fine to medium.....	301.0	307.0
Sand, very fine to fine, trace of medium; contains rootlets.....	307.0	315.0

**Tertiary System - Oligocene Series - Arikaree Group:**

<b>Rosebud Formation:</b>		
Silt, slightly clayey, light yellow gray; below 321 ft, mottled light yellow to pinkish gray.....	315.0	328.0
<b>Tertiary System - Oligocene Series - White River Group:</b>		
<b>Chadron Formation:</b>		
Clay, very sandy, very calcareous, in part slightly calcareous, light brownish yellow; sand is fine to coarse; contains limestone and ironstone grains; below 330 ft, mottled light yellowish gray to light brownish yellow; below 335 ft, some very fine sand and limestone grains.....	328.0	340.0
Clay, slightly calcareous, mottled light olive gray to light brownish yellow, few limestone grains....	340.0	350.0
Clay, slightly calcareous, light yellow brown with a little light gray.....	350.0	356.0
Clay, yellow brown; contains limestone, ironstone, and quartz.....	356.0	357.4
<b>Cretaceous System - Upper Cretaceous Series - Montana Group:</b>		
<b>Pierre Formation:</b>		
Shale, clayey, slightly calcareous, light medium yellow gray to light medium yellow.....	357.4	366.0
Shale, clayey, slightly calcareous, very dark gray with yellowish brown.....	366.0	370.0

**Test Hole #30-A-59  
(28N-8W-31cccc)  
Antelope County**

Location: SW SW SW SW Sec. 31, T. 28 N., R. 8 W., approximately 166 feet east and 6 feet north of the southwest corner.  
 Ground elevation: 1,953 ft. (t). (Ewing, 7.5 min. quadrangle)  
 Depth to water: 98.70 ft. (8-26-59)

	<u>Depth, in feet</u>	
	From	To
<b>Quaternary System, undifferentiated:</b>		
Road fill; silt, very sandy, medium brown; sand is very fine.....	0.0	0.5
Silt, very sandy, medium dark brown; sand is very fine to fine; from 1 to 2 ft; sand is very fine to coarse, some fine gravel; below 2 ft, sand is very fine to medium, below 3 ft, some coarse and trace of very coarse.....	0.5	5.0
Silt, moderately sandy, medium light brown; sand is very fine, below 9 ft, some limy nodes.....	5.0	16.0
Silt, moderately sandy, slightly clayey, yellowish brown; sand is very fine; below 18 ft, in places limy zones, below 19 ft, medium brown.....	16.0	31.0
Silt, slightly clayey, slightly sandy, slightly calcareous, light medium brown, some medium brown; below, 35 ft, very to in part moderately calcareous.....	31.0	39.0
Silt, slightly clayey, medium brown, in part light medium brown.....	39.0	60.0
Silt, slightly clayey, light medium olive gray; below 65 ft, light olive gray.....	60.0	69.0
Silt, slightly clayey, slightly sandy, light medium olive gray; sand is very fine; below 72 ft, some fine sand.....	69.0	75.0
Sand, very silty; sand is very fine to coarse, some very coarse.....	75.0	77.0
Silt, moderately sandy, light olive gray; sand is very fine to fine, some medium; below 78 ft, trace coarse.....	77.0	81.0
Silt, moderately clayey, slightly sandy, light olive gray; sand is very fine to fine; below 88 ft, some medium sand.....	81.0	90.0
Sand, gravelly; fine sand to medium gravel; contains interbedded silt lenses.....	90.0	93.0
Silt, very sandy, light olive gray; sand is very		



fine to medium, some coarse.....	93.0	94.0
Sand, gravelly; fine sand to coarse gravel; below 100 ft, less coarse gravel.....	94.0	112.0
Silt, moderatley clayey, moderately sandy, light medium olive gray; sand is very fine to medium....	112.0	116.0
Sand, gravelly; fine sand to medium gravel; below 125 ft, some coarse gravel.....	116.0	145.0
Sand, gravelly; fine sand to medium gravel; below 160 ft, some coarse gravel.....	145.0	170.0
Sand, gravelly; fine sand to fine gravel, some medium gravel.....	170.0	196.0
<b>Tertiary System - Miocene Series - Ogallala Group:</b>		
Silt, very sandy, slightly clayey, light medium olive gray; sand is very fine to fine.....	196.0	202.0
Sand, very fine to medium, trace coarse; below 205 ft, sand is very fine to fine, some medium; contains rootlets.....	202.0	215.0
Sandstone to sand, sand is very fine to fine, trace medium; contains rootlets; below 220 ft, sand is very fine to medium, trace coarse; from 227.5 to 228 ft, silt lens; below 230 ft, sand is very fine to fine.....	215.0	233.0
Silt, coarse textured, light olive green.....	233.0	235.0
Sand, very fine to fine; contains rootlets; below 240 ft, some medium sand.....	235.0	253.0
Marl, very sandy; sand is very fine to fine.....	253.0	255.0
Silt, very sandy, light olive green; sand is very fine to fine.....	255.0	260.0
Sand, very fine to fine, some medium; contains rootlets and silt lenses.....	260.0	275.0
Sand, very fine to medium; below 280 ft, some medium; below 285 ft, some rootlets.....	275.0	330.0
Silt, very sandy, slightly clayey, light olive gray; sand is very fine to fine; below 335 ft, inter- bedded siltstone.....	330.0	339.0
<b>Tertiary System - Oligocene Series - White River Group:</b>		
<b>Chadron Formation:</b>		
Siltstone, clayey, bentonitic, light grayish green..	339.0	341.0
<b>Cretaceous System - Upper Cretaceous Series - Montana Group:</b>		
<b>Pierre Formation:</b>		
Shale, clayey, light yellow to grayish green.....	341.0	380.0